University of Colorado
Boulder

CP142463 - CHEM – 3rd and 4TH FLOOR – ATMOSPHERIC LAB

CP160825 – DM – CHEM UPGRADE FUME HOOD CONTROLS

100% CONSTRUCTION DOCUMENTS – REBID

SPECIFICATIONS
VOLUME I

2 JULY 2013

ARCHITECTURE
URBAN DESIGN
INTERIOR DESIGN

3003 Larimer St, Denver, CO 80205
P: 303-861-5704 F: 303.861.9230
www.ozarch.com

PROJECT	**CP142463 CHEM** **3RD AND 4TH FLOOR - ATMOSPHERIC LABS** **CP160825 DM** **CHEM UPGRADE FUME HOOD CONTROLS** University of Colorado at Boulder Boulder, Colorado
OWNER	**UNIVERSITY OF COLORADO AT BOULDER** **ATMOSPHERIC LAB** Boulder, Colorado 80309 (303) 492-1367 Contact: Larry Hill
ARCHITECT	**OZ ARCHITECTURE OF DENVER, INC.** 3003 Larimer Street Denver, Colorado 80205 (303) 861-5704; (303) 861-9230 FAX Contact: Steve Brooks
MECHANICAL/PLUMBING/ELECTRICAL	**THE RMH GROUP, INC.** 12600 West Colfax Avenue, Suite A-400 Lakewood, Colorado 80215 (303) 239-0909; (303) 235-0218 FAX Contact: Tony Lott, Mechanical/Plumbing Don Cherry, Electrical
SPECIFICATIONS	**ASCS, INC.** 8704 Yates Drive, Suite 225 Westminster, Colorado 80031 (303) 650-0500; (303) 650-1219 FAX Contact: Jon Willis

TABLE OF CONTENTS

PROCUREMENT AND CONTRACTING REQUIREMENTS GROUP

DIVISION 00 - PROCUREMENT REQUIREMENTS

DIVISION 00 - CONTRACTING REQUIREMENTS

Division 00 - Contracting Requirements (Continued)

SPECIFICATIONS GROUP - GENERAL REQUIREMENTS SUBGROUP

DIVISION 01 - GENERAL REQUIREMENTS

DIVISION 02 - EXISTING CONDITIONS

Division 23 - Heating, Ventilating, and Air-Conditioning (HVAC) (Continued)

DIVISION 27 - COMMUNICATIONS

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

DIVISION 29 (Not Assigned)

SPECIFICATIONS GROUP - SITE AND INFRASTRUCTURE SUBGROUP

DIVISIONS 30 THROUGH 49 (Not Applicable)

ADVERTISEMENT FOR BIDS
This is a two step AFB with prequalification required.
State of Colorado
University of Colorado
Notice Number: 12-23

Project No: CP 142463

Project Title: CHEM – 4th FL – Atmospheric Lab

Estimated Construction Cost: $1,461,000.00

Project Description

The design features two smog chambers with strict temperature, humidity, and lighting controls. A source room allows for the input of precise amounts of specific pollutants into chamber number one. Open space around both chambers and on the floor above provides ample space for instrumentation to record results. Office space is conveniently located adjacent to the open lab space for researchers.

Existing wet lab bench work will be removed to make room for the new lab. Ductwork within the spaces will be largely reconfigured, but existing HVAC units will continue to serve the general lab and office space. New specialized HVAC equipment will be provided to accommodate the rigorous environmental requirements of the smog chambers. Laboratory office space will be walled off to provide acoustical separation from the loud laboratory environment, but windows will be provided for visual connection.

Project Information

To be considered for pre-qualification to bid this project obtain a pre-qualification packet from the web site on August 16, 2012. Notice 12-23 –
http://www.colorado.edu/facilitiesmanagement/pdc/construction/open.html

Qualifications Due

Date & Time: **August 29, 2012 2:00 PM**

Address: **University of Colorado Boulder**
Department of Facilities Management
Research Laboratory No. 2
1540 30th Street, Third Floor
Boulder, CO 80309-0453

Comments: **Submittals through U.S. Postal Mail should use campus box number:**

Campus Box 453 UCB, Boulder, CO 80309-0453 rather than street address.

Point of Contact

Name: **Larry Hill, Project Manager**

Agency: **University of Colorado Boulder**

Phone: **303-492-1367**

Fax: **303-492-4082**

Email: **Lawrence.hill@colorado.edu**

This Notice is also available on the web at www.colorado.gov/dpa/dfp/sbrep

Media of Publication: The Daily Journal

Publication Date: August 16, 2012

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

INFORMATION FOR BIDDERS

Institution or Agency: University of Colorado Boulder
Project No./Name: CP 142463 – CHEM – 4th FL – Atmospheric Lab

1. **BID FORM:** Bidders are required to use the Bid form attached to the bidding documents. Each bidder is required to bid on all alternates and indicate the time from the date of the Notice to Proceed to Substantial Completion in calendar days, and in addition, the bidder is required to indicate the period of time to finally complete the project from Substantial Completion to Final Acceptance, also in calendar days. Bids indicating times for Substantial Completion and Final Acceptance in excess of the number of days indicated in the Advertisement for Bids for completion of the entire Project may be found non-responsive and may be rejected. The bid shall not be modified or conditioned in any manner. Bids shall be submitted in sealed envelopes bearing the address and information shown below. If a bid is submitted by mail, this aforementioned sealed envelope should be enclosed in an outer envelope and sent to the following addressee:

   INSERT NAME OF AGENCY AND ADDRESS WHERE BID SHOULD BE DELIVERED
   The outside of the sealed inner envelope should bear the following information:

   Project # CP 142463
   Project Name CHEM – 4th FL – Atmospheric Lab
   Name and Address of Bidder
   Date of Opening July 18, 2013
   Time of Opening 10:00 AM

   A bid with missing or inconsistent information may be considered non-responsive and may not be evaluated. The University will be the sole judge in determining the acceptability of an offer. **The University also reserves the right to reject any or all bids in part or in whole and to waive technicalities**. Any decision shall be considered final

2. **INCONSISTENCIES AND OMISSIONS:** Bidders may request clarification of any seeming inconsistencies, or matters seeming to require explanation, in the bidding documents at least three (3) business days prior to the time set for the opening of Bids. Decisions of major importance on such matters will be issued in the form of addendum.

3. **APPLICABLE LAWS AND REGULATIONS:** The bidder's attention is called to the fact that all work under this Contract shall comply with the provisions of all state and local laws, approved state building codes, ordinances and regulations which might in any manner affect the work to be done or those to be employed in or about the work. Attention is also called to the fact that the use of labor for work shall be governed by the provisions of Colorado law which are hereinafter set forth in Articles 27 and 52E of the GENERAL CONDITIONS.

4. **UNAUTHORIZED IMMIGRANTS:** Note that the Special Provisions of the General Conditions of the Contract includes the following language: PUBLIC CONTRACTS FOR SERVICES - CRS 8-17.5-101 and PUBLIC CONTRACTS WITH NATURAL PERSONS - 24-76.5-101. The Contractor certifies that the Contractor shall comply with the provisions of CRS 8-17.5-101 et seq. The Contractor shall not knowingly employ or contract with an illegal alien to perform work under this contract or enter into a contract with a subcontractor that fails to certify to the Contractor that the subcontractor shall not knowingly employ or contract with an illegal alien to perform work under this contract. The Contractor represents, warrants, and agrees that it (i) has verified that it does not employ any illegal aliens, through participation in the Basic Pilot Employment Verification Program administered by the Social Security Administration and Department of Homeland Security, and (ii) otherwise will comply with the requirements of CRS 8-17.5-102(2)(b). The

Contractor shall comply with all reasonable requests made in the course of an investigation under CRS 8-17.5-102 by the Colorado Department of Labor and Employment. If the Contractor fails to comply with any requirement of this provision or CRS 8-17.5-101 et seq., the State may terminate this contract for breach and the Contractor shall be liable for actual and consequential damages to the State.

A Contractor that operates as a sole proprietor hereby swears or affirms under penalty of perjury that the Contractor (i) is a citizen of the United States or otherwise lawfully present in the United States pursuant to federal law, (ii) shall comply with the provisions of CRS 24-76.5-101 et seq, and (iii) shall produce one of the forms of identification required by CRS 24-76.5-103 prior to the effective date of this Contract. Except where exempted by federal law and except as provided in CRS 24-76.5-103(3), a Contractor that receives federal or state funds under this contract must confirm that any individual natural person eighteen years of age or older is lawfully present in the United States pursuant to CRS 24-76.5-103(4) if such individual applies for public benefits provided under this contract.

2. **TAXES:** The bidder's attention is called to the fact that the Bid submitted shall exclude all applicable federal excise or manufacturers' taxes and all state sales and use taxes as hereinafter set forth in Article 9C of the GENERAL CONDITIONS.

3. **OR EQUAL:** The words "OR EQUAL" are applicable to all specifications and drawings relating to materials or equipment specified. Any material or equipment that will fully perform the duties specified, will be considered "equal", provided the bid submits proof that such material or equipment is of equivalent substance and function and is approved, in writing. Requests for the approval of "or equal" shall be made in writing at least five (5) business days prior to bid opening. During the bidding period, all approvals shall be issued by the Architect/Engineer in the form of addenda at least two (2) business days prior to the bid opening date.

4. **ADDENDA**: Owner/architect initiated addenda shall not be issued later than two (2) business days prior to bid opening date. All addenda shall become part of the Contract Documents and receipt must be acknowledged on the Bid form.

5. **METHOD OF AWARD - LOWEST RESPONSIBLE BIDDER:** If the bidding documents for this project require alternate prices, additive and/or deductible alternates shall be listed on the alternates bid form provided by the Principal Representative. Bidders should note the Method of Award is applicable to this Bid as stated below.

   A. **DEDUCTIBLE ALTERNATES:** The lowest responsible Bid, taking into account the Colorado resident bidder preference provision of Colorado law, will be determined by and the contract will be awarded on the base bid combined with deductible alternates, deducted in numerical order in which they are listed in the alternates bid form provided by the Principal Representative. The subtraction of alternates shall result in a sum total within available funds. If this bid exceeds such amount, the right is reserved to reject all bids. An equal number of alternates shall be subtracted from the base bid of each bidder within funds available for purposes of determining the lowest responsible bidder.

   B. **ADDITIVE ALTERNATES:** The lowest responsible Bid, taking into account the Colorado resident bidder preference provision of Colorado law, will be determined by and the contract will be awarded on the base bid plus all additive alternates added in the numerical order in which they are listed in the alternates bid form provided by the Principal Representative. The addition of alternates shall result in a sum total within available funds. If this bid exceeds such amount, the right is reserved to reject all bids. An equal number of alternates shall be added to the base bid of each bidder within funds available for purposes of determining the lowest responsible bidder.

   C. **DEDUCTIBLE AND ADDITIVE ALTERNATES:** Additive alternates will not be used if deductible alternates are used and deductible alternates will not be used if additive alternates are used.

6. **NOTICE OF CONTRACTOR'S SETTLEMENT** – Agencies/institutions must indicate in the initial Solicitation (Advertisement for Bids, Documented Quotes, or Requests for Proposals) whether settlement will be advertised in newspapers or electronic media.

The Advertisement for Bids can be located at the web site: www.colorado.gov/dpa/dfp/sbrep/constructdesign.htm
(Click on the link below the second paragraph Colorado Construction and Design Notices)

7. CONTRACTOR QUALIFICATIONS:

A. Prequalified Contractors are: Swinerton Builders- Krische Construction- GH Phipps Construction Companies- W.E. O'Neil Construction- Kiewit Building Group
B. Mechanical: JCOR Mechanical- Legacy Mechanical- Adams County Plumbing & Heating
C. Electrical: Sturgeon Electric- Guarantee Electric- Weifield Group Contracting

8. **SITE ACCESS:** Contractors / Bidders may schedule a time subsequent to the Site Inspection / Pre-bid Conference to take measurements or further observe existing conditions by contacting:

Larry Hill, Project Manager / Email address: Lawrence.hill@colorado.edu
University of Colorado Boulder
Department of Facilities Management
(303) 492-1367 office
(303) 492-4082 fax

9. **BID SCHEDULE:**

Date for Drawings and Specs available: July 8, 2013
Mandatory Pre bid meeting: July 8, 2013- 9:00 am Cristol Chemistry Room 350
Bids due: 7-18-2013 10:00 AM
Work to start: 8-2-2013

END

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

INFORMATION FOR BIDDERS

Institution or Agency: University of Colorado Boulder
Project No./Name: CP 160825 –DM- CHEM – Upgrade Fume Hood Controls

1. **BID FORM:** Bidders are required to use the Bid form attached to the bidding documents. Each bidder is required to bid on all alternates and indicate the time from the date of the Notice to Proceed to Substantial Completion in calendar days, and in addition, the bidder is required to indicate the period of time to finally complete the project from Substantial Completion to Final Acceptance, also in calendar days. Bids indicating times for Substantial Completion and Final Acceptance in excess of the number of days indicated in the Advertisement for Bids for completion of the entire Project may be found non-responsive and may be rejected. The bid shall not be modified or conditioned in any manner. Bids shall be submitted in sealed envelopes bearing the address and information shown below. If a bid is submitted by mail, this aforementioned sealed envelope should be enclosed in an outer envelope and sent to the following addressee:

   INSERT NAME OF AGENCY AND ADDRESS WHERE BID SHOULD BE DELIVERED
   The outside of the sealed inner envelope should bear the following information:

   Project # CP160825
   Project Name DM-CHEM – Upgrade Fume Hood Controls
   Name and Address of Bidder
   Date of Opening July 18, 2013
   Time of Opening 10:00 AM

   A bid with missing or inconsistent information may be considered non-responsive and may not be evaluated. The University will be the sole judge in determining the acceptability of an offer. **The University also reserves the right to reject any or all bids in part or in whole and to waive technicalities**. Any decision shall be considered final

2. **INCONSISTENCIES AND OMISSIONS:** Bidders may request clarification of any seeming inconsistencies, or matters seeming to require explanation, in the bidding documents at least three (3) business days prior to the time set for the opening of Bids. Decisions of major importance on such matters will be issued in the form of addendum.

3. **APPLICABLE LAWS AND REGULATIONS:** The bidder's attention is called to the fact that all work under this Contract shall comply with the provisions of all state and local laws, approved state building codes, ordinances and regulations which might in any manner affect the work to be done or those to be employed in or about the work. Attention is also called to the fact that the use of labor for work shall be governed by the provisions of Colorado law which are hereinafter set forth in Articles 27 and 52E of the GENERAL CONDITIONS.

4. **UNAUTHORIZED IMMIGRANTS:** Note that the Special Provisions of the General Conditions of the Contract includes the following language: PUBLIC CONTRACTS FOR SERVICES - CRS 8-17.5-101 and PUBLIC CONTRACTS WITH NATURAL PERSONS - 24-76.5-101. The Contractor certifies that the Contractor shall comply with the provisions of CRS 8-17.5-101 et seq. The Contractor shall not knowingly employ or contract with an illegal alien to perform work under this contract or enter into a contract with a subcontractor that fails to certify to the Contractor that the subcontractor shall not knowingly employ or contract with an illegal alien to perform work under this contract. The Contractor represents, warrants, and agrees that it (i) has verified that it does not employ any illegal aliens, through participation in the Basic Pilot Employment Verification Program administered by the Social Security Administration and Department of Homeland Security, and (ii) otherwise will comply with the requirements of CRS 8-17.5-102(2)(b). The

Contractor shall comply with all reasonable requests made in the course of an investigation under CRS 8-17.5-102 by the Colorado Department of Labor and Employment. If the Contractor fails to comply with any requirement of this provision or CRS 8-17.5-101 et seq., the State may terminate this contract for breach and the Contractor shall be liable for actual and consequential damages to the State.

A Contractor that operates as a sole proprietor hereby swears or affirms under penalty of perjury that the Contractor (i) is a citizen of the United States or otherwise lawfully present in the United States pursuant to federal law, (ii) shall comply with the provisions of CRS 24-76.5-101 et seq, and (iii) shall produce one of the forms of identification required by CRS 24-76.5-103 prior to the effective date of this Contract. Except where exempted by federal law and except as provided in CRS 24-76.5-103(3), a Contractor that receives federal or state funds under this contract must confirm that any individual natural person eighteen years of age or older is lawfully present in the United States pursuant to CRS 24-76.5-103(4) if such individual applies for public benefits provided under this contract.

2. **TAXES:** The bidder's attention is called to the fact that the Bid submitted shall exclude all applicable federal excise or manufacturers' taxes and all state sales and use taxes as hereinafter set forth in Article 9C of the GENERAL CONDITIONS.

3. **OR EQUAL:** The words "OR EQUAL" are applicable to all specifications and drawings relating to materials or equipment specified. Any material or equipment that will fully perform the duties specified, will be considered "equal", provided the bid submits proof that such material or equipment is of equivalent substance and function and is approved, in writing. Requests for the approval of "or equal" shall be made in writing at least five (5) business days prior to bid opening. During the bidding period, all approvals shall be issued by the Architect/Engineer in the form of addenda at least two (2) business days prior to the bid opening date.

4. **ADDENDA**: Owner/architect initiated addenda shall not be issued later than two (2) business days prior to bid opening date. All addenda shall become part of the Contract Documents and receipt must be acknowledged on the Bid form.

5. **METHOD OF AWARD - LOWEST RESPONSIBLE BIDDER:** If the bidding documents for this project require alternate prices, additive and/or deductible alternates shall be listed on the alternates bid form provided by the Principal Representative. Bidders should note the Method of Award is applicable to this Bid as stated below.

   A. **DEDUCTIBLE ALTERNATES:** The lowest responsible Bid, taking into account the Colorado resident bidder preference provision of Colorado law, will be determined by and the contract will be awarded on the base bid combined with deductible alternates, deducted in numerical order in which they are listed in the alternates bid form provided by the Principal Representative. The subtraction of alternates shall result in a sum total within available funds. If this bid exceeds such amount, the right is reserved to reject all bids. An equal number of alternates shall be subtracted from the base bid of each bidder within funds available for purposes of determining the lowest responsible bidder.

   B. **ADDITIVE ALTERNATES:** The lowest responsible Bid, taking into account the Colorado resident bidder preference provision of Colorado law, will be determined by and the contract will be awarded on the base bid plus all additive alternates added in the numerical order in which they are listed in the alternates bid form provided by the Principal Representative. The addition of alternates shall result in a sum total within available funds. If this bid exceeds such amount, the right is reserved to reject all bids. An equal number of alternates shall be added to the base bid of each bidder within funds available for purposes of determining the lowest responsible bidder.

   C. **DEDUCTIBLE AND ADDITIVE ALTERNATES:** Additive alternates will not be used if deductible alternates are used and deductible alternates will not be used if additive alternates are used.

6. **NOTICE OF CONTRACTOR'S SETTLEMENT** – Agencies/institutions must indicate in the initial Solicitation (Advertisement for Bids, Documented Quotes, or Requests for Proposals) whether settlement will be advertised in newspapers or electronic media.

The Advertisement for Bids can be located at the web site: www.colorado.gov/dpa/dfp/sbrep/constructdesign.htm (Click on the link below the second paragraph Colorado Construction and Design Notices)

7. CONTRACTOR QUALIFICATIONS:

A. Prequalified Contractors are:Krische Construction- GH Phipps Construction Companies- W.E. O'Neil Construction- Kiewit Building Group
B. Mechanical: JCOR Mechanical- Legacy Mechanical- Adams County Plumbing & Heating
C. Electrical: Sturgeon Electric- Guarantee Electric- Weifield Group Contracting

8. **SITE ACCESS:** Contractors / Bidders may schedule a time subsequent to the Site Inspection / Pre-bid Conference to take measurements or further observe existing conditions by contacting:

Larry Hill, Project Manager / Email address: Lawrence.hill@colorado.edu
University of Colorado Boulder
Department of Facilities Management
(303) 492-1367 office
(303) 492-4082 fax

9. **BID SCHEDULE:**

Date for Drawings and Specs available: July 8, 2013
Mandatory Pre bid meeting: July 8, 2013- 9:00 am Cristol Chemistry Room 350
Bids due: July 18, 2013 10:00 AM
Work to start: Aug. 2, 2013

END

City of Boulder
Sales/Use Tax Division

Prepaid Tax Estimate for Contractors Working on Construction Projects Not Requiring a City Permit

To all Contractors working within the City of Boulder:

Under Boulder's Revised Code, the contractor is deemed to be the consumer of materials used in the construction project. Contractors may not avoid payment of the City of Boulder sales or use tax by placing provisions in a construction agreement or by using the name of a tax-exempt entity on an invoice or purchase order, regardless that the contractor is indicated thereon as the agent of a tax-exempt entity. **No exemption certificate issued by the Colorado Department of Revenue or any other taxing authority shall be recognized as a basis for exemption from sales or use taxes.**

Estimated use tax must be remitted to the City of Boulder prior to the start of the project. The tax is computed on the full contract price of the project. Follow these steps to compute and remit the sales/use tax to the City:

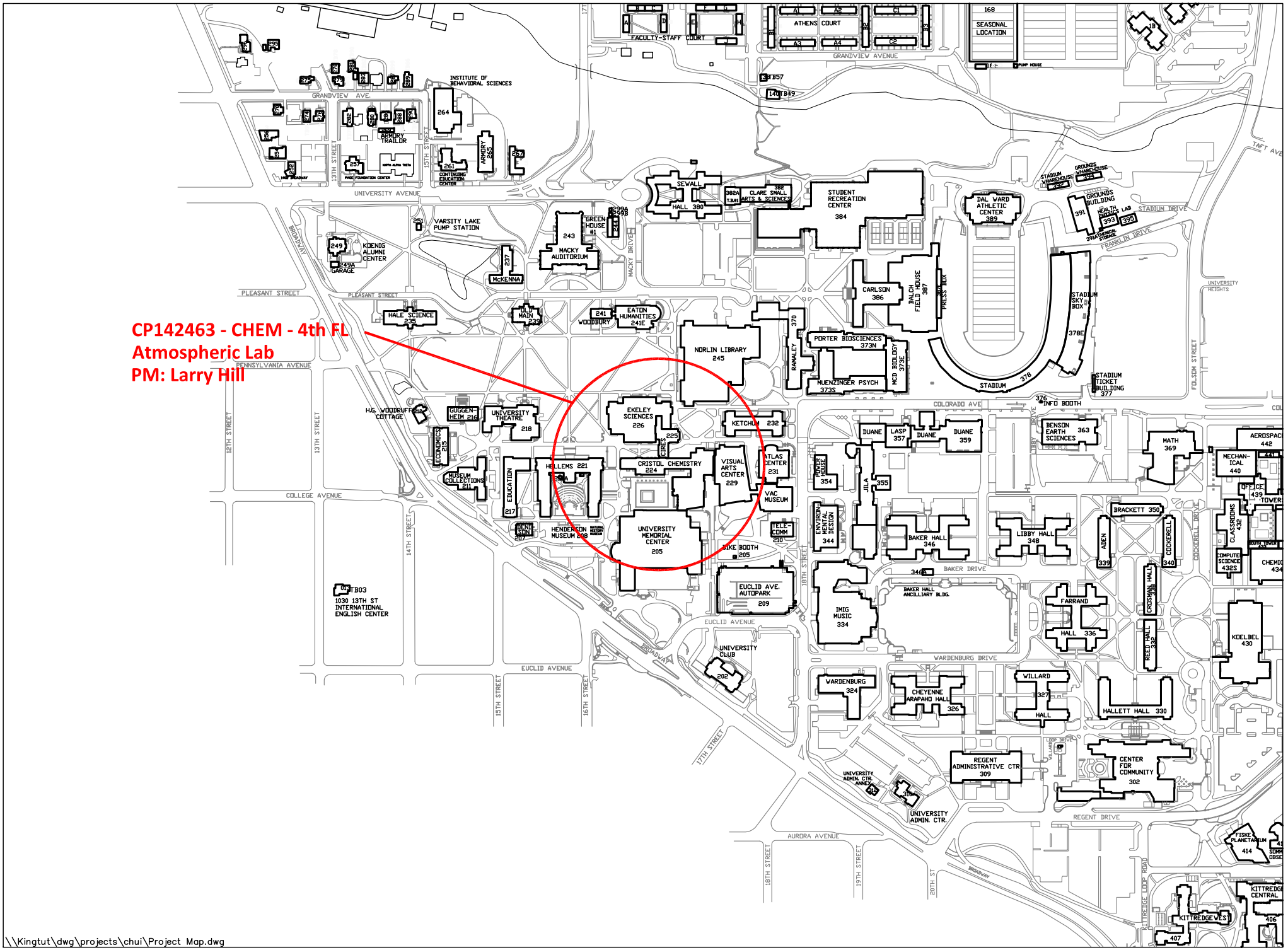
1. Multiply the full contract price by 0.5 and then multiply this result by the tax rate of 3.41% (0.0341). This is the tax that is due to the City prior to the start of the project.
2. Remit the tax to the attention of Ed Kaiser, Sales Tax Department, 1777 Broadway, P.O. Box 791, Boulder, CO 80306-0791 along with a copy of this completed form.
3. At the completion of the project the construction company has two options for closing out the project with the city.
    - Use the formula in (1.) above to compute the final tax due based on the final contract price (including all change orders). Remit the additional tax due or file a request for refund with the City; or
    - Request that the city perform a full audit. Contact **Ed Kaiser** at **303-441-3921** or kaisere@bouldercolorado.gov to inform the City of which option you have chosen.

Contractor Name		**Address**
Phone	**Email**	**Contact Person**
Project Name		**Project Address**
Full Project Contract Price		**(A)**
Multiply (A) by 0.50 **(This is the material cost estimate)**		**(B)**
Multiply (B) by 0.0341 **This is the City of Boulder tax due**		**(C)**

(C) is the amount of tax due to the City of Boulder. If you have any questions regarding sales/use tax or this process, contact Ed Kaiser at the above phone number or address.

Date received: _____ City Authority _____

Signature: _____


CP142463 - CHEM - 4th FL
Atmospheric Lab
PM: Larry Hill
\\Kingtut\dwg\projects\chui\Project Map.dwg

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

BID

Institution/Agency: University of Colorado Boulder
Project No./Name: CP 142463 – CHEM – 4th FL –Atmospheric Lab

Bidder Acknowledges Receipt of Addenda Numbers: _____

Base Bid $ _____

(Refer to Bid Alternate Form SC-6.13.1 Attached, If Applicable)

Bidder's Time of Completion

a. Time Period from Notice to Proceed to Substantial Completion: 196 calendar days

b. Time Period from Substantial Completion to Final Acceptance: 10 calendar days

c. Total Time of Completion of Entire Project (a + b): 206 calendar days

1. **BID:** Pursuant to the advertisement by the State of Colorado dated various on prequalification 2012 the undersigned bidder hereby proposes to furnish all the labor and materials and to perform all the work required for the complete and prompt execution of everything described or shown in or reasonably implied from the Bidding Documents, including the Drawings and Specifications, for the work and for the base bid indicated above. Bidders should include all taxes that are applicable.
2. **EXAMINATION OF DOCUMENTS AND SITE:** The bidder has carefully examined the Bidding Documents, including the Drawings and Specifications, and has examined the site of the Work, so as to make certain of the conditions at the site and to gain a clear understanding of the work to be done.
3. **PARTIES INTERESTED IN BID:** The bidder hereby certifies that the only persons or parties interested in this Bid are those named herein, and that no other bidder or prospective bidder has given any information concerning this Bid.
4. **BID GUARANTEE:** This Bid is accompanied by the required Bid Guarantee. You are authorized to hold said Bid Guarantee for a period of not more than thirty (30) days after the opening of the Bids for the work above indicated, unless the undersigned bidder is awarded the Contract, within said period, in which event the Director, State Buildings Programs, may retain said Bid Guarantee, until the undersigned bidder has executed the required Agreement and furnished the required Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance and Affidavit Regarding Unauthorized Immigrants.
5. **TIME OF COMPLETION: The bidder agrees to achieve Substantial Completion of the Project from the date of the Notice to Proceed within the number of calendar days entered above, and in addition, further agrees that the period between Substantial Completion and Final Acceptance of the Project will not exceed the number of calendar days noted above**. If awarded the Work, the bidder agrees to begin performance within ten (10) days from the date of the Notice to Proceed subject to Article 46, Time of Completion and Liquidated Damages of The General Conditions of the Contract, and agrees to prosecute the Work with due diligence to completion. The bidder represents that Article 54D has been reviewed to determine the type and amount of any liquidated damages that may be specified for this contract.
6. **EXECUTION OF DOCUMENTS:** The bidder understands that if this Bid is accepted, bidder must execute the required Agreement and furnish the required Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance and Affidavit Regarding Unauthorized Immigrants within ten (10) days from the date of the Notice of Award, and that the bidder will be required to sign to acknowledge and accept the Contract Documents, including the Drawings and Specifications.
7. **ALTERNATES:** Refer to the Information for Bidders (SC-6.12) for Method of Award for Alternates and use State Form SBP-6.13.1 Bid Alternates form to be submitted with this bid form if alternates are requested by the institution/agency in the solicitation documents.
8. **Submit wage rates** (direct labor costs) for prime contractor and subcontractor as requested by the institution/agency in the solicitation documents.
9. **The right is reserved to waive informalities and to reject any and all Bids.**

Dated this _____ Day of _____ , 2013

THE BIDDER:

Email address:

Company Name

Address (including city, state and zip)
Phone number:

Signature

Name (Print) and Title

SIGNATURES: If the Bid is being submitted by a Corporation, the Bid should be signed by an officer, i.e., President or Vice-President. If a sole proprietorship or a partnership is submitting the Bid, the Bid shall so indicate and be properly signed.

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

BID

Institution/Agency: University of Colorado Boulder
Project No./Name: CP160825-DM – CHEM – Upgrade Fume Hood Controls

Bidder Acknowledges Receipt of Addenda Numbers: _____

Base Bid $ _____
(Refer to Bid Alternate Form SC-6.13.1 Attached, If Applicable)

Bidder's Time of Completion

a. Time Period from Notice to Proceed to Substantial Completion: 196 calendar days
b. Time Period from Substantial Completion to Final Acceptance: 10 calendar days
c. Total Time of Completion of Entire Project (a + b): 206 calendar days

1. **BID:** Pursuant to the advertisement by the State of Colorado dated various on prequalification 2012 the undersigned bidder hereby proposes to furnish all the labor and materials and to perform all the work required for the complete and prompt execution of everything described or shown in or reasonably implied from the Bidding Documents, including the Drawings and Specifications, for the work and for the base bid indicated above. Bidders should include all taxes that are applicable.
2. **EXAMINATION OF DOCUMENTS AND SITE:** The bidder has carefully examined the Bidding Documents, including the Drawings and Specifications, and has examined the site of the Work, so as to make certain of the conditions at the site and to gain a clear understanding of the work to be done.
3. **PARTIES INTERESTED IN BID:** The bidder hereby certifies that the only persons or parties interested in this Bid are those named herein, and that no other bidder or prospective bidder has given any information concerning this Bid.
4. **BID GUARANTEE:** This Bid is accompanied by the required Bid Guarantee. You are authorized to hold said Bid Guarantee for a period of not more than thirty (30) days after the opening of the Bids for the work above indicated, unless the undersigned bidder is awarded the Contract, within said period, in which event the Director, State Buildings Programs, may retain said Bid Guarantee, until the undersigned bidder has executed the required Agreement and furnished the required Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance and Affidavit Regarding Unauthorized Immigrants.
5. **TIME OF COMPLETION: The bidder agrees to achieve Substantial Completion of the Project from the date of the Notice to Proceed within the number of calendar days entered above, and in addition, further agrees that the period between Substantial Completion and Final Acceptance of the Project will not exceed the number of calendar days noted above**. If awarded the Work, the bidder agrees to begin performance within ten (10) days from the date of the Notice to Proceed subject to Article 46, Time of Completion and Liquidated Damages of The General Conditions of the Contract, and agrees to prosecute the Work with due diligence to completion. The bidder represents that Article 54D has been reviewed to determine the type and amount of any liquidated damages that may be specified for this contract.
6. **EXECUTION OF DOCUMENTS:** The bidder understands that if this Bid is accepted, bidder must execute the required Agreement and furnish the required Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance and Affidavit Regarding Unauthorized Immigrants within ten (10) days from the date of the Notice of Award, and that the bidder will be required to sign to acknowledge and accept the Contract Documents, including the Drawings and Specifications.
7. **ALTERNATES:** Refer to the Information for Bidders (SC-6.12) for Method of Award for Alternates and use State Form SBP-6.13.1 Bid Alternates form to be submitted with this bid form if alternates are requested by the institution/agency in the solicitation documents.
8. **Submit wage rates** (direct labor costs) for prime contractor and subcontractor as requested by the institution/agency in the solicitation documents.
9. **The right is reserved to waive informalities and to reject any and all Bids.**

Dated this _____ Day of _____ , 2013

THE BIDDER:

Email address:

Company Name

Address (including city, state and zip)
Phone number:

Signature

Name (Print) and Title

SIGNATURES: If the Bid is being submitted by a Corporation, the Bid should be signed by an officer, i.e., President or Vice-President. If a sole proprietorship or a partnership is submitting the Bid, the Bid shall so indicate and be properly signed.

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

BID ALTERNATES FORM

Institution/Agency: University of Colorado Boulder

Project No./Name: **CP 142463 - CHEM – 4th FL – Atmospheric Lab**

Additive alternates will not be used if deductible alternates are used and deductible alternates will not be used if additive alternates are used.

Additive Alternates (AA)

Refer to specification section 01 23 00 for descriptions of add alternates. If the add alternates are accepted, the base bid would be modified by the amount entered by the bidder.

A.A. No. 1	Install a total of four (4) AADCO Clean Air Generators instead of two (2).	Add $ _____
A.A. No. 2	Add Vibration Mounts on the compressors.	Add $ _____
A.A. No. 3	Provide and install extended Electrical Bus on the 4th Floor.	Add $ _____
A.A. No. 4	Add the two (2) projector and two (2) screens in the labs.	Add $ _____
A.A. No. 5	Add all Cabinets on the West wall of the 4th floor.	Add $ _____
A.A. No. 6	Add demo and new work for rooms 346, 349C, 433, 435, 439 as indicated on drawings.	Add $ _____

THE BIDDER:

_____
Company Name

_____
Signature Date

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

BID ALTERNATES FORM

Institution/Agency: University of Colorado Boulder

Project No./Name: **CP 160825 DM-CHEM Upgrade Fume Hood Controls**

Additive alternates will not be used if deductible alternates are used and deductible alternates will not be used if additive alternates are used.

Alternates

Refer to specification section 01 23 00 for descriptions of add alternates. If the add alternates are accepted, the base bid would be modified by the amount entered by the bidder.

Alternate No. 7	Add doors, hardware, glazing, painting, flooring,, fire protection and lighting in Rooms 346, 349B, 433, 435, 439 in association with CP142463 Add Alternate No.6	Add $ _____

THE BIDDER:

_____
Company Name

_____
Signature Date

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

BID BOND

Institution/Agency: University of Colorado Boulder

Project No./Name: CP 142463 – CHEM – 4th FL –Atmospheric Lab

KNOW ALL MEN BY THESE PRESENTS:

WHEREAS, _____ hereinafter called the "PRINCIPAL", is submitting a PROPOSAL for the above described project, to the STATE OF COLORADO, hereinafter called the "OBLIGEE".

WHEREAS, the Advertisement for Bids has required as a condition of receiving the Proposals that the Principal submit with the PROPOSAL GUARANTY in an amount not less than five per cent (5%) of the Proposal, which sum it is specifically agreed is to be forfeited as Liquidated Damages in the event that the Principal defaults in his obligation as hereinafter specified, and, in pursuance of which Requirement, this Bid is made, executed and delivered.

NOW THEREFORE, the Principal and _____ a corporation of the State of _____ _____, duly authorized to transact business in Colorado, as Surety, are held and firmly bound unto the Obligee, in the sum of five per cent (5%) of the Principal's total bid price, lawful money of the United States for the payment of which sum, well and truly to be made to the Obligee, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

FURTHER THAT, a condition of the obligation that the Principal shall maintain his Proposal in full force and effect for thirty (30) days after the opening of the proposals for the project, or, if the Principal's Proposal is accepted, the Principal shall, within the prescribed time, execute the required Agreement, furnish the required Performance Bond, Labor and Material Payment Bond, Insurance Policy, Certificates of Insurance and Certification and Affidavit Regarding Illegal Aliens, then this obligation shall be null and void, otherwise it shall remain in full force and effect, and subject to forfeiture upon demand as Liquidated Damages.

IN WITNESS WHEREOF said Principal and Surety have executed this Bond, this _____ day of _____, A.D., 20___.

(Corporate Seal)

THE PRINCIPAL

_____
Company Name

ATTEST

_____
Address (including city, state and zip)

_____
Secretary

Phone number: _____

_____
Name (Print)

_____
Signature

_____
Name (Print) and Title

Email address: _____

SIGNATURES If the "Principal" is doing business as a Corporation, the Bid Bond shall be signed by an officer, i.e., President or Vice President. The signature of the officer shall be attested to by the Secretary and properly sealed.

If the "Principal" is an individual or a partnership, the Bid Bond shall so indicate and be properly signed.

(Corporate Seal)

THE SURETY

_____

_____
Secretary

By _____
Attorney-in-Fact

THIS BOND MUST BE ACCOMPANIED BY POWER OF ATTORNEY, EFFECTIVELY DATED.
FAILURE TO PROVIDE A PROPERLY EXECUTED BID BOND WITH A PROPERLY EXECUTED POWER OF ATTORNEY WILL RESULT IN THE BIDDER'S PROPOSAL BEING DEEMED NON-RESPONSIVE.

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

BID BOND

Institution/Agency: University of Colorado Boulder

Project No./Name: CP160825 DM-CHEM Upgrade Fume Hood Controls

KNOW ALL MEN BY THESE PRESENTS:

WHEREAS, _____ hereinafter called the "PRINCIPAL", is submitting a PROPOSAL for the above described project, to the STATE OF COLORADO, hereinafter called the "OBLIGEE".

WHEREAS, the Advertisement for Bids has required as a condition of receiving the Proposals that the Principal submit with the PROPOSAL GUARANTY in an amount not less than five per cent (5%) of the Proposal, which sum it is specifically agreed is to be forfeited as Liquidated Damages in the event that the Principal defaults in his obligation as hereinafter specified, and, in pursuance of which Requirement, this Bid is made, executed and delivered.

NOW THEREFORE, the Principal and _____ a corporation of the State of _____ _____, duly authorized to transact business in Colorado, as Surety, are held and firmly bound unto the Obligee, in the sum of five per cent (5%) of the Principal's total bid price, lawful money of the United States for the payment of which sum, well and truly to be made to the Obligee, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

FURTHER THAT, a condition of the obligation that the Principal shall maintain his Proposal in full force and effect for thirty (30) days after the opening of the proposals for the project, or, if the Principal's Proposal is accepted, the Principal shall, within the prescribed time, execute the required Agreement, furnish the required Performance Bond, Labor and Material Payment Bond, Insurance Policy, Certificates of Insurance and Certification and Affidavit Regarding Illegal Aliens, then this obligation shall be null and void, otherwise it shall remain in full force and effect, and subject to forfeiture upon demand as Liquidated Damages.

IN WITNESS WHEREOF said Principal and Surety have executed this Bond, this _____ day of _____, A.D., 20___.

(Corporate Seal)

ATTEST

_____
Secretary

_____
Name (Print)

THE PRINCIPAL

_____
Company Name

_____
Address (including city, state and zip)
Phone number: _____

_____
Signature

_____
Name (Print) and Title

SIGNATURES If the "Principal" is doing business as a Corporation, the Bid Bond shall be signed by an officer, i.e., President or Vice President. The signature of the officer shall be attested to by the Secretary and properly sealed.

If the "Principal" is an individual or a partnership, the Bid Bond shall so indicate and be properly signed.

(Corporate Seal)

_____
Secretary

THE SURETY

_____

By _____
Attorney-in-Fact

THIS BOND MUST BE ACCOMPANIED BY POWER OF ATTORNEY, EFFECTIVELY DATED.
FAILURE TO PROVIDE A PROPERLY EXECUTED BID BOND WITH A PROPERLY EXECUTED POWER OF ATTORNEY WILL RESULT IN THE BIDDER'S PROPOSAL BEING DEEMED NON-RESPONSIVE.

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

NOTICE OF AWARD

Date of Notice: _____
Date to be inserted by the Principal Representative

Institution/Agency: University of Colorado Boulder

Project No./Name: _____

TO:

The State of Colorado, represented by the undersigned, has considered the Proposals submitted for the above described work.

Your Proposal, deemed to be in the best interest of the State of Colorado, in the amount of Thousand, and no/100 Dollars* ($ *) is hereby accepted, pending final execution of the Agreement.

Base Bid $ _____
Total Contract Amount $ *

You **are** required to execute the approved Agreement and to furnish the Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance within ten (10) days from the date of this Notice.

If you fail to execute said Agreement and to furnish said Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance, and Certification and Affidavit Regarding Unauthorized Immigrants within ten (10) days from the date of this Notice, the State Controller is entitled to retain the amount of the Proposal Guaranty submitted with your Proposal as Liquidated Damages. In this event, the right is reserved to consider all of your rights arising out of the acceptance of your Proposal as abandoned and to award the work covered by your Proposal to another, or to re-advertise the Project, or otherwise dispose thereof.

By _____ Date
State Buildings Programs
(of Authorized Delegate)
Paul M. Leef, AIA, TM AP
Campus Architect &
Director, Planning, Design & Construction

By _____ Date
Principal Representative
(Institution or Agency)
Ronald L. Ried, Director
Facilities Management Business Services

When completely executed, this form is to be sent by **certified mail** to the Contractor by the Principal Representative or by any other means to which the parties agree.

SAMPLE

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

University of Colorado Boulder

CONTRACTOR'S AGREEMENT
DESIGN/BID/BUILD
(STATE FORM SC-6.21)

~~CONTRACT ID NUMBER:~~

~~AGENCY IDENTIFICATION NUMBER:~~

PROJECT NUMBER:

PROJECT NAME:

PROJECT MANAGER:

SAMPLE

STATE OF COLORADO
CONTRACTOR'S AGREEMENT DESIGN/BID/BUILD
(STATE FORM SC-6.21)

TABLE OF CONTENTS Page(s)

Attachment – Notice of Award

Exhibits:

- **A** Contractor's Bid (Form SC-6.13)
- **B** Performance Bond (Form SC-6.22)
- **C** Labor and Material Payment Bond (Form SC-6.221)
- **D** Insurance Certificates
- **E** Certification and Affidavit Regarding Unauthorized Immigrants (required at contract signing prior to commencing work)
- ~~**F** Contract Management Information Construction Contractor~~

SAMPLE

STATE OF COLORADO
CONTRACTOR'S AGREEMENT DESIGN/BID/BUILD
(STATE FORM SC-6.21)

~~Agency I.D. No.:~~ _____ ~~Contract ID No.:~~ _____ Project No. _____

1. PARTIES. THIS AGREEMENT is entered into by and between the STATE OF COLORADO, acting by and through the Regents of the University of Colorado, a body corporate, hereinafter referred to as the Principal Representative, and having its offices at hereinafter referred to as the Contractor.

2. EFFECTIVE DATE AND NOTICE OF NONLIABILITY. This Agreement shall not be effective or enforceable until it is approved and signed by the State Controller or its designee (hereinafter called the "Effective Date"), but shall be effective and enforceable thereafter in accordance with its provisions. The State shall not be liable to pay or reimburse Contractor for any performance hereunder or be bound by any provision hereof prior to the Effective Date.

WHEREAS, the Principal Representative intends to remodel Chemistry 4th floor for the atmospheric lab, Hereinafter called the Project; and

WHEREAS, authority exists in Law and Funds have been budgeted, appropriated, and otherwise made available, and a sufficient unencumbered balance thereof remains available for payment in Fund Number **17100157**, Account Number 515191, Contract Encumbrance Number **TBD**, and

WHEREAS, this is a phase one waived contract, waiver number 156 Contractors Agreement for Capital Construction Form SC6.21.

WITNESSETH, that the State of Colorado and the Contractor agree as follows:

ARTICLE 1. PERFORMANCE OF THE WORK
The Contractor shall perform all of the Work required for the complete and prompt execution of everything described or shown in, or reasonably implied from the Contract Documents for the above referenced Project.

ARTICLE 2. PROVISIONS OF THE CONTRACT DOCUMENTS
The Contractor agrees to perform the Work to the highest industry standards and to the satisfaction of the State of Colorado and its Architect/Engineer in strict accordance with the provisions of the Contract Documents.

ARTICLE 3. TIME OF COMPLETION
The Contractor agrees to Substantially Complete the Project within calendar days from the date of the Notice to Proceed, in addition, the Contractor agrees to finally complete the Project from Substantial Completion to Final Acceptance within calendar days for a total time of completion of the entire Project of calendar days. The Contractor shall perform the Work with due diligence to completion.

ARTICLE 4. ESSENTIAL CONDITION
Timely completion of the Project is an essential condition of this Agreement. The Contractor shall be subject to any liquidated damages described in Article 54D of The General Conditions of the Construction Contract SC-6.23 for failure to satisfactorily complete the Work within the time periods in Article 3 above.

ARTICLE 5. CONTRACT SUM
The Contractor shall be paid for the performance of this Agreement, subject to any additions and deductions as provided for in Articles 32, 34 and 35 of The General Conditions of the Construction Contract SC-6.23, the sum of and no/100 Dollars * ($ *).

Base Bid	$	
Total Contract Amount	$	*

SAMPLE

ARTICLE 6. CONTRACT DOCUMENTS
The Contract Documents, as enumerated in Article 1 of The General Conditions of the Construction Contract Sc-6.23, are all essential parts of this Agreement and are fully incorporated herein.

ARTICLE 7. OPTIONAL PROVISIONS AND ELECTIONS
The provisions of this Article 7 alter the Articles (General Conditions SC-6.23) or enlarge upon them as indicated:
The Principal Representative and or the State Buildings Programs shall mark boxes and initial where applicable.

A. MODIFICATION OF ARTICLE 45. GUARANTEE INSPECTIONS AFTER COMPLETION
If the box below is marked the six month guarantee inspection is not required.
☐ _____ Principal Representative initial

B. MODIFICATION OF ARTICLE 27. LABOR AND WAGES
If the box is marked the Federal Davis-Bacon Act shall be applicable to the Project. The minimum wage rates to be paid on the Project shall be furnished by the Principal Representative and included in the Contract Documents.
☐ _____ Principal Representative initial

C. MODIFICATION OF ARTICLE 39. NON-BINDING DISPUTE RESOLUTION – FACILITATED NEGOTIATIONS
If the box is marked, and initialed by the State as noted, the requirement to participate in facilitated negotiations shall be deleted from this Contract. Article 39, Non-Binding Dispute Resolution – Facilitated Negotiations, shall be deleted in its entirety and all references to the right to the same where ever they appear in the contract shall be similarly deleted.
The box may be marked only for projects with an estimated value of less than $500,000.
☐ _____ Principal Representative initial

D. MODIFICATION OF ARTICLE 46. TIME OF COMPLETION AND LIQUIDATED DAMAGES
If an amount is indicated immediately below, liquidated damages shall be applicable to this Project as, and to, the extent shown below. Where an amount is indicated below, liquidated damages shall be assessed in accordance with and pursuant to the terms of Article 46, Time of Completion And Liquidated Damages, in the amounts and as here indicated. The election of liquidated damages shall limit and control the parties right to damages only to the extent noted.
1. For the inability to use the Project, for each day after the number of calendar days specified in the Contractor's bid for the Project and the Agreement for achievement of Substantial Completion, until the day that the Project has achieved Substantial Completion and the Notice of Substantial Completion is issued, the Contractor agrees that an amount equal to _____ ($) shall be assessed against Contractor from amounts due and payable to the Contractor under the Contract, or the Contractor and the Contractor's Surety shall pay to the Principal Representative such sum for any deficiency, if amounts on account thereof are deducted from remaining amounts due, but amounts remaining are insufficient to cover the entire assessment.

2. For damages related to or arising from additional administrative, technical, supervisory and professional expenses related to and arising from the extended closeout period, for each day in excess of the number of calendar days specified in the Contractor's bid for the Project and the Agreement to finally complete the Project as defined by the issuance of the Notice of Final Acceptance) after the issuance of the final Notice of Substantial Completion, the Contractor agrees that an amount equal to _____ ($) shall be assessed against Contractor from amounts due and payable to the Contractor under the Contract, or the Contractor and the Contractor's Surety shall pay to the Principal Representative such sum for any deficiency, if amounts on account thereof are deducted from remaining amounts due but amounts remaining are insufficient to cover the entire assessment.

E. NOTICE IDENTIFICATION

All Notices pertaining to General Conditions or otherwise required to be given shall be transmitted in writing, to the individuals at the addresses listed below, and shall be deemed duly given when

SAMPLE

received by the parties at their addresses below or any subsequent persons or addresses provided to the other party in writing. Notice to Principal Representative:

With copies to (State Buildings Programs (or Delegate) State of Colorado):

Notice to Contractor:

With copies to:

ARTICLE 7. SAFETY and SECURITY – "Contractor understands that concern for the safety and well-being of University students and staff is of particular importance to the University. Contractor expressly acknowledges that it is Contractor's duty to take reasonable precautions to protect the University's students and staff. The extent of such precautions will depend on the particular circumstances of the work to be performed. However, to the extent that work to be performed involves security-sensitive functions or security-sensitive areas (e.g. unsupervised access to minors or work involving access to security-sensitive data), such precautions may include, but are not limited to, conducting criminal history checks on employees or agents assigned to such work at the University."

SAMPLE

SIGNATURE APPROVALS:

THE PARTIES HERETO HAVE EXECUTED THIS CONTRACT

*Persons signing for Contractor hereby swear and affirm that they are authorized to act on Contractor's behalf and acknowledge that the State is relying on their representations to that effect. **Principal is not a recognized title and will not be accepted**

Project Name/Number: _____

~~Contract ID No.:~~ _____

THE CONTRACTOR

_____
Legal Name of Contracting Entity

_____
*Signature

By _____
Name (print) Title

Date: _____

STATE OF COLORADO, acting by and through:
The Regents of the University of Colorado A Body Corporation

By: _____ /
Ronald L. Ried, Director / Date
Facilities Management Business Services

Date: _____

APPROVED
DEPARTMENT OF PERSONNEL & ADMINISTRATION
STATE BUILDINGS PROGRAMS
State Architect (or authorized Delegate)

By: _____ /
Paul M. Leef, AIA, LEED TM AP / Date
Campus Architect & Director, Planning, Design & Construction

ALL CONTRACTS MUST BE APPROVED BY THE STATE CONTROLLER:

CRS §24-30-202 requires the State Controller to approve all State Contracts. This Contract is not valid until signed and dated below by the State Controller or delegate. Contractor is not authorized to begin performance until such time. If Contractor begins performing prior thereto, the State of Colorado is not obligated to pay Contactor for such performance or for any goods and/or services provided hereunder.

APPROVED:
STATE OF COLORADO
STATE CONTROLLER'S OFFICE
State Controller (or authorized Delegate)

By: _____
Laura Ragin, Controller, Accounting & Business Support

Date: _____

SAMPLE

STATE OF COLORADO
CONTRACTOR'S AGREEMENT DESIGN/BID/BUILD
(STATE FORM SC-6.21)

EXHIBIT A -

CONTRACTOR'S BID (Form SBP-6.13)

SAMPLE

STATE OF COLORADO
CONTRACTOR'S AGREEMENT DESIGN/BID/BUILD
(STATE FORM SC-6.21)

EXHIBIT B -

PERFORMANCE BOND (Form SC-6.22)

SAMPLE

STATE OF COLORADO
CONTRACTOR'S AGREEMENT DESIGN/BID/BUILD
(STATE FORM SC-6.21)

EXHIBIT C -

LABOR AND MATERIAL PAYMENT BOND (Form SC-6.221)

SAMPLE

STATE OF COLORADO
CONTRACTOR'S AGREEMENT DESIGN/BID/BUILD
(STATE FORM SC-6.21)

EXHIBIT D -

INSURANCE CERTIFICATE(S) (attached)

SAMPLE

STATE OF COLORADO
CONTRACTOR'S AGREEMENT DESIGN/BID/BUILD
(STATE FORM SC-6.21)

EXHIBIT E -

Certification and Affidavit Regarding Unauthorized Immigrants (required at contract signing prior to commencing work) (UI-1, attached)

SAMPLE

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

PERFORMANCE BOND

Institution/Agency: University of Colorado Boulder
Project No./Name: _____

BONDING COMPANY: DO NOT MAKE ANY CHANGES TO THE LANGUAGE IN THIS BOND.

KNOW ALL PERSONS BY THESE PRESENTS:

That the Contractor

as Principal and hereinafter called "Principal,"

and

as Surety and hereinafter called "Surety," a corporation organized and existing under the laws of _____ _____ are held and firmly bound unto **the STATE OF COLORADO** acting by and through the Regents of the University of Colorado, a body corporate, hereinafter called the "Principal Representative", in the sum of _____

_____Dollars ($_____)

for the payment whereof the Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly, by these presents.

WHEREAS, the Principal and the State of Colorado acting by and through the Principal Representative have entered into a certain Contract, hereinafter called "Contract," dated _____, 2013, for the construction of a PROJECT described as _____

which Contract is hereby by reference made a part hereof;

SAMPLE

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION, is such that, if the Principal shall promptly, fully and faithfully perform all the undertakings, covenants, terms, conditions and agreements of said Contract during the original term of said Contract any extensions thereof that may be granted by the Principal Representative with or without notice to the Surety, and during the life of any guaranty required under the Contract, and shall also well and truly perform and fulfill all undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said Contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

AND THE SAID SURETY, for value received hereby stipulates and agrees that whenever the Principal shall be, and declared by the Principal Representative to be in default under said Contract, the State of Colorado having performed its obligations thereunder, the Surety may promptly remedy the default or shall promptly (1) Complete the Contract in accordance with its terms and conditions, or (2) Obtain a bid or bids for submittal to the Principal Representative for completing the Contract in accordance with its terms and conditions, and upon determination by the Principal Representative and Surety of the lowest responsible bidder, arrange for a contract between such bidder and the State of Colorado acting by and through the Principal Representative and make available as work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion, less the balance of the contract price but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount hereinbefore set forth. The term "balance of the contract price" as herein used shall mean the total amount payable to the Principal under the Contract and any amendments thereto, less the amount properly paid by the State of Colorado to the Contractor.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the State of Colorado.

IN WITNESS WHEREOF said Principal and Surety have executed this Bond, this _____ day of _____, A.D. 2013.

(Corporate Seal)

THE PRINCIPAL

_____

ATTEST:

By: _____

_____ Title: _____

Secretary

(Corporate Seal)

SURETY

_____

By: _____

Attorney-in-fact

THIS BOND MUST BE ACCOMPANIED BY POWER OF ATTORNEY, EFFECTIVELY DATED

Note: This bond is issued simultaneously with another bond conditioned for the full and faithful payment for all labor and material of the contract.

SAMPLE

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

LABOR AND MATERIAL BOND

Institution/Agency: University of Coloradoe Boulder
Project No./Name: _____

BONDING COMPANY: DO NOT MAKE ANY CHANGES TO THE LANGUAGE IN THIS BOND.

KNOW ALL PERSONS BY THESE PRESENTS:

That the Contractor

as Principal and hereinafter called "Principal,"

and

as Surety and hereinafter called "Surety," a corporation organized and existing under the laws of _____ are held and firmly bound unto the STATE OF COLORADO acting by and through the Regents of the University of Colorado at Boulder, a body corporate,

hereinafter called "Principal Representative," and to all subcontractors and any others who have supplied or furnished or shall supply or furnish materials, rental machinery, tools, or equipment actually used in the performance of the hereinafter identified Contract, or who have performed or shall perform labor in the performance of or in connection with said Contract, hereinafter called "Obligees" in the sum of _____ _____ Dollars ($_____)

together with interest at the rate of eight per cent (8%) per annum on all payments becoming due in accordance with said Contract, from the time such payments shall become due until such payment shall be made, for the payment of which, well and truly made to the Obligees, the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly, by these presents.

WHEREAS, the Principal and the State of Colorado acting by and through the Principal Representative have entered into a certain Contract, hereinafter called "Contract," dated _____ for the construction of a PROJECT described as _____

which Contract is hereby by reference made a part hereof;

SAMPLE

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal and the Surety shall fully indemnify and save harmless the State of Colorado and the Principal Representative from and against any and all costs and damages, including patent infringements, which either may suffer by reason of any failure or failures of the Principal promptly and faithfully to perform all terms and conditions of said Contract and shall fully reimburse and repay the State of Colorado and the Principal Representative all outlay and expense which the State of Colorado and the Principal Representative may incur in making good any such failure or failures, and further, if the Principal and his subcontractors shall duly and promptly pay for any and all labor, materials, team hire, sustenance, provisions, provender, rental machinery, tools, or equipment and other supplies which have been or shall be used or consumed by said Principal or his subcontractors in the performance of the work of said Contract , and it said Principal shall duly and promptly pay all his subcontractors the sums due them for any and all materials, rental machinery, tools, or equipment and labor that have been or shall be furnished, supplied, performed or used in connection with performance of said Contract, and shall also fully indemnify and save harmless the State of Colorado and the Principal Representative to the extent of any and all expenditures which either or both of them may be required to make by reason of any failures or defaults by the Principal or any subcontractor in connection with such payments; then this obligation shall be null and void, otherwise it shall remain in full force and effect.

It is expressly understood and agreed that any alterations which may be made in the terms of said Contract or in the work to be done under said Contract, or any extension(s) of time for the performance of the Contract, or any forebearance on the part of either the State of Colorado or the Principal to any of the others, shall not in any way release the Principal and the Surety, or either of them, their heirs, executors, administrators, successors or assigns from their liability hereunder, notice to the Surety of any such alteration, extension or forbearance being hereby waived.

IN WITNESS WHEREOF, the Principal and the Surety have executed this Bond, this _____ day of _____, A.D., 2013.

(Corporate Seal)

THE PRINCIPAL

_____

ATTEST:

By: _____

_____ Title: _____

Secretary

(Corporate Seal)

SURETY

_____

By: _____

Attorney-in-fact

THIS BOND MUST BE ACCOMPANIED BY POWER OF ATTORNEY, EFFECTIVELY DATED

Note: This bond is issued simultaneously with another bond conditioned for the full and faithful performance of the contract.

SAMPLE

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

THE GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT
DESIGN/BID/BUILD

(STATE FORM SC-6.23)

PROJECT NUMBER:

PROJECT NAME:

PROJECT MANAGER:

October 2012

TABLE OF CONTENTS

Note: The sections of the General Conditions indicated in *italics* (Articles 35 General and 35A, 35B, 37, 38, 46, 48B, 49 and 50) are regulatory and cannot be modified except through appropriate rule making procedures through the Division of Finance and Procurement, Department of Personnel & Administration.

General Conditions of Contract

ARTICLE 1. DEFINITIONS

A. CONTRACT DOCUMENTS

The Contract Documents consist of the following some of which are procedural documents used in the administration and performance of the Agreement:

1. Agreement; (SC-6.21);
2. Performance Bond (SC-6.22) and Labor and Material Payment Bond (SC-6.221);
3. General Conditions of the Construction Contract (SC- 6.23) and if applicable, Supplementary General Conditions;
4. Detailed Specification Requirements, including all addenda issued prior to the opening of the bids; and,
5. Drawings, including all addenda issued prior to the opening of the bids.
6. Change Orders (SC-6.31) and Amendments (SC-6.0), if any, when properly executed.
7. Authorization to Bid (SBP-6.10)
8. Information for Bidders (SBP-6.12);
9. Bid (SBP-6.13);
10. Bid Bond (SBP-6.14);
11. Notice of Award (SBP-6.15);
12. Builder's risk insurance certificates of insurance (ACORD 25-S);
13. Liability and workers' compensation certificates of insurance;
14. Notice to Proceed (Design/Bid/Build) (SBP-6.26);
15. Notice of Approval of Occupancy/Use (SBP-01);
16. Notice of Partial Substantial Completion (SBP-071);
17. Notice of Substantial Completion (SBP-07);
18. Notice of Partial Final Acceptance (SC-6.27);
19. Notice of Final Acceptance (SBP-6.271);
20. Notice of Partial Contractor's Settlement (SC-7.3);
21. Notice of Contractor's Settlement (SBP-7.31);
22. Application and Certificate for Contractor's Payment (SBP-7.2);
23. Other procedural and reporting documents or forms referred to in the General Conditions, the Supplementary General Conditions, the Specifications or required by the State Buildings Programs or the Principal Representative, including but not necessarily limited to Pre-Acceptance Check List (SBP-05) and the Building Inspection Record (SBP-BIR). A list of the current standard State Buildings Programs forms applicable to this Contract may be obtained from the Principal Representative on request.

B. DEFINITIONS OF WORDS AND TERMS USED

1. AGREEMENT. The term "Agreement" shall mean the written agreement entered into by the State of Colorado acting by and through the Principal Representative and the Contractor for the performance of the Work and payment therefore, on State Form SC-6.21. The term Agreement when used without reference to State Form SC-6.21 may also refer to the entirety

of the parties' agreement to perform the Work described in the Contract Documents or reasonably inferable there from. The term "Contract" shall be interchangeable with this latter meaning of the term Agreement

2. ARCHITECT/ENGINEER. The term "Architect/Engineer" shall mean either the architect of record or the engineer of record under contract to the State of Colorado for the Project identified in the Contract Documents.
3. OCCUPANCY. The term "Occupancy" means occupancy taken by the State as Owner after the Date of Substantial Completion at a time when a building or other discrete physical portion of the Project is used for the purpose intended. The Date of Occupancy shall be the date of such first use, but shall not be prior to the date of execution of the Notice of Approval of Occupancy/Use. Prior to the date of execution of a Notice of Approval of Occupancy/Use, the state shall have no right to occupy and the project may not be considered safe for occupancy for the intended use.
4. CHANGE ORDER. The term "Change Order" means a written order, signed by a Procurement Officer, directing the Contractor to make changes in the Work, in accordance with Article 35A, The Value of Changed Work.
5. COLORADO LABOR. The term "Colorado labor" shall be defined, as provided in § 8-17-101, C.R.S., as any person who is a resident of the state of Colorado, at the time of employment, without discrimination as to race, color, creed, sex, age, or religion except when sex or age is a bona fide occupational qualification, or shall have such other meaning as the term may otherwise be given in § 8-17-101, C.R.S., as amended.
6. CONTRACTOR. The word "Contractor" shall mean the person, company, firm, corporation or other legal entity entering into a contract with the State of Colorado acting by and through the Principal Representative
7. DAYS. The term "days" whether singular or plural shall mean calendar days unless expressly stated otherwise. Where the term "business days" is used it shall mean business days of the State of Colorado.
8. DRAWINGS. The term "Drawings" shall mean all drawings approved by appropriate State officials which have been prepared by the Architect/Engineer showing the work to be done, except that where a list of drawings is specifically enumerated in the Supplementary General Conditions or division 1 of the Specifications, the term shall mean the drawings so enumerated, including all addenda drawings.
9. EMERGENCY FIELD CHANGE ORDER. The term "Emergency Field Change Order" shall mean a written change order for extra work or a change in the work necessitated by an emergency as defined in Article 35C executed on State form SC 6.31 and identified as an Emergency Field Change Order. The use of such orders is limited to emergencies and to the amounts shown in Article 35C.
10. FINAL ACCEPTANCE. The terms "final acceptance" or "finally complete" mean the stage in the progress of the work, after substantial completion, when all remaining items of work have been completed, all requirements of the Contract Documents are satisfied and the Notice of Acceptance can be issued. Discrete physical portions of the Project may be separately and partially deemed finally complete at the discretion of the Principal Representative when that portion of the Project reaches such stage of completion and a partial Notice of Acceptance can be issued.
11. NOTICE. The term "Notice" shall mean any communication <u>in writing</u> from either contracting party to the other by such means of delivery that receipt cannot properly be denied. Notice shall be provided to the person identified to receive it in Article 7E (Contractor's Agreement SC-6.21), Notice Identification, or to such other person as either party identifies in writing to receive Notice. Notice by facsimile transmission where proper transmission is evidence shall be adequate where facsimile numbers are included in Article 7E (Contractor's Agreement SC-6.21). Notwithstanding an email delivery or return receipt, email Notice shall not be adequate. Acknowledgment of receipt of a voice message shall not be deemed to waive the requirement that Notice, where required, shall be in writing.

12. OWNER. The term “Owner” shall mean the Principal Representative.
13. PRINCIPAL REPRESENTATIVE. The term “Principal Representative ” shall be defined, as provided in § 24-30-1301(11), C.R.S., as the governing board of a state department, institution, or agency; or if there is no governing board, then the executive head of a state department, institution, or agency, as designated by the governor or the general assembly and as specifically identified in the Contract Documents, or shall have such other meaning as the term may otherwise be given in § 24-30-1301(11), C.R.S., as amended. The Principal Representative may delegate authority. The Contractor shall have the right to inquire regarding the delegated authority of any of the Principal Representative’s representatives on the project and shall be provided with a response in writing when requested.
14. PROCUREMENT OFFICER. The term “Procurement Officer ” means any person duly authorized to enter into and administer contracts and make written determinations with respect thereto. “Procurement Officer” includes an authorized representative of the Principal Representative acting within the limits of his or her authority.
15. PRODUCT DATA. The term “Product Data ” shall mean all submittals in the form of printed manufacturer’s literature, manufacturer’s specifications, and catalog cuts.
16. REASONABLY INFERABLE: The phrase “reasonably inferable” means that if an item or system is either shown or specified, all material and equipment normally furnished with such items or systems and needed to make a complete installation shall be provided whether mentioned or not, omitting only such parts as are specifically excepted, and shall include only components which the Contractor could reasonably anticipate based on his or her skill and knowledge using an objective, industry standard, not a subjective standard. This term takes into consideration the normal understanding that not every detail is to be given on the Drawings and Specifications. The phrase shall not, however, be construed to make the Contractor, rather than the Architect/Engineer, responsible for producing the Drawings and Specifications
17. SAMPLES. The term “Samples” shall mean examples of materials or work provided to establish the standard by which the Work will be judged.
18. SC. The term "SC" means "State Contract" which is used in connection with labeling applicable State form documents (e.g. "SC 6.23" is the State form number for these General Conditions of the Contract).
19. SBP. The term "SBP" means "State Buildings", which is used in connection with labeling applicable State form documents (e.g., "SBP-01" is the form number for Notice of Approval of Occupancy/Use).
20. SHOP DRAWINGS. The term “Shop Drawings” shall mean any and all detailed drawings prepared and submitted by Contractor, Subcontractor at any tier, vendors or manufacturers providing the products and equipment specified on the Drawings or called for in the Specifications.
21. SPECIFICATIONS. The term “Specifications” shall mean the requirements of the CSI divisions of the project manual prepared by the Architect/Engineer describing the work to be accomplished.
22. STATE BUILDINGS PROGRAMS. Shall refer to the Office of the State Architect within the Department of Personnel & Administration of Colorado State government responsible for project administration, review, approval and coordination of plans, construction procurement policy, contractual procedures, and code compliance and inspection of all buildings, public works and improvements erected for state purposes; except public roads and highways and projects under the supervision of the division of wildlife and the division of parks and outdoor recreation as provided in § 24-30-1301, *et seq*, C.R.S. The term State Buildings Programs shall also mean that individual within a State Department agency or institution, including institutions of higher education, who has signed an agreement accepting delegation to perform all or part of the responsibilities and functions of State Buildings Programs.
23. SUBMITTALS. The term “submittals” means drawings, lists, tables, documents and samples prepared by the Contractor to facilitate the progress of the work as required by these General Conditions or the Drawings and Specifications. They consist of Shop Drawings, Product Data, Samples, and various administrative support documents including but not limited to lists of subcontractors, construction progress schedules, schedules of values, applications for payment, inspection and test results, requests for information, various document logs, and as-

built drawings. Submittals are required by the Contract Documents, but except to the extent expressly specified otherwise are not themselves a part of the Contract Documents.

24. SUBSTANTIAL COMPLETION. The terms “substantial completion ” or “substantially complete ” mean the stage in the progress of the work when the construction is sufficiently complete, in accordance with the Contract Documents as modified by any Change Orders, so that the Work, or at the discretion of the Principal Representative, any designated portion thereof, is available for its intended use by the Principal Representative and a Notice of Substantial Completion can be issued. Portions of the Project may, at the discretion of the Principal Representative, be designated as substantially complete.
25. SURETY. The term “Surety ” shall mean the company providing the labor and material payment and performance bonds for the Contractor as obligor.
26. WORK. The term “Work ” shall mean all or part of the labor, materials, equipment, and other services required by the Contract Documents or otherwise required to be provided by the Contractor to meet the Contractor’s obligations under the Contract.

ARTICLE 2. EXECUTION, CORRELATION, INTENT OF DOCUMENTS, COMMUNICATION AND COOPERATION

A. EXECUTION

The Contractor, within ten (10) days from the date of Notice of Award, will be required to:

1. Execute the Agreement, State Form SC-6.21;
2. Furnish fully executed Performance and Labor and Material Payment Bonds on State Form s SC-6.22 and SC-6.221; and
3. Furnish certificates of insurance evidencing all required insurance on standard Acord forms designed for such purpose.
4. Furnish certified copies of any insurance policies requested by the Principal Representative.

B. CORRELATION

By execution of the Agreement the Contractor represents that the Contractor has visited the site, has become familiar with local conditions and local requirements under which the Work is to be performed, including the building code programs of the State Buildings Program as implemented by the Principal Representative, and has correlated personal observations with the requirements of the Contract Documents.

C. INTENT OF DOCUMENTS

The Contract Documents are complementary, and what is called for by any one document shall be as binding as if called for by all. The intention of the documents is to include all labor, materials, equipment and transportation necessary for the proper execution of the Work. Words describing materials or work which have a well-known technical or trade meaning shall be held to refer to such recognized standards.

In any event, if any error exists, or appears to exist, in the requirements of the Drawings or Specifications, or if any disagreement exists as to such requirements, the Contractor shall have the same explained or adjusted by the Architect/Engineer before proceeding with the work in question. In the event of the Contractor’s failure to give prior written Notice of any such errors or disagreements of which the Contractor or the Subcontractors at any tier are aware, the Contractor shall, at no additional cost to the Principal Representative, make good any damage to, or defect in, work which is caused by such omission.

Where a conflict occurs between or within standards, Specifications or Drawings, which is not resolved by reference to the precedence between the Contract Documents, the more stringent or higher quality requirements shall apply so long as such more stringent or higher quality requirements are reasonably inferable. The Architect/Engineer shall decide which requirements will provide the best installation.
With the exception noted in the following paragraph, the precedence of the Contract Documents is in the following sequence:

1. The Agreement (SC-6.21);

2. The Supplementary General Conditions, if any;
3. The General Conditions (SC-6.23); and
4. Drawings and Specifications, all as modified by any addenda.

Change Orders and Amendments, if any, to the Contract Documents take precedence over the original Contract Documents.

Notwithstanding the foregoing order of precedence, the Special Provisions of Article 52 of the General Conditions, Special Provisions, shall take precedence, rule and control over all other provisions of the Contract Documents.

Unless the context otherwise requires, form numbers in this document are for convenience only. In the event of any conflict between the form required by name or context and the form required by number, the form required by name or context shall control. The Contractor may obtain State forms from the Principal Representative upon request.

D. PARTNERING, COMMUNICATIONS AND COOPERATION

In recognition of the fact that conflicts, disagreements and disputes often arise during the performance of construction contracts, the Contractor and the Principal Representative aspire to encourage a relationship of open communication and cooperation between the employees and personnel of both, in which the objectives of the Contract may be better achieved and issues resolved in a more fully informed atmosphere.

The Contractor and the Principal Representative each agree to assign an individual who shall be fully authorized to negotiate and implement a voluntary partnering plan for the purpose of facilitating open communications between them. Within thirty days (30) of the Notice to Proceed, the assigned individuals shall meet to discuss development of an informal agreement to accomplish these goals.

The assigned individuals shall endeavor to reach an informal agreement, but shall have no such obligation. Any plans these parties voluntarily agree to implement shall result in no change to the contract amount, and no costs associated with such plan or its development shall be recoverable under any contract clause. In addition, no plan developed to facilitate open communication and cooperation shall alter, amend or waive any of the rights or duties of either party under the Contract unless and except by written Amendment to the Contract, nor shall anything in this clause or any subsequently developed partnering plan be deemed to create fiduciary duties between the parties unless expressly agreed in a written Amendment to the Contract. It is also recognized that projects with relatively low contract values may not justify the expense or special efforts required. In the case of small projects with an initial Contract value under $500,000, the requirements of the preceding paragraph shall not apply.

ARTICLE 3. COPIES FURNISHED

The Contractor will be furnished, free of charge, the number of copies of Drawings and Specifications as specified in the Contract Documents, or if no number is specified, all copies reasonably necessary for the execution of the work.

ARTICLE 4. OWNERSHIP OF DRAWINGS

Drawings or Specifications, or copies of either, furnished by the Architect/Engineer, are not to be used on any other work. At the completion of the Work, at the written request of the Architect/Engineer, the Contractor shall endeavor to return all Drawings and Specifications.

The Contractor may retain the Contractor's Contract Document set, copies of Drawings and Specifications used to contract with others for any portion of the Work and a marked up set of as-built drawings.

ARTICLE 5. ARCHITECT/ENGINEER'S STATUS

The Architect/Engineer is the representative of the Principal Representative for purposes of administration of the Contract, as provided in the Contract Documents and the Agreement. In case of termination of

employment or the death of the Architect/Engineer, the Principal Representative will appoint a capable Architect/Engineer against whom the Contractor makes no reasonable objection, whose status under the Contract shall be the same as that of the former Architect/Engineer.

ARTICLE 6. ARCHITECT/ENGINEER DECISIONS AND JUDGMENTS, ACCESS TO WORK AND INSPECTION

A. DECISIONS

The Architect/Engineer shall, within a reasonable time, make decisions on all matters relating to the execution and progress of the Work or the interpretation of the Contract Documents, and in the exercise of due diligence shall be reasonably available to the Contractor to timely interpret and make decisions with respect to questions relating to the design or concerning the Contract Documents.

B. JUDGMENTS

The Architect/Engineer is, in the first instance, the judge of the performance required by the Contract Documents as it relates to compliance with the Drawings and Specifications and quality of workmanship and materials.

The Architect/Engineer shall make judgments regarding whether directed work is extra or outside the scope of Work required by the Contract Documents at the time such direction is first given. If, in the Contractor's judgment, any performance directed by the Architect/Engineer is not required by the Contract Documents or if the Architect/Engineer does not make the judgment required, it shall be a condition precedent to the filing of any claim for additional cost related to such directed work that the Contractor, before performing such work, shall first obtain in writing, the Architect/Engineer's written decision that such directed work is included in the performance required by the Contract Documents. If the Architect/Engineer's direction to perform the work does not state that the work is within the performance required by the Contract Documents, the Contractor shall, in writing, request the Architect/Engineer to advise in writing whether the directed work will be considered extra work or work included in the performance required by the Contract Documents.

The Architect/Engineer shall respond to any such written request for such a decision within three (3) business days and if no response is provided, or if the Architect/Engineer's written decision is to the effect that the work is included in the performance required by the Contract Documents, the Contractor may file with the Principal Representative and the Architect/Engineer a Notice of claim in accordance with Article 36, Claims. Whether or not a Notice of claim is filed, the Contractor shall proceed with the ordered work. Disagreement with the decision of the Architect/Engineer shall not be grounds for the Contractor to refuse to perform the work directed or to suspend or terminate performance.

C. ACCESS TO WORK

The Architect/Engineer, the Principal Representative and representatives of State Buildings Programs shall at all times have access to the work. The Contractor shall provide proper facilities for such access and for their observations or inspection of the work.

D. INSPECTION

The Architect/Engineer has agreed to make, or that structural, mechanical, electrical engineers or other consultants will make, periodic visits to the site to generally observe the progress and quality of the Work to determine in general if the Work is proceeding in accordance with the Contract Documents. Observation may extend to all or any part of the Work and to the preparation, fabrication or manufacture of materials.

Without in any way meaning to be exclusive or to limit the responsibilities of the Architect/Engineer or the Contractor, the Architect/Engineer has agreed to observe, among other aspects of the Work, the following for compliance with the Contract Documents:

1. Bearing surfaces of excavations before concrete is placed based upon the findings and recommendations of the Principal Representative's soils engineering consultant;
2. Reinforcing steel after installation and before concrete is poured;

3. Structural concrete;
4. Laboratory reports on all concrete testing based upon the findings and recommendations of the Principal Representative's testing consultant;
5. Structural steel during and after erection and prior to its being covered or enclosed;
6. Steel welding; Principal Representative will furnish steel welding inspection consultant/agency if required or necessary for the project;
7. Mechanical and plumbing work following its installation and prior to its being covered or enclosed;
8. Electrical work following its installation and prior to its being covered or enclosed;
9. Compaction testing reports based upon the findings and recommendations of the Principal Representative's testing consultant; and
10. Any special or quality control testing required in the Contract Documents provided by the Principal Representative's testing consultant.

If the Specifications, the Architect/Engineer's instructions, laws, ordinances of any public authority require any work to be specifically tested or approved, the Contractor shall give the Architect/Engineer timely notice of its readiness for observation by the Architect/Engineer or inspection by another authority, and if the inspection is by another authority, of the date fixed for such inspection, required certificates of inspection being secured by the Contractor. The Contractor shall give all required Notices to the Principal Representative or his or her designee for inspections required for the building inspection program. It shall be the responsibility of the Contractor to determine the Notice required by the State pursuant to Building Inspection Record for the Project, according to State form SBP-B.I.R., or the equivalent form required by the Principal Representative as approved by the State Buildings Program. If any such work is covered up without approval or consent of the Architect/Engineer or prior to any building code inspection, it must, if required by the Architect/Engineer, the Principal Representative or the State Buildings Programs, be uncovered for examination, at the Contractor's expense. If such work is found to be not in accordance with the Contract Documents, the Contractor shall pay such costs, unless he or she shall show that the defect in the work was caused by another contractor engaged by the Principal Representative. In that event, the Principal Representative shall pay such cost. In addition, examination of questioned work may be ordered, and if so ordered, the work must be uncovered by the Contractor. If such work be found in accordance with the Contract Documents, the Contractor shall be reimbursed the cost of examination and replacement.

ARTICLE 7. CONTRACTOR'S SUPERINTENDENCE AND SUPERVISION

The Contractor shall employ, and keep present on the Project during its progress, a competent superintendent and any necessary assistants, all satisfactory to the Architect/Engineer and the Principal Representative. The superintendent shall not be changed except with the consent of the Architect/Engineer and the Principal Representative, unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in his or her employ. The superintendent shall represent the Contractor in his or her absence and all directions given to the superintendent shall be as binding as if given to the Contractor. Directions received by the superintendent shall be documented by the superintendent and confirmed in writing with the Contractor.

The Contractor shall give efficient supervision to the Work, using his or her best skill and attention. He or she shall carefully study and compare all Drawings, Specifications and other written instructions and shall without delay report any error, inconsistency or omission which he or she may discover in writing to the Architect/Engineer. The Contractor shall not be liable to the Principal Representative for damage to the extent it results from errors or deficiencies in the Contract Documents or other instructions by the Architect/Engineer, unless the Contractor knew or had reason to know, that damage would result by proceeding and the Contractor fails to so advise the Architect/Engineer.

The superintendent shall see that the Work is carried out in accordance with the Contract Documents and in a uniform, thorough and first-class manner in every respect. The Contractor's superintendent shall establish all lines, levels, and marks necessary to facilitate the operations of all concerned in the Contractor's Work. The Contractor shall lay out all work in a manner satisfactory to the Architect/Engineer, making permanent

records of all lines and levels required for excavation, grading, foundations, and for all other parts of the Work.

ARTICLE 8. MATERIALS AND EMPLOYEES

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation and other facilities necessary for the execution and completion of the Work.

Unless otherwise specified, all materials shall be new and both workmanship and materials shall be first class and of uniform quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

The Contractor is fully responsible for all acts and omissions of the Contractor's employees and shall at all times enforce strict discipline and good order among employees on the site. The Contractor shall not employ on the Work any person reasonably deemed unfit by the Principal Representative or anyone not skilled in the work assigned to him.

ARTICLE 9. SURVEYS, PERMITS, LAWS, TAXES AND REGULATIONS

A. SURVEYS

The Principal Representative shall furnish all surveys, property lines and bench marks deemed necessary by the Architect/Engineer, unless otherwise specified.

B. PERMITS AND LICENSES

Permits and licenses necessary for the prosecution of the Work shall be secured and paid for by the Contractor. Unless otherwise specified in the Specifications, no local municipal or county building permit shall be required. However, State Buildings Programs requires each Principal Representative to administer a building code inspection program, the implementation of which may vary at each agency or institution of the State. The Contractors' employees shall become personally familiar with these local conditions and requirements and shall fully comply with such requirements. State electrical and plumbing permits are required, unless the requirement to obtain such permits is altered by State Building's Programs. The Contractor shall obtain and pay for such permits.

Easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the Principal Representative, unless otherwise specified.

C. TAXES

1. REFUND OF SALES AND USE TAXES

The Contractor shall pay all local taxes required to be paid, including but not necessarily limited to all sales and use taxes. If requested by the Principal Representative prior to issuance of the Notice to Proceed or directed in the Supplementary General Conditions or the Specifications, the Contractor shall maintain records of such payments in respect to the Work, which shall be separate and distinct from all other records maintained by the Contractor, and the Contractor shall furnish such data as may be necessary to enable the State of Colorado, acting by and through the Principal Representative, to obtain any refunds of such taxes which may be available under the laws, ordinances, rules or regulations applicable to such taxes. When so requested or directed, the Contractor shall require Subcontractors at all tiers to pay all local sales and use taxes required to be paid and to maintain records and furnish the Contractor with such data as may be necessary to obtain refunds of the taxes paid by such Subcontractors. No State sales and use taxes are to be paid on material to be used in this Project. On application by the purchaser or seller, the Department of Revenue shall issue to a Contractor or to a Subcontractor at any tier, a certificate or certificates of exemption per § 39-26-114(1)(d), C.R.S., and § 39-26-203, C.R.S.

2. FEDERAL TAXES

The Contractor shall exclude the amount of any applicable federal excise or manufacturers' taxes from the proposal. The Principal Representative will furnish the Contractor, on request exemption certificates.

D. LAWS AND REGULATIONS

The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the Work as drawn or specified. If the Contractor observes that the Drawings or Specifications require work which is at variance therewith, the Contractor shall without delay notify the Architect/Engineer in writing and any necessary changes shall be adjusted as provided in Article 35, Changes In The Work.

The Contractor shall bear all costs arising from the performance of work required by the Drawings or Specifications that the Contractor knows to be contrary to such laws, ordinances, rules or regulations, if such work is performed without giving Notice to the Architect/Engineer.

ARTICLE 10. PROTECTION OF WORK AND PROPERTY

A. GENERAL PROVISIONS

The Contractor shall continuously maintain adequate protection of all work and materials, protect the property from injury or loss arising in connection with this Contract and adequately protect adjacent property as provided by law and the Contract Documents. The Contractor shall make good any damage, injury or loss, except to the extent:

1. Directly due to errors in the Contract Documents;
2. Caused by agents or employees of the Principal Representative; and,
3. Due to causes beyond the Contractor 's control and not to fault or negligence; provided such damage, injury or loss would not be covered by the insurance required to be carried by the Contractor;

B. SAFETY PRECAUTIONS

The Contractor shall take all necessary precautions for the safety of employees on the Project, and shall comply with all applicable provisions of federal, State and municipal safety laws and building codes to prevent accidents or injury to persons on, about or adjacent to the premises where the Work is being performed. He or she shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for the protection of workers and the public and shall post danger signs warning against the hazards created by such features of construction as protruding nails, hoists, well holes, elevator hatchways, scaffolding, window openings, stairways and falling materials; and he or she shall designate a responsible member of his or her organization on the Project, whose duty shall be the prevention of accidents. The name and position of any person so designated shall be reported to the Architect/Engineer by the Contractor.

The Contractor shall provide all necessary bracing, shoring and tying of all structures, decks and framing to prevent any structural failure of any material which could result in damage to property or the injury or death of persons; take all precautions to insure that no part of any structure of any description is loaded beyond its carrying capacity with anything that will endanger its safety at any time during the execution of this Contract; and provide for the adequacy and safety of all scaffolding and hoisting equipment. The Contractor shall not permit open fires within the building enclosure. The Contractor shall construct and maintain all necessary temporary drainage and do all pumping necessary to keep excavations and floors, pits and trenches free of water. The Contractor shall be solely responsible for all construction means, methods, techniques, sequences and procedures, and for coordinating all portions of the Work, except as otherwise noted.

The Contractor shall take due precautions when obstructing sidewalks, streets or other public ways in any manner, and shall provide, erect and maintain barricades, temporary walkways, roadways, trench covers, colored lights or danger signals and any other devices necessary or required to assure the safe passage of pedestrians and automobiles.

C. EMERGENCIES

In an emergency affecting the safety of life or of the Work or of adjoining property, the Contractor without special instruction or authorization from the Architect/Engineer or Principal Representative, is hereby permitted to act, at his or her discretion, to prevent such threatened loss or injury; and he or she shall so act, without appeal, if so authorized or instructed. Provided the Contractor has no responsibilities for the emergency, if the Contractor incurs additional cost not otherwise recoverable from insurance or others on account of any such emergency work, the Contract sum shall be equitably adjusted in accordance with Article 35, Changes In The Work.

ARTICLE 11. DRAWINGS AND SPECIFICATIONS ON THE WORK

The Contractor shall keep on the job site one copy of the Contract Documents in good order, including current copies of all Drawings and Specifications for the Work, and any approved Shop Drawings, Product Data or Samples, and as-built drawings. As-built drawings shall be updated weekly by the Contractor and Subcontractors to reflect actual constructed conditions including dimensioned locations of underground work and the Contractor's failure to maintain such updates may be grounds to withhold portions of payments otherwise due in accordance with Article 33, Payments Withheld. All such documents shall be available to the Architect/Engineer and representatives of the State. In addition, the Contractor shall keep on the job site one copy of all approved addenda, Change Orders and requests for information issued for the Work.

The Contractor shall develop procedures to insure the currency and accuracy of as-built drawings and shall maintain on a current basis a log of requests for information and responses thereto, a Shop Drawing and Product Data submittal log, and a Sample submittal log to record the status of all necessary and required submittals.

ARTICLE 12. REQUESTS FOR INFORMATION AND SCHEDULES

A. REQUESTS FOR INFORMATION

The Architect/Engineer shall furnish additional instructions with reasonable promptness, by means of drawings or otherwise, necessary for the proper execution of the Work. All such drawings and instructions shall be consistent with the Contract Documents and reasonably inferable there from. The Architect/Engineer shall determine what additional instructions or drawings are necessary for the proper execution of the Work.

The Work shall be executed in conformity with such instructions and the Contractor shall do no work without proper drawings, specifications or instructions. If the Contractor believes additional instructions, specifications or drawings are needed for the performance of any portion of the Work, the Contractor shall give Notice of such need in writing through a request for information furnished to the Architect/Engineer sufficiently in advance of the need for such additional instructions, specifications or drawings to avoid delay and to allow the Architect/Engineer a reasonable time to respond. The Contractor shall maintain a log of the requests for information and the responses provided.

B. SCHEDULES

1. SUBMITTAL SCHEDULES

Prior to filing the Contractor ’s first application for payment, a schedule shall be prepared which may be preliminary to the extent required, fixing the dates for the submission and initial review of required Shop Drawings, Product Data and Samples for the beginning of manufacture and installation of materials, and for the completion of the various parts of the Work. It shall be prepared so as to cause no delay in the Work or in the work of any other contractor. The schedule shall be subject to change from time to time in accordance with the progress of the Work, and it shall be subject to the review and approval by the Architect/Engineer. It shall fix the dates at which the various Shop Drawings Product Data and Samples will be required from the Architect/Engineer. The Architect/Engineer, after review and agreement as to the time provided for initial review, shall review and comment on the Shop Drawings, Product Data and Samples in accordance with that schedule. The schedule shall be finalized, prepared and submitted with respect to each of the elements of the Work in time to avoid delay, considering reasonable periods for review, manufacture or installation.

At the time the schedule is prepared, the Contractor, the Architect/Engineer and Principal Representative shall jointly identify the Shop Drawing, Product Data and Samples, if any, which the Principal Representative shall receive simultaneously with the Architect/Engineer for the purposes of owner coordination with existing facility standards and systems. The Contractor shall furnish a copy for the Principal Representative when so requested. Transmittal of Shop Drawings and Product Data copies to the Principal Representative shall be solely for the convenience of the Principal Representative and shall neither create nor imply responsibility or duty of review by the Principal Representative.

The Contractor may also, or at the direction of the Principal Representative at any time shall, prepare and maintain a schedule, which may also be preliminary and subject to change to the extent required, fixing the dates for the initial responses to requests for information or for detail drawings which will be required from the Architect/Engineer to allow the beginning of manufacture, installation of materials and for the completion of the various parts of the Work. The schedule shall be subject to review and approval by the Architect/Engineer. The Architect/Engineer shall, after review and agreement, furnish responses and detail drawings in accordance with that schedule. Any such schedule shall be prepared and approved in time to avoid delay, considering reasonable periods for review, manufacture or installation, but so long as the request for information schedule is being maintained, it shall not be deemed to transfer responsibility to the Contractor for errors or omissions in the Contract Documents where circumstances make timely review and performance impossible.

The Architect/Engineer shall not unreasonably withhold approval of the Contractor's schedules and shall inform the Contractor and the Principal Representative of the basis of any refusal to agree to the Contractor's schedules. The Principal Representative shall attempt to resolve any disagreements.

2. SCHEDULE OF VALUES

Within twenty-one (21) calendar days after the date of the Notice to Proceed, the Contractor shall submit to the Architect/Engineer and Principal Representative, for approval, and to the State Buildings Programs when specifically requested, a complete itemized schedule of the values of the various parts of the Work, as estimated by the Contractor, aggregating the total price. The schedule of values shall be in such detail as the Architect/Engineer or the Principal Representative shall require, prepared on forms acceptable to the Principal Representative. It shall, at a minimum, identify on a separate line each division of the Specifications including the general conditions costs to be charged to the Project. The Contractor shall revise and resubmit the schedule of values for approval when, in the opinion of the Architect/Engineer or the Principal Representative, such resubmittal is required due to changes or modifications to the Contract Documents or the Contract sum.

The total cost of each line item so separately identified shall, when requested by the Architect/Engineer or the Principal Representative, be broken down into reasonable estimates of the value of:

a. Material, which shall include the cost of material actually built into the Project plus any local sales or use tax paid thereon; and,
b. Labor and other costs.

The cost of subcontracts shall be incorporated in the Contractor's schedule of values, and when requested by the Architect/Engineer or the Principal Representative, shall be separately shown as line items.

The Architect/Engineer shall review the proposed schedules and approve it after consultation with the Principal Representative, or advise the Contractor of any required revisions within ten (10) days of its receipt. In the event no action is taken on the submittal within ten days, the

Contractor may utilize the schedule of values as its submittal for payment until it is approved or until revisions are requested.

When the Architect/Engineer deems it appropriate to facilitate certification of the amounts due to the Contractor, further breakdown of subcontracts, including breakdown by labor and materials, may be directed.

This schedule of values, when approved, will be used in preparing Contractor's applications for payment on State Form SC-7.2, Application for Payment.

3. CONSTRUCTION SCHEDULES

Within twenty-one (21) calendar days after the date of the Notice to Proceed, the Contractor shall submit to the Architect/Engineer and the Principal Representative, and to the State Buildings Programs when specifically requested, on a form acceptable to them, an overall timetable of the construction schedule for the Project. Unless the Supplementary General Conditions or the Specifications allow scheduling with bar charts or other less sophisticated scheduling tools, the Contractor's schedule shall be a critical-path method (CPM) construction schedule. The CPM schedule shall start with the date of the Notice to Proceed and include submittals activities, the various construction activities, change order work (when applicable), close-out, testing, demonstration of equipment operation when called for in the Specifications, and acceptance. The CPM shall at a minimum correlate to the schedule of values line items and shall be cost loaded if requested by the Architect/Engineer or Principal Representative. The completion time shall be the time specified in the Agreement and all Project scheduling shall allocate float utilizing the full period available for construction as specified in the Agreement on State Form SC 6.13, without indication of early completion, unless such earlier completion is approved in writing by the Principal Representative and State Building Programs.

The time shown between the starting and completion dates of the various elements within the construction schedule shall represent one hundred per cent (100%) completion of each element.

All other elements of the CPM schedule shall be as required by the Specifications. In addition, the Contractor shall submit monthly updates of the construction schedule. These updates shall reflect the Contractor's "work in place" progress.

When requested by the Architect/Engineer, the Principal Representative or the State Buildings Programs, the Contractor shall revise the construction schedule to reflect changes in the schedule of values.

When the testing of materials is required by the Specifications, the Contractor shall also prepare and submit to the Architect/Engineer and the Principal Representative a schedule for testing in accordance with Article 14, Samples and Testing.

ARTICLE 13. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

A. SUBMITTAL PROCESS

The Contractor shall check and field verify all dimensions. The Contractor shall check, approve and submit to the Architect/Engineer in accordance with the schedule described in Article 12, Requests for Information and Schedules, all Shop Drawings, Product Data and Samples required by the specifications or required by the Contractor for the work of the various trades. All Drawings and Product Data shall contain identifying nomenclature and each submittal shall be accompanied by a letter of transmittal identifying in detail all enclosures. The number of copies of Shop Drawings and Product Data to be submitted shall be as specified in the Specifications and if no number is specified then three copies shall be submitted.

The Architect/Engineer shall review and comment on the Shop Drawings and Product Data within the time provided in the agreed upon schedule for conformance with information given and the design

concept expressed in, or reasonably inferred from, the Contract Documents. The nature of all corrections to be made to the Shop Drawings and Product Data, if any, shall be clearly noted, and the submittals shall be returned to the Contractor for such corrections. If a change in the scope of the Work is intended by revisions requested to any Shop Drawings and Product Data, the Contractor shall be requested to prepare a change proposal in accordance with Article 35, Changes In The Work. On resubmitted Shop Drawings, Product Data or Samples, the Contractor shall direct specific attention in writing on the transmittal cover to revisions other than those corrections requested by the Architect/Engineer on any previously checked submittal. The Architect/Engineer shall promptly review and comment on, and return, the resubmitted items.

The Contractor shall thereafter furnish such other copies in the form approved by the Architect/Engineer as may be needed for the prosecution of the work.

B. FABRICATION AND ORDERING

Fabrication shall be started by the Contractor only after receiving approved Shop Drawings from the Architect/Engineer. Materials shall be ordered in accordance with approved Product Data. Work which is improperly fabricated, whether through incorrect Shop Drawings, faulty workmanship or materials, will not be acceptable.

C. DEVIATIONS FROM DRAWINGS OR SPECIFICATIONS

The review and comments of the Architect/Engineer of Shop Drawings, Product Data or Samples shall not relieve the Contractor from responsibility for deviations from the Drawings or Specifications, unless he or she has in writing called the attention of the Architect/Engineer to such deviations at the time of submission, nor shall it relieve the Contractor from responsibility for errors of any sort in Shop Drawings or Product Data. Review and comments on Shop Drawings or Product Data containing identified deviations from the Contract Documents shall not be the basis for a Change Order or a claim based on a change in the scope of the Work unless Notice is given to the Architect/Engineer and Principal Representative of all additional costs, time and other impacts of the identified deviation by bring it to their attention in writing at the time the submittals are made, and any subsequent change in the Contract sum or the Contract time shall be limited to cost, time and impacts so identified.

D. CONTRACTOR REPRESENTATIONS

By preparing, approving, and/or submitting Shop Drawings, Product Data and Samples, the Contractor represents that the Contractor has determined and verified all materials, field measurements, and field construction criteria related thereto, and has checked and co-ordinated the information contained within each submittal with the requirements of the Work, the Project and the Contract Documents and prior reviews and approvals.

ARTICLE 14. SAMPLES AND TESTING

A. SAMPLES

The Contractor shall furnish for approval, with such promptness as to cause no delay in his or her work or in that of any other Contractor, all Samples as directed by the Architect/Engineer. The Architect/Engineer shall check and approve such Samples, with reasonable promptness, but only for conformance with the design intent of the Contract Documents and the Project, and for compliance with any submission requirements given in the Contract Documents.

B. TESTING - GENERAL

The Contractor shall provide such equipment and facilities as the Architect/Engineer may require for conducting field tests and for collecting and forwarding samples to be tested. Samples themselves shall not be incorporated into the Work after approval without the permission of the Architect/Engineer.

All materials or equipment proposed to be used may be tested at any time during their preparation or use. The Contractor shall furnish the required samples without charge and shall give sufficient Notice of the placing of orders to permit the testing thereof. Products may be sampled either prior to shipment or after being received at the site of the Work.

Tests shall be made by an accredited testing laboratory. Except as otherwise provided in the Specifications, sampling and testing of all materials, and the laboratory methods and testing equipment, shall be in accordance with the latest standards and tentative methods of the American Society of Testing Materials (ASTM). The cost of testing which is in addition to the requirements of the Specifications shall be paid by the Contractor if so directed by the Architect/Engineer, and the Contract sum shall be adjusted accordingly by Change Order ; provided however, that whenever testing shows portions of the Work to be deficient, all costs of testing including that required to verify the adequacy of repair or replacement work shall be the responsibility of the Contractor.

C. TESTING - CONCRETE AND SOILS

Unless otherwise specified or provided elsewhere in the Contract Documents, the Principal Representative will contract for and pay for the testing of concrete and for soils compaction testing through an independent laboratory or laboratories selected and approved by the Principal Representative. The Contractor shall assume the responsibility of arranging, scheduling and coordinating the concrete sample collection efforts and soils compaction efforts. Testing shall be performed in accordance with the requirements of the Specifications, and if no requirements are specified, the Contractor shall request instructions and testing shall be as directed by the Architect/Engineer or the soils engineer, as applicable, and in accordance with standard industry practices.

The Principal Representative and the Architect/Engineer shall be given reasonable advance notice of each concrete pour and reserve the right to either increase or decrease the number of cylinders or the frequency of tests.

Soil compaction testing shall be at random locations selected by the soils engineer. In general, soils compaction testing shall be as directed by the soils engineer and shall include all substrate prior to backfill or construction.

D. TESTING - OTHER

Additional testing required by the Specifications will be accomplished and paid for by the Principal Representative in a manner similar to that for concrete and soils unless noted otherwise in the Specifications. In any case, the Contractor will be responsible for arranging, scheduling and coordinating additional tests. Where the additional testing will be contracted and paid for by the Principal Representative the Contractor shall give the Principal Representative not less than one month advance written Notice of the date the first such test will be required.

ARTICLE 15. SUBCONTRACTS

The Contractor shall, within twenty one (21) days after the date of the Notice of Award, submit to the Architect/Engineer, the Principal Representative and State Buildings Programs a preliminary list of Subcontractors. It shall be as complete as possible at the time, showing all known Subcontractors planned for the work. The list shall be supplemented as other Subcontractors are determined by the Contractor and any such supplemental list shall be submitted to the Architect/Engineer, the Principal Representative and State Buildings Programs not less than ten (10) days before the Subcontractor commences work.

The Contractor's list shall include those Subcontractors, if any, which the Contractor indicated in its bid would be employed for specific portions of the Work if such indication was requested in the bid documents issued by the State. The substitution of any Subcontractor listed in the Contractor's bid shall be justified in writing not less than ten (10) days after the date of the Notice of Award, and shall be subject to the approval of the Principal Representative. For reasons such as the Subcontractor's refusal to perform as agreed, subsequent unavailability or later discovered bid errors, or other similar reasons, but not including the availability of a lower Subcontract price, such substitution may be approved. The Contractor shall bear any additional cost incurred by such substitutions.

The Contractor shall not employ any Subcontractor that the Architect/Engineer, within seven (7) days after the date of receipt of the Contractor's list of Subcontractors or any supplemental list, objects to in writing as being unacceptable to either the Architect/Engineer, the Principal Representative or State Buildings

Programs. If a Subcontractor is deemed unacceptable, the Contractor shall propose a substitute Subcontractor and the Contract sum shall be adjusted by any demonstrated difference between the Subcontractor's bids, except where the Subcontractor has been debarred by the State or fails to meet qualifications of the Contract Documents to perform the work proposed.

The Contractor shall be fully responsible to the Principal Representative for the acts and omissions of Subcontractors and of persons either directly or indirectly employed by them. All instructions or orders in respect to work to be done by Subcontractors shall be given to the Contractor.

ARTICLE 16. RELATIONS OF CONTRACTOR AND SUBCONTRACTOR

The Contractor agrees to bind each Subcontractor to the terms of these General Conditions and to the requirements of the Drawings and Specifications, and any Addenda thereto, and also all the other Contract Documents, so far as applicable to the work of such Subcontractor. The Contractor further agrees to bind each Subcontractor to those terms of the General Conditions which expressly require that Subcontractors also be bound, including without limitation, requirements that Subcontractors waive all rights of subrogation, provide adequate general commercial liability and property insurance, automobile insurance and workers' compensation insurance as provided in Article 25, Insurance.

Nothing contained in the Contract Documents shall be deemed to create any contractual relationship whatsoever between any Subcontractor and the State of Colorado acting by and through its Principal Representative.

ARTICLE 17. MUTUAL RESPONSIBILITY OF CONTRACTORS

Should the Contractor cause damage to any separate contractor on the work, the Contractor agrees, upon due Notice, to settle with such contractor by agreement, if he or she will so settle. If such separate contractor sues the Principal Representative on account of any damage alleged to have been so sustained, the Principal Representative shall notify the Contractor, who shall defend such proceedings if requested to do so by Principal Representative. If any judgment against the Principal Representative arises there from, the Contractor shall pay or satisfy it and pay all costs and reasonable attorney fees incurred by the Principal Representative, in accordance with Article 52C, Indemnification, provided the Contractor was given due Notice of an opportunity to settle.

ARTICLE 18. SEPARATE CONTRACTS

The Principal Representative reserves the right to enter into other contracts in connection with the Project or the Contract. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate his or her work with theirs. If any part of the Contractor's work depends, for proper execution or results, upon the work of any other contractor, the Contractor shall inspect and promptly report to the Architect/Engineer any defects in such work that render it unsuitable for such proper execution and results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of work, except as to defects which may develop in the other Contractor's work after the execution of the Contractor's work.

To insure the proper execution of subsequent work, the Contractor shall measure work already in place and shall at once report to the Architect/Engineer any discrepancy between the executed work and the Drawings.

ARTICLE 19. USE OF PREMISES

The Contractor shall confine apparatus, the storage of materials and the operations of workmen to limits indicated by law, ordinances, permits and any limits lines shown on the Drawings. The Contractor shall not unreasonably encumber the premises with materials.

The Contractor shall enforce all of the Architect/Engineer's instructions and prohibitions regarding, without limitation, such matters as signs, advertisements, fires and smoking.

ARTICLE 20. CUTTING, FITTING OR PATCHING

The Contractor shall do all cutting, fitting or patching of work that may be required to make its several parts come together properly and fit it to receive or be received by work of other Contractors shown upon, or reasonably inferred from, the Drawings and Specifications for the complete structure, and shall provide for such finishes to patched or fitted work as the Architect/Engineer may direct. The Contractor shall not endanger any work by cutting, excavating or otherwise altering the work and shall not cut or alter the work of any other Contractor save with the consent of the Architect/Engineer.

ARTICLE 21. UTILITIES

A. TEMPORARY UTILITIES

Unless otherwise specifically stated in the Specifications or on the Drawings, the Principal Representative shall be responsible for the locations of all utilities as shown on the Drawings or indicated elsewhere in the Specifications, subject to the Contractor's compliance with all statutory or regulatory requirements to call for utility locates. When actual conditions deviate from those shown the Contractor shall comply with the requirements of Article 37, Differing Site Conditions. The Contractor shall provide and pay for the installation of all temporary utilities required to supply all the power, light and water needed by him and other Contractors for their Work and shall install and maintain all such utilities in such manner as to protect the public and workmen and conform with any applicable laws and regulations. Upon completion of the work, he or she shall remove all such temporary utilities from the site. The Contractor shall pay for all consumption of power, light and water used by him or her and the other Contractors, without regard to whether such items are metered by temporary or permanent meters. The Superintendent shall have full authority over all trades and Subcontractors at any tier to prevent waste. The cut-off date on permanent meters shall be either the agreed date of the date of the Notice of Substantial Completion or the Notice of Approval of Occupancy/Use of the Project.

B. PROTECTION OF EXISTING UTILITIES

Where existing utilities, such as water mains, sanitary sewers, storm sewers and electrical conduits, are shown on the Drawings, the Contractor shall be responsible for the protection thereof, without regard to whether any such utilities are to be relocated or removed as a part of the Work. If any utilities are to be moved, the moving must be conducted in such manner as not to cause undue interruption or delay in the operation of the same.

C. CROSSING OF UTILITIES

When new construction crosses highways, railroads, streets, or utilities under the jurisdiction of State, city or other public agency, public utility or private entity, the Contractor shall secure proper written permission before executing such new construction. The Contractor will be required to furnish a proper release before final acceptance of the Work.

ARTICLE 22. UNSUITABLE CONDITIONS

The Contractor shall not work at any time, or permit any work to be done, under any conditions contrary to those recommended by manufacturers or industry standards which are otherwise proper, unsuited for proper execution, safety and performance. Any cost caused by ill-timed work shall be borne by the Contractor unless the timing of such work shall have been directed by the Architect/Engineer or the Principal Representative, after the award of the Contract, and the Contractor provided Notice of any additional cost.

ARTICLE 23. TEMPORARY FACILITIES

A. OFFICE FACILITIES

The Contractor shall provide and maintain without additional expense for the duration of the Project temporary office facilities, as required and as specified, for his or her own use and the use of the Architect/Engineer, representatives of the Principal Representative and State Buildings Programs.

B. TEMPORARY HEAT

The Contractor shall furnish and pay for all the labor, facilities, equipment, fuel and power necessary to supply temporary heating, ventilating and air conditioning, except to the extent otherwise specified, and shall be responsible for the installation, operation, maintenance and removal of such facilities and

equipment. Unless otherwise specified, the permanent HVAC system shall not be used for temporary heat in whole or in part. If the Contractor desires to put the permanent system into use, in whole or in part, the Contractor shall set it into operation and furnish the necessary fuel and manpower to safely operate, protect and maintain that HVAC system. Any operation of all or any part of the permanent HVAC system including operation for testing purposes shall not constitute acceptance of the system, nor shall it relieve the Contractor of his or her one-year guarantee of the system from the date of the Notice of Substantial Completion of the entire Project, and if necessary due to prior operation, the Contractor shall provide manufacturers' extended warranties from the date of the Contractor's use prior to the date of the Notice of Substantial Completion.

C. WEATHER PROTECTION

The Contractor shall, at all times, provide protection against weather, so as to maintain all work, materials, apparatus and fixtures free from injury or damages.

D. DUST PARTITIONS

If the Work involves work in an occupied existing building, the Contractor shall erect and maintain during the progress of the work, suitable dust-proof temporary partitions, or more permanent partitions as specified, to protect such building and the occupants thereof.

E. BENCH MARKS

The Contractor shall maintain any site bench marks provided by the Principal Representative and shall establish any additional benchmarks specified by the Architect/Engineer as necessary for the Contractor to layout the work and ascertain all grades and levels as needed.

F. SIGN

The Contractor shall erect and permit one 4' x 8' sign only at the site to identify the Project as specified or directed by the Architect/Engineer which shall be maintained in good condition during the life of the Project.

G. SANITARY PROVISION

The Contractor shall provide and maintain suitable, clean, temporary sanitary toilet facilities for any and all workmen engaged on the Work, for the entire construction period, in strict compliance with the requirement of all applicable codes, regulations, laws and ordinances, and no other facilities, new or existing, may be used by any person on the Project. When the Project is complete the Contractor shall promptly remove them from the site, disinfect, and clean or treat the areas as required. If any new construction surfaces in the Project other than the toilet facilities provided for herein are soiled at any time, the entire areas so soiled shall be completely removed from the Project and rebuilt. In no event may present toilet facilities of any existing building at the site of the work be used by employees of any contractor.

ARTICLE 24. CLEANING UP

The Contractor shall keep the building and premises free from all surplus material, waste material, dirt and rubbish caused by employees or work, and at the completion of the Work shall remove all such surplus material, waste material, dirt, and rubbish, as well as all tools, equipment and scaffolding, and shall wash and clean all window glass and plumbing fixtures, perform cleanup and cleaning required by the Specifications and leave all of the work clean unless more exact requirements are specified.

ARTICLE 25. INSURANCE

A. GENERAL

The Contractor shall procure and maintain all insurance requirements and limits as set forth below, at his or her own expense, for the length of time set forth in Contract requirements. The Contractor shall continue to provide evidence of such coverage to State of Colorado on an annual basis during the aforementioned period including all of the terms of the insurance and indemnification requirements of this agreement. All below insurance policies shall include a provision preventing cancellation without thirty (30) days' prior notice by certified mail. A completed Certificate of Insurance shall be filed with the Principal Representative and State Buildings Programs within ten (10) days after the date of the

Notice of Award, said Certificate to specifically state the inclusion of the coverages and provisions set forth herein and shall state whether the coverage is “claims made” or “per occurrence”.

B. COMMERCIAL GENERAL LIABILITY INSURANCE (CGL)

This insurance must protect the Contractor from all claims for bodily injury, including death and all claims for destruction of or damage to property (other than the Work itself), arising out of or in connection with any operations under this Contract, whether such operations be by the Contractor or by any Subcontractor under him or anyone directly or indirectly employed by the Contractor or by a Subcontractor. All such insurance shall be written with limits and coverages as specified below and shall be written on an occurrence form.

General Aggregate	$2,000,000
Products – Completed Operations Aggregate	$2,000,000
Each Occurrence	$1,000,000
Personal Injury	$1,000,000

The following coverages shall be included in the CGL:

1. Per project general aggregate (CG 25 03 or similar)
2. Additional Insured status in favor of the State of Colorado and any other parties as outlined in The Contract and must include both ONGOING Operations AND COMPLETED Operations per CG2010 10/01 and CG 2037 10/01 or equivalent as permitted by law.
3. The policy shall be endorsed to be **primary and non-contributory** with any insurance maintained by Additional Insureds.
4. A waiver of Subrogation in favor of all Additional Insured parties.
5. Personal Injury Liability
6. Contractual Liability coverage to support indemnification obligation per Article 53.I
7. Explosion, collapse and underground (xcu)

The following exclusionary endorsements are prohibited in the CGL policy:

1. Damage to Work performed by Subcontract/Vendor (CG 22-94 or similar)
2. Contractual Liability Coverage Exclusion modifying or deleting the definition of an “insured contract” from the unaltered SO CG 0001 1001 policy from (CG 24 26 or similar)
3. If applicable to the Work to be performed: Residential or multi-family
4. If applicable to the Work to be performed :Exterior insulation finish systems
5. If applicable to the Work to be performed: Subsidence or Earth Movement

The Contractor shall maintain general liability coverage including Products and Completed Operations insurance, and the Additional Insured with primary and non-contributory coverage as specified in this Contract for three (3) years after completion of the project.

C. AUTOMOBILE LIABILITY INSURANCE and business auto liability covering liability arising out of any auto (including owned, hired and non-owned autos).

Combined Bodily Injury and Property Damage Liability
(Combined Single Limit): $1,000,000 each accident

Coverages:
Specific waiver of subrogation

D. WORKERS' COMPENSATION INSURANCE

The Contractor shall procure and maintain Workers' Compensation Insurance at his or her own expense during the life of this Contract, including occupational disease provisions for all employees per statutory requirements. Policy shall contain a waiver of subrogation in favor of the State of Colorado.

The Contractor shall also require each Subcontractor to furnish Workers' Compensation Insurance, including occupational disease provisions for all of the latter's employees, and to the extent not furnished, the Contractor accepts full liability and responsibility for Subcontractor's employees.

In cases where any class of employees engaged in hazardous work under this Contract at the site of the Project is not protected under the Workers' Compensation statute, the Contractor shall provide, and shall cause each Subcontractor to provide, adequate and suitable insurance for the protection of employees not otherwise protected.

E. UMBRELLA LIABILITY INSURANCE (for construction projects exceeding $10,000,000, provide the following coverage):

The Contractor shall maintain umbrella/excess liability insurance on an occurrence basis in excess of the underlying insurance described in Section B-D above. Coverage shall follow the terms of the underlying insurance, included the additional insured and waiver of subrogation provisions. The amounts of insurance required in Sections above may be satisfied by the Contractor purchasing coverage for the limits specified or by any combination of underlying and umbrella limits, so long as the total amount of insurance is not less than the limits specified in each section previously mentioned.

Each occurrence	$5,000,000
Aggregate	$5,000,000

F. BUILDER'S RISK INSURANCE

Unless otherwise expressly stated in the Supplementary General Conditions (e.g. where the State elects to provide for projects with a completed value of less than $1,000,000), the Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made or until no person or entity other than the Owner has an insurable interest in the property, or the Date of Notice specified on the Notice of Acceptance, State Form SBP-6.27 or whichever is later.

This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project as named insureds.

All associated deductibles shall be the responsibility of the Contractor. Such policy may have a deductible clause but not to exceed ten thousand dollars ($10,000.00).

Property insurance shall be on an "all risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

Contractor shall maintain Builders Risk coverage including partial use by Owner.
The Contractor shall waive all rights of subrogation as regards the State of Colorado and the Principal Representative, its officials, its officers, its agents and its employees, all while acting within the scope and course of their employment For damages caused by fire or thoer causes of loss to the extent covered by property insurance obtained pursuant to this Section or other property insurance applicable

to the Work. The Contractor shall require all Subcontractors at any tier to similarly waive all such rights of subrogation and shall expressly include such a waiver in all subcontracts.

Upon request, the amount of such insurance shall be increased to include the cost of any additional work to be done on the Project, or materials or equipment to be incorporated in the Project, under other independent contracts let or to be let. In such event, the Contractor shall be reimbursed for this cost as his or her share of the insurance in the same ratio as the ratio of the insurance represented by such independent contracts let or to be let to the total insurance carried.

The Principal Representative, with approval of the State Controller, shall have the power to adjust and settle any loss. Unless it is agreed otherwise, all monies received shall be applied first on rebuilding or repairing the destroyed or injured work.

G. POLLUTION LIABILITY INSURANCE

If Contractor is providing directly or indirectly work with pollution/environmental hazards, the Contractor must provide or cause those conducting the work to provide Pollution Liability Insurance coverage. Pollution Liability policy must include contractual liability coverage. State of Colorado must be included as additional insureds on the policy. The policy limits shall be in the amount of $1,000,000 with maximum deductible of $25,000 to be paid by the Subcontractor/Vendor.

H. ADDITIONAL MISCELLANEOUS INSURANCE PROVISIONS

Certificates of Insurance and/or insurance policies required under this Contract shall be subject to the following stipulations and additional requirements:

1. Any and all deductibles or self-insured retentions contained in any Insurance policy shall be assumed by and at the sole risk of the Contractor;
2. If any of the said policies shall fail at any time to meet the requirements of the Contract Documents as to form or substance, or if a company issuing any such policy shall be or at any time cease to be approved by the Division of Insurance of the State of Colorado, or be or cease to be in compliance with any stricter requirements of the Contract Documents, the Contractor shall promptly obtain a new policy, submit the same to the Principal Representative and State Building Programs for approval if requested, and submit a Certificate of Insurance as hereinbefore provided. Upon failure of the Contractor to furnish, deliver and maintain such insurance as provided herein, this Contract, in the sole discretion of the State of Colorado, may be immediately declared suspended, discontinued, or terminated. Failure of the Contractor in obtaining and/or maintaining any required insurance shall not relieve the Contractor from any liability under the Contract, nor shall the insurance requirements be construed to conflict with the obligations of the Contractor concerning indemnification;
3. All requisite insurance shall be obtained from financially responsible insurance companies, authorized to do business in the State of Colorado and acceptable to the Principal Representative;
4. Receipt, review or acceptance by the Principal Representative of any insurance policies or certificates of insurance required by this Contract shall not be construed as a waiver or relieve the Contractor from its obligation to meet the insurance requirements contained in these General Conditions.

ARTICLE 26. CONTRACTOR'S PERFORMANCE AND PAYMENT BONDS

The Contractor shall furnish a Performance Bond and a Labor and Material Payment Bond on State Forms SC-6.22, Performance Bond, and SC-6.221, Labor and Material Payment Bond, or such other forms as State Buildings Programs may approve for the Project, executed by a corporate Surety authorized to do business in the State of Colorado and in the full amount of the Contract sum. The expense of these bonds shall be borne by the Contractor and the bonds shall be filed with State Buildings Programs.

If, at any time, a Surety on such a bond is found to be, or ceases to be in strict compliance with any qualification requirements of the Contract Documents or the bid documents, or loses its right to do business in the State of Colorado, another Surety will be required, which the Contractor shall furnish to State

Buildings Programs within ten (10) days after receipt of Notice from the State or after the Contractor otherwise becomes aware of such conditions.

ARTICLE 27. LABOR AND WAGES

In accordance with laws of Colorado, C.R.S. § 8-17-101, et. seq., as amended, Colorado labor shall be employed to perform the work to the extent of not less than eighty percent (80%) of each type or class of labor in the several classifications of skilled and common labor employed on the Project. If the Federal Davis-Bacon Act shall be applicable to the Project, as indicated in Article 7B (Contractor's Agreement 6.21), Modification of Article 27, the minimum wage rates to be paid on the Project will be specified in the Contract Documents.

ARTICLE 28. ROYALTIES AND PATENTS

The Contractor shall be responsible for assuring that all rights to use of products and systems have been properly arranged and shall take such action as may be necessary to avoid delay, at no additional charge to the Principal Representative, where such right is challenged during the course of the work. The Contractor shall pay all royalties and license fees required to be paid and shall defend all suits or claims for infringement of any patent rights and shall save the State of Colorado harmless from loss on account thereof, in accordance with Article 52C, Indemnification; provided, however, the Contractor shall not be responsible for such loss or defense for any copyright violations contained in the Contract Documents prepared by the Architect/Engineer or the Principal Representative of which the Contractor is unaware, or for any patent violations based on specified processes that the Contractor is unaware are patented or that the Contractor should not have had reason to believe were patented.

ARTICLE 29. ASSIGNMENT

Except as otherwise provided hereafter the Contractor shall not assign the whole or any part of this Contract without the written consent of the Principal Representative. This provision shall not be construed to prohibit assignments of the right to payment to the extent permitted by C.R.S. § 4-9-406, et. seq., as amended, provided that written Notice of assignment adequate to identify the rights assigned is received by the Principal Representative and the controller for the agency, department, or institution executing this Contract (as distinguished from the State Controller). Such assignment of the right to payment shall not be deemed valid until receipt by the Principal Representative and such controller and the Contractor assumes the risk that such written Notice of assignment is received by the Principal Representative and the controller for the agency, department, or institution involved. In case the Contractor assigns all or part of any moneys due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any moneys due or to become due to the Contractor shall be subject to all claims of all persons, firms, and corporations for services rendered or materials supplied for the performance of the work called for in this Contract, whether said service or materials were supplied prior to or after the assignment. Nothing in this Article shall be deemed a waiver of any other defenses available to the State against the Contractor or the assignee.

ARTICLE 30. CORRECTION OF WORK BEFORE ACCEPTANCE

The Contractor shall promptly remove from the premises all work or materials condemned or declared irreparably defective as failing to conform to the Contract Documents on receipt of written Notice from the Architect/Engineer or the Principal Representative, whether incorporated in the Work or not. If such materials shall have been incorporated in the Work, or if any unsatisfactory work is discovered, the Contractor shall promptly replace and re-execute his or her work in accordance with the requirements of the Contract Documents without expense to the Principal Representative, and shall also bear the expense of making good all work of other contractors destroyed or damaged by the removal or replacement of such defective material or work.

If the Contractor does not remove such condemned or irreparably defective work or material within a reasonable time, the Principal Representative may, after giving a second seven (7) day advance Notice to the Contractor and the Surety, remove them and may store the material at the Contractor's expense. The Principal Representative may accomplish the removal and replacement with its own forces or with another Contractor. If the Contractor does not pay the expense of such removal and pay all storage charges within ten (10) days thereafter, the Principal Representative may, upon ten (10) days' written Notice, sell such

material at auction or at private sale and account for the net proceeds thereof, after deducting all costs and expenses which should have been borne by the Contractor. If the Contractor shall commence and diligently pursue such removal and replacement before the expiration of the seven day period, or if the Contractor shall show good cause in conjunction with submittal of a revised CPM schedule showing when the work will be performed and why such removal of condemned work should be scheduled for a later date, the Principal Representative shall not proceed to remove or replace the condemned work.

Should any defective work or material be discovered during the process of construction, or should reasonable doubt arise as to whether certain material or work is in accordance with the Contract Documents, the value of such defective or questionable material or work shall not be included in any application for payment, or if previously included, shall be deducted by the Architect/Engineer from the next application submitted by the Contractor.

If the Contractor does not perform repair, correction and replacement of defective work, in lieu of proceeding by issuance of a Notice of intent to remove condemned work as outlined above, the Principal Representative may, not less than seven (7) days after giving the original written Notice of the need to repair, correct, or replace defective work, deduct all costs and expenses of replacement or correction as instructed by the Architect/Engineer from the Contractor's next application for payment in addition to the value of the defective work or material. The Principal Representative may also make an equitable deduction from the Contract sum by unilateral Change Order, in accordance with Article 33, Payments Withheld and Article 35, Changes In The Work.

If the Contractor disagrees with the Notice to remove work or materials condemned or declared irreparably defective, the Contractor may request facilitated negotiation of the issue and the Principal Representative's right to proceed with removal and to deduct costs and expenses of repair shall be suspended and tolled until such time as the parties meet and negotiate the issue

During construction, whenever the Architect/Engineer has advised the Contractor in writing, in the Specifications, by reference to Article 6, Architect/Engineer Decisions And Judgments, of these General Conditions or elsewhere in the Contract Documents of a need to observe materials in place prior to their being permanently covered up, it shall be the Contractor's responsibility to notify the Architect/Engineer at least forty-eight (48) hours in advance of such covering operation. If the Contractor fails to provide such notification, Contractor shall, at his or her expense, uncover such portions of the work as required by the Architect/Engineer for observation, and reinstall such covering after observation. When a covering operation is continued from day to day, notification of the commencement of a single continuing covering operation shall suffice for the activity specified so long as it proceeds regularly and without interruption from day to day, in which event the Contractor shall coordinate with the Architect/Engineer regarding the continuing covering operation.

ARTICLE 31. APPLICATIONS FOR PAYMENTS

A. CONTRACTOR'S SUBMITTALS

On or before the first day of each month and no more than five days prior thereto, the Contractor may submit applications for payment for the work performed during such month covering the portion of the Work completed as of the date indicated, and payments on account of this Contract shall be due within thirty (30) days after the last day of the period for which payment is requested. The Contractor shall submit the application for payment to the Architect/Engineer on State forms SBP-7.2, Certificate for Contractor's Payment, or such other format as the State Buildings Programs shall approve, in an itemized format in accordance with the schedule of values or a cost loaded CPM when required, supported to the extent reasonably required by the Architect/Engineer or the Principal Representative by receipts or other vouchers, showing payments for materials and labor, prior payments and payments to be made to Subcontractors and such other evidence of the Contractor's right to payments as the Architect/Engineer or Principal Representative may direct.

If payments are made on account of materials not incorporated in the Work but delivered and suitably stored at the site, or at some other location agreed upon in writing, such payments shall be conditioned upon submission by the Contractor of bills of sale or such other procedure as will establish the

Principal Representative's title to such material or otherwise adequately protect the Principal Representative's interests, and shall provide proof of insurance whenever requested by the Principal Representative or the Architect/Engineer, and shall be subject to the right to inspect the materials at the request of either the Architect/Engineer or the Principal Representative.

All applications for payment, except the final application, and the payments there under, shall be subject to correction in the next application rendered following the discovery of any error.

B. ARCHITECT/ENGINEER CERTIFICATION

In accordance with the Architect/Engineer's agreement with the Principal Representative, the Architect/Engineer after appropriate observation of the progress of the work shall certify to the Principal Representative the amount that the Contractor is entitled to, and forward the application to the Principal Representative. If the Architect/Engineer certifies an amount different from the amount requested or otherwise alters the Contractor's application for payment, a copy shall be forwarded to the Contractor.

If the Architect/Engineer is unable to certify all or portions of the amount requested due to the absence or lack of required supporting evidence, the Architect/Engineer shall advise the Contractor of the deficiency. If the deficiency is not corrected at the end of ten (10) days, the Architect/Engineer may either certify the remaining amounts properly supported to which the Contractor is entitled, or return the application for payment to the Contractor for revision with a written explanation as to why it could not be certified.

C. RETAINAGE WITHHELD

Unless otherwise provided in the Supplementary General Conditions, an amount equivalent to five percent (5%) of the amount shown to be due the Contractor on each application for payment shall be withheld until the work required by the Contract has been performed. The withheld percentage of the contract price of any such work, improvement, or construction shall be administered according to § 24-91-101, et seq., C.R.S., as amended, and except as provided in § 24-91-103, C.R.S., as amended, and Article 31D, shall be retained until the Work or discrete portions of the Work, have been completed satisfactorily, finally or partially accepted, and advertised for final settlement as further provided in Article 41.

D. RELEASE OF RETAINAGE

The Contractor may, for satisfactory and substantial reasons shown to the Principal Representative's satisfaction, make a written request to the Principal Representative and the Architect/Engineer for release of part or all of the withheld percentage applicable to the work of a Subcontractor which has completed the subcontracted work in a manner finally acceptable to the Architect/Engineer, the Contractor, and the Principal Representative. Any such request shall be supported by a written approval from the Surety furnishing the Contractor's bonds and any surety that has provided a bond for the Subcontractor. The release of any such withheld percentage shall be further supported by such other evidence as the Architect/Engineer or the Principal Representative may require, including but not limited to, evidence of prior payments made to the Subcontractor, copies of the Subcontractor's contract with the Contractor, any applicable warranties, as-built information, maintenance manuals and other customary close-out documentation. Neither the Principal Representative nor the Architect Engineer shall be obligated to review such documentation nor shall they be deemed to assume any obligations to third parties by any review undertaken.

The Contractor's obligation under these General Conditions to guarantee work for one year from the date of the Notice of Substantial Completion or the date of any Notice of Partial Substantial Completion of the applicable portion or phase of the Project, shall be unaffected by such partial release; unless a Notice of Partial Substantial Completion is issued for the work subject to the release of retainage.

Any rights of the Principal Representative which might be terminated by or from the date of any final acceptance of the Work, whether at common law or by the terms of this Contract, shall not be affected by such partial release of retainage prior to any final acceptance of the entire Project.

The Contractor remains fully responsible for the Subcontractor's work and assumes any risk that might arise by virtue of the partial release to the Subcontractor of the withheld percentage, including the risk that the Subcontractor may not have fully paid for all materials, labor and equipment furnished to the Project.

If the Principal Representative considers the Contractor's request for such release satisfactory and supported by substantial reasons, the Architect/Engineer shall make a "final inspection" of the applicable portion of the Project to determine whether the Subcontractor 's work has been completed in accordance with the Contract Documents. A final punch list shall be made for the Subcontractor's work and the procedures of Article 41, Completion, Final Inspection, Acceptance and Settlement, shall be followed for that portion of the work, except that advertisement of the intent to make final payment to the Subcontractor shall be required only if the Principal Representative has reason to believe that a supplier or Subcontractor to the Subcontractor for which the request is made, may not have been fully paid for all labor and materials furnished to the Project.

ARTICLE 32. CERTIFICATES FOR PAYMENTS

State Form SBP-7.2, Certificate For Contractor's Payment, and its continuation detail sheets, when submitted, shall constitute the Certificate of Contractor 's Application for Payment, and shall be a representation by the Contractor to the Principal Representative that the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and materials for which payment is requested have been incorporated into the Project except as noted in the application. If requested by the Principal Representative the Certificate of Contractor's Application for Payment shall be sworn under oath and notarized.

ARTICLE 33. PAYMENTS WITHHELD

The Architect/Engineer, the Principal Representative or State Buildings Programs may withhold, or on account of subsequently discovered evidence nullify, the whole or any part of any application on account of, but not limited to any of the following:

1. Defective work not remedied;
2. Claims filed or reasonable evidence indicating probable filing of claims;
3. Failure of the Contractor to make payments to Subcontractors for material or labor;
4. A reasonable doubt that the Contract can be completed for the balance of the contract price then unpaid;
5. Damage or injury to another contractor or any other person, persons or property except to the extent of coverage by a policy of insurance;
6. Failure to obtain necessary permits or licenses or to comply with applicable laws, ordinances, codes, rules or regulations or the directions of the Architect/Engineer;
7. Failure to submit a monthly construction schedule;
8. Failure of the Contractor to keep work progressing in accordance with the time schedule;
9. Failure to keep a superintendent on the work;
10. Failure to maintain as built drawings of the work in progress;
11. Unauthorized deviations by the Contractor from the Contract Documents; or
12. On account of liquidated damages.

In addition, the Architect Engineer, Principal Representative or State Buildings Programs may withhold or nullify the whole or any part of any application for any reason noted elsewhere in these General Conditions of the Contract. Nullification shall mean reduction of amounts shown as previously paid on the application. The amount withheld or nullified may be in such amount as the Architect/Engineer or the Principal Representative estimates to be required to allow the State to accomplish the Work, cure the failure and cover any damages or injuries, including an allowance for attorneys fees and costs where appropriate.

When the grounds for such withholding or nullifying are removed, payment shall be made for the amounts thus withheld or nullified on such grounds.

.

ARTICLE 34. DEDUCTIONS FOR UNCORRECTED WORK

If the Architect/Engineer and the Principal Representative deem it inexpedient to correct work injured or not performed in accordance with the Contract Documents, the Principal Representative may, after consultation with the Architect/Engineer and ten (10) days' Notice to the Contractor of intent to do so, make reasonable reductions from the amounts otherwise due the Contractor on the next application for payment. Notice shall specify the amount or terms of any contemplated reduction. The Contractor may during this period elect to correct or perform the work. If the Contractor does not elect to correct or perform the work, an equitable deduction from the Contract sum shall be made by Change Order, in accordance with Article 35, Changes In The Work, unilaterally if necessary. If either party elects facilitation of this issue after Notice is given, the ten-day notice period shall be extended and tolled until facilitation has occurred.

ARTICLE 35. CHANGES IN THE WORK

The Principal Representative, or such other Procurement Officer as the Principal Representative may designate, without invalidating the Agreement, and with the approval of State Buildings Programs and the State Controller, may order extra work or make changes with or without the consent of the Contractor as hereafter provided, by altering, adding to or deducting from the Work, the Contract sum being adjusted accordingly. All such changes in the Work shall be within the general scope of and be executed under the conditions of the Contract, except that any claim for extension of time made necessary due to the change or any claim of other delay or other impacts caused by or resulting from the change in the Work shall be presented by the Contractor and adjusted by Change Order to the extent known at the time such change is ordered and before proceeding with the extra or changed work. Any claims for extension of time or of delay or other impacts, and any costs associated with extension of time, delay or other impacts, which are not presented before proceeding with the change in the Work, and which are not adjusted by Change Order to the extent known, shall be waived.

The Architect/Engineer shall have authority to make minor changes in the Work, not involving extra cost, and not inconsistent with the intent of the Contract Documents, but otherwise, except in an emergency endangering life or property, no extra work or change in the Contract Documents shall be made unless by 1) a written Change Order, approved by the Principal Representative, State Buildings Programs, and the State Controller prior to proceeding with the changed work; or 2) by an Emergency Field Change Order approved by the Principal Representative and State Buildings Programs as hereafter provided in Article 35C, Emergency Field Ordered Changed Work; or 3) by an allocation in writing of any allowance already provided in the encumbered contract amount, the Contract sum being later adjusted to decrease the Contract sum by any unallocated or unexpended amounts remaining in such allowance. No change to the Contract sum shall be valid unless so ordered.

A. THE VALUE OF CHANGED WORK

1. *The value of any extra work or changes in the Work shall be determined by agreement in one or more of the following ways:*
   a. *By estimate and acceptance of a lump-sum amount;*
   b. *By unit prices specified in the Agreement, or subsequently agreed upon, that are extended by specific quantities;*
   c. *By actual cost plus a fixed fee in a lump sum amount for profit, overhead and all indirect and off-site home office costs, the latter amount agreed upon in writing prior to starting the extra or changed work.*
2. *Where the Contractor and the Principal Representative cannot agree on the value of extra work, the Principal Representative may order the Contractor to perform the changes in the Work and a Change Order may be unilaterally issued based on an estimate of the change in the Work prepared by the Architect/Engineer. The value of the change in the Work shall be the Principal Representative's determination of the amount of equitable adjustment attributable to the extra work or change. The Principal Representative's determination shall be subject to*

appeal by the Contractor pursuant to the claims process in Article 36, Claims. The Principal Representative is the Procurement Officer for purposes of all of the remedies provisions of the Contract.

3. *Except as otherwise provided in Article 35B, Detailed Breakdown, below, the Cost Principles of the Colorado Procurement Rules in effect on the date of this Contract, pursuant to § 24-107-101, C.R.S., as amended, shall govern all Contract changes.*

B. DETAILED BREAKDOWN

In all cases where the value of the extra or changed work is not known based on unit prices in the Contractor 's bid or the Agreement, a detailed change proposal shall be submitted by the Contractor on a Change Order Proposal (SC-6.312), or in such other format as the State Buildings Program approves, with which the Principal Representative may require an itemized list of materials, equipment and labor, indicating quantities, time and cost for completion of the changed work.

Such detailed change proposals shall be stated in lump sum amounts and shall be supported by a separate breakdown, which shall include estimates of all or part of the following when requested by the Architect/Engineer or the Principal Representative:

1. *Materials, indicating quantities and unit prices including taxes and delivery costs if any (separated where appropriate into general, mechanical and electrical and/or other Subcontractors' work; and the Principal Representative may require in its discretion any significant subcontract costs to be similarly and separately broken down).*
2. *Labor costs, indicating hourly rates and time and labor burden to include Social Security and other payroll taxes such as unemployment, benefits and other customary burdens.*
3. *Costs of project management time and superintendence time of personnel stationed at the site, and other field supervision time, but only where a time extension, other than a weather delay, is approved as part of the Change Order, and only where such project management time and superintendence time is directly attributable to and required by the change; provided however that additional cost of on-site superintendence shall be allowable whenever in the opinion of the Architect/Engineer the impact of multiple change requests to be concurrently performed will result in inadequate levels of supervision to assure a proper result unless additional superintendence is provided.*
4. *Construction equipment (including small tools). Expenses for equipment and fuel shall be based on customary commercially reasonable rental rates and schedules. Equipment and hand tool costs shall not include the cost of items customarily owned by workers.*
5. *Workers' compensation costs, if not included in labor burden.*
6. *The cost of commercial general liability and property damage insurance premiums but only to the extent charged the Contractor as a result of the changed work.*
7. *Overhead and profit, as hereafter specified.*
8. *Builder's risk insurance premium costs.*
9. *Bond premium costs.*
10. *Testing costs not otherwise excluded by these General Conditions.*
11. *Subcontract costs.*

Unless modified in the Supplementary General Conditions, overhead and profit shall not exceed the percentages set forth in the table below.

	OVERHEAD	*PROFIT*	*COMMISSION*
To the Contractor or to Subcontractors for the portion of work performed with their own forces:	*10%*	*5%*	
To the Contractor or to Subcontractors for work performed by others at a tier immediately below either of them:	*5%*		*5%*

Overhead shall include: a) insurance premium for policies not purchased for the Project and itemized above, b) home office costs for office management, administrative and supervisory personnel and assistants, c) estimating and change order preparation costs, d) incidental job burdens, e) legal costs, f) data processing costs, g) interest costs on capital, h) general office expenses except those attributable to increased rental expenses for temporary facilities, and all other indirect costs, but shall not include the Social Security tax and other direct labor burdens. The term "work" as used in the proceeding table shall include labor, materials and equipment and the "Commission" shall include all costs and profit for carrying the subcontracted work at the tiers below except direct costs as listed in items 1 through 11 above if any.

On proposals for work involving both additions and credits in the amount of the Contract sum, the overhead and profit will be allowed on the net increase only. On proposals resulting in a net deduct to the amount of the Contract sum, profit on the deducted amount shall be returned to the Principal Representative at fifty percent (50%) of the rate specified. The inadequacy of the profit specified shall not be a basis for refusal to submit a proposal.

Except in the case of Change Orders or Emergency Field Change Orders agreed to on the basis of a lump sum amount or unit prices as described in paragraphs 35A1 and 35A2 above, The Value of Changed Work, the Contractor shall keep and present a correct and fully auditable account of the several items of cost, together with vouchers, receipts, time cards and other proof of costs incurred, summarized on a Change Order form (SC-6.31) using such format for supporting documentation as the Principal Representative and State Buildings Programs approve. This requirement applies equally to work done by Subcontractors. Only auditable costs shall be reimbursable on Change Orders where the value is determined on the basis of actual cost plus a fixed fee pursuant to paragraph 35A3 above, or where unilaterally determined by the Principal Representative on the basis of an equitable adjustment in accordance with the Procurement Rules, as described above in Article 35A, The Value Of Changed Work.

Except for proposals for work involving both additions and credits, changed work shall be adjusted and considered separately for work either added or omitted. The amount of adjustment for work omitted shall be estimated at the time it is directed to be omitted, and when reasonable to do so, the agreed adjustment shall be reflected on the schedule of values used for the next Contractor 's application for payment.

The Principal Representative reserves the right to contract with any person or firm other than the Contractor for any or all extra work; however, unless specifically required in the Contract Documents, the Contractor shall have no responsibility without additional compensation to supervise or coordinate the work of persons or firms separately contracted by the Principal Representative.

C. EMERGENCY FIELD CHANGE ORDERED WORK

The Principal Representative, without invalidating the Agreement, and with the approval of State Buildings Programs and without the approval of the State Controller, may order extra work or make changes in the case of an emergency that is a threat to life or property or where the likelihood of delays in processing a normal Change Order will result in substantial delays and or significant cost

increases for the Project. Emergency Field Orders are not to be used solely to expedite normal Change Order processing absent a clear showing of a high potential for significant and substantial cost or delay. Such changes in the Work may be directed through issuance of an Emergency Field Change Order signed by the Contractor, the Principal Representative (or by a designee specifically appointed to do so in writing), and approved by the Director of State Buildings Program or his or her delegate. The change shall be directed using an Emergency Field Change Order form (SC-6.31E).

If the amount of the adjustment of the Contract price and time for completion can be determined at the time of issuance of the Emergency Field Change Order, those adjustments shall be reflected on the face of the Emergency Field Change Order. Otherwise, the Emergency Field Change Order shall reflect a not to exceed (NTE) amount for any schedule adjustment (increasing or decreasing the time for completion) and an NTE amount for any adjustment to Contract sum, which NTE amount shall represent the maximum amount of adjustment to which the Contractor will be entitled, including direct and indirect costs of changed work, as well as any direct or indirect costs attributable to delays, inefficiencies or other impacts arising out of the change. Emergency Field Change Orders directed in accordance with this provision need not bear the approval signatures of the State Controller.

On Emergency Field Change Orders where the price and schedule have not been finally determined, the Contractor shall submit final costs for adjustment as soon as practicable. No later than seven (7) days after issuance, except as otherwise permitted, and every seven days thereafter, the Contractor shall report all costs to the Principal Representative and the Architect/Engineer. The final adjustment of the Emergency Field Change Order amount and the adjustment to the Project time for completion shall be prepared on a normal Change Order from (SC-6.31) in accordance with the procedures described in Article 35A, The Value of Changed Work, and B, Detailed Breakdown, above. Unless otherwise provided in writing signed by the Director of State Buildings Programs to the Principal Representative and the Contractor, describing the extent and limits of any greater authority, individual Emergency Field Change Orders shall not be issued for more than $25,000, nor shall the cumulative value of Emergency Field Change Orders exceed an amount of $100,000.

D. APPROPRIATION LIMITATIONS - § 24-91-103.6, C.R.S., as amended

The amount of money appropriated, as shown on the Agreement (SC 6.21), is equal to or in excess of the Contract amount. No Change Order, Emergency Field Change Order, or other type of order or directive shall be issued by the Principal Representative, or any agent acting on his or her behalf, which directs additional compensable work to be performed, which work causes the aggregate amount payable under the Contract to exceed the amount appropriated for the original Contract, as shown on the Agreement (SC-6.21), unless one of the following occurs: (1) the Contractor is provided written assurance from the Principal Representative that sufficient additional lawful appropriations exist to cover the cost of the additional work; or (2) the work is covered by a contractor remedy provision under the Contract, such as a claim for extra cost. By way of example only, no assurance is required for any order, directive or instruction by the Architect/Engineer or the Principal Representative to perform work which is determined to be within the performance required by the Contract Documents; the Contractor's remedy shall be as described elsewhere in these General Conditions.

Written assurance shall be in the form of an Amendment to the Contract reciting the source and amount of such appropriation available for the Project. No remedy granting provision of this Contract shall obligate the Principal Representative to seek appropriations to cover costs in excess of the amounts recited as available to pay for the work to be performed.

ARTICLE 36. CLAIMS

It is the intent of these General Conditions to provide procedures for speedy and timely resolution of disagreements and disputes at the lowest level possible. In the spirit of on the job resolution of job site issues, the parties are encouraged to use the partnering processes of Article 2D, Partnering, Communications and Cooperation, before turning to the more formal claims processes described in this Article 36, Claims. The use of non-binding dispute resolution, whether through the formal processes described in Article 39, Non-Binding Dispute Resolution – Facilitated Negotiations, or through less formal alternative processes developed as part of a partnering plan, are also encouraged. Where such process

cannot resolve the issues in dispute, the claims process that follows is intended to cause the issues to be presented, decided and where necessary, documented in close proximity to the events from which the issues arise. To that end, and in summary of the remedy granting process that follows commencing with the next paragraph of this Article 36, Claims, the Contractor shall 1) first, seek a decision by the Architect/Engineer, and 2) shall second, informally present the claim to Principal Representative as described hereafter, and 3) failing resolution in the field, give Notice of intent to exercise statutory rights of review of a formal contract controversy, and 4) seek resolution outside the Contract as provided by the Procurement Code.

If the Contractor claims that any instructions, by detailed drawings, or otherwise, or any other act or omission of the Architect/Engineer or Principal Representative affecting the scope of the Contractor's work, involve extra cost, extra time or changes in the scope of the Work under this Contract, the Contractor shall have the right to assert a claim for such costs or time, provided that before either proceeding to execute such work (except in an emergency endangering life or property), or filing a Notice of claim, the Contractor shall have obtained or requested a written decision of the Architect/Engineer following the procedures as provided in Article 6A and B, Architect/Engineer Decisions and Judgments, respectively; provided, however, that in the case of a directed change in the Work pursuant to Article 36A4, no written judgment or decision of the Architect/Engineer is required. If the Contractor is delayed by the lack of a response to a request for a decision by the Architect/Engineer, the Contractor shall give Notice in accordance with Article 38, Delays And Extensions Of Time.

Unless it is the Architect/Engineer's judgment and determination that the work is not included in the performance required by the Contract Documents, the Contractor shall proceed with the work as originally directed. Where the Contractor's claim involves a dispute concerning the value of work unilaterally directed pursuant to Article 35A3 the Contractor shall also proceed with the work as originally directed while his or her claim is being considered.

The Contractor shall give the Principal Representative and the Architect/Engineer Notice of any claim promptly after the receipt of the Architect/Engineer's decision, but in no case later than three (3) business days after receipt of the Architect/Engineer's decision (or no later than ten (10) days from the date of the Contractor's request for a decision when the Architect/Engineer fails to decide as provided in Article 6). The Notice of claim shall state the grounds for the claim and the amount of the claim to the extent known in accordance with the procedures of Article 35, Changes In The Work. The period in which Notice must be given may be extended by the Principal Representative if requested in writing by the Contractor with good cause shown, but any such extension to be effective shall be in writing.

The Principal Representative shall respond in writing, with a copy to the Architect/Engineer, within a reasonable time, and except where a request for facilitation of negotiation has been made as hereafter provided, in no case later than seven (7) business days (or at such other time as the Contractor and Principal Representative agree) after receipt of the Contractor's Notice of claim regarding such instructions or alleged act or omission. If no response to the Contractor's claim is received within seven (7) business days of Contractor's Notice (or at such other time as the Contractor and Principal Representative agree) and the instructions have not been retracted, it shall be deemed that the Principal Representative has denied the claim.

The Principal Representative may grant or deny the claim in whole or in part, and a Change Order shall be issued if the claim is granted. To the extent any portion of claim is granted where costs are not clearly shown, the Principal Representative may direct that the value of that portion of the work be determined by any method allowed in Article 35A, The Value of Changed Work. Except in the case of a deemed denial, the Principal Representative shall provide a written explanation regarding any portion of the Contractor's claim that is denied.

If the Contractor disagrees with the Principal Representative's judgment and determination on the claim and seeks an equitable adjustment of the Contract sum or time for performance, he or she shall give Notice of intent to exercise his or her statutory right to seek a decision on the contract controversy within ten (10) days of receipt of the Principal Representative's decision denying the claim. A "contract controversy," as such

term is used in the Colorado Procurement Code, § 24-109-106, C.R.S., shall not arise until the initial claim process described above in this Article 36 has been properly exhausted by the Contractor. The Contractor's failure to proceed with work directed by the Architect/Engineer or to exhaust the claim process provided above in this Article 36, shall constitute an abandonment of the claim by the Contractor and a waiver of the right to contest the decision in any forum.

At the time of filing the Notice of intent to exercise his or her statutory right to seek a decision on the contract controversy, the Contractor may request that the Principal Representative defer a decision on the contract controversy until a later date or until the end of the Project. If the Principal Representative agrees, he or she shall so advise the Contractor in writing. If no such request is made, or if the Principal Representative does not agree to such a request, the Principal Representative shall render a written decision within twenty (20) business days and advise the Contractor of the reasons for any denial. Unless the claim has been decided by the Principal Representative (as opposed to delegates of the Principal Representative), the person who renders the decision on this statutory contract controversy shall not be the same person who decided the claim. To the extent any portion of the contract controversy is granted where costs are not clearly shown, the Principal Representative may direct that the value of that portion of the work be determined by any method allowed in Article 35A, The Value of Changed Work. In the event of a denial the Principal Representative shall give Notice to the Contractor of his or her right to administrative and judicial reviews as provided in the Colorado Procurement Code, § 24-109-201 *et seq*, C.R.S., as amended. If no decision regarding the contract controversy is issued within twenty (20) business days of the Contractor's giving Notice (or such other date as the Contractor and Principal Representative have agreed), and the instructions have not been retracted or the alleged act or omission have not been corrected, it shall be deemed that the Principal Representative has ruled by denial on the contract controversy. Except in the case of a deemed denial, the Principal Representative shall provide an explanation regarding any portion of the contract controversy that involves denial of the Contractor's claim.

Either the Contractor or the Principal Representative may request facilitation of negotiations concerning the claim or the contract controversy, and if requested, the parties shall consult and negotiate before the Principal Representative decides the issue. Any request for facilitation by the Contractor shall be made at the time of the giving of Notice of the claim or Notice of the contract controversy. Facilitation shall extend the time for the Principal Representative to respond by commencing the applicable period at the completion of the facilitated negotiation, which shall be the last day of the parties' meeting, unless otherwise agreed in writing.

Disagreement with the decision of the Architect Engineer, or the decision of the Principal Representative to deny any claim or denying the contract controversy, shall not be grounds for the Contractor to refuse to perform the work directed or to suspend or terminate performance. During the period that any claim or contract controversy decision is pending under this Article 36, Claims, the Contractor shall proceed diligently with the work directed.

In all cases where the Contractor proceeds with the work and seeks equitable adjustment by filing a claim and or statutory appeal, the Contractor shall keep a correct account of the extra cost, in accordance with Article 35B, Detailed Breakdown supported by receipts. The Principal Representative shall be entitled to reject any claim or contract controversy whenever the foregoing procedures are not followed and such accounts and receipts are not presented.

The payments to the Contractor in respect of such extra costs shall be limited to reimbursement for the current additional expenditure by the Contractor made necessary by the change in the work, plus a reasonable amount for overhead and profit, determined in accordance with Article 35B, Detailed Breakdown, determined solely with reference to the additional work, if any, required by the change.

ARTICLE 37. DIFFERING SITE CONDITIONS

A. NOTICE IN WRITING

The Contractor shall promptly, and where possible before conditions are disturbed, give the Architect/Engineer and the Principal Representative Notice in writing of:

1. *subsurface or latent physical conditions at the site differing materially from those indicated in or reasonably assumed from the information provided in the Contract Documents; and,*
2. *unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents.*

The Architect/Engineer shall promptly investigate the conditions, and if it is found that such conditions do materially so differ and cause an increase or decrease in the Contractor 's costs of performance of any part of the work required by the Contract Documents, whether or not such work is changed as a result of such conditions, an equitable adjustment shall be made and the Contract sum shall be modified in accordance with Article 35, Changes In The Work.

If the time required for completion of the work affected by such materially differing conditions will extend the work on the critical path as indicated on the CPM schedule, the time for completion shall also be equitably adjusted.

B. LIMITATIONS

No claim of the Contractor under this clause shall be allowed unless the Contractor has given the Notice required in Article 37A, Notice In Writing, above. The time prescribed for presentation and adjustment in Articles 36, Claims and 38, Delays And Extensions Of Time, shall be reasonably extended by the State to the extent required by the nature of the differing conditions; provided, however, that even when so extended no claim by the Contractor for an equitable adjustment hereunder shall be allowed if not quantified and presented prior to the date the Contractor requests a final inspection pursuant to Article 41A, Notice Of Completion.

ARTICLE 38. DELAYS AND EXTENSIONS OF TIME

If the Contractor is delayed at any time in the progress of the Work by any act or neglect of the State of Colorado or the Architect/Engineer, or of any employee or agent of either, or by any separately employed Contractor or by strikes, lockouts, fire, unusual delay in transportation, unavoidable casualties or any other causes beyond the Contractor's control, including weather delays as defined below, the time of Completion of the Work shall be extended for a period equal to such portion of the period of delays directly affecting the completion of the Work as the Contractor shall be able to show he or she could not have avoided by the exercise of due diligence.

The Contractor shall provide Notice in writing to the Architect/Engineer, the Principal Representative and State Buildings Programs within three (3) business days from the beginning of such delay and shall file a written claim for an extension of time within seven (7) business days after the period of such delay has ceased, otherwise, any claim for an extension of time is waived.

Provided that the Contractor has submitted reasonable schedules for approval when required by Article 12, Requests for Information and Schedules, if no schedule is agreed to fixing the dates on which the responses to requests for information or detail drawings will be needed, or Shop Drawings, Product Data or Samples are to be reviewed as required or allowed by Article 12B, Schedules, no extension of time will be allowed for the Architect/ Engineer's failure to furnish such detail drawings as needed, or for the failure to initially review Shop Drawings, Product Data or Samples, except in respect of that part of any delay in furnishing detail drawings or instructions extending beyond a reasonable period after written demand for such detailed drawings or instructions is received by the Architect/Engineer. In any event, any claim for an extension of time for such cause will be recognized only to the extent of delay directly caused by failure to furnish detail drawings or instructions or to review Shop Drawings, Product Data or Samples pursuant to schedule, after such demand.

All claims for extension of time due to a delay claimed to arise or result from ordered changes in the scope of the Work, or due to instructions claimed to increase the scope of the Work, shall be presented to the Architect/Engineer, the Principal Representative and State Buildings Programs as part of a claim for extra cost, if any, in accordance with Article 36, Claims, and in accordance with the Change Order procedures required by Article 35, Changes In The Work.

Except as otherwise provided in this paragraph, no extension of time shall be granted when the Contractor has failed to utilize a CPM schedule or otherwise identify the Project's critical path as specified in Article 12, Requests for Information and Schedules, or has elected not to do so when allowed by the Supplementary General Conditions or the Specifications to use less sophisticated scheduling tools, or has failed to maintain such a schedule. Delay directly affecting the completion of the Work shall result in an extension of time only to the extent that completion of the Work was affected by impacts to the critical path shown on Contractor's CPM schedule. Where the circumstances make it indisputable in the opinion of the Architect/Engineer that the delay affected the completion of the Work so directly that the additional notice of the schedule impact by reference to a CPM schedule was unnecessary, a reasonable extension of time may be granted.

Extension of the time for completion of the Work will be granted for delays due to weather conditions only when the Contractor demonstrates that such conditions were more severe and extended than those reflected by the ten-year average for the month, as evidenced by the Climatological Data, U. S. Department of Commerce, for the Project area.

Extensions of the time for completion of the Work due to weather will be granted on the basis of one and three tenths (1.3) calendar days for every day that the Contractor would have worked but was unable to work, with each separate extension figured to the nearest whole calendar day.

For weather delays and delays caused by events, acts or omissions not within the control of the Principal Representative or any person acting on the Principal Representative's behalf, the Contractor shall be entitled to an extension of time only and shall not be entitled to recovery of additional cost due to or resulting from such delays. This Article does not, however, preclude the recovery of damages for delay by either party under other provisions in the Contract Documents.

ARTICLE 39. NON-BINDING DISPUTE RESOLUTION – FACILITATED NEGOTIATIONS

The Contractor and Principal Representative agree to designate one or more mutually acceptable persons willing and able to facilitate negotiations and communications for the resolution of conflicts, disagreements or disputes between them at the specific request of either party with regard to any Project decision of either of them or any decision of the Architect/Engineer. The designation of such person(s) shall not carry any obligation to use their services except that each party agrees that if the other party requests the intervention of such person(s) with respect to any such conflict, dispute or disagreement, the non-requesting party shall participate in good faith attempts to negotiate a resolution of the issue in dispute. If the parties cannot agree on a mutually acceptable person to serve in this capacity one shall be so appointed; provided, however, that either party may request the director of State Buildings Programs to appoint such a person, who, if appointed, shall be accepted for this purpose by both the Contractor and the Principal Representative.

The cost, if any, of the facilitative services of the person(s) so designated shall be shared if the parties so agree in any partnering plan; or in the absence of agreement the cost shall be borne by the party requesting the facilitation of negotiation.

Any dispute, claim, question or disagreement arising from or relating to the Contract or an alleged breach of the Contract may be subject to a request by either party for facilitated negotiation subject to the limitations hereafter listed, and the parties shall participate by consultation and negotiation with each other, as guided by the facilitator and with recognition of their mutual interests, in an attempt to reach an equitable solution satisfactory to both parties.

The obligation to participate in facilitated negotiations shall be as described above and elsewhere in these General Conditions, as by way of example in Article 36, Claims, or Article 34, Deductions for Uncorrected Work, and to the extent not more particularly described or limited elsewhere, each party's obligations shall be as follows:

1. a party shall not initiate communication with the facilitator regarding the issues in dispute; except that any request for facilitation shall be made in writing with copies sent, faxed or delivered to the other party;

2. a party shall prepare a brief written description of its position if so requested by the facilitator (who may elect to first discuss the parties' positions with each party separately in the interest of time and expense);
3. a party shall respond to any reasonable request for copies of documents requested by the facilitator, but such requests, if voluminous, may consist of an offer to allow the facilitator access to the parties' documents;
4. a party shall review any meeting agenda proposed by a facilitator and endeavor to be informed on the subjects to be discussed;
5. a party shall meet with the other party and the facilitator at a mutually acceptable place and time, or, if none can be agreed to, at the time and place designated by the facilitator for a period not to exceed four hours unless the parties agree to a longer period;
6. a party shall endeavor to assure that any facilitation meeting shall be attended by any other persons in their employ that the facilitator requests be present, if reasonably available, including the Architect/Engineer;
7. each party shall participate in such facilitated face-to-face negotiations of the issues in dispute through persons fully authorized to resolve the issue in dispute;
8. each party shall be obligated to participate in negotiations requested by the other party and to perform the specific obligations described in paragraphs (1) through (10) this Article 39, Facilitated Negotiation, no more than three times during the course of the Project;
9. neither party shall be under any obligation to resolve any issue by facilitated negotiation, but each agrees to participate in good faith and the Principal Representative shall direct the Architect/Engineer to appropriately document any resolution or agreement reached and to execute any Amendment or Change Order to the Contract necessary to implement their agreement; and,
10. any discussions and documents prepared exclusively for use in the negotiations shall be deemed to be matters pertaining to settlement negotiations and shall not be subsequently available in further proceedings except to the extent of any documented agreement.

In accordance with State Fiscal Rules and Article 52F, Choice of Law; No Arbitration, nothing in this Article 39 shall be deemed to call for arbitration or otherwise obligate the State to participate in any form of binding alternative dispute resolution.

A partnering plan developed as described in Article 2D, Communications and Cooperation, may modify or expand the requirements of this Article but may not reduce the obligation to participate in facilitated negotiations when applicable. In the case of small projects estimated to be valued under $500,000, the requirements of this Article may be deleted from this Contract, by modification in Article 7 (Contractor's Agreement SC-6.21), Optional Provisions And Elections. When so modified, the references to the parties' right to elect facilitated negotiation elsewhere in these General Conditions shall be deleted.

ARTICLE 40. RIGHT OF OCCUPANCY

The Principal Representative shall have the right to take possession of and to use any completed or partially completed portions of the Work, even if the time for completing the entire Work or portions of the Work has not expired and even if the Work has not been finally accepted, and the Contractor shall fully cooperate with the Principal Representative to allow such possession and use. Such possession and use shall not constitute an acceptance of such portions of the Work.

Prior to any occupancy of the Project, an inspection shall be made by the Principal Representative, State Buildings Programs and the Contractor. Such inspection shall be made for the purpose of ensuring that the building is secure, protected by operation safety systems as designed, operable exits, power, lighting and HVAC systems, and otherwise ready for the occupancy intended and the Notice of Substantial Completion has been issued for the occupancy intended. The inspection shall also document existing finish conditions to allow assessment of any damage by occupants. The Contractor shall assist the Principal Representative in completing and executing State Form SBP-01, Approval of Occupancy/Use, prior to the Principal Representative's possession and use. Any and all areas so occupied will be subject to a final inspection when the Contractor complies with Article 41, Completion, Final Inspection, Acceptance and Settlement.

ARTICLE 41. COMPLETION, FINAL INSPECTION, ACCEPTANCE AND SETTLEMENT

A. NOTICE OF COMPLETION

When the Work, or a discrete physical portion of the Work (as hereafter described) which the Principal Representative has agreed to accept separately, is substantially complete and ready for final inspection, the Contractor shall file a written Notice with the Architect/Engineer that the Work, or such discrete physical portion, in the opinion of the Contractor, is substantially complete under the terms of the Contract. The Contractor shall prepare and submit with such Notice a comprehensive list of items to be completed or corrected prior to final payment, which shall be subject to review and additions as the Architect/Engineer or the Principal Representative shall determine after inspection. If the Architect/Engineer or the Principal Representative believe that any of the items on the list of items submitted, or any other item of work to be corrected or completed, or the cumulative number of items of work to be corrected or completed, will prevent a determination that the Work is substantially complete, those items shall be completed by the Contractor and the Notice shall then be resubmitted.

B. FINAL INSPECTION

Within ten (10) days after the Contractor files written Notice that the Work is substantially complete, the Architect/Engineer, the Principal Representative, and the Contractor shall make a “final inspection” of the Project to determine whether the Work is substantially complete and has been completed in accordance with the Contract Documents. State Buildings Programs shall be notified of the inspection not less than three (3) business days in advance of the inspection. The Contractor shall provide the Principal Representative and the Architect/Engineer an updated punch list in sufficient detail to fully outline the following:

1. work to be completed, if any; and
2. work not in compliance with the Drawings or Specifications, if any.

A final punch list shall be made by the Architect/Engineer in sufficient detail to fully outline to the Contractor:

1. work to be completed, if any;
2. work not in compliance with the Drawings or Specifications, if any; and
3. unsatisfactory work for any reason, if any.

The required number of copies of the final punch list will be countersigned by the authorized representative of the Principal Representative and will then be transmitted by the Architect/Engineer to the Contractor, the Principal Representative, and State Buildings Programs. The Architect/Engineer's final punch list shall control over the Contractor's preliminary punch list.

C. NOTICE OF SUBSTANTIAL COMPLETION

Notice of Substantial Completion shall establish the date of substantial completion of the Project. The Contractor acknowledges and agrees that because the departments, agencies and institutions of the State of Colorado are generally involved with the business of the public at large, greater care must be taken in establishing the date of substantial completion than might otherwise be the case to ensure that a project or building or discrete physical portion of the Work is fully usable and safe for public use, and that such care necessarily raises the standard by which the concept of substantial completion is applied for a public building.

The Notice of Substantial Completion shall not be issued until the following have been fully established:

1. All required building code inspections have been called for and the appropriate code officials have affixed their signatures to the Building Inspection Record indicating successful completion of all required code inspections;
2. All required corrections noted on the Building Inspection Record shall have been completed unless the Architect/Engineer, the Principal Representative and State Buildings Programs, in their complete and absolute discretion, all concur that the condition requiring the remaining

correction is not in any way life threatening, does not otherwise endanger persons or property, and does not result in any undue inconvenience or hardship to the Principal Representative or the public;

3. The building, structure or Project can be fully and comfortably used by the Principal Representative and the public without undue interference by the Contractor's employees and workers during the completion of the final punch list taking into consideration the nature of the public uses intended and taking into consideration any stage or level of completion of HVAC system commissioning or other system testing required by the Specifications to be completed prior to issuance of the Notice of Substantial Completion;
4. The Project has been fully cleaned as required by these General Conditions, and as required by any stricter requirements of the Specifications, and the overall state of completion is appropriate for presentation to the public; and
5. The Contractor has provided a schedule for the completion of each and every item identified on the punch list which specifies the Subcontractor or trade responsible for the work, and the dates the completion or correction of the item will be commenced and finished; such schedule will show completion of all remaining final punch list items within the period indicated in the Contract for final punch list completion prior to Final Acceptance, with the exception of only those items which are beyond the control of the Contractor despite due diligence. The schedule shall provide for a reasonable punch list inspection process. Unless liquidated damages have been specified in Article 7D(2) (Contractor's Agreement SC-6.21), the cost to the Principal Representative, if any, for re-inspections due to failure to adhere to the Contractor's proposed punch-list completion schedule shall be the responsibility of the Contractor and may be deducted by the Principal Representative from final amounts due to the Contractor.

Substantial completion of the entire Project shall not be conclusively established by a decision by the Principal Representative to take possession and use of a portion, or all of the Project, where portions of the Project cannot meet all the criteria noted above. Notice of Substantial Completion for the entire Project shall, however, only be withheld for substantial reasons when the Principal Representative has taken possession and uses all of the Project in accordance with the terms of Article 40, Right Of Occupancy. Failure to furnish the required completion schedule shall constitute a substantial reason for withholding the issuance of any Notice of Substantial Completion.

The Contractor shall have the right to request a final inspection of any discrete physical portion of the Project when in the opinion of the Principal Representative, The Architect/Engineer and State Buildings Programs a final punch list can be reasonably prepared, without confusion as to which portions of the Project are referred to in any subsequent Notice of Partial Final Settlement which might be issued after such portion is finally accepted. Discrete physical portions of the Project may be, but shall not necessarily be limited to, such portions of the Project as separate buildings where a Project consists of multiple buildings. Similarly, an addition to an existing building where the Project also calls for renovation or remodeling of the existing building may constitute a discrete physical portion of the Project. In such circumstances, when in the opinion of the Principal Representative, the Architect/Engineer and State Buildings Programs, the requirements for issuance of a Notice of Substantial Completion can be satisfied with respect to the discrete portion of the Project, a partial Notice of Substantial Completion may be issued for such discrete physical portion of the Project.

D. NOTICE OF ACCEPTANCE

The Notice of Acceptance shall establish the completion date of the Project. It shall not be authorized until the Contractor shall have performed all of the work to allow completion and approval of the Pre-Acceptance Checklist (SBP-05).

Where partial Notices of Substantial Completion have been issued, partial Notices of Final Acceptance may be similarly issued when appropriate for that portion of the Work. Partial Notice of Final Acceptance may also be issued to exclude the work described in Change Orders executed during late stages of the Project where a later completion date for the Change Ordered work is expressly provided for in the Contract as amended by the Change Order, provided the work can be adequately described

to allow partial advertisement of any Notice of Partial Final Settlement to be issued without confusion as to the work included for which final payment will be made.

E. SETTLEMENT

Final payment and settlement shall be made on the date fixed and published for such payment except as hereafter provided. The Principal Representative shall not authorize final payment until all items on the Pre-Acceptance check list (SBP-05) have been completed, the Notice of Acceptance issued, and the Notice of Contractors Settlement published. If the work shall be substantially completed, but Final Acceptance and completion thereof shall be prevented through delay in correction of minor defects, or unavailability of materials or other causes beyond the control of the Contractor, the Principal Representative in his or her discretion may release all amounts due to the Contractor except such amounts as may be in excess of three times the cost of completing the unfinished work or the cost of correcting the defective work, as estimated by the Architect/Engineer and approved by State Buildings Programs. Before the Principal Representative may issue the Notice of Contractor's Settlement and advertise the Project for final payment, the Contractor shall have corrected all items on the punch list except those items for which delayed performance is expressly permitted, subject to withholding for the cost thereof, and shall have:

1. Delivered to the Architect/Engineer:

    a. All guarantees and warranties;
    b. All statements to support local sales tax refunds, if any;
    c. Three (3) complete bound sets of required operating maintenance instructions; and,
    d. One (1) set of as-built Contract Documents showing all job changes.

2. Demonstrated to the operating personnel of the Principal Representative the proper operation and maintenance of all equipment.

Upon completion of the foregoing the Project shall be advertised in accordance with the Notice of Contractor's Settlement by two publications of Notice, the last publication appearing at least ten (10) days prior to the time of final settlement. Publication and final settlement should not be postponed or delayed solely by virtue of unresolved claims against the Project or the Contractor from Subcontractors, suppliers or materialmen based on good faith disputes; the resolution of the question of payment in such cases being directed by statute.

Except as hereafter provided, on the date of final settlement thus advertised, provided the Contractor has submitted a written Notice to the Architect/Engineer that no claims have been filed, and further provided the Principal Representative shall have received no claims, final payments and settlement shall be made in full. If any unpaid claim for labor, materials, rental machinery, tools, supplies or equipment is filed before payment in full of all sums due the Contractor, the Principal Representative and the State Controller shall withhold from the Contractor on the date established for final settlement, sufficient funds to insure the payment of such claim, until the same shall have been paid or withdrawn, such payment or withdrawal to be evidenced by filing a receipt in full or an order for withdrawal signed by the claimant or his or her duly authorized agent or assignee. The amount so withheld may be in the amount of 125% of the claims or such other amount as the Principal Representative reasonably deems necessary to cover expected legal expenses. Such withheld amounts shall be in addition to any amount withheld based on the cost to compete unfinished work or the cost to repair defective work. However, as provided by statute, such funds shall not be withheld longer than ninety (90) days following the date fixed for final settlement with the Contractor, as set forth in the published Notice of Contractor's Settlement, unless an action at law shall be commenced within that time to enforce such unpaid claim and a Notice of such action at law shall have been filed with the Principal Representative and the State Controller. At the expiration of the ninety (90) day period, the Principal Representative shall authorize the State Controller to release to the Contractor all other money not the subject of such action at law or withheld based on the cost to compete unfinished work or the cost to repair defective work.

Notices of Partial Final Settlement may be similarly advertised, provided all conditions precedent have been satisfied as though that portion of the work affected stood alone, a Notice of Partial Acceptance has been issued, and the consent of surety to the partial final settlement has been obtained in writing. Thereafter, partial final payments may be made to the Contractor subject to the same conditions regarding unpaid claims.

ARTICLE 42. GENERAL WARRANTY AND CORRECTION OF WORK AFTER ACCEPTANCE

The Contractor warrants that the materials used and the equipment furnished shall be new and of good quality unless specified to the contrary. The Contractor further warrants that the Work shall in all respects be free from material defects not permitted by the Specifications and shall be in accordance with the requirements of the Contract Documents. Neither the final certificate for payment nor any provision in the Contract Documents shall relieve the Contractor of responsibility for defects or faulty materials or workmanship. The Contractor shall be responsible to the Principal Representative for such warranties for the longest period permitted by any applicable statute of limitations.

In addition to these general warranties, and without limitation of these general warranties, for a period of one year after the date of any Notice of Substantial Completion, or any Notice of Partial Substantial Completion if applicable, the Contractor shall remedy defects, and faulty workmanship or materials, and work not in accordance with the Contract Documents which was not accepted at the time of the Notice of Final Acceptance, all in accordance with the provisions of Article 44, One-Year Guarantee And Special Guarantees And Warranties.

ARTICLE 43. LIENS

Colorado statutes do not provide for any right of lien against public buildings. In lieu thereof, § 38-26-107, C.R.S., provides adequate relief for any claimant having furnished labor, materials, rental machinery, tools, equipment, or services toward construction of the particular public work in that final payment may not be made to a Contractor until all such creditors have been put on Notice by publication in the public press of such pending payment and given opportunity for a period of up to ninety (90) days to stop payment to the Contractor in the amount of such claims.

ARTICLE 44. ONE-YEAR GUARANTEE AND SPECIAL GUARANTEES AND WARRANTIES

A. ONE-YEAR GUARANTEE OF THE WORK

The Contractor shall guarantee to remedy defects and repair or replace the Work for a period of one year from the date of the Notice of Substantial Completion or from the dates of any partial Notices of Substantial Completion issued for discrete physical portions of the Work. The Contractor shall remedy any defects due to faulty materials or workmanship and shall pay for, repair and replace any damage to other work resulting there from, which shall appear within a period of one year from the date of such Notice(s) of Substantial Completion. The Contractor shall also remedy any deviation from the requirements of the Contract Documents which shall later be discovered within a period of one year from the date of the Notice of Substantial Completion; provided, however, that the Contractor shall not be required to remedy deviations from the requirements of the Contract Documents where such deviations were obvious, apparent and accepted by the Architect/Engineer or the Principal Representative at the time of the Notice of Final Acceptance. The Principal Representative shall give Notice of observed defects or other work requiring correction with reasonable promptness. Such Notice shall be in writing to the Architect/Engineer and the Contractor.

The one year guarantee of the Contractor's work may run separately for discrete physical portions of the Work for which partial Notices of Substantial Completion have been issued, however, it shall run from the last Notice of Substantial Completion with respect to all or any systems common to the work to which more than one Notice of Substantial Completion may apply.

This one-year guarantee shall not be construed to limit the Contractor's general warranty described in Article 42, General Warranty and Correction of Work After Acceptance, that all materials and equipment are new and of good quality, unless specified to the contrary, and that the Work shall in all respects be free from material defects not permitted by the Specifications and in accordance with the requirements of the Contract Documents.

B. SPECIAL GUARANTEES AND WARRANTIES

In case of work performed for which product, manufacturers or other special warranties are required by the Specifications, the Contractor shall secure the required warranties and deliver copies thereof to the Principal Representative through the Architect/Engineer upon completion of the work.

These product, manufacturers or other special warranties, as such, do not in any way lessen the Contractor's responsibilities under the Contract. Whenever guarantees or warranties are required by the Specifications for a longer period than one year, such longer period shall govern.

ARTICLE 45. GUARANTEE INSPECTIONS AFTER COMPLETION

The Architect/Engineer, the Principal Representative and the Contractor together shall make at least two (2) complete inspections of the work after the Work has been determined to be substantially complete and accepted. One such inspection, the "Six-Month Guarantee Inspection," shall be made approximately six (6) months after date of the Notice of Substantial Completion, unless in the case of smaller projects valued under $500,000 this inspection is declined in Article 7A (Contractor's Agreement SC-6.21), Modification of Article 45, in which case the inspection to occur at six months shall not be required. Another such inspection, the "Eleven-Month Guaranty Inspection" shall be made approximately eleven (11) months after the date of the Notice of Substantial Completion. The Principal Representative shall schedule and so notify all parties concerned, including State Buildings Programs, of these inspections. If more than one Notice of Substantial Completion has been issued at the reasonable discretion of the Principal Representative separate eleven month inspections may be required where the one year guarantees do not run reasonably concurrent.

Written punch lists and reports of these inspections shall be made by the Architect/Engineer and forwarded to the Contractor, the Principal Representative, State Buildings Programs, and all other participants within ten (10) days after the completion of the inspections. The punch list shall itemize all guarantee items, prior punch list items still to be corrected or completed and any other requirements of the Contract Documents to be completed which were not waived by final acceptance because they were not obvious or could not reasonably have been previously observed. The Contractor shall immediately initiate such remedial work as may be necessary to correct any deficiencies or defective work shown by this report, and shall promptly complete all such remedial work in a manner satisfactory to the Architect/Engineer, the Principal Representative and State Buildings Programs.

If the Contractor fails to promptly correct all deficiencies and defects shown by this report, the Principal Representative may do so, after giving the Contractor ten (10) days written Notice of intention to do so.

The State of Colorado, acting by and through the Principal Representative, shall be entitled to collect from the Contractor all costs and expenses incurred by it in correcting such deficiencies and defects, as well as all damages resulting from such deficiencies and defects.

ARTICLE 46. TIME OF COMPLETION AND LIQUIDATED DAMAGES

It is hereby understood and mutually agreed, by and between the parties hereto, that the date of beginning, rate of progress, and the time for completion of the Work to be done hereunder are ESSENTIAL CONDITIONS of this Agreement, and it is understood and agreed that the Work embraced in this Contract shall be commenced at the time specified in the Notice to Proceed (SC-6.26).

It is further agreed that time is of the essence of each and every portion of this Contract, and of any portion of the Work described on the Drawings or Specifications, wherein a definite and certain length of time is fixed for the performance of any act whatsoever. The parties further agree that where under the Contract additional time is allowed for the completion of the Work or any identified portion of the Work, the new time limit or limits fixed by such extension of the time for completion shall be of the essence of this Agreement.

The Contractor acknowledges that subject to any limitations in the Advertisement for Bids, issued for the Project, the Contractor's bid is consistent with and considers the number of days to substantially complete the Project and the number of days to finally complete the Project to which the parties may have stipulated

in the Agreement, which stipulation was based on the Contractor's bid. The Contractor agrees that work shall be prosecuted regularly, diligently and uninterruptedly at such rate of progress as will ensure the Project will be substantially complete, and fully and finally complete, as recognized by the issuance of all required Notices of Substantial Completion and Notices of Final Acceptance, within any times stipulated and specified in the Agreement, as the same may be amended by Change Order or other written modification, and that the Principal Representative will be damaged if the times of completion are delayed.

It is expressly understood and agreed, by and between the parties hereto, that the times for the Substantial Completion of the Work or for the final acceptance of the Work as may be stipulated in the Agreement, and as applied here and in Article 7D (Contractor's Agreement SC-6.21), Modifications of Article 46, are reasonable times for these stages of completion of the Work, taking into such consideration all factors, including the average climatic range and usual industrial conditions prevailing in the locality of the building operations.

If the Contractor shall neglect, fail or refuse to complete the Work within the times specified in the Agreement, such failure shall constitute a breach of the terms of the Contract and the State of Colorado, acting by and through the Principal Representative, shall be entitled to liquidated damages for such neglect, failure or refusal, as specified in Article 7D (Contractor's Agreement SC-6.21), Modification of Article 46.

The Contractor and the Contractor's Surety shall be jointly liable for and shall pay the Principal Representative, or the Principal Representative may withhold, the sums hereinafter stipulated as liquidated damages for each calendar day of delay until the entire Project is 1) substantially completed, and the Notice (or all Notices) of Substantial Completion are issued, 2) finally complete and accepted and the Notice (or all Notices) of Acceptance are issued, or 3) both. Delay in substantial completion shall be measured from the Date of the Notice to Proceed and delay in final completion and acceptance shall be measured from the Date of the Notice of Substantial Completion.

In the first instance, specified in Article 7D(1) (Contractor's Agreement SC-6.21), Modification of Article 46, liquidated damages, if any, shall be the amount specified therein, for each calendar day of delay beginning after the stipulated number of days for Substantial Completion from the date of the Notice to Proceed, until the date of the Notice of Substantial Completion. Unless otherwise specified in any Supplementary General Conditions, in the event of any partial *Notice of Substantial Completion, liquidated damages shall accrue until all required Notices of Substantial Completion are issued.*

In the second instance, specified in Article 7D(2) (Contractor's Agreement SC-6.21), Modification of Article 46, liquidated damages, if any, shall be the amount specified in Article 7D (Contractor's Agreement SC-6.21), Modification of Article 46, for each calendar day in excess of the number of calendar days specified in the Contractor's bid for the Project and stipulated in the Agreement to finally complete the Project (as defined by the issuance of the Notice of Acceptance) after the final Notice of Substantial Completion has been issued.

In the third instance, when so specified in both Articles 7D(1) and (2) (Contractor's Agreement SC-6.21), both types of liquidated damages shall be separately assessed where those delays have occurred.

The parties expressly agree that said amounts are a reasonable estimate of the presumed actual damages that would result from any of the breaches listed, and that any liquidated damages that are assessed have been agreed to in light of the difficulty of ascertaining the actual damages that would be caused by any of these breaches at the time this Contract was formed; the liquidated damages in the first instance representing an estimate of damages due to the inability to use the Project; the liquidated damages in the second instance representing an estimate of damages due to the additional administrative, technical, supervisory and professional expenses related to and arising from the extended closeout period including delivery of any or all guarantees and warranties, the submittals of sales and use tax payment forms, the calling for the final inspection and the completion of the final punch list.

The parties also agree and understand that the liquidated damages to be assessed in each instance are separate and distinct, although potentially cumulative, damages for the separate and distinct breaches of

delayed substantial completion or final acceptance. Such liquidated damages shall not be avoided by virtue of the fact of concurrent delay caused by the Principal Representative, or anyone acting on behalf of the Principal Representative, but in such event the period of delay for which liquidated damages are assessed shall be equitably adjusted in accordance with Article 38, Delays And Extensions Of Time.

ARTICLE 47. DAMAGES

If either party to this Contract shall suffer damage under this Contract in any manner because of any wrongful act or neglect of the other party or of anyone employed by either of them, then the party suffering damage shall be reimbursed by the other party for such damage. Except to the extent of damages liquidated for the Contractor's failure to achieve timely completion as set forth in Article 46, Time of Completion and Liquidated Damages, the Principal Representative shall be responsible for, and at his or her option may insure against, loss of use of any existing property not included in the Work, due to fire or otherwise, however caused. Notwithstanding the foregoing, or any other provision of this Contract, to the contrary, no term or condition of this contract shall be construed or interpreted as a waiver, express or implied, of any of the immunities, rights, benefits, protection, or other provisions of the Colorado Governmental Immunity Act, Section 24-10-101, *et seq.*, CRS, as now or hereafter amended. The parties understand and agree that liability for claims for injuries to persons arising out of negligence of the State of Colorado, its departments, institutions, agencies, boards, officials and employees is controlled and limited by the provisions of Section 24-10-101, *et seq.*, CRS, as now or hereafter amended and the risk management statutes, Section 24-30-1501, *et seq.*, CRS, as now or hereafter amended.

Notice of intent to file a claim under this clause shall be made in writing to the party liable within a reasonable time of the first observance of such damage and not later than the time of final payment, except that in the case of claims by the Principal Representative involving warranties against faulty work or materials Notice shall be required only to the extent stipulated elsewhere in these General Conditions. Claims made to the Principal Representative involving extra cost or extra time arising by virtue of instructions to the Contractor to which Article 36, Claims, applies shall be made in accordance with Article 36. Other claims arising under the Contract involving extra cost or extra time which are made to the Principal Representative under this clause shall also be made in accordance with the procedures of Article 36, whether or not arising by virtue of instructions to the Contractor; provided however that it shall not be necessary to first obtain or request a written judgment of the Architect/Engineer.

Provided written Notice of intent to file a claim is provided as required in the preceding paragraph, nothing in this Article shall limit or restrict the rights of either party to bring an action at law or to seek other relief to which either party may be entitled, including consequential damages, if any, and shall not be construed to limit the time during which any action might be brought. Nothing in these General Conditions shall be deemed to limit the period of time during which any action may be brought as a matter of contract, tort, warranty or otherwise, it being the intent of the parties to allow any and all actions at law or in equity for such periods as the law permits. All such rights shall, however be subject to the obligation to assert claims and to appeal denials pursuant to Article 36, Claims, where applicable.

ARTICLE 48. STATE'S RIGHT TO DO THE WORK; TEMPORARY SUSPENSION OF WORK; DELAY DAMAGES

A. STATE'S RIGHT TO DO THE WORK

If after receipt of Notice to do so, the Contractor should neglect to prosecute the Work properly or fail to perform any provision of the Contract, the Principal Representative, after a second seven (7) days' advance written Notice to the Contractor and the Surety may, without prejudice to any other remedy the Principal Representative may have, take control of all or a portion of the Work, as the Principal Representative deems necessary and make good such deficiencies deducting the cost thereof from the payment then or thereafter due the Contractor, as provided in Article 30, Correction Of Work Before Acceptance and Article 33, Payments Withheld, provided, however, that the Architect/Engineer shall approve the amount charged to the Contractor by approval of the Change Order.

B. TEMPORARY SUSPENSION OF WORK

The State, acting for itself or by and through the Architect/Engineer, shall have the authority to suspend the Work, either wholly or in part, for such period or periods as may be deemed necessary due to:

1. *Unsuitable weather;*
2. *Faulty workmanship;*
3. *Improper superintendence;*
4. *Contractor 's failure to carry out orders or to perform any provision of the Contract Documents;*
5: *Loss of, or restrictions to, appropriations;*
6. *Conditions, which may be considered unfavorable for the prosecution of the Work.*

If it should become necessary to stop work for an indefinite period, the Contractor shall store materials in such manner that they will not become an obstruction or become damaged in any way; and he or she shall take every precaution to prevent damage to or deterioration of the Work, provide suitable drainage and erect temporary structures where necessary.

Notice of suspension of work shall be provided to the Contractor in writing stating the reasons therefore. The Contractor shall again proceed with the work when so notified in writing.

The Contractor understands and agrees that the State of Colorado cannot predict with certainty future revenues and could ultimately lack the revenue to fund the appropriations applicable to this Contract. The Contractor further acknowledges and agrees that in such event that State may, upon Notice to the Contractor, suspend the work in anticipation of a termination of the Contract for the convenience of the State, pursuant to Article 50, Termination For Convenience of State. If the Contract is not so terminated the Contract sum and the Contract time shall be equitably adjusted at the time the Principal Representative directs the work to be recommenced and gives Notice that the revenue to fund the appropriation is available.

C. DELAY DAMAGES

The Principal Representative and the State of Colorado shall be liable to the Contractor for the payment of any claim for extra costs, extra compensation or damages occasioned by hindrances or delays encountered in the work only when and to the limited extent that such hindrance or delay is caused by an act or omission within the control of the Principal Representative, the Architect/Engineer or other persons or entities acting on behalf of the Principal Representative. Further, the Principal Representative and the State of Colorado shall be liable to the Contractor for the payment of such a claim only if the Contractor has provided required Notice of the delay or impact, or has presented its claim for an extension of time or claim of other delay or other impact due to changes ordered in the work before proceeding with the changed work. Except as otherwise provided, claims for extension of time shall be Noticed and filed in accordance with Article 38, Delays and Extensions of Time, within three (3) business days of the beginning of the delay with any claim filed within seven (7) days after the delay has ceased, or such claim is waived. Claims for extension of time or for other delay or other impact resulting from changes ordered in the Work shall be presented and adjusted as provided in Article 35, Changes in the Work.

ARTICLE 49. STATE'S RIGHTS TO TERMINATE CONTRACT

A. GENERAL

If the Contractor should be adjudged bankrupt, or if he or she should make a general assignment for the benefit of his or her creditors, or if a receiver should be appointed to take over his affairs, or if he or she should fail to prosecute his or her work with due diligence and carry the work forward in accordance with the construction schedule and the time limits set forth in the Contract Documents, or if he or she should fail to subsequently perform one or more of the provisions of the Contract Documents to be performed by him, the Principal Representative may serve written Notice on the Contractor and the Surety on performance and payment bonds, stating his or her intention to exercise one of the remedies hereinafter set forth and the grounds upon which the Principal Representative bases his or her right to exercise such remedy.

In such event, unless the matter complained of is satisfactorily cleared within ten (10) days after delivery of such Notice, the Principal Representative may, without prejudice to any other right or remedy, exercise one of such remedies at once, having first obtained the concurrence of the Architect/Engineer in writing that sufficient cause exists to justify such action.

B. CONDITIONS AND PROCEDURES

1. *The Principal Representative may terminate the services of the Contractor, which termination shall take effect immediately upon service of Notice thereof on the Contractor and his or her Surety, whereupon the Surety shall have the right to take over and perform the Contract. If the Surety does not provide Notice to the Principal Representative of its intent to commence performance of the Contract within ten (10) days after delivery of the Notice of termination, the Principal Representative may take over the Work, take possession of and use all materials, tools, equipment and appliances on the premises and prosecute the Work to completion by such means as he or she shall deem best. In the event of such termination of his or her service, the Contractor shall not be entitled to any further payment under the Contract until the Work is completed and accepted. If the Principal Representative takes over the Work and if the unpaid balance of the contract price exceeds the cost of completing the Work, including compensation for any damages or expenses incurred by the Principal Representative through the default of the Contractor, such excess shall be paid to the Contractor. If, however, the cost, expenses and damages as certified by the Architect/Engineer exceed such unpaid balance of the contract price, the Contractor and his or her Surety shall pay the difference to the Principal Representative.*
2. *The Principal Representative may require the Surety on the Contractor 's bond to take control of the Work and see to it that all the deficiencies of the Contractor are made good, with due diligence within ten (10) days of delivery of Notice to the Surety to do so. As between the Principal Representative and the Surety, the cost of making good such deficiencies shall all be borne by the Surety. If the Surety takes over the Work, either by election upon termination of the services of the Contractor pursuant to Section B(1) of this Article 49, State's Right To Terminate Contract, or upon instructions from the Principal Representative to do so, the provisions of the Contract Documents shall govern the work to be done by the Surety, the Surety being substituted for the Contractor as to such provisions, including provisions as to payment for the Work, the times of completion and provisions of this Article as to the right of the Principal Representative to do the Work or to take control of all or a portion of the Work.*
3. *The Principal Representative may take control of all or a portion of the Work and make good the deficiencies of the Contractor, or the Surety if the Surety has been substituted for the Contractor, with or without terminating the Contract, employing such additional help as the Principal Representative deems advisable in accordance with the provisions of Article 48A, State's Right To Do The Work; Temporary Suspension Of Work; Delay Damages. In such event, the Principal Representative shall be entitled to collect from the Contractor and his or her Surety, or to deduct from any payment then or thereafter due the Contractor, the costs incurred in having such deficiencies made good and any damages or expenses incurred through the default of Contractor, provided the Architect/Engineer approves the amount thus charged to the Contractor.*

   If the Contract is not terminated, a Change Order to the Contract shall be executed, unilaterally if necessary, in accordance with the procedures of Article 35, Changes In The Work.

C. ADDITIONAL CONDITIONS

If any termination by the Principal Representative for cause is later determined to have been improper, the termination shall be automatically converted to and deemed to be a termination by the Principal Representative for convenience and the Contractor shall be limited in recovery to the compensation provided for in Article 50, Termination For Convenience Of State. Termination by the Contractor shall not be subject to such conversion.

ARTICLE 50. TERMINATION FOR CONVENIENCE OF STATE

A. NOTICE OF TERMINATION

The performance of Work under this Contract may be terminated, in whole or from time to time in part, by the State whenever for any reason the Principal Representative shall determine that such termination is in the best interest of State. Termination of work hereunder shall be effected by delivery to the Contractor of a Notice of such termination specifying the extent to which the performance of work under the Contract is terminated and the date upon which such termination becomes effective.

B. PROCEDURES

After receipt of the Notice of termination, the Contractor shall, to the extent appropriate to the termination, cancel outstanding commitments hereunder covering the procurement of materials, supplies, equipment and miscellaneous items. In addition, the Contractor shall exercise all reasonable diligence to accomplish the cancellation or diversion of all applicable outstanding commitments covering personal performance of any work terminated by the Notice. With respect to such canceled commitments, the Contractor agrees to:

1. *settle all outstanding liabilities and all claims arising out of such cancellation of commitments, with approval or ratification of the Principal Representative, to the extent he or she may require, which approval or ratification shall be final for all purposes of this clause; and,*
2. *assign to the State, in the manner, at the time, and to the extent directed by the Principal Representative, all of the right, title, and interest of the Contractor under the orders and subcontracts so terminated, in which case the State shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts.*

The Contractor shall submit his or her termination claim to the Principal Representative promptly after receipt of a Notice of termination, but in no event later than three (3) months from the effective date thereof, unless one or more extensions in writing are granted by the Principal Representative upon written request of the Contractor within such three month period or authorized extension thereof. Upon failure of the Contractor to submit his or her termination claim within the time allowed, the Principal Representative may determine, on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination and shall thereupon pay to the Contractor the amount so determined.

Costs claimed, agreed to, or determined pursuant to the preceding and following paragraph shall be in accordance with the provisions of § 24-107-101, C.R.S., as amended and associated Cost Principles of the Colorado Procurement Rules as in effect on the date of this Contract.

Subject to the preceding provisions, the Contractor and the Principal Representative may agree upon the whole or any part of the amount or amounts to be paid to the Contractor by reason of the termination under this clause, which amount or amounts may include any reasonable cancellation charges thereby incurred by the Contractor and any reasonable loss upon outstanding commitments for personal services which he or she is unable to cancel; provided, however, that in connection with any outstanding commitments for personal services which the Contractor is unable to cancel, the Contractor shall have exercised reasonable diligence to divert such commitments to other activities and operations. Any such agreement shall be embodied in an Amendment to this Contract and the Contractor shall be paid the agreed amount.

The State may from time to time, under such terms and conditions as it may prescribe, make partial payments against costs incurred by the Contractor in connection with the termination portion of this

Contract, whenever, in the opinion of the Principal Representative, the aggregate of such payments is within the amount to which the Contractor will be entitled hereunder.

The Contractor agrees to transfer title and deliver to the State, in the manner, at the time, and to the extent, if any, directed by the Principal Representative, such information and items which, if the Contract had been completed, would have been required to be furnished to the State, including:

a. completed or partially completed plans, Drawings and information; and,
b. materials or equipment produced or in process or acquired in connection with the performance of the work terminated by the Notice.

Other than the above, any termination inventory resulting from the termination of the Contract may, with written approval of the Principal Representative, be sold or acquired by the Contractor under the conditions prescribed by and at a price or prices approved by the Principal Representative. The proceeds of any such disposition shall be applied in reduction of any payments to be made by the State to the Contractor under this Contract or shall otherwise be credited to the price or cost of work covered by this Contract or paid in such other manners as the Principal Representative may direct. Pending final disposition of property arising from the termination, the Contractor agrees to take such action as may be necessary, or as the Principal Representative may direct, for the protection and preservation of the property related to this Contract which is in the possession of the Contractor and in which the State has or may acquire an interest.

Any disputes as to questions of fact, which may arise hereunder, shall be subject to the Remedies provisions of the Colorado Procurement Code, §§ 24-109-101, et seq., C.R.S., as amended.

ARTICLE 51. CONTRACTOR'S RIGHT TO STOP WORK AND/OR TERMINATE CONTRACT

If the Work shall be stopped under an order of any court or other public authority for a period of three (3) months through no act or fault of the Contractor or of any one employed by him, then the Contractor may on seven (7) days' written Notice to the Principal Representative and the Architect/Engineer stop work or terminate this Contract and recover from the Principal Representative payment for all work executed, any losses sustained on any plant or material, and a reasonable profit. If the Architect/Engineer shall fail to issue or otherwise act in writing upon any certificate for payment within ten (10) days after it is presented and received by the Architect/Engineer, as provided in Article 31, Applications For Payments, or if the Principal Representative shall fail to pay the Contractor any sum certified that is not disputed in whole or in part by the Principal Representative in writing to the Contractor and the Architect/Engineer within thirty (30) days after the Architect/Engineer's certification, then the Contractor may on ten (10) days' written Notice to the Principal Representative and the Architect/Engineer stop work and/or give written Notice of intention to terminate this Contract.

If the Principal Representative shall thereafter fail to pay the Contractor any amount certified by the Architect/Engineer and not disputed in writing by the Principal Representative within ten (10) days after receipt of such Notice, then the Contractor may terminate this Contract and recover from the Principal Representative payment for all work executed, any losses sustained upon any plant or materials, and a reasonable profit. The Principal Representative's right to dispute an amount certified by the Architect/Engineer shall not relieve the Principal Representative of the obligation to pay amounts not in dispute as certified by the Architect/Engineer.

ARTICLE 52. SPECIAL PROVISIONS

A. CONTROLLER'S APPROVAL CRS 24-30-202(1)

This Contract shall not be deemed valid until it has been approved by the Colorado State Controller or designee.

B. FUND AVAILABILITY CRS 24-30-202(5.5)

Financial obligations of the State payable after the current fiscal year are contingent upon funds for that purpose being appropriated, budgeted, and otherwise made available

C. GOVERNMENTAL IMMUNITY

No term or condition of this contract shall be construed or interpreted as a waiver, express or implied, of any of the immunities, rights, benefits, protections, or other provisions, of the Colorado Governmental Immunity Act, CRS §24-10-101 et seq., or the Federal Tort Claims Act, 28 U.S.C. §§1346(b) and 2671 et seq., as applicable now or hereafter amended.

D. INDEPENDENT CONTRACTOR 4 CCR 801-2

Contractor shall perform its duties hereunder as an independent contractor and not as an employee. Neither Contractor nor any agent or employee of Contractor shall be deemed to be an agent or employee of the State. Contractor and its employees and agents are not entitled to unemployment insurance or workers compensation benefits through the State and the State shall not pay for or otherwise provide such coverage for Contractor or any of its agents or employees. Unemployment insurance benefits will be available to Contractor and its employees and agents only if such coverage is made available by Contractor or a third party. Contractor shall pay when due all applicable employment taxes and income taxes and local head taxes incurred pursuant to this contract. Contractor shall not have authorization, express or implied, to bind the State to any agreement, liability or understanding, except as expressly set forth herein. Contractor shall (a) provide and keep in force workers' compensation and unemployment compensation insurance in the amounts required by law, (b) provide proof thereof when requested by the State, and (c) be solely responsible for its acts and those of its employees and agents.

E. COMPLIANCE WITH LAW

Contractor shall strictly comply with all applicable federal and State laws, rules, and regulations in effect or hereafter established, including, without limitation, laws applicable to discrimination and unfair employment practices.

F. CHOICE OF LAW

Colorado law, and rules and regulations issued pursuant thereto, shall be applied in the interpretation, execution, and enforcement of this contract. Any provision included or incorporated herein by reference which conflicts with said laws, rules, and regulations shall be null and void. Any provision incorporated herein by reference which purports to negate this or any other Special Provision in whole or in part shall not be valid or enforceable or available in any action at law, whether by way of complaint, defense, or otherwise. Any provision rendered null and void by the operation of this provision shall not invalidate the remainder of this contract, to the extent capable of execution.

G. BINDING ARBITRATION PROHIBITED

The State of Colorado does not agree to binding arbitration by any extra-judicial body or person. Any provision to the contrary in this contract or incorporated herein by reference shall be null and void.

H. **SOFTWARE PIRACY PROHIBITION. Governor's Executive Order D 002 00**

State or other public funds payable under this contract shall not be used for the acquisition, operation, or maintenance of computer software in violation of federal copyright laws or applicable licensing restrictions. Contractor hereby certifies and warrants that, during the term of this contract and any extensions, Contractor has and shall maintain in place appropriate systems and controls to prevent such improper use of public funds. If the State determines that Contractor is in violation of this provision, the State may exercise any remedy available at law or in equity or under this contract, including, without limitation, immediate termination of this contract and any remedy consistent with federal copyright laws or applicable licensing restrictions.

I. EMPLOYEE FINANCIAL INTEREST/CONFLICT OF INTEREST CRS 24-18-201 & CRS 24-50-507

The signatories aver that to their knowledge, no employee of the State has any personal or beneficial interest whatsoever in the service or property described in this contract. Contractor has no interest and shall not acquire any interest, direct or indirect, that would conflict in any manner or degree with the performance of Contractor's services and Contractor shall not employ any person having such known interests.

J. VENDOR OFFSET CRS 24-30-202(1) & CRS 24-30-202.4

Subject to CRS §24-30-202.4 (3.5), the State Controller may withhold payment under the State's vendor offset intercept system for debts owed to State agencies for: **(a)** unpaid child support debts or child support arrearages; **(b)** unpaid balances of tax, accrued interest, or other charges specified in CRS §39-21-101, et seq.; **(c)** unpaid loans due to the Student Loan Division of the Department of Higher Education; **(d)** amounts required to be paid to the Unemployment Compensation Fund; and **(e)** other unpaid debts owing to the State as a result of final agency determination or judicial action.

K. PUBLIC CONTRACTS FOR SERVICES. **CRS §8-17.5-101**. [***Not Applicable to agreements relating to the offer, issuance, or sale of securities, investment advisory services or fund management services, sponsored projects, intergovernmental agreements, or information technology services or products and services***] Contractor certifies, warrants, and agrees that it does not knowingly employ or contract with an illegal alien who will perform work under this contract and will confirm the employment eligibility of all employees who are newly hired for employment in the United States to perform work under this contract, through participation in the E-Verify Program or the Department program established pursuant to CRS §8-17.5-102(5)(c), Contractor shall not knowingly employ or contract with an illegal alien to perform work under this contract or enter into a contract with a subcontractor that fails to certify to Contractor that the subcontractor shall not knowingly employ or contract with an illegal alien to perform work under this contract. Contractor **(a)** shall not use E-Verify Program or Department program procedures to undertake pre-employment screening of job applicants while this contract is being performed, **(b)** shall notify the subcontractor and the contracting State agency within three days if Contractor has actual knowledge that a subcontractor is employing or contracting with an illegal alien for work under this contract, **(c)** shall terminate the subcontract if a subcontractor does not stop employing or contracting with the illegal alien within three days of receiving the notice, and **(d)** shall comply with reasonable requests made in the course of an investigation, undertaken pursuant to CRS §8-17.5-102(5), by the Colorado Department of Labor and Employment. If Contractor participates in the Department program, Contractor shall deliver to the contracting State agency, Institution of Higher Education or political subdivision a written, notarized affirmation, affirming that Contractor has examined the legal work status of such employee, and shall comply with all of the other requirements of the Department program. If Contractor fails to comply with any requirement of this provision or CRS §8-17.5-101 et seq., the contracting State agency, institution of higher education or political subdivision may terminate this contract for breach and, if so terminated, Contractor shall be liable for damages.

L. PUBLIC CONTRACTS WITH NATURAL PERSONS. CRS §24-76.5-101.

Contractor, if a natural person eighteen (18) years of age or older, hereby swears and affirms under penalty of perjury that he or she (a) is a citizen or otherwise lawfully present in the United States pursuant to federal law, (b) shall comply with the provisions of CRS §24-76.5-101 et seq., and (c) has produced one form of identification required by CRS §24-76.5-103 prior to the effective date of this contract.

ARTICLE 53. MISCELLANEOUS PROVISIONS

A. CONSTRUCTION OF LANGUAGE

The language used in these General Conditions shall be construed as a whole according to its plain meaning, and not strictly for or against any party. Such construction shall, however, construe language to interpret the intent of the parties giving due consideration to the order of precedence noted in Article 2C, Intent of Documents.

B. SEVERABILITY

Provided this Agreement can be executed and performance of the obligations of the Parties accomplished within its intent, the provisions hereof are severable and any provision that is declared invalid or becomes inoperable for any reason shall not affect the validity of any other provision hereof, provided that the Parties can continue to perform their obligations under this Agreement in accordance with its intent.

C. SECTION HEADINGS

The captions and headings in this Agreement are for convenience of reference only, and shall not be used to interpret, define, or limit its provisions.

D. AUTHORITY

Each person executing the Agreement and its Exhibits in a representative capacity expressly represents and warrants that he or she has been duly authorized by one of the parties to execute the Agreement and has authority to bind said party to the terms and conditions hereof.

E. INTEGRATION OF UNDERSTANDING

This Contract is intended as the complete integration of all understandings between the parties and supersedes all prior negotiations, representations, or agreements, whether written or oral. No prior or contemporaneous addition, deletion, or other amendment hereto shall have any force or effect whatsoever, unless embodied herein in writing. No subsequent novation, renewal, addition, deletion, or other amendment hereto shall have any force or effect unless embodied in a written Change Order or Amendment to this Contract.

F. VENUE

All suits or actions related to this Agreement shall be filed and proceedings held in the State of Colorado and exclusive venue shall be in the City and County of Denver.

G. NO THIRD PARTY BENEFICIARIES

Enforcement of this Agreement and all rights and obligations hereunder are reserved solely to the Parties. Any services or benefits which third parties receive as a result of this Contract are incidental to the Contract, and do not create any rights for such third parties.

H. WAIVER

Waiver of any breach under a term, provision, or requirement of this Agreement, or any right or remedy hereunder, whether explicitly or by lack of enforcement, shall not be construed or deemed as a waiver of any subsequent breach of such term, provision or requirement, or of any other term, provision, or requirement.

I. INDEMNIFICATION

Contractor shall indemnify, save, and hold harmless the State, its employees and agents, against any and all claims, damages, liability and court awards including costs, expenses, and attorney fees and related costs, incurred as a result of any act or omission by Contractor, or its employees, agents, subcontractors, or assignees pursuant to the terms of this contract.

J. STATEWIDE CONTRACT MANAGEMENT SYSTEM

If the maximum amount payable to Contractor under this Contract is $100,000 or greater, either on the Effective Date or at anytime thereafter, this section shall apply.

Contractor agrees to be governed, and to abide, by the provisions of CRS 24-102-205, 24-102-206, 24-103-601, 24-103.5-101, 24-105-101, and 24-105-102 concerning the monitoring of vendor performance on state contracts and inclusion of contract performance information in a statewide contract management system.

Contractor's performance shall be subject to Evaluation and Review in accordance with the terms and conditions of this Contract, State law, including C.R.S 24-103.5-101, and State Fiscal Rules, Policies and Guidance. Evaluation and Review of Contractor's performance shall be part of the normal contract administration process and Contractor's performance will be systematically recorded in the statewide Contract Management System. Areas of Evaluation and Review shall include, but shall not be limited to quality, cost and timeliness. Collection of information relevant to the performance of Contractor's obligations under this Contract shall be determined by the specific requirements of such obligations and shall include factors tailored to match the requirements of Contractor's obligations. Such performance information shall be entered into the statewide Contract Management System at intervals established herein and a final Evaluation, Review and Rating shall be rendered within 30 days of the end of the Contract term. Contractor shall be notified following each performance Evaluation and Review, and shall address or correct any identified problem in a timely manner and maintain work progress.

Should the final performance Evaluation and Review determine that Contractor demonstrated a gross failure to meet the performance measures established hereunder, the Executive Director of the Colorado Department of Personnel and Administration (Executive Director), upon request by the Principal Representative, and showing of good cause, may debar Contractor and prohibit Contractor from bidding on future contracts. Contractor may contest the final Evaluation, Review and Rating by: (a) filing rebuttal statements, which may result in either removal or correction of the evaluation (CRS 24-105-102(6)), or (b) under CRS 24-105-102(6), exercising the debarment protest and appeal rights provided in CRS 24-109-106, 107, 201 or 202, which may result in the reversal of the debarment and reinstatement of Contractor, by the Executive Director, upon a showing of good cause.

K. CORA DISCLOSURE

To the extent not prohibited by federal law, this Agreement and the performance measures and standards under CRS §24-103.5-101, if any, are subject to public release through the Colorado Open Records Act, CRS §24-72-101, et seq.

University of Colorado Boulder, Supplementary Conditions to The General Conditions of the Construction Contract, Design/Bid/Build, SC-6.23

1. GENERAL CONDITIONS, ARTICLE 23. F. SIGN – DELETE the entire section.

2. GENERAL CONDITIONS, ARTICLE 25 INSURANCE - DELETE the entire section and replace with the following:

The Contractor shall obtain and maintain, at its own expense and for the duration of the contract including any warranty periods under the Contract are satisfied, the insurance coverages set forth below.

By requiring such insurance, the Principal Representative shall not be deemed or construed to have assessed the risk that may be applicable to the Contractor its agents, representatives, employees or subcontractors under this contract. The insurance requirements herein for this Contract in no way limit the indemnity covenants contained in the Contract. The Principal Representative in no way warrants that the limits contained herein are sufficient to protect the Contractor from liabilities that might arise out of the performance of the work under this Contract by the Contractor, its agents, representatives, employees, or subcontractors. The Contractor shall assess its own risks and if it deems appropriate and/or prudent, maintain higher limits and/or broader coverages. The Contractor is not relieved of any liability or other obligations assumed or pursuant to the Contract by reason of its failure to obtain or maintain insurance in sufficient amounts, duration, or types.

COVERAGES AND LIMITS OF INSURANCE - - Contractor shall provide coverage with limits of liability not less than those stated below.

1. ***Commercial General Liability – ISO CG 0001 or equivalent. Coverage to include:***
   - Premises and Operations
   - Explosions, Collapse and Underground Hazards
   - Personal / Advertising Injury
   - Products / Completed Operations
   - Liability assumed under an Insured Contract (including defense costs assumed under contract)
   - Independent Contractors
   - Designated Construction Projects(s) General Aggregate Limit, ISO CG 2503 (1997 Edition)
   - Additional Insured—Owners, Lessees or Contractors Endorsement, ISO Form 2010 (2004 Edition or equivalent)
   - Additional Insured—Owners, Lessees or Contractors Endorsement (Completed Operations), ISO CG 2037 (7/2004 Edition or equivalent)
   - **The policy shall be endorsed to include the following additional insured language on the Additional Insured Endorsements specified above: "The Regents of the University of Colorado, a Body Corporate, named as an additional insured with respect to liability and defense of suits arising out of the activities performed by, or on behalf of the Contractor, including completed operations".**
   - Commercial General Liability Completed Operations policies must be kept in effect for up to three (3) years after completion of the project. For buildings with a

construction cost greater than $99 million, the Commercial General Liability Completed Operations policies must be kept in effect for up to eight (8) years after the completion of the project.

- **An umbrella and/or excess liability policy may be used to meet the minimum liability requirements provided that the coverage is written on a "following form" basis.**

Liability Limits	General Aggregate	Products/Completed Operation Aggregate	Each Occurrence	Personal/Advertising Injury
Primary General Liability	$2,000,000	$2,000,000	$1,000,0000	$1,000,000
Umbrella or Excess Liability*	$5,000,000	$5,000,000	$5,000,000	$5,000,000

***Umbrella or Excess Liability does not apply to projects totaling $500, 000 or under.**

2. ***Automobile Liability***

Bodily Injury and Property Damage for any owned, hired, and non-owned vehicles used in the performance of this contract

Minimum Limits:

Bodily Injury/Property Damage (Each Accident)	$	1,000,000

3. ***Workers Compensation***
   - Statutory Benefits (Coverage A)
   - Employers Liability (Coverage B)

   a. This requirement shall not apply when a contractor or subcontractor is exempt under Colorado Workers' Compensation Act., **AND** when such contractor or subcontractor executes the appropriate sole proprietor waiver form.

Minimum Limits:

Coverage A (Workers' Compensation)	Statutory	
Coverage B (Employers Liability)		
Each accident	$	100,000
Disease each employee	$	100,000
Disease policy limit	$	500,000

4. ***Contractors Pollution Liability***
   - Coverage shall apply to sudden and gradual pollution conditions resulting from the escape of release of smoke, vapors, fumes, acids, alkalis, toxic chemicals, liquids, or gases, natural gas, waste materials, or other irritants, contaminants, or pollutants (including asbestos). Policy shall cover the Contractor's completed operations.
   - If the coverage is written on a claims-made basis, the Contractor warrants that any retroactive date applicable to coverage under the policy precedes the effective date of this Contract; and that continuous coverage will be maintained or an extended

discovery period will be exercised for a period of three (3) years beginning from the time that work under this contract is completed.

- **The policy shall be endorsed to include the following as Additional Insureds: The Regents of the University of Colorado, a Body Corporate, named as an additional insured with respect to liability and defense of suits arising out of the activities performed by, or on behalf of the Construction Manager, including completed operations".**
- Endorsements CA9948 and MCS-90 are required on the Automobile Liability Coverage if the Contractor is transporting any type of hazardous materials.
- **Contractors Pollution Liability policies must be kept in effect for up to three (3) years after completion of the project.**

Minimum Limits:

Per Loss	$	2,000,000
Aggregate	$	2,000,000

5. ***Builder's Risk/ Installation Floater***

Unless otherwise provided or instructed by the Principal Representative, the Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the project is located, Builder's Risk Insurance in the amount of the initial contract amount as well as subsequent modifications for the entire project at the site on a replacement cost basis without optional deductibles. This coverage is required for new buildings or additions to existing buildings and for materials and equipment to be installed in existing structures.

- Covered Cause of Loss: Special Form
- Include Theft and Vandalism
- Labor costs to repair damaged work
- Shall be written for 100% of the completed value (replacement cost basis)
- Deductible maximum is $50,000.00
- Waiver of Subrogation is to apply
- The Regents of the University of Colorado, a body corporate, shall be added as **Additional Named Insured on Builders Risk**.

1. Policy must provide coverage from the time any covered property becomes the responsibility of the Contractor, and continue without interruption during construction, renovation, or installation, including any time during which the covered property is being transported to the construction installation site, or awaiting installation, whether on or off site.
2. The Policy shall be maintained, unless otherwise provided in the contract documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made or until no person or entity other than the Principal Representative has insurable interest in the property to be covered, whichever is later.
3. The Builder's Risk insurance shall include interests of the Principal Representative, and if applicable, affiliated or associated entities, the General Contractor, subcontractors and sub-tier contractors in the project.
4. Builders' Risk Coverage shall be on a **Special** Covered Cause of Loss Form and shall include theft, vandalism, malicious mischief, collapse, false-work, temporary buildings and

debris removal including demolition, increased cost of construction, architect's fees and expenses, flood (including water damage), earthquake, and if applicable, all below and above ground structures, piping, foundations including underground water and sewer mains, piling including the ground on which the structure rests and excavation, backfilling, filling, and grading. Equipment Breakdown Coverage (a.k.a. Boiler & Machinery) shall be included as required by the Contract Documents or by law, which shall specifically cover insured equipment during installation and testing (including hot testing, where applicable). Other coverages may be required if provided in contract documents.

5. The Builders' Risk shall be written for 100% of the completed value (replacement cost basis) of the work being performed. The Builders' Risk shall include the following provisions:
   a. Replacement Cost Basis - including modification of the valuation clause to cover all costs needed to repair the structure or work (including overhead and profits) and will pay based on the values figured at the time of rebuilding or repairing, not at the time of loss
   b. Modify or delete exclusion pertaining to damage to interior of building caused by an perils insured against are covered; also provide coverage for water damage

   Note, if the addition, or renovation is to an existing building, The Principal Representative requires that the Contractor provide as an option to include the existing building into the Builders' Risk Policy. The Principal Representative shall provide the replacement cost value of the existing building
6. At the option of the Principal Representative, the Principal Representative may include Soft Costs (including Loss of Use)/Delay in Opening Endorsement under the builder's risk policy. The Principal Representative agrees to provide the necessary exposure base information for quotation by the Builder's Risk carrier. The Principal Representative agrees to pay the premium associated with the Soft Costs coverage, the Principal Representative decides to purchase this coverage.
7. The Builders' Risk Policy shall specifically permit occupancy of the building during construction. Partial occupancy or use of the work shall not commence until the insurance company or companies providing insurance have consented to such partial occupancy or use. The Principal Representative and Contractor shall take reasonable steps to obtain consent of the insurance company or companies and delete any provisions with regard to restrictions within any Occupancy Clauses within the Builders' Risk Policy. The Builders' Risk Policy shall remain in force until acceptance of the project by the Principal Representative.
8. The deductible shall not exceed $50,000 and shall be the responsibility of the Contractor except for losses such as flood (not water damage), earthquake, windstorm, tsunami, volcano, etc. Losses in excess of $50,000 insured shall be adjusted in conjunction with the Principal Representative. Any insurance payments/proceeds shall be made payable to the Principal Representative subject to requirements of any applicable mortgagee clause. The Contractor shall pay subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require subcontractors to make payments to their sub-subcontractors in similar manner.

   The Principal Representative shall have the authority to adjust and settle any losses in excess of $50,000 with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Principal Representative exercise of this power. It is expressly agreed that nothing in this section shall be subject to arbitration and any references to arbitration are expressly deleted.

9. The Policy shall be amended to show 45 days notice of cancellation. Such notice shall be given to the Principal Representative and Contractor. If requested, the Contractor shall file with the Principal Representative a copy of the policy that includes the insurance coverages required in this section. The policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to the Project.

   If the Contractor does not intend to purchase such Builder's Risk Insurance required by the Contract and with all of the coverages in the amount described above, the Contractor shall so inform the Principal Representative as stated in writing prior to commencement of the work. The Principal Representative may then affect insurance that will protect the interests of the Principal Representative, the General Contractor, Subcontractors and sub-tier contractors in the project. Coverages applying shall be the same as stated above including other coverages that may be required by the Principal Representative. The cost shall be charged to the Contractor. Coverage shall be written for 100% of the completed value of the work being performed, with a deductible not to exceed $50,000 per occurrence for most projects.
   All deductibles will be assumed by the Contractor. Waiver of Subrogation is to apply against all parties named as insureds, but only to the extent the loss is covered, and Beneficial Occupancy Endorsements are to apply.
   If the Principal Representative is damaged by the failure or neglect of the Contractor to purchase or maintain insurance as described above, without so notifying the Principal Representative , then the Contractor shall bear all reasonable costs properly attributable thereto.

ADDITIONAL INSURANCE REQUIREMENTS

1. All insurers must be licensed or approved to do business within the State of Colorado, and unless otherwise specified, all policies must be written on a per occurrence basis.
2. Contractor's insurance carrier should possess a minimum A.M. Best's Insurance Guide rating of A- VI.
3. On insurance policies where the Principal Representative are named as additional insureds, the Principal Representative shall be additional insureds to the full limits of liability purchased by the Contractor even if those limits of liability are in excess of those required by this Contract.
4. Contractor shall furnish the Principal Representative with certificates of insurance (ACORD form or equivalent approved by the Principal Representative) as required by this Contract. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf.
   All certificates and any required endorsements are to be received and approved by the Principal Representative before work commences. Each insurance policy required by this Contract must be in effect at or prior to commencement of work under this Contract and remain in effect for the duration of the project. Failure to maintain the insurance policies as required by this Contract or to provide evidence of renewal is a material breach of contract.
5. Upon request by the Principal Representative, Contractor must provide a copy of the actual insurance policy effecting coverage(s) required by the contract.
6. The Contractor's insurance coverage shall be primary insurance and non-contributory with respect to all other available resources.
7. The Contractor shall advise the Principal Representative in the event any general aggregate or other aggregate limits are reduced below the required per occurrence limit. At their own expense, the Contractor will reinstate the aggregate limits to comply with the minimum

requirements and shall furnish to the Principal Representative a new certificate of insurance showing such coverage is in force.

8. Provide a minimum of thirty (30) days advance written notice to the Principal Representative for cancellation, non-renewal, or material changes to policies required under the Contract.
9. Certificate Holder: The Regents of the University of Colorado, University Risk Management, 1800 Grant Street, Suite 700, Denver, CO 80203.

Failure of the Contractor to fully comply with these requirements during the term of the Contract may be considered a material breach of contract and may be cause for immediate termination of the Contract at the option of the Principal Representative. The Principal Representative reserves the right to negotiate additional specific insurance requirements at the time of the contract award.

Subcontractors
Contractor's certificate(s) shall include all subcontractors as additional insureds under its policies **or** subcontractors shall maintain separate insurance as determined by the Contractor, however, subcontractor's limits of liability shall not be less than $1,000,000 per occurrence / $2,000,000 aggregate.

Non-Waiver
The parties hereto understand and agree that The Principal Representative is relying on, and does not waive or intend to waive by any provision of this Contract, the monetary limitations or any other rights, immunities, and protections provided by the Colorado Governmental Immunity Act, et seq., as from time to time amended, or otherwise available to the Principal Representative or its officers, employees, agents, and volunteers.

Mutual Cooperation
The Principal Representative and Contractor shall cooperate with each other in the collection of any insurance proceeds which may be payable in the event of any loss, including the execution and delivery of any proof of loss or other actions required to effect recovery.

3. GENERAL CONDITIONS, ARTICLE 53 J. MISCELLANEOUS PROVISIONS – STATEWIDE CONTRACT MANAGEMENT SYSTEM- <u>DELETE the entire section</u>.

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

CHANGE ORDER BULLETIN

Change Order Bulletin No: _____ Date _____

Contractor: _____

Institution or Agency: University of Colorado Boulder

Project No./Name: _____

Description of Work: _____

This bulletin is issued to define the scope of revision in drawings and/or specifications for a contemplated change order. The work called for by these revisions shall be in accordance with the requirements of the original contract documents.

Please prepare and submit a proposal for the changes described below. For pricing use State Form SC-6.312. A formal change order State Form SC-6.31 will be issued after approval of your proposal by the Principal Representative and the Architect. Your proposal shall include a statement as to the effect this change will have on the time for completion of the project.

This bulletin is **NOT** an authorization to proceed.

DESCRIPTION OF CHANGE:

SPECIFICATION REVISIONS:

STATUS OF EXISTING WORK:

PREPARED BY: _____
ARCHITECT/ENGINEER OR CONTRACTOR

APPROVED BY: _____
PRINCIPAL REPRESENTATIVE
(INSTITUTION or AGENCY)

SAMPLE

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

CHANGE ORDER PROPOSAL

(enter information ONLY in YELLOWED cells)

Change Order Proposal No. _____ Date _____

Change Order Bulletin No: _____

Description of Work: (enter into text box) Date _____

Contractor
University of Colorado Boulder
Institution or Agency

Project No./Name

(Before completing this form, read instructions on reverse side.)

PART I -	**WORK PERFORMED BY CONTRACTOR**					
Line 1.	Direct Labor Costs		$			
Line 2.	Labor Overhead (Direct Labor Burdens)	(x Line 1)	$	0.00		
Line 3.	Total Contractor's Labor Costs (Lines 1 and 2)				$ 0.00	
Line 4.	Direct Materials Costs		$			
Line 5.	Materials Overhead (Delivery Costs & Taxes)	(x Line 4)	$	0.00		
Line 6.	Total Materials Costs (Lines 4 and 5)				$ 0.00	
Line 7.	Total Equipment Costs				$	
Line 8.	PART I - TOTAL CONTRACTOR'S L, M & E COSTS (Lines 3, 6 and 7)				**Part I** $	0.00
PART II -	**WORK PERFORMED BY SUBCONTRACTOR**					
Line 9.	Direct Labor Costs		$			
Line 10.	Labor Overhead (Direct Labor Burdens)	(x Line 9)	$	0.00		
Line 11.	Total Subcontractor's Labor Costs (Lines 9 and 10)				$ 0.00	
Line 12.	Direct Materials Costs					
Line 13.	Materials Overhead (Delivery Costs & Taxes)	(x Line 12)	$	0.00		
Line 14.	Total Subcontractor's Materials Costs (Lines 12 and 13)				$ 0.00	
Line 15.	Total Subcontractor's Equipment Costs				$	
Line 16.	Total Subcontractor's L, M & E Costs (Line 11, 14 and 15)				$ 0.00	
Line 17.	Subcontractor's Overhead (Indirect Costs)	(10% x Line 16)	$	0.00		
Line 18.	Subcontractor's Profit (on line 16)	Addition or Deduct	$	0.00		
Line 19.	PART II - TOTAL SUBCONTRACTOR'S COSTS (Lines 16, 17 and 18)				**Part II** $	0.00
PART III -	**CONTRACTOR'S OVERHEAD & PROFIT**					
Line 20.	Contractor's Overhead (Indirect Costs)	(10% x Part I Total)	$	0.00		
Line 21.	Contractor's Profit	(5% x Part I Total)	$	0.00		
Line 22.	PART III - TOTAL CONTRACTOR OVERHEAD & PROFIT (Lines 20 and 21)				**Part III** $	0.00
PART IV -	**CONTRACTOR'S MARKUP ON SUBCONTRACTOR**					
Line 23.	Contractor's Commission on Subcontractor	(5% x Part II Total)	$	0.00		
Line 24.	Contractor's Profit (on Line 19)	Addition or Deduct	$	0.00		
Line 25.	PART IV - TOTAL CONTRACTOR MARKUP ON SUBCONTRACTOR (Lines 23 and 24)				**Part IV** $	0.00
PART V -	**SUBTOTAL C.O. PROPOSAL (Parts I and II and III and IV)**				Part V (Subtotal) $	0.00
PART VI -	**CONTRACTOR'S BOND COST**	(x Part V Total)			Part VI $	0.00
PART VII -	**GRAND TOTAL CHANGE ORDER PROPOSAL (Sum of Totals: Parts V and VI)**				**Grand Total** $	**0.00**
PART VIII -	**CONTRACT TIME (CALENDAR DAYS CHANGED)**	☐ EXTENDED ☐ NO CHANGE ☐ REDUCED				Days

THE TIME OF COMPLETION MAY CHANGE BY THE CALENDAR DAYS INDICATED (ABOVE) FROM THE TOTAL NUMBER OF DAYS LISTED IN THE CONTRACTOR'S AGREEMENT TO COMPLETE THE ENTIRE PROJECT.

CONTRACTOR'S CERTIFICATE:
This is to certify that, to the best of my knowledge and belief, the cost/price data submitted in response to the listed C.O. Bulletin, are accurate, complete and current as of _____.

Firm: _____

Name & title: _____

Signature: _____

*Date: _____

ARCHITECT/ENGINEER'S CERTIFICATE:
This is to certify that I have analyzed the proposal and find, to the best of my knowledge and belief, that the proposal represents current, fair, factual and competitive cost/price data.

Firm: _____

Name & title: _____

Signature: _____

Date: _____

* The proposal shall remain in full force and effect for a period of _____ calendar days from date of signature.

PRINCIPAL REPRESENTATIVE (Institution or Agency)

_____ Date: _____

STATE BUILDINGS PROGRAMS (or Authorized Delegate)

_____ Date: _____

SAMPLE

INSTRUCTIONS FOR COMPLETING "CHANGE ORDER PROPOSAL" COST/PRICE DATA SUMMARY (STATE FORM SC-6.312)

(enter information only in YELLOWED cells)

Enter Change Order Proposal Number, Date Created, Contractor's Name, Agency/Institution, State Project Number and Name.
REFERENCE: Enter Change Order Bulletin Number, Date Issued, and Description of Changes from Bulletin, noting exceptions which are listed in the Bulletin but are excluded, i.e., not priced on this form.

PART I - WORK PERFORMED BY CONTRACTOR:

Line 1. Direct Labor Costs: Fill in subtotal of direct labor costs which includes base rates plus applicable fringe benefits. On Contractor's (or Sub's) letterhead show costs as follows:

Trade	Rate		Duration		Extended Costs
	$	x		= $	0
	$	x		= $	0
			Direct Labor Cost	= $	0

Line 2. Labor Overhead (Direct Labor Burdens, etc,): Enter percentage of Line 1 as applicable. (Spreadsheet calculates the value)
Line 3. Total Contractor's Labor Costs: Total of Lines 1 and 2. (Spreadsheet calculates the total)

Line 4. Direct Material Cost: Support with quotes or invoices. Fill in subtotal of direct materials costs.
Include all delivery, handling, insurance costs, etc. On Contractor's letterhead show direct materials costs as follows:

Materials	Rate		Quantity		Extended Costs
	$	x		= $	0
	$	x		= $	0
			Direct Materials Cost	= $	0

Line 5. Materials Overhead (Delivery, taxes, insurance, etc. - as mutually agreed upon at contract signing):
Enter percentage as applicable. (Spreadsheet calculates the value)
Line 6. Total Contractor's Material Costs: Total of Lines 4 and 5. (Spreadsheet calculates the total)

Line 7. Total Contractor's Equipment Costs: Enter total equipment costs including indirect overhead costs in hourly rate - except indirect labor costs. On Contractor's letterhead show total equipment costs as follows:

Equipment	Rate		Duration		Extended Costs
	$	x		= $	0
	$	x		= $	0
			Total Equipment Cost	= $	0

Line 8. TOTAL CONTRACTOR'S Labor, Materials & Equipment (L, M & E) Costs: Add Lines 3, 6 and 7 of Part I. (Spreadsheet form calculates totals)

PART II - WORK PERFORMED BY SUBCONTRACTOR:

Line 9. Direct Labor Costs: See Line 1 instructions.
Line 10. Labor Overhead (Direct Labor Burdens, etc,): Enter percentage of Line 9 as applicable. (Spreadsheet calculates the value)
Line 11. Total Contractor's Labor Costs: Total of Lines 9 and 10. (Spreadsheet calculates the total)
Line 12. Direct Material Cost: See Line 4 instructions.
Line 13. Materials Overhead (Delivery, taxes, insurance, etc.) Enter percentage as applicable. (Spreadsheet calculates the value)
Line 14. Total Subcontractor's Material Costs: Total of Lines 12 and 13. (Spreadsheet calculates the total)
Line 15. Total Subcontractor's Equipment Costs: See Line 7 instructions.
Line 16. TOTAL SUBCONTRACTOR'S Labor, Materials & Equipment (L, M & E) Costs: Add Lines 11, 14 and 15 of Part II.
Line 17. Subcontractor's Overhead (Indirect costs): Edit percentage of Line 16 if applicable - See Article 35 of General Conditions.
Line 18. Subcontractor's Profit: Enter a "1" in appropriate cell. For an addition, Edit E37, a deduct, Edit I37, See Article 35 General Conditions.
Line 19. TOTAL SUBCONTRACTOR'S Labor, Materials & Equipment (L, M & E) Costs: Add Lines 16, 17 and 18 of Part II.

PARTS III THROUGH VIII - CERTIFICATIONS - Self Explanatory.

Part 3. Edit percentages for Line 20 or 21 if applicable. See Article 35 of General Conditions.
Part 4. Line 23, Edit percentages applicable to Line 18. See Article 35 of General Conditions.
Part 4. Line 24, Enter a "1" in appropriate cell. For an addition, edit E45, a deduct edit I45. See Article 35 of General Conditions.
Part 5. SUBTOTAL OF CHANGE ORDER PROPOSAL (sum of lines 8, 19, 22, and 25 - applicable)
Part 6. Contractor's Bond Cost: Enter percentage value of Part 5 as applicable. (spreadsheet calculates the value)
Part 7. GRAND TOTAL OF THE CHANGE ORDER PROPOSAL. (spreadsheet calculates the sum of parts 5 and 6)
Part 8. Contract time change. Place an "X" in appropriate cell and edit the cell to indicate the number of days changed.

A. The Contractor, who prepares this proposal form, certifies the cost/price data by signing, dating, and forwarding same to the Architect/Engineer (or Consultant) for further action.

B. The Architect/Engineer (or Consultant) reviews and analyzes the cost/price data for the requirements that these are: 1) currently prevalent, 2) reasonably fair, 3) factually applicable, and 4) equivalently competitive market selling prices. The Architect/Engineer (or Consultant) may negotiate - after receipt of the cost proposal - any or all of the cost elements of the proposal to support a recommendation of acceptance to the Principal Representative. Certification by the A/E (or Consultant) of the above requirements is made upon his signature. The Architect/Engineer (or Consultant) forwards the proposal with the supporting back-up to the Agency.

C. Authority for the Institution or Agency (usually the Principal Representative) reviews the proposal, signs, dates, and forwards to Office of the State Architect for final action.

D. State Buildings Division reviews the cost proposal, with all supporting back-up, for technical and procedural requirements and, if in order, signs and dates the proposal.

SAMPLE

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

CHANGE ORDER

Change Order No: _____ ~~Contract ID No.~~ N/A Date _____

Contractor: _____

Institution or Agency: University of Colorado Boulder

Project No./Name: _____

Your Change Order Proposal(s), dated _____ is hereby being designated for approval of the following work:

(Note: If more space is needed for description of work, attach additional 8-1/2" x 11" sheets hereto.)

SAMPLE

This change order was originated by the Contractor ☐, Architect/Engineer ☐, State ☐, and I/We do hereby recommend acceptance and approval of the change to the Contractor's Agreement Dated _____ (Exhibit A) which is by this reference, made a part hereof, and identified as Exhibit _____ with an increase ☐, a decrease ☐, no change ☐, of $_____.

The Time of Completion is extended _____ calendar days ☐, is unchanged ☐, is reduced ☐ calendar days, from the total number of days listed in the Contractor's Agreement to complete the entire Project. The revised total number of days to complete the entire Project aggregating this Change Order and previously approved Change Order(s) per the Summary of Changes chart below, is _____ calendar days. If the completion date was extended or reduced, the new completion date of the Project is _____ (M/D/YYYY).

SUMMARY OF CHANGES			
	Description of Work/Date	Time of Completion/ Calendar Days Extended/Reduced	Dollar Amounts
Original Contract (Exhibit A) - partial			
Change Order #1			
Change Order #2			
Current Totals			

*Persons signing for Architect/Engineer/Contractor hereby swear and affirm that they are authorized to act on Architect/Engineer/Contractor's behalf and acknowledge that the State is relying on their representations to that effect. **Principal is not a recognized title and will not be accepted.**

Short and Brennan Architects Architect/Engineer Firm	Name and Title (print) Signature	Date
Contractor (Name of Firm)	Name and Title (print) Signature	Date
University of Colorado Boulder Institution or Agency	Name and Title (print) Principal Representative (Signature) Ronald L. Ried, Director, Facilities Management Business Services	Date

CONTRACT STATUS

Original Contract Value _____

Previous increases by CO/Amend _____

Previous decreases by CO/Amend _____

Value After Prior CO's/Amend _____

This CO/Amend

Increases ☐ Decreases ☐ _____

CURRENT CONTRACT VALUE _____

STATE BUILDINGS PROGRAMS (or Authorized Delegate) _____ DATE _____
Paul M. Leef, AIA, LEED TM AP
Campus Architect &
Director, Planning, Design & Construction

STATE CONTROLLER (or Authorized Delegate) _____ DATE _____
Laura Ragin, Controller
Accounting & Business Support

(Verification)

SAMPLE

REQUEST FOR INFORMATION
(RFI # 01)

Project No./ Project Name: _____
Date: _____
To: _____
From: _____
Sent Via: _____

Drawing Ref.: _____ **Spec. Ref.:** _____

Subject:

Proposed Solution:

	NO	YES
Schedule Impac		
Cost Impact:		

 # I _____

Estimated C _____

Date Response Required _____ **Sent Via:** E-mail

Signature: _____ **Company:** _____

Response:

Response Date: _____ **Sent Via:** _____
Person Responding _____ **Signature:** _____

Further Action Required:

Other Documents This RFI Refers to:

Letters	RFP	PCO	CO	Other

SAMPLE

University of Colorado at Boulder
ENVIRONMENTAL HEALTH AND SAFETY
413 UCB, (303) 492-6025, Fax (303) 492-2854

ENVIRONMENTAL SITE ASSESSMENT FORM

Building & Location	Job Description	Work Order / Project Number
CAMP_	Description of work that will be done	MY010905

Follow-up required for:

ASBESTOS MATERIALS
RADIOACTIVE MATERIALS
ENVIRONMENTAL COMPLIANCE
LEAD MATERIALS
LASER OR X-RAY
HAZARDOUS MATERIALS
NONE FOUND

Suspect Building Components, Materials, and Site Conditions:

Lists all suspect materials for asbestos and/or lead-based paint. Also describes any other environmental and safety conditions, e.g. laboratory, hazardous materials, radiation issues, etc. Will address other conditions of the building being worked in, e.g. classroom, offices, laboratories, or other uses.

SAMPLE REPORT ONLY

Samples / Results:

Lists all know results of suspect materials or environmental monitoring results. Where suspect materials are not known, lists these as presumed positive.

SAMPLE REPORT ONLY

REQUIRED ACTION:

Identifies any action that may be required by all parties for the project, conditions that shall be followed, and all other notations relavant to the project. Explains further steps that must be taken for the project and responsibilities of key project staff, e.g. Project Managers, Contractors, EH&S, etc.

SAMPLE REPORT ONLY

EH&S Inspector: Certified CDPHE Inspector — **Date Inspected:** 1/9/2005

EH&S Manager: Michael Yanker — **Date Reviewed:** 1/9/2005

This report based upon conditions, regulations, policies at time of inspection and is valid for 90 days. Changing scope of work requires re-inspection. If areas contain hazardous materials (asbestos, chemicals, gases, bio-hazards, radioactive materials or radiation) and/or involve laboratories, shops, haz exhausts, tanks, sewer drains or traps, storm or surface water, or other occupational hazards, work must be coordinated with appropriate EH&S manager. No new materials containing asbestos may be used for any part of the construction project. Project must conform with all applicable codes & standards. Project Rep must submit to EH&S Env Compliance - comprehensive haz materials/chemical inventory used to determine additional requirements. Contractor and/or Project Rep must provide above information to employees, subcontractors and other relevant parties .

University Representative /	Project Manager	**Phone Number:**
Contractor Name:	Contractor	**Phone Number:**
Contractor Representative: (signature)	Foreman or Superintendant	**Date Signed:**

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

NOTICE TO PROCEED (DESIGN/BID/BUILD CONTRACT)

Date of Notice: _____
Date to be inserted by the Principal Representative

Date/Description of Contract Documents: _____

Institution/Agency: University of Colorado at Boulder

Project No./Name: _____

~~Attach Notice of Code Compliance from Code Review Agent/Building Official for Documents Listed Above~~

To:

This is to advise you that your Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance, and Affidavit Regarding Unauthorized Immigrants have been received. Our issuance of this Notice does not relieve you of responsibility to assure that the bond and insurance requirements of the Contract Documents are met for the duration of the Agreement. The Agreement dated _____ covering the above described work has been fully executed.

You are hereby authorized and directed to proceed within ten (10) days from date of this Notice as required in the Agreement. Any liquidated damages for failure to achieve Substantial Completion by the date agreed that may be applicable to this Contract will be calculated using the date of this Notice for the date of the commencement of the Work.

The completion date of the Project is _____ (M/D/YYYY).

Actual on-site construction may not commence until all applicable building permits have been obtained by the Contractor.

By _____
State Buildings Programs Date
(or Authorized Delegate)
Paul M. Leef, AIA, LEED TM AP
Campus Architect &
Director, Planning, Design & Construction

By _____
Principal Representative Date
(Institution or Agency)
Ronald L. Ried, Director
Facilities Management Business Services

When completely executed, this form is to be sent by certified mail to the Contractor by the Principal Representative; or by any other means to which the parties agree.

SAMPLE

STATE OF COLORADO

OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS
CERTIFICATION AND AFFIDAVIT REGARDING UNAUTHORIZED IMMIGRANTS

Institution/Agency: University of Colorado Boulder
Project No./Name: _____

A. CERTIFICATION STATEMENT CRS 8-17.5-101 & 102 (HB 06-1343, SB 08-193)

The Vendor, whose name and signature appear below, certifies and agrees as follows:

1. The Vendor shall comply with the provisions of CRS 8-17.5-101 et seq. The Vendor shall not knowingly employ or contract with an unauthorized immigrant to perform work for the State or enter into a contract with a subcontractor that knowingly employs or contracts with an unauthorized immigrant.
2. The Vendor certifies that it does not now knowing employ or contract with and unauthorized immigrant who will perform work under this contract, and that it will participate in either (i) the "E-Verify Program", jointly administered by the United States Department of Homeland Security and the Social Security Administration, or (ii) the "Department Program" administered by the Colorado Department of Labor and Employment in order to confirm the employment eligibility of all employees who are newly hired to perform work under this contract.
3. The Vendor shall comply with all reasonable requests made in the course of an investigation under CRS 8-17.5-102 by the Colorado Department of Labor and Employment. If the Vendor fails to comply with any requirement of this provision or CRS 8-17.5-101 et seq., the State may terminate work for breach and the Vendor shall be liable for damages to the State.

or

B. SOLE PROPRIETOR AFFIDAVIT CRS 24-76.5-101 (HB 06S-1023)

1. If the Vendor is a sole proprietor, the undersigned hereby swears or affirms under penalty of perjury under the laws of the State of Colorado that (check one):
   - ☐ I am a United States citizen, or
   - ☐ I am a Permanent Resident of the United States, or
   - ☐ I am lawfully present in the United States pursuant to Federal law.

   I understand that this sworn statement is required by law because I am a sole proprietor entering into a contract to perform work for the State of Colorado. I understand that state law requires me to provide proof that I am lawfully present in the United States prior to starting work for the State. I further acknowledge that I will comply with the requirements of CRS 24-76.5-101 et seq. and will produce the required form of identification prior to starting work. I acknowledge that making a false, fictitious, or fraudulent statement or representation in this sworn affidavit is punishable under the criminal laws of Colorado as perjury in the second degree under CRS 18-8-503 and it shall constitute a separate criminal offense each time a public benefit is fraudulently received.

CERTIFIED and AGREED to this _____ day of _____, 2013.
VENDOR:

_____
Vendor Full Legal Name

BY: _____ _____
Signature of Authorized Representative Title

SAMPLE

Notice to Contractors:
ENVIRONMENTAL RESPONSIBILITIES

Given To: _____ **Project No.** _____

Contractor Project No.

_____ _____

Signature / Date Project Name Project Name

Contractors working on the UCB campus must comply with all applicable University, City, State and Federal environmental regulations and standards.

This includes but is not limited to:

- Developing and implementing Storm Water Management Plans, obtaining associated permits (i.e. dewatering), and using erosion control techniques and Best Management Practices (BMP's) to protect drains and sewer systems from inappropriate discharges, paying special attention to preventing any contaminants from entering storm sewers or surface water collection systems.
- Properly managing and disposing of hazardous and regulated materials.
- Controlling dust, odors, vapors, debris and run-off during project activities.
- Reporting spills or releases of hazardous materials immediately! Call **911** and during weekdays report to EH&S 303-492-6025.

You are expected do your part to promote awareness and compliance. Violations can result in serious penalties and fines for contractors!

On the **reverse side** of this flyer you will find examples of the kinds of environmental and safety issues and practices that often require attention at construction sites.

Questions, Comments or Concerns? – Please Contact:

Environmental Health and Safety **303-492-6025.**

ENVIRONMENTAL & SAFETY REMINDERS at Construction Sites

Spills and Emergencies → Post contingency/preparedness plan; prevent releases to the environment; call 911 immediately to report hazardous spills, & weekdays report to EH&S 303-492-6025

Construction Waste & Debris → **Keep saw-cut slurry, drywall mud, grout and mortar, paint, sediment, and all Waste other wastes and process water OUT OF GUTTERS, STREETS, STORM DRAINS, AND PARKING LOTS!** Use proper BMP's to protect from run-off and discharges, see website for examples of BMP's related to project activities: http://www.bouldercolorado.gov/www/pace/government/index.html; sweep and shovel solid materials to contractor supplied construction dumpster; allow solids to settle before pouring off water to the sanitary sewer. Identify drains in advance and designate sanitary sewer drain(s) where it's OK to dump liquids that are pre-approved by EH&S 303-492-6025.

OSHA → Follow applicable regulations for confined space entry (e.g. tunnels), MSDS, product identification & labeling, PPE, trenching and shoring, fall protection, welding vision screens, etc.

Asbestos & Lead-Based Paint → Assume all building materials are asbestos-containing unless written report(s) indicate otherwise. A pre-construction environmental site assessment (ESA) is required prior to beginning work--call EH&S Asbestos/Lead Unit 303-492-6168.

Dust Control → Use wet methods, exhaust fans, HEPA vacs, barriers, etc.; watch for fire alarms in buildings that could be activated by dusts; visible emissions are not permitted.

Hazardous Materials & Waste → Includes paints and solvents, oils, fuels, coolants, corrosives, cleaners, pesticides, PCB light ballasts, mercury vapor lamps, smoke detectors, rechargeable and lead acid batteries, and many other materials and products. **Do not** place in the trash or down the drain. Coordinate disposal with EH&S Haz Mat Unit 303-492-8531.

Odors and Vapors, IAQ → Use protective measures such as barriers, smoke eaters, exhaust fans, ventilation system controls, etc. to capture harmful odors/vapors ; watch for building air intakes & coordinate work with building occupants to avoid exposures/complaints.

De-watering → Water must be visibly clear without a petroleum "sheen" to be discharged; solids must be settled-out or removed prior to discharge. Dewatering permits may be required from the Colorado Department of Public Health and Environment (CDPHE) - Water Quality Division 303-692-3500.

Utility Locates → Before digging, **ALWAYS** call the Utility Notification Center of Colorado (UNCC) 1-800-922-1987.

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

CLOSING-OUT CHECKLIST*

Institution or Agency: University of Colorado at Boulder Final Punch List Date _____
Architect/Engineer: OZ Architecture
Contractor: _____
Project No./Name: _____

After Contractor or Construction Manager is satisfied that work is complete, a date for final review is established. Architect/Engineer inspection is made with Contractor(s) and Principal Representative and State Buildings Programs (SBP) present. Forms are processed as required.

	DATE COMPLETED	SIGNOFF INITIALS	REMARKS
1a. Final inspections have been made and permission to occupy Project is obtained through SBP Delegate. The **Building Inspection *Cards are*** completely signed off and attached.			
1b. If Principal Representative wishes to occupy entire project or portions of Project before completion (Beneficial Occupancy) Project review of condition and responsibility is conducted and noted. (Fill out Form SBP-01 in addition to this form).			
2. Notify the local fire department of the date the building will be occupied.			
3. Coordination for final utility and service connections, meters, etc., has been made (water, gas, sewer, electricity and telecommunication) and in full operating order.			
4. Sterilization of plumbing systems has been performed.			
5. Operational tests of systems and equipment have been performed as required.			
6. Systems adjustments, such as balancing, equipment operations, etc., have been performed. Reports have been submitted to Architect/Engineer and approved.			
7. State personnel are instructed in system and equipment operations as required by contract.			
8. Instructions, manuals, guides, charts, etc., are transmitted to Principal Representative.			
9. Principal Representative furnish equipment and furnishing are coordinated and placed.			
10. Review drawing, specifications, addenda, change orders, etc. for work to be done and note.			

SAMPLE

	DATE COMPLETED	SIGNOFF INITIALS	REMARKS
11. On the Contract Close-out Punch List (Form SBP-06) the final punch list items deficient or still required are made by the Architect and includes lists furnished by the consultants and promptly distributed to all parties..			
12. Schedule for corrections, deficiencies, and items to be supplied is established by Contractor, Assistant Contractor and trades as to location of specific defects if necessary.			
13. Final Change Orders are processed (must be completed prior to contract acceptance.			
14. The Principal Representative shall not authorize final payment until all items on the punch lists have been completed, the Notice of Acceptance issued and the Notice of Contractor's Settlement Date is published.			
15. Permanent keying, keys and keying instructions have been performed.			
16. Extra materials, spares, etc., are delivered to Principal Representative.			
17. Record drawings (as-built) requirements have been submitted to A/E.			
18. Guarantee/Warranty requirements are met.			
19. All records, reports, files, documents, etc., of construction inspector are in order and turned over to Owner as arranged, and to SBP as applicable.			
20. Removal of Contractor's temporary work; cleanup and debris removal is understood and performed.			
21. Post-contract maintenance conditions, such as equipment, landscaping, etc., are understood and arranged for.			

SAMPLE

* Verification, item by item, as applicable, to be submitted with Notice of Acceptance Form SC-6.27.

OZ Architecture
Architect/Engineer

Date

Contractor

Date

Paul M. Leef, AIA, LEED ™ AP
Campus Architect &
Director, Planning, Design & Construction
State Buildings Programs
(or Authorized Delegate)

Date

Ronald L. Ried, Director
Facilities Business Services
Principal Representative
(Institution or Agency)

Date

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

PRE-ACCEPTANCE CHECKLIST*

Institution or Agency: University of Colorado Boulder Final Punch List Date _____
Architect/Engineer: OZ Architecture
Contractor: _____
Project No./Name: _____

After Contractor is satisfied that work is complete as per Notice of Substantial Completion Punch List, a date for final review is established. Architect/Engineer inspection is made with Contractor(s) and Principal Representative and State Buildings Programs (SBP) present. Forms are processed as required.

	DATE COMPLETED	A/E SIGNOFF	REMARKS
1. The Notice of Approval of Occupancy/Use has been fully executed ***and the Inspection Cards are completely signed-off..***			
2. Schedule for corrections, deficiencies, and items to be supplied are established by Contractor.			
3. Final Change Orders are processed (must be completed prior to Notice of Acceptance).			
4. The Principal Representative shall not authorize final payment until all items on the punch list have been completed, the Notice of Acceptance issued and the Notice of Contractor's Settlement Date is published.			
5. Permanent keying, keys and keying instructions have been performed.			
6. Extra materials as per specifications are delivered to Principal Representative.			
7. As-built drawings have been submitted to Architect/Engineer.			
8. Guarantee/Warranty documentation requirements are met.			
9. Removal of Contractor's temporary work including cleanup and debris removal.			
10. State personnel are instructed in system and equipment operations as required by contract.			
11. All Instructions, manuals, guides, and charts have been transmitted to Principal Representative.			

Architect/Engineer Date
OZ Architecture

Contractor Date

State Buildings Programs Date
(or Authorized Delegate)
Paul M. Leef, AIA, LEED TM AP
Department of Facilities Management

Principal Representative Date
(Institution or Agency)
Ronald L. Ried, Director
Facilities Management Business Services

SAMPLE

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

NOTICE OF SUBSTANTIAL COMPLETION

Date of Substantial Completion: _____
Date to be inserted by the Principal Representative

Institution/Agency: University of Colorado Boulder

Project No./Name: _____

TO: **Larry Hill,** Project Manager
University of Colorado Boulder
Department of Facilities Management
Campus Box 453 UCB
Boulder, CO 80309-0453
(Principal Representative)

And

(Contractor)

This is to advise you that the Work has been reviewed, inspected and determined, to the best knowledge, information and belief of the Architect/Engineer, to be substantially complete as of the date noted above in accordance with the criteria outlined in Article 41 of The General Conditions of the Contract and the Specifications, including without limitation a) suitable for occupancy, b) inspected for code compliance with ~~Building Inspection Records signed by code officials for the State~~, *Inspection Cards completely signed-off or a Temporary Certificate, or Certificate, of Occupancy has been issued,* c) determined to be fully and comfortably usable, and d) fully cleaned and appropriate for presentation to the public.

A punch list of work to be completed, work not in compliance with the Drawings or Specifications, and unsatisfactory work is attached hereto, along with the Contractor's schedule for the completion of each and every item identified on the punch list specifying the Subcontractor or trade responsible for the work, and the dates the completion or correction will be commenced and finished within any period indicated in the Agreement for punch list completion prior to Final Acceptance.

Except as stated on the reverse side of this Notice of Substantial Completion, all manufacturers' warranties, other special warranties and the Contractor's one-year obligation to perform remedial work, shall commence on the Date of Substantial Completion noted above.

This Notice of Substantial Completion shall be effective and establish the Date of Substantial Completion only when fully executed on the reverse by the Contractor and the Principal Representative. The Principal Representative accepts the Work as substantially complete as of the Date of Substantial Completion herein noted. The Contractor agrees to complete or correct the Work identified on the attached punch list and to do so in accordance with attached punch list completion schedule

SAMPLE

OZ Architecture	Date	Ronald L. Ried, Director Facilities Business Services Principal Representative (Institution or Agency)	Date
Paul M. Leef, AIA, LEED ™ AP Campus Architect & Director, Planning, Design & Construction (Authorized Delegate)	Date	Contractor	Date

The responsibilities of the Principal Representative and the Contractor for security, maintenance, heat, utilities, and insurance shall be as specified in the Contract Documents or as otherwise hereafter noted:

Exceptions, if any, to the commencement of warranties shall be:

The attached final punch list consists of _____ pages, and the attached Contractor's schedule showing the dates of commencement and completion of each punch list item consists of _____ pages.

When completely executed, this form shall be sent to the Contractor and the Principal Representative with a copy to State Buildings Programs.

SAMPLE

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

NOTICE OF FINAL ACCEPTANCE

Date of Notice of Acceptance: _____
Date to be inserted by A/E after consultation with the Principal Representative

Institution/Agency: University of Colorado Boulder

Project No./Name: _____

TO:

Notice is hereby given that the State of Colorado, acting by and through the Regents of the University of Colorado Boulder, accepts as complete* the above numbered project.

By _____ / _____
Paul M. Leef, AIA, LEED ™ AP / Date
Campus Architect
Director, Planning, Design & Construction
State Buildings Programs
(of Authorized Delegate)

By _____ / _____
Ronald L. Ried, Director / Date
Facilities Management Business Services
Principal Representative
(Institution or Agency)

*When completely executed, this form is to be sent by certified mail to the Contractor by the Principal Representative.

SAMPLE

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

NOTICE OF APPROVAL OF OCCUPANCY/USE

Date of Occupancy: _____
Date to be inserted by the Architect/Engineer after consulation with Principal Representative

Institution/Agency: University of Colorado Boulder

Project No./Name: _____

Portion(s) of project for which occupancy is approved:

Type of Occupancy: ☐ Total or ☐ Partial

The items identified below if applicable must be completed with before Occupancy is approved.

Date Completed	A/E Signoff	
		1. The Notice of Substantial Completion has been issued and the ~~Building~~ Inspection ~~Record is~~ ***Cards are*** completely signed-off ***(or a Temporary Certificate, or Certificate, of Occupancy has been issued and copies*** attached.
		2a. Notification has been made to the local Fire Department concerning which portion(s) of the building will be occupied and the date(s).
		2b. Fire alarms, smoke detection systems and building fire sprinkler systems have been fully checked and are operable.
		2c. The building's fire connections must be installed and operable, if applicable.
		3. Coordination for final utility and service connections and meters (water, gas, sewer, electricity and telecommunication) has been made and systems are in full operating order.
		4. Sterilization of plumbing systems has been performed.
		5. Operational test of systems and equipment has been performed as required.
		6. Systems adjustments such as balancing, equipment operations, etc., have been performed. Reports have been submitted to the Architect/Engineer for approval.
		7. Principal Representative furnished equipment and furnishings are coordinated and placed.

SAMPLE

		8. All elements left unfinished must be in such condition that there would be no hazard to the health or safety of the occupants.
		9. All restroom facilities must be fully functional and operable.
		10. All light fixtures must be installed and operable.
		11. All exit lights and emergency lighting systems have been checked and are operable.
		12. All windows have been glazed and hardware is available for ventilation purposes.
		13. All routes of egress must be clear of construction materials and debris at all times.
		14. There must be a means of pedestrian access to each building. Contractor must have sidewalks installed before occupancy and pedestrian barricades and other means of public protection as required.

Occupancy does not constitute acceptance of the project as being complete. It simply provides the Principal Representative the opportunity to occupy/use the project or the applicable portion thereof prior to final completion and acceptance. Occupants can expect to be impacted by the Contractor's efforts to complete the project. The Contractor would not repair any damage caused by the occupants.

Architect/Engineer
OZ Architecture
Date

Principal Representative
(Institution or Agency)
Ronald L. Ried, Director
Facilities Management Business Services
Date

State Buildings Programs
(or Authorized Delegate)
Paul M. Leef, AIA, LEED TM AP
Campus Architect &
Director, Planning, Design & Construction
Date

Contractor
Date

SAMPLE

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

NOTICE OF CONTRACTOR'S SETTLEMENT

Institution/Agency: University of Colorado Boulder
Notice Number:
Project No./Title:

Notice is hereby given that on at Department of Facilities Management, 1540 30th Street, Room 303, Campus Box 453 UCB, Boulder, CO 80309, final settlement will be made by the STATE OF COLORADO with hereinafter called the "CONTRACTOR", for and on account of the contract for the construction of a PROJECT as referenced above.

1. Any person, co-partnership, association or corporation who has an unpaid claim against the said project, for or on account of the furnishing of labor, materials, team hire, sustenance, provisions, provender, rental machinery, tools. or equipment and other supplies used or consumed by such Contractor or any of his subcontractors In or about the performance of said work, may at any time up to and including said time of such final settlement, file a verified statement of the amount due and unpaid on account of such claim

2. All such claims shall be filed with the Authority for College, Institution, Department or Agency.

3. Failure on the part of a creditor to file such statement prior to such final settlement will relieve the State of Colorado from any and all liability for such claim.

Authorized Facility Manager or Authorized Individual

Name: Larry Hill, Project Manager
Approval Date:
Agency: University of Colorado Boulder
Phone: 303-492-1367
Fax: 303-492-4082
Email: lawrence.hill@colorado.edu (project manager)

MEDIA OF PUBLICATION:

PUBLICATION DATES:
First:

NOTES TO EDITOR:

Transmit one copy of the Affidavit of Publication, and invoice, to: Marsha Slepicka, University of Colorado at Boulder, Department of Facilities Management, Campus Box 453 UCB, Boulder, CO 80309-0453.

SAMPLE

Post Construction Warranty Report

Project:_____
Warranty Contractor:_____
Date Warranty Begins:_____ Date Warranty Expires:_____
Facilities Management (F/M) FAX No. 303-492-4082 Reported By:_____
Campus Box 453 UCB, Boulder, CO 80309-0453 F/M Rep. Informed:_____

Date Reported:_____ Taken By:_____

Extended Warranty Item:

Description of Warranty Item:

Date Reported to Contractor:_____

Contractor Response:

Date of Resolution:_____

Note:

SAMPLE

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

DATE: ____________

CONTRACTOR'S APPLICATION FOR PAYMENT

SAMPLE

Detail of Schedule of Values					Totals of Work Completed and Stored to Date				
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
Item No.	Description of Work	Material	Labor and Other	Totals (C + D)	Materials On-Site But Not In Place	WORK IN PLACE Material	WORK IN PLACE Labor and Other	Total Amount Due to Date (F+G+H)	% Complete and in Place (I / E)
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
				$0.00				$0.00	#DIV/0!
(K)	ORIGINAL CONTRACT TOTALS (SUM)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	#DIV/0!
(L)	AMENDMENTS/CHANGE ORDER DEDUCTIONS			$0.00				$0.00	#DIV/0!
(M)	AMENDMENTS/CHANGE ORDER ADDITIONS			$0.00				$0.00	#DIV/0!
(N)	PRESENT CONTRACT TOTALS	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	#DIV/0!

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

DATE:

CERTIFICATE FOR CONTRACTOR'S PAYMENT

SAMPLE

PAY APPLICATION #: FROM: TO: P.O. NO:
CONTRACTOR:
AGENCY/INSTITUTION: University of Colorado Boulder
PROJECT #/TITLE:

AMENDMENTS/CHANGE ORDER SUMMARY		Deductions (L)	Additions (M)
Prior amendments / Change Orders CO#'s:			
	Total		
Approved This Period			
Number	Date		
Total Approved this Period		$0.00	$0.00
	Totals	$0.00	$0.00
		$0.00	$0.00
Net change by Amendments / Change Orders (L + M)			$0.00

Application is made for Progress for work completed and in place and stored on site on the above Project. As indicated on the following page(s).

ORIGINAL CONTRACT SUM (K/E)	$0.00
NET CHANGE FROM AMENDMENTS/CHANGE ORDERS (L + M/E)	$0.00
PRESENT CONTRACT TOTAL (N/E)	$0.00

Current to Date Total Amount Earned (Due to Date (I))	Retainage	Current to Date Payment Less Retainage
$0.00		$0.00

Prior Payments Total Amount Earned	Retainage	Prior Payments Less Retainage
		$0.00

This Payment Total Amount Earned	Retainage	This Payment Less Retainage
		$0.00

Warrant Amount

INSTITUTION/AGENCY (or Authorized Delegate) Date

STATE BUILDINGS PROGRAMS (or Authorized Delegate) Date

Contractor certifies that all work and materials included in this estimate complies with the terms and conditions of the conditions construction contract and authorized changes thereto.

CONTRACTOR Date

ARCHITECTS/ENGINEER'S CERTIFICATION

In accordance with the Contract and this Application for Payment, the above Contractor is entitled to a payment of: **$0.00**

ARCHITECT/ENGINEER Date

PROJECT SUBMITTAL LOG

Project

Contractor:

Report Date

NE - No Exception taken
MCN- Make corrections noted
R&R- Revise & Resubmit
RE - Re-submit Properly
NR - Not Reviewed

Date:

SAMPLE

Spec. Section No.	Sub No.	Contr No.	Description	Contr/ SUB Contr	Submit Date	Date Rec From Contr	No. of Copies Rec					Date Returned to Architect	Action					Date Returned to Contractor	Distribution copies-Trans				DAYS OUT TO Architect	DAYS OUT TO Contractor
							ARCH	STRU	MECH	ELEC	CONT		NE	MCN	R&R	RP	NR		CON	FIL	OWN	OTH		

NOTES:

a. The Submittal Log lists the specification section that requires submittals. It is the Contractor's responsibility to reference the appropriate subsection of the specification section for specific individual submittal requirements and to submit accordingly.

b. The Submittal Log does not necessarily list all specification sections that require submittals. The Contractor is responsible for any additional submittals that may be called for and required on drawings in the individual schedules and notes.

SECTION 01 10 00
SUMMARY

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-01 Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

General description of the work of the entire Project with limitations or coordination with other contracts, if any.

1.2 SCHEDULE OF DRAWINGS, SPECIFICATIONS AND ADDENDA:

The following Drawings, Project Manual, and Addenda from the Contract Documents.

Set(s) of Drawings and project manuals dated July 2, 2013. Drawing list is as follows:

Sheet No.	Titled
T1.01	Cover Sheet
T1.02	Code Plan
T1.03	Perspective Views - for reference only
AD2.03	3rd Floor Demo Plan
AD2.04	4th Floor Demo Plan
AD3.03	3rd Floor Demo RCP
AD3.04	4th Floor Demo RCP
A2.03a	3rd Floor Plan
A2.03b	3rd Floor Furniture/Finish Plan
A2.04a	4th Floor Plan
A2.04b	4th Floor Furniture/Finish Plan
A2.05	Roof Plan and Details
A3.03	3rd Floor RCP
A3.04	4th Floor RCP
A5.01	Interior Elevation/Sections
A5.02	Interior Elevation/Sections
A5.03	Interior Elevation/Sections
A6.01	Chamber Details
A6.02	Chamber Details
A6.03	Chamber Details
A6.04	Chamber Exterior Elevations
A6.05	Interior Elevations
A7.01	Interior Details
A8.01	Door Schedule and Details
M1.01	Mechanical Legend
MD2.03	3rd Floor HVAC Demo Plan
MD2.04	4th Floor HVAC Demo Plan

Sheet No.	Titled
M2.00	Basement VAV Replacement
M2.01	1st Floor VAV Replacement
M2.02	2nd Floor VAV Replacement
M2.03	3rd Floor HVAC Plan
M2.04	4th Floor HVAC Plan
M3.01	Enlarged Mechanical Room Plan
M3.02	Rooftop Chiller Plan
M3.03	Mechanical Elevations
M3.04	Mechanical Elevations
M4.01	Mechanical Control Schematics
M4.02	Mechanical Control Schematics
M4.03	Mechanical Control Schematics
M5.01	Mechanical Details
M5.02	Test Chamber HVAC
M5.03	Pure Air Humidifier
M5.04	Pure Air Humidifier
M5.05	Pure Air Humidifier
M5.06	Pure Air Humidifier
M6.01	Mechanical Schedules
PD2.03	3rd Floor Plumbing Demo Plan
PD2.04	4th Floor Plumbing Demo Plan
P2.03	3rd Floor Plumbing Plan
P2.04	4th Floor Plumbing Plan Plumbing Details and Piping
P3.01	Schematic
FP2.03	Third Floor Fire Protection
FP2.04	Fourth Floor Fire Protection
FP3.01	Fire Protection Diagrams
E1.01	Electrical Legend
ED2.03	3rd Floor Power Demo Plan
ED2.04	4th Floor Power Demo Plan
ED3.03	3rd Floor Lighting Demo Plan
ED3.04	4th Floor Lighting Demo Plan
ED5.01	One-line Demolition
E2.00	Basement Power Plan
E2.01	First Floor Power Plan
E2.02	Second Floor Power Plan
E2.03	Third Floor Power Plan
E2.04	4th Floor Power Plan
E2.05	Roof Power Plan
E3.03	3rd Floor Lighting Plan
E3.04	4th Floor Lighting Plan
E4.03	3rd Floor Special Systems
E4.04	4th Floor Special Systems
E5.01	Installation One Line Diagram

Sheet No.	Titled
E5.02	Electrical Schedules
E5.03	Electrical Schedules
E5.04	Control Schematics
E5.05	Test Chamber Lighting
E5.06	Standard Details

Project Manual titled CP142463 Chem - 3rd and 4th Floor - Atmospheric Lab and CP160825 DM - Chem Upgrade Fume Hood Controls, dated July 2, 2013.

Addenda: All Addenda issued prior to bidding.

1.3 CONTRACTORS:

All work will be executed under one prime construction contract between the Owner and the Design Build Entity (Contractor).

Except as indicated otherwise, all work under this contract will be under the direction of the prime contractor.

1.4 GENERAL:

The work to be done under this Contract includes all materials, equipment and labor necessary for the construction in a workmanlike manner, to the satisfaction of the Owner, Contractor and the Architect, of the Work as shown, documented, and set forth in the Contract Documents or reasonably inferred.

If these documents or job conditions make it impossible to produce first class work or to warranty the work or its performance, or should discrepancies appear among the Contract Documents, the Contractor shall request interpretation, correction or clarification prior to bidding to Subcontractors to establish or confirm a guaranteed maximum price. If the Contractor fails to make such request, work must be performed in a satisfactory manner and no request for added cost or extension of time will be considered.

Should conflict occur in or between Drawings and Specifications, Contractor (or Installer) is deemed to have estimated on the more expensive way of doing work, so long as such more stringent or higher quality requirements are reasonably inferable, unless he shall have asked for and obtained written decision before submission of Bid as to which method or materials will be required.

The Contractor represents that he fully understands the nature and extent of the work, all factors and conditions affecting or which may be affected by it and characteristics of its various parts and elements and their fitting together and functioning.

1.5 PROJECT DESCRIPTION:

General:

Briefly and without force and effect upon the contract documents, the Work of the Contract can be summarized as follows:

Project Description: University of Colorado, Cristol Chemistry Building, 3rd and 4th Floor Atmospheric Lab and Upgrade Fume Hood Controls, Boulder, Colorado.

Stories: Work on two levels.

Approximate Area: 10,800 gross square feet.

Occupancy: B.

Construction Type: Type II-1 hour, partially sprinklered, except small portion of Type III-N as shown on the code plans.

Roof: Built-up bituminous roofing.

Partitions: Gypsum board systems and insulated metal panels (environmental chambers).

Mechanical Systems:
- Fire sprinklers
- Plumbing
- HVAC
- Laboratory systems
- Controls
- Other

Electrical Systems:
- Power and lighting
- Telephone conduits
- Fire alarm and detection

1.6 SPECIAL REQUIREMENTS:

Separate Contracts:

The Owner may award separate contracts for other on-going work at the Project site.

Contractor is required to coordinate his work with any of these separate contractors.

Mandatory Sequences and Scheduling Requirements:

The intent of the categorization is to generally summarize the nature and extent of work to be performed without in any way limiting specific requirements of the Contract Documents.

The construction sequence schedule and related drawings are intended to aid the Contractor in bidding and in the preparation of a specific construction schedule. Deviations of sequence may be made upon approval of the Owner and the Architect. The preparation of a specific construction schedule remains the responsibility of the Contractor.

No work may be performed in the building when students are occupying the building except as specifically approved by the Owner's Project Manager.

No work may be performed inside or outside the building during the period leading up to and through final exams (December 6, 2013 through December 18, 2013 and April 25, 2014 through May 6, 2014).

Construction work is anticipated to start August 2, 2013 depending on Contract execution.

All work must be substantially complete (including commissioning) within 196 calendar days of the execution of the Contract.

Owner Furnished and Installed Equipment:

The Owner will furnish certain items as listed below and as shown on the drawings. Contractor will be responsible for coordinating his work to accommodate these items including, but not limited to, physical space fit, wall blocking, utility connections and rough-in, power wiring and electrical characteristics.

- 4th floor environmental chamber.
- Thermo Chemiluminescent Trace Level NONO2-NOx Analyzer (42i-TL).
- NOy Converter Components: (1) Mo converter and (2) T-controller components.
- Thermo U.V. Photometric Ozone Analyzer (49i).
- Thermo Multi-Gas Calibrator (146i).
- Thermo Direct Methane-non-Methane Hydrocarbon Analyzer with Flame Ionization Detector (55i).
- Agilent 7890 GC-FID - without VOC sampling.
- Picarro CO, CO2, CH4, H2O.
- BMT 802N Ozone Generator.
- Ocean Optics Spectrometer + 10 meter fiber optics (bifurcated) or two RH-T sensors (Vaisala HM70 with HMP75 probe).
- Temperature Sensors.
- NO cal gas (50 ppm).
- NO2 cal gas (50 ppm).
- CO, CO2, CH4 cal gas (50 ppm each).
- NO injection gas (1%).
- Mass flow controllers.
- Dekati DI1000.
- Swagelok fittings and valves.
- Tubing.
- Teflon bag port/feedthroughs and Chamber 1'x1' feedthrough plates labor and fittings.
- Transfer pump, Teflon and stainless head (KNF) (Greenhouse to chamber and between chambers).
- Regulators for cal, injection gases.
- Purafil Select CP Blend in a 40lb Box.
- Lab stools.
- Mobile Carts (3'x6').
- Lista Cabinets.
- 19" rack.
- Teflon Bags (Foiltec).
- Other loose furniture and furnishings except as included in this agreement.

Contractor will include in their scheduling the latest times when information, especially physical dimensions, piping, electrical rough-ins, for such items is required and so notify the Owner in writing.

Owner Furnished, Contractor Installed Equipment:

The Owner will furnish certain items delivered to the jobsite as listed below and shown on the drawings. Contractor will receive, unload, move, set in position, anchor and connect such items and put them into operating condition.

- Freezer relocated from existing East Campus location.
- Other refrigerators and freezers.
- LCD projector: 7609WU Projector WUXGA with 2-Year Advanced (1920 x 1200).
- BenQ SP840 1920 x 1080 DLP projector - HD 1080p - 4000 ANSI lumens.

Contractor will be responsible for coordinating his work to accommodate these items including, but not limited to, physical space fit, wall blocking, utility connections and rough-in, power wiring and electrical characteristics.

Contractor will include in his scheduling the latest times when information for such items is required and so notify the Owner in writing.

He will cooperate with Owner in scheduling the delivery of these items and be responsible for accommodating their storage and protection in the building and their replacement or repair due to damage as a result of his operations.

1.7 OCCUPANCY:

Occupancy by Owner:

During the Contractor's performance of the work of this Contract, the Owner will continue to occupy any areas of the existing building which is not within the project scope, inclusive of parking facilities, on a full time basis.

Interruption of building access and facilities, inclusive of parking facilities, by the Contractor will not be permitted, to whatever extent such interruptions might interfere with Owner's occupancy.

Control work on the 2nd floor will have to occur while the space is occupied. Special arrangements will have to be made to schedule and coordinate this work.

Limit construction operations to those methods and procedures which will not adversely and unduly affect the working environment of Owner's occupied spaces, including noise, dust, odors, air pollution, ambient discomfort, poor lighting, hazards and other undesirable effects and conditions. Provide 8 working days notice to the Owner of construction activities which will severely impact the occupancy and use of adjacent areas.

Do not interrupt power, lighting, plumbing, telephone and HVAC services to occupied areas except during break periods (such as winter break, spring break and summer break). Such interruptions must be scheduled at least 8 working days in advance, have Owner's approval and have users of the area notified 72 hours in advance of the actual interruption.

1.8 ENVIRONMENTAL PERFORMANCE:

For all areas of the project, use adhesives and sealants that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA method 24):

Wood Glues: 30 grams per liter.
Metal to Metal Adhesives: 30 grams per liter.
Adhesives for Porous Materials (Except Wood): 50 grams per liter.
Fiberglass Adhesives: 80 grams per liter.
Subfloor Adhesives: 50 grams per liter.
Plastic Foam Adhesives: 50 grams per liter.
Carpet Adhesives: 50 grams per liter.
Carpet Pad Adhesives: 50 grams per liter.
Resilient Flooring Adhesives: 50 grams per liter.
Cove Base Adhesives: 50 grams per liter.
Gypsum Board and Panel Adhesives: 50 grams per liter.
Rubber Floor Adhesives: 60 grams per liter.
Ceramic Tile Adhesives: 65 grams per liter.
Multipurpose Construction Adhesives: 70 grams per liter.
Fiberglass Adhesives: 80 grams per liter.

Structural Glazing Adhesives: 100 grams per liter.
Wood Flooring Adhesive: 100 grams per liter.
Contact Adhesive: 80 grams per liter.
Special-Purpose Contact Adhesive: 250 grams per liter.
Structural Wood Member Adhesive: 140 grams per liter.
Sheet-Applied Rubber Lining Operations: 850 grams per liter.
Top and Trim Adhesive: 250 grams per liter.
Plastic Cement Welding Compounds: 250 grams per liter.
ABS Welding Compounds: 325 grams per liter.
CPVC Welding Compounds: 490 grams per liter.
PVC Welding Compounds: 510 grams per liter.
Adhesive Primer for Plastic: 550 grams per liter.
Architectural Sealants: 250 grams per liter.
Non-Membrane Roof: 300 grams per liter.
Single-Ply Roof Membrane: 450 grams per liter.
Roadway: 250 grams per liter.
Other Sealants: 420 grams per liter.
Architectural Sealant Primers for Nonporous Substrates: 250 grams per liter.
Architectural Sealant Primers for Porous Substrates: 775 grams per liter.
Other Sealant Primers: 750 grams per liter.

For all areas of the project, use paints and coatings that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA method 24) and the following chemical restrictions:

Flat Paints and Coatings: VOC not more than 50 grams per liter.
Non-Flat Paints and Coatings: VOC not more than 150 grams per liter.
Anti-Corrosive Coatings: VOC not more than 250 grams per liter.
Clear Wood Finishes:
    Varnish: 350 grams per liter.
    Lacquer: 550 grams per liter.
Shellacs:
    Clear: 730 grams per liter.
    Pigmented: 550 grams per liter.
Sealers:
    Waterproofing Sealers: VOC not more than 250 grams per liter.
    Sanding Sealers: VOC not more than 275 grams per liter.
    All Other Sealers: VOC not more than 200 grams per liter.
Stains: VOC not more than 250 grams per liter.
Floor Coatings: 100 grams per liter.
Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
Toxicity/IEQ: Comply with applicable regulations regarding toxic and hazardous materials, and as specified. Paints and coatings must meet or exceed the VOC and chemical component limits of Green Seal requirements where specified in Section 09900. Interior paint must comply with GS-11 except comply with GC-03 for corrosive coatings, unless specifically excluded in Section 09900.
Restricted Components: Paints and coatings shall not contain any of the following:

    Acrolein.
    Acrylonitrile.
    Antimony.
    Benzene.
    Butyl benzyl phthalate.
    Cadmium.
    Di (2-ethylhexyl) phthalate.

Di-n-butyl phthalate.
Di-n-octyl phthalate.
1,2-dichlorobenzene.
Diethyl phthalate.
Dimethyl phthalate.
Ethylbenzene.
Formaldehyde.
Hexavalent chromium.
Isophorone.
Lead.
Mercury.
Methyl ethyl ketone.
Methyl isobutyl ketone.
Methylene chloride.
Naphthalene.
Toluene (methylbenzene).
1,1,1-trichloroethane.
Vinyl chloride.

Within the chambers and the air-handling units serving the chambers, no off-gassing of materials can contaminate the chamber air at temperatures up to 60 degrees Celsius. This includes, but is not limited to, air handling units serving chambers and related ductwork, raised floor system (all components, gaskets, sealants, etc.), chamber walls, ceiling and floor (all components, gaskets, sealants, skins, insulation, etc.), light fixtures, strut support systems, shelving, through wall penetration sealants, etc.

The Contractor shall submit a certification of either no off-gassing of these materials will be experienced within the operating temperature of the chambers or specifically state what materials and quantities of materials can be expected. This list of materials to be expected is subject to the review and approval of the Scientists. Where unacceptable materials or quantities are shown, alternative materials will need to be provided by the Contractor at no additional expense to the Owner.

The Contractor shall submit a certification indicating applicable products will not degrade under the use conditions indicated including in the presence of high ultraviolet light and temperatures up to 60 degrees Celsius.

1.9 EXAMINATION OF SITE:

Failure to visit the site will in no way relieve any Contractor from the necessity of furnishing materials or performing work that may be required to complete work in accordance with the Contract Documents without additional cost to the Owner.

1.10 PROTECTION OF WORK AND ADJACENT PROPERTY:

Buildings and property adjacent to work included in this project may be subject to damage due to construction operations.

Prior to the start of the work included in this Contract, perform pre-construction photographs.

Prior to the start of the work included in this Contract, engage the services of a digital photographer to record the existing condition of adjacent structures and property. Contractor shall provide one set of prints (not less than 3" x 5") of digital photographs along with a CD containing photographs to the Owner. Retain digital files and one set of prints in the Project office. Provide sufficient photos with adequate detail to thoroughly document the conditions surrounding the work.

At the completion of the project, Contractor shall restore existing buildings, landscaping and property to same condition as prior to the start of the work.

It is incumbent on the Contractor to identify and document any existing conditions prior to the start of work.

In addition to the requirements of the General Conditions of the Contract for Construction, the Contractor shall:

Notify, in writing, the Owner of University or private property which interferes with the work and arrange with them for disposition of such property.

Provide and maintain proper shoring and bracing to prevent earth from caving or washing into excavation. Provide temporary protection around openings through and at floors, roofs, and other openings.

Provide and maintain proper shoring and bracing for existing underground utilities, sewers, etc., encountered during excavation work, to protect them from collapse or other type of damage until such time as they are to be removed, incorporated into the work of this project, or can be properly back-filled upon completion of new work.

Weather Protection: Provide protection against rain, snow, wind, ice, storms, or heat so as to maintain work, materials, apparatus, and fixtures free from injury or damage. At the end of each day's work, cover new work likely to be damaged.

Provide and maintain adequate protection of the work from damage due to freezing, especially freezing earth and soils. Risk of proceeding with the work on or with freezing or frozen materials will be the sole responsibility of the Contractor.

Water Protection: Provide protection from damage at all times from rain water, ground water, backing up of drains or sewers, and other water. Provide pumps and equipment enclosures to provide this protection.

The Contractor will maintain free of obstructions and debris, all designated corridors and emergency exits, handicap access ramps and sidewalks to building. Provide temporary directional handicapped signage for routing to the nearest accessible facilities.

1.11 EXISTING FURNITURE AND EQUIPMENT:

The Owner will remove or relocate existing movable furniture and equipment from the areas in which the Contractor is working. Notify the Owner not less than three working days prior to starting work in areas where furniture and equipment require moving.

1.12 CONTRACTOR'S ACCESS PARKING AND STAGING AREAS:

Work included in this project will need to be performed within the limitations of available access at the site. The University will limit the area available for staging and parking due to the additional number of construction projects planned during the execution of this contract. Contractor shall adjust the means and methods of construction to allow for the restrictions surrounding the site.

All parking on campus except for some one-hour zones on city streets and a few metered spaces is under control and authority of the Parking Management Office of the University. All University parking is by permit only.

Types of parking and staging are defined as follows:

General Staging Areas are approved areas adjacent to the site when available or in University designated group staging yards. General Staging Areas may be used for any purpose, including employee parking, on a space available basis, but must be coordinated through the Owner's Project Manager. Vehicles may not park outside of general staging areas except in Contractor Employee Parking lots.

Restricted Staging Areas are approved areas near the site for the construction dumpster, off-loading of equipment, Contractor's work trailer, and materials that are soon to be incorporated into the work. No vehicles shall park in a restricted staging area for more than 20 minutes between the hours of 8:00 a.m. and 5:00 p.m. weekdays.

Contractor Employee Parking are areas for workers needing parking on campus. Contact the University of Colorado Parking Services for price information.

Prohibited Parking are areas designated in the Contract Documents as No Parking areas. The contractor shall not allow any parking in areas so designated under any circumstance.

The restrictions in this Section are in addition to any other restrictions or rules provided by Parking Services.

The designated staging area for this project is indicated in the attachment following this section.

Vehicles parked on sidewalks or in landscape areas outside the designated staging areas cause damage to University property. The contractor shall reimburse the University $25.00 per vehicle per occurrence for vehicles parked outside the designated staging areas. This amount shall be in addition to any fines which might be levied by Parking Services.

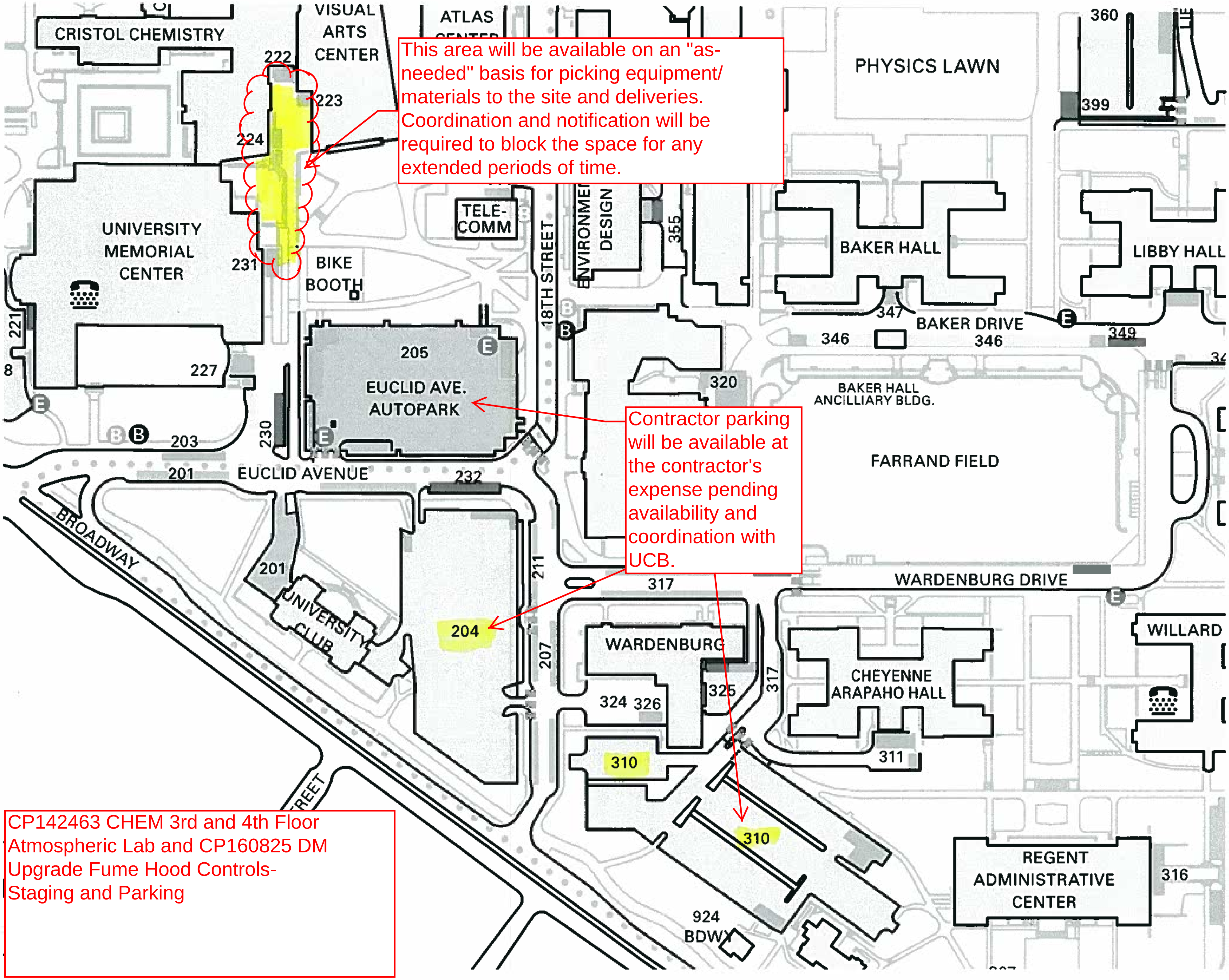
1.13 METHODS OF CONSTRUCTION:

The procedure and method of construction is the prerogative and the responsibility of the Contractor. If professional assistance is required to safely implement method of construction, the Contractor shall, on his own, employ professional help.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 01 10 00


CRISTOL CHEMISTRY
VISUAL ARTS CENTER
ATLAS
PHYSICS LAWN
360
399
222
223
224
231
This area will be available on an "as-needed" basis for picking equipment/ materials to the site and deliveries. Coordination and notification will be required to block the space for any extended periods of time.
UNIVERSITY MEMORIAL CENTER
BIKE BOOTH
TELE-COMM
18TH STREET
DESIGN
355
BAKER HALL
LIBBY HALL
347
BAKER DRIVE
346
346
349
221
8
227
205
EUCLID AVE. AUTOPARK
320
BAKER HALL ANCILLIARY BLDG.
FARRAND FIELD
203
230
201
EUCLID AVENUE
232
Contractor parking will be available at the contractor's expense pending availability and coordination with UCB.
BROADWAY
201
UNIVERSITY CLUB
211
317
WARDENBURG DRIVE
204
207
WARDENBURG
325
324
326
317
CHEYENNE ARAPAHO HALL
WILLARD
310
311
310
REGENT ADMINISTRATIVE CENTER
316
924 BDWY
CP142463 CHEM 3rd and 4th Floor Atmospheric Lab and CP160825 DM Upgrade Fume Hood Controls- Staging and Parking

SECTION 01 23 00
ALTERNATES

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-01 Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Requirements and descriptions for Alternates as defined herein and as indicated.

1.2 DEFINITIONS:

"Alternates" are defined as alternate products, materials, equipment, systems, methods, units of work or major elements of the construction, which may, at the Owner's option and under the terms established by Instructions to Bidders and in the Contract or Agreement, be selected for the work in lieu of the corresponding requirements of the Contract Documents. Selection may occur prior to the Contract Date, or may, by the Agreement, be deferred for possible selection at a subsequent date.

1.3 PROCEDURES:

Include as a part of each alternate, miscellaneous devices, appurtenances, differences in utility or power requirements and similar items incidental to or required for a complete installation whether or not mentioned as part of the alternate.

Immediately following award of Contract, prepare and distribute to each party involved, notification of the status of each alternate. Indicate whether alternates have been accepted, rejected or deferred for consideration at a later date. Include a complete description of negotiated modifications to alternates, if any.

1.4 LIMITATIONS:

The description herein of each alternate is recognized to be incomplete and abbreviated, but requires that each change must be complete for the scope of work affected. Refer to the applicable specification sections (Divisions 02 through 49), and to applicable drawings, for the specific requirements of the work whether or not references are so noted in the description of each alternate. Coordinate related work and modify surrounding work as required to properly integrate with the work of each alternate.

Execute accepted alternates under the same conditions as other work of the Contract.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES:

Alternate No. 1:

Base Bid: Where existing light fixtures are indicated to remain in their current locations or are scheduled to be salvaged and reused, no cleaning, re-lamping or ballast replacement is required.

Add Alternate: In lieu of base bid where existing light fixtures are indicated to remain in their current locations or are scheduled to be salvaged and reused, include cleaning, re-lamping and ballast replacement complying with the requirements of Section 26 51 00.

Alternate No. 2:

Base Bid: All-steel access floor system as specified in Section 09 69 00 with chrome-plated panel finish.

Add Alternate: In lieu of base bid, provide all-aluminum access floor system as specified in Section 09 69 00 in unfinished aluminum.

END OF SECTION 01 23 00

SECTION 01 25 00
SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification sections apply to work of this section.

1.1 SUMMARY:

Section Includes:

Administrative and procedural requirements for substitutions of products not specified.

Related Sections:

Product Requirements: Section 01 60 00

1.2 SUBSTITUTION PROCEDURES DURING BIDDING:

To obtain approval to use unspecified products, submit written requests in accordance with the Information for Bidders. Requests received after this time will not be considered. Requests shall clearly describe the product for which approval is asked, including all data necessary to demonstrate acceptability. If the product is acceptable, the Architect will approve it and issue an Addendum during bidding. No action will be taken where information submitted is inadequate or unclear.

Requests for approval of proposed substitutions must be made by the Contractor only. Requests made directly to the Architect by sub-bidders, material suppliers, or others besides the Contractor will not be considered.

Proposed substitute products will be evaluated on the following criteria:

Equivalence: The Architect will be the sole judge of the relative equivalency of proposed substitute products, and will make written recommendation to the Owner concerning acceptance or rejection of the product.

Contractor's Satisfaction: Contractor's request shall either include written certification that the product he proposes is, in his best judgment, substantially equal to the specified product, that it will fit in the space allocated, that it affords comparable ease of operation, maintenance, and service, that its appearance, life expectancy, and suitability for climate and use are equal to the specified product, and that the proposed substitution is in the Owner's best interest; or shall include a statement to the contrary to the extent that the proposed substitution does not conform with the criteria above.

Design Intent: No substitutions will be allowed which will result in changes to the Architect's design intent or to the aesthetic appearance of the work.

Submittal Data: Manufacturer's data which is readily available to the Architect will not, in most cases, be sufficient for establishing proof of equality. Provide additional information, including laboratory test results from an independent, nationally recognized testing laboratory which certify types of materials used in the product, thickness, gauge or weight of materials, capacities, capabilities, coatings or finishes, functions, life expectancy, and operation information as applicable to the particular product.

Savings: Acceptance of a proposed substitution must result in a savings in cost over the product originally specified, or otherwise be substantially in the Onwer's best interest. Cost savings will be a prime determinant as to the acceptance of proposed substitutions.

Burden of Proof: The burden of proof that a proposed substitution is equal to the specified proposed substitution is equal to the specified product lies solely with the Contractor. Under no circumstance will the Architect be expected or required to prove that a product is not equal.

1.3 SUBSTITUTIONS FOLLOWING BIDDING:

Basis:

After execution of the Contract, the Owner and the Architect will consider substitutions of products in place of those specified or approved prior to Contract award only in the following cases:

The specified product or products are no longer available.

Procedure:

Make written request for the substitution documenting fully the above reason. Include complete data on the proposed substitution substantiating compliance with the Contract Documents including product identification and description, performance and test data, references and samples where applicable, and an itemized comparison of the proposed substitution with the products specified or otherwise approved, with data relating to Contract time schedule, design and artistic effect where applicable, and its relationship to separate contracts.

Accompany the request by accurate installed cost data on the proposed substitution in comparison with the product specified.

Should any substitution require redesign by the Architect (or his consultants) the costs for such redesign due to the substitution will be paid by the Contractor.

Consideration:

Making such requests for substitutions is a representation by the Contractor that:

The Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified and will carry the same warranty;

The cost data are complete and include all related costs under this Contract but excludes costs under separate contracts and excludes Architect's re-design costs, and the Contractor waives all claims for additional costs related to the substitution which subsequently become apparent;

The Contractor will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

When approved by the Owner and Architect, such substitution will be documented by Change Order modifying the Specifications. The Contract Sum will be changed only if the substitution results in a cost savings to the Owner.

Evaluation:

Requests for substitution will be reviewed based on the following criteria:

Compliance with Contract Documents and intended quality.

Performance record in public schools in Colorado or adjacent states.
Life cycle cost.
Initial cost.
Availability/impact on construction schedule.
Maintenance procedures, access, service and parts availability.
Risk/reward.
Compatibility with existing materials, including District-wide considerations.
Ramifications for other components of the finished construction.
Physical size, configuration for the intended use.

Product options and substitutions will not be considered without the confirmation of compliance with project-specific:

Specifications.
Measurements.
Details and interfaces.
Schedule implications.
Physical conditions.
Operation and maintenance requirements.
Other relevant criteria of the Contract Documents.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 01 25 00

SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Procedures for processing minor changes, Change Orders, Emergency Field Change Orders and Requests for Information.

Refer to General Conditions Article 1 for definitions and Article 35 for contractual requirements.

Related Sections:

Percentage allowances for Contractor's overhead and profit: General Conditions Article 35
Contract Closeout Procedures: Section 01 77 00
Project Record Documents: Section 01 78 39

1.2 SUBMITTALS:

Submit the name of individual authorized to accept changes, and to be responsible for informing others in the Contractor's employ of changes in the work.

1.3 FORMS:

Proposal Request Form: Submit on State Change Order Form SC-6.31.

Change Order Form: Submit on State Change Order Form SC-6.31.

Architect's Supplemental Instructions Form: AIA form G710.

Requests for Information: Standard form as acceptable to the Architect.

1.4 DOCUMENTATION:

Maintain detailed records of the work completed. Provide complete information for evaluation of proposed changes and to substantiate changes in Contract Sum or Contract time.

Provide the following additional data to support calculations:

Quantities of products, labor and equipment.
Insurance and bonds.
Overhead and profit within the limits set forth in General Conditions Article 35.
Justifications for any change in Contract Time.
Credit for deletions from the Contract and similar documentation.

1.5 REQUESTS FOR INFORMATION:

Submit written requests for information or interpretation of the documents on written form only. The RFI must show date reply is required (an actual date, not "ASAP") and within the time limitations specified below.

As pertaining to the documents, clarifications, explanations, or solutions to field circumstances can be provided by the Architect using the "Request for Information" (RFI) format. The RFI is a cooperative effort between the Architect and Contractor to maintain the progress of the Work without utilizing other lengthy project procedures.

RFI's are submitted by the General Contractor to the Architect. RFI's by Subcontractors, Suppliers, manufacturers, or others shall be submitted to the General Contractor for their endorsement, finalization, and submission the Architect. The General Contractor will submit these RFI's only if they can not provide a direct response. The General Contractor shall submit these RFI's on the approved form.

The Contractor's assessment of a problem and a solution is essential. Only if no apparent solution is obvious will an RFI be reviewed without a solution included in its submission. A statement to that effect shall be made in the RFI.

Solutions described in an RFI shall not be performed until all responses and reviews of the RFI are completed, and the cost and schedule impacts are acknowledged by the Contractor. Once accepted and finalized by the General Contractor, cost or schedule impacts will not be considered.

The Architect's review period for an RFI is 7 working days from the time of receipt. If multiple RFI's are submitted on the same day, or within a 5 day period, the review time may be extended by mutual agreement between the Architect and Contractor. Requests that are not for interpretation of the documents will not be reviewed and will be returned and marked as such.

It is understood by all parties that time is of the essence and every effort shall be made by the Architect and Contractor to review RFI's quickly.

The General Contractor shall accept or reject the response and circumstances of an RFI within 5 working days of their receipt from the Architect, and convey to the Architect a copy signed by the General Contractor.

The Contractor may request additional information only through an RFI. Once done, the Architect will issue supplemental instructions or other change documentation. Always use the RFI to request additional information.

Review of Contract Documents and Field Conditions:

Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for resolving the problem. Submit requests as a written "Request for Information." Requests for Information will not be considered if not accompanied with recommendations.

The Architect shall not be required to respond to Requests for Information where the intent of the construction documents can be reasonably be inferred.

The Architect shall not be required to respond to Requests for Information where the subject of the Request pertains to the Contractor's means and methods.

1.6 MINOR CHANGES IN THE WORK:

Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on Architect's Supplemental Instructions form. If the Contractor elects to not accept the ASI as a no cost or time document the Architect must be advised and a Change Order prepared.

1.7 PROPOSAL REQUESTS:

Owner-Initiated Proposal Requests:

Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.

Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.

Include costs of labor and supervision directly attributable to the change.

Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

Contractor-Initiated Proposals:

If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to the Architect.

Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.

Include costs of labor and supervision directly attributable to the change.

Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

Comply with requirements in Section 01 25 00 if the proposed change requires substitution of one product or system for product or system specified.

1.8 AUTHORIZATION:

Claims by Contractor:

Architect will follow procedures set forth in Articles 35 and 36 of the General Conditions which may result in one or more of the following:

A written decision on the claim.
Issuance of a Change Order.

Requests for Change Proposal:

After receipt of Contractor's response to a request for a change, Architect will evaluate and either request additional information or issue a Change Order.

1.9 PROCESSING:

Emergency Field Change Orders:

In cases of emergency that involve a threat to life or property or where the likelihood of delays in processing a normal Change Order will result in substantial delays and/or significant cost increases in Project Cost, an Emergency Field Change Order may be issued in accordance with Article 35.C of the General Conditions.

Architect will prepare Emergency Field Change Order with Architect's signature, for signature by Principal Representative as approved by State Buildings Programs, in 5 copies, one each for Owner, Architect and Contractor.

Contractor will proceed with the work directed and respond promptly to the stated amount or method for determining costs and time impact by:

Agreement with the Emergency Field Change Order.
Providing data to substantiate any disagreement with the Emergency Field Change Order.

Architect and Principal Representative will resolve any differences as determined under Article 35.C of the General Conditions.

Change Orders:

Contractor will furnish supporting documentation for the Change Order as requested by the Architect in 5 copies. Architect will prepare and sign the Change Order in 5 copies, and forward to the Contractor who will sign all copies and forward to Principal Representative for signature and distribution to Architect and Contractor.

Lump Sum Change Order:

Lump sum change orders will be based upon the Proposal Request and the Contractor's quotation, or Contractor's request for change order as approved by the Architect.

Submit detailed breakdown of costs as listed above under "DOCUMENTATION".

Unit Price Change Order:

Where the change order is based upon unit prices agreed to by the Owner, Change Order will be executed on a lump sum basis determined by multiplying the unit price by the actual in-place quantities.

1.10 CORRELATION:

Promptly revise the Schedule of Values on the Application for Payment Form by indicating each authorized Change Order or Emergency Field Change Order as a separate line item and adjusting the Contract Sum as shown on the Change Order or Emergency Field Change Order.

Promptly revise the Construction Schedule to reflect any change in the Contract Time and resubmit.

Promptly enter changes in the Project Record Documents.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 26 00

SECTION 01 29 00

PAYMENT PROCEDURES

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 SCHEDULE OF VALUES:

Coordination:

Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.

Correlate line items in the Schedule of Values with other required administrative forms and schedules, including, Submittals Schedule and Application for Payment forms with Continuation Sheets.

Submit the Schedule of Values to Architect at earliest possible date but no later than 10 days before the date scheduled for submittal of initial Application for Payment.

Format and Content:

Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each major Specification Section with section number and section title.

Identification: Include the following Project identification on the Schedule of Values:

Project name and location.
Name of Architect.
Architect's project number.
Contractor's name and address.
Date of submittal.

Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:

Description of the Work.
Name of subcontractor.
Name of manufacturer or fabricator.
Name of supplier.
Change Orders (numbers) and Emergency Field Change Orders that affect value.
Dollar value.

Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual Table of Contents. Provide several line items for principal subcontract amounts, where appropriate.

Round amounts to nearest whole dollar; total shall equal the Contract Sum.

Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when approved Change Orders or approved Emergency Field Change Orders result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT:

Each Application for Payment shall be consistent with previous applications and payments as reviewed by Architect and paid for by Owner.

Initial Application for Payment, Application for Payment at time of Completion, and final Application for Payment involve additional requirements.

Payment Application Times: The date for each progress payment is indicated in the Contractor's Agreement. The period of construction Work covered by each Application for Payment is the period indicated in the Contractor's Agreement.

Payment Application Times: The period covered by each Application for Payment starts on the day following the end of the preceding period and ends one day before the date for each progress payment.

Payment Application Forms: Use Owner's standard form (SC 7.2, SC7.2-A and SC7.2-B as required).

Application Preparation: Complete every entry on form. Execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.

Include amounts of Change Orders and Emergency Field Change Orders issued before last day of construction period covered by application.

Transmittal: Submit three signed copies of each Application for Payment to Architect by a method ensuring receipt within 1 working day.

Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

List of known subcontractors.
Schedule of Values.
Contractor's preliminary Construction Schedule.
Schedule of unit prices.
Submittals Schedule for initial phase of work.
List of Contractor's staff assignments.
List of Contractor's principal consultants.
Copies of authorizations and licenses from authorities having jurisdiction for performance of the initial phase of Work.
Initial progress report.
Report of preconstruction conference.

Application for Payment at Completion: After issuing the Certificate of Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as complete.

Include documentation supporting claim that the Work is complete and a statement showing an accounting of changes to the Contract Sum.

This application shall reflect Certificates of Partial Completion issued previously for Owner occupancy of designated portions of the Work.

Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

Evidence of completion of Project closeout requirements.

Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.

Updated final statement, accounting for final changes to the Contract Sum.

AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims".

AIA Document G707, "Consent of Surety to Final Payment".

Evidence that claims have been settled.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 29 00

SECTION 01 31 13
PROJECT COORDINATION

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Requirements for coordination, supervision and administration for Project, including but not necessarily limited to:

- Coordination.
- Recorded logs.
- Existing conditions.
- Administrative and supervisory personnel.

Related Sections:

- For descriptions of the work of the entire Project within and outside of the work of this Contract: Section 01 10 00.
- Project meetings: Section 01 31 19.
- Procedures and field engineering: Section 01 73 00.
- General Commissioning Requirements: Section 01 91 13.

1.2 SUBMITTALS:

Coordination Drawings:

For locations where several elements of equipment, mechanical or combined mechanical and electrical work must be sequenced and positioned with precision in order to fit into the available space, prepare coordination shop drawings showing the actual physical dimensions at accurate scale required for the installation. Prepare and submit coordination drawings prior to purchase/fabrication/installation of any of the elements involved in the coordination.

Lay out the mechanical and electrical work in conformity with the Contract Drawings, coordination drawings and other shop drawings, product data and similar requirements, so that the entire mechanical plant will perform as an integrated system properly interfaced with electrical work and other work.

Submit coordination drawings with all mechanical, electrical, fire protection and building monitoring systems for the Architect's review prior to any shop drawings or submittals for work in those trades. Approval of required shops and submittals must be obtained prior to starting work, and must be obtained prior to approval of pay applications of the work. Create the drawings to include all trades on a particular level of the building on one drawing. Identify conflicts between the systems or between the systems and architectural elements such as ceiling heights, ceiling types, or walls. Conduit routing for electrical, mechanical, energy management system and security trades shall be included. Identify potential solutions to the conflicts for the Architect and Owner to review during the submittal process. Revise the coordination drawings to show any comments made during the submittal review process, and reissue for use by all affected trades, Owner and Architect.

Include sectional coordination documents in the coordination drawings. Identify elevations of systems A.F.F. (above finish floor) and component dimensions. Show elevations whenever component changes height.

Submit coordination drawings for environmental chambers.

Staff Names:

Within 15 days of Notice to Proceed, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; their addresses and telephone numbers.

Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.

1.3 GENERAL COORDINATION:

General:

Each entity involved in the performance of work for the entire Project shall cooperate in the overall coordination of the work; promptly, when requested, furnish information concerning its portion of the work; and respond promptly and reasonably to the decisions and requests of persons designated with coordination, supervisory, administrative, or similar authority.

Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

Prepare similar memoranda for the Owner and separate Contractors where coordination of their work is required.

The Contractor shall coordinate the work so as not to interfere with the building custodian's normal cleanup activities.

The Contractor will be responsible for coordinating all the work of the project. The Contractor will coordinate the efforts of all subcontractor(s) and the deliveries of suppliers so that the work progresses in an orderly fashion without delay towards timely completion of a complete project in accordance with the drawings and specifications.

The Contractor shall note that concurrent with his work, other contractors, suppliers, and the Owner's facilities and maintenance personnel may be working in relatively close proximity. The Contractor will be solely responsible for coordinating his work with that of other contractors and will make no claims for failure to do so.

Contractor Coordination:

General Contractor is responsible for all of the work of this contract.

Assign and subcontract portions of the work as required to assure that all work is constructed in compliance with these documents.

Coordinate the work of the several subcontractors for the project.

Coordinate work of this contract with work by separate contractors.

Include an orientation to the job site for Contractors that includes Construction Waste Management and Disposal, storage locations for materials to be recycled and Construction Indoor Air Quality plan and requirements.

Subcontractor Coordination:

Each subcontractor shall:

- Coordinate work of his own employees and subcontractors.
- Expedite his work to assure compliance with schedules.
- Coordinate his work with that of other subcontractors and work by separate contractor.
- Comply with orders and instructions of Owner.

Administrative Procedures:

Coordinate scheduling and timing of required administrative procedures with other construction work. Such administrative activities include, but are not limited to, the following:

- Preparation of schedules.
- Installation and removal of temporary facilities.
- Delivery and processing of submittals.
- Progress meetings.
- Startup and adjustment of commissioned systems.
- Project closeout activities.

Conservation:

Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water and materials.

- Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work. Refer to other sections for disposition of salvaged materials that are designated as Owner's property.

Site Utilization:

In addition to the site utilization limitations and requirements shown on the drawings, and indicated by the Contract Documents, administer the allocation of available space equitably among entities needing access and space, so as to produce the best overall efficiency in the performance of the total work of the project. Schedule deliveries so as to minimize the space and time requirements for storage of materials and equipment on the site; but do not unduly risk delays in the work.

Coordination Meetings:

Include in scheduled meetings, coordination of various entities and activities as set forth in Section 01 31 19. Where necessary, schedule additional coordination meetings for this purpose on an as-needed basis.

Layout:

It is recognized that the Contract Documents are diagrammatic in showing certain physical relationships of the various elements and systems and their interfacing with other elements and systems. Establishment and coordination of these relationships is the exclusive responsibility of the Contractor. Do not scale the drawings. Lay out and arrange all elements to contribute to safety, efficiency and to carry the harmony of design throughout the Work. In case of conflict or undimensioned locations, verify required positioning with Architect.

1.4 EXISTING CONDITIONS:

All existing components of the building in areas of work or potentially impacted by the work are assumed to be without damage and fully functioning, including mechanical, plumbing, fire protection, fire alarm systems and telecommunications systems. Should any existing components of the building in areas of work or areas potentially impacted by the work found to be damaged or not properly functioning, Contractor shall provide written notice to the Owner and the Architect including complete documentation of existing conditions using photos and written descriptions prior to any work in that area or when potential work could impact that area. Any components or systems found not to be functioning following the completion of the work and not documented by the Contractor prior to start of the work in that area will be assumed to have been damaged by the Contractor during his operations and shall be placed back into complete operating order or repaired to the satisfaction of the Owner and the Architect under work of this Contract.

1.5 CONSTRUCTION ORGANIZATION AND START-UP:

Establish on-site lines of authority and communications.

Attend pre-construction meeting with subcontractors upon commencement of the project.
Establish procedures for intra-project communications.

Submittals.
Reports and records.
Recommendations.
Coordination Drawings.
Schedules.
Resolution of conflicts.

Interpret Contract Documents.

Consult with Architect to obtain interpretation.
Assist in resolution of questions or conflicts which may arise.
Transmit written interpretations to subcontractors, and to other concerned parties.

Assist in obtaining permits and approvals.

Obtain building permits and special permits required for work or for temporary facilities.
Verify that subcontractors have obtained inspections for work and for temporary facilities.

Control the use of site.

Supervise field engineering and site layout.
Allocate space for each Subcontractor's use for field offices, sheds, work and storage areas.
Establish access, traffic and parking allocations and regulations.
Monitor use of site during construction.

1.6 CONTRACTOR DUTIES:

Construction Schedules:

Coordinate schedules with several subcontractors.

Monitor schedules as work progresses.

Identify potential variances between schedules and probable completion dates for each phase.

Recommend adjustments in schedule to meet required completion dates.

Adjust schedules of subcontractors as required.

Document changes in schedule.

Observe work of each subcontractor to monitor compliance with schedule.

Verify that labor and equipment are adequate for the work and the schedule.

Verify that product procurement schedules are adequate.

Verify that product deliveries are adequate to maintain schedule.

Process Shop Drawings, Product Data and Samples:

Review for compliance with Contract Documents.

Field dimensions and clearance dimensions.
Relation to available space.
Relation to other trades, equipment and systems.
Submit to Architect.

Monitor the Use of Temporary Utilities:

Verify that adequate services are provided and maintained.

Inspection and Testing:

Inspection work to assure performance in accord with requirements of Contract Documents.

Administer special testing and inspections of suspected work.

Reject work which does not comply with requirements of Contract Documents.

Coordinate testing laboratory services.

Verify that required laboratory personnel are present.
Verify that tests are made in accordance with specified standards.
Review test reports for compliance with specified criteria.
Recommend and administer required retesting.

Monitor Contractor's Periodic Cleaning:

Enforce compliance with specifications.

Resolve any conflicts.

Coordinate Changes:

Recommend necessary or desirable changes.

Assist Owner in negotiating change orders.

Promptly notify all Subcontractors of pending changes.

Reports and Records:

Maintain Reports and Records at Job Site available to Architect and Subcontractors.

Log progress of work of each subcontractor.
Records:

Contracts.
Purchase orders.
Materials and equipment records.
Applicable handbooks, codes and standards.

Obtain information from subcontractors and maintain file of Project Record Documents.
Assemble documentation for handling of claims and disputes.

Separate Contracts:

Coordinate work of this Contract and requirements of this section with work by Separate Contract including but not limited to:

Removal of asbestos containing materials by separate contract.

1.7 PROJECT MANAGEMENT AND COORDINATION - ENVIRONMENTAL:

Contractor's Environmental Manager:

Designate at on-site party responsible for overseeing the Contractor's conformance to environmental goals for the project and implementing procedures for environmental protection.

Qualifications: Minimum 3 years construction experience on projects of similar size and scope; minimum 3 years experience with environmental procedures similar to those of this project; a LEED Accredited Professional; familiarity with environmental regulations applicable to construction operations.

Responsibilities Shall Include:

Compliance with applicable Federal, State and local environmental regulations, including maintaining required documentation.

Implementation of the Waste Management Plan.

Implementation of the Indoor Air Quality Management Plan.

Training for Contractor personnel in accordance with their position requirements.

1.8 CONTRACT CLOSEOUT:

Coordinate equipment start-up.

Provide seven days notification prior to start-up of each item.

Ensure that each piece of equipment or system is ready for operation.

Execute start-up under supervision of responsible persons in accordance with manufacturer's instructions.

Perform required testing and balancing.

Record dates of start of operation of systems and equipment. Submit written report that equipment or system has been properly installed and is functioning correctly.

Provide written notice of beginning of warranty period for equipment put into service.

Demonstration and Instructions:

Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to Completion inspection.

Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, seasonal operation, and shutdown of each item of equipment.

At completion of work of each Section, conduct an inspection to assure that:

Specified cleaning has been accomplished.
Temporary facilities have been removed from site.

At completion:

Conduct an inspection to list work to be completed or corrected.
Supervise correction and completion of work as established in Certificate of Completion.

When a portion of the Project is occupied prior to acceptance, coordinate established responsibilities of each subcontractor.

Completion:

When each Subcontractor determines that work is finally complete, conduct an inspection to verify completion of work.

Assist Owner and Architect in inspection.

Administer contract closeout.

Receive and review Subcontractor's final submittals.
Transmit to architect with recommendation for action.

1.9 COMPLETE SYSTEMS:

It is the intent of the Contract Documents that all systems, including mechanical and electrical, be complete and functional to provide the intended or specified performance. The Contractor shall provide all incidental items and parts necessary to achieve this requirement.

Provide correctly sized power, utilities, piping, drains, services and their connections to equipment and systems requiring them, whether or not specific items are listed in the schedule included in this section.

1.10 MECHANICAL/ELECTRICAL/EQUIPMENT COORDINATION:

General:

Sequence, coordinate and integrate the various elements of equipment, mechanical work and electrical work so that various systems and mechanical plant will perform as indicated and be in harmony with other work of the building. Neither the Architect or his consultants will supervise the coordination, which is the exclusive responsibility of the Contractor.

Comply with the following requirements:

Install piping, ductwork and similar services straight and true, aligned with other work, close to walls and overhead structure, allowing for insulation, concealed (except where indicated as exposed) in occupied spaces, and out-of-the-way with maximum passageway and headroom remaining in each space.

Install electrical work in a neat, organized manner with conduit and similar services in or parallel with building lines, and concealed unless indicated as exposed.

For all work maintain maximum practical overhead clearance but not less than 6" above ceiling. Where exposed, maintain 8'-0" minimum clearance.

Arrange all work to facilitate maintenance and repair or replacement of equipment. Locate services requiring maintenance, such as valves and similar units, in front of services requiring less maintenance. Connect equipment for ease of disconnecting, with minimum of interference with other work.

Provide space to permit removal of coils, tubes, fan shafts, filters, other parts which may require replacement.

Locate operating and control equipment and devices for easy access. Furnish access panels where units are concealed by finishes and similar work.

Integrate mechanical work in ceiling plenums with suspension system, light fixtures and other work, so that required performances of each will be achieved.

Give the right-of-way to piping systems required to slope for drainage over other service lines and ductwork.

Advise other trades of openings required in their work for accommodation of mechanical and electrical elements. Provide and place sleeves and anchors required in other work.

Access Panels:

Access panels for concealed valves, controls, dampers, pull boxes and other devices requiring access and located in concealed positions other than above lift-out ceilings will be furnished by Installer of item needing access. Furnish panels as specified in Section 08 31 00. Coordinate locations with other trades and with Architect. Locate exact positions for installation under Sections 04 20 00 in masonry, 06 10 00 and applicable Division 09 sections in other materials.

Prior to beginning work requiring access panels/doors, submit drawings showing locations of all access panels/doors in walls or unaccessible ceilings.

1.11 COMPATIBILITY:

Provide products and equipment which are compatible with other work requiring mechanical/electrical interface including electrical connections, control devices, water, drain and other piping connections. Verify electrical characteristics, fuel requirements and other interface requirements before ordering equipment and resolve conflicts that may arise.

Make connections to controls directly attached to ducts, piping or equipment with flexible connections.

Carefully coordinate the interface between Division 23 (Mechanical) and Division 26 (Electrical) before submitting any equipment for review or commencing installation.

Responsibility: Unless otherwise indicated, all motor and controls for Division 23 equipment shall be furnished, set in place and wired in accordance with the following schedule:

ITEM	FURNISHED UNDER	SET IN PLACE UNDER	POWER WIRING UNDER	CONTROL WIRING UNDER
Equipment Motor	23	23	26	-
Automatically Controlled Starter/Contactors:				
Separate	23	26	26	23
Factory Mounted & Wired	23	23	26	23
In Motor Control Centers	26	26	26	26
Manually Controlled Starter/Contactors:				
Separate	23	26	26	23
Factory Mounted & Wired	23	23	26	23
Motor Speed Controllers	23	26	26	26
Disconnect (Note 1) Switches	26	26	26	-
Contactors	26	26	26	-
Thermal Overload (Note 1) Switches	26	26	26	-
Manual Operation (Note 2)	26	26	26	-
Switches	26	26	26	-
Control Relays (Note 2)	23	23	-	23
Control Transformers	23	23	26	23
Control Circuit Outlets	26	26	26	-

ITEM	FURNISHED UNDER	SET IN PLACE UNDER	POWER WIRING UNDER	CONTROL WIRING UNDER
Thermostats (Note 2)	23	23	-	23
Time Switches (Note 2) Not in Control Panel	23	23	26	23
Push Button Stations, Pilot Lights	26	26	26	26
Thermostats (Note 2) Controls: Integral with Equipment or Directly Applied to Ducts, Pipes, etc.	23	23	26	23
Valve Motors, Damper Motors, Solenoid Valves, etc.	23	23	26	23
EP Valves or Switches, P.E. Switches, etc.	23	23	-	23
Control Circuit Outlets	26	26	26	-
Fire Alarm Systems	26	26	26	26
Fire Sprinkler Alarm	26	26	-	26
Firestats	26	26	-	26
Smoke Detectors Including Relays for Fan Control	26	26	-	26
Control Air Compressor	23	23	26	23
Refrigerated Air Dryer	23	23	26	23
Equipment Interlocks	23	23	-	23
Boiler and Water Heaters	23	23	26	23

Note 1: If furnished as part of factory wired equipment furnished and set in place under Division 23, wiring and connections under Division 26.

Note 2: If float switches, line thermostats, P.E. switches, time switches, or other controls carry the FULL LOAD CURRENT to any motor, they shall be furnished under Division 23, but they shall be set in place and connected under Division 26 except that where such items are an integral part of the mechanical equipment, or directly attached to ducts, piping, or other mechanical equipment, they shall be set in place under Division 23 and connected under Division 26. If they do not carry the FULL LOAD CURRENT to any motor, they shall be furnished, set in place and wired under Division 23.

Control Wiring: Consists of wiring in pilot circuits of contact or starters, sensors, controllers, and relays, and wiring for valve and damper operators.

Connections: Connections to all controls directly attached to ducts, piping and mechanical equipment shall be made with flexible connections.

Starters: Provide magnetic starters for all three phase motors and equipment complete with:

Control transformers.
120V holding coils.
Integral hand-off-auto switch.
Auxiliary contacts required for system operation plus one (1) spare.

Remote Switches and Push Button Stations: Provide all remote switches and/or push button stations required for manually operated equipment (if no automatic controls have been provided) complete with pilot lights of an approved type lighted by current from load side of starter.

Special Requirements: Motors, starters and other electrical equipment installed in moist areas or areas of special conditions, such as explosion proof, shall be designed and approved for installation in such areas with appropriate enclosure.

Identification: Provide identification of purpose for each switch and/or push button station furnished. Identification may be either engraved plastic sign or permanent mounting to wall below switch, or stamping on switch cover proper. All such identification signs and/or switch covers in finished areas shall match other hardware in the immediate areas.

Control Voltage:

Maximum allowable control voltage 120V. Fully protect control circuit conductors in accordance with National Electrical Code.

Provide 20A breakers in emergency panels under Division 26 as required for Building Management System Air Temperature Controls (BMS/ATC). Provide all control transformers, control wiring and connections to circuits under Section 23 09 00 of Division 23.

Contractor must review all concrete embedded items (including conduit) with owner prior to placement.

1.12 COMMISSIONING:

Selected building systems are commissioned. The equipment and systems to be commissioned are specified in Section 01 91 13. The commissioning process is described in Section 01 91 13.

The Commissioning Agent will prepare a Commissioning Plan. The Commissioning Plan provides direction for the commissioning process during construction, providing resolution for issues such as scheduling, roles and responsibilities, lines of communication and reporting, approvals, and coordination. It is, somewhat, a reiteration of the Commissioning specifications. The Commissioning Plan also describes the implementation of the commissioning process and provides a framework for integration of commissioning activities into the construction and acceptance process. The Commissioning Plan also provides an agenda for organizing and focusing the commissioning scoping meeting. The Commissioning Plan expands to incorporate more information as the design, construction, and acceptance and warranty phases of the facility are completed. The Commissioning Plan will be updated during the construction and warranty phases.

PART 2 - PRODUCTS

2.1 MOTOR HORSEPOWER:

In general, all motors 1/2 HP and above shall be three phase, all motors less than 1/2 HP shall be single phase.

Voltage and phase of motors as scheduled on the electrical drawings shall take precedence in the case of a conflict between the mechanical and electrical drawings or the requirement in the paragraph above.

Work under Division 23 includes coordinating the electrical requirements of all mechanical equipment with the requirements of the work under Division 26, before ordering the equipment.

If motor horsepower is changed under the work of Division 23, without a change in duty of the motor's driven device, coordination of additional electrical work (if any) and additional payment for the work (if any) shall be provided under the section of Division 23 initiating the change. Increases or decreases in motor horsepower from that specified shall not be made without written approval from the Engineer.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 31 13

SECTION 01 31 19
PROJECT MEETINGS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to the work of this section.

1.1 SUMMARY:

Section Includes:

Administrative and procedural requirements for project meetings in the following categories:

- Pre-construction meeting.
- Progress and Coordination meetings.
- Pre-installation conferences.
- Specially called meetings.

Related Sections:

- Construction Progress Documentation: Section 01 32 00
- General Commissioning Requirements: Section 01 91 13

1.2 REQUIREMENTS:

Contractor shall schedule and administer, unless otherwise indicated, pre-construction meeting, periodic progress meetings, coordination meetings, pre-installation conferences and specially called meetings through-out progress of the work including the following:

Prepare agenda for meetings.

Distribute written notice of each meeting four days in advance of meeting date.

Make physical arrangements for meetings.

Preside at meetings.

Record the minutes; include significant proceedings and decisions.

Reproduce and distribute copies of minutes within three days after each meeting and send to:

- Participants in the meeting.
- Parties affected by decisions made at the meeting.
- Architect (1 copy).
- Principal Representative (1 copy).

Representatives of Subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

Architect may attend meetings to ascertain that Work is expedited consistent with Contract Documents and construction schedules.

1.3 PRE-CONSTRUCTION MEETING:

The Owner will schedule within 15 days after date of Notice to Proceed.

Attendance:

- Owner's Principal Representative.
- Architect.
- Architect's professional consultants at the discretion of the Architect.
- Contractor and Contractor's Superintendent.
- Major Subcontractors.
- Major Suppliers and manufacturers.
- Others as appropriate.

Suggested Agenda:

Discuss items of significance that could affect progress including such topics as:

- Distribution and discussion of:
  - List of major subcontractors and suppliers
  - Projected construction schedules
  - Critical work sequencing
  - Major equipment deliveries and priorities
  - Project Coordination
  - Designation of responsible personnel
- Procedures and processing of:
  - Field decisions
  - Proposal requests
  - Submittals
  - Change Orders
  - Applications for Payment
- Adequacy of Distribution of Contract Documents
- Procedure for Maintaining Record Documents
- Inspections
- Stormwater Management Plan (SWMP)
- Use of the premises.
- Office, Work, staging and storage areas.
- Owner's requirements.
- Temporary construction Facilities, Utilities, Controls and Construction Aids.
- Safety, First-aid, Security and Housekeeping Procedures.
- Administrative Procedures and Documents as Required by Owner.

The Contractor will: Record the minutes; including significant proceedings and decisions and distribute to all attendees and others affected by the meeting.

1.4 PROGRESS AND COORDINATION MEETINGS:

The Contractor will schedule weekly job progress and coordination meetings at the site.

Attendance:

- Owner as needed
- Contractor
- Subcontractors as appropriate to the agenda.
- Suppliers as appropriate to the agenda.
- Architect except for matters that are the Contractor's responsibility.

If needed, Architect's professional consultants except for matters that are the Contractor's responsibility.
Commissioning Agent during the equipment start-up and functional testing phase.
Others.

Suggested Agenda:

Review of work progress since previous meeting.
Field observations, problems, conflicts.
Problems which impede Construction Schedule.
Review of off-site fabrication and delivery schedules.
Corrective measures and procedures to regain projected schedule.
Revisions to Construction Schedule.
Progress and schedule during succeeding work period.
Coordination of schedules.
Review submittal schedules and expedite as required.
Maintenance of quality standards.
Commissioning coordination (during equipment start-up and functional testing).
Pending changes and substitutions.
Review proposed changes for:

Effect on Construction Schedule and on completion date.
Effect on other contracts of the Project.

The Contractor will record and distribute the minutes of all progress meetings throughout the construction period.

1.5 PRE-INSTALLATION CONFERENCES:

Conduct pre-installation conferences at the site for those installations, systems or assemblies where required by the Specifications or where deemed necessary by the Contractor. The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Architect of scheduled meeting dates. Coordinate meetings to occur on the same day as normally scheduled weekly progress and coordination meetings.

Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference.

Commissioning will include a scoping meeting where all members of the design and construction team to be involved in the commissioning process meet and agree on the scope of work, tasks, schedules, deliverables, and responsibilities for implementation of the Commissioning Plan. During this meeting, the coordination of commissioning activities that will coincide with the completion of mechanical systems is discussed. Each building system to be commissioned is addressed, including commissioning requirements, and completion and start-up schedules for each area. A commissioning kickoff meeting (typically held on the jobsite) will be run by the Contractor and the Commissioning Agent. This meeting will include all applicable Subcontractors that are involved in the commissioning process. During this meeting, the Contractor will advise the Subcontractors of their roles in this process, and will explain what tasks and milestones have been added to the "standard" construction process as a result of the district including commissioning in their scope. The Contractor will direct the Subcontractors to the commissioning specification and will clear up any questions that may arise as a result of the specification. It is expected that the Contractor will be prepared and will be familiar with the commissioning specification and its requirements, and will be able to clearly explain what the Subcontractors need to do to participate. Prior to this kickoff meeting, the Commissioning Agent will be available to the Contractor to aid in their understanding of the commissioning requirements.

Record significant discussions and agreements and disagreements of each conference, along with the approved schedule. Distribute the record of the meeting to everyone concerned, promptly, including the Owner and Architect.

Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

In addition to the above, schedule and conduct a pre-construction conference to review the detailed quality control and construction requirements for each of the materials and/or systems listed below, not less than ten working days prior to commencement of the applicable portion of the work:

- Cast-in-place concrete
- Metal support assemblies
- Roofing
- Doors, door frames and hardware
- Laboratory casework, countertops and sinks.
- Environmental chambers.
- Plumbing, mechanical and electrical items indicated in Division 22, 23 and 26 sections.
- Start-up/commissioning

Require responsible representatives of each party concerned with that portion of the work to attend the conference, including but not limited to the following:

- Architect
- Owner's Principal Representative
- Contractor's superintendent
- Materials supplier(s) or fabricator
- Installation subcontractor(s)
- Agency responsible for Contractor furnished testing

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 01 31 19

SECTION 01 32 00

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Construction progress documentation including:

- Scheduling of work.
- Contractor's construction schedule.
- Submittals schedule.

Related Sections:

- Photographic Documentation: Section 01 32 33
- Submittal Procedures: Section 01 33 00

1.2 SYSTEM DESCRIPTION:

An essential condition of this Contract shall be the scheduling and conduct of all phases of construction operations in such a manner that the Owner's operations and use of the adjacent existing buildings and campus shall be uninterrupted at all times, except for such limited interruption as is required and approved by the Owner.

Contractor shall repair at his own expense all damage done to Owner's property, unknown utilities and adjoining public property as a result of Contractor's construction activities.

1.3 CONSTRUCTION AND SEQUENCE SCHEDULE:

In order to accommodate the uninterrupted operation of the existing building during the various phases of construction, the sequence of construction operations shall be as follows:

The sequence concept is to: (1) prepare the existing facility to function during renovation through completion; (2) coordinate control work in occupied second floor; and (3) upon completion, finally reoccupy the remodeled third and fourth floor portions.

Utilizing this concept break down the Schedule into broad scope categories augmented by "Owner Action" and "Contractor action" columns that indicate coordination tasks which define the various phases of the work.

The intent of the categorization is to generally summarize the nature and extent of work to be performed without in any way limiting specific requirements of the Contract Documents.

Some overlapping between the several construction operations will occur, and where possible, permission may be granted to start certain portions of the work before the previous operations were completed in their entirety. Such detail scheduling shall be done as the work progresses, provided that the Owner's operations remains uninterrupted, but in all cases must receive Owner approval.

Where it may not be possible to complete certain mechanical and electrical services in connection with making the work complete and ready for occupancy, temporary services as directed and as approved shall be installed to permit occupancy by the Owner at the earliest possible date.

The construction sequence schedule and related drawings are intended to aid the Contractor in bidding and in the preparation of a specific construction schedule. Deviations of sequence may be made upon approval of the Owner and the Architect. The preparation of a specific construction schedule remains the responsibility of the Contractor.

1.4 CONTRACTOR'S CONSTRUCTION SCHEDULE:

Furnish Construction Schedule, as required by General Conditions, not less than 4 copies.

Prepare the schedule on a sheet, or series of sheets, of stable transparency, or other reproducible media, of sufficient width to show data for the entire construction period.

Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the Work.

Coordinate the Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests and other schedules.

Indicate complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities.

Indicate projected percentage of completion for each item of work at the time of each Application for Progress Payment.

Indicate action dates for shop drawings, product data, samples and other required submittals.

Show product delivery dates, including those furnished by Owner or Others.

Identify Test and Balance as a separate line item.

Show time for commissioning process for each building system to be commissioned (occurring before Acceptance).

Indicate closeout as a separate line item with completion in advance of the date established for Completion. Indicate Completion on the schedule to allow time for the Architect's procedures necessary for Acceptance.

Interval: 3 week maximum.

Critical Path Schedule:

Submit within 21 days of the date of the "Notice to Proceed", a critical path network showing each unit of work broken down in sufficient detail to meet network logic and actual project conditions giving early and late starts for each unit, the critical path, and corrected for normal weather delays and plotted on calendar time. Present in graphic form. Include latest dates for decisions for work specified by allowance, selection of colors, finishes, etc.

These critical path diagrams and printouts shall be prepared by persons skilled and experienced in this technique and who use computer facilities to prepare the schedule; all subject to the acceptance by the Owner and the Architect.

Updating:

The schedules shall be updated and reissued monthly at project meetings, unless otherwise agreed to by the Owner and the Architect, and shall reflect actual job progress, delays or gains of time and any rescheduling. The original schedule and each updating shall be furnished in 4 copies, one to the Owner and three to the Architect. All costs for this scheduling shall be borne by the Contractor. Pay requests will not be processed if schedules have not been updated.

When schedule revisions affect the submittals schedule, revise that schedule and submit to Architect with revised Construction Schedule.

Short Term Schedule:

Maintain a detailed short interval look ahead schedule for all construction activities to be performed within the subsequent 3 weeks. This schedule shall be in sufficient detail to identify major tasks requiring coordination with the existing building users, separate contractors, coordination between Subcontractors and major support/decisions from the Architect or the Owner. Comply with requirements specified above for critical path scheduling, except update the short interval weekly. Submit updated short interval schedule to the Owner and Architect weekly at or before each job progress meeting.

1.5 SUBMITTALS SCHEDULE:

Submit with Contractor's construction schedule, a complete schedule of submittals.

Coordinate submittal schedule with the list of subcontracts, schedule of values and the list of products as well as the Contractor's construction schedule.

Prepare the schedule in chronological order; include submittals required during the first 90 days of construction. Provide the following information.

Scheduled date for the first submittal.
Related Section number.
Name of Subcontractor.
Description of the part of the Work covered.
Scheduled date for resubmittal.
Scheduled date the Architect's final release or approval.
Include related CPM event numbers.

Schedule Updating:

Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

1.6 PROJECT/SITE CONDITIONS:

Access and Use of Site:

Contractor shall use the designated site access for construction offices and material storage in such a manner that access to existing buildings and campus remain accessible at all times for use.

Confine operations to as limited a use of the existing building and campus as possible. A route of access to and from the work for employees shall be agreed upon and it shall be the Contractor's responsibility to see that the agreed route is maintained in order to prevent unwarranted or unnecessary traffic through the existing buildings or site.

Owner Notice and Approval:

All arrangements and scheduling in connection with the work of this Contract shall be made with and subject to the approval of the Owner.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 01 32 00

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Administrative and procedural requirements for submittal and review of product data, shop drawings, samples and similar items required by the specifications.

Related Sections:

Submittals Schedule: Section 01 32 00.
General Commissioning Requirements: Section 01 91 13.
Commissioning of HVAC: Section 23 08 00.
Refer to appropriate sections of Divisions 21 through 28 for additional submittal requirements (if any) of fire protection, plumbing, mechanical, controls, electrical, communications and electronic safety and security work.

1.2 ADMINISTRATIVE SUBMITTALS:

Refer to other Division-01 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:

Schedules.
Permits.
Applications for payment.
Performance and payment bonds.
Insurance certificates.
List of Subcontractors.
Schedule of Values.
Daily reports.
Inspection and test results.
Closeout documents.
Coordination drawings.
Quality control plan.

Such submittals are for information and record and do not require action on the part of the Architect except where not in conformity with the Contract Documents. If such non-conformity is observed the Architect will notify the Contractor within two weeks of receipt of document. Failure to observe or notify by the Architect does not relieve Contractor of compliance with Contract Documents.

Submit one copy of all administrative submittals to the Owner.

Daily Reports:

Keep a daily record of all on-site activities and conditions. Include a description of the work being performed, the weather conditions, manpower on site, visitors, and any other data relevant to the progress of the work. Submit copies of these reports to the Owner and the Architect not less than once a month.

1.3 SUBMITTAL REQUIREMENTS FOR COMMISSIONING:

The Commissioning Agent will receive a copy or have access to the Owner's copy of the standard submittals for equipment to be commissioned.

The Commissioning Agent may require additional documentation necessary for the commissioning process. The Contractor will receive a written request from the Commissioning Agent requesting specific equipment or system information.

1.4 SUBMITTAL PROCEDURES:

General:

Make submittals from Contractor to the Architect, and to the Owner for concurrent review for color submittals and for other items as directed by the Owner, after Contractor has reviewed each submittal and indicated his action thereon except for samples and selection submittals. Submittal of any item constitutes an implied statement by the Contractor and applicable Subcontractors of the following:

Submittal has been reviewed and approved by the Contractor and applicable Subcontractors.

Submittals have been verified and coordinated with the Specifications, measurements, conditions and criteria of the Contract Documents.

Submitted items can be fabricated and delivered to the project site within the proposed Construction Schedule.

Include an additional copy of submittals as requested for review by the Owner.

Submittals are not Change Orders. The purpose of submittals is to demonstrate that the Contractor understands the design concept and confirms such through proposed detailing, fabrication, and installation methods.

Do not use unreviewed or unapproved submittals in conjunction with the work.

Review by the Architect, his consultants or the Owner does not relieve the Contractor from full compliance with the Contract Documents.

Maintain a record set of all submittals for the Owner.

Review of all interior finishes will be made simultaneously. Review of individual finishes will not be performed until receipt of all project finish samples.

Scheduling:

The Contractor shall prepare a listing and schedule organized by related specification section number sequence, showing the principal work-related submittals and their initial submittal dates as required for coordination of the work. Submit listing prior to filing the Contractor's first application for payment.

Submit with Contractor's construction schedule, a complete schedule of submittals.

Coordinate submittal schedule with the list of subcontracts, schedule of values and the list of products as well as the Contractor's construction schedule.

Prepare the schedule in chronological order; include submittals required during the first 90 days of construction. Provide the following information.

- Scheduled date for the first submittal.
- Related Section number.
- Name of Subcontractor.
- Description of the part of the Work covered.
- Scheduled date for resubmittal.
- Scheduled date the Architect's final release or approval.
- Include related CPM event numbers.

Schedule Updating:

Revise the schedule after each meeting or activity, where significant revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

Coordination:

Coordinate the preparation and processing of submittals with the performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.

Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.

- The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

Submit samples of all interior and exterior finishes simultaneously at earliest opportunity for Architect to verify finish coordination. This submittal shall be separated from actual submittal review process. Review and approval of finishes cannot be made until all finishes have been submitted.

Responsibilities of the Contractor:

Review shop drawings, product data, samples and project record drawings for specification performance prior to submission.

Determine and verify field measurements, field construction criteria, catalog numbers and similar data, and conformance with specifications.

Coordinate each submittal with requirements of the work and of the Contract Documents.

Notify the Architect in writing, at the time of submission, of any deviations in the submittals for requirements of the Contract Documents.

Begin no fabrication or work that requires submittals until return of submittals with Architect's acceptance.

Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by Consultant's review of submittals.

Contractor shall stamp, sign or initial, and date each submittal to show compliance with the Contract Documents prior to submittal to the Consultant.

Consultant's Duties:

Review submittals with reasonable promptness and in accordance with schedule.

Review of separate item does not constitute review of an assembly in which item functions.

Affix stamp and initials or signature, and indicate requirements for resubmittal or acceptance of submittal.

Return submittals to the Contractor for distribution or for resubmission.

Processing:

Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.

Allow ten working days (not including Saturdays, Sundays or holidays) for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Architect will promptly advise the Contractor when a submittal being processed must be delayed for coordination.

If an intermediate submittal is necessary, process the same as the initial submittal.

Allow ten working days (not including Saturdays, Sundays or holidays) for reprocessing each submittal.

No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.

Submittal Preparation:

Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.

Provide a blank space in the lower right hand corner on Shop Drawings approximately 8" x 3" to record the Contractor's review and approval markings and other review stamps.

Include the following information on the label for processing and recording action taken.

- Project title and number.
- Date of the submission and dates of any previous submissions.
- Contract identifications.
- Name and address of Architect.
- Name and address of Contractor.
- Name and address of Subcontractor.
- Name and address of supplier.
- Name of manufacturer.
- Number and title of appropriate Specification Section.
- Drawing number and detail references, as appropriate.

Submittal to be numbered as described by the following example:

09 30 00-01.A
Spec Section: → → → → ↑ ↑↑
First Submittal: → → → → → → ↑↑
Resubmittal of 09 30 00-01:→ → →↑

For each submittal, include the following:

Identification of product with the specification section number.
Field dimensions, clearly identified as such.
Relation to adjacent or critical features of the work or materials.
Applicable standards, such as ASTM or Federal specification numbers.
Identification of deviations from Contract Documents.

Electronic Media:

Architect and consultant's computer generated CAD drawings on diskettes are available for preparation of background for creation of project specific shop drawings.

The Architect will give the Contractor electronic files required upon completion of the Architect's Electronic Waiver Form. Subcontractors may obtain files from the Contractor.

The Architect will only transfer files containing plans, including roof plans, exterior elevations and building sections. File may not reflect field changes. All other drawing files will not be transferred to parties outside OZ Architecture unless authorized by the Owner. A current copy of the waiver must be signed by the Contractor.

Submittal Transmittal:

Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Owner and Architect using a transmittal form. Submittals received from sources other than the Contractor will be returned without action.

On the transmittal record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.

Architect will coordinate Owner submittal review. Owner will review submittal and forward any comments to the Architect for incorporation into the submittal returned to the Contractor.

Submittal Disposition:

Submittals will be returned with the disposition noted as follows:

APPROVED: Submittal is approved, work may proceed.

APPROVED AS NOTED: Submittal is approved and confirmation of notations by Contractor is not required. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.

REVISE AND RESUBMIT: Notations and comments are extensive enough to require a resubmittal of the package. The resubmittal must address all comments, omissions and non-conforming items noted. Release of the equipment or material for manufacture is not authorized.

REJECTED: Submittal does not meet the intent of the Contract Documents. The Contractor must resubmit the entire package to bring the submittal into conformance.

Multiple Resubmittals:

If the Architect is required to review a submittal an excessive or unreasonable number of times, the Owner may compensate the Architect for cost for additional reviews and deduct amount paid from final payment to Contractor.

1.5 SHOP DRAWINGS:

Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.

Drawings shall be presented in a clear and thorough manner.

Details shall be identified by reference to sheet, detail, schedule, or room numbers shown on drawings.

Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:

Dimensions.
Identification of products and materials included.
Compliance with specified standards.
Notation of coordination requirements.
Notation of dimensions established by field measurement.

Submit initially, three bond paper prints for Architect and one bond paper print for Principal Representative, State Buildings Division. One bond paper print will be returned to the Contractor.

Contractor will provide prints of returned print as may be required for his use and that of his Subcontractors and suppliers.

For revised submittals, revise initial drawings and resubmit as specified for initial submittal. Indicate any changes that have been made, other than those requested by the Consultant.

Final submittal shall be delivered to the Architect with sufficient copies so that desired distribution can be made by Contractor, one copy each to the Architect, his professional consultants where applicable, the Owner, the Contractor's field office, his home office, the Record Documents, the fabricator, and any others involved in the submittal.

If initial submittal becomes final submittal, provide sufficient additional copies that may be needed to meet these requirements.

Where shop drawings are indicated to be submitted for "information only", submit two sets of prints to Architect, one set (two sets for mechanical, plumbing electrical and technology submittals) for Principal Representative, State Buildings Division and retain one set for Project Record Documents.

See Section 01 78 39 for additional requirements for submittal of CAD drawings for record documents.

1.6 PRODUCT DATA:

Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, rough-in diagrams and templates, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings".

Include supplemental data or information for unique project conditions not documented in manufacturer's standard literature.

Clearly mark each copy to identify pertinent products or models.

Show performance characteristics and capabilities.

Show dimensions and clearances required.

Show wiring or piping diagrams and controls.

Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information.

Manufacturer's printed recommendations.
Compliance with recognized trade association standards.
Compliance with recognized testing agency standards.
Application of testing agency labels and seals.
Notation of dimensions verified by field measurement.
Notation of coordination requirements.

For manufacturer's standard schematic drawings and diagrams:

Modify drawings and diagrams to delete information that is not applicable to the work.

Supplement Standard information to provide information specifically applicable to the work.

Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.

Where maintenance instructions are required, provide typewritten information complying with the requirements of Section 01 78 23.

Submittal is for information and record, unless otherwise indicated; and therefore, initial submittal is final submittal unless returned promptly by the Architect marked with an "action" which indicates an observed non-compliance.

Submit seven copies. Where applicable, include additional copies for maintenance manuals. Submit a covering letter to show Contractor's review and action. Four copies will be returned to the Contractor.

For revised submittals, revise initial product data and resubmit as specified for initial submittal. Indicate any changes that have been made, other than those requested by the Consultant.

Distribute copies of product data to affected subcontractors and retain one copy for use at the job-site.

Material Safety Data Sheets (MSDS):

Copies of all material safety data sheets for all applicable products, including but not limited to; paint, adhesives, mastics, solvents, and finishes, etc., shall be retained on site by the Contractor for all applicable products used during the construction and/or remodeling work. Furnish copies of all MSDS's to the Architect upon request, and include in the Project Record Document submittal.

1.7 SAMPLES:

Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture and pattern.

Mount, display or package Samples in the manner specified to facilitate review of qualities indicated. Prepare Samples to match the Architect's Sample. Include the following:

Generic description of the Sample.
Sample source.
Product name or name of manufacturer.
Compliance with recognized standards.
Availability and delivery time.

Office samples shall be of sufficient size and quantity to clearly illustrate:

Functional characteristics of the product with integrally related parts and attachment devices.

Full range of color, texture and pattern.

Submit Samples to Architect who will review them solely for kind, color, pattern, and texture, for a final check of these characteristics with other elements, and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed.

Where variation in color, pattern, texture or other characteristics are inherent in the material or product represented, submit multiple units (not less than 3), that show approximate limits of the variations.

Refer to other Sections for Samples to be returned to the Contractor for incorporation in the Work. Such Samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample submittals.

Preliminary Submittals:

Where Samples are for selection of color, pattern, texture or similar characteristics from a range of standard choices, submit a full set of choices for the material or product.

Preliminary submittals will be reviewed and returned with the Architect's mark indicating selection and other action.

Submittals:

Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation and similar characteristics, submit 3 sets unless specifically indicated otherwise in the technical sections; one will be returned marked with the action taken.

For resubmittals, submit same quantity as required above.

Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of construction.

Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.

Sample sets may be used to obtain final acceptance of the construction associated with each set.

Distribution of Samples:

Prepare and distribute additional sets to Subcontractors, manufacturers, fabricators, suppliers, Installers, and others as required for performance of the Work. Show distribution on transmittal forms.

Field Samples and Mock-Ups:

Field Samples and mock-ups specified in individual Sections are erected on site to illustrate finishes, coatings, or finish materials and to establish the standard by which the Work will be judged. Locate mock-ups on site at locations approved by the Architect.

Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

Do not remove or alter approved mock-ups until final punch list inspections have been completed.

Mock-ups are to be separate from the work except where specifically indicated that they may remain as part of the completed work.

Remove mock-up at the conclusion of the project or when directed by the Architect.

Restore or finish site to finish condition indicated on the Drawings.

1.8 SELECTIONS SUBMITTAL:

Where selections of colors, patterns, textures are specified to be made by the Architect, assemble complete samples of all specified or approved products for all specification sections and submit to Architect. Review specifications and assemble all such samples for a combined single submittal. Indicate on the transmittal the latest date for selections to be made for each item to permit delivery of material in accordance with Progress Schedule. Architect's action is limited solely to the specified selections or rejection of submittal items not in accordance with Specifications.

Final finish selections will not be made until samples have been received.

1.9 TEST REPORT SUBMITTAL:

Where standard tests are specified for products, including equipment, which tests are not performed at the job site, follow procedures for Product Data. For field inspection and tests specified to be performed by independent agencies, such agencies shall transmit directly one copy each as follows:

General Contractor's Project Manager
General Contractor's Field superintendent
Applicable supplier or subcontractor

Owner
Applicable Consultant
Architect
Authorities having jurisdiction (as applicable)
Other copies as directed

1.10 INFORMATIONAL SUBMITTALS:

General: Prepare and submit Informational Submittals required by other Specification Sections.

Number of Copies: Submit three copies of each submittal, unless otherwise indicated. Architect will not return copies.

Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

Test and Inspection Reports: Comply with requirements specified herein.

For items listed in the commissioning documents also provide "Pre-Functional Checklists" and "Functional Testing Procedures".

Coordination Drawings: Comply with requirements specified in Section 01 31 13.

Contractor's Construction Schedule: Comply with requirements specified in Section 01 32 00.

Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on

evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.

Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Section 01 78 23.

Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.

Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:

Statement on condition of substrates and their acceptability for installation of product.

Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.

Results of operational and other tests and a statement of whether observed performance complies with requirements.

Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

1.11 DELEGATED DESIGN:

Performance and Design Criteria:

Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

Delegated-Design Submittal:

In addition to Shop Drawings, Product Data, and other required submittals, submit four copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 01 33 00

SECTION 01 35 43
ENVIRONMENTAL PROCEDURES

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

General administrative requirements and procedures for Hazardous Communication Program.

Related Sections:

Summary: Section 01 10 00.
Regulatory Requirements: Section 01 41 00.

1.2 WORK BY OWNER:

Asbestos:

The Owner has completed an Environmental Site Assessment to identify asbestos containing materials and other immediate Health and Safety items. Do not begin work until Form Exhibit A has been executed. Where asbestos materials or other hazardous conditions are known to exist in locations affected by this project, remediation measures will be undertaken by the Contractor. The Contractor shall coordinate his sequence and schedule with that of the environmental remediation work.

In the event that the Contractor encounters any material on the site which is reasonably believed hazardous, which has not been rendered harmless, the Contractor shall:

Stop work immediately in affected areas.

Report the condition in writing to the Department of Facilities Management Project Administrator.

Report the condition in writing to the Architect.

Resume work only under the provisions of this section.

1.3 QUALITY ASSURANCE:

Asbestos containing materials may exist within the general project area where such materials are not expected to be disturbed during the work. The Contractor shall review the Environmental Health and Safety Environmental Site Assessment Form at the project site and become familiar with known asbestos and hazardous containing materials in the work areas.

1.4 PROJECT/SITE CONDITIONS:

Hazard Communication Requirements:

All Contractors are responsible for compliance with mandatory federal rules and regulations concerning Hazard Communication, including, but not limited to those regulations contained in 29 CFR 1910.1200 Hazard Communication, 1910.146 Confined Space, 1910.147 Lock-out Tag-out, 1910.1101 Asbestos, and 1926.62 Lead. Contractor and all subcontractors working at sites under the control of the Owner shall make available to the Architect, upon request, copies of the Hazard Communication Program used by their firm. In addition to this requirement, all regulations related to Multi-employer workplaces shall be adhered to. These regulations are found in 29 CFR 1910.1200, (e) (2) (I) through (e) (4) specifically:

> (e) (2) Multi-employer workplaces. Employers who produce, use, or store hazardous chemicals at workplace in such a way that employees of other employer(s) may be exposed (for example, employees of a construction contractor working on site) shall additionally ensure that the hazard communication programs developed and implemented under paragraph (e) include the following:
>
> (e) (2) (i) The methods the employer will use to provide the other employer(s) with a copy of the material safety data sheet, or to make it available at a central location in the workplace, for each hazardous chemical the other employer(s)' employees may be exposed to while working;
>
> (e) (2) (ii) The methods the employer will use to inform the other employer(s) of any precautionary measures that need to be taken to protect employees during the workplace's normal operating conditions and in foreseeable emergencies; and,
>
> (e) (2) (iii) The methods the employer will use to inform the other employer(s) of the labeling system used in the workplace.
>
> (e) (3) The employer may rely on an existing hazard communication program to comply with these requirements, provided that it meets the criteria established in this paragraph (e).
>
> (e) (4) The employer shall make the written hazard communication program available, upon request, to employees, their designated representatives, the Assistant Secretary and the Director, in accordance with requirements of 29 CFR 1910.20 (e).

The referenced regulations were excerpted from 29 CFR 1910.1200. This excerpt shall not be relied upon for compliance with mandatory federal, state and local regulations. The Contractor shall comply with all such regulations and shall be solely liable for insuring that all requirements under applicable regulations are met.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION

3.1 EXAMINATION:

Asbestos and Hazardous Materials Discovery:

The Contractor is cautioned to be alert to the possibility that his work may uncover undocumented asbestos containing or hazardous materials. If suspected materials are found, the Contractor shall notify the Owner and stop all work in the area immediately. If the suspected materials prove to contain asbestos or hazardous materials, the Contractor will arrange to have the materials abated in a timely manner.

3.2 HAZARDOUS MATERIALS/EQUIPMENT REMOVAL:

Definition:

Removal of hazardous materials/equipment is extremely dangerous. Hazardous materials/equipment is defined to include, but not limited to the following:

Fume hoods.
Hood exhaust duct work.
Exhaust fans.
Laboratory casework and equipment.
PCB ballast's.
Mercury and Sodium Vapor Lights.
Adjacent material that could come in contact with workers or public.

Protection:

Hazardous materials/equipment removal shall include the protection of personnel, material, environment and safe legal disposal of the equipment; and further includes the following:

Notification of Project Administrator and appropriate Environmental Health and Safety Unit.

Proper protective clothing for personnel involved in the removal.

Appropriate emergency and first aid facilities.

Removal procedures shall be accomplished during minimal occupancy of the remainder of the building on the weekends or at night.

Disposal:

All equipment related to the use, storage or processing of hazardous materials/equipment shall be removed and properly disposed of under the direct, full-time supervision of a qualified Laboratory Specialist fully conversant with the chemistry and properties of the material/equipment involved. Certification is required. Contractors are responsible for the removal of all hazardous materials/equipment and chemicals from the work site as well as proper disposal of all hazardous waste generated by their project.

Hazardous waste disposal must include prior notification to the Department of Environmental Health and Safety in order to verify that the appropriate procedures and documentation are used. Copies of all paper work for shipping and disposing of these materials (hazardous waste manifests, land disposal restrictions, etc.) will be provided by the Contractor to the Department of Environmental Health and Safety (303-492-6025). Where appropriate, the Main Campus EPF ID COD007431505 will be used for these shipments.

Hazardous chemicals, waste and other pollutants may not be discharged to the sanitary or storm sewer systems at anytime. Releases to the environment must be reported to University of Colorado Police Department and the Department of Environmental Health and Safety immediately.

3.3 ENVIRONMENTAL RESPONSIBILITIES:

Environmental and Safety Issues and Practices:

Contractors working on the University of Colorado at Boulder campus are required to comply with all applicable University, City, State and Federal environmental regulations and safety standards. Hazardous and regulated materials must be managed and disposed of properly. Work sites must control dust, debris and run-off, and pay special attention to preventing any pollutants from entering the storm sewer or surface water collection systems. These systems ultimately drain into our creeks and waterways.

Contractor will be required to sign an Environmental Responsibilities form. The Contractor is responsible for notifying all subcontractors of the responsibilities identified on the form. A copy of this form must be posted, throughout the duration of the project, in a visible area for all workers to see.

END OF SECTION 01 35 43

SECTION 01 41 00

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Regulatory requirements including:

- Approval and recommendation agencies.
- Codes.
- Occupational Safety and Health Administration (OSHA).
- Hot work permits.
- Permits.
- Inspections.
- University of Colorado sexual harassment policy.
- Fire alarm interruption.
- Stormwater Management Plan (SWMP).

1.2 APPROVAL AND RECOMMENDATION AGENCIES:

The University of Colorado at Boulder has jurisdiction for the interpretation and enforcement of code requirements for construction of projects.

1.3 CODES:

All Contractors shall comply with all applicable codes, ordinances and regulations in effect at the time of bid openings.

Approved State Building Codes:

The following approved building codes and standards have been adopted by State Buildings Programs (SBP) as the minimum requirements to be applied to all state-owned buildings and physical facilities including capital construction and controlled maintenance construction projects.

The 2009 edition of the International Building Code (IBC)
(as adopted by the Colorado State Buildings and Real Estate Programs as follows: Chapters 2-35 and Appendices C and I)

The 2009 edition of the International Fire Code (IFC)

The 2009 edition of the International Mechanical Code (IMC)
(as adopted by the Colorado State Buildings and Real Estate Programs as follows: Chapters 2-15 and Appendix A)

The 2009 edition of the International Energy Conservation Code (IECC)
(as adopted by the Colorado State Buildings and Real Estate Programs)

The 2008 edition of the National Electrical Code (NEC)
(National Fire Protection Association Standard 70) (as adopted by the Colorado State Electrical Board)

The 2009 edition of the International Plumbing Code (IPC)
(as adopted by the Colorado Examining Board of Plumbers as follows: Chapter 1 Section 101.2,102, Chapters 2-13 and Appendices B, D, E, F and G)

The 2009 edition of the International Fuel Gas Code (IFGC)
(as adopted by the Colorado Examining Board of Plumbers as follows: Chapter 1 Section 101,102, Chapters 2-8 and Appendices A, B, C and D)

The National Fire Protection Association Standards (NFPA)
(as adopted by the Department of Public Safety/Division of Fire Safety as follows with editions shown in parentheses: NFPA-1 (2005), 10 (2000), 11 (1998), 11A (1999), 12 (2000), 12A (1997), 13 (2002), 13D (2002), 13R (2002), 14 (2000), 15 (1996), 16 (1999), 17 (1998), 17A (1998), 20 (1999), 22 (1998), 24 (1995), 25 (2002), 72 (2002), 85 (2004), 101 (2003), 231D (1998), 409 (1995), 423 (1999), 705 (1997), 2001 (2000) and 5000 (2006). Also NFPA 4-5.

The 2010 edition of the ASME Boiler and Pressure Vessel Code
(as adopted by the Department of Labor and Employment/Boiler Inspection Section as follows: sections I, IV, V, VIII-Divisions 1 and 2 and 3, 1X, X including the 2011 addenda and B31.1, 2010 edition)

The 2011 edition of the National Boiler Inspection Code (NBIC)
(as adopted by the Department of Labor and Employment/Boiler Inspection Section)

The 2009 edition of the Controls and Safety Devices for Automatically Fired Boilers CSD-1
(as adopted by the Department of Labor and Employment/Boiler Inspection Section)

The 2007 edition of the Boiler and Combustion Systems Hazards Code, NFPA 85
(as adopted by the Department of Labor and Employment/Boiler Inspection Section)

The 2005 edition ASME A17.3 Safety Code for Existing Elevators and Escalators

The 2005 edition of ASME A18.1 Safety Standard for Platform Lifts and Stairway Chairlifts Exhibit A
(as adopted by the Department of Labor and Employment/Conveyance Section and as amended by ASME International)

The 2003 edition of ICC/ANSI A117.1, Accessible and Usable Buildings and Facilities
(as adopted by the Colorado General Assembly as follows: CRS 9-5-101, as amended, for accessible housing)

Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG).

Note: Additional codes, standards and appendices may be adopted by the state agencies and institutions in addition to the minimum codes and standards herein adopted by State Buildings Programs.

The 2009 edition of the IBC became effective on July 1 of 2010. Consult the state electrical and plumbing boards and the state boiler inspector and conveyance administrator and the Division of Fire Safety for adoption of current editions and amendments to their codes.

Projects should be designed and plans and specifications should be reviewed based upon the approved codes at the time of A/E contract execution. If an agency prefers to design to a

different code such as a newer edition of a code that State Buildings Programs has not yet adopted, the agency must contact SBP for approval and then amend the A/E contract with a revised Exhibit D, Approved State Building Codes. Please note that the state plumbing and electrical boards enforce the editions of their codes that are in effect at the time of permitting not design.

The state's code review agents, or the State Buildings Programs approved agency building official, shall review all documents for compliance with the codes stipulated herein. Note: The Department of Public Health and Environment, Division of Consumer Protection will review drawings for food service related projects.

This policy does not prohibit the application of various life safety codes as established by each agency for specific building types and funding requirements. NFPA 101 and other standards notwithstanding, approved codes will supersede where their minimum requirements are the most restrictive in specific situations. If a conflict arises, contact State Buildings Programs for resolution.

It is anticipated that compliance with the federal Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) and Colorado Revised Statutes Section 9-5-101 will be met by compliance with the 2009 International Building Code and ICC/ANSI A117.1. However, each project may have unique aspects that may require individual attention to these legislated mandates.

The 2006 edition of the International Building Code (IBC) is to be applied to factory-built nonresidential structures as established by the Division of Housing within the Department of Local Affairs.

Appendices: Appendices are provided to supplement the basic provisions of the codes. Approved IBC Appendices are as follows:

Mandatory:

IBC Appendix Chapter C - Agricultural Buildings.
IBC Appendix Chapter I - Patio Covers.

Optional: Any non-mandatory appendix published in the International Building Code may be utilized at the discretion of the agency. Use of an appendix shall be indicated in the project code approach.

Amendments: None.

Referenced Codes: While not adopted in entirety, portions of the following codes are referenced in the International Building Code (IBC), the International Mechanical Code (IMC), the International Energy Conservation Code (IECC) the International Plumbing Code (IPC), and the International Fuel Gas Code (IFGC). These following codes would be applied as reference standards.

2009 International Fire Code (IFC).
2009 International Existing Building Code (IEBC).

In case of a conflict between references applicable codes, the one having the more stringent requirements shall govern. Where governing codes indicate that the drawings or specifications do not comply with the minimum requirements of the codes, the Contractor shall be responsible for providing an installation, which will comply with code requirements. Drawings and specifications shall be followed where they are superior to code requirements.

1.4 OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA):

The Contractor shall have sole responsibility for compliance on the job site to all applicable portions of the Occupational Safety and Health Act. The Contractor is responsible for other regulatory requirements as they relate to occupational Health and Safety requirements. For example, NIOSH, ANSI, and MSA.

Protection of life, health and public welfare as it relates to the execution of the construction contract is the responsibility of the Contractor. The Owner's Representative may, at their discretion, observe, inspect, or comment on plans, procedures, or actions employed at the project as they relate to safety of life, health or public welfare. If conditions are imposed by the Owner which interfere with, or imply actions detrimental to safety, written notice shall be returned to the Owner for action prior to affecting any unsafe conditions.

Contractors shall use OSHA Lock Out/Tag Out procedures when working with energized equipment.

All Contractors entering confined spaces owned by the University of Colorado or while conducting work under contract with University of Colorado shall develop a written program and utilize procedures that, at a minimum, comply with all federal, state and local confined space standards and all applicable regulatory requirements. Contractors shall, independent of the University, monitor the space to obtain their own data to ensure a safe entry and exit. Any data generated by a Contractor's confined space entry, should be provided to the Facilities Management confined Space Program Manager.

When Contractors perform work that may involve Facilities Management controlled permit required confined spaces, Facilities Management will:

Inform Contractors of permit required confined spaces and that entry is allowed only after compliance with the confined space entry standard;

Require Contractors planning to enter a confined space to provide the Facilities Management Confined Space Program Manager in charge of that space, 48-hour advance notice of such planned entry. The Contractor's entry will be in accordance with the current Occupational Safety and Health Administration confined space entry standard and a signed document stating such, shall be provided to the FM Confined Space Program Manager prior to entry.

The FM Confined Space Program Manager, following receipt of notice of contractor planned entry, will:

Apprise Contractor of the hazards identified in the confined space and of any prior experience that is documented on the space;

Appraise the Contractor of any precautions or procedures that the University of Colorado has implemented for the protection of workers in or near the confined space;

Coordinate entry operations with the contractor when both Facilities Management and Contractor personnel are working in or around the confined space;

Debrief the Contractor at the end of the entry operations regarding hazards confronted or created.

1.5 HOT WORK PERMITS:

All Contractors shall be required to obtained a Hot Work Permit, three (3) working days in advance, for work that involves welding, heat treating, grinding, thawing pipe, hot riveting, soldering and brazing, power driven fasteners and similar activities involving spark, flame or heat. Compliance with the requirements of the applicable fire code, the International Building Code, and NFPA Standard 51B are mandatory and all Contractors performing hot work activities shall read and understand these code requirements. To obtain a current Hot Work Permit, go to website:

http://www.colorado.edu/facilitiesmanagement/safety/#hotwork

Contractors shall read and comply with the procedures and requirements for Fire Watch, Fire Alarm Interruption and Fire Suppression Interruption as found on the following websites:

Fire Watch Procedures:
http://www.colorado.edu/facilitiesmanagement/pdc/safety/documents/firewatch.pdf

Fire Alarm and Detection System Interruption/Outage:
http://www.colorado.edu/facilitiesmanagement/pdc/safety/documents/FireAlarm_Detection.pdf

Fire Suppression System Interruption/Outage:
http://www.colorado.edu/facilitiesmanagement/pdc/safety/documents/fire_suppresssion_systems.pdf

No hot work shall be conducted in any campus facility without a hot work permit. Any person or firm who conducts hot work without a permit shall be fined one thousand dollars ($1,000) for each occurrence and their non-permitted activities shall be stopped immediately until they obtain a hot work permit. Contractor shall be responsible for any damages caused as a result of improper hot work activities or the work stoppage.

Individuals or firms who obtain a permit shall fully read, understand and implement the requirements of the permit. Any person or firm who conducts hot work without the full implementation of the permit requirements shall be fined five hundred dollars ($500) the first time and one thousand dollars ($1,000) for subsequent occurrences. When the requirements of the hot work permit are not being implemented, the improper activities shall be stopped immediately until a hot work permit is obtained. Contractor shall be responsible for any damages caused as a result of improper hot work activities or the work stoppage. Any contractor who is found to be in non-compliance a third time, will not be allowed to work on campus until further notice by Facilities Management.

The campus inspectors, project managers and fire marshal shall have the authority to stop improper or non-permitted hot work activities.

The Contractor shall notify the University of Colorado Fire Alarm Supervisor to deactivate all smoke alarms in the vicinity of the work prior to any demolition and construction work activity. Failure of the Contractor to comply with the smoke alarm deactivation requirement and cause a false alarm and arrival of the Boulder Fire Department shall be a $400 fine per occurrence.

1.6 PERMITS:

The Contractor must obtain a no fee building permit prior to starting work from Office Manager, Facilities Management at (303) 492-2904 in the Design and Construction Office, Research Laboratory No. 2, 1540 30th Street, Boulder, Colorado. Building permits are required on all projects except those work items specifically exempted by Section 105 of IBC.

The Contractor must post the permit(s) in a prominent location at the jobsite including all inspection reports. The contractor shall have an updated set of contract documents available at the jobsite for all inspections.

1.7 INSPECTIONS:

The Contractor must schedule all required inspections 48 hours in advance by calling (303) 492-2922. The University of Colorado or their designated inspectors will complete these inspections within 48 hours with the exception of weekends and state holidays.

The Contractor is required to arrange for the following inspections:

Required Inspections, General: Reinforcing steel or structural framework of any part of any building of structure shall not be covered or concealed without first obtaining the approval of the building official.

Lath or Gypsum Board Inspection: To be made after lathing and gypsum board, interior and exterior, is in place, but before any plastering is applied or before gypsum board joints and fasteners are taped and finished.

Final Inspection: To be made after finish grading and the building is completed and ready for occupancy.

Special Inspection: Special inspection may be required on special projects and special types of construction.

Re-Inspections: A reinspection fee may be assessed for each inspection or reinspection when such portion of work for which inspection is called is not complete or when corrections called for are not made.

The Contractor will be responsible for all cost related to reinspections and will be billed at a rate of $50.00 per hour for University of Colorado reinspections and at the testing agency bill-out rate for other reinspections.

1.8 UNIVERSITY OF COLORADO SEXUAL HARASSMENT POLICY

Contractors should be aware of and review the University of Colorado at Boulder's policies that prohibit discrimination and harassment on the basis of race, color, national origin, sex, age, disability, creed, religion, sexual orientation or veteran status. These policies are located on the web at: http://www.colorado.edu/odh/. Contractor personnel must adhere to these policies and conduct themselves in a manner that does not discriminate or harass as a result of interacting with an around the University of Colorado faculty, staff and students and visitors.

1.9 FIRE ALARM INTERRUPTION:

Contractor shall contact the University of Colorado Fire Alarm Systems Supervisor at 303-492-0633 prior to all interruptions or shutdowns of fire alarm systems. Interruptions or shutdowns shall be scheduled three (3) working days in advance with the University of Colorado Fire Alarm Systems Shop, University of Colorado Project Manager and building proctor. Contractor shall provide a fire watch as directed by the University of Colorado Fire Alarm Systems Shop during interruption or shutdown.

The Contractor shall be responsible for preventing nuisance alarm due to activities at their work site. Common sources of nuisance alarms are:

Smoke (soldering, welding, cooking, etc.).
Grinding.
Dust (drilling, sweeping, canister vacuums, sand blasting, etc.).
Water leaking (plumbing leaks, overflows).

Water sprayed on or near detectors (pressure washing or cleaning with water).
Popcorn or other food burning in microwaves.
Static electricity (covering or uncovering detectors).
Changing filters on air handling units (dust).
Steam (leaks, pressure pop-offs).
Broken or frozen sprinkler heads.
Sprinkler drain valves turned by mistake.
Vandalism.

Precautions to prevent nuisance alarms are:

During construction projects, treat all buildings, except totally new construction, as though they were occupied buildings with live systems.

Do not assume that all detectors are in plain sight. Contact University personnel for verification.

Maintain dust control measures per UCB Standards:

Maintaining barriers.
Covering air returns.
Asking CU personnel to cap or disable smoke detectors. (Note any capping or disabling of fire safety devices is to be done ONLY by CU personnel, not contractors.)
Avoiding recirculation of dust or smoke through the building air handling system.

Follow campus hot work procedures. Refer to requirements specified above.

Do not expose fire alarm devices to water or extreme temperatures.

Contact Fire Systems Group for any actions that affect fire detection, alarm, and suppression systems.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 01 41 00

SECTION 01 42 16
DEFINITIONS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Definitions of certain terms used in the specifications, and explanations of the language, abbreviations thereof, format and certain conventions used in the specifications and associated Contract Documents.

Limitations of Scope:

The definitions and explanations of this section are not necessarily either complete or exclusive, but are general for the work to the extent such definitions or explanations are not stated more explicitly in other provisions of the Contract Documents.

1.2 DEFINITIONS:

General Requirements: Provisions and requirements of other Division 01 Sections apply to the entire work of the Contract and to other elements of work which are included in the Project.

Indicated: The term "indicated" refers to graphic representations, notes or schedules on the drawings, to other paragraphs or schedules in the specifications, and to similar requirements in the Contract Documents. Where terms such as "shown", "noted", "scheduled" and "specified" are used, it is to help locate the reference, no limitation on location is intended.

Directed: Terms such as "directed", "requested", "authorized", "selected", "approved", "required", "accepted", and "permitted" mean "directed by the Architect", "requested by the Architect", and similar phrases. However, no such implied meaning will be interpreted to extend the Architect's responsibility into the Contractor's area of construction supervision.

Installer: The entity (person or firm) engaged by the Contractor, either as an employee, Subcontractor or lower tier for the performance of a particular construction activity, including installation, erection, application and similar required operations. Installers are required to be experienced in the operations they are engaged to perform.

> The term "experienced", when used with the term "Installer" means having completed a minimum of 5 successful previous projects similar in size and scope to this Project, and being familiar with the precautions required, and having complied with requirements of the authorities having jurisdiction.

Where the specifications require Installer experience or other qualifications, such requirements apply to the firm and not to its employees or individual members. Where firm ownership has changed after the required experience occurred, Architect and Owner reserve the right to consider the ownership change as invalidating the experience requirements.

Specialists: The Specification requires that certain specific construction activities shall be performed by specialists who are recognized experts in the operations to be performed. The specialists must be engaged for those activities, and the assignments are requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.

These requirements shall not be interpreted to conflict with the enforcement of the building codes and similar regulations governing the Work. They are also not intended to interfere with local trade union jurisdictional settlements and similar conventions.

Trades: The use of certain titles such as "carpentry" is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter". It also does not imply that the requirements specified apply exclusively to tradepersons of that corresponding generic name.

Project Site: The space available to the Contractor for the performance of the Work, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the project site is shown on the drawings, and may or may not be identical with the description of the land upon which the project is to be built.

Testing Agency or Laboratory: An independent entity engaged to perform specific inspections or tests of the work, either at the project site or elsewhere; and to report on, and if required, interpret the results of those inspections or tests.

Approve: Where used in conjunction with the Architect's action on the Contractor's submittals, applications and requests, is limited to the Architect's responsibilities and duties as specified in the General and Supplementary Conditions. Such approval shall not release the Contractor from responsibility to fulfill requirements of the Contract Documents, unless otherwise provided in the Contract Documents.

Regulation: The term "Regulations" includes laws, statutes, ordinances and lawful orders issued by authorities having jurisdiction, as well as rules, conventions and agreements within the construction industry that control performance of the Work.

Contractor's Option: Where materials, products, systems or methods are specified to be at the Contractor's option, the choice of which material, method, product or system will be used is solely the Contractor's. There will be no change in Contract Sum or Time because of such choice.

Furnish: The term "furnish" is used to mean, "supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, and similar operations".

Install: The term "install" is used to describe operations at the project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations".

Provide: The term "provide" means "to furnish and install, complete and ready for the intended use".

Guarantee: The narrow definition of the term "warranty" is hereby established as applying to both "warranty" and "guarantee" which terms are used interchangeably.

1.3 SPECIFICATION EXPLANATIONS:

Specification Content Conventions:

In certain circumstances language used in specifications and other Contract Documents is of the abbreviated type and include incomplete sentences. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where the full context of the Contract Documents so indicates.

Omissions of words or phrases such as "the Contractor shall," "in conformity therewith," "shall be," "as noted on the Drawings," "a," "the" are intentional. Supply omitted words or phrases by inference in same manner as they are when "NOTE" occurs on Drawings. Supply words "shall be" or "shall" by inference when colon is used within sentences or phrases. Supply words "on the Drawings" by inference when "as indicated" or "as shown" is used with sentences or phrases.

Specification Format:

These specifications have been derived from automated specification systems, and include minor deviations from format and traditional writing forms. Such deviations must be recognized as a normal result of this production technique, and no other meaning will be implied or permitted.

These specifications are organized into Divisions and Sections based on the CSI 50-Division format, generally conforming to CSI "Masterformat 2010" for section titles and numbers.

Imperative Language:

Imperative language is used generally in the specifications. Requirements expressed imperatively are to be performed by the Contractor. At certain locations in the text, for clarity, contrasting subjective language is used to describe the responsibilities which must be fulfilled either indirectly by the Contractor or, when so noted, by others.

1.4 DRAWING SYMBOLS:

Graphic symbols used on the Drawings are those recognized in the construction industry for purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., tenth edition.

Mechanical/Electrical Drawings:

Graphic symbols used on mechanical and electrical Drawings are generally aligned with symbols recommended by ASHRAE. Where appropriate, they are supplemented by more specific symbols recommended by technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to the Architect for clarification before proceeding.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 42 16

SECTION 01 42 19
REFERENCE STANDARDS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

General information and listing of reference standards.

1.2 REFERENCE STANDARDS:

Applicability of Standards:

Except where Contract Documents include more explicit or stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into Contract Documents. Such standards are made a part of the Contract Documents by reference. Individual Sections indicate which codes and standards the Contractor must keep available at the project site for reference.

Conflicting Requirements:

Where compliance with two or more standards is specified, and they establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the Contract Documents indicate otherwise. Refer requirements that are different, but apparently equal, and uncertainties as to which quality level is more stringent to the Architect for a decision before proceeding.

Publication Dates:

Comply with standard in effect as of date of Contract Documents unless a specific revision date is indicated.

Copies of Standards:

Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activities. Copies of applicable standards are not bound with the Contract Documents.

Where copies of standards are needed for proper performance of a recognized construction activity, the Contractor shall obtain copies directly from the publication source.

1.3 ABBREVIATIONS:

Trade Associations, Standards and Abbreviations:

References in the Contract Documents to publications and recommendations, by either acronym, name or abbreviation, include but are not necessarily limited to the following trade associations, technical societies, government agencies, recognized authorities and standards:

AA	Aluminum Association
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AAN	American Association of Nurserymen
AASHTO	American Association of State Highway & Transportation Officials
AATCC	American Association of Textile Chemists & Colorists
ACI	American Concrete Institute
ACIL	American Council of Independent Laboratories
ACPA	American Concrete Pipe Association
ADA	Americans with Disabilities Act
ADC	Air Diffusion Council
AFBMA	Anti-Friction Bearing Manufacturer's Assoc.
AGA	American Gas Association
AHA	American Hardboard Association
AHAM	Association of Home Appliance Manufacturers
AI	The Asphalt Institute
AIA	The American Institute of Architects
A.I.A.	American Insurance Association
AIHA	American Industrial Hygiene Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ALI	Associated Laboratories
ALSC	American Lumber Standards Committee
AMCA	Air Movement & Control Association
ANSI	American National Standards Institute
APA	American Plywood Association
A.P.A.	American Parquet Association
API	American Petroleum Institute
ARI	Air Conditioning and Refrigeration Institute
ARMA	Asphalt Roofing Manufacturer's Association
ASA	Acoustical Society of America
ASC	Adhesive and Sealant Council
ASHRAE	American Society of Heating, Refrigeration & Airconditioning Engineers
ASME	American Society of Mechanical Engineers
ASPE	American Society of Plumbing Engineers
ASSE	American Society of Sanitary Engineering
ASTM	American Society for Testing and Materials
AWI	Architectural Woodwork Institute
AWPA	American Wood Preserver's Association
AWPB	American Wood Preserver's Bureau
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders' Hardware Manufacturer's Association
BIA	Brick Institute of America
BIFMA	Business & Institutional Furniture Manufacturer's Association
BMBL	Biosafety in Microbiological and Biomedical Laboratories, 4th Edition.
CAGI	Compressed Air & Gas Institute
CAUS	Color Association of the United States
CBM	Certified Ballast Manufacturers Association
CDA	Copper Development Association
CE	Corps of Engineers (U.S. Dept. of the Army)
CFR	Code of Federal Regulations
CGA	Compressed Gas Association
CISCA	Ceiling and Interior Systems Contractors Association
CISPI	Cast Iron Soil Pipe Institute

CLFMI	Chain Link Fence Manufacturers Institute
CPSC	Consumer Products Safety Commission
CRI	The Carpet and Rug Institute
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standard (U.S. Dept. of Commerce)
CSI	The Construction Specification Institute
CTI	Ceramic Tile Institute of America
CSSB	Cedar Shake and Shingle Bureau
DHI	Door and Hardware Institute
DLPA	Decorative Laminate Products Association
DOC	Department of Commerce
DOT	Department of Transportation
ECSA	Exchange Carrier's Standards Association
EIA	Electronic Industries Association
EIMA	Exterior Insulation Manufacturer's Association
EJMA	Expansion Joint Manufacturer's Association
EPA	Environmental Protection Agency
ETL	ETL Testing Laboratories, Inc.
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FCI	Fluid Controls Institute
FGMA	Flat Glass Marketing Association
FHA	Federal Housing Administration (U.S. Dept. of HUD)
FM	Factory Mutual Research Organization
FPL	Forest Products Laboratory (U.S. Dept. of Agriculture)
FS	Federal Specification (General Services Admin.)
FTI	Facing Tile Institute
GA	Gypsum Association
GSA	General Services Administration
HEI	Heat Exchange Institute
HI	Hydronics Institute
H.I.	Hydraulic Institute
HMA	Hardwood Manufacturer's Association
HPMA	Hardwood Plywood Manufacturer's Association
HUD	Housing and Urban Development
IBD	Institute of Business Designers
ICBO	International Conference of Building Officials
ICC	International Code Council
ICEA	Insulated Cable Engineer's Association, Inc.
IEC	International Electrotechnical Commission (available from ANSI)
IEEE	Institute of Electrical & Electronic Engineers
IESNA	Illuminating Engineering Society of North America
IGCC	Insulating Glass Certification Council
ILI	Indiana Limestone Institute of America
IMI	International Masonry Institute
IMSA	International Municipal Signal Association
IRI	Industrial Risk Insurers
ISA	Instrument Society of America
LPI	Lightning Protection Institute
MBMA	Metal Building Manufacturer's Association
MCAA	Mechanical Contractors' Association of America
MFMA	Maple Flooring Manufacturer's Association
MIA	Marble Institute of America
MIL	Military Standardization Documents (U.S. Dept. of Defense)
ML/SFA	Metal Lath/Steel Framing Association
MRCA	Midwest Roofing Contractors' Association

MSS	Manufacturer's Standardization Society of the Valve & Fitting Industry
NAAMM	The National Association of Architectural Metal Manufacturers
NAPA	National Asphalt Pavement Association
NAPF	National Association of Plastic Fabricators (Now DLPA)
NBGQA	National Building Granite Quarries Association
NBHA	National Builders Hardware Association (Now DHI)
NBS	National Bureau of Standards (U.S. Dept. of Commerce)
NCMA	National Concrete Masonry Association
NCRPM	National Council on Radiation Protection and Measurement
NEC	National Electrical Code by NFPA
NECA	National Electrical Contractors Association
NEII	National Elevator Industry, Inc.
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
N.F.P.A.	National Forests Products Association
NHLA	National Hardwood Lumber Association
NIST	National Institute of Standards and Technology
NKCA	National Kitchen Cabinet Association
NLGA	National Lumber Grades Authority
NOFMA	National Oak Flooring Manufacturers Association
NPA	National Particleboard Association
NPCA	National Paint & Coating Association
NRCA	National Roofing Contractor's Association
NSF	National Sanitation Foundation
NSPE	National Society of Professional Engineers
NSSEA	National School Supply & Equipment Association
NTMA	The National Terrazzo and Mosaic Assoc.
NWMA	National Woodwork Manufacturers Association (Now NWWDA)
NWWDA	National Wood Window & Door Association (formerly NWMA)
OSHA	Occupational Safety & Health Administration
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
PDI	Plumbing & Drainage Institute
PEI	Porcelain Enamel Institute
PS	Product Standard of NBS (U.S. Dept. of Commerce)
RFCI	Resilient Floor Covering Institute
RIC	Roof Insulation Committee
RIS	Redwood Inspection Service
RMA	Rubber Manufacturer's Association
SAMA	Scientific Apparatus Makers Association
SDI	Steel Deck Institute
S.D.I.	Steel Door Institute
SGCC	Safety Glazing Certification Council
SIGMA	Sealed Insulating Glass Manufacturer's Assoc.
SJI	Steel Joist Institute
SMACNA	Sheet Metal & Air Conditioning Contractor's Nat'l. Assoc.
SPIB	Southern Pine Inspection Bureau
SPRI	Single Ply Roofing Institute
SSPC	Steel Structures Painting Council
SSPMA	Sump and Sewage Pump Manfacturers Association
SWI	Steel Window Institute
SWPA	Submersible Wastewater Pump Association
TCA	Tile Council of America, Inc.
TIA	Telecommunication Industry Association
TIMA	Thermal Insulation Manufacturer's Association
TPI	Truss Plate Institute

UBC	Uniform Building Code
UL	Underwriters' Laboratories
USDA	United States Department of Agriculture
USPS	United States Postal Service
WCLIB	West Coast Lumber Inspection Bureau
WCMA	Wall Covering Manufacturer's Association
WIC	Woodwork Institute of California
WRI	Wire Reinforcing Institute
WSC	Water Systems Council
WSFI	Wood and Synthetic Flooring Institute
WWPA	Western Wood Products Association (Grading Rules)
W.W.P.A.	Woven Wire Products Association

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 01 42 19

SECTION 01 45 00
QUALITY CONTROL

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-01 Specification sections, apply to this section.

1.1 SUMMARY:

Section Includes:

Administrative and procedural requirements for quality control services.

- Field samples.
- Mock-ups.
- Inspection and testing laboratory services.
- Manufacturer's field services and reports.

Related Sections:

- Inspections, testing and approvals required by public authorities: General Conditions
- Cutting and Patching: Section 01 73 29
- Reference Standards: Section 01 42 19
- Pre-Construction Conferences: Section 01 31 19
- Submittals: Section 01 33 00
- Test Report Submittal: Section 01 33 00
- Project Record Documents: Section 01 78 39
- General Commissioning Requirements: Section 01 91 13.
- Subsurface Exploration: Section 02 32 00
- Inspections and tests required and standards for testing: Individual Specification sections
- Testing, adjusting and balancing of mechanical systems: Division 23 sections.
- Electrical system tests: Division 26 sections.
- Communication system tests: Division 27 sections.

1.2 REFERENCES:

ASTM D3740, "Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction".

ASTM E329, "Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction".

Should specified reference standards conflict with the Contract Documents, request clarification from the Architect before proceeding.

1.3 DEFINITIONS:

Quality control services include inspections and tests, and related actions including reports, performed by independent agencies, governing authorities, and Contractor. Contract enforcement activities performed by the Architect are not included.

Inspection and testing services required to verify compliance with requirements specified do not relieve the Contractor of responsibility for compliance with Contract Document requirements.

Requirements of this Section relate to customized fabrication and installation procedures and not production of standard products.

Specific quality control requirements, inspections and tests, covering production, customized fabrication and installation procedures of standard products are specified in the individual sections.

Inspections, tests and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Documents.

Requirements for the Contractor to provide quality control services required by the Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.4 RESPONSIBILITIES:

Contractor Responsibilities:

Provide independent inspections, tests and similar services specified in individual specification sections and required by governing authorities, except where they are indicated to be Owner's responsibility, or are provided by another entity. These services include those specified to be performed by an independent agency and not by the Contractor. Costs for these services shall be included in the Contract Sum.

Retesting:

The Contractor is responsible for retesting where results of required inspections, tests or similar services prove unsatisfactory and do not meet specified requirements, regardless of whether the original test was the Contractor's responsibility.

Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility regardless of the results, where required tests were performed on original construction.

Limitations:

Where manufactured products or equipment are required to have representative samples tested, do not use such materials or equipment until tests have been made and the materials or equipment found to be acceptable. Do not incorporate in the work any product which becomes unfit for use after acceptance.

Associated Services:

The Contractor shall cooperate with Owner or other agencies performing required inspections, tests and similar services and provide reasonable associated services as requested. Notify the agency sufficiently in advance of operations to allow for completion of initial tests and to permit proper assignment of personnel. Associated services required include:

Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.

Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.

Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.

Providing adequate facilities for safe storage and proper curing of concrete test cylinders on the project site for the first 24 hours after casting as required by ASTM C31.

Providing the agency with a preliminary design mix proposed for use for material mixes that require control by the testing agency.

Security and protection of samples and test equipment at the project site.

Contractor shall notify the testing agency sufficiently in advance of cancellation of required testing operations. The Contractor shall assume responsibility for costs incurred due to the failure to provide such notice.

Supplemental Testing:

If required, the following testing shall be performed at the expense of the contractor installing the material being tested:

Material Substitution: Any tests of basic material or fabrication equipment offered as a substitute for specified item on which a test may be required in order to prove its compliance with the specifications.

Mechanical/Electrical: Tests on mechanical and electrical systems required to ensure their proper installation and operation.

Any test that fails shall be paid for by the installing contractor subject to the following conditions:

Quantity and nature of tests will be determined by the Architect.

All test shall be done in the presence of the Owner or his representative.

Proof of noncompliance will make the installing Contractor liable for any corrective action which the Owner feels is prudent including complete removal and replacement of defective material.

Nothing contained herein is intended to imply that the installing contractor does not have the right to have tests performed on any material at any time for his own information and job control so long as the Consultant or Owner does not assume responsibility for costs or for giving them consideration when appraising quality of materials.

The Architect will determine the type and number of tests to be performed on the project.

Owner Responsibilities:

The Owner will provide inspections, tests and similar quality control services specified to be performed by independent agencies and not by the Contractor, except where they are specifically indicated as the Contractor's responsibility or are provided by authorities having jurisdiction or another identified entity. Costs for these services are not included in the Contract Sum.

The Owner will employ and pay for the services of an independent agency, testing laboratory or other qualified firm to perform services which are the Owner's responsibility.

Duties of Testing Agency:

The independent testing agency engaged to perform inspections, sampling and testing of materials shall cooperate with the Architect and Contractor in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.

The agency shall notify the Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.

The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.

The agency shall not perform any duties of the Contractor.

Coordination:

The Contractor and each agency engaged to perform inspections, tests and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

The Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.

Provide not less than 8 working hours of advance notice to the testing and inspection agent prior to time when testing or inspection will be required unless otherwise noted.

1.5 SUBMITTALS:

General:

Refer to Section 01 33 00 for general requirements of submittals. Certified written report of each inspection, test or similar service, will be submitted directly to Architect except to Contractor with copy to Architect where service is Contractor's responsibility. Submit additional copies directly to governing authorities where requested by authority.

Report Data:

Written reports of each inspection, test or similar service shall include, but not be limited to:

- Date of issue.
- Project title and number.
- Dates and locations of samples and tests or inspections.
- Names of individuals making the inspection or test.
- Designation of the work and test method.
- Identification of product and specification section.
- Complete inspection or test data.
- Test results and interpretation of test results.
- Ambient conditions at the time of sample taking and testing.
- Comments or professional opinion as to whether inspected or tested work complies with Contract Document requirements.
- Name and signature of laboratory inspector.
- Recommendations on retesting.
- Reference retesting reports back to original test report.

1.6 QUALITY CONTROL SYSTEM:

General: The contractor shall establish a quality control system to perform sufficient inspection and tests of all items of work, including that of all subcontractors, to ensure conformance to the Contract Documents for materials, workmanship, construction, finish, functional performance and identification. This control shall be established for all construction except where the Contract Documents provide for specific compliance tests by testing laboratories or Consultants employed by the Owner.

The quality control system is the means by which the Contractor assures that construction complies with the requirements of the Contract Documents. Controls shall be adequate to cover all construction operations and should be keyed to the proposed construction schedule.

The Contractor shall designate a quality control representative on staff to review the work to ensure compliance with the Contract Documents by weekly jobsite visits for observation. The designated employee shall not be involved in the performance of the work. The quality control representative shall review the work and make necessary corrections to bring the work into compliance prior to scheduling the Architect for the final punchlist review.

Records: The Contractor shall maintain correct records on an appropriate form for all inspections and tests performed, instruction received from the Owner and actions taken as a result of those instructions. These records shall include evidence that the required inspections or tests have been performed (including type and number of inspections or tests, nature of defects, causes for rejection, etc.) proposed or directed remedial action, and corrective action taken. The Contractor shall document inspections and tests as required by each Section of the Specifications.

1.7 QUALITY ASSURANCE:

Qualification of Service Agencies:

Engage inspection and test service agencies, including independent testing laboratories, which are prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by American Council of Independent Laboratories, which are recognized in the industry as specialized in the types of inspections and tests to be performed and which have not less than 5 years experience in such testing.

Comply with requirements of ASTM E329 and ASTM D3740.

Each inspection and testing agency shall be authorized to operate in the State of Colorado.

Maintain a full time registered engineer on staff to review services.

Calibrate testing equipment at reasonable intervals with devices of an accuracy traceable to National Institute for Standards and Technology or of accepted values of natural physical constants.

Control of Installation:

Monitor quality control over products, services, site conditions, and workmanship to produce work of specified quality.

Comply fully with manufacturers' instructions, including each step in sequence.

Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

Comply with specified standards as a minimum quality for the work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

Perform work by persons qualified to produce workmanship of specified quality.

1.8 CONTRACTOR'S QUALITY CONTROL SYSTEM:

Establish a quality control system and perform sufficient inspection and tests of all items of work, including that of his Subcontractors, to ensure conformance to the Contract Documents for materials, workmanship, construction, finish, functional performance and identification. Contractor's quality control system is the means by which he assures himself that his construction complies with the requirements of the Contract Documents. Controls shall be adequate to cover all construction operations.

1.9 SPECIAL TESTS AND INSPECTIONS:

Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of the Owner, and as follows:

Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.

Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.

Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.

Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.

Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.

Retesting and reinspecting corrected work.

1.10 MOCK-UP AND FIELD SAMPLES:

Install mock-up and field samples for review at the site as required by individual specification sections.

Assemble and erect specified items, with specified or required attachment and anchorage devices, flashings, seals, and finishes.

Maintain mock-up as a representation of quality level for the work until accepted by Architect.

Remove mock-up and clear area when no longer required and when authorized by Architect.

1.11 INSPECTION AND TESTING LABORATORY SERVICES:

Perform inspections, tests and other services specified in individual specification sections.

Submit reports indicating observations and results of tests indicating compliance or non-compliance with Contract Documents.

1.12 MANUFACTURER'S FIELD SERVICES:

When specified in respective Specification sections, Contractor shall require supplier or manufacturer to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, testing, adjusting and balancing of equipment as applicable, and to make appropriate recommendations.

Manufacturer's representative shall submit written report to Architect listing observations and recommendations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION:

General:

Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for "Cutting and Patching".

Protect construction exposed by or for quality control service activities, and protect repaired construction.

Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

3.2 SCHEDULE OF INSPECTIONS AND TESTS:

The following is a summary of tests and inspections specified in the appropriate sections and compiled here for convenience of reference.

Testing Paid By Owner:

Commissioning agent: Section 01 91 13.
Concrete testing: Section 03 30 00.
Firestopping: Section 07 84 00.

Testing Paid By Contractor:

Field testing of laboratory fume hoods: Section 11 53 13.
Air testing and commissioning of environmental chambers: Section 13 21 33.
Fire protection system testing: Division 21 sections.
Plumbing systems testing: Division 22 sections.
Mechanical systems balancing and testing: Division 23 sections.
Electrical systems testing: Division 26 sections.
Communications system testing: Division 27 sections.
Electronic safety and security systems testing: Division 28 sections.

END OF SECTION 01 45 00

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary General Conditions and other Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Minimum requirements for temporary services, utilities and facilities. Nothing in this section is intended to limit types and amounts of temporary work required, and no omission from this section will be recognized as an indication by Architect that such temporary activity is not required for successful completion of the work. The use of alternative facilities equivalent to those specified is the Contractor's option, subject to Architect's acceptance.

Except as otherwise indicated, the costs of providing and using temporary utility services are included in the Contract Sum.

Related Sections:

Indoor Air Quality Requirements: Section 01 81 19

1.2 QUALITY ASSURANCE:

Standards:

Comply with governing regulations, industry standards and utility company regulations and recommendations including, but not necessarily limited to, code compliances, permits, inspections, testing, and health, safety, fire, pollution and environmental compliances.

Comply with NFPA Code 241 "Building Construction and Demolition Operations", ANSI A10 Series and NECA Electrical Design Library "Temporary Electrical Facilities".

Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", prepared jointly by AGC and ASC, for industry recommendations.

Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).

Temporary Utilities:

Install temporary service by connecting to existing service.

Arrange with existing users for a time when service can be interrupted, where necessary, to make connections for temporary services. See Section 01 10 00 for scheduling requirements.

1.3 PROJECT CONDITIONS:

Scheduled Uses:

Provide temporary facilities and services at the time first needed at the site; and maintain, expand and modify the facilities as needed throughout the construction period and do not remove until no longer needed. At the earliest feasible time, and when acceptable to the Owner, change over from the use of temporary utility service to permanent service.

Temporary Use of Permanent Facilities:

Regardless of assigned responsibility for initial installation of a temporary facility, the primary Installer of the corresponding permanent facility shall assume responsibility for its operation, maintenance and protection during use as a temporary facility prior to the Owner's acceptance and assumed operation of the facility.

Conditions of Use:

Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT:

Provide either new or used materials and equipment for temporary facilities, which are in substantially undamaged and serviceable condition. Provide types and qualities which are recognized in the construction industry as suitable for the intended use in each application.

Comply with the requirements of Section 06100 for temporary facilities using carpentry materials.

PART 3 - EXECUTION

3.1 GENERAL:

Use qualified workers for the installation of temporary facilities. Locate facilities where they will serve the Project adequately, and result in minimum interference with performance of the work. Locate field offices within approved staging area.

3.2 TEMPORARY FACILITIES BY CONTRACTOR:

Use of Site:

See Section 01 10 00 for additional information and limitation on staging areas, parking and similar items.

The Contractor shall limit his use of the premises to the work areas indicated, so as to allow for Owner occupancy and use by the public.

Confine operations to areas within Contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.

Field Offices:

Provide insulated, weathertight temporary offices of sufficient size to accommodate required office personnel at the Project site. Keep the office clean and orderly for use for small progress meetings.

Storage and Fabrication Facilities: (For Work not Subcontracted)

Install individual trailers or sheds as required to accommodate the work; sized, furnished and equipped properly including temporary utilities as needed. Locate on site in an orderly manner as determined by Owner.

Locate only within approved staging area in an orderly manner as determined by the Owner.

Spaces within the building may be used for these purposes provided permanent construction elements are adequately protected subject to the approval of the Owner.

Sanitary Facilities:

Toilets: Use of the Owner's existing facilities within or immediately adjacent to the work area is permitted, so long as they are properly cleaned and maintained in a condition acceptable to the Owner, and provided they are fully restored to the condition of initial use by the Contractor at the time of substantial completion.

Contractor may obtain water from these locations.

Drinking water is available from drinking fountains within the existing building.

Temporary Telephones:

Provide temporary telephone service for Contractor's field office throughout the construction period. Pay for service. If a mobile phone is designated as the field office phone, then it shall be a local phone number.

Contractor shall include as part of his telephone system a telephone answering machine, a separate voice-data telephone line and a facsimile machine with adequate paper supply.

The Owner will not provide internet access or access to the Owner's LAN. Include DSL internet access and active, site-specific e-mail address and required computer equipment.

Thermometer:

Install an official project outdoor thermometer, in a shaded-from-the-sun, conveniently readable location, which will give reasonably accurate readings of the actual temperatures, and which can be reached easily for resetting. Instrument: Re-settable type indicating daily maximum and minimum temperatures. Keep a permanent daily log of those readings.

Temporary Enclosure:

Provide temporary enclosure for protection of construction in progress and completed from exposure, foul weather, other construction operations and similar activities.

Provide temporary enclosure wherever permanent building enclosure is not yet completed.

Coordinate temporary enclosures with ventilating and material drying or curing requirements to avoid dangerous conditions and deleterious effects.

Close openings through floor or roof decks and horizontal surfaces with load-bearing construction or otherwise protect per codes.

Hoists and Temporary Elevator Use:

Provide facilities for hoisting materials. The selection of type, size and number of hoisting facilities for temporary use at the project site is the Contractor's responsibility.

Permanent elevator designated by the Owner may be used by the Contractor at no charge for transporting personnel, small tools, materials, and equipment, provided as follows:

All car walls are lined with protective blankets;

Door jambs are protected with temporary cardboard;

Total load carried does not exceed rated capacity of elevator;

No materials, equipment, trash, tools or other items too large to be readily moved into and out of the car be carried in the elevator;

Use is coordinated with the Owner;

Special deliveries are scheduled in advance;

No locking out elevator to the general public without prior approval.

Barricades, Warning Signs and Lights: (For Work not Subcontracted)

Comply with recognized standards and code requirements for the erection of substantial and structurally adequate barricades wherever needed to prevent accidents and losses.

Paint with appropriate colors, graphics and warning signs to inform personnel at the site and the general public where exposure exists of the hazard being protected. Provide lighting where appropriate and needed for recognition of the facility, including flashing red or amber lights where appropriate.

Temporary Partitions:

Provide temporary partitions and ceilings as required to separate work areas from Owner occupied areas, to prevent penetration of dust and moisture into Owner occupied areas, to prevent damage to existing areas and equipment and to protect the occupants of the building and the general public from injury due to the work of this project.

Construction: Framing and sheet materials with closed joints and sealed edges at intersections with existing surfaces.

Construction: 0.5" minimum Type X gypsum board on public face and 0.5" minimum plywood on construction side face attached to 2 x 4 wood studs or 25 gage steel studs at 24" o.c.
STC rating 35 in accordance with ASTM E90.
Flame Spread Rating of 25 in accordance with ASTM E84.
Paint surfaces exposed to view in Owner occupied areas.

Enclosure Fence:

Install fence to enclose the area to be used by the Contractor as a staging area. Provide open mesh galvanized fencing as acceptable to Architect, 6 ft. height.

Gates: Provide where required. Keep gates closed and locked after working hours.

At time staging area is dismantled, remove fences form the site. Patch paving which was damaged by fence posts after removal.

See Section 01 10 00 regarding restrictions on use of site.

Heating During Construction:

Provide temporary heat required by construction activities, for curing or drying of completed installations or protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.

Provide temporary heat as necessary to heat enclosed spaces to the temperatures described below:

Except as otherwise specified, maintain a minimum temperature of 50°, and a maximum temperature of 85°. At all times during the placing, setting, and curing of plaster, drywall and ceramic tile, provide sufficient heat to produce a uniform temperature in the spaces involved of not less than 55°. Before, during and through the placing of wood finish and the application of other interior finishing, varnishing, painting, etc., and until final acceptance of the work, provide sufficient heat to produce a temperature of not less than 60°.

Include power and operating costs for temporary equipment.

Use existing building systems as required. Costs for power, steam and natural gas associated with use of existing building systems will be paid by the Owner.

Heating Facilities: Except where use of the permanent system is authorized, provide vented self-contained LP gas or fuel oil heaters with individual space thermostatic control.

Use of gasoline-burning space heaters, open flame, or salamander type heating units is prohibited.

Ventilation: Provide such temporary ventilation as may be required to prevent hazardous accumulation of fumes, remove excess humidity, ventilate sanitary facilities and storage spaces for volatile and hazardous materials.

Miscellaneous Facilities:

Provide built-in ladders, ramps or temporary stairs for access to all levels of the construction for general access by all trades. Individual contractors and subcontractors will furnish their own stepladders, scaffolds, staging, work platforms and other facilities for use of their workers and as necessary to the expeditious completion of their work. Provide waste chutes as required by applicable laws and regulations.

Temporary Fire Protection:

Until fire protection needs are supplied by permanent facilities, install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers", and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations".

Locate fire extinguishers where convenient and effective for their intended purpose, but not less than two extinguishers on each floor in areas where work is being performed.

Store combustible materials in containers in fire-safe locations.

Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.

Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.

Protection of Work:

The Contractor shall obtain the advice and recommendations of his installers for procedures to protect their work. Installers are responsible for protecting their work and that of other trades while working at the jobsite or in an area thereof. When the Installer is no longer working in the area or at the job, the Contractor shall provide protective measures and materials to assure that each element will be without damage or deterioration (other than normal weathering for exterior exposed materials) throughout the remainder of the construction period up to the date of the Notice of Acceptance. Remove protective coverings and materials at the appropriate time but no later than final cleaning operations.

Provide protective coverings at walls, projections, jambs, sills, and soffits of openings. Protect finished floors and stairs from traffic, movement of heavy objects, and storage.

Prohibit traffic and storage on roofed surfaces, on lawn and landscaped areas.

Always protect excavation, trenches, and building from damage from rain water, spring water, ground water, backing up of drains or sewers. Provide pumps, equipment, enclosures, to provide this protection.

Security:

Provide security program and facilities to protect Work from unauthorized entry, vandalism, and theft. Coordinate with Owner's security program.

Install substantial temporary enclosure of partially completed areas of construction. Provide self-closing, locking entrance to prevent unauthorized entrance, vandalism, theft and similar violations of security.

Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup.

Environmental Protection:

Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

3.3 TEMPORARY FACILITIES BY APPROPRIATE SUBCONTRACTOR:

Water Service: (by Plumbing)

Install water service and distribution piping, of sizes and pressures adequate for construction until permanent water service is in use. Users will provide their own hoses at valved outlet points.

Obtain water services from existing building service as designated by the Owner.

Water costs will be paid by the Owner.

Temporary Fire Protection: (by Fire Protection for Sprinklers).

Maintain existing fire protection system in operating condition during the work.

Heat and Ventilation:

Mechanical Installer shall maintain permanent systems and equipment, clean, adjust, put in new condition before building occupancy as specified in Division 15.

Light and Power: (by Electrical)

Provide a weatherproof, grounded, electric power distribution system of sufficient size, capacity and power characteristics to accommodate all activities during construction period. Include overload protected disconnects, automatic ground fault interrupters and main distribution switch gear.

Extend from existing building panels. Power consumption shall not disrupt Owner's need for continuous service. Provide power outlets for construction operations, branch wiring, distribution boxes and flexible power cords as required.

Provide the following services:

Sufficient 220v outlets for special tools, welding equipment and similar devices requiring such service at locations where required.

Sufficient circuits and duplex 120v single phase outlets so located that any part of the work can be reached with a 75 ft. extension cord to accommodate normal power tools and supplemental lighting.

Temporary light to levels and as required by governing regulations but not less than minimum 5 footcandle illumination in all areas accessible to workers during hours they are at the job; minimum 10 footcandles for shop areas; 20 footcandles or more where detailed or finishing work is being done, supplemented as may be required.

Provide additional exterior and interior lighting as required for warning, public safety, and project security.

Contractor and each Subcontractor furnishes his own extension cords for power as required by him. Electric Utility power charges will be paid by the Owner.

Where permanent light fixtures have been used for temporary lighting, supply temporary lamps and replace with new lamps prior to final inspection.

3.4 FACILITIES BY SUBCONTRACTORS REQUIRING THEM:

Storage and Fabrication Facilities:

Install individual trailers or sheds as required to accommodate the work; sized, furnished and equipped properly including temporary utilities as needed.

Sizes, quantities and locations are under control of the Contractor.

Locate only within approved staging area in an orderly manner as determined by the Owner.

Spaces within the building may be used when approved by the Contractor, provided permanent construction elements are adequately protected subject to the approval of the Owner.

Barricades, Warning Signs and Lights:

Comply with recognized standards and code requirements for the erection of substantial and structurally adequate barricades wherever needed to prevent accidents and losses.

Paint with appropriate colors, graphics and warning signs to inform personnel at the site and the general public where exposure exists of the hazard being protected. Provide lighting where appropriate and needed for recognition of the facility, including flashing red or amber lights where appropriate.

3.5 OPERATIONS AND TERMINATIONS:

Supervision:

Enforce strict discipline in the use of temporary facilities at the project site. Limit availability of temporary facilities to essential and intended uses, so as to minimize waste and possibility of abuses and the resulting unsanitary and hazardous or dangerous conditions.

Janitorial Services:

Provide daily janitorial services for temporary offices, toilets, wash facilities, and similar areas at the project site. Require users of other temporary facilities to maintain clean and orderly premises.

Maintenance:

Installing entity shall maintain temporary facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.

Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation and similar facilities on a 24-hour day basis where required to achieve indicated results and to avoid possibility of damage.

Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

Termination and Removal:

At the time the need has ended for each temporary facility, or when it has been replaced by authorized use of a permanent facility, or at the time of Substantial Completion, promptly remove the facility unless requested by the Architect to be retained for a longer period of time.

Complete or, if necessary, restore permanent construction that may have been delayed or otherwise affected by the temporary facility. Repair damaged work, clean exposed surfaces and replace construction which cannot be satisfactorily repaired.

Except as otherwise indicated, materials and equipment of temporary facilities remain the property of the installing entity.

END OF SECTION 01 50 00

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification sections apply to work of this section.

1.1 SUMMARY:

Section Includes:

Administrative and procedural requirements for products including:

- Definitions.
- Administrative and procedural requirements for Contractor's selection of products for use in the Project.
- Substitutions of products not specified.
- Environmentally preferable products.
- Transportation.
- Delivery, storage and handling.

Related Sections:

- Substitution Procedures: Section 01 25 00

1.2 DEFINITIONS:

Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties", "systems", "structure", "finishes", "accessories", and similar terms. Such terms are self-explanatory and have well recognized meanings in the construction industry.

Products: Are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "Product" includes the terms "material", "equipment", "system" and terms of similar intent.

Named Products: Are items identified by manufacturer's product name, including make or model designation, indicated in the manufacturer's published product literature, that is current as of the date of the Contract Documents.

Materials: Are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.

Equipment: Is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.

Definitions Pertaining to Sustainable Development: As defined in ASTM E2114.

Bio-Based Materials: As defined in the Farm Security and Rural Investment Act, for purposes of Federal procurement of biobased products, "biobased" means a "commercial or industrial product (other than food or feed) that is composed, in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal and marine materials) or forestry

materials". Biobased materials also include fuels, chemicals, building materials or electric power or heat produced from biomass as defined by The Biomass Research and Development Act of 2000.

Biobased Content: The amount of biobased carbon in the material or product as a percentage of weight (mass) of the total organic carbon in the material or product.

Chain-of-Custody: Process whereby a product or material is maintained under the physical possession or control during its entire life cycle.

Deconstruction: Disassembly of buildings for the purpose of recovering materials.

Recycled Content Materials: Products that contain preconsumer or post-consumer materials as all or part of their feedstock. Recycled content claim shall be consistent with Federal Trade Commission (FTC) Guide for the Use of Environmental Marketing Claims.

Rapidly Renewable Material: Material made from plants that are typically harvested within a ten-year cycle.

Environmentally Preferable Products: Products and services that have a lesser or reduced effect on the environment in comparison to conventional products and services. Refer to EPA's Final Guidance on Environmentally Preferable Purchasing for more information www.epa.gov/epp/pubs/guidance/finalguidancetoc.html.

Sustainability: The maintenance of ecosystem components and functions for future generations.

1.3 QUALITY ASSURANCE:

Source Limitations:

To the fullest extent possible, provide products of the same kind, from a single source.

Nameplates:

Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on the exterior.

Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.

Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface which is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data.

Name of product and manufacturer.
Model and serial number.
Capacity.
Speed.
Ratings.
Power characteristics (if applicable).
UL label or compliance (if applicable).

1.4 PRODUCT LISTING:

Prepare a schedule showing products specified in a tabular form acceptable to the Architect. Include generic names of products required. Include the manufacturer's name and proprietary product names for each item listed.

Coordinate the product list schedule with the Contractor's Construction Schedule and the Schedule of Submittals.

Listing of products having an aggregate value of less than $5,000 is not required.

Form: Prepare the product listing schedule with information on each item tabulated under the following column headings:

Related Specification Section number.
Generic name used in Contract Documents.
Proprietary name, model number and similar designations.
Manufacturer's name and address.
Supplier's name and address.
Installer's name and address.
Projected delivery date, or time span of delivery period.

Initial Submittal:

Within 30 days after date of commencement of the Work, submit 3 copies of an initial product list schedule. Provide a written explanation for omissions of data, and for known variations from Contract requirements.

Completed Schedule:

Within 60 days after date of commencement of the Work, submit 3 copies of the completed product list schedule.

Within 2 weeks of receipt of product-listing schedule, Architect will respond to Contractor in writing, indicating unacceptable selections (if any) together with a brief explanation thereof.

No response within this time period constitutes no objection to the listed product or manufacturers, but does not constitute a waiver of the requirement that products comply with the Contract Documents.

1.5 PRODUCT SELECTION:

When products are specified by ASTM or other reference standards, furnish products conforming to such reference standards.

When products are specified by trade name or manufacturer's name and model number, whether or not reference standards are also specified, furnish those specific proprietary products. Where more than one manufacturer is specified, the Contractor has the option as to which manufacturer's products are to be used.

Where manufacturers are listed as acceptable for specific proprietary products but precise identification by model, series, or trade name is not specified, submit detailed product information for such products for Architect's acceptance prior to ordering. Include specific requirements for modifications to other construction, as specified for substitutions, including power and utility requirements, characteristics, capacities and locations.

See Section 01 42 16 regarding "options".

When terms "or equal", "equal to", "or approved equivalent" and other similar terms are used, provide only the specific product or products specified or approved by written Addendum.

Do not furnish products of manufacturers not specified or not approved in writing except where such products have been specified solely by reference standards. Substitute products proposed must be equivalent in quality, performance and appearance and such equivalence is solely the judgement of the Architect. There is no obligation for the Architect to prove non-equivalence.

Approved substitutions may, because of different size, weight, configuration, power requirements, utility connections or other characteristics, require modifications to other elements of the Work. If such substitutions are used, all such modifications to other elements of the work must be shown by shop drawings or other submittals as appropriate, and approved. The cost of such modifications are solely the Contractor's.

Compatibility of Options:

Compatibility of products is a basic requirement of product selection. When the Contractor is given the option of selecting between two or more products for use on the project, the product selected must be compatible with other products previously selected, even if the products previously selected were also Contractor options. The complete compatibility between the various choices available to the Contractor is not assured by the various requirements of the Contract Documents, but must be provided by the Contractor.

1.6 GENERAL PRODUCT REQUIREMENTS:

Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation. Provide products complete with accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.

It is the responsibility of the Contractor and his Installers, as experts, to notify the Architect of any specified product that to his knowledge will not meet the requirements or is unsuited to the application indicated or specified.

1.7 ENVIRONMENTALLY PREFERABLE PRODUCTS:

Provide environmentally preferable products to the greatest extent possible.

To the greatest extent possible, provide products and materials that have a lesser or reduced effect on the environment considering raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance and/or disposal of the product.

1.8 TRANSPORTATION AND HANDLING:

Arrange deliveries of products in accordance with construction schedules. Coordinate to avoid conflict with work and conditions at the site.

Promptly inspect shipments to assure that products comply with requirements, quantities are correct and products are undamaged.

1.9 DELIVERY, STORAGE AND HANDLING:

Properly carton, crate, cover and protect materials, products and equipment for shipping, handling and storing. Use appropriate means for hoisting and loading which will prevent damage or overstress to items being handled or shipped. Store them under roof in controlled environment whenever feasible otherwise store off the ground under suitable coverings properly secured against wind and weather. Protect all items from rain, snow, moisture, wind, cold, heat, frost, sun, staining, discoloration, deterioration and physical damage from any cause. Refer to individual sections for specific requirements.

Store products in accordance with manufacturer's instructions with seals and labels intact and legible.

Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged and are maintained under required conditions.

1.10 PACKAGING:

Where Contractor has the option to provide one of the listed products or equal, preference shall be given to products with minimal packaging and easily recyclable packaging as defined in ASTM D5834.

Maximize use of source reduction and recycling procedures outlines in ASTM D5834.

Provide minimum 45 percent post-consumer recycled content and minimum 100 percent recovered fiber content of industrial paperboard in accordance with EPA's Comprehensive Procurement Guidelines and ASTM D5663.

Provide minimum 10 percent post-consumer recycled content and minimum 10 percent recovered fiber content of carrier board in accordance with EPA's Comprehensive Procurement Guidelines and ASTM D5663.

Provide minimum 5 percent post-consumer recycled content and minimum 5 percent recovered fiber content of brown papers (e.g., wrapping papers and bags) in accordance with EPA's Comprehensive Procurement Guidelines and ASTM D5663.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 01 60 00

SECTION 01 73 00
EXECUTION

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Execution of the Contract including:

- Field engineering and construction layout.
- Examination of substrate.
- General installation procedures.
- Cleaning and protection of work.

Specific requirements for individual units of work are specified in sections of Divisions 02 through 50.

Related Sections:

- Temporary protection requirements: Section 01 50 00
- Cutting and Patching: Section 01 73 29
- Progress Cleaning: Section 01 74 13

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION

3.1 FIELD ENGINEERING AND CONSTRUCTION LAYOUT:

General:

Working from lines and levels as shown in relation to the existing work, the General Contractor each applicable Subcontractor shall establish and maintain bench marks and other dependable markers to set the lines and levels for the work as needed to properly locate every element of the work of the entire project.

Calculate and measure required dimensions as shown within recognized tolerances if not otherwise indicated; do not scale the drawings to determine dimensions. Continuously advise Installer performing the work, of the marked lines and levels provided for use in the layout of work.

Layout of Work:

The Owner will furnish reference bench mark and maintain bench mark and all other lines, levels and dimensions as indicated in the Contract Documents. Report any errors or inconsistencies in above to Owner before commencing work.

Each Subcontractor shall be responsible for all lines, elevations, and measurements of work indicated.

3.2 EXISTING UTILITIES:

The existence and location of underground utilities and construction indicated as existing are not guaranteed.

Before starting any work disturbing, moving or penetrating the ground, call the Utility Notification Center of Colorado, 811, 303-534-6700 or 1-800-922-1987, to locate, stake and identify depth of all buried utilities within the construction limits. Obtain location information for water and sewer lines from the appropriate entity.

Obtain exact location of on-site communications lines from the Owner.

3.3 SUBSTRATE EXAMINATION:

The Installer of each element of the work must examine the conditions of the substrate to receive the work, dimensions and spaces adjacent, tolerances, interfacing with other elements and services, and the conditions under which the work will be performed, and must notify the Contractor in writing of conditions detrimental to the proper or timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

Field-verify condition and performance of existing components, systems, lines, etc. before beginning demolition or new construction. Advise the Architect and the Owner in writing of anything that could adversely affect the work of this Contract or anything the work of this Contract could adversely affect.

Require the Installer of each major component to inspect both the substrate and conditions under which work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

Recheck measurements and dimensions, before starting each installation.

3.4 GENERAL INSTALLATION PROCEDURES:

Manufacturer's Instructions:

Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by the Contract Documents.

Obtain and distribute copies of such instructions to parties involved in the installation, including one copy to the Architect and one copy to the Contractor.

Installation:

Provide attachment and connection devices and methods necessary for securing work. Secure work true to line and level. Allow for expansion and building movement.

Install each component during weather conditions and project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

Special Requirements for Environmental Chambers:

See Section 01 10 00 for Environmental Performance requirements related to the environmental chambers and their related elements.

Do not use any installation techniques or materials, including cleaning materials and similar materials, which contain any VOCs or which will leave behind any residue containing such materials.

All materials used within the Environmental Chambers must be approved by the User Scientists prior to incorporating into the work. The requirement is in addition to any other submittals specified and if any submittals specified in individual sections does not specifically mention certain materials used in these areas, submittals shall be provided.

Visual Effects:

Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable choices to the Owner and the Architect for final decision.

Mounting Heights:

Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Comply with Uniform Federal Accessibility Standards (UFAS) and the Americans with Disabilities Act Accessibility Guidelines (ADAAG). Refer questionable mounting height decisions to the Architect for final decision.

3.5 REMODELING:

Construction activities of all areas to be constructed in existing facilities shall be completely separated from the rest of the building by dust-proof enclosures erected by Contractor.

See Section 01 50 00 for requirements related to temporary partitions.

All surfaces in existing facilities not indicated to be remodeled, or removal of existing items by any Contractor, shall be repaired by the responsible Contractor to match existing adjoining similar surfaces.

3.6 CLEAN-UP:

All areas within existing facilities, which are not within enclosed areas to be constructed used for access to work areas shall be completely cleaned of all debris and made "broom-clean" at the end of each day's work.

See Section 01 74 13 for additional requirements.

Dust, which permeates areas of existing facilities because of improperly constructed dust-proof barriers, shall be the responsibility of the Contractor. The Contractor shall employ the services of a professional cleaning company to clean any area outside of the designated construction dust barriers that are contaminated by Contractor's operations. Completely clean all such areas to the satisfaction of the Owner at no additional cost.

3.7 CLEANING AND PROTECTION:

During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at completion.

Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

Limiting Exposures:

Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:

- Excessive static or dynamic loading.
- Excessive internal or external pressures.
- Excessively high or low temperatures.
- Thermal shock.
- Excessively high or low humidity.
- Air contamination or pollution.
- Water or ice.
- Solvents.
- Chemicals.
- Light.
- Radiation.
- Puncture.
- Abrasion.
- Heavy traffic.
- Soiling, staining and corrosion.
- Bacteria.
- Rodent and insect infestation.
- Combustion.
- Electrical current.
- High speed operation.
- Improper lubrication.
- Unusual wear or other misuse.
- Contact between incompatible materials.
- Misalignment.
- Excessive weathering.
- Unprotected storage.
- Improper shipping or handling.
- Theft.
- Vandalism.

END OF SECTION 01 73 00

SECTION 01 73 29
CUTTING AND PATCHING

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Administrative and procedural requirements for cutting and patching in addition to those indicated on the General Conditions of the Contract for Construction.

1.2 DEFINITION:

"Cutting-and-patching" is defined to include but is not necessarily limited to the cutting and patching of nominally completed and previously existing work, in order to accommodate construction requirements; and is defined to exclude integral cutting-and-patching during the manufacturing, fabricating, erecting and installing process for individual units of work. Drilling the work to install fasteners and similar operations are excluded from the definition of cutting-and-patching.

Demolition is recognized as an example of a related-but-separate category of work, which may or may not also require cutting-and-patching as defined in this section; refer to Section 02 41 19.

1.3 RESPONSIBILITIES:

Contractor shall be responsible for all cutting, fitting and patching, including attendant excavation and backfill, required to complete the Work or to:

Make its several parts fit together properly.

Uncover portions of the Work to provide for installation of ill-timed work.

Remove and replace defective work or work not conforming to requirements of Contract Documents.

Patch new construction into existing construction.

Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduit.

In addition to requirements specified, upon the Architect's request, uncover work to provide for inspection of covered work, and remove samples of installed materials for testing.

Do not cut or alter work performed under separate contract without the Architect's written permission.

Refer to other sections of the specifications for specific cutting-and-patching requirements and limitations applicable to individual units of work.

1.4 SUBMITTALS:

Conform to the requirements of Section 01 33 00.

Proposals for Cutting-and-Patching:

Submit a proposal describing procedures to be used in cutting and patching well in advance of the time cutting and patching will be performed and request approval to proceed. Submit proposals for the following:

Cutting new openings in existing suspended slabs.

Cutting new openings in existing roofs and roofing materials.

Other items as deemed appropriate by the Contractor or specifically requested by the Architect.

Description of why cutting-and-patching cannot reasonably be avoided, how it will be performed, how structural elements will be reinforced, products to be used, firms and trades to perform the Work, approximate dates of the Work, and anticipated results in terms of variations from the work as originally completed (structural, operational, visual and other qualities of significance).

List utilities that will be disturbed or otherwise affected by work, including those that will be relocated and those that will be out-of-service temporarily. Indicate how long utility service will be disrupted.

Where cutting and patching involves addition of reinforcement to structural elements, submit details and engineering calculations to show how reinforcement is integrated with the original structure.

Approval by Architect to proceed with proposed cutting-and-patching does not waive his right to later require complete removal and replacement of work found to be unsatisfactorily cut-and-patched.

1.5 QUALITY ASSURANCE:

General:

Perform all cutting and patching in strict accordance with pertinent requirements of the Specifications and, in the event no such requirements are determined, in conformance with the Architect's written direction.

Use skilled workmen to perform all cutting and patching work.

Use methods least likely to damage existing surfaces and materials to remain, while providing proper surfaces to receive installation of repair, patching, and/or new work.

Requirements for Structural Work:

Do not cut-and-patch structural work in a manner resulting in a reduction of load-carrying capacity or load/deflection ratio.

Operational and Safety Limitations:

Do not cut-and-patch operational elements and safety-related components in a manner resulting in a reduction of capacities to perform in the manner intended or resulting in decreased operational life, increased maintenance, or decreased safety.

Visual Requirements:

Do not cut and patch work exposed to public view, and the exterior and/or interior of the building in a manner that will result in an unacceptable appearance as determined by the Architect.

Do not cut and patch work in a manner that will result in obvious appearance that cutting and patching work was done.

When cutting existing structural concrete, do not extend saw cuts beyond the corners of the required opening on either side of the opening.

1.6 EXISTING CONSTRUCTION:

Where cutting and patching of existing construction is required; prior to start of work, inform Owner of existing construction to be disturbed. Owner will determine if elements of existing construction contain asbestos. Do not proceed with work until after Owner has examined areas to be disturbed. Refer to Exhibit A, Project Pre-Inspection for Possible Presence of Asbestos for additional information concerning the possible presence of materials containing asbestos.

PART 2 - PRODUCTS

2.1 MATERIALS:

Except as otherwise indicated in pertinent sections of these specifications, or as directed by the Architect, use materials that are identical to existing materials in workmanship, appearance and performance. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

Recycled Content: Materials/products shall contain the maximum amount of recycled content allowed that retains material integrity.

Local/Regional Materials: Preference shall be given to materials that are manufactured, harvested, extracted, mined, quarried, etc. within a 500 mile radius of the project site.

Composite Wood and Agrifiber: All composite wood and agrifiber products shall be free of urea-formaldehyde resin binders.

Certified Wood: Wood based products shall be made from wood obtained from forests certified by an FSC accredited certification body to comply with the Forest Stewardship Councils "Principles and Criteria." Wood from other certification programs such as Sustainable Forest Initiative (SFI) are not acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION:

Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.

Before proceeding, inspect existing conditions, including elements subject to movement or damage during cutting, excavating, backfilling, and patching.

After uncovering the work, inspect conditions affecting installation of new work.

If uncovered conditions are not as anticipated or if existing construction is not as indicated on the Drawings, immediately notify the Architect for further instructions.

3.2 PREPARATION:

Provide shoring, bracing and support as required to maintain structured integrity of the project.

Take all necessary action required to protect adjacent existing surfaces from damage due to the work of this section.

Take all precautions necessary to protect existing surfaces and materials, new work, and the work of this section from damage due to adverse weather conditions.

Provide temporary support of work to cut and adjacent work to prevent failure or damage due to the work of this section.

Properly prepare substrate surfaces exposed during cutting as required to receive the work of this or other sections of these specifications in strict compliance with manufacturer's recommendations and these specifications.

Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 CUTTING-AND-PATCHING:

General:

Employ skilled workers to perform cutting-and-patching. Proceed with cutting-and-patching at the earliest feasible time and complete without delay.

Perform all required cutting and patching as required or reasonably implied under pertinent sections of these specifications.

Perform cutting and demolition by methods which will prevent damage to other portions of the work and will provide proper finished installation complying with the specified tolerances and finishes.

Cutting:

Execute cutting and demolition by methods which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs and new work. Saw-cut and otherwise isolate areas to be demolished.

Review proposed procedure with original Installer where possible, and comply with his recommendations.

Cut holes and slots neatly to size required and temporarily cover openings when not in use.

In general, cut work with sawing and grinding tools, not with hammering and chopping tools. Core drill openings through concrete work.

To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.

Cut through concrete and masonry using a cutting machine such as a Carborundum saw or diamond core drill.

Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.

Patching:

Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.

Where feasible, inspect and test patched areas to demonstrate integrity of the installation.

Repair or otherwise rebuild and/or construct all surfaces affected by cutting and demolition. Execute fitting and adjustment of products to provide totally finished installation to comply with tolerances, finishes, and profiles of adjacent surfaces, whether new or existing.

Restore work which has been cut or exposed by demolition; install new construction in compliance with specifications for type of new work to be done or as required to match existing adjacent surfaces. In no case shall any exposed existing surface be left in a raw, marred, or unfinished surface.

Restore exposed finishes of patched areas; and, where necessary extend finish restoration onto retained work adjoining, in a manner which will eliminate evidence of patching.

Where a patch occurs in a smooth painted surface, extend final paint coat over the entire unbroken surface containing the patch.

Refinish entire surfaces as necessary to provide an even finish and as follows:

Continuous Surfaces: To nearest intersections.
Assembly: Entire refinishing.

Patch, repair or rehang existing or in-place lay-in ceilings as necessary to provide an even plane surface of uniform appearance.

END OF SECTION 01 73 29

SECTION 01 74 13
PROGRESS CLEANING

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Facilities, equipment and labor for cleaning and waste disposal during construction.

Related Sections:

Construction Waste Management and Disposal: Section 01 74 19.
Final Cleaning: Section 01 74 23.

1.2 RESPONSIBILITIES:

General:

Contractor and each Subcontractor and Installer is responsible for specific cleaning operations of his work to the extent specified in the appropriate specification sections.

See Section 01 32 00 for additional requirements.

Pollution Control:

Conduct clean-up and disposal operations to comply with applicable anti-pollution laws and local ordinances.

Burning or burying of waste materials on the project site is not permitted.

Disposal of volatile fluids and wastes in storm or sanitary sewers, or into streams or waterways is not permitted.

Special Requirements for Environmental Chambers:

See Section 01 10 00 for Environmental Performance requirements related to the environmental chambers and their related elements.

Do not use any installation techniques or materials, including cleaning materials and similar materials, which contain any VOCs or which will leave behind any residue containing such materials.

All materials used within the Environmental Chambers must be approved by the User Scientists prior to incorporating into the work. These requirements supersede any requirements specified herein where less stringent or contradictory.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS:

Use only cleaning materials recommended by manufacturer of surface to be cleaned.

Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.1 WASTE DISPOSAL:

Collection and Disposal of Wastes:

The Contractor will establish and enforce a daily system for collecting and disposing of waste materials from construction areas and elsewhere at the project site. The Contractor will provide suitable trash containers at a central collection point on the site. Applicable Subcontractors shall provide suitable means for removing trash safely and cleanly from elevated portions of the work.

Do not use Owner's trash containers.

Comply with NFPA 241 for removal of combustible waste material and debris.

Sort materials for recycling complying with the requirements of Section 01 74 19.

Each Subcontractor and Installer is responsible for cleaning and removal of his trash and debris to this collection point.

Handle hazardous, dangerous or unsanitary wastes separately from other waste materials, by containerizing properly. Dispose of each category of waste material in a lawful manner. Do not bury or burn waste materials on the Owner's property.

Enforce strict prohibition against the washing of waste materials down sewers or into waterways.

Waste concrete and masonry shall be removed from the site and legally disposed of by masonry and concrete installers.

3.2 CLEANING UP:

Cleaning and Protection of Work:

At the time each unit of work or element of the construction is completed (substantially) in each area of the Project, clean the unit or element to a condition suitable for occupancy and use (as intended), and restore minor or superficial damage. Replace units and elements which are damaged beyond successful restoration.

Clean and restore adjoining surfaces and other work which was soiled or damaged (superficially) during the installation; replace other work damaged beyond successful restoration.

Where the performance of subsequent construction activities could possibly result in damage to other work in place, provide appropriate protective covering or other provisions.

Repeat cleaning and protection operations during remainder of construction period, wherever work might otherwise be damaged by sustained soiling or exposure.

During Construction:

The Contractor will oversee cleaning and ensure that building, grounds and public properties are maintained free from accumulation of waste materials and rubbish.

Take measures to prevent spread of trash, debris, cartons, packaging or other waste materials on or off the Project Site by wind.

Sprinkle dusty debris with water.

The Contractor will clean and vacuum interior building areas when ready to receive finish painting.

Each Subcontractor shall keep the building and premises free from all surplus material, waste material, dirt and rubbish caused by his employees or work, and at the completion of his work he shall remove all such surplus material, waste material, dirt and rubbish, as well as his tools, equipment and scaffolding, and shall leave his work clean and spotless, unless more exact requirements are specified.

Each Subcontractor shall perform his clean-up daily and shall transport his rubbish to an on-site location designated by the Contractor who will arrange for its removal.

END OF SECTION 01 74 13

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Administrative and procedural requirements for the following:

- Salvaging nonhazardous demolition and construction waste.
- Recycling nonhazardous demolition and construction waste.
- Disposing of nonhazardous demolition and construction waste.

Salvage and recycling of the following waste materials as required to meet the specified minimum recycling requirements and applies to all such listed waste materials produced during the course of this Contract, except where specifically indicated below. Additional salvage and recycling of waste materials is encouraged.

Construction Waste:

- Building demolition waste.
- Concrete construction.
- Concrete masonry.
- Lumber.
- Wood sheet materials.
- Roofing.
- Insulation.
- Carpet and pad.
- Gypsum board.
- Metal scrap including metal stud framing, mechanical equipment and ductwork, and electrical equipment and fixtures.
- Glass.
- Plumbing piping.
- Electrical conduits and wiring.
- Clean, corrugated cardboard such as used for packaging, etc.

Discarded temporary office refuse paper such as unwanted files, correspondence, etc.

Plastic bucket containers for various liquid and semi-solid or viscous construction materials and compounds.

Aluminum, glass and plastic beverage containers.

Packaging: Regardless of salvage/recycle goal indicated, salvage or recycle 100% of the following uncontaminated packaging materials:

Paper.
Cardboard.
Boxes.
Plastic sheet and film.
Wood crates.
Plastic pails.

Other mixed construction and demolition waste including solid waste resulting solely from construction, remodeling, repair or demolition operations exclusive of waste materials listed herewith.

Non-Recycled Waste: Collect and segregate non-recyclable waste for delivery to a permitted landfill site.

Mixed solid waste usually collected as a municipal service, exclusive of waste materials listed above.

Related Sections:

Progress Cleaning: Section 01 74 13
Final Cleaning: Section 01 74 23
Demolition for Remodeling: Section 02 41 19

1.2 DEFINITIONS:

Waste Materials: Large and small pieces of the materials indicated which are excess to the contract requirements and generally include materials which are to be salvaged from existing construction to be demolished and items of trimmings, cuttings and damaged goods resulting from new installations, which can not be effectively used in the Work.

Recycle: Recovery of demolition or construction waste and subsequent processing in preparation for reuse.

Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

1.3 MINIMUM PROJECT RECYCLING REQUIREMENTS:

It is a requirement of this Project that not less than 50% (with a goal of 75%) of all construction waste and demolition debris by weight be salvaged or diverted to recycling facilities.

1.4 SUBMITTALS:

Construction Waste Management Plan:

Before start of construction, submit for the approval of the Architect a construction waste management plan indicating how Contractor proposes to collect, segregate, and dispose of all construction wastes and debris produced by the work of this Contract including compliance with minimum project recycling requirements specified above.

Indicate any instances where compliance with requirements of this specification does not appear to be possible and request resolution from the Architect.

The Plan shall contain the following:

Name of Contractor's recycling coordinator and personnel responsible for managing the plan.

Identification of licensed haulers for recyclable materials and salvaged or re-used items.

Analysis of job site waste that may be generated, including types and approximate quantities. Offer options to reduce the waste generated, especially for reducing packaging and material waste. Also offer options to reduce waste that must be disposed of in a hazardous waste facility.

Develop method to document costs for recycling and salvage/reused items.

Landfill Options: The name of the landfill(s) where trash will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all Contract waste in the landfill(s).

Landfill Certification: Contractor's statement that landfill(s) proposed for use are licensed for the types of waste to be deposited.

Materials Identification: A list of each material proposed to be salvaged, reused or recycled during the course of the Contract.

Materials Identification: The materials to be salvaged, reused or recycled includes, at minimum, the following:

Cardboard.
Concrete.
Wood, including palettes and crates from shipping.
Ferrous metals.
Non-ferrous metals, including copper, brass and aluminum.
Glass, including glass bottles from beverages.
Carpet.
Paints.
Fabric.
Rubber.
Plastics, including beverage containers.
Concrete Masonry Units (CMU).
Newspaper.
Office and drawing paper.
Gypsum board products.
If cost-effective, rigid foam insulation, engineered wood products and other materials the Contractor or Sub-Contractors may suggest.

Materials Handling Procedures: Describe the means by which any materials identified above will be protected from contamination and describe the mans to be employed in recycling the materials consistent with the requirements for acceptance by designated facilities (separation requirements, containers, etc.)

Transportation: Describe means of transportation of the recyclable materials, such as whether materials will be site-separated and self-hauled, hauled by others or collected by the designated facility.

The Contractor shall submit three draft copies of the Plan for review by the Architect and Owner representatives. Allow at least two weeks for the review. Contractor shall make requested revisions and complete the approved Waste Management Plan.

Delivery Receipts:

Provide to the Contractor's waste management plan manager delivery receipts for waste materials salvaged and sent to permitted waste materials processors or recyclers within 48 hours of delivery that indicate the location and name of firm accepting recyclable waste materials, types of materials, net weights of each type, date of delivery and value of materials.

Waste Reduction Progress Reports:

Concurrent with each Application for Payment, submit 3 copies of report. Include the following information:

Material category.
Generation point of waste.
Location of receiving agent (recycler/landfill).
Total quantity of waste in tons.
Quantity of waste salvaged, both estimated and actual in tons.
Quantity of waste recycled, both estimated and actual in tons.
Total quantity of waste recovered (salvaged plus recycled) in tons.
Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

Waste Reduction Calculations:

Before request for Substantial Completion, submit 3 copies of calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

Records of Donations:

Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

Record of Sales:

Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

Recycling and Processing Facility Records:

Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

Landfill and Incinerator Disposal Records:

Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.5 QUALITY ASSURANCE:

Regulatory Requirements:

Comply with all applicable requirements of the State of Colorado Department of Health concerning management of construction, demolition, land clearing, inert and yard trash debris and any and all subsequent modifications and amendments to same.

Comply with applicable local ordinances and regulations in addition to the above.

Contractor's Designated Recycling Coordinator:

Appoint a knowledge person, available on site, who is trained in the recycling processes and requirements of facilities who is available to answer questions and direct how materials are to be recycled.

Disposal Sites, Recyclers, and Waste Materials Processors:

Use only facilities properly permitted by the State of Colorado and by local authorities where applicable.

Pre-Construction Waste Management Conference:

Prior to beginning work at the site, schedule and conduct a conference to review the Construction Waste Management Plan and discuss procedures, schedules and specific requirements for waste materials recycling and disposal.

Discuss coordination and interface between the Contractor and other construction activities.

Identify and resolve problems with compliance with requirements.

Record minutes of the meeting, identifying all conclusions reached and matters requiring further resolution.

Attendees: The Contractor and related Contractor personnel associated with the work of this section, including personnel to be in charge of the waste management program; the Construction Quality Manager; the Architect; and the Owner.

Plan Revision: Make any revisions to the Construction Waste Management Plan agreed upon during the meeting and incorporate resolutions agreed to be made subsequent to the meeting. Submit the revised plan to the Architect for approval.

Implementation:

Designate an on-site party responsible for instructing workers and implementing the Construction Waste Management Plan.

Distribute copies of the Construction Waste Management Plan to the job site foreman and each subcontractor. Include waste management and recycling in worker orientation.

Provide on-site instruction on appropriate separation, handling, recycling, and salvaging methods to be used by all parties at the appropriate stages of the work at the site. Include waste management and recycling discussion in pre-fabrication meetings with subcontractors and fabricators.

Also include discussion of waste management and recycling in regular job meetings and job safety meetings conducted during the course of work at the site.

1.6 STORAGE AND HANDLING:

Site Storage:

Remove all indicated recyclable materials from the work location to approved containers daily. Failure to remove waste materials will be considered cause for withholding payment.

Position covered containers for recyclable waste materials at a designated location on the Project Site. Select a location for the recyclable materials containers separated from that of general waste and rubbish containers. Provide separate collection containers for a minimum of the following materials:

Concrete masonry.
Paper, paper products and cardboard.
Plastics.
Metals.
Glass.
Other salvaged materials.

Change out loaded containers for empty ones as demand requires.

Handling:

Deposit all indicated recyclable materials in containers in a clean (no mud, adhesives, solvents, petroleum contamination), debris-free condition.

Do not deposit contaminated materials into the containers until such time as such materials have been cleaned.

If the contamination chemically combines with the material so that it cannot be cleaned, do not deposit into the recycle containers. In such case, request resolution by the Contractor's designated recycling coordinator as to disposal of the contaminated material.

Directions from the Contractor's designated recycling coordinator do not relieve the Contractor from compliance with all legal and regulatory requirements for disposal, not shall such directions cause a request for modification of the Contract.

1.7 PROJECT/SITE CONDITIONS:

Environmental Requirements:

Transport recyclable waste materials from the Work Area to the recycle containers and carefully deposit in the containers without excess noise and interference with other activities, in a manner to minimize noise and dust. Reclose container covers immediately after materials are deposited.

Do not place recyclable waste materials on the ground adjacent to a container.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 WASTE MANAGEMENT:

General:

Distribution: The Contractor shall distribute copies of the approved Waste Management Plan to the Superintendent, each Subcontractor, the Architect and the Owner. One copy shall be posted on the job site at all times.

Instruction: The Contractor shall provide on-site instruction of appropriate separation, handling and recycling, salvage, reuse and return methods to be used by all parties at the appropriate stages of the Work.

Implement waste management procedures in accordance with approved Construction Waste Management Plan. Maintain procedure throughout the life of this Contract.

Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan.

Comply with Section 01 50 00 for operation, termination, and removal requirements.

Source Separation:

Separate, store, protect, and handle at the project site all identified recyclable and salvageable waste products to prevent contamination of materials and maximize recyclability and salvageability of materials.

Arrange for the regular collection, transport from the site, and delivery to respective approve recycling centers of indicated recyclable waste materials. Maintain records accessible to the Architect for verification of construction waste materials recycling.

Separation Facilities: The Contractor shall lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse and return. Recycling and waste bin areas are to be kept neat and clean, and clearly marked in order to avoid contamination of materials.

Hazardous Wastes: Hazardous wastes shall be separated, stored, and disposed of according to local regulations.

Delivery Receipts:

Arrange for timely pick-ups from the site or deliveries to approved recycling facilities of designated waste materials to keep construction site clear and prevent contamination of recyclable materials.

Keep and maintain records of all deliveries to recycling facilities and all pick-ups of waste materials at the site by others as specified above.

Submit copies of all delivery receipts as a part of the project closeout requirements.

Application for Progress Payments:

The Contractor shall submit with each Application for Progress Payment a Summary of Waste Generated by the Contract. Failure to submit this information shall render the Application for Payment incomplete. The Summary shall contain the following information:

The amount (in tons) of material landfilled from the Contract, the identity of the landfill, the total amount of tipping fees paid and the total disposal cost.

The amount (in tons) of each material recycled, reused on the job site, salvaged or returned. Include the transportation cost, the amount of money paid or received for the recycled or salvaged material and the net total cost or savings of recycled or salvaged materials.

3.2 RECYCLABLE WASTE MATERIALS HANDLING:

General:

The following paragraphs supplement handling requirements for various materials identified for classification and recycling listed in Part 1 "Summary" article above.

Paper:

Classify and handle waste paper goods as follows:

Bond Paper (Including Bond Paper Drawing Prints (Not Diazo Prints)): As generally found in the construction offices and used for specifications, correspondence, copiers, PC laser printers and FAX machines. Collect in a separate container at each workstation and deposit loose in the appropriate recycle container daily.

Newsprint: Newspapers and tabloid style advertising (slick finish magazines and advertising materials are not typically recyclable). Collect in a single location and deposit daily in the appropriate recycle container.

Diazo Prints (Drawings): Set up a single location for collection. Roll together to minimize space. Deposit daily in the appropriate recycle container.

Packaging Materials:

Cardboard and Paperboard Cartons and Boxes: Knock-down, fold flat and deposit in the appropriate recycle container.

Paper packing materials (separators, stiffeners, etc.) shall be placed in the same container.

Newsprint, used as packing (shredded or whole), shall be deposited in the recyclable container for newsprint.

Plastic (polystyrene peanuts and other shapes) shall be deposited in the recyclable container for plastics.

Metal and plastic banding materials shall be deposited in the appropriate container.

Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.

Crates: Break down crates into component wood pieces and comply with requirements for wood recycling.

Concrete and Masonry:

Remove steel reinforcing materials and sort as specified below for metals.

Demolish into smaller pieces to allow for better consolidation/handling within containers. Where Contractor has a source for sale of recycled concrete materials, these material may be ground up at the project site and made suitable for aggregate sale.

Metals:

Cut all items to lengths and sizes to fit within the container provided, when necessary.

Where there is sufficient quantity of a specific recyclable waste item (for example; salvaged aluminum fenestration framing), make special arrangements for items to be bundled, banded or tied, and stack in a designated location for a special pick-up.

Coordinate all special arrangements with the Contractor's designated recycling coordinator.

Plastics:

Collect recyclable plastics (polystyrene and others specifically marked for recycling) daily from work areas and deposit in designated containers.

Glass:

Remove waste glass products (sheet, bottles, etc.) daily from the work area and deposit in designated containers.

Where glass containers are marked for separation by color or type, segregate glass accordingly.

Glass containing embedded wire (typical in some fire rated doors having glazed lights) is usually not reprocessed; verify with the Contractor's designated recycling coordinator that wire glass is not recyclable.

Wood Materials:

Clean Cut-Offs of Lumber: Grind or chip into small pieces.

Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

Gypsum Board:

Stack large clean pieces on wood pallets and store in a dry location.

Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

Other Items:

Where recyclability classification of any given waste material is unclear, verify with the Contractor's designated recycling coordinator.

3.3 DISPOSAL OF WASTE:

General:

Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on site.

Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

Burning:

Do not burn waste materials.

Disposal:

Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 01 74 19

SECTION 01 74 23
FINAL CLEANING

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Procedural requirements to perform final cleaning.

Pollution Control: Conduct clean-up and disposal operations to comply with applicable anti-pollution laws and local ordinances.

Related Sections:

Progress Cleaning: Section 01 74 13
Waste Materials Management and Recycling: Section 01 74 19

1.2 QUALITY ASSURANCE:

Personnel:

All final clean-up of exterior and interior of the building shall be done by professional cleaners.

Special Requirements for Environmental Chambers:

See Section 01 10 00 for Environmental Performance requirements related to the environmental chambers and their related elements.

Do not use any installation techniques or materials, including cleaning materials and similar materials, which contain any VOCs or which will leave behind any residue containing such materials.

All materials used within the Environmental Chambers must be approved by the User Scientists prior to incorporating into the work. These requirements supersede any requirements specified herein where less stringent or contradictory.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS:

Use only cleaning materials and methods recommended by manufacturer of surface to be cleaned and by the manufacturer of the cleaning materials.

The Owner requires floor care products to be from the same product line. (Different brands may interact disastrously.)

All of these products may be ordered through Construction Stores, but these products are not stocked at the Construction Stores. Place orders at least two weeks in advance of time needed. Provide the following for resilient flooring from one manufacturer only (no substitutions):

Type:	JohnsWax:	Butchers:	Airkeim:
Strippers:	Freedom	Time Buster Full Impact	Air Strip
Sealers:	Over & Under Technique	Iron Stone	Laser, Gemini
Finishes:	Show Place Above	MainStay	Laser, Gemini

PART 3 - EXECUTION

3.1 FINAL CLEANING:

General Requirements:

Perform final cleaning just prior to substantial completion inspection.

Sort materials for recycling complying with the requirements of Section 01 74 19.

Clean each surface or unit to the condition expected in a normal, high-end commercial building cleaning and maintenance program.

The entire project, inside and out, and the entire premises shall be in first class, clean condition upon completion before being accepted by the Owner.

Remove labels which are not required as permanent labels.

Remove grease, dust, dirt, stains, films, fingerprints, and other noticeable distracting substances, from new interior and exterior surfaces (including metals, masonry and concrete).

Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are noticeable vision-obscuring material. Replace chipped or broken glass and other damaged transparent materials. Clean both sides of all glass by professional window cleaners.

Clean and polish all hardware and leave clean and free from paint, grease, dirt, etc.

Except as otherwise indicated; avoid disturbance of natural weathering of exterior surfaces. Restore reflective surfaces to original reflective condition.

Clean surfaces of mechanical and electrical equipment in addition to that specified in Divisions 23 and 26; remove excess lubrication and other substances.

Carefully and thoroughly clean all items of equipment, mechanical, electrical, cabinets, ductwork, etc.

Remove debris and surface dust from limited-access spaces including roofs, plenums, shafts, attic and similar spaces.

Thoroughly clean sealed concrete floors by brooming and then mopping. Vacuum and clean carpeted surfaces. Shampoo pre-existing carpet once project is complete. Power scrub and power buff resilient flooring surfaces and tile.

Clean and polish all plumbing fixtures, fittings and exposed plated piping to a sanitary condition, free of stains including those resulting from water exposure. Leave clean and free from paint, grease, dirt, etc. Remove all labels.

Repair, patch and touch-up marred surfaces to match adjacent finishes.

Broom clean paved surfaces; rake clean other surfaces of grounds.

Clean and polish all electric fixtures, including glassware, switch plates, etc. and leave clean and free from paint, grease, dirt, etc.

Clean light fixtures and lamps so as to function with full efficiency, by electrical Installer.

Replace air supply unit filters if units were operated during construction, by mechanical Installer.

Clean ducts, blowers, and coils if air supply units were operated without filters during construction, by mechanical Installer.

Maintain cleaning until the building, or portion thereof, is occupied or accepted by the Owner.

Floor Cleaning Procedures:

Perform the following steps:

1. Sweep floor clean of debris.
2. Cord off area if necessary.
3. Put up Caution signs.
4. Mix Stripper or Cleaning solution according to label.
5. Apply solution to floor.
6. Start setting up equipment.
7. Place RED abrasive pad on buffer (buffer less than 300 rpms).
8. Begin stripping or cleaning floor working with buffer moving it side to side across the floor.
9. Use HEPA filtered water vacuum to begin to suck up slurry*.
   *Use of HEPA filtered water vacuum is required on existing floor tile which contains asbestos.
10. Apply additional coats of water and re-vacuum up floor.
11. Mop floor with clean water, changing rinse water often.
12. Mop floor a second time.
13. Mop floor to dry completely.
14. Clean up equipment.
15. Wash red pad with clean water.

Sealing Procedures:

Perform the following steps:

1. Using a new mop head or clean wax mop and clean bucket. Apply first coat of approved sealer to floor.
2. Allow floor to dry completely (at least 20 minutes).
3. Apply second coat of sealer.
4. Allow floor to dry.

Finishing (Waxing) Procedures:

Perform the following steps:

1. Using a clean wax mop and bucket, apply first coat of approved finish (wax).

2. Allow floor to dry completely (at least 20 minutes).
3. Apply second coat of finish (wax).
4. Allow floor to dry completely (at least 20 minutes).
5. Apply third coat of finish (wax).
6. Allow floor to dry completely (at least 30 minutes).
7. Wash mop and bucket with clean water.
8. If floor is dry, remove caution signs and open area up.

Burnishing Procedures:

The next working day perform the following steps:

1. Sweep floor clean of debris.
2. Spot mop floor to remove spots and dirt.
3. Set up High Speed Burnisher to make for a safe environment.
4. Start burnishing. Walk forward in a straight line.
5. At end of row, turn around and start forward again.
6. Repeat steps 4 and 5 until finished.
7. Clean up equipment and pad.

END OF SECTION 01 74 23

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Administrative and procedural requirements for project closeout, including but not limited to:

- Inspection procedures.
- Commissioning documentation.
- Project record document submittal.
- Operating and maintenance manual submittal.
- Submittal of warranties.
- Spare parts.

Specific requirements for individual units of work are specified in sections of Divisions 02 through 50.

Contractor's responsibility is to complete the project in accordance with the Contract Documents and to enforce their requirements on their employees, suppliers and Subcontractors.

Related Sections:

- Final Cleaning: Section 01 74 23
- Operation and Maintenance Data: Section 01 78 23
- Warranties: Section 01 78 36
- Project Record Documents: Section 01 78 39
- General Commissioning Requirements: Section 01 91 13
- Facility Operation Procedures: Section 01 92 13

Time of Closeout:

Time of closeout is directly related to "Substantial Completion", and it therefore may be either a single time period for the entire work or a series of time periods for individual parts of the work which have been certified as substantially complete at different dates.

That time variation (if any) shall be applicable to other provisions of this section, regardless of whether resulting from "phased completion" originally specified by the Contract Documents or subsequently agreed upon by Owner and Contractor.

1.2 SUBSTANTIAL COMPLETION: (See General Conditions Article 41.C)

Preliminary Procedures:

Contractor will notify Architect of their claim for substantial completion in accordance with General Conditions Article 41.A.

In the Application for Payment that coincides with, or first follows the date Substantial Completion is claimed, show 100% completion for the portion of the Work claimed as substantially complete.

Include supporting documentation for completion as indicated in the Contract Document. If 100% completion cannot be shown, include list of incomplete items, the value of incomplete construction, and reasons for the Work being incomplete.

Submit statement showing accounting of changes to the Contract Sum.

Advise Owner of pending insurance change-over requirements.

Submit specific warranties, final certifications and similar documents.

Obtain and submit releases enabling Owner unrestricted use of the Work and access to services and utilities, including occupancy permits, operating certificates, and similar releases.

Submit Record Drawings, maintenance manuals, and similar final record information. Refer to Sections 01 78 23 and 01 78 39.

Deliver tools, spare parts, extra stocks of materials, and similar physical items to Owner.

Make final change-over of permanent locks and transmit keys to Owner, and advise Owner's personnel of change-over in security provisions.

Complete start-up and testing of systems, and instructions for Owner's operating/maintenance personnel.

Submit all reports and test results as required by the Contract Documents. This includes test and balance reports and completed and approved pre-functional checklists and functional performance testing reports from the commissioning documentation.

Discontinue or change over and remove from project site temporary facilities and services, along with construction tools and facilities, mock-ups, and similar elements.

Complete final cleaning up requirements including touch-up painting.

Touch-up and otherwise repair and restore marred exposed finishes.

Complete Contractor's internal punch list items.

In order to act upon the Contractor's claim of Substantial Completion, the Architect and his Engineers, as appropriate, and the Principal Representative, will inspect the Project, provided specified prerequisites are met. If they find it substantially complete, State Buildings Programs will prepare the Notice of Substantial Completion or advise the Contractor by means of a "punch list" inspection report of items required for completion and acceptance. If Work is not substantially complete, Contractor will be advised of general reasons for this judgement or specific areas of non-compliance with the Contract Documents requiring correction or completion for the Work to be considered substantially complete.

> The "punch list" inspection will not be made until Project Record Documents, test and balance reports and operating and maintenance manuals have been delivered to the Architect and found by him to be substantially complete.

The Contractor will proceed immediately to complete all items and will transmit to the Architect weekly a report of the progress on or completion of each item on the "punch list" and the Contractor's list. Any non-conforming or incomplete work coming to the Architect's attention during this period will be added to the list.

The Architect/Engineer will complete the Notice of Approval of Beneficial Occupancy, Closing-Out Checklist and Contract Close-Out forms and forward them to the Contractor. Comply with procedures stated in the General Conditions of the Contract.

1.3 FINAL ACCEPTANCE:

Preliminary Procedures:

Before requesting inspection for certification of final acceptance and final payment, complete the following. List known exceptions in the request.

Submit final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

Submit updated final statement, accounting for final additional changes to the Contract Sum.

Submit the following prior to the final application for payment:

Contractor's Affidavit of Payment of Debit and Claims: AIA G706.
Contractor's Affidavit of Release of Liens (claims): AIA G706A, with:

Consent of Surety to final payment: AIA G707.
Contractor's release of waivers of claims.
Separate release of waivers of claims for subcontractors, suppliers and others with claim rights, against property of owner, together with list of those parties.

Submit copy of Architect's final punch list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, endorsed and dated by Architect.

Submit evidence of final, continuing insurance coverage complying with insurance requirements.

The commissioning requirements of Section 01 91 13 must be complete unless approved in writing by the Owner's Project Manager. Exceptions to this are any required seasonal or approved deferred testing.

The Contractor will complete and date all items indicated to be completed on the Closing-Out Checklist and Contract Close-Out forms. When all items are completed, the Contractor will sign both forms and forward them to the Architect along with a letter stating that all punch list items are complete.

The Architect verifies that all items are complete, signs both forms and sends them to the Owner.

Final Acceptance Inspection:

The Architect and Principal Representative will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Architect.

Upon completion of this inspection, the State Buildings Programs will prepare a Notice of Acceptance, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

If necessary, inspection will be repeated.

Reinspections:

Should Architect be required to perform more than two Substantial Completion inspections or more than one Final Acceptance inspection because of failure of Work to comply with original certifications of Contractor, Owner may be required to compensate Architect for additional services, and deduct amount paid from final payment to Contractor.

Delay in Completion:

Should Contractor delay substantial completion and final acceptance beyond date initially scheduled, Contractor will be responsible to pay costs incurred by the Architect for such delay. Owner will deduct required amounts from affected pay requests.

Guaranty Inspections After Completion: (See General Conditions Article 45)

Two complete inspections of the work after final acceptance will be made, one at 6 months following the date of Substantial Completion and one at 11 months following the date of Substantial Completion. Refer to General Conditions for details.

Contractor will be notified in writing of all deficiencies.

Corrective work must start on noted deficiencies within 10 days of receipt of notification to Contractor.

Public Advertisement:

Before the Principle Representative may advertise, the Contractor shall deliver to Architect/Engineer:

- Closing-Out Checklist and Contract Close-Out forms with all items completed.
- Deductions for uncorrected work.
- Deductions for reinspection payments.
- Total Contract sum, as adjusted.
- Previous payments.
- Sum remaining due.

Advertisement and final settlement will be completed in accordance with the General Conditions.

1.4 CLOSEOUT DOCUMENTS:

In order to complete the Project, provide the following documents:

Project Record Documents as set forth in General and Supplementary Conditions and Section 01 78 39.

Operating and Maintenance Manuals for Equipment, Systems and Mechanical and Electrical Systems as specified in Section 01 78 23 and Division 02 through 50 sections.

Test and Balance Reports for the Mechanical Systems as specified in Division 23.

Printed Warranties and instructions for use or maintenance as specified in the appropriate Sections.

Parts and Maintenance materials as specified in the appropriate sections.

Completed Closing-Out Checklist and Contract Close-Out forms.

1.5 START UP AND INSTRUCTIONS:

Refer to Section 01 92 13.

1.6 SPARE PARTS AND REPLACEMENT MATERIALS:

Assemble and deliver to Owner all specified extra or replacement materials as specified in Division 02 through 50 sections in addition to that used for construction of work. Coordinate with Owner. Accompany with written list in triplicate itemizing each material, pattern, color; quantity; specification section. Obtain Owner's signature on list acknowledging receipt of materials and transmit signed copy to Architect.

At the completion of the project, all loose keys for hose bibs; adjustment keys and wrenches for door closers and panic hardware; and keys for electric switches, electrical panels, etc., shall be accounted for by the Contractor and turned over to the Owner.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 01 77 00

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Administrative and procedural requirements for operation and maintenance manuals for mechanical, electrical and other equipment or systems.

Compile product data and related information appropriate for the University of Colorado's maintenance and operation of products furnished.

Prepare operating and maintenance data as specified in this section and as referenced in other pertinent sections of specifications.

Related Sections:

Submittals: Section 01 33 00.
Closeout Procedures: Section 01 77 00.
Project Record Documents: Section 01 78 39.
General Commissioning Requirements: Section 01 91 13.

1.2 QUALITY ASSURANCE:

Preparation of data shall be done by personnel:

Trained and experienced in maintenance and operation of the described products.

Completely familiar with requirements of this section.

Skilled as a technical writer to the extent required to communicate essential data.

Skilled as a draftsman competent to prepare required drawings.

1.3 FORM OF SUBMITTALS:

Prepare data in form of an instructional manual for use by Owner's personnel.

Format:

Submit electronically in Portable Document Format (PDF) format as one document, OCR (Optical Character Recognition) searchable, bookmarked according to the Construction Specifications Institute (CSI) standards.

Cover:

Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:

Name of Project and date of completion (month and year).
Project number.
Identity of general subject matter covered in the manual (e.g., Architectural, Mechanical, Electrical and/or Civil).

1.4 CONTENT OF MANUALS:

An electronically-written table of contents shall be provided for each volume, arranged according to CSI standards. Include the following:

Contractor, name of responsible principal, address and telephone number.

A list of each product required to be included, indexed to content of the volume.

List, with each product, name, address and telephone number of:

Maintenance contractor, as appropriate.
Identify area of responsibility of each.
Local source of supply for parts and replacement.

Identify each product by product name and other identifying symbols.

Product Data:

Include only those sheets which are pertinent to the specific product. Annotate each sheet to clearly identify specific product or part installed, clearly identify data applicable to installation, and delete references to inapplicable information.

Drawings:

Supplement product data with drawings as necessary to clearly illustrate relations of component parts of equipment or systems and control and flow diagrams.

Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.

Do not use Project record drawings as maintenance drawings.

Written Text:

As required to supplement product data for the particular installation organized into consistent format under separate headings for different procedures. Provide logical sequence of instructions for each procedure.

Other Data:

Copy of each warranty, bond and service contract issued.

Provide information sheet for University of Colorado, Facilities Management's personnel, covering proper procedures in event of failure and instances which might affect validity of warranties or bonds.

1.5 MANUAL FOR MATERIALS AND FINISHES:

Submit copies (per schedule) of complete manual in final form covering maintenance and cleaning procedures for materials specified in Division 02 through 50 sections. Include:

Summary of final product color selections for all materials.

Manufacturer's data, giving full information on products:

Catalog number, material, composition.
Color and texture designations.
Information required for re-ordering special manufactured products.

Instructions for care and maintenance:

Manufacturer's recommendations for types of cleaning agents and methods.
Cautions against cleaning agents and methods which are detrimental to product.
Recommended schedule for cleaning and maintenance.

Submit copies (per schedule) of manual covering moisture protection and weather exposed products.

Provide manufacturer's data, giving full information on products, applicable standards, chemical composition and details of installation.

Provide instructions for inspection, maintenance and repair.

1.6 MANUALS FOR EQUIPMENT AND SYSTEMS:

Submit copies (per schedule) of complete manual in final form.

Provide complete information for products specified in individual sections.

Provide information for each unit of equipment and system.

Provide information for each electric and electronic system.

Submit manuals with complete data as required, including the following as applicable.

Description of Unit and Component Parts:

Function, normal operating characteristics, and limiting conditions; performance curves, engineering data and tests; complete nomenclature and commercial number of replaceable parts. (Consultant approved submittals)

Operating Procedures:

Start-up, break-in, routine and normal operating instructions; regulation, control, stopping, shut-down and emergency instructions; day and night special procedures; summer and winter operating instructions; other special operating instructions.

Maintenance Procedures:

Include routine operations, guide to "trouble-shooting", disassembly, repair and reassembly, alignment, adjusting and checking.

Include lubrication schedule, lubricants required and filter cleaning or replacement schedule.

Instructions:

Submit manufacturer's printed operating and maintenance instructions with description of sequence of operation, original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance covering predicted life of parts subject to wear and items recommended to be stocked as spare parts.

List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

Prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel or when specified in respective sections.

Video:

Provide standard compatible DVD for all HVAC equipment and systems demonstrating routine operations and preventive maintenance procedures. Relate video presentation to printed manuals for easy reference. Utilize video during equipment and system demonstrations with Owner's personnel.

Diagrams, Charts:

Submit as-installed control diagrams by controls manufacturer, charts of valve tag numbers, with location and function of each valve, content for each electric and electronic system, as appropriate, complete wiring diagrams, circuit directories of panelboards, electrical service and distribution, controls, and communications systems with as-installed color coded wiring diagrams.

1.7 OPERATION AND MAINTENANCE MANUAL:

Submit Operations and Maintenance Manuals for all disciplines electronically in Portable Document Format (PDF) format as one document, OCR (Optical Character Recognition) searchable, bookmarked according to the Construction Specifications Institute (CSI) standards.

1.8 SUBMITTAL SCHEDULE:

Submit one electronic copy to the Consultants and one to the University of draft of proposed formats and outlines of contents upon completion of the submittal process. The Consultants and the University staff will review the draft and will submit comments through the consultants.

Submit electronic copies of complete manual(s) in final form 15 days prior to final inspection or acceptance. Comments will be submitted after final inspection.

Submit number of CDs or DVDs of approved data specified in individual sections, but not less than three, in final form prior to acceptance.

Commissioning Agent Review:

As specified, the Commissioning Agent will review the operating and maintenance manuals for systems that were commissioned. The manuals are reviewed for completeness and for adherence to the requirements of the specifications. The Commissioning Agent will communicate deficiencies in the manuals to the Owner's Project Manager. Materials may be added, or requested from the Subcontractors, to stress and enhance the importance of system interactions, troubleshooting, and long-term preventative maintenance and operation. This work does not supersede the Architect's review of the operating and maintenance manuals.

1.9 COMMISSIONING RECORD IN OPERATING AND MAINTENANCE MANUALS:

The Commissioning Agent is responsible to compile, organize and index all commissioning data into labeled and indexed three-ring binders for delivery it to the Owner's Project Manager. The manuals summarize all of the tasks, findings, and documentation of the commissioning process. The report addresses the actual performance of the building systems in reference to the design intent and Contract Documents.

1.10 START UP:

Test and start up all systems as specified in the appropriate sections. See Section 01 92 13 for demonstration and training requirements.

Equipment start-up requires coordination with the commissioning process. Refer to Section 01 92 13. Equipment shall not be "temporarily" started for commissioning.

1.11 FRAMED OPERATING AND MAINTENANCE INSTRUCTIONS:

All mechanically and electrically operated equipment and controls shall be provided with legible and complete wiring diagrams, schematics, operating instructions, and pertinent preventative maintenance instructions. These operating and maintenance instructions may be mounted on equipment where clearly visible in final position or in a sturdy frame with clear glass or plastic cover. Utilize non-fading, permanent media.

Frames shall be located in the same room or service enclosure as the equipment, or in the nearest mechanical or electrical room.

Submit proposed instructions to Architect for review and acceptance prior to installation.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 01 78 23

SECTION 01 78 36
WARRANTIES

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification Sections, apply to this Section.

1.1 SUMMARY:

Section Includes:

General administrative and procedural requirements for warranties required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.

Related Sections:

Refer to the General Conditions for terms of the Contractor's special warranty of workmanship and materials.
General closeout requirements: Section 01 77 00
Specific requirements for warranties for Work, products and installations: Individual Sections of Divisions-02 through -50
Certifications and other commitments and agreements for continuing services to Owner: Applicable portions of Contract Documents.

Disclaimers and Limitations:

Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and Subcontractors required to countersign special warranties with the Contractor.

1.2 DEFINITIONS:

Standard Product Warranties:

Preprinted written warranties published by individual manufacturers for particular products and specifically endorsed by the manufacturer to the Owner.

Special Warranties:

Written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.3 WARRANTY REQUIREMENTS:

Related Damages and Losses:

When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

Reinstatement of Warranty:

When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty.

Replacement Cost:

Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefitted from use of the Work through a portion of its anticipated useful service life.

Owner's Recourse:

Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.

Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.4 SUBMITTALS:

Submit written warranties to the Architect/Engineer prior to Substantial Completion. If any partial Notice of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.

When a designated portion of the Work is completed and occupied or used by the Owner under a partial Notice of Substantial Completion, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within 15 days of completion of that designated portion of the Work.

When a special warranty is required to be executed by the Contractor, or the Contractor and a Subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Architect for approval prior to final execution.

Refer to individual Sections of Divisions 02 through 50 for specific content requirements, and particular requirements for submittal of special warranties.

Form of Submittal:

At Final Completion, compile 2 copies of each required warranty properly executed by the Contractor, or by the Contractor, Subcontractor, supplier or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

Bind warranties in heavy duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8.5" by 11" paper.

Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the Installer.

Identify each binder on the front and the spine with the typed or printed title "WARRANTIES", the Project title or name, and the name of the Contractor.

When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 01 78 36

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

The recording, maintenance, preparation and submittal of Project Record Documents.

1.2 DEFINITIONS:

The Project Record Documents are intended to indicate all changes and deviations from the original Contract Documents and permanently record the "as-built" condition of material, equipment and structure. The project record documents shall include the Contract Drawings, Project Manual, addenda, change orders, modifications and clarifications, field directives, approved shop drawings, approved product data, manufacturer's certificates and project test results.

1.3 DOCUMENTS:

General:

Maintain at job site, one copy of:

- Contract Drawings
- Specifications
- Addenda
- Reviewed Shop Drawings
- Change Orders
- Other Modifications to Contract
- Field Test Records
- As-Built Drawings

Store Documents in temporary field office apart from documents used for construction and maintain documents in clean, dry, legible condition. Do not use record documents for construction purposes. Label each document "PROJECT RECORD" in 1" or larger printed letters.

Make documents available at all times for inspection by Architect, his Professional Consultants, and Owner.

Record Drawings:

Maintain a clean, undamaged set of bond paper prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.

Do not use marking methods that cannot be reproduced on a standard photocopier and which will be completely legible upon photocopying. Translucent markers or methods of marking of information that is not reproducible by photocopy, or methods that obliterate information when photocopied, are not acceptable.

Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings.

Note related Change Order numbers where applicable.

Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.

Record drawing information with opaque lines and symbols conforming to Contract Drawings. Note where positions of elements have been changed. Follow methods directed by Architect.

Keep Record Documents current. Update at least weekly. Progress applications for payment will not be approved if record documents are not current.

Do not permanently conceal any work, including lay-in ceiling panels, until required information has been recorded. Include the following:

Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.

Location of concealed valves, dampers, controls, balancing devices, junction boxes, cleanouts, access doors and other items requiring access or maintenance.

Field changes of dimension and detail, changes made by Change Order or Field Order.

Fire protection and alarm systems shop drawings.

Record Specifications:

Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and Product Data.

Indicate manufacturers provided for all products complete with catalogue or model number and trade name.

Upon completion of the Work, submit record Specifications to the Architect for the Owner's records.

Record Product Data:

Maintain one copy of each Product Data submittal. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendation. Give particular attention to concealed products and portions of the Work which cannot otherwise be readily discerned later by direct observation. Note related Change Orders and mark-up of record drawings and Specifications.

Upon completion of the mark-up, submit complete set of record Product Data to the Architect for the Owner's records.

Maintain product listing furnished under Section 01 60 00 and record any changes made to it, either brand, model, Subcontractor or Installer so that final listing will accurately reflect the materials, equipment and systems incorporated in the Work.

Record Sample Submitted:

Immediately prior to the date of Substantial Completion, the Contractor will meet at the site with the Architect and the Owner's personnel to determine which of the submitted Samples that have been maintained during progress of the Work are to be transmitted to the Owner for record purposes. Comply with delivery to the Owner's Sample storage area.

Miscellaneous Record Submittals:

Refer to other Specification Sections for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the Work. Immediately prior to the date of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Architect for the Owner's records.

Include manufacturer's certifications, field test records, copies of permits, licenses, certifications, inspection reports, releases, notices, receipts for fee payments, and similar documents.

With miscellaneous record submittals, submit the following:

Affirmative Procurement Reporting Form. Submit on form approved by the Owner's Environmental Consultant.

Material Safety Data Sheets (MSDS): For each product required by OSHA to have a MSDS, submit an MSDS. MSDS shall be prepared within the previous five years. Include information for MSDS Sections 1-16 in accordance with ANSI Z400.1.

Chain of Custody: Submit chain-of-custody documentation for sustainable forestry for the following products:

Rough carpentry.
Stile and rail wood doors.
Wood laboratory casework.
Other furnishings and accessories.

1.4 SUBMITTAL:

Complete this work and submit as specified in Section 01 77 00.

Submit marked-up drawing prints and final product listing as part of Substantial Completion Documents.

Submit revised and corrected mark-ups if initial submittal is unsatisfactory as part of Final Acceptance Documents and prior to the final application for payment. The final application for payment will not be approved prior to the submittal of record documents.

Deliver record documents to Architect including all items listed above under "Documents".

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 01 78 39

SECTION 01 81 19
INDOOR AIR QUALITY REQUIREMENTS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

General requirements and procedures that apply to indoor air quality management including air quality management plan and building flush-out.

Related Sections:

Temporary Facilities and Controls: Section 01 50 00

1.2 DEFINITIONS:

Volatile Organic Compounds (VOC): Chemical compounds common in and emitted by many building products, including solvents in paints, coatings, adhesives and sealants, wood preservatives; composite wood binder, and foam insulations. Not all VOC's are harmful, but many of those contained within building products contribute to the formation of smog and irritate (at best) building occupants by their smell and/or health impact.

Materials the Act as "Sinks" for VOC Contamination: Absorptive materials, typically dry and soft (such as textiles, carpeting, acoustical ceiling tiles and gypsum board) that readily absorb VOC's emitted by "source" materials and release them over a prolonged period of time.

Materials that Act as "Sources" for VOC Contamination: Products with high VOC contents that emit VOC's either rapidly during application and curing (typically "wet" products, such as paints, sealants, adhesives, caulks and sealers) or over a prolonged period (typically "dry" products such as flooring coverings with plasticizers and engineered wood with formaldehyde).

1.3 REFERENCES:

"IAQ Guidelines for Occupied Buildings under Construction", Second Edition, 2007: Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA), www.smacna.org and ANSI/SMACNA 008 - 2008, Chapter 3.

ANSI/ASHRAE 52.2-1999, "Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size", www.ashrae.org.

1.4 SUBMITTALS:

Product Data:

Submit product data for temporary filtration media indicating MERV rating and filtration media installed immediately prior to occupancy with MERV values highlighted. Cut sheets shall be submitted with the Contractor's or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.

Construction Documentation:

Submit six photographs at three different occasions during construction (18 total) along with a brief description of the SMACNA approach employed, documenting implementation of the IAQ management measures, such as protection of ducts and on-site stored or installed absorptive materials.

Indoor Air Quality Management Plan:

Requirements for the Construction Indoor Air Quality (IAQ) Management Plan: The Contractor shall prepare and submit a Construction IAQ Management Plan to the Owner and Architect for approval. The Construction IAQ Management Plan shall meet the following criteria:

Construction activities shall be planned to meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors' Association (SMACNA) "IAQ Guidelines for Occupied Buildings under Construction", Second Edition, 2007 and ANSI/SMACNA 008 - 2008, Chapter 3.

Absorptive materials shall be protected from moisture damage when stored on-site and after installation.

Filtration media shall be replaced immediately prior to occupancy. Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 8 as determined by ASHRAE 52.2-2004.

If air handlers used during construction MERV 8 filters to be used during construction.

If air handlers not to be used during construction equipment and duct openings must be sealed with plastic.

Include special procedures to be used to maintain air quality requirements specified in Section 01 10 00 in the Environmental Chambers.

Sequence of Finishes Installation Plan:

A "Sequence of Finishes Installation" Plan shall be developed, highlighting measures to reduce the absorption of VOC's by materials that act as "sinks".

Upon the Plan's approval by the Owner and Architect, the Plan shall be implemented by the Contractor and Subcontractors through the duration of the construction process, and documented in accordance with the Submittal Requirements of this section.

Further description of the Construction IAQ Management Plan requirements are as follows:

SMACNA Guidelines: Chapter 3 of the SMACNA document "IAQ Guidelines for Occupied Buildings under Construction" outlines IAQ measures in five major categories, as listed below. The Construction IAQ Management Plan shall be organized in accordance with the SMACNA format, and shall address measures to be implemented by the Contractor and/or Subcontractors in each of the five categories (including subsections). All subsections shall be listed in the Plan; items that are not applicable for this project should be listed as such.

HVAC Protection:

Return Side
Central Filtration
Supply Side

Duct Cleaning
Filters

Source Control:

Product Substitution
Modifying Equipment Operation
Changing Work Practices
Local Exhaust
Air Cleaning
Cover or Seal
Isolate Toxic Materials.

Pathway Interruption:

Depressurize the Work Area
Pressurize Occupied Space
Erect Barriers to Contain Construction Areas
Relocate Pollutant Sources
Temporarily Seal the Building

Housekeeping:

Protect porous materials.
Cleaning frequency.
Wetting agents for dust.
Vacuum cleaners with HEPA filters.

Scheduling:

Material delivery.
Sequence activities/installation.
Replacement of filters.

Replacement of Filtration Media: Under the "HVAC Protection" section of the Construction IAQ Management Plan, a description of the filtration media in all ventilation equipment shall be provided. The description shall include replacement criteria for filtration media during construction, and confirmation of filtration media replacement for all equipment immediately prior to occupancy.

Protection of Materials from Moisture Damage: As part of the "Housekeeping" section of the Construction IAQ Management Plan, measures to prevent stored or installed materials from moisture damage shall be described. This section should also describe measures to be taken if moisture damage does occur to absorptive materials during the course of construction.

Sequence of Finish Installation for Materials: Where feasible, absorptive materials shall be installed after the installation of materials or finishes which have high short-term emissions of VOC's, formaldehyde, particulates, or other air-borne compounds. Absorptive materials include, but are not limited to: carpets; acoustical ceiling panels; fabric wall coverings; insulations (exposed to the air stream); upholstered furnishings; and other woven, fibrous or porous materials. Materials with high short-term emissions include, but are not limited to: adhesives, sealants, and glazing compounds (specifically those with petrochemical vehicles or carriers); paints, wood preservatives and finishes; control and/or expansion joint fillers; hard finishes requiring adhesive installation; gypsum board (with associated finish processes and products); and composite or engineered wood products with formaldehyde binders. The Contractor shall develop a separate sequencing plan that identifies feasible opportunities to

meet the above-stated goals for the project. The plan shall be submitted to the Architect and Owner in accordance with the Submittal Requirements of this section.

Implementation and Coordination: The Contractor shall be responsible for implementation of the Construction IAQ Management Plan, and for the coordination of the Plan with all affected trades. The Contractor shall designate on individual as the Construction IAQ Representative, who will be responsible for communicating the progress of the Plan with the Owner and Architect on a regular basis. Contractor shall include provisions in the Construction IAQ Management Plan for addressing conditions in the field that do not adhere to the Plan, including provisions to implement a stop work order, or to rectify noncompliant conditions.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION

3.1 CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT:

Comply with SMACNA IAQ Guideline for Occupied Buildings under Construction. Develop and conduct a Construction Indoor Air Quality (IAQ) Management Plan, as described in this specification section, and coordinate with Division 23 Installer.

Comply with and provide photographs where possible of the six requirements in SMACNA IAQ Guideline for Occupied Buildings under Construction, 1995: HVAC Protection, Source Control, Pathway Interruption, Housekeeping, Scheduling, and Flush-out as defined below:

HVAC Protection: Wherever possible, do not operate HVAC system during construction and utilize temporary systems. Seal all return air openings with plastic. If the system is used during construction, maintain sealing of return air side and temporarily supply 100% outside air. Shut down the HVAC system whenever possible during heavy construction. The return side should also be isolated from the surrounding environment by putting in place all ceiling tiles for the ceiling plenum. All leaks in ducts and air handlers should be repaired promptly. If the ventilation system must be operated during construction, it should be fitted with temporary MERV 8 filters that can be replaced with clean media just prior to occupancy. Do not use mechanical rooms for storage.

Source Control: For Contractor information, all paints, carpet, caulks, adhesives, sealants are specified as low-VOC and non-toxic.

Pathway Interruption: During construction, isolate areas of work to prevent contamination of clean or spaces. Ventilate using 100% outside air to exhaust contaminated air directly to the outside during installation of VOC emitting materials. Pressure differentials or barriers between work and clean areas should be used to prevent contaminated air from entering clean areas. Recover, isolate and ventilate containers with toxic contents.

Housekeeping: Protect building materials from weather and store in a clean area prior to unpacking for installation. Clean all coils, air filters, and fans before performing testing and balancing procedures. Use vacuum cleaners with HEPA filters, increase cleaning frequency and use wetting agents for dust.

Scheduling: Complete applications of wet and odorous materials such as VOCs in paints, sealants, and coatings before installing absorbing materials such as ceiling tiles, carpets, insulation, gypsum products, and fabric-covered furnishings. Avoid exposure of all interior materials to moisture.

If Contracting Officer authorizes the use of permanent heating, cooling, and ventilating systems during construction period as specified in Section 01 50 00, install filter media having a MERV 8 according to ASHRAE 52.2 at each return-air inlet for the air-handling system used during construction.

Environmental Chambers: Comply with approved requirements in the Indoor Air Quality Management Plan and the Environmental Performance requirements specified in Section 01 10 00.

After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out of project area with outside air.

Supplying a total air volume of 14,000 cu.ft. of outdoor air per sq. ft. of floor area while maintaining an internal temperature of at least 60 degrees F and relative humidity no higher than 60%.

If occupancy is desired prior to flush-out completion, the space may be occupied following delivery of a minimum of 3500 cu. ft. (1,070,000 L) of outdoor air per sq. ft. (sq. m) of floor area to the space. Once a space is occupied, it shall be ventilated at a minimum rate of 0.30 cfm per sq. ft. (1.52 L/s per sq. m) of outside air. During each day of the flush-out period, ventilation shall begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions shall be maintained until a total of 14,000 cu. ft./sq. ft. (4,300,000 L/sq. m) of outside air has been delivered to the space.

All paints, coatings, sealants, carpet, and wood products shall be installed prior to the commencement of building flush-out to ensure flushing of VOCs.

Final clean-up, punch list completion, removal of temporary filters and installation of design filters (MERV 13) must be completed prior to building flush-out commencement.

Coordinate dates of building flush-out proposed and procedure with the Owner and Architect.

Replace all filtration media installed immediately prior to occupancy the flush-out with filtration media with a Minimum Efficiency Reporting Value (MERV) of 13 as specified in Division 23 sections.

END OF SECTION 01 81 19

SECTION 01 91 13
GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification Sections, apply to this Section.

OPR and BoD documentation are included by reference for information only.

1.1 SUMMARY:

Section Includes:

General requirements that apply to implementation of commissioning without regard to specific systems, assemblies, or components.

Related Sections:

Requirements for Government employed commissioning agent: Sections 01 10 00 and 01 45 00.
Plumbing: Division 22 sections.
HVAC: Division 23 sections.
Electrical: Division 26 sections.

Systems to be Commissioned:

The following systems will be commissioned:

HVAC&R systems.
Lighting and daylighting controls.
Communications systems.

1.2 DEFINITIONS:

BoD: Basis of Design. A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.

CxA: Commissioning Authority.

OPR: Owner's Project Requirements. A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

1.3 COMMISSIONING TEAM:

Members Appointed by Contractor(s):

Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated action. The commissioning team shall consist of, but not be limited to, representatives of Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.

Members Appointed by Owner:

CxA: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract.

Representatives of the facility user and operation and maintenance personnel.

Architect and engineering design professionals.

1.4 OWNER'S RESPONSIBILITIES:

Provide the OPR documentation to the CxA and Contractor for information and use.

Assign operation and maintenance personnel and schedule them to participate in commissioning team activities.

Provide the BoD documentation, prepared by Architect and approved by Owner, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.5 CONTRACTOR'S RESPONSIBILITIES:

Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:

Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.

Cooperate with the CxA for resolution of issues recorded in the Issues Log.

Attend commissioning team meetings held on a weekly basis during commissioning process and at other times on an as-needed basis.

Integrate and coordinate commissioning process activities with construction schedule.

Review and accept construction checklists provided by the CxA.

Complete electronic construction checklists as Work is completed and provide to the Commissioning Authority on a weekly basis.

Review and accept commissioning process test procedures provided by the Commissioning Authority.

Complete commissioning process test procedures.

Costs for retesting are born by the Contractor.

1.6 CxA'S RESPONSIBILITIES:

Organize and lead the commissioning team.

Provide commissioning plan.

Convene commissioning team meetings.

Provide Project-specific construction checklists and commissioning process test procedures.

Verify the execution of commissioning process activities using random sampling. The sampling rate may vary from 1 to 100 percent. Verification will include, but is not limited to, equipment submittals, construction checklists, training, operating and maintenance data, tests, and test reports to verify compliance with the OPR. When a random sample does not meet the requirement, the CxA will report the failure in the Issues Log.

Prepare and maintain the Issues Log.

Prepare and maintain completed construction checklist log.

Witness systems, assemblies, equipment, and component startup.

Compile test data, inspection reports, and certificates; include them in the systems manual and commissioning process report.

1.7 DESCRIPTION OF WORK:

Prepare commissioning process based on the Commissioning Checklists found in the UCB Standards website:

http://www.colorado.edu/facilitiesmanagement/pdc/construction/standards/index.html

Coordinate the requirements of Project Closeout and Operating and maintenance sections that are part of Division 01.

Schedule the required commissioning activities with the University of Colorado Facilities Department and their consultants at least 72 hours prior to conducting Commissioning activities.

1.8 ATMOSPHERIC CHAMBER SYSTEM PERFORMANCE:

Test Sequence:

The Contractor shall verify each environmental chamber's performance for acceptance by carrying out the following test sequence:

Starting at ambient conditions, with chamber's internal lighting off, cool chamber until a uniform steady - state temperature of 41°F is achieved.

Log time vs. temperature inside chamber.

Log time vs. temperature in laboratory at a distance of 24 inches from chamber exterior wall at an elevation of 5'-0" AFF.

With chamber at a uniform steady - state temperature of 41°F and internal lighting off, heat chamber until a uniform steady - state temperature of 104°F is achieved.

Log time vs. temperature inside chamber.

Log time vs. temperature in laboratory at a distance of 24 inches from chamber exterior wall at an elevation of 5'-0" AFF.

With chamber at a uniform, steady - state temperature of 104°F, activate 100% internal environmental lighting and cool chamber until a uniform, steady - state temperature of 41°F is achieved.

Log time vs. temperature inside chamber.

Log time vs. temperature in laboratory at a distance of 24 inches from chamber exterior wall at an elevation of 5'-0" AFF.

Starting at laboratory ambient conditions activate 100% internal environmental lighting and heat chamber until a uniform steady - state temperature of 140°F is achieved.

Log time vs. temperature inside chamber.
Log time vs. temperature in laboratory at a distance of 24 inches from chamber exterior wall at an elevation of 5'-0" AFF.

Performance Constraints:

Under each condition described under Test Sequence above, the target steady - state temperature must be maintained inside the chamber's Teflon bag to within ± 1°F ± .5°C.

When internal environment lighting is activated at 100% in either heating or cooling mode the return air temperature from the lighting arrays must not exceed 122°F.

Infiltration:

Execute a blower door test at 50 pascals pressure with all mechanical supply and returns sealed. Leakage from the chamber shall not exceed five (5) CFM.

Provide staffing and equipment necessary to conduct air leakage performance testing in accordance with the following recognized standards:

ASTM E779 (2003): Test Method for Determining Air Leakage Rate by Fan Pressurization.

ASTM E1827-96 (2002): Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door.

U.S. Army Corps of Engineers Air Leakage Test Protocol for Measuring Air Leakage in Buildings.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 01 91 13

SECTION 01 92 13
FACILITY OPERATION PROCEDURES

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01-Specification Sections, apply to this Section.

1.1 SUMMARY:

Section Includes:

This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

Demonstration of operation of systems, subsystems, and equipment.

Training in operation and maintenance of systems, subsystems, and equipment.

Demonstration and training DVDs.

Related Sections:

Project Meetings: Section 01 31 19
General Commissioning Requirements: Section 01 91 13.
For specific requirements for demonstration and training for products in specific sections: Divisions 02 through 33 Sections.

1.2 SUBMITTALS:

Instruction Program:

Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

At completion of training, submit one complete training manual for Owner's use.

Qualification Data:

Submit Qualification Data for facilitator and instructor.

Attendance Record:

For each training module, submit list of participants and length of instruction time.

Evaluations:

For each participant and for each training module, submit results and documentation of performance-based test.

Demonstration and Training DVDs:

Submit two copies within seven days of end of each training module.

On each copy, provide an applied label with the following information:

Name of Project.
Name and address of photographer.
Name of Architect.
Name of Contractor.
Date of recording.
Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

Prepared on 8-1/2" by 11" paper, punched and bound in heavy-duty, 3-ring, vinyl-covered binders. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding DVD. Include name of Project and date of DVD on each page.

1.3 QUALITY ASSURANCE:

Facilitator Qualifications:

A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

Instructor Qualifications:

A factory-authorized service representative experienced in operation and maintenance procedures and training.

Pre-Instruction Conference:

Conduct conference at Project site to comply with requirements in Section 01 31 19. Review methods and procedures related to demonstration and training including, but not limited to, the following:

Inspect and discuss locations and other facilities required for instruction.

Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.

Review required content of instruction.

For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.4 COORDINATION:

Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

Equipment start-up requires coordination with the commissioning process described in Section 01 91 13. The start-up procedures shall document all manufacturer's recommendations for installation, inspection, and start-up. Equipment is not "temporarily" started (for heating or cooling), until all manufacturer's installation and start-up procedures are completed, and moisture, dust and other environmental or building integrity issues have been addressed.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM:

Program Structure:

Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows:

Door hardware including electrified hardware.

Equipment, including projection screens and projectors.

Laboratory equipment, including laboratory air and vacuum equipment and piping.

Fire-protection systems, including fire alarm and fire-extinguishing systems.

HVAC systems, including specialty laboratory HVAC systems.

HVAC instrumentation and controls.

Lighting equipment and controls including specialty laboratory lighting.

Communication systems.

Fire alarm system.

Training Modules:

The operating and maintenance manual shall constitute the textbook for instruction.

Review contents of manual in detail to explain all aspects of operations and maintenance.

Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:

Basis of System Design, Operational Requirements, and Criteria: Include the following:

System, subsystem, and equipment descriptions.
Performance and design criteria if Contractor is delegated design responsibility.
Operating standards.
Regulatory requirements.
Equipment function.
Operating characteristics.
Limiting conditions.
Performance curves.

Documentation: Review the following items in detail:

- Emergency manuals.
- Operations manuals.
- Maintenance manuals.
- Project Record Documents.
- Identification systems.
- Warranties and bonds.
- Maintenance service agreements and similar continuing commitments.

Emergencies: Include the following, as applicable:

- Instructions on meaning of warnings, trouble indications, and error messages.
- Instructions on stopping.
- Shutdown instructions for each type of emergency.
- Operating instructions for conditions outside of normal operating limits.
- Sequences for electric or electronic systems.
- Special operating instructions and procedures.

Operations: Include the following, as applicable:

- Startup procedures.
- Equipment or system break-in procedures.
- Routine and normal operating instructions.
- Regulation and control procedures.
- Control sequences.
- Safety procedures.
- Instructions on stopping.
- Normal shutdown instructions.
- Operating procedures for emergencies.
- Operating procedures for system, subsystem, or equipment failure.
- Seasonal and weekend operating instructions.
- Required sequences for electric or electronic systems.
- Special operating instructions and procedures.

Adjustments: Include the following:

- Alignments.
- Checking adjustments.
- Noise and vibration adjustments.
- Economy and efficiency adjustments.

Troubleshooting: Include the following:

- Diagnostic instructions.
- Test and inspection procedures.

Maintenance: Include the following:

- Inspection procedures.
- Types of cleaning agents to be used and methods of cleaning.
- List of cleaning agents and methods of cleaning detrimental to product.
- Procedures for routine cleaning
- Procedures for preventive maintenance.
- Procedures for routine maintenance.
- Instruction on use of special tools.

Repairs: Include the following:

Diagnosis instructions.
Repair instructions.
Disassembly; component removal, repair, and replacement; and reassembly instructions.
Instructions for identifying parts and components.
Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION:

Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.

Set up instructional equipment at instruction location.

3.2 INSTRUCTION:

Facilitator:

Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

Instructor:

Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

Owner will furnish an instructor to describe Owner's operational philosophy.

Owner will furnish Contractor with names and positions of participants.

Scheduling:

Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

Schedule training with Owner, through Architect, with at least ten days' advance notice.

Evaluation:

At conclusion of each training module, assess and document each participant's mastery of module by use of a written performance-based test followed by a demonstration of proper operation of selected components.

Cleanup:

Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING DVDS:

General:

Engage a qualified photographer to record demonstration and training DVDs. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

At beginning of each training module, record each chart containing learning objective and lesson outline.

Format:

Provide high-quality color DVD in a protective hard case.

Recording:

Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.

Narration:

Describe scenes on DVD by audio narration by microphone while DVD is recorded. Include description of items being viewed. Describe vantage point, indicating location, direction (by compass point), and elevation or story of construction.

Transcript:

Provide a hard copy transcript of the narration. Display images and running time captured from DVD opposite the corresponding narration segment.

END OF SECTION 01 92 13

SECTION 02 41 19

SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Selective structure demolition work as shown on the drawings for removal of portions of existing construction as required to accommodate remodeling and new construction.

Removal of hazardous materials other than materials containing no more than "trace" amounts of asbestos.

Related Sections:

Summary: Section 01 10 00
Environmental Procedures: Section 01 35 43
Waste Materials Management and Recycling: Section 01 74 19
Cutting holes in non-structural floors, walls or roofs for mechanical, plumbing, fire protection, electrical, telecommunications or safety and security installations: Division 21 through 28 sections

Hazardous Materials:

Removal of asbestos or materials containing more than "trace" amounts of asbestos and any PCB or lead, if any, will be performed by the Owner under a separate contract. Refer to Sections 01 10 00 and 01 35 43.

1.2 SUBMITTALS:

Schedule:

For information only, submit schedule for demolition work by areas, location and types prior to start of work. Include relationship to remodeling and new construction scheduling and the cut-off or interruption of utilities.

Provide a detailed sequence of demolition work to ensure the uninterrupted use of areas to remain occupied and in use by the Owner.

Proposed Protection Measures:

Submit informational report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and for noise control. Indicate proposed locations and construction of barriers.

Inventory:

Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.

Pre-Demolition Photographs or Video:

Submit pre-demolition photographs or video showing existing conditions of adjoining building construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Submit before the Work begins.

Qualifications:

Submit evidence of qualifications specified herein.

1.3 QUALITY ASSURANCE:

Contractor's Designated Recycling Coordinator:

Appoint a knowledge person, available on site, who is trained in the recycling processes and requirements of facilities who is available to answer questions and direct how materials are to be recycled.

Building Reuse:

The existing building structure (including floor and roof decking), envelope (exterior skin and framing) and interior non-structural elements (walls, doors, floor coverings and ceiling systems) not indicated to be demolished are to be maintained.

Demolition Subcontractor Qualifications:

Certified by OSHA for removal of "trace" amounts of asbestos as defined in Section 01 35 43.

Pre-Demolition Conference:

Conduct conference at Project site.

Inspect and discuss condition of construction to be demolished.

Review structural load limitations of existing structures.

Review and finalize demolition schedule and verify availability of demolition personnel, equipment and facilities needed to make progress and avoid delays.

Review and finalize protection requirements.

Review procedures for noise control and dust control.

Review procedures for protection of adjacent surfaces.

Waste Management Conference:

Conduct conference at Project site to comply with Contract requirements in Section 01 31 19. Review methods and procedures related to waste management including, but not limited to, the following:

Review and discuss waste management plan including responsibilities of Waste Management Coordinator.

Review requirements for documenting quantities of each type of waste and its disposition.

Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.

Review procedures for periodic waste collection and transportation to recycling and disposal facilities.

Review waste management requirements for each trade.

1.4 PROJECT/SITE CONDITIONS:

Occupancy:

The existing building to be remodelled will remain in partial occupancy and use with areas made available for demolition and remodeling work in accordance with a mutually agreed schedule between Contractor and Owner.

Notify Owner not less than 72 hours in advance of any demolition activities which will significantly impact Owner's normal operations.

Condition of Structure:

The Owner assumes no responsibility for the actual condition of construction to be demolished.

Conditions existing at the time of bidding will be maintained by the Owner insofar as practical although variations may occur due to Owner's salvage operations.

1.5 COORDINATION:

Arrange demolition schedule so as not to interfere with Owner's on-site operations or operations of adjacent occupied areas of building.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PREPARATION:

Location of Concrete Slab Reinforcing:

Locate existing slab reinforcing in concrete slabs using 'pacometer' or 'ground penetrating radar (GPR)' and shift location of core-drilled holes (including conduit, misc piping, etc.) to clear reinforcing by at least 1", typical.

Protections:

Maintain safe and convenient access to and egress from existing occupied areas during normal operational days and times.

Erect and maintain dustproof and sound retardant partitions and ceilings as required to separate work areas from Owner occupied areas, to prevent spread of dust, fumes and smoke to other parts of the building, to prevent damage to existing areas and equipment, and to maintain the Owner's required security. Equip with doors and locks if required. On completion, remove partitions and repair damaged surfaces to match adjacent surfaces.

Construction: Framing and sheet materials with closed joints and sealed edges at intersections with existing surfaces.

STC rating 35 in accordance with ASTM E90.
Flame Spread Rating of 25 in accordance with ASTM E84.
Paint surfaces exposed to view in Owner occupied areas.

Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.

Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces, and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building.

Carry out demolition work to cause as little inconvenience to adjacent occupied building areas as possible.

Damages:

Promptly repair damages caused to adjacent facilities by demolition work at no additional cost to the Owner.

Traffic:

Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with streets, drives, parking areas, walks and other adjacent occupied or used facilities.

Do not close, block or otherwise obstruct streets, drives, parking areas, walks or other occupied or used facilities without written permission from the Owner. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

Hazardous Materials:

Remove, handle and dispose of hazardous materials, including materials containing no more than "trace" quantities of asbestos or PCB in a safe manner and as required by EPA, OSHA and the Colorado Department of Health.

For material containing or likely to contain more than "trace" amounts of asbestos or any PCB or lead, refer to Section 01 35 43 and General Conditions. Remove, handle and dispose of PCB ballasts in accordance with EPA and OSHA requirements.

3.2 DEMOLITION:

General:

Prevent movement or settlement of structure. Provide and place bracing or shoring and be responsible for safety and support of structure. Assume liability for such movement, settlement, damage or injury.

Cease operations and notify the Architect immediately if safety of structure appears to be endangered. Take precautions to properly support structure. Do not resume operations until safety is restored.

Provide, erect and maintain barricades, lighting and guard rails as required by applicable regulatory requirements to protect occupants of building and workers.

Arrange and pay for disconnecting, removing and capping utility services within areas of demolition. Disconnect and stub off.

Do not disrupt services to occupied areas except as scheduled in advance and agreed to by Owner. Give 72 hours advance notice of such disruptions.

Place markers to indicate location of disconnected services. Identify service lines and capping locations on Project Record Documents.

The use of explosives will not be permitted.

Control dust resulting from demolition operations.

Selective Removal:

Demolish in an orderly and careful manner as required to accommodate new work.

Perform demolition in accordance with applicable requirements of authorities having jurisdiction.

Demolish masonry in small sections. Cut masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.

Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors or framing.

For removal of existing concrete floor slab to accommodate required floor ports, core drill slab as required for port.

If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Architect in written, accurate detail. Pending receipt of directive from Architect rearrange selective demolition schedule as necessary to continue overall job progress without delay.

Repair all demolition performed in excess of that required and all damage to remaining elements due to demolition, at no additional cost to the Owner.

Remove and dispose of all materials, equipment, and construction indicated as not to remain. Use methods and sequencing which will protect and minimize damage to existing work to remain.

Before removing existing conduit, wiring, piping be sure all lines are disconnected and shut off or capped. Remove existing wiring and conduit which is no longer required and which is exposed to view.

3.3 SALVAGE:

Items for Reuse:

Use skilled workers to carefully remove, clean, store and protect existing items scheduled or indicated for reuse in remodeling or new construction.

Include the following:

- Stone veneer as required for patching penetrations.
- Roof tiles.
- Fire extinguishers and cabinets.
- Refrigerators as indicated.
- Freezers as indicated.
- Shelving.

All adjustable shelving and associated hardware.
Laboratory fume hoods as indicated.
Laboratory casework as indicated.
Laboratory tops and fixtures as indicated.
Overhead snorkles.
Other items as shown on the drawings.

Salvage:

Use skilled workers to carefully remove materials and equipment indicated for the Owner's salvage. Deliver and store on site where directed by the Owner.

Include the following:

Undamaged roof tiles not utilized for patching.
Laboratory casework not reused.
Laboratory service fixtures not reused.
Other items shown on the drawings.

Contractor's Salvage:

All materials and equipment to be removed and not indicated for reuse or Owner's salvage become the property of the Contractor shall be salvaged, recycled or otherwise diverted from landfills wherever possible in accordance with specified requirements. Contractor shall remove any remaining non-recyclable or non-salvageable items from the site to a legal disposal site.

Items of salvable value or which the Contractor wishes to donate may be removed from the structure as the work progresses. Salvaged items must be transported from the site as they are removed.

Storage or sale of removed items on the site will not be permitted.

Recycling Incentives: Revenues, savings, rebates, tax credits and other incentives received for recycling waste materials shall accrue to Contractor.

3.4 DISPOSAL:

Burning of materials on site is not permitted.

Remove from site contaminated or dangerous materials encountered and dispose of legally off-site by safe means so as not to endanger health of workers and public.

Remove demolished materials, tools and equipment daily from site upon completion of the work in accordance with the requirements of Sections 01 74 13 and 01 74 19. Leave site in a condition acceptable to the Architect.

END OF SECTION 02 41 19

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Cast-in-place concrete as shown on the drawings and covers forming, reinforcing, concrete, placement, consolidation, curing, stripping and finishing. Work includes, but is not limited to, the following:

New concrete equipment pads.

Related Sections:

Cast Underlayment: Section 03 54 00

1.2 SUBMITTALS:

Mix Proportions and Design:

Proportion mixes by either laboratory trial batch or field experience method complying with ACI 301, Article 3.9.

Submit written report to Architect for each proposed concrete mix at least 7 days prior to start of work. Do not begin concrete production until mixes have been reviewed and are acceptable to Architect.

Submit laboratory test or evaluation reports for concrete materials and mix designs.

Mix designs may be adjusted when material characteristics, job conditions, weather, test results or other circumstances warrant. Do not use revised concrete mixes until submitted to and accepted by Architect.

1.3 QUALITY ASSURANCE:

Codes and Standards:

ACI 301 "Specifications for Structural Concrete for Buildings"; ACI 347 "Recommended Practice for Concrete Formwork"; ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete"; comply with applicable provisions and other standards referenced therein, except as otherwise indicated. Conform to ACI 301, ACI 347 and ACI 117 for tolerances.

Delivery, Handling and Storage:

Deliver reinforcement to the project site bundled, tagged and marked. Use tags indicating bar size, lengths, and other information corresponding to markings shown on placement diagrams.

Store concrete reinforcement materials at the site to prevent damage and accumulation of dirt or excessive rust.

Quality Control:

Concrete Testing Service: Employ acceptable testing laboratory to perform materials evaluation, testing and design of concrete mixes.

Certificates, signed by concrete producer and Contractor, may be submitted in lieu of material testing.

The Owner may employ a separate testing laboratory to evaluate concrete delivered to and placed at the site.

Perform sampling and testing during concrete placement, as follows:

Sampling: ASTM C172 and C31.

Slump: ASTM C143, one test for each set of compressive test specimens taken at point of discharge.

Air Content: ASTM C231, one for each set of compressive strength specimens.

Compressive Strength: ASTM C39, one set for each 50 cu. yds. or fraction thereof of each class of concrete; 2 specimens tested at 7 days, 3 specimens tested at 28 days, and one retained for later testing if required.

Report test results in writing to the Architect, Contractor and concrete producer on same day tests are made.

PART 2 - PRODUCTS

2.1 CONCRETE:

Concrete Materials:

Portland Cement: ASTM C150, Type I.

Aggregates: ASTM C33.

Water: Clean, drinkable.

Fly Ash: Do not use fly ash.

Admixtures:

Do not use admixtures containing thiocyanates nor having chloride ions in excess of 0.10%.

Air-Entraining Admixture: ASTM C260. Provide one of the following:

Air-Mix by Euclid Chemical Company
Micro-Air by Master Builders
Darex AEA or Daravair by W.R. Grace
Airtite 60 by Cormix Construction Chemicals Co., Inc.

Calcium Chloride: Use is prohibited.

2.2 RELATED MATERIALS:

Curing Compounds:

Dissipating Resin Curing Compound: ASTM C309, Type I, Class A or B, The Euclid Chemical Company "Kurez DR VOX" or approved equal by L&M Construction Chemicals, Sonneborn-Chemrex or US Mix Products Company.

VOC Content: Not greater than 250 grams per liter.

Bonding Agent:

ASTM C1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene, one of the following:

Acrylic Bondcrete; The Burke Company.
J-40 Bonding Agent; Dayton Superior Corporation.
Eucobond; Euclid Chemical Company.
SBR Latex; Euclid Chemical Company.
Daraweld "C"; W.R. Grace.
Weldcrete: Larsen Products.
Everbond; L&M Construction Chemicals.
Sonocrete; Sonneborn-Rexnord.

VOC Content: Not more than 775 grams per liter.

Epoxy-Bonding Adhesive:

ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements, and as follows:

Type II, non-load bearing, for bonding freshly mixed concrete to hardened concrete.

VOC Content: Not greater than 50 grams per liter.

2.3 FORM MATERIALS:

General:

Provide form materials with sufficient stability to withstand pressure of placed concrete without bow or deflection.

Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.

Provide all wood and wood products from forests certified by a Forest Stewardship Council accredited certification body to comply with Forest Stewardship Council "Principles and Criteria".

Form Release Agent:

Commercially formulated non-staining, vegetable and mineral oil base form release agent that will not discolor or deface surface of concrete.

VOC Content: Not more than 250 grams per liter.

Provide "Eucoslip VOX" by The Euclid Chemical Company or approved equal by L&M Construction Chemicals, Sonneborn-Chemrex or US Mix Products Company.

2.4 REINFORCING MATERIALS:

Deformed Reinforcing Bars: ASTM A615, Grade 60 unless otherwise indicated.

Bars for Ties, Stirrups and Bars Subjected to Bending After Placement: ASTM A706, low-alloy steel, grades as specified above.

Minimum Recycled Steel Content for All Reinforcing Steel: 60% by weight.

Welded Wire Fabric: ASTM A185.

Minimum Recycled Steel Content: 30% by weight.

PART 3 - EXECUTION

3.1 FORMING:

General Requirements for Formwork:

Construct so that concrete members and structures are of correct size, shape, alignment, elevation and position, complying with ACI 347.

Provide openings in formwork to accommodate work of other trades. Accurately place and securely support items built into forms.

Fabricate forms for easy removal without hammering or prying against concrete surfaces.

Form intersecting planes to provide true, clean-cut corners.

Coat form contact surfaces with form-coating compound before reinforcement is placed. Use chemical (not oil-base) type for surfaces to receive other materials bonded to concrete.

Clean and adjust forms prior to concrete placement. Retighten forms during and after concrete placement if required to eliminate mortar leaks.

Joints:

Provide construction, isolation and control joints as indicated or required. Locate construction joints so as to not impair the strength and appearance of the structure. Place isolation and control joints in slabs-on-ground to stabilize differential settlement and random cracking.

Embedded Items:

Set and build into the work, anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete.

Install and accessories furnished under other sections for installation in this Section.

3.2 REINFORCEMENT:

Comply with the specified codes and standards, CRSI "Manual of Standard Practice", ACI 301 and ACI 318. Do not weld reinforcing steel unless so indicated or specifically acceptable to Architect.

Position, support and secure reinforcement against displacement. Locate and support with metal chairs, runners, bolsters, spacers, and hangers, as required.

Install welded wire fabric in as long lengths as practical, lapping at least one-and-one-half meshes.

Splices:

Provide standard reinforcement splices by lapping ends, placing bars in contact, and tightly wire tieing. Comply with requirements of ACI 318 for minimum lap of spliced bars.

3.3 CONCRETE:

Mixing:

Provide 4000 psi minimum 28 day compressive strength mix with not less than 6 sacks cement per cu. yd. (water/cementitious material ratio not greater than 0.48) with slump of 2 to 4 inches for all concrete.

Use air-entraining admixture, providing not less than 2% nor more than 4% entrained air.

Limit aggregate size to 0.75".

Ready-Mix Concrete: ASTM C94.

Concrete Placement:

Place concrete in compliance with the practices and recommendations of ACI 304, and as herein specified.

Notify Architect not less than 24 hours hours in advance of "buttoning up" the forms prior to any pour and reinforcing is substantially complete.

Do not place concrete until forms have been checked for line and level.

Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section.

Perform concrete placing at such a rate that concrete which is being integrated with fresh concrete is still plastic. Deposit concrete as nearly as practical to its final location to avoid segregation due to rehandling or flowing.

Do not subject concrete to any procedure which will cause segregation.

Protect concrete from physical damage during mixing, placement and curing.

Consolidation:

Consolidate concrete placed in forms by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with the recommended practices of ACI 309, to suit the type of concrete and project conditions.

3.4 CONCRETE FINISHES:

Finish:

Provide monolithic finish to equipment pads by stripping forms while concrete is still green and steel troweling to a hard, dense finish with corners, intersections, and terminations slightly rounded.

Consolidate concrete surfaces by finish troweling, free of trowel marks, uniform in texture and appearance.

Tool edges of vertical concrete and nosings with 1/2" radius edging tool. Repeat edging after applying surface finish.

3.5 CURING:

Begin curing as soon as free water has disappeared from exposed surfaces. Continue curing by use of dissipating resin curing compound. Cure formed surfaces by moist curing until forms are removed. During the curing period exclude all traffic.

3.6 MISCELLANEOUS:

Equipment Bases and Foundations:

Provide machine and equipment bases, inertia blocks and foundations, as shown on the drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of the manufacturer furnishing the machines and equipment.

Repairs and Protection:

Repair defective areas as directed by Architect using methods meeting his approval.

Protect concrete from damage.

END OF SECTION 03 30 00

SECTION 03 54 00
CAST UNDERLAYMENT

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Cast underlayments including floor underlayments for patching and leveling areas as required for floor finishes shown.

Work of this section is applicable to all existing slabs to receive new floor finishes (whether indicated or not) as required to achieve a level surface free of defects meeting requirements/tolerances of new interior concrete flatwork.

Related Sections:

Removal of non-asbestos flooring: Section 02 41 19
Flooring: Division 09 sections

1.2 SUBMITTALS:

Product Data:

Submit manufacturer's product data and installation instructions for each type of underlayment and patching compound to be used.

1.3 PROJECT/SITE CONDITIONS:

Maintain room temperature at minimum 65° F. for at least 24 hours prior to and 72 hours after installation of underlayment and patching compounds.

PART 2 - PRODUCTS

2.1 MATERIALS:

Patching and Leveling Compounds:

Provide a free-flowing, self-leveling, pumpable, cement-based or gypsum-based compound for patching and leveling applications to a feathered edge which is compatible with new floor finish.

Subject to compliance with requirements, provide one of the following:

K-15 by Ardex, Inc.
Self-Leveling Wear Topping by W.R. Bonsal Co.
Conflow by Conspec Marketing and Manufacturing Co.
Corlevel by Cormix Construction Chemicals
LevelLayer II by Dayton Superior Corp.
Flo-Top by Euclid Chemical Co.
Gyp-Crete by Gyp-Crete Corp.

Levelex by L&M Construction Chemicals, Inc.
Underlayment 110 by Master Builders, Inc.
Dura-Cap Floor Underlayment by Maxxon Corporation
Stoncrete UL1 by Stonhard, Inc.
Concrete Top by Symons Corp.
Thoro Underlayment Self-Leveling by Thoro System Products

Trowelable Patching Compound:

Provide a trowelable, cement-based compound for patching larger defects and taking applications to a feathered edge. Where product cannot achieve a feathered edge, use a combination of trowelable product followed by cement-based (not gypsum-based) patching and leveling compound to achieve feathered edge. Provide products which are compatible with one another and with required floor finish.

Subject to compliance with requirements, provide one of the following.

Masterpatch 20 by Master Builders.
Eucocrete by The Euclid Chemical Co.
Durapatch Industrial by L&M Construction Chemicals, Inc.
SikaRepair 222 by Sika Corporation.

Bonding Agents:

As recommended by the manufacturer for application indicated.

VOC Content: Not greater than 775 grams per liter.

PART 3 - EXECUTION

3.1 INSTALLATION:

General:

Mix and apply products in accordance with the manufacturer's written instructions.

Clear away debris, oils, paint, and solvents from surfaces to receive underlayment or patching compound. Roughen slab if required to achieve good bonding.

Use patching and leveling compound to patch cracks, small holes and for leveling. Grind or smooth offsets to eliminate wear points.

Use bonding compound or moisten surface as recommended by manufacturer to achieve a tight and uniform bond with concrete substrate.

Vacuum substrate and remove all deleterious substances which would interfere with finish flooring installation.

Finishing:

Provide float and trowel finish matching finish specified for new concrete slabs.

Finish and measure surface so gap at any point between concrete surface and an unleveled freestanding 10-foot long straightedge, resting on two high spots and placed anywhere on the surface, does not exceed the following:

1/4 inch unless otherwise indicated including at exposed floor slabs.
1/8 inch for slope to drain floors.

END OF SECTION 03 54 00

SECTION 04 05 10

MASONRY MORTARING AND MASONRY GROUTING

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Mortar and grout mixes and materials for stone.

Related Sections:

Mortars and grouts used in the following sections are specified in this section:

Stone Assemblies: Section 04 40 00

1.2 SUBMITTALS:

Samples:

Submit colored mortar samples for initial color selection.

Tests:

Submit current mortar and grout tests including mortar and grout proportions for materials and mixes in accordance with IBC Section 2105.

Submit mortar tests for proposed materials and mixes in accordance with:

Mortar Properties: ASTM C270.

1.3 QUALITY ASSURANCE:

Obtain mortar materials from one manufacturer or source.

1.4 DELIVERY, STORAGE, AND HANDLING:

Store cementitious materials on elevated platforms, under cover, and in a dry location.

PART 2 - PRODUCTS

2.1 MATERIALS:

Portland Cement:

ASTM C150 Type I.

Provide portland cement complying with non-staining requirements of ASTM C91 for not more than 0.03% water soluble alkali.

Fly Ash: Type F or C may be used for grout only. Maximum 20% cement replacement.

Do not use fly ash in mortar.

Lime:

Hydrated lime, ASTM C207, Type S.

Sand:

ASTM C144, except for joints narrower than 0.25" use gradation with 100% passing the No. 16 sieve.

For colored pointing stone mortar, furnish ground marble, granite or other sound stone, meeting specified grading requirements for sand, as required to match existing adjacent stone mortar on the building.

Grout Aggregates:

ASTM C404, size 1.

Water:

Clean, potable and free of salts or alkalis which could cause efflorescence or other impurities affecting strength or appearance.

Coloring:

Factory mixed pure mineral oxide pigments prepackaged in units to produce the desired color. Provide Solomon Chem/Grind Service A Series or equal by Tamm's, Davis Colors, or L.M. Scofield.

Provide color to match existing adjacent stone mortar color.

Latex Additive for Stone Mortar:

Manufacturer's standard acrylic type but not containing a retarder.

PART 3 - EXECUTION

3.1 MIXES:

General:

Do not lower the freezing point of mortar by use of admixtures or anti-freeze agent. Do not use calcium chloride in mortar or grout. Do not use accelerators.

Mortars:

Stone: Non-staining, cement/lime mortar, complying with ASTM C270, Type S, using specified materials.

3 parts sand, 1 part portland cement and ½ part hydrated lime.

Add dark buff colored pigment to each sack of cement as required to match existing adjacent stone mortar (1 pound typically).

Include latex additive per manufacturer's instructions.

Grouts:

Use modified mortar to create "slush mortar" for grouting.

3.2 MEASUREMENT AND MIXING OF MORTAR AND GROUT:

Job-Mixed Mortar and Grout:

Measure mortar and grout mixes by volume. For aggregates, use dump boxes of correct size for each mix batch such that specified proportions can be controlled and accurately maintained. Measurement by shovel count is not permitted.

Mix mortar and grout ingredients for a minimum of 3 minutes for mortar and 5 minutes for grout in a mechanical batch mixer. Use water clean and free of deleterious materials which would impair the work. Do not use mortar which has begun to set, or if more than 2.5 hours has elapsed since initial mixing. Retemper mortar during 2.5 hour period as required to restore workability.

Mix colored mortar in accordance with mineral pigment manufacturer's recommendations, do not add water to retemper.

Mix mortar with the amount of water required for workability and to provide maximum tensile bond strength within the capacity of the mortar.

END OF SECTION 04 05 10

SECTION 04 40 00
STONE ASSEMBLIES

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Stone assemblies as shown on the drawings for patching of existing stone veneer as required to accommodate the work of this Contract.

Related Sections:

Quality Control: Section 01 45 00
Salvage of existing stone: Section 02 41 19
Masonry Mortaring and Masonry Grouting: Section 04 05 10

1.2 SUBMITTALS:

Product Data:

Submit at least four weeks prior to start of construction, manufacturer's product descriptions for each type of stone tie and anchor proposed for the work. Include a detailed description of where each will be used on the project and detailed information on how they will be installed, including connectors, spacing and tolerances. Provide certificate of compliance for each type and size of reinforcement, anchor, and tie with the requirements of ACI-ASCE 530.1.

Sample Panel:

Prior to installation of stonework, the Owner will designate a sample panel of stonework on the existing building with range of color, texture and workmanship to be expected in completed work.

1.3 QUALITY ASSURANCE:

Installer Qualifications:

For the work of this Section engage an Installer experienced in the type of stonework required having not less than 5 years successful experience having completed three jobs of similar scope in the last 5 years.

Fabricator Qualifications:

For stone fabrication engage a firm which has successfully fabricated stone similar to the quality specified for a period of not less than 5 years and is equipped to provide the quantity shown without delaying the work.

Allowable Tolerances:

Variation from Plumb: For lines and surfaces of walls, do not exceed 0.25" in 10'.

Variation in Cross-Sectional Dimensions: For thickness of walls from dimensions shown, do not exceed -0.25", nor +0.5".

Measure variation from plumb, level, and position shown in plan as the variation of the average plane of the face of each stone from a plumb, level, or dimensioned plane.

1.4 DELIVERY, STORAGE AND HANDLING:

Protect stone during storage and construction against moisture, soiling, staining and physical damage.

Handle stone to prevent chipping, breakage, soiling or other damage. Do not use pinch or wrecking bars without protecting edges of stone with wood or other rigid materials. Lift with wide-belt type slings wherever possible.

1.5 PROJECT/SITE CONDITIONS:

Protect mortar materials and stonework accessories from weather, moisture and contamination with earth and other foreign materials.

Cold Weather Protection:

Remove any ice or snow formed on stonework bed by carefully applying heat until top surface is dry to touch.

Remove stonework determined to be frozen or damaged by freezing conditions.

Perform the following construction procedures while work is progressing:

When air temperature is from 40° F. to 32° F., heat sand or mixing water to produce mortar temperatures between 40° F. and 120° F.

When air temperature is from 32° F. to 25° F., heat sand or water to produce mortar temperatures between 40° F. and 120° F.; maintain temperature of mortar on boards above freezing.

When air temperature is from 25° F. to 20° F., heat sand and mixing water to produce mortar temperatures between 40° F. and 120° F.; maintain temperature of mortar on boards above freezing; use other heat sources on both sides of walls under construction; use wind breaks when wind is in excess of 15 mph.

When air temperature is 20° F. and below, heat sand and mixing water to produce mortar temperatures between 40° F. and 120° F.; provide enclosures and auxiliary heat to maintain air temperature above 32° F.; do not lay units which have a surface temperatures of 20° F.

Perform following protections for completed stonework and partially completed stonework not being worked on:

When mean daily air temperature is from 40° F. to 32° F., protect stonework from rain or snow for at least 24 hours by covering with weather-resistive membrane.

When mean daily air temperature is from 32° F. to 25° F., completely cover stonework with weather-resistive membrane for at least 24 hours.

When mean daily air temperature is from 25° F. to 20° F., completely cover stonework with insulating blankets or similar protection for at least 24 hours.

When mean daily air temperature is 20° F. and below, maintain stonework temperature above 32° F. for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps, or other acceptable methods.

Do not use frozen materials or materials mixed or coated with ice or frost. Do not use salt to thaw ice in anchor holes or slots. Do not lower the freezing point of mortar by use of admixtures or anti-freeze agents, and do not use calcium chloride in mortar or grout.

PART 2 - PRODUCTS

2.1 STONE:

Sandstone (Native Stone):

Reuse existing salvaged sandstone veneer to the greatest extent possible. Where existing materials are damaged or insufficient to complete the work, furnish sandstone conforming to ASTM C616 Class II, quartzitic sandstone and as follows:

Cut stone 5" wide (tolerance of +2" to -0.75") to allow for 1" to 1.5" face projection.

Height and Length: As required to match existing adjacent stonework at each new construction location on the building. 1.5" minimum, 14" maximum for Red; 1.5" minimum, 5 maximum for Pink and Buff. Provide a minimum of 20% by area of smallest specified size and a maximum of 20% by area of largest specified size.

Length: Minimum of 3 times height, maximum of 7'-0".

Color: Blend of Lyons Red, Berthoud Pink, and Loveland Buff as required to match existing adjacent stonework at each new construction location on the building. Minimum of 20% of Lyons Red color to be stained faces with up to 100% of faces stained for other colors. Black staining is not acceptable.

Provide native stone quarried and fabricated within 500 miles of the project site.

2.2 MORTAR AND GROUT:

Refer to Section 04 05 10.

2.3 ACCESSORIES:

Sandstone Veneer Anchors:

For Metal Stud Back-up: 16 gage x 6" long AA401J1 Screw-on anchors (hot-dipped galvanized) with 3/16" diameter x 4" long AA400 Flex-O-Lok ties (hot dipped galvanized). Screw anchors to metal studs at 16" maximum horizontally and vertically with 2-#10 x 1-1/4" long "Climaseal" coated TEK screws each anchor.

General: Provide anchorage system described above or equal. All requests for substitution must be made in writing and must include substantiating data acceptable to the Architect and Owner demonstrating equal performance to above system.

Hot-dip galvanize all products indicated above in accordance with ASTM A153, B2 (1.5 oz. per square foot).

Flashing:

Provide concealed flashings, shown to be built into masonry as follows:

Rubberized Asphalt Sheet Flashing: An 8 mil thickness high-strength cross-laminated polyethylene film integrally bonded to a 32 mil thickness of rubberized asphalt protected by a silicone coated release sheet for an overall thickness of 40 mils. Include manufacturer's recommended mastic for sealing any incidental holes or cuts. Provide one of the following:

Advanced Building Products Inc.; Peel-N-Seal.
Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
Dayton Superior Corporation, Dur-O-Wal Division; Dur-O-Barrier-44.
Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Perm-A-Barrier Wall Flashing.
Heckmann Building Products Inc.; No. 82 Rubberized-Asphalt Thru-Wall Flashing.
Hohmann & Barnard, Inc.; Textroflash.
Polyguard Products, Inc.; Polyguard 300.
Polytite Manufacturing Corp.; Poly-Barrier Self-Adhering Wall Flashing.
Williams Products, Inc.; Everlastic MF-40.

VOC Content: Not more than 50 grams per liter for flashing and not more than 775 grams per liter for primer used on porous substrates and not more than 250 grams per liter for primer used on non-porous substrates.

Weep Holes: Provide 0.25" round x 4" long cotton sash cord to form weep holes.

2.4 FABRICATION:

Sandstone:

Provide both vertical and beveled head joints (10% minimum) to match sample panel.

Thickness:

Provide stone of thickness indicated. Saw-cut back surfaces which will be concealed in finished work.

Allow not less than 1" clearance between back face of units and back-up wall.

PART 3 - EXECUTION

3.1 PREPARATION:

Advise Installers of other work about specified requirements relating to his placement of inserts which are to be used by stone mason for anchoring and supporting and flashing of stonework. Coordinate with Section 07 62 00 to ensure required flashings are in place before preceding with the work. Furnish Installers of other work with drawings or templates showing location of inserts for stone anchors and supports.

3.2 INSTALLATION:

General:

Thickness: Build stone construction to the full thickness shown.

Cut stone wall panel units with motor-driven saw designed to cut masonry with clean, sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full units without cutting wherever possible. Adjust dimensions and install starter units as required to eliminate small cuts and to maintain bond.

Lay up wall panel units plumb and true and with courses level, accurately spaced and coordinated with other work.

Built-In Work: As the work progresses, build in items specified under this and other sections of these specifications. Fill in solidly with masonry around built-in items.

Execute stonework by skilled mechanics, and employ skilled stone fitters at the site to do necessary field cutting as stone is set.

Shape stone to fit each other approximately. Knock off weak portions to bring stones to even bearing.

Set stone in accordance with directed sample panel. Provide anchors, supports, fasteners and other attachments as shown or necessary to secure stonework in place. Shim and adjust accessories for proper setting of stone. Completely fill holes, slots and other sinkages for anchors, dowels, fasteners and supports with mortar during setting of stones.

Do not use stone units with chips, cracks, voids, concave surfacesl, stains or other defects which might be visible in the finished work unless otherwise acceptable to the Architect.

Do not build on frozen work; remove and replace stonework damaged by frost or freezing. Do not use frozen materials or materials mixed or coated with ice or frost.

During all seasons, protect partially completed stonework against weather when work is not in progress. Cover top of wall with strong, waterproof, non-staining membrane extending at least 2' down both sides of walls and anchor securely in place.

Construct stonework so that completed work matches directed sample panel.

Ferrous Metals:

Where stonework will contact ferrous metal surfaces which will be concealed in back-up construction (anchors, pipe penetrations and similar surfaces), apply a heavy coat of bituminous paint on metal surfaces, prior to setting of stone. Do not extend coating onto portions of ferrous metal which will be exposed in finished work. Do not apply coating to stainless or non-ferrous metals.

Walls:

Erect walls plumb and true with joints uniform in width and accurately aligned. Set in full bed of mortar, unless otherwise indicated. Provide setting buttons as required to prevent extrusion of mortar. Do not set stone above until mortar in courses below is set sufficiently to maintain alignment and prevent extrusion.

Lay native face stone work from outside face of walls.

Lay stones on natural flat beds in horizontal courses.

Lay sandstone veneer to match the directed sample panel. The general pattern for sandstone veneer is to be 2 against 1, a few 3 against 1, and some 2 against 2. No 3 against 3 will be permitted. No continuous horizontal joints to exceed 7' in length nor vertical joints to exceed 12" in height. 20% of vertical joints may be angled.

Clip 60% of sandstone units on both ends for an average projection of 1" to 1.5" from face of wall.

Flashing:

Provide concealed flashings in stone work as shown. Prepare surfaces smooth and free from projections which might puncture flashing.

Place through-wall flashing on a slurry of fresh mortar and cover with mortar. Seal flashing penetrations with mastic before covering with mortar.

Terminate and seal flashing 0.5" from face of wall, unless otherwise shown. Extend flashings at least 4" up vertical backup walls and turn up edge on sides to form pan to direct moisture to exterior.

Provide weep holes in the head joints of the first course of stone immediately above concealed flashings, spaced 24" o.c., unless otherwise shown. Install in soft mortar. Remove cotton after mortar has set.

Install flashings in accordance with manufacturer's instructions.

Grouted Construction:

Grout space between back of stone wall units and back-up material with slush mortar as stone is laid. Fill open space solidly with non-staining grout. Pour grout in lifts and rod to eliminate voids, allowing each pour to set enough to carry weight of next pour. Exercise care to prevent displacement of stone units during grouting operation.

Joints:

Butter vertical joints for full width before setting and set units in full bed of mortar, unless otherwise indicated. Provide minimum 0.5" wide joints, maximum 0.75" wide joints.

Provide both vertical and beveled head joints. Work all joints so that all joints are in the same plane.

Provide 4" minimum overlap in coursing.

Point joints after setting with a flat jointer.

Provide finished joint with a uniform 6" distance from edge of structure unless noted otherwise.

Tip all stone slightly out and down to facilitate drainage. Lay bevel face stone with the long part of the bevel as the bottom.

3.3 ADJUST AND CLEAN:

Remove and replace stone units which are broken, chipped, stained or otherwise damaged. Where directed, remove and replace units which do not match adjoining stonework. Provide new matching units, install as specified and point-up joints to eliminate evidence of replacement. Repoint defective and unsatisfactory joints as required to provide a neat, uniform appearance.

Clean stonework not less than 6 days after completion of work, using clean water and stiff-bristle brushes. Do not use wire brushes, acid type cleaning agents or other cleaning compounds with caustic or harsh fillers.

Installer shall advise Contractor of proper procedures required to protect the stonework from collapse, deterioration, discoloration or damage during subsequent construction and until acceptance of the work.

END OF SECTION 04 40 00

SECTION 05 45 00

METAL SUPPORT ASSEMBLIES

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Metal support assemblies as shown on drawings including fitting and selected accessories for the following applications:

Strut framing for walls.
Strut framing for ceilings.

Related Sections:

Summary: Section 01 10 00
Metal Fabrications: Section 05 50 00
Environmental Chambers: Section 13 21 33
Electrical work: Division 26 sections

1.2 SUBMITTALS:

Product Data:

Submit manufacturer's complete product data for metal support assembly system to be provided including all fitting and accessories available for use with the system.

Shop Drawings:

Submit shop drawings for fabrication and erection of metal support assemblies. Include plans, elevations, and details of sections and connections. Show anchorage and accessory items. Base on field measurements wherever possible.

Coordinate shop drawings and submit coincidentally with shop drawings for related or supported work.

Show locations where framing member supports as required in adjacent environmental chamber panels.

Certification:

Submit certification that products provided meet the Environmental Performance requirements specified in Section 01 10 00 including for no off-gassing and no degradation of performance due to the presence of high amounts of UV and for temperature up to 60° Celsius.

1.3 QUALITY ASSURANCE:

Manufacturer's Qualifications:

Engage a manufacturer with not less than 10 years experience in the manufacturing of the types of metal support assemblies required for this project.

Certify in writing that all components supplied have been produced in accordance with an established quality assurance program.

Installer's Qualifications:

Engage an Installer with not less than 5 years experience and which has been trained and certified by the manufacturer of the metal support assembly for installation of the type, size and configuration required for this project.

Sole Source Responsibility:

Furnish all framing members, fittings and accessories from a single manufacturer for sole source responsibility.

Design Concept:

The drawings indicate framing systems required based on the specific types indicated. Framing systems by other manufacturers having equal performance characteristics may be considered, provided deviations from indicated dimensions and profiles are minor and do not change the design concept or intended performance as judged by the Architect.

1.4 DELIVERY, STORAGE AND HANDLING:

Deliver all material to the work site in protective packaging to avoid damage to the finish.

Protect all components at the site from the elements by a shelter or other covering.

1.5 WARRANTY:

Submit warranty signed by the Installer and the manufacturer agreeing to repair or replace any components which fail in their intended purpose for a period of 1 year following the date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

Provide metal support assemblies manufactured by one of the following:

B Line
Power Strut
Unistrut

2.2 MATERIALS:

General: Provide products will not degrade under the use conditions indicated including in the presence of high ultraviolet light and temperatures up to 60 degrees Celsius. Provide products which do not off-gas in accordance with the requirements of Section 01 10 00.

Fabricate channel members from pre-galvanized structural grade steel conforming to either ASTM A653, Grade 33.

Fabricate fittings from steel conforming to ASTM A575, A576, A36 or A635.

2.3 FINISHES:

Finish metal support assemblies in accordance with the following:

Provide unfinished galvanized metal.

2.4 ACCESSORIES:

Provide the following components as manufactured by Unistrut:

Channels: A1000; A1001, A1001A and A3300.

Wing and "U" Shape Fittings: A2341 R-L and A2345.

Brackets: A2492 R-L, 8" bracket, and A2494 R-L, 12" bracket.

Channel End Caps and Closure Strip: A1184.

Flat Plate and Ninety Degree Fittings: A1026, A1325 and A1326.

Provide the following components as manufactured by Unistrut:

Channels: P1000; P1001; P1001 A; P1001 B; P1001 C; P1001 K; P1001 3; P1001 A3; P1001 B3; P1001 C3; P1001 D3; P1001 C41; P1003; and P1004 A.

"Z" and "U" Shape Fittings: P1045 and P1047.

Wing Shape Fittings: As required for layout shown from manufacturer's standards.

Post Bases: P2072 and P2072 A.

Brackets: P1026 angle bracket; P1381, 4-hole 90° right hand; P1382, 4-hole 90° left hand; P1773, 12.5" bracket; P1775, 14.5" bracket; P1777, 16.5" bracket.

Channel End Caps: P1180 two-piece end caps and P2860-10 over-channel end caps.

Beam Clamp: PLF9050.

Flat Plate and Ninety Degree Fittings: As required for layout shown from manufacturer's standards.

Nuts and Screws: Nuts without springs, nuts with springs, stud nuts, and standard screws nuts and washers as required for complete system as indicated.

Swivel Hangers for Electrical Components: M2350 for 1" long, 0.5" diameter nut with No. 13 threads.

Confirm with the Owner and Electrical Installer if different hangers are required to accommodate their work.

PART 3 - EXECUTION

3.1 EXAMINATION:

Installer shall examine work area prior to installation. If work are conditions are unsatisfactory, do not proceed with installation until satisfactory corrections are completed.

3.2 INSTALLATION:

Set metal support system components into final position true to line, level and plumb, in accordance with approved shop drawings and the manufacturer's installation instructions.

Anchor material firmly in place. Tighten all connections to their recommended torques.

3.3 CLEANUP:

Remove all protective wraps and debris. Repair any damage due to installation.

3.4 PROTECTION:

During installation it is the responsibility of the Installer to protect this work from damage.

Upon completion of this scope of work, it is the responsibility of the Contractor to protect this work from damage during the remainder of the construction period and until acceptance by the Owner.

END OF SECTION 05 45 00

SECTION 05 50 00
METAL FABRICATIONS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Metal fabrications work as shown on drawings. Items specified in this section, include, but are not limited to, the following:

- Floor port access pipes.
- Wall pipe port covers for chambers.
- Miscellaneous pipes.

Related Sections:

- Summary: Section 01 10 00
- Metal Support Assemblies: Section 05 45 00
- Environmental Chambers: Section 13 21 33

1.2 DEFINITIONS:

Metal Fabrications:

Synonymous with miscellaneous metals.

Metal fabrications for items fabricated from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere.

Architecturally Exposed Structural Steel: As used under this section, includes all metal fabrications exposed to view.

1.3 SUBMITTALS:

Product Data:

Submit product data for manufactured products used in metal fabrications including paint products and grout.

Shop Drawings:

Submit shop drawings for fabrication and erection of miscellaneous metal fabrications including:

Plans and elevations.

Profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners and accessories.

Erection drawings, elevations and details.

Welded connections using standard AWS welding symbols.

Provide templates for anchor and bolt installation by others. Base on field measurements wherever possible.

Certifications:

Submit current welder's certification qualified in accordance with AWS D1.1.

Submit certification that products provided meet the Environmental Performance requirements specified in Section 01 10 00 including for no off-gassing and no degradation of performance due to the presence of high amounts of UV and for temperature up to 60° Celsius.

1.4 QUALITY ASSURANCE:

Fabricator Qualifications:

Minimum of three years experience producing metal fabrications similar to that required for this project, with sufficient production capacity to produce units without causing delay in the work.

Welding Qualifications:

Qualify welding processes and welding operators in accordance with AWS D1.1 "Structural Welding Code - Steel", D1.3 "Structural Welding Code - Sheet Steel".

Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.5 PROJECT CONDITIONS:

Field Measurements:

Take field measurements prior to preparation of shop drawings and fabrication, where possible. Show field measurements on shop drawings. Do not delay job progress; allow for trimming and fitting wherever taking field measurements before fabrication might delay work.

PART 2 - PRODUCTS

2.1 GENERAL:

Metal Surfaces: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names, roughness and steel sheet variations in flatness not exceeding those permitted by reference standards.

Provide metal fabrications which are fabricated within 500 miles of the project site.

Minimum Recycled Steel Content: 30% by weight.

Provide products will not degrade under the use conditions indicated including in the presence of high ultraviolet light and temperatures up to 60 degrees Celsius. Provide products which do not off-gas in accordance with the requirements of Section 01 10 00.

2.2 FERROUS METALS:

Steel Plates: ASTM A36.

Minimum Recycled Steel Content: 30% by weight.

Rolled Steel Floor Plates: ASTM A786.

Minimum Recycled Steel Content: 30% by weight.

Steel Tubing: Cold-formed, ASTM A500, Grade B.

Minimum Recycled Steel Content: 30% by weight.

Steel Pipe: ASTM A53; black finish, Type F, standard weight, Schedule 40, unless otherwise indicated.

Minimum Recycled Steel Content: 30% by weight.

Threaded Rods: ASTM A193.

Nuts: ASTM A563 hex carbon steel.
Washers: ASTM F436 hardened carbon steel.
Finish: Mechanically deposited zinc coating, ASTM B695, Class 50.

Adhesive Anchors: Threaded carbon steel rod conforming to requirements above complete with required nuts, washers, adhesive system and manufacturer's installation instructions. Current ICC approval and published ICC Research Report required. Size as indicated on drawings.

VOC Content: Not more than 50 grams per liter.

Subject to compliance with requirements and acceptance by the Architect, provide one of the following:

"HVA Adhesive Anchor" by Hilti Fastening Systems.
"Parabond Capsule Anchor" by Molly Fastener Group.
"ESI Internally Threaded Epoxy Inserts" by ITW Ramset/Red Head.

2.3 FASTENERS:

Provide zinc-coated fasteners. Select fasteners for the type, grade and class required.

Bolts and Nuts: Regular hexagon head type, ASTM A307, Grade A.

Machine Screws: Cadmium plated steel, FS FF-S-92.

Plain Washers: Round, carbon steel, FS FF-W-92.

Lock Washers: Helical spring type carbon steel, FS FF-W-84.

2.4 PAINT:

Metal Primer Paint: Tnemec Series 115or approved equal.

VOC Content for Shop Application: Not more than 150 grams per liter as determined in accordance with EPA Method 24 or ASTM D3960 and complying with GC-03 Green Seal Environmental Standard for Anti-Corrosive Paints by Green Seal, Inc.

VOC Content for Field Application and Field Touch-Up: Not more than 50 grams per liter as determined in accordance with EPA Method 24 or ASTM D3960 and complying with GC-03 Green Seal Environmental Standard for Anti-Corrosive Paints by Green Seal, Inc.

Primer selected must be compatible with finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in Division 09.

2.5 MISCELLANEOUS MATERIALS:

Containerized Minimally Expanding Foam Insulation: Provide two-component, minimally expanding polyurethane foam packaged in small containers for application in small areas; zero VOC content; CFC and HCFC-free; complying with ASTM E84 for flame spread less than 25. Provide one of the following or approved equal:

Handi-Foam Spray Foam Two-Component Disposable Compact Kits by BetterFoam Division of Pyro-Chem Company (888-849-3626).

Tiger Foam Slow Rise, Low-Pressure Cavity Fill Formula by Commercial Thermal Solutions, Inc. (800-664-0063).

2.6 FABRICATION:

General:

Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in finished product. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.

Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on temperature change below.

Temperature Change (Range): 150° F.

Shear and punch metals cleanly and accurately. Remove burrs.

Ease exposed edges to a radius of approximately 1/32" unless otherwise shown. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

Remove sharp or rough areas on exposed traffic areas.

Weld corners and seams continuously, complying with AWS recommendations. Miter and cope intersections and weld all around. Remove spatter, grind exposed welds to blend, and contour surfaces to match those adjacent.

Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible.

Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.

Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.

Shop Assembly:

Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

2.7 MISCELLANEOUS METAL FABRICATIONS:

Floor Ports:

Fabricate top cover from 0.25" thick steel plate continuously welded to Schedule 40 steel pipe section as indicated.

Include threaded rods and adhesive anchors as specified herein to support bottom (ceiling) cover plate.

Fabricate bottom (ceiling) cover plate from 0.25" steel plate. Punch plate to accommodate required threaded fasteners.

Wall Port Cover Plates:

Fabricate top cover from 0.25" thick steel plate for each steel pipe port location indicated.

Provide non-emitting rubber gaskets which are suitable for use in high temperature and high UV environments to eliminate as much air leakage around the ports as possible.

Miscellaneous Pipes:

Furnish miscellaneous steel pipes as indicated on the mechanical drawings fabricated from Schedule 40 steel pipe.

2.8 FINISHING:

Comply with NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.

Finish metal fabrications after assembly.

Shop Painting:

Shop paint miscellaneous ferrous metal work.

Follow procedures for preparation and painting published by SSPC PA1. Provide dry paint film thickness of 2 mils minimum. Apply two shop coats to ferrous metals that will be inaccessible after erection.

Prepare interior items in accordance with SSPC SP-1 and SP-2 or SP-3 or better.

Spray apply paint to items exposed to view.

Painting specified here does not count as a coat for finish painting.

PART 3 - EXECUTION

3.1 INSTALLATION:

Fastening to In-Place Construction:

Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction;.

Secure upper portion of floor port in place with silicone adhesive.

See Section 02 41 19 for required core drilling of concrete floor slabs.

Provide firestopping at floor ports as shown on the drawings and complying with the requirements of Section 07 84 00.

For wall ports, install steel pipe port into factory-fabricated opening of chamber panel and fill annular space between pipe and chamber panel with minimally expanded containerized spray foam insulation to completely fill the space. Apply port covers with gaskets between chamber panels and port covers to eliminate air leakage around covers. Secure port covers through gaskets with mechanical fasteners to structural supports within chamber panels.

Coordinate location of structural supports with the work of Section 13 21 33.

Field Welding:

Field welding is not permitted.

END OF SECTION 05 50 00

SECTION 05 58 00

FORMED METAL FABRICATIONS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.1 SUMMARY:

Section Includes:

Formed metal fabrications as shown on the drawings including the following:

Wall, floor and ceiling panel cladding at Environmental Chambers including within custom light fixture boxes.

Related Sections:

Summary: Section 01 10 00.
Sheet Metal Flashing and Trim: Section 07 62 00.
Hollow Metal Systems: Section 08 11 13.
Access Flooring: Section 09 69 00.
Environmental Chambers: Section 13 21 33.
Lighting fixtures and electrical wiring in connection with lighting: Division 26 sections.

1.2 SUBMITTALS:

Product Data:

Submit manufacturer's product data for each type of product specified.

Include copies of laboratory test reports for optical qualities demonstrating compliance with specified requirements.

Shop Drawings:

Submit shop drawings for each sheet metal fabrication required, including plans, elevations and detail sections. Indicate jointing, fasteners, anchorage, and accessory items, and specify finishes.

Submit coordination drawings for sheet metal fabrications housing items specified (such as light fixtures) under other sections of these specifications.

Coordinate shop drawings for sheet metal fabrications which will be attached to access flooring with the work of Section 09 69 00.

Coordinate shop drawings for sheet metal fabrications which will be attached to environmental chamber wall and ceiling panels with the work of Section 13 21 33.

Samples:

Submit samples for verification purposes in 8 inch square units of metal finish prepared on metal of same composition and thickness to be used in final construction.

For color anodized aluminum, provide sets for each color, texture, and pattern specified, showing full range of variations expected in these characteristics.

Certification:

Submit certification that products provided meet the Environmental Performance requirements specified in Section 01 10 00 including for no off-gassing and no degradation of performance due to the presence of high amounts of UV and for temperature up to 60° Celsius.

1.3 QUALITY ASSURANCE:

Manufacturer Qualifications:

Firm which employs skilled persons and which has successfully fabricated products similar to those required for this Project and which has sufficient capacity to produce required units without causing delay in the Work.

Single Source Responsibility:

Obtain sheet metal fabrications from a single manufacturer.

Coordination:

Coordinate fabrication and installation of items specified in this section with other, adjoining units of Work.

1.4 DELIVERY, STORAGE, AND HANDLING:

Deliver sheet metal fabrications as factory assembled units with protective crating and covering.

Store products on elevated platforms in a dry location.

1.5 PROJECT CONDITIONS:

Field Measurements: Verify size, location, and placement of sheet metal fabrications with adjoining construction prior to fabrication.

PART 2 - PRODUCTS

2.1 SHEET METALS:

General:

Provide sheet metals selected for their surface flatness, smoothness and freedom from surface blemishes where exposed to view in the finished unit. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, variations in flatness exceeding those permitted by referenced standards for stretcher-leveled metal sheet, stains, discoloration or other imperfections.

Provide products will not degrade under the use conditions indicated including in the presence of high ultraviolet light and temperatures up to 60 degrees Celsius. Provide products which do not off-gas in accordance with the requirements of Section 01 10 00.

Aluminum Sheet:

Alloy and temper recommended by manufacturer for use intended and as suitable for application of finish indicated, but with not less than the strength and durability properties specified in ASTM B209 for 1090-H19.

2.2 MISCELLANEOUS MATERIALS:

Fasteners:

Do not use metals which are corrosive or incompatible with metals joined. Unless otherwise indicated, use self-tapping stainless steel screws.

Provide Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.

Verify fastener types and locations with Architect prior to fabrication.

Adhesives:

Use of adhesives is not acceptable for any applications.

2.3 FABRICATION, GENERAL:

General: Fabricate sheet metal fabrications to comply with requirements indicated for design, dimensions, materials, joinery, and performance.

Coordinate dimensions and attachment methods of sheet metal fabrications with those of adjoining products and construction to produce integrated assemblies with closely fitting joints, and edges and surfaces aligned with one another in relationship indicated.

Increase metal thickness or reinforce metal with concealed stiffeners or backing materials or both as required to produce surfaces whose variations in flatness exceed those permitted by referenced standards for stretcher-leveled metal sheet and to impart sufficient strength for use indicated.

Preassemble sheet metal fabrications in the shop to the greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

Form sheet metal fabrications to profiles indicated in maximum lengths to minimize joints and without exposed cut edges. Fold back exposed ends of unsupported sheet metal to form a 1/2 inch wide hem on the concealed side, or ease exposed edges with backing to a radius of approximately 1/32 inch. Produce flat, flush surfaces without cracking and grain separation at bends.

Continuously weld all joints and seams except where other methods of joining are indicated; grind, fill, and dress welds to produce smooth flush exposed surfaces in which welds are invisible after final finishing is completed.

Build-in straps, plates and brackets as required for support and anchorage of fabricated items to adjoining construction; reinforce sheet metal units as required for attachment and support of other construction.

2.4 WALL AND CEILING PANELS:

Form wall and ceiling panels for cladding of environmental chamber panels from sheet metal of type and minimum nominal thickness indicated. Fabricate cladding for each environmental chamber panel of size to match the panel it is to be attached to without joints.

Aluminum sheet, 0.040 inch.

2.5 ACCESS FLOOR PANEL CLADDING:

Form cladding of access floor panels at environmental chamber panels from sheet metal of type and minimum nominal thickness indicated. Fabricate cladding for each access floor panel of size to match the access floor panel it is to be attached to without joints.

Aluminum sheet, 0.040 inch.

2.6 LIGHT FIXTURE CLADDING:

Form cladding for custom light fixtures from sheet metal of type and minimum nominal thickness as indicated below. Coordinate location of cutouts for electrical wiring.

Aluminum sheet, 0.040 inch.

2.7 FINISHES, GENERAL:

Comply with NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.

Complete mechanical finishes of flat sheet metal surfaces before fabrication, wherever possible. After fabrication, finish all joints, bends, abrasions, and other surface blemishes to match sheet finish.

Protect mechanical finishes on exposed surfaces from damage by application of adhesive paper or other temporary protective covering, prior to shipment.

Apply anodic finishes to sheet metal fabrications after assembly.

2.8 ALUMINUM FINISHES:

Finish designations prefixed by "AA" conform to the system established by the Aluminum Association for designating aluminum finishes.

Class I Clear Specular Anodized Finish: AA-M11C31A21 (Mechanical Finish: as fabricated, specular; Chemical Finish: brightened, highly specular; Anodic Coating: Protective and Decorative: clear film thicker than 0.000007 inch) complying with AAMA 607.1 and complying with the following optical properties:

Total Reflectance: 90% minimum in accordance with Technidyne TR-2 and ASTM D1651-94 (withdrawn).

Distinctness of Image: 95% minimum in accordance with Hunter Labs D47 Dorigon and ASTM E430.

Specular Reflectance: 75 minimum in accordance with Hunter Labs D47 Dorigon and ASTM E430.

15° Diffuseness: 0.0 maximum in accordance with Hunter Labs D47 Dorigon and ASTM E430.

Provide No. 490LB/BF Ultrabrite 90 (Luxal Enhanced) as manufactured by Aluminum Coil Anodizing Corporation, 501 East Lake Street, Streamwood, Illinois, (630) 837-4000, www.acacorp.com, or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION:

Locate and place sheet metal fabrications plumb, level and in alignment with adjacent construction.

Use exposed anchorages in accordance with approved shop drawings.

Anchor to wall and ceiling panels with screws at 6" o.c. at the perimeter of each panel and at 12" o.c. at the field of the panel.

Anchor to access floor panels with screws at 6" o.c. at the perimeter of each panel.

Anchor to other surfaces with screws at 12" o.c. at each bearing frame member.

Form tight joints with exposed connections accurately fitted together.

3.2 ADJUSTING:

Repair finishes damaged during installation and construction period so that no evidence remains of correction work. Return items which cannot be refinished in the field to the factory; make required alterations and refinish entire unit, or provide new units as required.

3.3 PROTECTION:

Protect finishes of sheet metal fabrications from damage during construction period. Remove temporary protective coverings at time of Substantial Completion.

END OF SECTION 05 58 00

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

- Rooftop equipment bases and support curbs except where specifically indicated to be furnished under the work of Division 23 sections.
- Wood grounds, nailers, and blocking.
- Framing around new mechanical openings at sloped roofs using engineered wood framing.
- Telephone, security and electrical backing panels.

Installation of the following items are included in this Section but specified in other sections:

- Hollow Metal Systems: Section 08 11 13
- Flush Wood Doors: Section 08 14 16
- Stile and Rail Wood Doors: Section 08 14 33
- Access Doors and Panels: Section 08 31 00
- Door Hardware: Section 08 71 00
- Specialty equipment and furnishing items where so specified in Division 10 and 11 sections

1.2 DEFINITIONS:

Carpentry work as shown on the drawings and work normally performed by carpenters not elsewhere specified and generally not exposed to normal view.

1.3 SUBMITTALS:

Product Data:

Submit Product Data for the following products:

- Engineered wood products.
- Metal framing anchors.

Material Certificate:

Submit material certificates for dimensional lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use as well as design values approved by the Board of Review of American Lumber Standards Committee.

Wood Treatment Data:

Submit chemical treatment manufacturer's instructions for handling, storing, installation, and finishing of treated material.

Preservative Treatment: For each type specified, include certification by treating plant stating preservative solutions and pressure process used, net amount of preservative retained, and conformance with applicable standards.

For water-borne preservatives, certify that moisture content of materials was reduced to maximum of 19% after treatment and prior to shipping to project site.

Fire-Retardant Treatment: Include certification by treating plant that treatment material complies with specified standards, and governing authorities.

Material Certificates:

Submit certificates of chain-of-custody signed by manufacturers certifying that products specified to be made from certified wood were made from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria." Include evidence that mill is certified for chain-of-custody by an FSC-accredited certification body.

Place chain-of-custody certificates in permit sleeve at the project site.

1.4 QUALITY ASSURANCE:

Single Source Responsibility:

Obtain engineered wood products from one source from a single manufacturer.

Obtain each type of fire-retardant treated wood products from one source for both treatment and formulation.

Standards:

Lumber: Comply with PS 20, WWPA Grading Rules and with applicable grading rules of inspection agencies certified by ALSC Board of Review.

Plywood: Comply with PS 1, "U.S. Product Standard for Construction and Industrial Plywood".

Construction Panels: Comply with APA "Performance Standard and Policies for Structural Use Panels", APA PRP-108.

Inspection Agencies:

Inspection agencies and the abbreviations used to reference with lumber grades and species include the following:

NLGA - National Lumber Grades Authority (Canadian).
SPIB - Southern Pine Inspection Bureau.
WCLIB - West Coast Lumber Inspection Bureau.
WWPA - Western Wood Products Association.

Grade Stamps:

Factory-mark each piece of lumber and plywood with type, grade, mill and grading agency.

Forest Certification:

For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship":

Structural-use panels.
Backing boards.
Miscellaneous lumber.

1.5 DELIVERY, STORAGE AND HANDLING:

Keep materials dry during delivery and storage. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and plywood, and provide air circulation within stacks.

For pressure treated lumber, place spacers between each bundle to provide air circulation.

PART 2 - PRODUCTS

2.1 MATERIALS:

General:

Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for the moisture content specified for each use.

Provide dressed lumber, S4S, unless otherwise shown or specified, seasoned to maximum 19% moisture content for thicknesses less than 2" nominal.

General:

Composite Wood and Agrifiber: All composite wood and agrifiber products shall be free of added urea-formaldehyde resin binders.

Certified Wood: Wood based products shall be made from wood obtained from forests certified by an FSC accredited certification body to comply with the Forest Stewardship Councils "Principles and Criteria." Wood from other certification programs such as Sustainable Forest Initiative (SFI) are not acceptable.

OSB manufactured from certified wood materials is available from the following:

Cambium Forest Products, Calgary, Alberta, (403) 236-9740.
Columbia Forest Products, Inc., Portland, Oregon, (800) 547-1791.
Johnson International Hardwood Company, Kent, Washington, (253) 479-9900.
Phoenix Organics, Phoenix, Oregon, (541) 535-1134.

Dimension Lumber:

West Coast Douglas Fir-Larch or Hem-Fir when graded under NLGA, WCLIB, or WWPA as follows:

Blocking: Standard Grade.

Include wood curbs for rooftop equipment.

Structural-Use Panels:

Provide structural use panels meeting the following environmental requirements:

Composite wood to contain no added urea-formaldehyde resins.

Adhesive: Water based contact cement with VOC content not to exceed 10 grams per liter as determined in accordance with EPA Method 24 or ASTM D3960.

Concealed: APA Rated Sheathing Grade, Exposure 1, Group 1 or 2 species for miscellaneous sheathing, thickness as shown on drawings or as required to meet job conditions.

Provide very low formaldehyde emitting structural-use panel sheathing.

Telephone, Security or Electrical Equipment Backing Board:

APA A-C, Group 1 or 2, Exposure 1, 23/32" thickness. Furnish with fire retardant treatment. Install finished side out.

Provide very low formaldehyde emitting backing board.

Miscellaneous Materials:

Fasteners and Anchorages: Provide size and type as indicated and as recommended by applicable standards:

Nails, Wire Brads and Staples: ASTM F1667.
Power Driven Fasteners: National Evaluation Report NER-272.
Wood Screws: ANSI B18.6.1.
Lag Bolts: ANSI B18.2.1.
Bolts: ASTM A307, Grade A, with A563 hex nuts, flat washers.

Include all rough hardware required for the Work and not specified in other sections.

Where rough carpentry is exposed to weather, pressure-preservative treated or fire-retardant treated, provide fasteners with hot-dip zinc coating complying with ASTM A153/A or Type 304 stainless steel.

Metal Framing Anchors: Include galvanized steel joist hangers and other metal framing anchors as required. Furnish products for which manufacturer publishes allowable design loads. Provide with maximum number of nails and/or bolts allowed for each connector according to manufacturer's requirements.

Manufacturers: Simpson Strong-Tie Company, San Leandro, California or approved equal.

2.2 PREFABRICATED STRUCTURAL WOOD:

Parallel Strand Lumber (PSL):

Lumber manufactured with wood strands running parallel to their length using exterior adhesive and cured under pressure. Furnish sizes as indicated.

Allowable Stress Ratings:

Shear Modulus of Elasticity: 125,000 psi.

Modulus of Elasticity: 2,000,000 psi.
Flexural Stress: 2,900 psi for 12" nominal depth.
Compression Perpendicular to Grain: 750 psi parallel to wide face of strands.
Compression Parallel to Grain: 2,900 psi.
Horizontal Shear: 290 psi perpendicular to wide face of strands.

2.3 WOOD TREATMENT:

Preservative Treatment:

Comply with the applicable requirements of AWPA Standard C2 for lumber and C9 for plywood. Mark each treated item to comply with the AWPB or SPIB Quality Mark requirements or other quality marking acceptable to the Architect.

Pressure-treat above-ground items with water-borne preservatives to a minimum retention of 0.25 pcf. Treat indicated items and the following:

Wood nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing and flashing.

Fire-Retardant Treatment:

Provide fire-retardant or treated lumber or plywood for all wood complying with AWPA C20 for lumber and C27 for plywood, Type A for interior use.

Provide UL label on each piece of fire-retardant lumber or plywood.

Products: Provide one of the following or approved equal:

"Dricon" by Hickson Corporation.
"Pyro-Guard" by Hoover Treated Wood Products.
"Flameproof LHC-HTT" by Osmose Wood Preserving Co., Inc.

PART 3 - EXECUTION

3.1 INSTALLATION:

General:

Provide layout work for lines, levels, locations of floors, walls, partitions, windows, doors and other general features, for all trades.

Provide temporary construction as specified in Division 01 Sections and as required for safety and protection during construction.

Provide blocking, curbs, nailers, miscellaneous wood items as indicated or required.

Discard units of material with defects which might impair the quality of the work, and units which are too small to fabricate the work with minimum joints or the optimum joint arrangement.

Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.

Scribe and cope as required for accurate fit of rough carpentry to other construction.

Correlate location of furring, nailers, blocking, grounds and similar supports for attachment of construction.

Securely attach carpentry work to substrates by anchoring and fastening as shown and as required by recognized standards.

Use common wire nails except as otherwise indicated. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

Wood Grounds, Nailers, Blocking and Sleepers:

Provide wherever shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.

Provide 2" nominal wood blocking in metal stud framing to support fixtures, wall mounted casework and equipment, identifying devices and signage, visual display boards, wall-mounted door stops, plumbing fixtures, electrical devices (such as luminaires, sensors, and alarms) and other similar items.

At Contractor's option, metal strapping as specified in Section 09 29 00 may be provided in lieu of wood blocking at all locations except grab bars and wall-mounted door stops.

Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown.

3.2 WOOD FRAMING:

Standards:

Except as otherwise indicated, comply with "Manual for House Framing" by National Forest Products Association, including nailing, firestopping, anchorage, framing and bracing.

Install engineered wood products following manufacturer's written instructions.

General:

Provide framing for openings as shown, or if not shown, comply with the other recommendations of the "Manual for House Framing" of the National Forest Products Association. Do not splice structural members between supports.

Anchor with self-tapping wood screws into manufactured joist hangers and to comply with the following:

National Evaluation Report No. NER-272 for pneumatic or mechanical driven staples, P-Nails, and allied fasteners.

Published requirements of manufacturer of metal framing anchors.

"Table 2304.9.1, Fastening Schedule" of the International Building Code.

3.3 INSTALLATION OF BACKING BOARDS AND SHEATHING:

General:

Comply with applicable recommendations of Form No. E30, "APA Design/Construction Guide-Residential & Commercial", for types of products with applications indicated.

Secure sheathing and backing boards to substrate using screws spaced at 12" o.c. at perimeter and 16" o.c. at other locations.

END OF SECTION 06 10 00

SECTION 07 32 00
ROOF TILES

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Patching of existing roof tiles as required to accommodate work of this contract and includes clay tile.

Related Sections:

Wood, plywood or nailable substrate: Section 06 10 00
Metal Flashings: Section 07 62 00

1.2 SUBMITTALS:

Product Data:

Submit specifications and installation instructions from the manufacturer for roofing system required. Include data substantiating compliance with the requirements.

Samples:

Submit one set of samples, not less than 3 units each, of roof tiles showing color and maximum color range. Supply material within approved color range. Resubmit samples until required colors are achieved at no additional cost to the Owner.

1.3 QUALITY ASSURANCE:

Subcontract the roofing and associated work to a single firm, called the Installer in this section, specializing in the type of roofing required with 5 years experience and having successfully completed 2 similar projects within the last 4 years.

Conform to details and installation requirements of NRCA Roofing and Waterproofing Manual, Steep Roofing, Tile Roofing sections except as otherwise indicated.

Furnish products manufactured by a firm having not less than 5 years successful experience in the production of the type of roof tiles required.

1.4 PROJECT/SITE CONDITIONS:

Proceed with roofing work only after substrate construction and penetration work have been completed.

Proceed with roofing work only when weather conditions are in compliance with manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with requirements and the manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 ROOFING TILES:

Clay Tiles:

Reuse existing clay tiles to the greatest extent possible. Where existing roof tiles are insufficient or of incorrect configurations required, provide new roof tiles matching existing as approved by the Owner and Architect and conforming to the requirements specified below.

Fired clay roofing tiles, ASTM C56, manufacturer's standard glazed unglazed units, color as selected, as manufactured by Ludowici-Celadon (no substitutions).

Furnish Tapered Barrel Mission Tile design units with matching fittings, with two holes, 18" length with 14.25" length starters. Installer to field verify match to existing clay tiles on the building prior to submitting his bid.

Provide 18" tiles with 2 holes at hips, ridges, starter course and where wind uplift is a problem.

Furnish color range as indicated below:

Pans:	Red Range.
Covers:	As required to match existing adjacent clay tiles on the existing building generally from Red Range, 25-G Burgundy, C-07 Red, and X-280 Black Slip colors. Installer to field verify match to existing clay tiles on the building prior to submitting his bid.

Other Materials:

Fasteners (Nails): Non-corrosive smooth copper shank type, size recommended by roof tile manufacturer.

Sealant: Single-component urethane conforming to Section 07 92 00.

VOC Content: Limit VOC content to not more than 250 grams per liter for all sealants, backer rods, tapes and cleaners used at interior locations. Limit VOC content to not more than 250 grams per liter for primers used in non-porous substrates and to not more than 775 grams per liter for primers used in porous substrates.

Compressible foam joint fillers, polyester polyurethane foam impregnated with neoprene rubber or acrylic ester styrene copolymer manufactured using chlorofluorocarbons (CFCs) or hydrochlorofluorocarbons (HCFCs) is not acceptable.

Joint sealers and accessories formulated with aromatic solvents (organic solvent with a benzene ring in its molecular structure), fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, or their components are not acceptable.

Do not use joint sealers containing the following:

Mercury.
Butyl rubber.
Neoprene.
SBR (styrene butadiene rubber).
Nitrile.

Asphalt Saturated Felt: ASTM D226, No. 30 type.

Wood Strips: Preservative treated wood strips as specified in Section 06 10 00.

Provide all wood and wood products from certified forests in accordance with the Forest Stewardship Council Guidelines.

2.2 ICE DAM MATERIALS:

Self-Adhering Sheet Underlayment, Polyethylene Faced: ASTM D1970, minimum of 40 mils thick; slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release-paper backing; melt point not less than 210° F.; cold applied. Provide one of the following or approved equal:

Grace, W. R. & Co.; Grace Ice and Water Shield.
Polyguard Products, Inc.; Polyguard Deck Guard.
Polyken Technologies; Polyken 640 Underlayment Membrane.

VOC Content: Not more than 250 grams per liter.

VOC Content for Primers: Not more than 250 grams per liter for primers used in non-porous substrates and not more than 775 grams per liter for primers used in porous substrates.

PART 3 - EXECUTION

3.0 INSPECTION:

Refer to Section 01 73 00 for examination of substrate and job conditions.

Verify that metal flashings required under roof tile have been properly installed to provide watertight installation.

3.1 PREPARATION OF SUBSTRATE:

Clean the substrate of projections and substances detrimental to the work.

Felt Underlayment:

Nail two plies of felt underlayment to wood deck, shingle fashion, using galvanized roofing nails, lap felts 6" at end and 18" at edges.

Ice Dams:

Install ice dam at roof penetrations to a point not less than five feet from the penetration. Apply ice dam sheets horizontally using maximum available widths to eliminate or minimize horizontal joints.

Apply plasticized asphalt by removing separating membrane and pressing to adhere to substrate. Lap and self-seal joints with 3" minimum lap. Cover ice and water shield with felt within 30 days of applying ice and water shield. Apply roofing immediately.

Wood Strips:

Apply wood strips at cover roof tile of proper height to support roof tile. Place across roof slope and space to support each row of cover tile. Toenail wood strips to substrate with 16d nails staggered pattern 18" o.c.

3.2 INSTALLATION:

Installation of Roof Tiles:

Except as otherwise indicated, install tiles to match Owner's existing roofs and in accordance with manufacturer's recommendations. Ensure that lugs are hooked over strapping. Provide course of underlayment on substrate before installation. Provide accessory items as shown and as required to make a complete installation of roofing, including flashing integrated with the roof tile work.

Secure with nails for exposure as recommended by manufacturer for climate, wind conditions, roof slope. Include closers as indicated or required. Caulk all exposed nail heads with roof tile caulking or polyurethane sealant. Ensure nails penetrate wood (batten) substrate 3/4" minimum.

Seal all exposed holes. Provide bird stops at all open roof tile ends to match existing roofs.

Install roof tile using "tight" method.

Take special care in handling and working over installed or existing roof tile to avoid cracking, chipping or breaking of roof tile. Replace any broken or chipped roof tile found during installation.

All roof tile shall be nailed including pan and cover tile. No exceptions.

Use concrete mortar to cover end of cut roof tile.

Roof tile shall be installed to withstand 100 mph winds.

All curbs heights shall be 12" above finished roof.

END OF SECTION 07 32 00

SECTION 07 51 00

BUILT-UP BITUMINOUS ROOFING

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Built-up roofing and roof insulation as shown on the drawings and includes insulation associated with roofing and related composition flashings for:

Patching of existing roofing to accommodate new roof penetrations and other work of this Contract.

Types of built-up roofing required for project include:

Asphalt and glass fiber felt roof membrane with aggregate surface.

Related Sections:

Wood Nailers, Curbs, Cants: Section 06 10 00.
Roof Curbs: Division 23 sections.

1.2 SUBMITTALS:

Product Data:

Submit technical product data and installation instructions from the manufacturer for each major roofing product or system required, including membrane, insulation, flashing material and accessories. Include data substantiating compliance with the requirements.

Certification: Provide written certification from manufacturer that felts, flashing and bitumen conform to specified ASTM standards.

For asphalt bitumen, provide label on each container or certification with each load of bulk bitumen, indicating flash point (FP), finished blowing temperature (FBT), softening point (SP) and equiviscous temperature (EVT).

Submit not less than three copies of the manufacturer's specifications and application instructions for all roof installations used; one copy each shall be furnished to the Owner and the Architect and one copy shall be kept on the job site until the roof installation is complete.

Shop Drawings:

For tapered insulation systems, furnish layout shop drawings showing thickness, slopes, valleys, ridges, top elevations, straight and tapered unit locations, as required to provide uniform drainage pattern around new roof-mounted equipment.

Samples:

Submit two samples of each type of piping and conduit support for approval. Include detail indicating method of anchorage to roof structure and method of flashing. Coordinate with Divisions 23 and 26.

Certifications:

Submit manufacturer's certification that materials provided meet or exceed specified requirements.

1.3 QUALITY ASSURANCE:

Installer:

Subcontract the roofing and associated insulation work to a single firm with not less than 5 years continuous experience under the same name, called the Installer in this section, specializing in the type of roofing required, which is acceptable to or licensed by manufacturer of primary roofing materials, and who has installed a minimum of 500 squares of similar roofing to the type required for this project during that 5 years.

Provide manufacturer's written certification showing that Installer is currently approved applicator before award of roofing work.

Installer's Field Supervision:

Require roofing Installer to maintain a full-time supervisor on job site during application of built-up roofing and who is experienced in installation of roofing system.

Standards:

Comply with insurance rating bureau requirements for Class or Type of approved roofing as indicated.

Comply with FM "Class I" or "Noncombustible", including zoned wind resistance for 1A-90 rating.

Provide component materials and roofing systems which have been tested for application and slopes indicated, listed and labeled by UL for Class A Rating, and which can be installed to comply with the requirements.

Comply with UL "Fire Classified".

Design roof system to resist wind velocities indicated on the Boulder County Wind Map. Note that wind speeds vary across the campus, but will not be less than 90 mph. Exposure should be appropriate to location.

Except as otherwise specified, conform to recommendations and specifications of NRCA Roofing and Waterproofing Manual. Where manufacturer's specifications are different from these standards conform to the more stringent requirements unless unacceptable to the manufacturer. Comply with EVT (equiviscous temperature) Standard and apply bitumen within EVT ±25° F.

Manufacturer Qualifications:

Obtain primary BUR materials including felts, bitumen and flashings from a single manufacturer, who publishes complete information on the required "BUR System", which has produced that type of product successfully for not less than 3 years. Provide secondary materials from sources acceptable to the manufacturer of the primary BUR materials for use with the roofing system specified.

Manufacturer of BUR is further limited to one who is willing to participate in the Pre-Roofing Conference as required.

Manufacturer's Recommendations:

All products comprising the total roofing system, including the insulation, shall be acceptable to the roofing membrane manufacturer.

The published and written general requirements and specific recommendations of the various materials manufacturers shall become a part of the project specification to the extent referenced hereinafter.

The manufacturer's recommendations will govern the construction when not in conflict with the specific provisions of the project specification.

In the event of conflict, the specific provisions of this specification will prevail over such requirements or recommendations of the manufacturers. Any such conflict shall be called to the attention of the Contractor, Architect and Owner with submittal.

Pre-Roofing Conference:

Approximately one week before scheduled commencement of roof patching and associated work and after approval of systems, submittals and foreman's resume, meet at Project site with Installer, installer of each component of associated work, installers of rooftop units and other work in and around roofing that must precede or follow roofing work (including mechanical work if any), Architect, Campus Roofer, Owner, roofing system manufacturer's representative, inspector and other representatives directly concerned with performance of the Work.

Review foreseeable methods and procedures related to roofing work, including but not necessarily limited to the following:

Tour representative areas of roofing, inspect and discuss condition of substrate, roof drains, curbs, penetrations, and other preparatory work performed by other trades.

Review roofing system drawings, specifications, and other contract documents with the Owner, Contractor, Architect and Installer.

Review required submittals, both completed and yet to be completed.

Review and finalize construction schedule related to roofing work. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

Review required inspection, testing, and certifying.

Confirm that the Installer and manufacturer accept the roofing specifications and details as a proper and functional system. If the Installer and manufacturer have any apprehension or concerns they shall discuss and resolve them at this time.

Confirm that the Installer and manufacturer accepts the roofing substrate. Coordinate with appropriate party any remedial action required to make substrate acceptable.

Establish where the roofing project will start and how the installation will proceed.

Determine what type of equipment will be used for the roofing application.

Resolve where and how the materials are to be stored on the project.

Determine the weather conditions under which the roofing Installer will install the roofing system. The Architect, Owner and Contractor must acknowledge that if the weather conditions do require the roofing Installer to stop the installation of the roofing system that pressure will not be brought to bear on the roofing applicator to ignore the predetermined conditions and continue the installation. (Provide for contingent temporary drying under all circumstances.)

Establish a program with the mechanical Installer as to exactly how and where the mechanical equipment will be transported across the roof area. If two men cannot carry the equipment to the base it shall be placed directly on the base by crane. Under no conditions can any equipment or materials be transported across roofing without the prior approval of the roofing Installer, and adequate protection weight/point loading shall be reviewed and approved prior to placement.

All penetrations and walls must be in place prior to the roofing application.

Establish a program for controlling all traffic across finished roofing.

1.4 DELIVERY, STORAGE, AND HANDLING:

Handle and store roofing system products and insulation in a manner which will ensure no possibility of significant moisture pick-up. Store in a dry, well ventilated, weatherproof place. Do not leave un-protected materials on roof over night, unless protected from weather or other moisture sources. Store all materials on pallets or other raised surface with rolls placed on end.

Roof Loading: Do not store materials on roof decks, nor position roofing installation equipment on roof decks, in concentrations exceeding design live loading or causing permanent deflection of deck.

Protect plastic insulation from exposure to sunlight.

Fire Hazard: Do not deliver plastic insulation materials to the project site ahead of the time of installation. Protect at all times against ignition. Complete the installation and concealment of plastic materials as rapidly as possible in each area of work.

1.5 PROJECT/SITE CONDITIONS:

Proceed with roofing work only after substrate construction and penetrating work have been completed.

Weather Conditions:

Proceed with roofing work only when existing and forecasted weather conditions are in accordance with manufacturer's recommendations and warranty requirements.

1.6 SEQUENCING AND SCHEDULING:

Sequence installation of roofing with related units of Work specified in other Sections to ensure that roof assemblies, including roof accessories, flashing, trim, and joint sealers, are protected against damage from effects of weather, corrosion, and adjacent construction activity.

1.7 WARRANTY:

Roofer's Warranty:

Provide in standard MRCA form, 2 year written warranty against roof leaks and failures with all available options and including flashings. The Contractor shall repair all damages due to failures covered above at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

Manufacturer: One of the following:

GAF Buildings Materials Corporation.
Johns-Manville Building Materials Corp.
Tamko Asphalt Products.

2.2 GENERAL:

Recycled Content: Materials/products shall contain the maximum amount of recycled content allowed that retains material integrity.

Regional Materials: Preference shall be given to materials that are manufactured, harvested, extracted, mined, quarried, etc. within a 500 mile radius of the project site.

Certified Wood: Wood based products shall be made from wood obtained from forests certified by an FSC accredited certification body to comply with the Forest Stewardship Councils "Principles and Criteria." Wood from other certification programs such as Sustainable Forest Initiative (SFI) are not acceptable.

2.3 BUILT-UP ROOFING SYSTEMS:

Aggregate-Surfaced Asphalt BUR:

Asphalt BUR on Roof Insulation: Provide built-up aggregate-surfaced roof system with asphalt bitumen and 4 glass-fiber plies and composition flashing, one of the following:

GAF Specification I-0-4-G.
Johns-Manville Specification No. 4GIG.
Tamko Specification 603.

Provide materials conforming to following standards:

Bitumen: ASTM D312, Types I, II and III or IV as specified by manufacturer.
VOC Content: Not more than 300 grams per liter.
Primer ASTM D41.
VOC Content: Not more than 775 grams per liter for porous substrates and not more than 250 grams per liter for non-porous substrates.
Felts, Fiberglass: ASTM D2178, Type IV.
Plastic Cement: ASTM D2822.
VOC Content: Not more than 300 grams per liter.
Flashings:
GAF 2XBM with granule surface.
Johns-Manville Specification No. FE-1 (LB) with granule surfaced DynaFlex.
Tamko Awaplan Premium.

Flashings must be acceptable to primary roofing membrane manufacturer.

2.4 INSULATION:

General:

Furnish 4' x 8' size roof insulation where mechanically fastened and 4' x 4' size where set in hot mopping of asphalt.

Polyisocyanurate Board Insulation:

Rigid board of minimum of 2.0 pcf density polyisocyanurate based foam core integrally faced both sides with bituminous saturated roofing felt complying with ASTM C1289, Type II; meeting long term thermal resistance (LTTR) based on a 15-year time-weighted average in accordance with CAN/ULC-S770; manufacturer's standard sizes and bearing UL label on packaging. Thickness: As required to meet existing adjacent conditions (when accounting for overlay board) at patching.

Comply with UL 1256 or FM 4450 Fire Test Standard for Insulated Roof Deck Construction.

Recycled Content: Not less then 9% by weight.

Rigid insulation manufactured using chlorofluorocarbons (CFCs) or hydrochlorofluorocarbons (HCFCs) is not acceptable.

Products/Manufacturer: Provide one of the following:

ACFoam 1: Atlas Energy Products
Thermax Hy-Tec-2: Celotex Roofing Products Division, The Celotex Corporation
UltraGard Gold: Johns-Manville Building Materials Corporation

Perlite Board Insulation:

Perlite (expanded volcanic ore) and fibers molded with fillers and water-resistant binders into rigid, non-combustible boards with integral skin on top surface, and complying with ASTM C728; thermal conductivity (k-value at 75° F.) of 0.36; manufacturer's standard lengths and widths. Thickness: 0.75".

Recycled Content: Not less than 75% by weight.

Products/Manufacturers: Provide one of the following:

Celo-Therm; The Celotex Corporation.
Permalite Sealskin; International Permalite, Inc.
Fesco Board; Johns-Manville Building Materials Corporation.

Tapered System:

Where insulation is required to be tapered to form crickets or to provide slope for drainage, provide 1" perlite tapered units, used in combination with other specified non-tapered boards to form required levels.

Fabricate with taper to achieve a minimum slope on the roof surface of 0.25" per foot.

2.5 OTHER MATERIALS:

Preformed Cant Strips:

Wherever preformed cant strips of insulation material are shown, provide units supplied by the manufacturer's of the associated roof and deck insulation, and formed of the same material. If such units are not produced by the roof and deck insulation manufacturer, provide units formed of asphalt impregnated organic fiber insulation material preformed to 45° angle, unless otherwise shown.

Use fire-resistive preformed organic fiber cant strips where flashings are torch applied.

Wood cants may be used provided they are preservative treated and conform to roofing system manufacturer's recommendations.

Gravel:

Reuse existing gravel to the greatest extent possible and, where existing gravel is insufficient to complete the work, provide new crushed rock or gravel, washed and clean, uniformly graded, ASTM D1863, size No. 7, or as required to match existing gravel.

Thermal Barrier:

ASTM ASTM C1396, gypsum board, 0.625" thick, Type "X", 4 ft. width, square edge.

Traffic Pads:

Prefabricated concrete pavers designed specifically for protection of exposed roofing, maximum size 24" x 24", reinforced, air-entrained normal weight concrete with minimum ultimate compressive strength of 4000 psi.

Include roofing manufacturer's standard granular surfaced SBS-modified bitumen membrane sheet below paver locations.

Fasteners:

Nails: 12 gage, size as required to suit application, galvanized or non-ferrous type, or square head, 1" annular thread roofing nail. Include 1.375" diameter 30 gage metal caps.

Metal Decks Without Concrete: BFG Screw Fasteners, International Permalite, Inc. Perma-fasteners, GAF Gaftite fasteners or approved equal, corrosion resistant and acceptable by FM for attaching insulation to metal decks.

Provide fasteners appropriate to purpose intended in length required for thickness of insulation material, but not less than length required to ensure 0.75" penetration into the roof deck substrate.

Insulation Joint Tape:

Asphalt treated glass fiber reinforced; 4" to 6" wide; self-adhering.

PART 3 - EXECUTION

3.0 EXAMINATION:

Refer to Section 01 73 00 for examination of substrate and job conditions.

Verify that all penetrations are complete and in place prior to start of roofing work.

Start of this work constitutes acceptance of substrates as suitable for satisfactory performance of work of this Section.

3.1 GENERAL:

Install roofing, flashing and insulation in strict accordance with manufacturer's instructions.

3.2 PREPARATION:

Clean the substrate of projections and substances detrimental to the work.

Install cant strips and similar accessories as shown, and as recommended by the prime materials manufacturer.

Insulation Under Roofing: Do not advance the installation of roof insulation beyond that which can be covered by roofing the same day. Do not install roofing over wet insulation; remove and replace with dry insulation before proceeding.

Prime the substrate if recommended by the roofing materials manufacturer; comply with the manufacturer's recommendations.

Loose lay thermal barrier on metal deck with tight butt joints at fire-rated roof-ceiling assemblies and where included in existing roof system before installing roof insulation.

Coordinate roofing with flashing and other adjoining work to ensure proper sequencing of the entire work.

Bitumen Drippage: Prepare substrate to prevent hot bitumen from entering the building or drains, and from saturating insulation, and from damaging vapor barriers.

Coordinate the installation of insulation, roofing sheets, flashings, stripping, coatings and surfacings, so that insulation and felts are not exposed to precipitation nor exposed overnight.

Provide cut-offs at end of each day's work, to cover exposed felts and insulation with a course of coated felt with joints and edges sealed with roofing cement. Remove cut-offs immediately before resuming work.

Asphalt Bitumen Heating:

Heat and apply bitumen in accordance with equiviscous temperature method ("EVT Method") as recommended by NRCA. Do not raise temperature above minimum normal fluid-holding temperature necessary to attain EVT (plus 3° F. at point of application) for more than one hour prior to time of application. Discard bitumen which has been held at temperature exceeding finished blowing temperature (FBT) for a period exceeding 3 hours. Determine flash point, finished blowing temperature and EVT of bitumen, either by information from bitumen producer or by suitable tests, and determine maximum fire-safe handling temperature and do not exceed that temperature in heating bitumen; but in no case heat bitumen to a temperature higher than 25° F. below flash point. For aggregate surfaced pour coats of bitumen, limit application temperature to minimum required for proper embedment of aggregate and maximum which will permit retention of a coating of weight required (depends on slope of surface). Keep kettle lid closed except when adding bitumen.

Flashing for New Mechanical Penetrations:

Remove existing loose gravel, dirt and debris by brooming and power vacuuming. Spud off gravel or other protrusions as necessary for application of new flashings.

Set insulation in hot mopping of steep asphalt to build up to meet existing conditions complying with requirements specified below. Install cant strips or vent flashings, strip in base flashings and place gravel fully embedded in flood coat of hot asphalt comply with requirements specified below.

3.3 INSULATION:

Extend insulation full thickness as shown over entire surface to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation and mastic. Form cant strips and tapered areas as shown and as required for proper drainage of the membrane.

Comply with the insulation manufacturer's recommendations for handling, installation and bonding or anchorage of insulation to substrate.

Laying Insulation Units Under Membrane:

Apply one or more courses of polyisocyanurate insulation as required to meet existing conditions at patching. Stagger joints one way in each course, and both ways between courses, by not less than 12" in each direction. Run long joints of insulation in continuous straight lines perpendicular to roof slope.

Metal Deck Without Concrete: Secure first course of polyisocyanurate insulation to deck with mechanical fasteners, evenly spaced, to provide minimum 2 fasteners in each surface unit but not less than one fastener per 2.0 sq. ft. of surface and in no case less anchorage than required by FM "Loss Prevention Data Sheet 1-28" for Windstorm Classification 1-90.

Tape all joints in course of mechanically fastened insulation immediately below hot asphalt application to ensure bitumen does not migrate to roof deck substrate.

Set additional courses of insulation in full hot mopping of Type III asphalt applied in accordance with temperature range of EVT ±25° F. and at a rate of 25 lbs. (±25% on total job basis) per 100 sq. ft.

Tapered System: Place tapered units on top of topmost insulation layer. Use in sequence and orientation as identified by manufacturer and in accordance with final shop drawings. Set in full hot mopping of Type III asphalt.

Set perlite insulation overlay course in full hot mopping of Type III asphalt applied in accordance with temperature range of EVT ±25° F. and at a rate of 25 lbs. (±25% on total job basis) per 100 sq. ft.

Provide tapered slopes to drains, 4' by 4' taper, with gradual slope to drain.

Trim surface of insulation where necessary at roof drains so finished surface is flush with ring of drain.

On unfaced plastic insulation do not apply hot materials (or rest hot containers) at temperatures above those recommended by the insulation manufacturer. Comply with manufacturer's instructions for setting units in or with hot bitumen.

3.4 ROOFING INSTALLATION:

General:

Comply with the instructions and recommendations of the roofing materials manufacturer, except to the extent more stringent requirements are indicated or required by NRCA Specifications including equiviscous temperature (EVT) method.

Confinement of Materials: Do not allow fluid and plastic materials to spill or migrate beyond surfaces of intended application.

Performance: It is required that roofing work be watertight for normal weather exposures, and not deteriorate in excess of normal weathering.

Installation of BUR:

Comply with instructions of the primary BUR materials manufacturer, and comply with the requirements for guaranteeing by the manufacturer, including flashing endorsement.

Comply with NRCA Roofing and Waterproofing Manual, Construction Details, for edges, parapets, flashings and roof penetrations.

Shingling of Plies: Except as otherwise indicated, install membrane with ply sheets shingled uniformly to achieve required number of thicknesses of membrane throughout. Shingle in proper direction to shed water on each large area of roofing, where slope is significant (over 0.5" per ft.).

Cant Strips/Tapered Edge Strips: Except as otherwise shown, install preformed 45° insulation cant strips at junctures of BUR membrane with vertical surface. Provide preformed tapered edge strips at perimeter edges of roof which do not terminate at vertical surfaces.

Inter-Ply Sheets: Provide the number and type of ply sheets (felts) indicated, lapped (shingled) amount as required to form a continuous, uniform membrane with bitumen moppings between sheets so that ply sheet does not touch ply sheet. Except as otherwise indicated, glaze-coat top of ply-sheet membrane with 10 lb. mopping of same bitumen, integrally with operation of laying up membrane.

Extend built-up roofing membrane to 2" (nominal) above top edge of cant strip and terminate.

Provide a folded-back envelope at edges and penetrations of built-up roofing membrane where it is not turned up on a cant strip, so as to provide positive protection against flow of bitumen into building or off the edge. Seal corners and other interruptions of envelope with large beads of roofing cement to provide positive protection against flow of bitumen.

Nail edges of roofing membrane to wood blocking at perimeter edges of roof prior to installing metal gravel stops/fascias. Space nails at minimum 8" o.c.

Set-On Accessories:

Where small roof accessories are set on built-up roofing membrane, set metal flanges in a bed of roofing cement, and seal penetration of membrane with bead of roofing cement to prevent flow of bitumen from membrane.

Composition Flashing and Stripping:

Provide composition flashing at cant strips and other sloping and vertical surfaces, and at roof edges, and at penetrations through roof. Provide one ply of asphalt-impregnated glass fabric felt and one ply of polyester reinforced modified bitumen flashing cap sheet, each set in a continuous coating of roofing cement and extended onto deck 6" and 4", respectively. Nail or provide other forms of mechanical anchorage of composition flashing to vertical surfaces, as recommended by manufacturer of primary roofing materials.

Seal top of flashing with glass fabric strip and mastic.

Provide composition stripping where metal flanges are set on roofing. Provide not less than two plies of glass felts; set each in a continuous coating of roofing cement and extended onto the deck 4" and 6", respectively. Except where concealed by aggregate surfacing, apply a heavy coating of roofing cement over composition stripping.

Aggregate Surfacing:

Promptly after completion of built-up roof membrane, edge treatment and set-on accessories in each substantial area of roofing, flood-coat surface and, while each small area is hot and fluid, solidly embed gravel surfacing into flood-coat, to produce a uniform surface of aggregate. Sweep roof clean of any excess gravel.

Traffic Pads:

Sweep off any loose gravel.

At all walkways, place one layer of SBS-modified bitumen membrane protection mat on top of completed roof plies set in full hot mopping of Type IV asphalt.

Carefully place concrete pavers on modified bitumen protection mat for walkway with 4" or more space between units unless made with drainage channels. Arrange to avoid blocking roof drainage.

Sealant Pans:

Located for items as indicated or as required for roof supported work. Set on top of felts prior to flood coat application. Tie into roofing felts with two strip moppings of felt. After item to be supported is in place, fill to within 0.5" of top with sand and the remainder with pourable urethane sealant.

Roof Curbs:

Curb height shall be 12" above finished roof.

3.5 PROTECTION:

The Installer shall advise the Contractor (in writing) of recommended protection of roofing for the remainder of the construction period, so that the work will be without damage or deterioration (except for normal weathering) at the time of acceptance.

Installer shall repair or replace (as required) deteriorated or defective work found at time of final inspection. Installer shall be engaged by Contractor to repair damages to roofing which occurred subsequent to roofing installation and prior to final inspection. Repair or replace the roofing and associated work to a condition free of damage and deterioration at time of substantial completion.

END OF SECTION 07 51 00

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Flashing and sheet metal work as shown on the drawings for:

- Metal flashing and counterflashing.
- Miscellaneous flashing for patching of tile roofing.
- Metal flashing for new masonry wall penetrations.
- Metal covering and flashing of equipment supports.
- Sealants for sheet metal: Refer to Section 07900 for materials and installation methods.

Related Sections:

- Elastic flashings for stone veneer: Section 04 43 00.
- Elastic sheet roofing flashing: Section 07 51 00.
- Duct flashing: Division 23 sections.
- Conduit flashing: Division 26 sections.

1.2 SUBMITTALS:

Product Data:

Submit product data, installation instructions, and general recommendations by the manufacturer of flashing and sheet metal materials.

Samples:

Submit 12" long samples of each specified metal which is to be exposed as flashing.

Submit full size samples of typical profiles and joints for flashing.

1.3 QUALITY ASSURANCE:

Engage an experienced Installer who has successfully completed sheet metal flashing and trim work similar in material, design, and extent to that required for this project.

Except as otherwise indicated, conform to requirements and recommendations of SMACNA "Architectural Sheet Metal Manual" Sixth Edition, 2003, as applicable and including forming, anchoring, cleating and forming expansion joints, seams and details for accommodation of thermal movement.

Sheet metal and flashing installations shall be designed to withstand 100 mph wind uplift.

Completed work must be free from water leakage under all weather conditions.

1.4 PROJECT/SITE CONDITIONS:

Do not proceed with the installation of flashing and sheet metal work until curb and substrate construction, cant strips, blocking and other construction to receive the work is completed.

Coordinate with roofing work for scheduling installation of counterflashing and similar items related to roofing.

Coordinate with stone work for flashing built into stone.

1.5 WARRANTY:

Manufacturer's Warranty:

Submit manufacturer's printed 20 year warranty of the finish (prefinished steel only) against deterioration. Deterioration includes, but is not limited to, the following:

Color fading more than 5 Hunter units when tested according to ASTM D2244.

Chalking in excess of a No. 8 rating when tested according to ASTM D4214.

Cracking, checking, peeling, or failure of paint to adhere to bare metal.

Installer's Warranty:

Sheet metal work shall be warranted for a period of 2 years from date of Notice of Acceptance.

Warranty shall include replacement at Contractor's expense any defects which occur during the warranty period which, in the opinion of the Architect are due to defective materials, workmanship, or for failure to allow for expansion/contraction.

PART 2 - PRODUCTS

2.1 MATERIALS:

Metals:

Prefinished Work: "ColorKlad" by Vincent Metals a Division of Rio Algom, Inc., "Hickman Kynar 500" by W. P. Hickman Company or approved equal.

Zinc-Coated Steel Sheet: Commercial quality extra smooth carbon steel sheets complying with ASTM A446, Grade A, with hot-dipped galvanized coating complying with ASTM A525, G90, 0.0239" thick (24 gage) unless otherwise indicated.

Minimum Recycled Content: 60% by weight.

Finish: Factory finish prior to fabrication with "Kynar" based fluoropolymer prime and finish coating one side, 1 mil thick ±0.1 mil, with strippable plastic film on finish side, protective wash coat on back.

Color: As selected from manufacturer's full line of standards.

Stainless Steel Sheet: ASTM A167 Type 304 stainless sheet or strip, soft, except as otherwise indicated; No. 2D annealed finish, 0.0250" thick (24 gage) except as otherwise indicated.

Copper Sheet: Cold-rolled sheet copper (H00), complying with ASTM B370, except soft temper (060) where fully concealed and supported for proper performance, CDS 2B (bright) finish, 16 oz. per sq. ft. (0.0216" thick) except as otherwise indicated.

High-Temperature Waterproof Underlayment:

Provide high temperature resistant butyl flashing consisting of rubberized asphalt and polyethylene laminated self-adhesive sheet, "Ultra" by W.R. Grace or approved equal.

Include manufacturer's recommended primer.

Miscellaneous Materials:

For metal work, provide the type solder and fasteners recommended by the producer of the metal sheets, for fabrication and installation.

Use ASTM B32, Grade Sn50, with rosin flux, unless otherwise recommended.

Bituminous Coating: SSPC-Paint 12, cold-applied bituminous mastic, nominally free of sulphur, compounded for 15-mil dry-film-thickness per coating.

Nails and Fasteners: Use type and form of metal fastener compatible with base metal and support substrate.

2.2 FABRICATION:

General:

Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

Shop fabricate metal flashing, trim, sheet metal drainage work and similar items to comply with profiles and sizes shown, and to comply with standard industry details as shown by SMACNA in the "Architectural Sheet Metal Manual".

Except as otherwise indicated, provide soldered flat lock seams not less than 0.75" wide, and fold back metal to form a hem on the concealed side of exposed edges. Orient seams properly for direction of water flow. Comply with metal producer's recommendations for tinning, soldering, and cleaning flux from metal. Do not use mastic for seams.

Except as otherwise indicated, fabricate work associated with stone flashing from stainless steel sheet, work associated with tile roofing flashing from copper sheet and work associated with built-up roofing from prefinished steel sheet, using 8' to 10' lengths for continuous items except where otherwise indicated.

Expansion Provisions:

Provide for thermal expansion of all exposed sheet metal work exceeding 15'-0" running length, except as otherwise indicated.

Flashing and Trim: 10'-0" maximum spacing, and located 2'-0" from corners and intersections.

Conceal fasteners and expansion provisions wherever possible. Fold back edges on concealed side of exposed edges, to form a hem.

Edge Strips and Cleats:

Fabricate from metals matching adjacent metals to profiles indicated or required by SMACNA using 2.75" widths for continuous edge strips and 2" width, 3" long for cleats.

Miscellaneous Flashings for Tile Roofs:

Fabricate miscellaneous flashings for tile roofs using copper sheet including new roof penetrations following suggested details by tile manufacturer.

Run flashings between tile roofs and vertical surface not less than 2" higher than tile and covering the first roll of tile.

Lap flashings 6" and secure with 4" wide floating 20 gage stainless steel cleats at 36" on center or continuous 20 gage stainless steel cleat.

Use copper edge strip along all exposed sheathing edges.

Metal Coverings and Flashing of Equipment Supports on Roofs:

Built-Up Roof Locations: Cover raised bases and equipment supports on built-up roofs with 24 gage prefinished zinc-coated sheet steel. Fabricate metal to shapes required using 1" riveted and sealed flat seams. Extend counterflashing over base flashing 4" and fold bottom edge back 0.5" on underside. Where coverings are penetrated for bolt connections, use 4 lb. sheet lead washers, 2" larger than bolt holes.

Roofing Tile Locations: Run self-adhering waterproof underlayment below copper sheet flashing as detailed on the drawings. Lap edges by not less than 4". Remove protective sheet and adhere to substrate with full contact over all surfaces. Cover raised bases and equipment supports and waterproof underlayment with 16 ounce copper sheet. Fabricate metal to shapes required using 1" riveted and soldered flat seams. Extend counterflashing over base flashing 4" and fold bottom edge back 0.5" on underside. Where coverings are penetrated for bolt connections, use 4 lb. sheet lead washers, 2" larger than bolt holes.

PART 3 - EXECUTION

3.1 INSTALLATION:

General:

Install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, and SMACNA's "Architectural Sheet Metal Manual."

Anchor units of Work securely in place, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level.

Install Work with laps, joints, and seams that will be permanently watertight and weatherproof. Install exposed work without excessive oil canning, buckling or tool marks. Fold exposed edges to form hems.

Conceal fasteners and expansion provisions wherever possible.

Expansion Provisions:

Provide for thermal expansion of exposed sheet metal Work. Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant (concealed within joints).

Conceal fasteners and expansion provisions wherever possible. Fold back edges on concealed side of exposed edges, to form a hem.

Sealed Joints:

Form non-expansion, movable, joints to accommodate elastomeric sealant complying with SMACNA standards. Fill joint with sealant and form metal to completely conceal sealant.

Use joint adhesive for non-moving joints specified not to be soldered.

Cleats and Edge Strips:

Secure edges of sheet metal members over 12" wide and at other locations indicated with cleats. Space at 12" o.c. unless otherwise indicated.

Provide continuous edge strips for attaching exposed terminating edge of roof flashing. Provide butt joints of 0.125" width or greater as necessary to accommodate thermal movement.

Metal Coverings and Flashings of Equipment Supports In Roof:

Provide metal coverings and flashings to cover raised bases and equipment supports on roof.

Prefinished Work:

Take special care in the fabrication, handling and installation of prefinished work to avoid damage to finish. Remove protective film from each unit after installation. Touch up minor defects to match factory finish. Replace units excessively damaged as determined by Architect.

Copper:

Separate copper work from dissimilar metals by a 15-mil-dry-film thickness bituminous coating, or by a heavy tinning of solder at spot-contacts.

END OF SECTION 07 62 00

SECTION 07 84 00
FIRESTOPPING

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Through-penetration firestopping in fire-rated barriers including both empty openings and openings containing cables, pipes, ducts, conduits and other penetrating items.

Construction-gap firestopping at connections of the same or different materials in fire-rated construction.

Construction-gap firestopping occurring within fire-rated walls.

Construction-gap firestopping occurring at the top of fire-rated walls.

Construction-gap firestopping occurring at perimeter of fire-rated hollow metal door frames.

Filling of fire-rated and smoke-rated wall and floor penetrations with firestopping including for filling of penetrations abandoned under the scope of the Contract.

Filling of existing floor penetrations and fire-rated or smoke-rated walls which have been previously abandoned and which remain unfilled within the project area.

Construction-gap smoke-stopping in smoke partitions.

Related Sections:

Summary: Section 01 10 00.
Cutting and Patching: Section 01 73 29.
Joint Sealers: Section 07 92 00.
Fire dampers and manufactured mechanical devices: Division 23.
Raceway seals, cable trays and manufactured electrical devices: Division 26 and 28 sections.

1.2 DEFINITIONS:

Assembly: Particular arrangement of materials specific to given type of construction described or detailed on the drawings.

Barriers: Time rated fire walls, smoke partition walls, time rated ceiling/floor assemblies and structural floors.

Firestopping: Methods and materials applied in penetrations and unprotected openings to limit spread of heat, fire, gasses and smoke.

Penetration: Opening or foreign material passing through or into barrier or structural floor such that full thickness of rated materials is not obtained.

Construction Gaps: Gaps between adjacent sections of walls, exterior walls, at wall tops between top of wall and ceiling, and structural floors or roof decks.

Sleeve: Metal fabrication or pipe section extending through thickness of barrier and used to permanently guard penetration. Sleeves are described as part of penetrating system in other sections and may or may not be required for firestopping.

1.3 SYSTEM PERFORMANCE REQUIREMENTS:

General:

Provide firestopping systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gases.

F-Rated Through-Penetration Firestop Systems:

Provide through-penetration firestop systems with F ratings indicated, as determined per ASTM E814, but not less than that equaling or exceeding the fire-resistance rating of the constructions penetrated.

L-Rated Systems:

Provide firestop systems with L-ratings indicated by UL number as determined per ASTM E814, where systems maintain a barrier to cold smoke at all penetrations, connections with other surfaces, separations required to permit building movement, sound or vibration absorption, and other construction gaps.

T-Rated Through-Penetration Firestop Systems:

Provide through-penetration firestop systems with T ratings, in addition to F ratings, as determined per ASTM E814, where indicated and where systems protect penetrating items exposed to contact with adjacent materials in occupiable floor areas. T-rated assemblies are required where the following conditions exist:

Where firestop systems protect penetrations located outside of wall cavities.

Where firestop systems protect penetrations located outside fire-resistive shaft enclosures.

Where firestop systems protect penetrations located in construction containing doors required to have a temperature-rise rating.

Where firestop systems protect penetrating items larger than a 4-inch-diameter nominal pipe or 16 sq. in. in overall cross-sectional area.

Fire-Resistive Joint Sealants:

Provide joint sealants with fire-resistance ratings indicated, as determined per ASTM E119, but not less than that equaling or exceeding the fire-resistance rating of the construction in which the joint occurs.

Exposed-to-View Firestopping Materials:

For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.

For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.

For floor penetrations with annular spaces exceeding 4 inches or more in width and exposed to possible loading and traffic, provide firestop systems capable of supporting the floor loads involved either by installing floor plates or by other means.

For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

For firestopping exposed to view, provide products with flame-spread values of less than 25 and smoke developed values of less than 450, as determined per ASTM E84.

1.4 SUBMITTALS:

Product Data:

Submit manufacturer's technical data, for each type of firestopping required, including instructions for joint preparation and application. Clearly identify location where each material is to be used with same references on penetrations schedule produced by the Subcontractor.

Shop Drawings:

Submit firestop system drawings showing each condition requiring penetration seals indicating proposed UL or Warnock Hersey listing numbers, installation methods and relationships to adjoining construction.

For un-tested penetrations, submit firestop manufacturer's engineering judgements which reference related UL system(s). Engineering judgement drawings shall be in accordance with the recommended IFC (International Firestop Council) Guidelines for firestop systems engineering judgements.

Certifications:

Submit manufacturer's certification that materials supplied are in accordance with the specifications and requirements of the State of Colorado.

Submit certification that materials supplied are VOC compliant and are nontoxic to building occupants.

Submit certification that products provided meet the Environmental Performance requirements specified in Section 01 10 00 including for no off-gassing and no degradation of performance due to the presence of high amounts of UV and for temperature up to 60° Celsius.

Test Reports:

Submit product test reports from, and based on tests performed by, a qualified testing and inspecting agency who is acceptable to the State of Colorado evidencing compliance of firestopping with requirements based on comprehensive testing of current products.

Where test reports are not possible, submit ICC Evaluation Report.

Penetrations Schedule:

Submit a schedule showing typical penetrations of each penetrating material type, firestopping type to be used, F ratings, L ratings, T ratings, UL or other acceptable testing agency reference numbers, and other pertinent data.

Include each firestop and smokeseal material. Schedule of systems and materials shall be acceptable to the State of Colorado.

1.5 QUALITY ASSURANCE:

Fire-Test Response Characteristics:

Provide firestopping that complies with the following requirements and those specified under the "System Performance Requirements" article:

Perform firestopping tests by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, Warnock Hersey, or another agency performing testing and follow-up inspection services for firestop systems that is acceptable to the State of Colorado.

Furnish through-penetration firestop systems identical to those tested per ASTM E814 under conditions where positive furnace pressure differential of a least 0.01" of water is maintained at a distance of 0.78" below the fill materials surrounding the penetrating items in the test assembly. Provide rated systems complying with the following requirements:

Furnish products bearing classification marking of qualified testing and inspecting agency.

Furnish firestop systems corresponding to those indicated by reference to system designations listed by UL in their "Fire Resistance Directory" or by Warnock Hersey.

Furnish fire-resistive joint sealant systems identical to those tested for fire-response characteristics per ASTM E119 under conditions where the positive furnace pressure differential is at least 0.01 inch of water, as measured 0.78 inch from the face exposed to furnace fire. Provide systems complying with the following requirements:

Fire-Resistance Ratings of Joint Sealants: As indicated by reference to design designations listed by UL in their "Fire Resistance Directory."

Furnish joint sealants, including backing materials bearing classification marking of qualified testing and inspection agency.

Standards:

Conform to applicable standards, including, but not limited to:

UL 1479 and UL 2079.

ASTM E119 Method for Fire Tests of Building Construction and Materials.

ASTM E814 Test Method of Fire Tests of Through-Penetration Firestops.

Manufacturer's Qualifications:

A company specializing in manufacturing the products specified in this Section.

Installer Qualifications:

Engage an Installer who has successfully completed within the last three years at least three firestopping applications similar in type and size to that of this project.

Single Source for Materials:

Obtain firestopping materials from a single manufacturer for each different product required.

Preconstruction Laboratory Tests:

Submit substrate materials representative of actual joint surfaces to be sealed to manufacturer of firestopping products for laboratory testing of firestop materials for adhesion to primed and unprimed substrate joints and for compatibility with secondary seals, if required, as indicated below:

Use test methods standard with manufacturer to determine if priming and other specific substrate preparation techniques are required to obtain rapid, optimum adhesion of firestopping to substrate joints under environmental conditions that will exist during actual installation.

Testing will not be required when firestopping manufacturer is able to submit preparation data required above which is acceptable to Architect and is based on previous testing of current firestopping products for adhesion to, and compatibility with, substrates matching those submitted.

Preconstruction Field Tests:

Prior to installation of firestopping, field test adhesion to substrate joints as follows:

Install firestopping in five foot lengths using same materials and methods required for completed work. Allow firestopping to cure before testing. Test adhesion to substrates by manually trying to pull firestopping out of joint.

Locate test joints where indicated or, if not indicated, as directed by Architect.

Perform field tests for each type of firestop material and joint substrate application indicated.

Perform tests in presence of Architect and Owner.

Detectable Asbestos:

Provide firestopping products containing no detectable asbestos as determined by the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, "Polarized Light Microscopy."

Coordination:

Coordinate construction of openings and penetrating items to ensure that designated through-penetration firestop systems are installed per specified requirements.

Pre-installation Conference:

Conduct conference at Project site to comply with requirements of Section 01 31 19.

Field Inspections:

Owner may employ and pay a qualified inspection agency to check installed firestopping systems for compliance with requirements.

1.6 DELIVERY, STORAGE AND HANDLING:

Deliver materials to project site in original unopened containers with labels indicating manufacturer, product name and designation, expiration period for use, pot life, curing time and mixing instructions for multicomponent materials. Include lot numbers and UL or other recognized testing laboratory mark.

Store materials off the ground and handle materials to prevent their deterioration or damage due to moisture, temperature changes, freezing, contaminants or other causes.

Provide protection to prevent damage to adjacent surfaces and finishes and protect against damage from construction activities.

1.7 PROJECT/SITE CONDITIONS:

Environmental Conditions:

Do not proceed with installation of firestopping under adverse weather conditions, or when ambient and substrate temperatures are below or above manufacturer's recommended limitations for installation or below 60° F. Proceed with the work only when forecasted weather conditions are favorable for proper cure and development of bond strength. Maintain this minimum temperature before, during, and minimum 3 days after installation of materials.

Do not proceed with installation of firestopping when joint substrates are wet due to rain, frost, condensation, or other causes.

Furnish adequate ventilation per firestopping manufacturer's recommendations including forced air ventilation during installation if required by manufacturer.

Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

Surface Conditions:

Before start of installation, manufacturer and Installer shall review all substrate materials to which firestopping is to be bonded in any joint subject to thermal or other movements to determine need for and types of primers required.

Provide proper primers suited to conditions. Primers may be omitted upon certification by firestopping manufacturer that they are not required. Where any doubt exists, prepare sample joints on actual materials as furnished for the job to determine the matter.

1.8 SEQUENCING AND SCHEDULING:

Notify inspection agency (if any) at least 1 week in advance of firestopping installations; confirm dates and times on days preceding each series of installations.

Do not cover up those firestopping installations that will become concealed behind other construction until Owner or inspection agency (if any) and the State of Colorado have examined each installation.

1.9 WARRANTY:

Submit 2 copies of written 1-year warranty agreeing to repair or replace firestopping which fails to perform as airtight and watertight joints; or fails in joint adhesion, cohesion, abrasion resistance, weather resistance, extrusion resistance, migration resistance, stain resistance, or general durability; or appears to deteriorate in any other manner not clearly specified by submitted manufacturer's data as an inherent quality of the material for the exposure indicated.

Provide warranty signed by the Installer and Contractor.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

Provide products by one of the following for each different firestopping products required or approved equal:

3M Fire Protection Products
Bio-Fireshield Inc.
Hilti
Specified Technologies, Inc.

Provide products by one of the following for each different fire-resistant joint sealer products required or approved equal:

Dow Corning Corporation
General Electric Company
Harry S. Peterson Co., Inc.
Hilti Firestop Systems
Pecora Corporation
Rhone - Poulene, Inc.
Sika Corporation
Sonneborn Building Products Division, Rexnord Chemical Products, Inc.
Tremco, Inc.
W.R. Meadows, Inc.
USG

2.2 MATERIALS:

General:

Recycled Content: Materials/products shall contain the maximum amount of recycled content allowed that retains material integrity.

Regional Materials: Preference shall be given to materials that are manufactured, harvested, extracted, mined, quarried, etc. within a 500 mile radius of the project site.

Provide products will not degrade under the use conditions indicated including in the presence of high ultraviolet light and temperatures up to 60 degrees Celsius. Provide products which do not off-gas in accordance with the requirements of Section 01 10 00.

Compatibility:

Provide firestopping, joint fillers, dams and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by testing and field experience.

VOC Content:

Limit VOC content to not more than 420 grams per liter for all firestopping and fire sealants. Limit VOC content to not more than 250 grams per liter for primers used in non-porous substrates and to not more than 775 grams per liter for primers used in porous substrates.

Compressible foam joint fillers, polyester polyurethane foam impregnated with neoprene rubber or acrylic ester styrene copolymer manufactured using chlorofluorocarbons (CFCs) or hydrochloro-fluorocarbons (HCFCs) is not acceptable.

Joint sealers and accessories formulated with aromatic solvents (organic solvent with a benzene ring in its molecular structure), fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, or their components are not acceptable.

Do not use joint sealers containing the following:

- Mercury.
- Butyl rubber.
- Neoprene.
- SBR (styrene butadiene rubber).
- Nitrile.

Accessories:

Provide components for each firestopping system that are needed to install fill materials and to comply with "System Performance Requirements" article in Part 1. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for designated fire-resistance-rated systems. Accessories include but are not limited to the following items:

- Permanent forming/damming/backing materials including the following:
  - Semirefractory fiber (mineral wool) insulation.
  - Ceramic fiber.
  - Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
  - Fire-rated formboard.
  - Joint fillers for joint sealants.
- Temporary forming materials.
- Substrate primers.
- Collars.
- Steel sleeves.

Applications:

Provide firestopping systems composed of materials specified in this Section that comply with system performance and other requirements.

2.3 THROUGH PENETRATION FIRESTOP FILL MATERIALS:

Standards:

Comply with ASTM E814 requirements for appropriate F, L and T ratings.

General:

Provide one of the following at Contractor's option which will provide the required F, L and T ratings for the material involved.

Through Penetration Firestop Systems:

Systems or devices listed in the U.L. Fire Resistance Directory under categories XHCR (firestop devices) and XHEZ (firestop systems) may be used, providing that they conform to the construction type, penetrant type, annular space requirements and fire rating involved in each separate instance, and that the system is symmetrical for wall applications. Certify systems and devices are asbestos free and withstand the passage of cold smoke either as an inherent property of the system, or by use of a separate product included as a part of the U.L. system or device and designed to perform this function.

Single Component Latex Elastomeric:

Intumescent, endothermic, paintable, water base caulk material resistant against accidental water spills in the unexpanded state.

Location: Exterior and interior electrical cable, metal pipe, insulated pipe, glass pipe, construction gaps, HVAC ductwork and certain plastic pipe applications; head of wall joints exposed to view and head of wall joints concealed from view at Contractor's option to spray-applied material specified below.

Provide "CP 25WB" by 3M Fire Protection Products or approved equal by listed manufacturer.

Single Component Silicone Elastomeric:

Intumescent, endothermic, caulk material resistant against accidental water spills in the unexpanded state.

Location: Exterior and interior electrical cable, metal pipe, insulated pipe, HVAC ductwork; head of wall joints exposed to view and head of wall joints concealed from view at Contractor's option to spray-applied material specified below. In association with moldable putty and other locations required for work under this Contract.

Provide "3M Fire Barrier 3000 WT Silicone Sealant" by 3M Fire Protection Products or approved equal by listed manufacturer.

Single Component Silicone Elastomeric:

Intumescent, endothermic, caulk material resistant against accidental water spills in the unexpanded state.

Location: Exterior and interior electrical cable, metal pipe, insulated pipe, HVAC ductwork; head of wall joints exposed to view and head of wall joints concealed from view at Contractor's option to spray-applied material specified below.

Provide "3M Fire Barrier 2000 Silicone Sealant" by 3M Fire Protection Products or approved equal by listed manufacturer.

Two Component Silicone RTV Foam:

Intumescent, endothermic, caulk material resistant against accidental water spills in the unexpanded state.

Location: Exterior and interior electrical cable, metal pipe, insulated pipe, glass pipe, construction gaps, HVAC ductwork and certain plastic pipe applications; head of wall joints exposed to view and head of wall joints concealed from view at Contractor's option to spray-applied material specified below.

Provide "Fire Barrier 2001 Silicone RTV Foam" by 3M Fire Protection Products or approved equal by listed manufacturer.

Wrap Strip:

Intumescent, endothermic, flexible wrap strip elastomeric sheet material with aluminum foil backing, in the unexpanded state.

Location: Exterior and interior electrical cable, metal pipe, insulated metal pipe, construction gaps, and plastic pipe and conduit applications.

Provide "3M Fire Barrier FS-195 + Wrap/Strip" by 3M Fire Protection Products or approved equal by listed manufacturer.

Single Component Spray-Applied Polychloroprene:

Flexible, single component, sprayable, water based coating resistant against accidental water spills in the expanded state.

Location: Head of wall joints and other locations as required for work under this Contract.

Provide "3M FireDam Spray" by 3M Fire Protection Products or approved equal by listed manufacturer.

Pillows/Bags:

Reusable, heat-expanding pillows/bags composed of glass fiber cloth cases filled with a combination of mineral fiber, water-insoluble expansion agents and fire-retardant additives.

Location: Interior electrical cable tray openings and empty openings.

Provide SSB Series Firestop Pillows by Specified Technologies, Inc., Firestop Pillows by Bio Firesheild, Inc. or KBS Sealbags by International Protective Coatings Corp.

Moldable Putty:

Single-component, noncombustible, intumescent, water-based fill, void or cavity material.

Location: Miscellaneous conditions as required for work under this Contract.

Provide Fire Barrier MP+ Stix Putty by 3M Fire Protection Products or approved equal by listed manufacturer.

Firestop Mortar:

Factory packaged firestop mortar requiring only the addition of water per manufacturer's directions to fill formed spaces of floor penetrations.

Location: Metallic pipe, tube and conduit applications through floors.

Provide Fire Barrier Mortar by 3M Fire Protection Products or approved equal by listed manufacturer.

Fire Barrier Sheet:

Fire resistant composite board comprised of an intumescent synthetic elastomeric layer reinforced with a hexagonal mesh restraining wire and covered with aluminum foil on one side and with the opposite side bonded to a 28 gage sheet metal backing.

Provide "3M Brand Fire Barrier CS-195 Composite Sheet" by 3M Fire Protection Products or approved equal by listed manufacturer.

Fire-Safing Insulation:

Mineral fibers manufactured from slag with thermosetting resin binders formed into blankets with foil facing, complying with ASTM C612, Class 1 and 2, passing ASTM E136 for combustion characteristics, density not less than 4.0 lbs. per cu. ft., tested for "poke-through" fire containment for required depths and dimensions. Include galvanized steel safing clips, safing sealant as specified above and accessories for installation.

Provide U.S. Gypsum "Thermafiber Safing Insulation" or approved equal.

2.4 FIRE RATED JOINT SEALANTS:

Sealant Standard:

Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated that complies with ASTM C920 and ASTM E119 requirements, including those referenced for Type, Grade, Class, and Uses, and requirements specified in this Section applicable to fire-resistive joint sealants.

Colors:

Provide color of exposed joint sealants to comply with the following:

Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.

General:

Provide one of the following at Contractor's option which will provide the required F, L and T ratings for the material involved.

Construction Joint/Gap Firestop Systems for Fire Rated Assemblies:

Fill, void or cavity materials listed in the UL Fire Resistance Directory under category XHHW may be used, providing it conforms to the construction type and fire rating involved in each separate instance.

Forming materials listed in the UL Fire Resistance Directory under category XHKU may be used, providing it conforms to the construction type and fire rating involved in each separate instance and meet UL 2079 and ASTM E1966.

Additional Requirements: Withstand the passage of cold smoke either as an inherent property of the system, or by the use of a separate product included as a part of the UL system or device, and designed to perform this function.

Single-Component, Neutral-Curing Silicone Sealant:

Type S; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, G, A and (as applicable to joint substrates indicated) O.

Provide one of the following or approved equal:

Dow Corning 790, Dow Corning Corp.
Dow Corning 795, Dow Corning Corp.
Silpruf, General Electric Co.
Ultraglaze, General Electric Co.
864, Pecora Corp.

Multicomponent, Nonsag, Urethane Sealant:

Type M; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, A, and (as applicable to joint substrates indicated) O.

Provide one of the following or approved equal:

Vulkem 922, Tremco, Inc.
Dynflex, Pecora Corp.
Dynatred, Pecora Corp.
Dynatrol II, Pecora Corp.
Sikaflex 2cn NS, Sika Corp.
Sonolastic NP 2, Sonneborn Building Products Div., ChemRex Inc.
Dymeric 240 or Dymeric 240FC, Tremco Inc.

Single-Component, Nonsag, Urethane Sealant:

Type S; Grade NS; Class 25; and Uses NT, M, A, and (as applicable to joint substrates indicated) O.

Provide one of the following or approved equal:

Isoflex 880 GB, Harry S. Peterson Co., Inc.
Isoflex 881, Harry S. Peterson Co., Inc.
Vulkem 921, Tremco, Inc.
Sikaflex-15LM, Sika Corp.

Acrylic Emulsion:

One part, nonsag, mildew resistant, acrylic emulsion sealant complying with ASTM C834, paintable, recommended by manufacturer for exposed interior applications.

Provide "AC-20 FTR" by Pecora Corporation or equal by listed manufacturers.

PART 3 - EXECUTION

3.1 EXAMINATION:

Refer to Section 01 73 00 for examination of substrate and job conditions.

Start of this work constitutes acceptance of substrates as suitable for satisfactory performance of work of this section.

3.2 PREPARATION:

Clean joint surfaces immediately before installation of firestopping to comply with manufacturer's recommendations. Remove dirt, insecure coatings, moisture and other substances which would interfere with bond of firestopping or sealant.

Remove laitance and form release agents from concrete.

Remove remaining loose particles by vacuuming or blowing out joints with oil-free compressed air.

Prime the joint surfaces wherever recommended by the firestopping manufacturer. Do not allow primer to spill or migrate onto adjoining surfaces.

Use masking tape to prevent firestopping from contacting adjacent surfaces to remain exposed to view. Remove masking tape as soon as possible without disturbing firestopping seal.

3.3 INSTALLATION:

Comply with System Performance Requirements and manufacturer's printed instructions except where more stringent requirements are specified.

Set at proper depth or position in the joint to comply with the listed system.

Install firestopping at perimeters of doors and similar openings in fire-rated construction using methods and techniques recommended by manufacturer to achieve fire-ratings required in listed assemblies.

Provide specified fire-rated firestopping at all pipe, duct, conduit and other penetrations through fire-rated construction. Use forming materials, accessories, fillers and sealant materials of types and thickness for fire-rating required.

Joint Sealants:

Comply with the "System Performance Requirements", with ASTM C1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.

Install joint fillers to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability and develop fire-resistance rating required.

Install sealants as recommended by manufacturer to completely fill recesses and with uniform cross-sectional shapes and depths. Install sealant at the same time joint fillers are installed. Tool joints as required to achieve fire-resistive rating.

Spillage:

Do not allow sealants or compound to overflow or spill onto adjoining surfaces, or to migrate into the voids of adjoining surfaces. Clean the adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.

Fire-Safing Insulation:

Install safing insulation at all penetrations of fire-rated floors and fire-rated walls including those at pipes, ducts, conduits, wiring and other locations as required for work under this Contract. Conform to tested fire assembly and applicable Building Code requirements.

3.4 CONDITIONS REQUIRING FIRESTOPPING:

General:

Provide firestopping for conditions specified whether or not firestopping is indicated and if indicated, whether such material is designated as insulation, safing, or otherwise.

Insulation types specified in other sections shall not be installed in lieu of firestopping materials specified herein.

Interior Walls and Partitions:

Where a wall or partition is continuous past a structural floor, such as at stairwells and vertical shafts, and a space would otherwise remain open between the wall face and perimeter edge of the adjoining structural floor, provide elastomeric firestopping.

Provide firestopping whether or not there are any clips, angles, plates or other members bridging or interconnecting the wall and floor systems, and whether or not such items are continuous.

Where the top edge of the fire-rated wall or partition abuts and is at right angles to the fluted-type decking, and the construction is such that would otherwise leave the flute spaces open, provide elastomeric firestopping.

Penetrations:

Penetrations include conduit, cable, wire, pipe, duct, or other elements, which pass through one or both outer surfaces of a floor, roof, wall, or partition (membrane or through penetration).

Work includes firestopping penetrations through existing floors and fire-rated or smoke-rated walls which have been previously abandoned and not filled or which are abandoned under work of this Contract.

Where penetrations through existing floors and fire-rated or smoke-rated walls which have been previously abandoned and not filled are observed during the performance of the work of this Contract, notify the Architect and the Owner to allow for an inspection of said locations. Obtain direction from the Architect and the authorities having jurisdiction on required filling, if any, and materials to be used.

Except for floors on grade, where a penetration occurs through a structural floor or roof and a space would otherwise remain open between the surfaces of the penetration and the edge of the adjoining structural floor or roof, provide firestopping to fill such spaces in accordance with ASTM E814.

Where penetrations occur at the fire-rated walls or partitions of solid type construction, provide firestopping to completely fill around the penetration, in accordance with ASTM E814.

Where penetrations occur at fire-rated walls or partitions of hollow-type construction, provide firestopping to completely fill spaces around the penetration, on each side of the wall or partition, in accordance with ASTM E814.

These requirements for penetrations shall apply whether or not sleeves have been provided, and whether or not penetrations are to be equipped with escutcheons or other trim.

Miscellaneous Voids:

Provide firestopping to fill miscellaneous voids and openings in fire-rated construction in a manner essentially the same as specified herein before.

Special Conditions:

For floor penetrations with annular spaces exceeding 4 inches or more in width and exposed to possible loading and traffic, provide firestop systems capable of supporting the floor loads involved either by installing floor plates or by other means.

For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

3.5 FIELD QUALITY CONTROL:

Inspecting agency employed and paid by Owner may examine completed firestopping to determine, in general, if it is being installed in compliance with requirements.

Inspecting agency will report observations promptly and in writing to Contractor and Architect.

Do not proceed to enclose firestopping with other construction until reports of examinations are issued.

Where deficiencies are found, repair or replace firestopping so that it complies with requirements.

3.6 CLEANING:

Clean off excess firestopping materials adjacent to joints as work progresses by methods approved by manufacturers of firestopping and of products in which joint occur.

3.7 PROTECTION:

Protect firestopping during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of acceptance. If damage or deterioration occurs, cut out and remove damaged or deteriorated firestopping immediately and reseal joints with new materials to produce repaired areas indistinguishable from original work.

3.8 PENETRATION SCHEDULE:

General:

Prepare a schedule showing typical penetrations of each penetrating material type and other information as follows:

Project Name.
Construction Type.

Occupancy.
Firestop Applicator.

Construction Assemblies:

Gypsum Board Walls
CMU Walls
Openings between structurally separate sections of walls or floors
Concrete Floors
Floor/Ceiling Assemblies
Roof/Ceiling Assemblies
Gaps between top of walls and ceilings or floor or roof assemblies
Shafts
Chases
Construction Joints
Openings and penetrations in fire-rated partitions or walls containing fire doors
Openings around structural members which penetrate floors or walls
Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.

Fire Resistive Rating Requirements:

Furnish the following information for each type of construction assembly listed above:

Hourly fire rating.
"F" Rating.
"L" Rating.
"T" Rating.
Qualified testing agency Design No.
Penetrating item.
Penetrating material and size.
Minimum annular space.
Maximum annular space.
Drawing detail and sheet number.
Shop drawing detail or sheet number.

END OF SECTION 07 84 00

SECTION 07 92 00
JOINT SEALANTS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Each form and type of joint sealer as shown on the drawings or as specified.

The required applications, whether or not specifically shown or noted on the drawings, include, but are not necessarily limited to the following:

- Joints between different materials.
- Joints between similar materials.
- Perimeter inside and outside face of joints of exterior wall openings.
- Perimeter joints of interior door and borrow light frames.
- Perimeter joints of plumbing fixtures.
- Other joints as indicated or as required for neat appearance.

Related Sections:

- Summary: Section 01 10 00.
- Firestopping: Section 07 84 00.
- Acoustical Sealants in Gypsum Board Work: Section 09 29 00.

The following joint sealant work is to be provided by Installers of other sections and as specified in this section:

- Environmental Chambers: Section 13 21 33.
- Piping Sealants: Division 21 and 22 sections.
- Ductwork Sealants: Division 23 sections.
- Electrical Work Sealants: Divisions 26, 27 and 28 sections.

1.2 SUBMITTALS:

Product Data:

Submit manufacturer's technical data, for each type of joint sealer required, including instructions for joint preparation and application.

Tests:

Submit test results for required laboratory tests indicating which products, primers (if any) and joint preparation methods demonstrated acceptable adhesion to joint substrates.

Samples:

Submit manufacturer's standard bead samples consisting of strips of actual products to be exposed to view showing full range of colors available.

Certification:

Submit certification that products provided meet the Environmental Performance requirements specified in Section 01 10 00 including for no off-gassing and no degradation of performance due to the presence of high amounts of UV and for temperature up to 60° Celsius.

1.3 QUALITY ASSURANCE:

Installer Qualifications:

Application shall be done by a Joint Sealant Subcontractor with five years experience. Submit documentation to the Architect and Owner.

Manufacturer Technical Assistance:

Materials shall be supplied by manufacturer who will provide qualified technical assistance at the project site.

Single Source for Materials:

Obtain joint sealer materials from a single manufacturer for each different product required.

Preconstruction Laboratory Tests:

Submit substrate materials representative of actual joint surfaces to be sealed to manufacturer of joint sealer products for laboratory testing of sealants for adhesion to primed and unprimed substrates and for compatibility with secondary seals, if required, as indicated below:

Use test methods standard with manufacturer to determine if priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealers to joint substrates under environmental conditions that will exist during actual installation.

Testing will not be required when joint sealer manufacturer is able to submit joint preparation data required above which is acceptable to Architect and is based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates matching those submitted.

1.4 DELIVERY, STORAGE AND HANDLING:

Deliver materials to project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time and mixing instructions for multicomponent materials.

Store and handle materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants or other causes.

1.5 PROJECT/SITE CONDITIONS:

Conditions:

Do not proceed with installation of sealants under adverse conditions, or when ambient and substrate temperatures are below or above manufacturer's recommended limitations for installation or below 40° F. Proceed with the work only when conditions are favorable for proper cure and development of high early bond strength.

Do not proceed with installation of sealants when joint substrates are wet due to rain, frost, condensation, or other causes.

Wherever joint width is affected by ambient temperature variations, do not install elastomeric sealants when joint widths are less than allowed by joint sealer manufacturer.

Surface Conditions:

Before start of installation, sealant manufacturer and Installer shall review all substrate materials to which elastomeric sealants are to be bonded in any joint subject to thermal or other movements to determine need for and types of primers required.

Provide proper primers suited to conditions. Primers may be omitted upon certification by sealant manufacturer that they are not required. Where any doubt exists, prepare sample joints on actual materials as furnished for the job to determine the matter.

1.6 WARRANTY:

Submit 2 copies of written warranty agreeing to repair or replace joint sealers which fail to perform as airtight and watertight joints; or fail in joint adhesion, cohesion, abrasion resistance, weather resistance, extrusion resistance, migration resistance, stain resistance, or general durability; or appear to deteriorate in any other manner not clearly specified by submitted manufacturer's data as an inherent quality of the material for the exposure indicated.

Provide Installer's standard form signed by the Installer.

Warranty Period: Two years for date of Substantial Completion.

Provide manufacturer's standard form signed by the manufacturer.

Warranty Period: Five years for date of Substantial Completion.

PART 2 - PRODUCTS

2.0 MANUFACTURERS:

Silicone Elastomeric Sealants:

One of the following for each different product require or approved equal:

BASF Building Systems
Dow Corning Corporation
General Electric Company
May National Associates, Inc.
Pecora Corporation
Sika Corporation
Tremco, Inc.

Urethane Elastomeric Sealants:

One of the following for each different product require or approved equal:

BASF Building Solutions
May National Associates, Inc.
Pacific Polymers, Inc.
Pecora Corporation

Sika Corporation
Sonneborn Building Products Division, Rexnord Chemical Products, Inc.
Tremco, Inc.
W.R. Meadows, Inc.

Latex Sealants:

One of the following for each different product require or approved equal:

BASF Building Solutions
Bostick, Inc.
Gardner-Gibson
May National Associates, Inc.
Pecora Corporation
Tremco, Inc.

2.1 MATERIALS:

General:

Colors: For exposed materials provide colors as selected by Architect from manufacturer's standard colors (generally matching adjacent materials).

Compatibility: Provide joint sealers, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by testing and field experience.

Recycled Content: Materials/products shall contain the maximum amount of recycled content allowed that retains material integrity.

Regional Materials: Preference shall be given to materials that are manufactured and harvested, extracted, mined, quarried, etc. within a 500 mile radius of the project site.

Provide products will not degrade under the use conditions indicated including in the presence of high ultraviolet light and temperatures up to 60 degrees Celsius. Provide products which do not off-gas in accordance with the requirements of Section 01 10 00.

VOC Content: Limit VOC content to not more than 250 grams per liter for all sealants, backer rods, tapes and cleaners used at interior locations. Limit VOC content to not more than 250 grams per liter for primers used in non-porous substrates and to not more than 775 grams per liter for primers used in porous substrates.

Compressible foam joint fillers, polyester polyurethane foam impregnated with neoprene rubber or acrylic ester styrene copolymer manufactured using chlorofluorocarbons (CFCs) or hydrochloro-fluorocarbons (HCFCs) is not acceptable.

Joint sealers and accessories formulated with aromatic solvents (organic solvent with a benzene ring in its molecular structure), fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, or their components are not acceptable.

Do not use joint sealers containing the following:

Mercury.
Butyl rubber.
Neoprene.
SBR (styrene butadiene rubber).

Nitrile.

2.2 ELASTOMERIC SEALANTS:

Standards:

For elastomeric sealants, comply with ASTM C920 requirements, including those for Type, Grade, Class and Uses.

One-Part Mildew Resistant Silicone:

Type S, Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide. Use for sealing interior joints with nonporous substrates around plumbing fixtures, between equipment and walls, and between counters with sinks and walls; vertical and overhead joints within environmental chambers.

Provide "Dow Corning 786" by Dow Corning Corporation or equal by General Electric or Tremco.

Multi-Part Epoxidized Nonsag Urethane:

Type M; Grade NS; Class 25; Uses NT, M, A, and, as applicable to joint substrates indicated, O.

Location: Interior vertical joints in masonry.

Provide "Dymeric 240" or "Dymeric 240 FC" by Tremco, Inc. or equal by listed manufacturers.

Multi-Part Pourable Urethane:

Type M; Grade P; Class 25, Uses T, M, A and, as applicable to joint substrates, O.

Location: All interior floor joints.

Provide "Vulkem 245" by Tremco, Inc. or equal by listed manufacturers.

2.3 LATEX SEALANTS:

Acrylic Emulsion:

One part, nonsag, mildew resistant, acrylic emulsion sealant complying with ASTM C834, paintable, recommended by manufacturer for exposed interior applications.

Location: Use for all interior joints in field painted vertical and overhead joints not indicated otherwise.

Provide "AC-20" by Pecora Corporation or equal by listed manufacturers.

Zero VOC Silicone Acrylic:

One part, nonsag, mold and mildew resistant, rubberized acrylic sealant with silicone complying with ASTM C834, paintable, recommended by manufacturer for exposed interior and exterior applications including for temperature and UV exposure expected in the conditions of use for this project.

Location: Use for all vertical and overhead joints within and on external portion of environmental chambers.

Provide "SMART Zero VOC 1408-1-61" by Gardner-Gibson or approved equal by listed manufacturers.

2.4 MISCELLANEOUS MATERIALS:

Joint Primer:

Provide the type of joint primer recommended by the sealant manufacturer for adhesion of sealant to joint substrates.

Sealant Backer Rod:

Compressible rod stock of polyethylene foam, closed cell non-gassing type, as recommended for compatibility with sealant by the sealant manufacturer.

Bond Breaker Tape:

Polyethylene tape as recommended by the sealant manufacturer to be applied to sealant contact surfaces where bonded to the substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape wherever applicable.

PART 3 - EXECUTION

3.0 EXAMINATION:

Refer to Section 01 73 00 for examination of substrate and job conditions.

Start of this work constitutes acceptance of substrates as suitable for satisfactory performance of work of this section.

3.1 PREPARATION:

Clean joint surfaces immediately before installation of sealant to comply with joint sealer manufacturer's recommendations. Remove dirt, insecure coatings, moisture and other substances which would interfere with bond of sealant. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer.

Remove remaining loose particles by vacuuming or blowing out joints with oil-free compressed air.

Prime the joint surfaces wherever shown or recommended by the sealant manufacturer. Do not allow primer to spill or migrate onto adjoining surfaces.

3.2 INSTALLATION:

Comply with manufacturer's printed instructions except where more stringent requirements are shown or specified.

Apply sealant to a maximum thickness of 0.5" unless otherwise authorized in writing by the sealant manufacturer. Do not exceed manufacturer's recommended width to thickness ratios.

Set joint filler units at proper depth or position in the joint to coordinate with other work, including the installation of bond breakers, backer rods and sealants. Do not leave voids or gaps between the ends of joint filler units.

Install sealant backer rod for liquid elastomeric sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for the application shown.

Install bond breaker tape wherever shown and wherever required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.

Sealant Application:

Perform work in accordance with ASTM C962 for elastomeric and C790 for latex base sealants.

Employ only proven installation techniques, which will ensure that sealants will be deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of the joint bond surfaces equally on opposite sides.

Except as otherwise indicated, fill sealant recess to slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.

Tool nonsag sealants immediately after application to provide smooth, uniform beads of concave joint configuration.

Joints:

Install sealants to depths as shown or, if not shown, as recommended by the sealant manufacturer but within the following general limitations, measured at the center (thin) section of the bead:

For floor slabs and similar joints sealed with elastomeric sealants and subject to traffic and other abrasion and indentation exposures, fill joints to a depth equal to 75% of joint width, but neither more than 0.625" deep nor less than 0.375" deep.

For normal moving joints sealed with elastomeric sealants, but not subject to traffic, fill joints to a depth equal to 50% of joint width, but neither more than 0.5" deep nor less than 0.25" deep.

For joints sealed with latex sealants, fill joints to a depth in the range of 75% to 125% of joint width.

Spillage:

Do not allow sealants or compound to overflow or spill onto adjoining surfaces, or to migrate into the voids of adjoining surfaces. Clean the adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.

3.3 CLEANING:

Clean off excess sealants adjacent to joints as work progresses by methods approved by manufacturers of joint sealers and of products in which joint occur.

3.4 PROTECTION:

Protect joint sealers during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of acceptance. If damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce repaired areas indistinguishable from original work.

END OF SECTION 07 92 00

SECTION 08 11 13

HOLLOW METAL SYSTEMS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Fabricated commercial quality hollow metal work as shown on the drawings and schedules for the following:

- Steel doors, swinging (flush or glazed) installed in hollow metal frames, including fire-rated doors.
- Steel frames for steel and wood doors including fire-rated doors.
- Steel frames for steel and wood doors and sidelights.
- Steel frames for interior partition openings.
- Field welding of splice joints, finish grinding, and touch-up of primer.

Related Sections:

- Installation of hollow metal work: Section 06 10 00
- Wood doors installed in hollow metal frames: Sections 08 14 16 and 08 14 33
- Door Hardware: Section 08 71 00
- Glazing: Section 08 80 00
- Field painting: Section 09 90 00
- Doors associated with environmental chambers: Section 13 21 33
- Electrical connections including conduit and wiring for door controls and operators: Division 26 and 28 sections.

Contractor's Option:

Provide either standard hollow metal work or custom hollow metal work as specified in this section at Contractor's option. Where custom hollow metal frames are required or provided, provide custom hollow metal doors. Where standard hollow metal frames are provided, provide standard hollow metal doors. Provide entire opening assembly either from custom hollow metal or standard hollow metal. Do not mix within an opening.

1.2 DEFINITIONS:

Minimum Thickness: Minimum thickness of base metal without coatings.

Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

Custom Hollow Metal Work: Hollow metal work fabricated according to ANSI/NAAMM-HMMA 861.

1.3 SUBMITTALS:

Product Data:

Submit manufacturer's specifications for fabrication and installation, including construction details, material descriptions, core descriptions, fire-resistance rating and finishes.

Shop Drawings:

Submit shop drawings for the fabrication and installation of hollow metal work. Include the following:

- Details of each frame type.
- Elevations of door design types.
- Conditions at openings.
- Details of construction, location and installation requirements of finish hardware and reinforcements.
- Details of joints, connections and anchorages.
- Details of moldings, removable stops and glazing.
- Details of conduit and preparations for power, signal and control systems for electrified hardware components.

Submit a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on drawings. Coordinate with door hardware schedule.

Samples:

Submit 12" x 12" sample door showing vertical edge construction, top and bottom construction, insulation, hinge and lock reinforcement, and face stiffeners.

Submit 12" x 12" typical door frame corner showing corner joint, welded hinge reinforcement, and floor and wall anchors. Include glazing stops.

Product Test Reports:

Submit product test reports based on evaluation of comprehensive tests performed by a qualified testing agency for each type of hollow metal door and frame assembly which is required to be fire-rated.

1.4 QUALITY ASSURANCE:

Source Limitations:

Obtain hollow metal work from single source and from single manufacturer.

Standards:

Provide hollow metal systems complying with one or both of the following at Contractor's option:

Custom Hollow Metal Work: Conform to ANSI/NAAMM-HMMA 861 except where more stringent requirements are specified.

Standard Hollow Metal Work: Conform to ANSI/SDI A250.8 except where more stringent requirements are specified for the following:

Interior Doors and Frames: Level 3 per ANSI/SDI A250.8 and Physical Performance Level A (Extra Heavy Duty) per ANSI/SDI A250.4, Model 2 (Seamless) for door construction.

Conform to Life Safety Codes NFPA-1 (latest edition).

Fire-Rated Door Assemblies:

Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

Preinstallation Conference:

Conduct conference at the project site in accordance with the requirements of Section 01 31 19 "Project Meetings".

1.5 DELIVERY, STORAGE AND HANDLING:

Deliver hollow metal doors and frames palleted, wrapped, or crated to provide protection during transit and job storage.

Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided the finished items are equal in all respects to new work and acceptable to the Architect; otherwise, remove and replace damaged items as directed.

Store doors and frames at the building site under cover. Place units on at least 4" high wood blocking in a manner that will prevent rust and damage. Avoid the use of non-vented plastic or canvas shelters which could create a humidity chamber.

If the cardboard wrappers on doors become wet, remove cartons immediately. Provide 0.25" spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

Provide custom hollow metal work as manufactured by one of the following:

Gateway
West Central Manufacturing
Rocky Mountain Metals
Southwestern Hollow Metal

Provide standard hollow metal work as manufactured by one of the following:

Ceco Door Products; an Assa Abloy Group company.
Curries Company; an Assa Abloy Group company.
Fenestra.
Kewanee Corporation (The).
Republic Building Products.
Steelcraft; an Ingersoll-Rand company.

2.2 MATERIALS:

Interior Locations:

Cold-Rolled Steel Sheet: ASTM A1008, Commercial Steel (CS), Type B; suitable for exposed applications.

Minimum Recycled Content: 30% by weight.

Frame Anchors:

ASTM A591, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.

Powder-Actuated Fasteners in Concrete:

Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.

Mineral-Fiber Insulation:

ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.

Supports and Anchors:

Fabricate of not less than 16 gage sheet metal.

Inserts, Bolts, and Fasteners:

Manufacturer's standard units.

Shop Applied Paint:

Rust inhibitive enamel or paint suitable as base for specified finish paints.

2.3 FABRICATION:

General:

Comply with referenced standards unless otherwise specified herein. Fabricate hollow metal work to tolerances indicated in SDI 117 for standard hollow metal and ANSI/NAAMM-HMMA 861 for custom hollow metal.

Fabricate hollow metal units to be rigid, neat in appearance and free from defects, warp or buckle. Accurately form metal to required sizes and profiles. Wherever practical, fit and assemble units in the manufacturer's plant.

Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at the project site.

Weld exposed joints continuously, grind, dress, and make smooth, flush and with no visible seams on door face or vertical edges. Metallic filler to conceal manufacturing defects is not acceptable.

Frames:

Fabricate interior door opening frames over 36" wide of 0.0747" thick (14 gage) material and all other frames of 0.0598" thick (16 gage) material.

Fabricate sidelight frames from same thickness material as adjacent door frame.

Fabricate frames encompassing one or more doors with sidelights in rigid units of as large a size as practical to reduce, to a minimum, the number of joints.

Furnish with formed fixed stops butted or mitered, tightly closed and welded.

Fabricate interior frames for glazing with 0.25" thick glass units unless otherwise scheduled in Section 08 80 00.

Fabricate interior frames with corner joints mitered, and all contact edges closed tight with faces and stops continuously welded and ground smooth for watertight installation.

Knock-down type frames are not acceptable.

Fill all intersecting member joints where face welding is not specified so cracks are not visible.

Fabricate frames for pairs of doors with removable mullions both internal and external unless otherwise approved by the Architect.

Countersink hole and float head anchor to conceal prior to painting.

At existing conditions, furnish frames with countersunk hole to receive 0.375" flat head anchor bolt. Reinforce frame with continuous anchor spacer angle full depth of frame face and securely welded to frame.

Provide post-installed expansion type jamb and head anchors for existing masonry with minimum 0.375" diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location. Furnish four anchors per jamb. For doors more than 7'-0", provide one additional anchor per jamb.

Provide 0.0598" thick (16 gage) UL anchors for fire-rated openings, 0.0478" thick (18 gage) strap anchors welded to metal studs, other types as indicated or as approved for conditions of use. Furnish the following:

Masonry Anchors: 3 per jamb for doors to 7'-0".

Steel Stud Anchors: 4 per jamb (includes one floor anchor) for doors to 7'-0".

For Doors More Than 7'-0": 1 additional anchor per per jamb.

Head Anchors: 2 per head for frames over 42" wide in steel stud walls.

Floor Anchors: Form from same material as frames, not less than 0.0747" thick (14 gage), and as follows:

Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

Provide one per jamb and mullion that extends to floor.

Do not use exposed screws except where indicated or specifically approved. Hinge reinforcing plates must be full jamb width.

Door Silencers: Except on weatherstripped frames, drill for door silencers at factory. Drill stops to receive 3 silencers on strike jambs of single-door frames and 2 silencers on heads of double-door frames. Keep holes clear during construction.

Mullions:

Provide closed or tubular mullions where indicated. Fasten mullions at crossings and to jambs by butt welding. Reinforce joints between frame members with concealed clip angles or sleeves of same metal and thickness as frame.

At interior frames where vertical or horizontal mullions cross or where mullion butts a frame, continuously weld faces. Provide tight butt joints at rabbet or rebate and fixed stops unless required otherwise for fire ratings.

Grind smooth all welds on face of mullions.

Doors:

Flush Doors: Provide flush design doors, 1-3/4" thick, seamless hollow construction.

Construct doors with smooth surfaces without visible joints or seams on exposed faces. Fabricate doors of a seamless design consisting of spot welds ground smooth infilled with epoxy filler. Lapped seams and similar construction is not acceptable.

Interior Doors: 0.0598" thick (16 gage) face sheets fully welded, ground smooth.

Core Construction for Interior Doors:

Steel-Stiffened Core: 0.0359" thick (20 gage) steel vertical "Z" stiffeners or 28 gage continuous truss members of same material as face sheets extending full-door height, with vertical webs spaced not more than 6" apart, spot welded to face sheets a maximum of 5" o.c. for vertical "Z" stiffeners and at a maximum of 3" o.c. for continuous truss members. Fill spaces between stiffeners with 2" thick glass- or mineral-fiber insulation for sound-deadening. Do not use loose or blown insulation. Honeycomb fill is not acceptable.

Fire Door Core: As required to provide fire-protection ratings indicated.

Bevel edges of single acting doors 0.125" in 2".

Close top and bottom edges of doors with standard inverted 0.0598" thick (16 gage) steel channels, flush at top with filler channel, welded in place. Plastic inserts are not acceptable.

Close side edges of doors with inverted 0.0598" thick (16 gage) steel channels, flush at edge, welded in place. Plastic inserts are not acceptable.

Glazed Lites: Factory cut openings in flush doors.

Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 0.75" beyond edge of door on which astragal is mounted.

Stops and Moldings:

Moldings for Glazed Lites in Doors: Fabricated from same material as door face sheet in which they are installed except 0.0478" thick (18 gage) minimum.

Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 0.625" high unless otherwise indicated.

Loose Stops for Glazed Lites in Frames: Fabricated from same material as frames in which they are installed except 0.0478" thick (18 gage) minimum.

Provide stops and moldings around glazed lites. Form corners of stops and moldings with butted or mitered hairline joints. Cope ends of loose stops to clear rabbet or rebate fillet weld at intersecting mullions. Use rolled sections for fire-rated openings.

Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.

Provide fixed frame moldings on secure side of interior doors and frames.

Provide loose stops and moldings on inside of hollow metal work.

Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

Secure removable glazing stops with countersunk cadmium plated oval head screws.

Finish Hardware Preparation:

Prepare hollow metal units to receive mortised locksets and concealed finish hardware, including cutouts, reinforcing, drilling and tapping in accordance with final Door Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for door and frame preparation for hardware.

Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8 for standard hollow metal and ANSI/NAAMM-HMMA 861 for custom hollow metal.

If not specified, follow hardware manufacturer's recommendations.

Reinforce hollow metal units to receive non-templated, mortised and surface-applied hardware.

Drilling and tapping for surface-applied finish hardware may be done at project site.

Electrified Hardware Preparation:

Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

Prepare hollow metal door units to receive electrified hardware for doors scheduled on the drawings, including drilling and tapping in accordance with final security system requirements and templates provided by security system installer for electrified locksets and door position switches.

Frame Reinforcement:

Hardware Reinforcement: Fabricate according to ANSI/NAAMM-HMMA 861 for custom hollow metal work and ANSI/SDI A250.6 for standard hollow metal work with reinforcing plates from same material as door face sheets except as follows:

Butt Hinges and Pivots: One piece 0.188" thick (7 gage) plate 12" long by full width of jamb at each hinge. Secure with not less than 6 spot welds.

Closer: 10 gage channel section 12" long and full width of frame trim.

Strikes, Flush Bolts, and All Other Surface Mounted Hardware: 12 gage.

Head Reinforcement: Provide minimum 0.1046" thick (12 gage), steel channel or angle stiffener for opening widths more than 48".

Reinforce frames in direct proportion to the size and weight of door.

Door Reinforcement:

Hardware Reinforcement: Fabricate according to ANSI/NAAMM-HMMA 861 for custom hollow metal work and ANSI/SDI A250.6 for standard hollow metal work with reinforcing plates from same material as door face sheets except as follows:

Butt Hinges and Pivots: 0.188" thick (7 gage) plate 9" long welded to 16 gage interior edge channels at each hinge. Secure with not less than 6 spot welds.

Surface Applied Closers: 12 gage box section minimum 4" deep and 12" long.

Locksets, Deadbolts, Panic Devices: 12 gage welded to 16 gage interior edge channels.

Pull Plates, Flush Bolts and Surface Mounted Hardware: 12 gage.

2.4 STEEL FINISHES:

Prime Finish: Apply manufacturer's standard rust-inhibitive primer with 2.0 mil minimum dry film thickness on properly smoothed and cleaned surfaces, including galvanized surfaces, which have been phosphatized. Fully cure paint coating, prior to shipment. Conform to SSPC PT2, PT3 or PT4 for pretreatment.

Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION:

Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION:

Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist and plumbness to meet the tolerances specified herein.

Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

General:

Perform installation work under Section 06 10 00 as herein specified.

Install hollow metal units and accessories in accordance with the final shop drawings, manufacturer's data and as herein specified.

Install removable glazing stops located on secure side of opening.

Setting Floor Anchors:

Powder-actuated fasteners may be used for anchorage of floor anchors to concrete if so indicated on final shop drawings.

Placing Frames:

Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces and spreaders leaving surfaces smooth and undamaged. Comply with HMMA 840 for custom hollow metal and ANSI/SDI A250.11 for standard hollow metal.

Place frames at fire-rated openings in accordance with NFPA 80.

Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.

Make field splices in frames as detailed on final shop drawings, welded and finished to match factory work.

Install door silencers in frames.

Remove spreader bars or temporary braces only after frames or bucks have been properly set and secured.

Check plumbness, squareness and twist of frames as walls are constructed. Shim as required to comply with installation tolerances.

Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.

In-Place Masonry Construction: Secure frames in place with post-installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to ±1/16" for the following:

Squareness, measured at door rabbet on a line 90° from jamb perpendicular to frame head.

Alignment, measured at jambs on a horizontal line parallel to plane of wall.

Twist, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

Plumbness, measured at jambs at floor.

Door Installation:

Fit non-fire-rated hollow metal doors accurately in their respective frames with following clearances:

Jambs and Head: 0.125"
Meeting Stiles at Pairs of Doors: 0.125"
Bottom: 0.500" except at thresholds 0.125". Coordinate door height with floor covering thickness.

Install fire-rated doors with clearances as specified in NFPA Standard No. 80.

Door hardware installation is specified under Section 08 71 00.

3.4 ADJUSTMENT AND CLEANING:

Final Adjustment:

Check and adjust operating finish hardware items in hollow metal just prior to final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames which are warped, bowed or otherwise unacceptable.

Cleaning:

Remove bonding material from hollow metal work immediately after installation.

Prime-Coat Touch-Up: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touch-up of compatible air-drying, rust-inhibitive primer.

END OF SECTION 08 11 13

SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Wood doors as shown on the drawings and in schedules as follows:

- Flush wood doors with veneer faces.

Factory-fitting to frames (prefitting) and factory-machining for hardware (premachining) for all wood doors.

Factory finishing of wood doors.

Related Sections:

- Installation of flush wood doors: Section 06 10 00
- Hollow Metal Door Frames: Section 08 11 13
- Stile and Rail Wood Doors: Section 08 14 33
- Door Hardware: Section 08 71 00
- Glazing: Section 08 80 00

1.2 SUBMITTALS:

Product Data:

Submit product data for each type of wood door required.

Include details of core and edge construction, veneer species, veneer cut and match, trim for openings and similar components.

Include factory finishing specifications.

Shop Drawings:

Submit shop drawings indicating the location and size of each door, elevation of each kind of door, details of construction not covered in Product Data, location and extent of hardware blocking, fire ratings, cutouts, veneer matching, and other pertinent data.

Indicate doors to be factory finished and finishing requirements.

Template Lists:

Request template list to be submitted by supplier of hardware specified in Section 08 71 00 for wood doors.

Samples for Verification:

Factory Finished Doors: Submit three mounted veneer samples, 8" x 10" square, showing fully completed factory finish on same veneer which will be used in the completed work.

1.3 QUALITY ASSURANCE:

Source:

Obtain flush doors through one source and from a single manufacturer.

Quality Standards:

WDMA Quality Standard: NWWDA I.S. 1-A, "Architectural Wood Flush Doors".

AWI Quality Standard: "Architectural Woodwork Quality Standards Illustrated", 7th Edition, Version 1.0, 1997, including section 1300 "Architectural Flush Doors", for grade of door, core construction, finish and other requirements exceeding those of NWWDA quality standard.

Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.

Fire-Rated Wood Doors:

Where fire-rated door assemblies are indicated or required, provide doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

Test Pressure: UL 10(c), Fire Tests for Door Assemblies for Positive Pressure.

Provide UL or WHI label on each door. Class or rating as indicated on the Door Schedule.

1.4 DELIVERY, STORAGE AND HANDLING:

Protect wood doors during transit, storage and handling to prevent damage, soiling and deterioration. Comply with requirements of reference standards and manufacturer's written instructions.

Provide protective coverings for factory-finished doors prior to shipping. Package each door separately using manufacturer's standard packaging. Mark each door on top and bottom rail with opening number used on Shop Drawings.

Break seal on site to permit ventilation. Condition wood door to ambient humidity for at least 48 hours before installing.

1.5 PROJECT CONDITIONS:

Conditions:

Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during remainder of construction period.

1.6 WARRANTY:

Submit written lifetime of the installation warranty in door manufacturer's standard form, agreeing to repair or replace defective doors which have warped (bow, cup or twist) more than 1/4" in a 42" x 84" section, or which show telegraphing of core construction in face veneers exceeding 0.01" in a 3" span.

The warranty shall also include refinishing and reinstallation which may be required due to repair or replacement of defective doors.

Warranty shall be in effect following the date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

Provide AWI Custom Grade or NWWDA Premium Grade PC-5 flush wood doors as manufactured by one of the following:

Algoma Hardwoods, Inc.
Eggers Industries
Marshfield Door System, Inc.

2.2 FLUSH DOORS:

General:

Recycled Content: Materials/products shall contain the maximum amount of recycled content allowed that retains material integrity.

Local/Regional Materials: Preference shall be given to materials that are manufactured, harvested, extracted, mined, quarried, etc. within a 500 mile radius of the project site.

Composite Wood: All composite wood products shall be free of urea-formaldehyde resin binders.

Certified Wood: Wood based products shall be made from wood obtained from forests certified by an FSC accredited certification body to comply with the Forest Stewardship Councils "Principles and Criteria" except for recycled wood content which may be from any source. Wood from other certification programs such as Sustainable Forest Initiative (SFI) are not acceptable.

Locations currently certified are available at www.fscus.org/faq/fsc_products.php?link=4.

Particleboard manufactured from certified wood materials is available from the following:

Collins Wood, Kalamath Falls, Oregon, (800) 547-1793.
Columbia Forest Products, Inc., Portland, Oregon, (800) 547-1791.
Phoenix Organics, Phoenix, Oregon, (541) 535-1134.
Uniboard Canada, Inc., Laval, Quebec, Canada, (800) 263-5240.

Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.

Solid Core AWI PC-5 Construction:

Mat-formed, 32 lb. density particleboard core, ANSI A208.1, Grade LD-2 MD-Exterior or manufacturer's standard staved core. Bond door faces and crossbands to core with Type I adhesive and bond stiles and rails to core with Type I adhesive, NWWDA I.S. 1.6. Abrasive plane to a uniform thickness stiles, rails, and core before veneering.

Adhesive: Water based contact cement with VOC content not to exceed 10 grams per liter.

Provide cores containing not less than 10% post-consumer or 20% post-consumer plus post-industrial waste.

Fabricate using low-emitting adhesives and sealants.

Fabricate utilizing wood products with no added urea-formaldehyde resins.

Provide Environmental Class doors manufactured by Marshfield Door Systems or approved equal by listed manufacturer.

Door Facing:

Provide AWI Custom Grade A faces with plain sliced Red Oak veneers to match existing wood laboratory casework in the remodel area for transparent finish as follows:

Match Between Veneer Leaves: Slip match unless otherwise required to match existing wood laboratory casework in the remodel area.

Assembly of Veneer Leaves on Door Faces: Balance match.

Door Edges:

Stiles: Matching solid wood stiles of same species as faces for transparent finish, laminated to core. For fire-rated doors with concealed edge intumescent sealant, provide applied wood veneer edges of same species as faces and covering edges of faces.

Omit intumescent sealant at door edges adjacent to hollow metal frames where a surface-applied intumescent seal is specified in Section 08 71 00.

Rails: Mill option hardwood or laminated strand lumber (LSL) meeting environmental requirements specified above, laminated to core.

Mineral Core Doors:

Provide door faces and PC-5 construction as above for solid core doors, except for manufacturer's standard asbestos free mineral core construction, UL or ITS-WH label and no requirements for minimum waste content. Provide laminated or composite stiles with improved screw holding capability and interblocking meeting environmental requirements specified above for surface applied hardware eliminating through-bolts.

Minimum Recycled Content: 25% of mineral core by weight.

Provide mineral-fiber core without added urea-formaldehyde.

Adhesive: Water based contact cement with VOC content not to exceed 10 grams per liter.

Provide cores containing not less than 10% post-consumer or 20% post-consumer plus post-industrial waste.

Fabricate using low-emitting adhesives and sealants.

Provide edge construction with intumescent seals concealed by outer stile matching face veneer and laminated backing at hinge stiles for improved screw holding capability and split resistance.

2.3 ACCESSORIES:

Light Moldings:

Wood species compatible with door facing, lipped rectangular beads, mitered corners, and prepared for countersunk screws. Use tamper resistant screws on doors with locks.

For mineral core fire doors, provide manufacturer's standard wood veneered PVC light bead with wood species compatible with door facing and flush rectangular profile.

2.4 FABRICATION:

Prefit and premachine all wood doors at the factory or at a labeling agency licensed machiner.

Comply with the clearance requirements of AWI and NFPA 80 for fire-rated doors.

Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame shop drawings, hardware templates, and DHI A115-W series standards.

Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with factory machining.

Cut and trim openings through doors to comply with applicable requirements of AWI for kind of door required. Trim openings with moldings of material and profile indicated.

2.5 FACTORY FINISH:

Finish all wood doors at factory.

Finish AWI PC-5 doors after complete assembly of door units.

Comply with recommendations of AWI Section 1500 for factory finishing of doors. Comply with EPA Title 5 guidelines for VOC emissions and as required herein.

Provide AWI System TR-6 (similar), Custom Grade, water-based clear ultraviolet cured polyurethane, satin sheen, open pore effect.

Provide Enviroclad UV by Marshfield Door Systems or approved equal by listed manufacturer.

Color: Custom stain color to match existing wood laboratory casework in the building remodel area.

2.6 FIELD TOUCH-UP:

Manufacturer's recommended touch-up finish compatible with and matching appearance of shop finish and complying with the following environmental limitations.

VOC Content: Not more than 250 grams per liter for wood stain and not more than 350 grams per liter for clear polyurethane finish as determined in accordance with EPA Method 24 or ASTM D3960.

PART 3 - EXECUTION

3.0 EXAMINATION:

Refer to Section 01 73 00 for examination of substrate and job conditions.

Verify that frames are of the correct type and have been installed as required for proper hanging of corresponding doors including plumb jambs and level heads. Correct if not plumb or level.

Reject doors with defects.

3.1 INSTALLATION:

General:

Perform installation under Section 06 10 00 as specified herein.

Install hardware, including door preparation where doors are not premachined, as specified in Section 08 71 00.

Install wood doors in accordance with manufacturer's instructions, referenced AWI standards, and ITS-WH requirements.

Install fire-rated doors in corresponding fire-rated frames in accordance with the requirements of NFPA No. 80.

Prefit Doors:

Align in frames with uniform clearance at each edge.

Fit to frames and machine for hardware to whatever extent required by AWI and NFPA 80, if applicable, and not previously worked at factory as required for proper fit and uniform clearance at each edge.

Bevel doors 0.125" in 2" at lock edges. Trim stiles and rails only to extent permitted by labeling agency.

Clearances:

Non-Fire-Rated Doors: Provide 0.125" at jambs and heads and 0.125" (1/16" per leaf) at meeting stiles on pairs of doors. Provide 0.125" from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled provide 0.25" clearance from bottom of door to top of threshold.

Fire-Rated Doors: Comply with NFPA 80. Provide proper fit and uniform clearance.

Factory Finished Doors:

Restore finish on edges of factory finished doors before installation, if fitting or machining is required at the job site.

3.2 ADJUST AND CLEAN:

Operation: Rehang or replace doors which do not swing or operate freely.

Factory Finished Doors: Restore finish or replace doors damaged during installation. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

Protection: Installer shall advise Contractor of proper procedures required for protection of installed wood doors from damage or deterioration until acceptance of the work.

For factory finished doors, leave manufacturers standard protective covering in place until protection from damage or deterioration is no longer required.

END OF SECTION 08 14 16

SECTION 08 14 33

STILE AND RAIL WOOD DOORS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Stile and rail wood doors as shown on the drawings and in schedules as follows:

- Wood doors with full glass panels.

Factory finishing of stile and rail wood doors is included in this section.

Factory-fitting to frames (prefitting) and factory-preparation for hardware (premachining) for all wood doors is included in this section.

Related Sections:

- Hollow Metal Door Frames: Section 08 11 13
- Flush Wood Doors: Section 08 14 16
- Door Hardware: Section 08 71 00
- Glazing: Section 08 80 00

1.2 SUBMITTALS:

Product Data:

Submit door manufacturer's product data and installation instructions for each type of wood door required, including details of construction relative to materials, dimensions, profiles, finishes, and other data as may be required to show compliance with the specified requirements.

Include details of stile and rail construction, trim for openings and similar components.

Include finishing specifications.

Include certifications as may be required to show compliance with the specifications.

Shop Drawings:

Submit shop drawings indicating the location and size of each door, elevation of each kind of door, details of construction, moldings (sticking), location and extent of hardware blocking, and other pertinent data.

Template Lists:

Request template list to be submitted by supplier of hardware specified in Section 08 71 00 for all wood doors.

Samples:

Factory Finished Doors: Submit 3 samples, 1'-0" square, showing fully completed factory finish on same veneer and edge construction which will be used on the factory finished doors.

1.3 QUALITY ASSURANCE:

Manufacturer:

Obtain stile and rail doors from a single manufacturer to assure uniformity of appearance and construction and who has a minimum of 5 years experience.

Stile and Rail Wood Doors:

AWI Quality Standard: "Architectural Woodwork Quality Standards", 6th Edition, 1400 "Stile and Rail Doors", of Architectural Woodwork Institute (AWI) for grade of door, stile and rail construction, finish and other requirements.

Glass:

Comply with with requirements of Section 08 80 00.

1.4 DELIVERY, STORAGE AND HANDLING:

Protect wood doors during transit, storage and handling to prevent damage, soiling and deterioration. Comply with requirements of reference standards and recommendations of NWWDA pamphlet "How to Store, Handle, Finish, Install and Maintain Wood Doors" as well as with manufacturer's instructions.

Seal top and bottom edges if stored more than one week.

Provide protective coverings for factory-finished doors at the factory prior to shipping. Use manufacturer's standard packaging and mark with identification required for proper installation.

Break seal on site to permit ventilation. Condition wood door to ambient humidity for at least 48 hours before installing.

1.5 PROJECT/SITE CONDITIONS:

Conditions:

Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during remainder of construction period to comply with the following requirements applicable to project's geographical location:

Referenced AWI quality standard including Section 100-S-3 "Moisture Content".

1.6 WARRANTY:

Submit written warranty in door manufacturer's standard form signed by the Manufacturer, Installer and Contractor, agreeing to repair or replace defective doors which have warped (bow, cup or twist) or which show telegraphing of core construction in face veneers, or do not conform to tolerance limitations of referenced quality standards from AWI 1300 to the following term:

Interior Doors: Lifetime of the installation.

The warranty shall also include refinishing and reinstallation which may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.1 CUSTOM STILE-AND-RAIL DOORS:

Manufacturers:

Furnish stile and rail doors manufactured by one of the following or approved equal:

ENJO Doors and Windows
Golesh Door Company
Karona, Inc.
The Maiman Company
Marshfield Door Systems, Inc.
Woodtech

General:

Recycled Content: Materials/products shall contain the maximum amount of recycled content allowed that retains material integrity.

Local/Regional Materials: Preference shall be given to materials that are manufactured, harvested, extracted, mined, quarried, etc. within a 500 mile radius of the project site.

Composite Wood: All composite wood products shall be free of urea-formaldehyde resin binders.

Certified Wood: Wood based products shall be made from wood obtained from forests certified by an FSC accredited certification body to comply with the Forest Stewardship Councils "Principles and Criteria" except for recycled, reclaimed and salvaged wood content which may be from any source. Wood from other certification programs such as Sustainable Forest Initiative (SFI) are not acceptable.

Locations currently certified are available at www.fscus.org/faq/fsc_products.php?link=4.

Particleboard manufactured from certified wood materials is available from the following:

Collins Wood, Kalamath Falls, Oregon, (800) 547-1793.
Columbia Forest Products, Inc., Portland, Oregon, (800) 547-1791.
Phoenix Organics, Phoenix, Oregon, (541) 535-1134.
Uniboard Canada, Inc., Laval, Quebec, Canada, (800) 263-5240.

Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.

AWI Grade:

Doors for Transparent Finish: Premium.

Interior Doors:

1-3/4" thick, stile and rail construction as described below, doweled and glued joints.

Stile and Rail Construction: Veneered, structural composite lumber. Select veneers for similarity of grain and color, and arrange for optimum match between adjacent pieces.

Door Style:

Fabricate doors as indicated of the following types:

Glass panels.

Door Facing:

Interior Doors with Transparent Finish: Red Oak to match existing wood laboratory casework in the remodel area, plain sliced, with end matched grain.

Glazing:

Comply with Section 08 80 00.

Composite Core Materials:

Where provided, provide mat-formed, 32 lb. density particleboard complying with ANSI A208.1, Grade MD-Exterior (formaldehyde free).

Adhesive:

Type I, waterproof.

Use adhesive appropriate for application, except do not use any urea resins, hide glues, hot melts, generic white glues, contact cement or any non-catalyzed "quick-set" glues.

2.2 ACCESSORIES:

Glazing Stops:

Wood of same species as door facing, mitered corners, square edges and sticking, and attached with finishing nails.

2.3 FABRICATION:

General:

Fabricate using low-emitting adhesives and sealants.

Fabricate utilizing wood products with no added urea-formaldehyde resins.

Non-Fire Rated Doors:

Fabricate doors in accordance with AWI Quality Standards requirements.

Exposed Edge of Stiles:

Fabricate from same species as door facing for finish indicated.

Glazed Openings:

Trim openings with solid wood moldings, removable on secured side.

2.4 FACTORY FINISH:

Prefinish all stile and rail wood doors at the door factory.

Comply with recommendations of AWI Section 1500 for factory finishing of doors.

Provide AWI System TR-6, Custom Grade, water-based stain and clear catalyzed polyurethane, satin sheen, open pore effect.

Color: Custom stain color to match existing wood laboratory casework in the building remodel area.

2.5 PREFITTING AND PREPARATION FOR HARDWARE:

Prefit and premachine all wood doors at the factory.

Comply with the tolerance requirements of AWI for prefitting. Machine doors for hardware requiring cutting of doors. Comply with final hardware schedules and door frame shop drawings and with hardware templates and other essential information required to ensure proper fit of doors and hardware.

PART 3 - EXECUTION

3.0 EXAMINATION:

Refer to Section 01 73 00 for examination of substrate and job conditions.

Verify that frames are of the correct type and have been installed as required for proper hanging of corresponding doors including plumb jambs and level heads.

Reject doors with defects.

3.1 INSTALLATION:

General:

Perform installation under Section 06 10 00 as specified herein.

Install hardware, including door preparation, as specified in Section 08 71 00.

Pilot drill screw and bolt holes.

Install wood doors in accordance with manufacturer's instructions and referenced AWI standards.

Bevel non-fire rated doors 0.125" in 2" at lock and hinge edges.

Prefit Doors:

Fit to frames and machine for hardware to whatever extent required by AWI and not previously worked at factory as required for proper fit and uniform clearance at each edge.

Clearances:

Provide clearances of 0.125" at jambs and heads. Provide 0.125" from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled provide 0.25" clearance from bottom of door to top of threshold.

Factory Finished Doors:

Restore finish on edges of factory finished doors before installation, if fitting or machining is required at the job site.

3.2 ADJUST AND CLEAN:

Operation: Rehang or replace doors which do not swing or operate freely, as directed by the Architect.

Factory Finished Doors: Restore finish or replace doors damaged during installation, as directed by the Architect.

Leave manufacturer's standard protective covering in place until protection from damage or deterioration is no longer required.

Protection of Completed Work: Installer shall advise Contractor of proper procedures required for protection of installed wood doors from damage or deterioration until acceptance of the work.

END OF SECTION 08 14 33

SECTION 08 31 00
ACCESS DOORS AND PANELS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Access doors as shown on the drawings of the following types:

Wall or ceiling access doors.

Access doors where required to service, use, or maintain concealed valves, dampers, motors, balancing devices and similar items will be furnished under appropriate sections of Division 21 through 28 as specified in this Section.

Related Sections:

Acoustic Tile: Section 09 51 00.
Access Door Installation: Sections 06 10 00, 09 29 00 or other sections appropriate to substrate.
Access panels within environmental chambers: Section 13 21 33.
Duct and metal plenum access doors: Division 23 sections.

1.2 SUBMITTALS:

Product Data:

Submit manufacturer's technical data and installation instructions for each type of access door assembly.

Coordination Drawings:

Include access door locations on plumbing/mechanical/electrical coordination drawings for coordination of locations with the Architect.

Samples:

For each door face material, at least 3 by 5 inches in size, in specified finish.

1.3 QUALITY ASSURANCE:

Fire-Resistance Ratings:

Where fire-rated access door assemblies are indicated or required, provide fire-rated assemblies that comply with NFPA 80 and have been tested, listed and labeled in accordance with ASTM E152 by UL or Warnock Hersey. Comply with the following:

Vertical Access Doors: UL 10B.

Horizontal Access Doors: ASTM E119.

Size Variations:

Obtain Architect's acceptance of manufacturer's standard size units which may vary slightly from sizes indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

Provide wall and ceiling access doors as manufactured by one of the following:

Nystrom Building Products Co. (basis of design)
Acudor Products, Inc.
Babcock-Davis Associates, Inc.
Bar-Co, Inc. Div.; Alfab, Inc.
Cendrex, Inc.
Cesco Products.
Elmdor/Stoneman; Div. of Acorn Engineering Co.
Jensen Industries.
J. L. Industries, Inc.
Karp Associates, Inc.
Larsen's Manufacturing Company.
MIFAB Manufacturing, Inc.
Milcor Limited Partnership.
Precision Plumbing Products, Inc.
Williams Bros. Corporation of America (The).

2.2 MATERIALS AND FABRICATION:

Furnish door assemblies manufactured as an integral unit, complete with all parts and ready for installation.

Fabricate from one of the following materials, unless a specific location is indicated:

20 gage minimum uncoated steel with specified shop finish.

20 gage minimum hot-dipped galvanized steel with specified shop finish.

0.080" minimum aluminum sheet with specified shop finish .

Interior Wall and Ceiling Access Door Units:

Furnish assemblies with manufacturer's standard construction flush panel doors with details, anchorage for use in gypsum wallboard, ceramic tile and acoustic ceilings (other than exposed grid).

Furnish sizes as scheduled on the drawings and suited to conditions where not scheduled but not less than 18" x 18" for hand access and 24" x 24" for person access.

Fire-Rated Doors: UL label appropriate to assembly rating. Provide units which are self-closing and latching.

Access Panels - Gypsum Board Walls and Ceilings: Flush, Style WB by Nystrom, 16 gage frame, 14 gage panel, galvanized steel drywall bead, concealed spring hinges.

Access Panels - Acoustic Tile Ceilings: Recessed, Style RA by Nystrom, 16 gage frame, 14 gage panel, no exposed flange, concealed spring hinges, recessed door panel to receive acoustic tile as specified in Section 09 51 00.

Locking Devices: Furnish flush, screwdriver-operated cam locks of the number required to hold door in flush, smooth plane when closed.

Provide raised knob cam locks for fire-rated units.

2.3 SHOP FINISHES:

Steel Finishes:

Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

Surface Preparation for Steel Sheet: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."

Surface Preparation for Metallic-Coated Steel Sheet: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A780.

Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.

Color: Manufacturer's standard off-white as approved by the Architect.

Aluminum Finishes:

Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written specifications for cleaning, conversion coating, and painting.

Color: Manufacturer's standard off-white as approved by the Architect.

PART 3 - EXECUTION

3.1 INSTALLATION:

Obtain acceptance of locations from Architect and Owner prior to installation of units.

Perform installation work under sections appropriate to substrate as specified herein.

Comply with manufacturer's instructions for installation of access doors.

Coordinate installation with work of other trades. Obtain information on door sizes and exact locations from mechanical or electrical Installers as appropriate and verify with Architect.

Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.

Adjust hardware and panels after installation for proper operation.

Touch-up any damage to shop finished access doors using paint supplied by access door manufacturer.

Remove and replace panels or frames which are warped, bowed or otherwise damaged.

END OF SECTION 08 31 00

SECTION 08 71 00
DOOR HARDWARE

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

"Builder's" or "Finish" hardware as shown on the drawings and in schedules.

Furnish hardware items of proper design for use on doors and frames of the thicknesses, profile, swing security and similar requirements indicated, as necessary for proper installation and function.

Types of finish hardware:

- Hinges.
- Lock cylinders and keys.
- Lock sets.
- Bolts.
- Closers.
- Overhead holders.
- Miscellaneous door control devices.
- Door trim units.
- Protection plates.
- Sound stripping for interior doors.
- Astragals or meeting seals on pair of doors.

Related Sections:

- Installation of finish hardware: Section 06 10 00.
- Hollow Metal Systems: Section 08 11 13.
- Flush Wood Doors: Section 08 14 16.
- Stile and Rail Wood Doors: Section 08 14 33.
- Hardware for special door units: 08 30 00 series sections as applicable. Lock cylinders, if any, are furnished in this section.
- Cabinet hardware: Division 12 sections.

1.2 SUBMITTALS:

Product Data:

Submit product data (catalog cuts) including manufacturers' technical product information for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

Hardware Schedule:

Submit copies of the hardware schedule complying with the actual construction progress schedule requirements for each draft. Hardware schedules are intended for the coordination of the work. Review and acceptance by the Architect or Owner does not relieve the Contractor of his exclusive responsibility to fulfill the requirements as shown and specified.

Format for all schedule submittals to the same method and opening numbers as in this Section and on the drawings.

Final Hardware Schedule: Based on the hardware requirements indicated, showing complete designation of every item required for each door or opening. Include following information:

Type, style, function, size and finish of each hardware item.
Name, part number and manufacturer of each item.
Fastenings and other pertinent information.
Location of hardware set coordinated with floor plans and door schedule.
Explanation of all abbreviations, symbols and codes contained in schedule.
Mounting locations for hardware.
Door and frame sizes and materials.
Specific hardware directions.
List of manufacturers used and their nearest representative with address and phone number.
Keying information.

Furnish initial draft of schedule at the earliest possible date, in order to facilitate the fabrication of other work (such as hollow metal frames) which may be critical in the project construction schedule.

Furnish final draft of schedule after samples, manufacturer's data sheets, coordination with shop drawings for other work, delivery schedules and similar information has been completed and accepted.

Samples:

Upon request, submit samples of each type of hardware in finish indicated. Samples are to remain undamaged and in working condition through submittal and review process. Items will be returned to the supplier or incorporated into the work with limitations of keying coordination requirements.

Templates:

Furnish hardware templates to each fabricator of doors, frames and other work to be factory prepared for the installation of hardware. Upon request, check the shop drawings of such other work, to confirm that adequate provisions are made for the proper installation of hardware.

1.3 QUALITY ASSURANCE:

Acceptability of substitute items may be determined by the Architect solely on the basis of design, appearance, function or finish.

Accessibility Standards:

Comply with the following:

American National Standards for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People (CABO/ANSI A117.1).

Uniform Federal Accessibility Standards (UFAS).

Other Standards:

Hardware Brands: All locks and latch sets must be one brand, all overhead closers one brand, all floor checks one brand, all hinges one brand, all panic devices one brand.

Fire-Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80 and authorities having jurisdiction. This requirement takes precedence over other requirements for such hardware. Provide only hardware which has been tested and listed by UL, WH or FM for the types and sizes of doors required, and complies with the requirements of the door and door frame labels.

Test Pressure: UL 10(c), Fire Tests for Door Assemblies for Positive Pressure.

Make Certificates of Compliance available upon request by the authority having jurisdiction.

Closers: Maximum effort to operated doors shall not exceed 8.5 lbs. for exterior doors and 5 lbs. for interior doors, such pull or push effort being applied at right angles to hinged doors. Compensating devices or automatic door operators may be utilized to meet the above standards. When fire doors are required, the maximum effort to operate the door may be increased not to exceed 15 lbs. All closers shall be adjusted to operate with the minimum amount of opening force and still close and latch the door.

Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.

Fasteners:

Manufacture hardware to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.

Furnish screws for hardware installation, with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match the hardware finish or, if exposed in surfaces of other work, to match the finish of other such work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.

Suppliers:

A recognized builders hardware supplier who has been furnishing hardware in the Denver-Metro area for a period of not less than 3 years, and who is, or employs an experienced AHC certified hardware consultant who is available, at reasonable times during the course of the work, for consultation about project's hardware requirements.

Hardware supplier must be an authorized factory distributor of all products specified.

Hardware Installer:

Company specializing in the installation of commercial door hardware with five years documented experience.

Pre and Post Installation and Inspection:

After installation of all door closers and locks, General Contractor to have Manufacturer's representative submit a written report to the Architect with copies to the General Contractor and hardware supplier upon completion of service. This report shall include any installation errors and specifying specific door number.

Contractor shall contact UCB Access Services for Medeco cylinders to verify all cylinders have been provided based on door hardware schedule. Contractor shall sign a cylinder received document.

1.4 DELIVERY, STORAGE AND HANDLING:

General Contractor to provide secure lock-up for hardware delivered to the project, but not yet installed. Control the handling and installation of hardware items which are not immediately replaceable, so that the completion of the work will not be delayed by hardware losses, both before and after installation.

Packaging of hardware is the responsibility of the supplier. As material is received by the hardware supplier from the various manufacturers, sort and repackage, if necessary, in containers marked with the hardware set number. Two or more identical sets may be packed in same container.

No keys, other than construction master keys and/or temporary keys are to be packed in boxes with the locks.

Hardware supplier shall apply an easily identified separate label to each carton identifying clearly in large lettering the hardware group, door number, door location, product number, hand of door.

Inventory hardware jointly with representatives of the hardware supplier and the hardware installer until each is satisfied that the count is correct.

Coordinate hardware with other work. Tag each item or package separately, with identification related to the final hardware schedule, and include basic installation instructions in the package.

Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation.

1.5 WARRANTY:

Furnish 2 copies of following written warranties and insert in each maintenance manual:

Mechanical failure of door closers for 10 years.

Blanket coverage of locksets for 5 years.

Failure of parts of all other hardware for 2 years.

1.6 MAINTENANCE:

Furnish a complete set of specialized tools as needed for Owner's continued adjustment, maintenance, and removal and replacement of builders hardware.

Furnish copies of maintenance manuals covering finish hardware for this project complying with the requirements of Section 01730. Include printed sheets from hardware manufacturers, bound in a three-ring binder and properly indexed. Manuals to include the following items:

Approved hardware schedule, catalog cuts and keying schedule.
Hardware installation and adjustment instructions.
Manufacturer's written warranty information.
Wiring diagrams, elevations drawings and operational descriptions for all electronic openings.

Include name, address, phone number of hardware supplier, maintenance instructions and parts list for each type of operating hardware including locks, exit devices, closers.

PART 2 - PRODUCTS

2.1 HARDWARE LIST:

Furnish hardware in accordance with the hardware schedule at the end of this section and as indicated in the door schedule. Schedule is intended as a guide to indicate hardware functions. Provide all items needed for door function including fire-rating and labeling requirements for fire-rated doors.

General:

Conform to ANSI/BHMA A156 except as otherwise indicated.

2.2 HINGES:

Provide five-knuckle, bottom tip, full mortise template type with non-rising loose pins and ball or oilite bearings.

Interior Doors: Ball-bearing type, wrought steel construction, 0.134" or 0.145" gage hinges.

Doors Up To and Including 36" Width: 4.5" x 4.5" hinges.
Doors Over 36" Width: 5" x 5" hinges.

Number of Hinges:

Minimum of three hinges per door leaf for doors 84" or less in height.

One additional hinge for each 24" of additional height.

Acceptable Products/Manufacturers:

Stanley	Hager	Ives
FBB179	BB1279	5BB1
FBB199	BB1199	5BB1-HW (BRASS)
FBB168	BB1168	5BB1-HW (STEEL)

2.3 LOCKS:

Schlage L9000 Series (no substitutions) with the following characteristics:

Non-handed case.
Ability to reverse locking hub without opening case cover.
Independent spindles.

Minor Rekeying at Remodel Work: Match existing key system.

Heavy-duty mortise type.

Lock Throw: 3/4" minimum throw of latch and 1" minimum throw of deadbolt.

Trim: Cast lever and cast escutcheon, Schlage Lock Co. #03L on Schlage L 9000 series mortise locks (no substitutions).

2.4 DOOR CLOSERS:

Manufacturer:

LCN (no substitutions).
Closer Series is 4040XP.

Provide EDA arm (Extra Duty Arm) on parallel arm applications.
Provide "CUSH" arm where required.

Through bolted on all doors unless otherwise directed by Owner.
Surface Mounted Closers: Product of a single manufacturer.
Interior Doors: Delayed action and conform to UFAS requirements.

Size of Units: Adjust closers to comply with the manufacturer's recommendations for size of door control unit, depending upon size of door, and adjust for positive latching security doors.

2.5 DOOR TRIM, STOPS, AND HOLDERS:

Manufacturers:

Ives
Hager
Trimco
Rockwood
Quality
Master Manufacturers, Inc.
Glynn Johnson
Approved equal.

Door Stops: Locate in position to permit maximum door swing but not to present a hazard or obstruction.

Kick Plates: Include manufacturer's standard exposed fasteners.

Trim Plates: .050" in thickness.

Protection Plates (Armor, Kick or Mop): Minimum 2" less than door width on stop side and minimum 1/2" less than door width on pull side.

Accessible Entries: Provide 12" high kickplates minimum and 3/8" from bottom of door.

Overhead Holders:

Glynn Johnson 900 or 100 Series (no substitutions).

Use surface mounted devices unless otherwise approved by the Owner.

Through bolt mount on all doors unless otherwise approved by the Owner.

Do not use devices with "hold-open" feature, electromagnetic or otherwise, for doors which are to be used for "airlock" vestibules (typically at exterior doors), or stairwells that serve as vestibules.

Automatic Flush Bolts and Coordinators: Do not use automatic flush bolts or coordinators unless otherwise approved by the Owner or required by Code.

2.6 DOOR STRIP UNITS:

Manufacturers:

Pemko.
Reese.
Zero.
Master Manufacturers, Inc.
National Guard.
Approved equal.

Smoke Seal Applications: As required to meet all applicable codes.

Provide National Guard No. 2525 or approved equal.

Fasteners: Unless otherwise noted, use manufacturer's standard exposed fasteners for door trim units (kick plates, edge trim, and similar units). Provide non-corrosive fasteners as recommended by manufacturer for application indicated.

Smoke Seals: Silicone rubber seal; vinyl not acceptable.

2.7 KEYS AND KEYING:

Supply all keyed function locks with capability of accepting Medeco 31 series Large Format Interchangeable Core (LFIC). Mortise locks shall be provided with mortise cylinder housings that will accept Medeco 31 series 6-pin Large Format Interchangeable Core cylinders. Exit devices shall be provided with rim/mortise cylinder housings that will accept Medeco 31 series 7-pin Large Format Interchangeable Core cylinders. All keyed function locks to be supplied with LFIC housing, compatible with Medeco 31 series LFIC cylinders, less core. Approved mortise cylinder housings include Medeco part number 31-0175 (6 pin). Approved rim cylinder housings include Medeco part number 31-0153H (7 pin). Contact Access Services for any questions and/or clarifications.

Hardware supplier/Contractor to supply and install construction cores (Yale/Medeco 31 series type LFIC) to secure the building during construction.

Owner to provide permanent Medeco High Security cores (Medeco 31- series, 6-pin and 7-pin). The Contractor/Installer shall install permanent Medeco 31 series cores prior to building certificate of occupancy. Permanent Medeco 31 series cores and control key to be provided by Access Services.

Must contact Access Services for any questions and/or clarifications.

Finish to be determined by Hardware Schedule.

Hardware schedule to include following Medeco LFIC Housings, to be provided by hardware supplier:

Rim Cylinder Housings 7-pin Less Core: 31-0153H Medeco Part Number.

Mortise Cylinder Housings 6-pin Less Core: 31-0175 Medeco Part Number.

Cams and Tailpieces: To match and be compatible with specified lock/hardware manufacturer.

Mortise and Rim Cylinder Collars (When Needed): To be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes, example: Medeco part number 94-0188 x Finish. Finish to be determined by Hardware Schedule.

Mortise and Rim Cylinder Housing: To be of proper length to engage hardware chassis/lock body locking mechanism and also not protrude excessively from escutcheons.

Supply all locks with construction cylinders to secure the building until replaced by Owner with "Medeco" cylinders at job completion. All locks must accommodate "Medeco" cylinders.

2.8 SILENCERS:

Furnish rubber door silencers all hollow metal frames; two (2) per pair and three (3) per single door frame.

2.9 FINISHES:

Match the finish of the locksets.

Closers: Finish to match door hardware (powder coated).

Coordinate all the various manufactured items furnished for the project to ensure an acceptable uniform finish.

PART 3 - EXECUTION

3.1 INSTALLATION:

Perform installation under Section 06 10 00 as specified herein.

Mount hardware units at heights recommended in "Recommended Locations for Builder's Hardware" by DHI for standard steel frames or custom steel frames as applicable, except as otherwise specifically indicated or required to comply with governing regulations including handicapped accessibility.

Mount hardware in accordance with CABO/ANSI A117.1 and UFAS.

Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage, reinstallation or application of surface protections with finishing work of finish Installers specified in Division 9 sections. Do not install surface-mounted items until finishes have been completed on the substrate.

Installer may leave hardware items in place during finishing work provided such items are fully masked and protected. Remove finish materials which may penetrate masking, without damage to hardware or its finish or replace as required.

Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

Mount closers on wood doors using closed-head sex bolts. Through-bolt closers. Mount closers on push side.

Through-bolt mount overhead holders on all doors unless otherwise approved by the Owner.

Through-bolt push/pull units for matched pairs, but not for single units.

Cut and fit threshold and floor covers to profile of door frames. Use single piece units.

Screw thresholds to substrate with No. 10 or larger screws, of the proper type for permanent anchorage and of bronze or stainless steel which will not corrode in contact with the threshold metal.

3.2 ADJUST AND CLEAN:

General:

Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer (graphite-type if no other recommended).

Replace units which cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made. Hardware supplier shall make final check and adjustment of locks, closers, other items requiring fine adjustment.

Final Adjustment:

Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make a final check and adjustment of all hardware items in such space or area. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

Clean and relubricate operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilation equipment.

Instructions:

Instruct Owner's personnel in proper adjustment and maintenance of hardware, usage of electronic equipment, and hardware finishes, during the final adjustment of hardware.

Final Inspection:

Comply with the requirements indicated in Part 1.

3.3 HARDWARE SCHEDULE:

HW SET 01:

EACH OPENING TO HAVE:

6	EA	HINGE	5BB1 4.5 X 4.5 NRP	639	IVE
2	EA	MANUAL FLUSH BOLT	FB458	612	IVE
1	EA	DUST PROOF STRIKE	DP2	612	IVE
1	EA	STOREROOM LOCK	L9080L 03L	612	SCH
1	EA	MORTISE CYLINDER	MEDICO 31 LFIC TYPE	612	MED
1	EA	PERMANENT CORE	MEDECO 31 LFIC (BY OWNER)	612	MED
1	EA	OH STOP	90S TB	612	GLY
1	EA	SURFACE CLOSER	4040XP CUSH TBWMS	691	LCN
2	EA	KICK PLATE	8400 12" X 2" LDW	612	IVE
1	SET	SEALS	2525B	BRN	NGP
1	EA	ASTRAGAL	139SP TB	600	NGP

MOUNT ASTRAGAL ON PULL SIDE OF ACTIVE LEAF.

HW SET 01A:

EACH OPENING TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5 NRP	639	IVE
1	EA	CLASSROOM LOCK	L9080L 03L	612	SCH
1	EA	MORTISE CYLINDER	MEDICO 31 LFIC TYPE	612	MED
1	EA	PERMANENT CORE	MEDECO 31 LFIC (BY OWNER)	612	MED
1	EA	SURFACE CLOSER	4040XP SCUSH TBWMS	691	LCN
1	EA	KICK PLATE	8400 12" X 2" LDW	612	IVE
1	SET	SEALS	2525B	BRN	NGP

HW SET 02:

EACH OPENING TO HAVE:

6	EA	HINGE	5BB1 4.5 X 4.5 NRP	639	IVE
2	EA	MANUAL FLUSH BOLT	FB458	612	IVE
1	EA	DUST PROOF STRIKE	DP2	612	IVE
1	EA	CLASSROOM LOCK	L9070L 03L	612	SCH
1	EA	MORTISE CYLINDER	MEDICO 31 LFIC TYPE	612	MED
1	EA	PERMANENT CORE	MEDECO 31 LFIC (BY OWNER)	612	MED
1	EA	SURFACE CLOSER	4040XP EDA TBWMS	691	LCN
1	EA	KICK PLATE	8400 12" X 2" LDW	612	IVE
2	EA	WALL STOP	WS407CCV	612	IVE
1	SET	SEALS	2525B	BRN	NGP

HW SET 03:

EACH OPENING TO HAVE:

6	EA	HINGE	5BB1 4.5 X 4.5 NRP	639	IVE
2	EA	MANUAL FLUSH BOLT	FB458	612	IVE
1	EA	DUST PROOF STRIKE	DP2	612	IVE
1	EA	STOREROOM LOCK	L9080L 03L	612	SCH
1	EA	MORTISE CYLINDER	MEDICO 31 LFIC TYPE	612	MED
1	EA	PERMANENT CORE	MEDECO 31 LFIC (BY OWNER)	612	MED
2	EA	OH STOP	90S TB	612	GLY
1	EA	SURFACE CLOSER	4040XP EDA TBWMS	691	LCN
2	EA	KICK PLATE	8400 12" X 2" LDW	612	IVE
1	EA	WALL STOP	WS407CCV	612	IVE
1	EA	ASTRAGAL	139SP TB	600	NGP
2	EA	SILENCER	SR64-1	GRY	IVE

MOUNT ASTRAGAL ON PULL SIDE OF ACTIVE LEAF.

HW SET 04:

EACH OPENING TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	639	IVE
1	EA	OFFICE/ENTRY LOCK	L9050L 03L L583-363	612	SCH
1	EA	MORTISE CYLINDER	MEDICO 31 LFIC TYPE	612	MED
1	EA	PERMANENT CORE	MEDECO 31 LFIC (BY OWNER)	612	MED
1	EA	KICK PLATE	8400 12" X 2" LDW	612	IVE
1	EA	WALL STOP	WS407CCV	612	IVE
3	EA	SILENCER	SR64-1	GRY	IVE

HW SET 05:

EACH OPENING TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5 NRP	639	IVE
1	EA	CLASSROOM LOCK	L9070L 03L	612	SCH
1	EA	MORTISE CYLINDER	MEDICO 31 LFIC TYPE	612	MED
1	EA	PERMANENT CORE	MEDECO 31 LFIC (BY OWNER)	612	MED
1	EA	SURFACE CLOSER	4040XP EDA TBWMS	691	LCN
1	EA	KICK PLATE	8400 12" X 2" LDW	612	IVE
1	EA	WALL STOP	WS407CCV	612	IVE
3	EA	SILENCER	SR64-1	GRY	IVE

HW SET 06:

EACH OPENING TO HAVE:

4	EA	HINGE	5BB1 4.5 X 4.5	639	IVE
1	EA	CLASSROOM LOCK	L9070L 03L	612	SCH
1	EA	MORTISE CYLINDER	MEDICO 31 LFIC TYPE	612	MED
1	EA	PERMANENT CORE	MEDECO 31 LFIC (BY OWNER)	612	MED
1	EA	KICK PLATE	8400 12" X 2" LDW	612	IVE
1	EA	WALL STOP	WS407CCV	612	IVE
3	EA	SILENCER	SR64-1	GRY	IVE

HW SET 07:

EACH OPENING TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5 NRP	639	IVE
1	EA	STOREROOM LOCK	L9080L 03L	612	SCH
1	EA	MORTISE CYLINDER	MEDICO 31 LFIC TYPE	612	MED
1	EA	PERMANENT CORE	MEDECO 31 LFIC (BY OWNER)	612	MED
1	EA	SURFACE CLOSER	4040XP SCUSH TBWMS	691	LCN
1	EA	KICK PLATE	8400 12" X 2" LDW	612	IVE
3	EA	SILENCER	SR64-1	GRY	IVE

HW SET 08:

EACH OPENING TO HAVE:

4	EA	HINGE	5BB1 4.5 X 4.5	639	IVE
1	EA	STOREROOM LOCK	L9080L 03L	612	SCH
1	EA	MORTISE CYLINDER	MEDICO 31 LFIC TYPE	612	MED
1	EA	PERMANENT CORE	MEDECO 31 LFIC (BY OWNER)	612	MED
1	EA	SURFACE CLOSER	4040XP EDA TBWMS	691	LCN
1	EA	KICK PLATE	8400 12" X 2" LDW	612	IVE
1	EA	WALL STOP	WS407CCV	612	IVE
3	EA	SILENCER	SR64-1	GRY	IVE

END OF SECTION 08 71 00

SECTION 08 80 00
GLAZING

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Glass and glazing work as shown on the drawings for:

Interior doors, sidelights and borrowed light frames.

Related Sections:

Hollow Metal Systems: Section 08 11 13.

1.2 PERFORMANCE REQUIREMENTS:

General:

Provide glazing systems capable of withstanding normal thermal movement and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

1.3 SUBMITTALS:

Product Data:

Submit product data for laminated glass.

Samples:

Submit two 12" square glass samples illustrating glass and coloration. Indicate range of variation to be expected for "waviness" in final position. Submit 12" long samples of glazing compounds. Samples will be reviewed for appearance only. Submit 2 samples of each of the following:

Laminated safety glass.
For each color (except black) of exposed glazing sealant indicated.

Glazing Schedule:

Submit glazing schedule using same designations indicated in the schedule at the end of this section for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

Certification:

Submit product certificates signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

1.4 QUALITY ASSURANCE:

Standards:

Prime Glass: ASTM C1036.

Safety Glass: Comply with Colorado State Statutes, IBC Section 2406, ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for category II materials, with certifying label on each piece.

Where glazing units, including laminated glass, are specified herein for glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.

Heat-Treated Glass: ASTM C1048.

Fire-Resistant Ceramic Glass: Tested per ASTM E163 (UL 9) and listed by UL for "fire resistance". Provide glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 257.

Glazing Standards: Comply with recommendations of Flat Glass Marketing Association "Glazing Manual" and "Sealant Manual".

Elastomeric Sealant Standard: Comply with ASTM C920 requirements for Type, Grade, Class and Uses.

Manufacturers:

Provide each type of glass and primary sealant from a single manufacturer with not less than 5 years of successful experience in the production of materials similar to those required.

Installer (Glazier):

Engage an installer with a minimum of 5 years experience in projects of similar size and complexity and who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

Glass Product Testing:

Obtain glass test results for product test reports required herein from a qualified testing agency based on testing glass products.

Glass Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E548.

Glazing for Fire-Rated Door Assemblies:

Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.

1.5 DELIVERY, STORAGE AND HANDLING:

Comply with manufacturer's instructions for shipping, handling, storing and protecting glass and glazing materials. Exercise exceptional care to prevent edge damage to glass.

1.6 PROJECT/SITE CONDITIONS:

Do not proceed with installation of liquid sealants under adverse conditions, or when ambient and substrate temperatures are below or above manufacturer's recommended limitations for installation.

1.7 WARRANTY:

Provide warranty covering laminated glass for a period of 10 years after the date of substantial completion against defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination, materially obstructing vision through glass for vision glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

Approved Basic Manufacturers and Fabricators:

AFG Industries, Inc.	Ford Glass Div.
Guardian Industries	Pilkington
PPG Industries, Inc.	Saint-Gobain/Euroglass
Old Castle Glass	Viracon, Inc.
Approved equal	

2.2 GENERAL:

Recycled Content: Materials/products shall contain the maximum amount of recycled content allowed that retains material integrity.

Regional Materials: Preference shall be given to materials that are manufactured, harvested, extracted, mined, quarried, etc. within a 500 mile radius of the project site.

2.3 PRIME GLASS:

Clear Float Glass:

Type I, Class 1 (clear) Quality q3 (glazing select), thicknesses as scheduled.

Ceramic Glass:

Provide solid, clear, polished to eliminate distortions, ceramic glass without gel core, thicknesses as indicated or required to meet indicated fire-rating, by Technical Glass Products (TGP, 1-800-426-0279) or approved equal by O'Keeffes or St. Gobain with UL label to meet fire-rating scheduled on the drawings. Unless otherwise indicated, provide 0.313" thick "FireLite Plus Premium" by TGP.

2.4 LAMINATED SAFETY GLASS:

Two panes of equal thickness of glass; permanently laminated together with film of polyvinyl butyryl (PVB) or SentryGlass Plus (SGP) interlayer by manufacturer's standard heat plus pressure process and to exclude dirt, foreign substances and air or glass pockets and to comply with ASTM C1172.

Fabricate from two 0.125" thick panes of clear annealed float glass with 30 mil clear interlayer.

Provide interlayer with a proven record of no tendency to bubble, discolor or lose physical and mechanical properties after laminating glass lites and installation.

Laminated glass is being used in place of tempered glass for safety glazing.

2.5 GLAZING SEALANTS AND TAPES:

General:

Provide black exposed glazing materials.

Provide hardness of materials as recommended by the manufacturer for the required application and condition of installation in each case. Provide only sealants and tapes which are known (proven) to be fully compatible with surfaces contacted, including glass products, seals of insulating glass units and glazing channel surfaces.

At fire rated assemblies, provide materials in compliance with the tested UL assembly.

VOC Content: Limit VOC content to not more than 100 grams per liter as determined in accordance with EPA Method 24 or ASTM D3960 for structural glazing adhesives, 250 grams per liter as determined in accordance with EPA Method 24 or ASTM D3960 for all sealants, backer rods, tapes and cleaners used at interior locations. Limit VOC content to not more than 250 grams per liter for primers used in non-porous substrates and to not more than 775 grams per liter for primers used in porous substrates as determined in accordance with EPA Method 24 or ASTM D3960.

Compressible foam joint fillers, polyester polyurethane foam impregnated with neoprene rubber or acrylic ester styrene copolymer manufactured using chlorofluorocarbons (CFCs) or hydrochloro-fluorocarbons (HCFCs) is not acceptable.

Joint sealers and accessories formulated with aromatic solvents (organic solvent with a benzene ring in its molecular structure), fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, or their components are not acceptable.

Do not use joint sealers containing the following:

Mercury.
Butyl rubber.
Neoprene.
SBR (styrene butadiene rubber).
Nitrile.

1-Part Acrylic Glazing Sealant: (Use for Interior Glazing of Hollow Metal or Wood Work.)

Water-based, acrylic emulsion sealant; nonsag, mildew resistant, paintable; complying with ASTM C834.

Back-Bedding Mastic Glazing Tapes:

Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C1281 and AAMA 800 for products indicated below:

AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

Expanded Cellular Glazing Tapes:

Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:

Type 1: For glazing applications in which tape acts as the primary sealant.

Type 2: For glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.6 MISCELLANEOUS GLAZING MATERIALS:

Compatibility: Provide materials compatible with surfaces and sealants contacted in installation.

Setting Blocks: Neoprene, EPDM or silicone 80-90 Shore A durometer hardness, with proven compatibility with sealants used.

Spacers and Edge Blocks: Neoprene, EPDM or silicone with proven compatibility with sealants used, of size, shape and hardness as recommended by glass and sealant manufacturers. Provide edge blocks to limit lateral movement of glass.

Cleaners, Primers and Sealants: Type recommended by sealant manufacturer.

VOC Content for Cleaner: Not more than 250 grams per liter as determined in accordance with EPA Method 24 or ASTM D3960.
VOC Content for Primer: Not more than 250 grams per liter for primers used in non-porous substrates and not more than 775 grams per liter for primers used in porous substrates, each as determined in accordance with EPA Method 24 or ASTM D3960.
VOC Content for Sealant: Not more than 250 grams per liter as determined in accordance with EPA Method 24 or ASTM D3960.

PART 3 - EXECUTION

3.0 EXAMINATION:

Refer to Section 01 73 00 for examination of substrate and job conditions.

Examine framing glazing, with Installer present, for compliance with the following:

Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.

Minimum required face or edge clearances.

Effective sealing between joints of glass-framing members.

Proceed with installation only after unsatisfactory conditions have been corrected.

3.1 PREPARATION:

Clean the glazing channel or other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to the substrate. Remove lacquer from metal surfaces wherever elastomeric sealants are used.

3.2 INSTALLATION:

Performance:

Watertight and airtight installation of each piece of glass is required, except as otherwise shown. Each installation must withstand normal temperature changes, wind loading and impact loading (for operating doors) without failure of any kind including loss or breakage of glass, failure of sealants to remain watertight and air-tight, deterioration of glazing materials and other defects in the work.

General:

Protect glass from edge damage at all times during handling, installation and operation of the building.

Glazing channel dimensions as shown are intended to provide for necessary minimum bite on the glass, minimum edge clearance and adequate sealant thicknesses, with reasonable tolerances. The Glazier is responsible for correct glass size for each opening, within the tolerance and necessary dimensions established.

Comply with combined recommendations of glass manufacturer and manufacturer of sealants and other materials used in glazing, except where more stringent requirements are shown or specified, and except where manufacturer's technical representatives direct otherwise.

Comply with "Glazing Manual" and other applicable publications by Flat Glass Marketing Association except as shown and specified otherwise, and except as specifically recommended otherwise by the manufacturers of the glass and glazing materials.

Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

Inspect each piece of glass immediately before installation, and discard any which have observable edge damage or face imperfections.

Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

Unify appearance of each series of lights by setting each piece to match others as nearly as possible. Set with pattern, draw and bow oriented in the same direction as other pieces.

3.3 GLAZING:

General:

Install setting blocks of proper size at quarter points of sill rabbet but not less than 6" from corner of glass to edge of setting block. Set blocks in thin course of the heel-based compound, if any.

Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

Provide spacers inside and out, and of proper size and spacing, for all butt glazed glass or glass sized larger than 50 united inches, except where glazing tapes are used for glazing. Provide 0.125" minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.

Force sealants into channel to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.

Clean and trim excess glazing materials from the glass and stops or frames promptly after installation, and eliminate stains and discoloration.

Tape and Sealant Glazing:

Cut glazing tape to length and set against permanent stop 3/16" below sightline. Butt tape at corners and daub joint with butyl sealant.

Place setting blocks and rest glass pane on blocks and push against tape to attain full contact with glass perimeter.

Place glazing tape on glass and install removable stop.

Apply cap bead of acrylic sealant along external and internal void to uniform line and with "wash" away from glass. Tool or wipe sealant with solvent for smooth appearance.

Sealant Glazing (Wet):

Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.4 CURE, PROTECTION AND CLEANING:

Cure glazing sealants and compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability.

Protect interior glass from breakage immediately upon installation. Do not apply markers of any type to surface of glass.

Remove nonpermanent markers and clean surfaces.

Remove and replace glass which is broken, chipped, cracked, abraded, or damaged in other ways during the construction period, including natural causes, accidents and vandalism.

Washing of glass is specified in Section 01 74 23.

3.5 SCHEDULE:

Type 1: (Glazing Unless Otherwise Indicated)

Two 0.125" clear annealed float glass panes laminated to 30 mil clear interlayer.

Type 2: (UL Label Locations)

0.313" thick ceramic glass.

END OF SECTION 08 80 00

SECTION 09 29 00

GYPSUM BOARD SYSTEMS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Gypsum board work of the following types:

- Interior gypsum wallboard.
- Gypsum board finishing.
- Non-load bearing steel framing.

Related Sections:

- Rough Carpentry: Section 06 10 00.

1.2 DEFINITIONS:

Gypsum Board Terminology: Refer to ASTM C11 for definitions of terms not defined in this Section or other referenced standards.

1.3 PERFORMANCE REQUIREMENTS:

Structural Performance:

Provide metal framing used at interior locations capable of withstanding design loads and deflection limits as indicated herein.

Component Design:

Compute structural properties of studs and joists at interior locations in accordance with AISI "Specification for the Design of Cold-Formed Steel Structural Members".

Design and provide metal stud framing system in accordance with the drawings and the requirements within this specification section.

Design wall systems to withstand an air pressure or suction of 5 psf.

Design wall system to provide for movement without damage, overstressing, gypsum board failure, damage to applied finishes, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120° F.

Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflections of primary building structure as follows:

- Upward and downward movement of 1 inch.

Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:

Interior Non-Load-Bearing Wall Framing: Horizontal deflection of 1/240 of the wall height under a horizontal load of 5 lbf/sq. ft. without gypsum board applied.
Ceiling Joist Framing: Vertical deflection of 1/360 of the span.

Design framing and anchorage conditions for window connections where windows are set in framing.

Minimum Sizes and Gages: Sizes and gages included in the drawings and in the specifications represent the minimum acceptable sizes to be provided. In case of conflict, the more restrictive requirement shall govern. It is the responsibility of the manufacturer or installer to verify the minimum gages and sizes will meet the required loading based on all loading factors, including applied finishes, mechanical work, electrical work and audio/visual work, and deflection requirements specified above.

1.4 SUBMITTALS:

Product Data:

Submit manufacturer's data for each product indicated.

Indicate compliance with specified fire or sound ratings.

Indicate stud height limitations.

Certifications:

Submit certification indicating that products furnished for this project are asbestos free.

Submit certification indicating that products meet or exceed specification requirements.

1.5 QUALITY ASSURANCE:

Fire Test Response Characteristics:

For Gypsum board assemblies with fire resistance ratings, provide materials and construction which are identical to those assemblies whose fire resistance has been determined per ASTM E119 by a testing and inspecting organization acceptable to authorities having jurisdiction.

Provide assemblies identical to those in GA-600 "Fire Resistance Design Manual", UL "Fire Resistance Directory", or ITS's "Directory of Listed Products".

Sound Transmission Characteristics:

For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by a qualified independent testing agency.

STC Rated Assemblies: Indicated by design designations from GA-600, "Fire Resistance Design Manual".

Industry Standards:

Comply with applicable requirements of ASTM C840 "Application and Finishing of Gypsum Board", except where more detailed or more stringent requirements are indicated including the recommendations of the manufacturer.

Manufacturer:

Obtain each type of gypsum board and related joint treatment materials from a single manufacturer.

1.6 DELIVERY, STORAGE AND HANDLING:

Deliver materials in original packages, containers or bundles, bearing brand name and identification of manufacturer.

Store materials inside under cover. Keep dry and protected from damage due to weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

1.7 PROJECT/SITE CONDITIONS:

Comply with ASTM C840 requirements or gypsum board manufacturer's written recommendations, whichever is more stringent, for environmental conditions.

Maintain ambient temperatures at not less than 40° F. for non-adhesive attachment of gypsum board and 50° F. for adhesive attachment and for the period of 48 hours before wallboard finishing, during installation and 48 hours after installation. Provide adequate ventilation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include the following:

Metal Support Materials:

Dale Industries, Inc.
Dietrich Industries, Inc.
Gold Bond Building Products Div., National Gypsum Co.
USG Interiors, Inc.

Direct Suspension Systems:

Domtar Gypsum.
Donn Corporation.
National Rolling Mills Co.
USG Interiors, Inc.

Gypsum Board and Related Products:

Domtar Gypsum.
Georgia-Pacific Corp.
Gold Bond Building Products Div., National Gypsum Co.
United States Gypsum Co.

All catalog numbers and trade names used in this Section are those of United States Gypsum, unless otherwise noted, and are to establish continuity and a standard of quality.

2.2 CEILING AND SOFFIT FRAMING:

General:

Comply with ASTM C645 and C754, for metal system supporting gypsum wallboard work.

Minimum Recycled Content: 30% by weight.

Tie Wire:

Comply with ASTM A641, Class 1 zinc coating, soft temper, 0.0625", 8 gage, diameter wire, or double strand of 0.0475" diameter wire.

Hanger Attachment to Concrete:

Provide anchors and fasteners as follows:

Hanger Anchorage Devices: Size for 5 x imposed loads, as determined by testing per ASTM E488. Fabricate from corrosion-resistant materials with loops or holes for attachment of hanger wires.

Type: Postinstalled expansion anchor.

Hangers:

Provide hangers as follows:

Wire Hangers: ASTM A641, Class 1 zinc coating, soft temper, 0.162" diameter.

Rod Hangers: ASTM A510, mild carbon steel, 5/16" diameter, ASTM A153 hot-dipped galvanized coating.

Flat Hangers: Commercial steel sheet, ASTM A653, G40 (Z120) hot-dipped galvanized.

Size: 1" x 3/16" by length indicated.

Angle Hangers: ASTM A653, G60 (Z180) hot-dipped galvanized commercial steel sheet.

Minimum Base Metal Thickness: 0.0312" (20 gage).
Size: 7/8" x 1-3/8".

Carrying Channels:

Cold-rolled steel channels weighing not less than 0.475 pounds per linear foot with a minimum 1/2" wide flange, with ASTM A653, G40 (Z120) hot-dipped galvanized zinc coating.

Depth: 1-1/2".

Furring Channels:

Commercial steel sheet with ASTM A653, G40 (Z120), hot-dipped galvanized zinc coating.

Hat-Shaped, Rigid Furring Channels: ASTM C645, 0.0179" (25 gage) minimum base metal thickness, 7/8" deep.

2.3 STEEL PARTITION FRAMING:

Components:

General: Comply with ASTM C754 for conditions indicated.

Minimum Recycled Content: 30% by weight.

Sheet Steel Components: Comply with ASTM C645 requirements for metal and with ASTM A653/A, G40 (Z120), hot-dip galvanized zinc coating.

Studs and Runners: ASTM C645.

Minimum Base Metal Thickness:

0.0179" (25 gage), unless otherwise indicated.
At door frames use 0.0312" (20 gage) or heavier studs.

Stud Depth: As indicated.

Runners: Match studs; type recommended by stud manufacturer for floor and ceiling support of studs, and for vertical abutment of drywall work at other work.

Deep-Leg Deflection Track: ASTM C645 top runner with flanges of depth required to accommodate not less than 1" of vertical movement at above-grade slabs.

Firestop Track (Fire-Rated Partitions): Top runner manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistant-rated assembly indicated, in thickness not less than indicated for studs and in width to accommodate depth of studs.

Provide products by one of the following:

Fire Trak Corp: Fire Trak.
Metal-Lite, Inc.: The System.

Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated, and with minimum base metal thickness of 0.0312" (20 gage).

Provide for required blocking except at wall-mounted door stops at Contractor's option to wood blocking specified in Section 01 25 00 except as otherwise indicated.

Hat-Shaped, Rigid Furring Channels: ASTM C645, 0.0179" (25 gage) minimum base metal thickness, 7/8" deep.

Stud System Accessories: Provide stud manufacturer's standard clips, shoes, ties, reinforcements, fasteners and other accessories as needed for a complete stud system.

Fasteners for Metal Framing:

Type, size, corrosion resistance, and holding power as required to fasten steel members to substrates. Conform to ASTM C1002 for screws.

2.4 INTERIOR GYPSUM WALLBOARD:

General:

Minimum Recycled Content: 10% by weight.

Facing Paper of Gypsum Board: 100% recycled newsprint including post consumer waste.

Provide gypsum board made from material harvested within and manufactured from sources within 500 miles of the project location.

Panel Size:

Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system.

Gypsum Wallboard:

Provide ASTM C1396 as follows:

Type X: 5/8" thickness, tapered long edges. Use for vertical surfaces unless otherwise indicated.

Sag-Resistant Gypsum Wallboard:

ASTM C1396, manufactured to have more sag resistance than regular type gypsum board, 1/2" thickness, tapered long edges. Use for ceiling and soffit assemblies.

2.5 TRIM ACCESSORIES:

Interior Trim:

ASTM C1047, galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet, shapes as follows:

External Corners: Cornerbead, CB-118 x 118.
Termination Exposed to View: LC-58 Bead, long edge to receive joint compound.
Termination Abutting Another Material: L-58 Bead, exposed long edge to receive joint compound.
Expansion (Control) Joints: Expansion Joint with removable strip, No. 093 by U.S. Gypsum or approved equal. Use where indicated.

2.6 JOINT TREATMENT MATERIALS:

General:

Comply with ASTM C475 and recommendations of both board and joint compound manufacturers.

Joint Tape:

Provide joint tape as follows:

Interior Gypsum Wallboard: Paper.

Joint Compound for Interior Gypsum Wallboard:

For each coat use formulation that is compatible with other compounds applied on previous or for successive coats as follows:

Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.

Embedding and First Coat: For embedding tape and first coat on joint, fasteners, and trim flanges, use chemical-quick-setting-type compound, U.S. Gypsum Co. "Durabond 90" or approved equal.

Fill Coat: For second coat, use chemical-quick-setting-type compound, U.S. Gypsum Co. "Durabond 90" or approved equal.

Finish Coat: For third coat, use drying-type, all-purpose compound.

2.7 MISCELLANEOUS MATERIALS:

General:

Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

Fasteners:

Spot Grout: ASTM C475, setting type joint compound for spot grouting hollow metal frames.

Steel Drill Screws: ASTM C1002.

Use screws complying with ASTM C954 for fastening panels to steel members from 0.033" to 0.112" base metal thickness.

Sealants:

Non-shrinking, non-hardening, non-drying, non-skinning, non-bleeding and non-staining type formulated for acoustical use, Pecora AC-20 Acoustical and Insulation Sealant, Tremco Acoustical Sealant, U.S. Gypsum Acoustical Sealant, or approved equal.

For exposed locations to be painted, use skinnable type, Pecora AC-20 Acoustical and Insulation Sealant, Tremco Acrylic Latex Caulk or approved equal.

VOC Content of Interior Sealants: Provide sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

Not more than 250 grams per liter for all sealants, backer rods, tapes and cleaners.

Not more than 250 grams per liter for primers used in non-porous substrates.

Not more than 775 grams per liter for primers used in porous substrates.

Compressible foam joint fillers, polyester polyurethane foam impregnated with neoprene rubber or acrylic ester styrene copolymer manufactured using chlorofluorocarbons (CFCs) or hydrochloro-fluorocarbons (HCFCs) is not acceptable.

Joint sealers and accessories formulated with aromatic solvents (organic solvent with a benzene ring in its molecular structure), fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, or their components are not acceptable.

Do not use joint sealers containing the following:

Mercury.
Butyl rubber.
Neoprene.
SBR (styrene butadiene rubber).
Nitrile.

Sound Attenuation Blankets:

ASTM C665, Type I, semi-rigid mineral fiber blanket, without membrane, produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool. Provide 1.5" mineral fiber 3.0 lb. density or full thickness of 1.0 density glass fiber.

Provide insulating materials with post-consumer recycled content constituting a minimum of 10% of cost of materials used for project or post-consumer recycled content plus one-half of pre-consumer recycled content constituting a minimum of 20% of cost of materials used for project.

Provide Johns Manville Building Insulation Division "Unfaced" Formaldehyde-free Thermal and Acoustical Fiber Glass Insulation manufactured with a non-toxic binder or approved equal.

For fire rated assemblies, comply with mineral-fiber requirements of assembly.

Minimum Recycled Content for Mineral Fiber: 75% by weight.

PART 3 - EXECUTION

3.1 EXAMINATION:

Examine substrates to which drywall construction attaches or abuts and preset hollow metal frames with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of drywall construction. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF CEILING AND SOFFIT FRAMING:

Suspended Ceiling and Soffit Framing:

Suspend ceiling hangers from building structure as follows:

Install hangers plumb and free from contact with insulation or other objects within ceiling plenum. Splay hangers only where required to miss obstructions and to offset resulting horizontal forces by bracing, countersplaying, or other equally effective system.

Where width of ducts and other construction produces hanger spacings that are greater than that required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices sized to support ceiling loads within performance limits established by reference standards.

Secure wire hangers by looping and wire-tying directly to structure, inserts, eyescrews, or other devices and fasteners that are secure and in a manner that will not cause them to deteriorate or fail.

Secure rod, flat, or angle hangers to structure and intermediate framing members by attaching to inserts, eyescrews, or other devices and fasteners that are secure and in a manner that will not cause them to deteriorate or fail.

Do not attach hangers to steel deck tabs or to steel roof deck.

Do not connect or suspend steel framing from ducts, pipes, or conduits.

Space ceiling suspension carrying channels 4'-0" o.c., and space hangers as indicated, or if not otherwise indicated, at 4'-0" o.c. along channels; coordinate with structure.

In no case space hangers, channels or furring further apart than required either by specified standards or applicable codes, for gages and sections used.

Space ceiling furring members 16" o.c., except as otherwise indicated.

Install additional framing at termination of gypsum board work, and at openings for light fixtures, duct diffuser, access doors and similar openings, as required for support of gypsum boards and other work supported thereon.

Wire-tie or clip furring members to main ceiling runners and to other structural supports as required to comply with requirements for assemblies indicated.

Installation Tolerances: Install steel framing components for suspended ceilings so members for panel installation are level to within 1/8" in 12' measured lengthwise on each member and transversely between parallel members.

3.3 INSTALLATION OF STEEL WALL FRAMING:

General:

Comply with ASTM C754, ASTM C840 requirements that apply to framing installation, and manufacturer's instructions. Coordinate with mechanical and electrical work. Do not attach or support metal framing to ducts, pipes, conduit.

Install supplementary framing, blocking, strapping and bracing at terminations in gypsum board assemblies to support fixtures, equipment, services, heavy trim, furnishings, grab bars, toilet accessories, and similar construction. Comply with details indicated, gypsum board manufacturer's recommendations, and Unites States Gypsum's "Gypsum Construction Handbook".

Refer to Section 06 10 00 for wood blocking for use at wall-mounted door stops.

Steel strapping may be used for blocking at other locations at Contractor's option to wood blocking.

Install supplementary framing, blocking and bracing at terminations in gypsum board assemblies to support fixtures, equipment, services, heavy trim, furnishings, grab bars, toilet accessories, and similar construction. Comply with details indicated, gypsum board manufacturer's recommendations, and Unites States Gypsum's "Gypsum Construction Handbook".

Refer to Section 06 10 00 for wood blocking.

Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement and as follows:

Isolate ceiling assemblies where they abut or are penetrated by building structure.

Isolate partition framing and wall furring where it abuts structure, except at floor. Install slip-type joints at head of assemblies that avoid axial loading of assembly and laterally support assembly.

Use deep-leg deflection track where indicated except for fire-rated partitions.
Use firestop track at fire-rated partitions.

Partition Framing:

Install runner tracks at floors, ceiling and structural walls and columns where gypsum wallboard stud system abuts other work.

Where studs are installed directly against exterior masonry wall, install asphalt felt or foam gasket isolation strip between studs and wall.

Provide top slip joint to accommodate vertical movement as detailed or approved, but not less than 1" at above-grade slabs.

Install each steel framing and furring member so that fastening surfaces do not vary more than 1/8" from plane of faces of adjacent framing.

Extend partition stud system through suspended ceilings full height to the structural support or substrate above the ceiling.

Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceilings to provide support for gypsum board.

For fire-resistance rated and STC-rated partitions required to extend to underside of floor or roof decks to obtain ratings, install framing around structural and other members extending below floor or roof decks to support gypsum board enclosures and to make partitions continuous from finish floor to underside of solid structure.

Space studs 16" o.c. Secure studs to floor runners and to ceiling and deflection head runners by use of screws or special crimping tool at each contact surface. Do not attach to deflection head track.

Install steel studs so that flanges point in the same direction and gypsum board can be installed to open (unsupported) edge of stud first.

Frame door openings to comply with GA-600 and with applicable published recommendations of gypsum board manufacturer. Attach vertical studs at jambs with screws to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

Install double 0.0312" (20 gage) studs at each jamb for all doors.

Install cripple studs at head adjacent to each jamb stud with 1/2" spacing to allow for installation of control joint.

Extend vertical jamb studs through suspended ceiling and attach to underside of structure above.

Frame openings other than door openings in same manner as required for door openings. Install framing below sills of openings to match framing required above door heads.

Wall Furring:

Space wall furring members 16" o.c., except as otherwise indicated.

Screw furring members to structural support where possible; otherwise wire-tie or clip as recommended by manufacturer.

Provide furring, framing to conceal all pipes, ducts, conduits, raceways not indicated as exposed.

3.4 GYPSUM BOARD INSTALLATION:

Application and Finishing Standards:

In addition to compliance with ASTM C840 and GA-216, comply with manufacturer's instructions and requirements for fire-resistance ratings (if any), whichever is most stringent.

General:

Pre-Installation Conference: Meet at the project site with the installers of related work and review the coordination and sequencing of work to ensure that everything to be concealed by gypsum wallboard has been accomplished, and that chases, access panels, openings, supplementary framing and blocking and similar provisions have been completed.

Install sound attenuation blankets as indicated, prior to gypsum board unless readily installed after board has been installed on one side.

Install metal trim and accessories with screws.

Use screw fasteners for attachment of boards to framing or furring.

Install gypsum board panels with face side out. Butt panel together for a light contact at edges and ends with not more than 1/16" of open space between panels. Do not force into place.

Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.

Locate exposed end-butt joints as far from center of walls as possible, and stagger not less than 24" in alternate courses of board.

Form control joints and expansion joints with space between edges of boards, prepared to receive trim accessories.

Interior Ceilings and Soffits:

Install ceiling boards in the direction and manner which will minimize the number of end-butt joints, and which will avoid end joints in the central area of each ceiling. Stagger end joints at least one framing member. Apply ceilings first to greatest extent possible.

Partitions:

Install wall and partition boards vertically (parallel) without end butt joints and with edge joints over studs and staggered on opposite sides of wall.

At high walls (over one standard 12' board height), install boards horizontally with end joints over studs and staggered vertically.

Attach gypsum board to steel studs so that leading edge or end of each board is attached to open (unsupported) edge of stud flange first.

Attach gypsum board to supplementary framing and blocking provided at openings and cutouts.

Spot grout all hollow metal door frames. Apply spot grout at each jamb anchor clip just before inserting board into frame.

Cover both faces of studs with gypsum board in concealed spaces (above ceilings, etc.), except in chase walls braced internally.

Unless concealed application is required for sound, fire, air or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. area.

Fit gypsum panels around ducts, pipes, and conduits.

Where partitions intersect structural members, cut gypsum board panels to fit profile formed. Allow 1/4" to 3/8" wide joint for application of sealant or firestopping.

Isolate perimeter of non-load-bearing wallboard partitions at structural abutments. Provide 1/4" to 1/2" space and trim edge with L-bead finishing edge trim. Seal joints with exposed acoustical sealant.

STC Rated Assemblies:

Where sound-rated wallboard work is indicated (sound batts), seal the work at perimeters, control and expansion joints, openings and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions.

Comply with ASTM C919 and manufacturer's recommendations for location of beads, and close off sound-flanking paths around or through the work, including sealing of partitions above acoustical ceilings.

Fasteners:

Space fasteners in gypsum boards in accordance with referenced application and finishing standard and manufacturer's recommendations.

Allowable Tolerances:

1/16" offsets between planes of board faces, and 1/4" in 8'-0" for plumb, level, warp and bow.

3.5 SPECIAL GYPSUM BOARD APPLICATIONS:

Double-Layer Application:

Install ceiling base layer of gypsum backing board prior to wall/partition board installation, and install face layer of exposed gypsum board subsequently. Apply base layer perpendicular to framing members and offset face layer joints by one framing member, unless required by fire-resistance rated assembly.

Apply both gypsum board base and finish layers vertically to walls and partitions. Apply base layer to framing members and offset face layer joints by one framing member, unless required by fire-resistance rated assembly. Stagger joints on opposite sides of partitions.

Fasten base layer with steel drill screws.

Fasten face layer through base with screws into supports. Offset joints between layers not less than 10".

Follow requirements of NFPA and GA-600 for fire-rating indicated.

3.6 INSTALLATION OF TRIM ACCESSORIES:

Where feasible, use the same fastener to anchor trim accessory as required for gypsum board. Otherwise, follow manufacturer's instructions.

Install metal corner beads at external corners, metal edge trim where edge of gypsum board would be exposed, and metal control joints where indicated or required.

Install control joints according ASTM C840 and as follows:

Install control joints in ceilings exceeding 2500 sq. ft. in area and in partition, wall, and wall furring runs exceeding 30 ft. and in locations as approved by Architect for visual effect.

3.7 GYPSUM BOARD FINISHING:

General:

Apply treatment at gypsum board joints, interior angles, edge trim, flanges of trim accessories, penetrations, fastener heads, surface defects and elsewhere as required to prepare work for decoration.

Remove residual joint compound promptly from adjacent surfaces.

Prefill open joints and tapered edges, and damaged surface areas using type of compound recommended by manufacturer. Wipe off excess from tapered edges and allow to harden.

Apply joint tape in taping compound at joints between gypsum boards, except where exposed trim accessory is indicated. Tape in corner beads and termination metal.

Apply taping compound in a thin layer to all joints and angles, place reinforcing tape centered over joint, and follow immediately with thin skim coat (first coat) to embed tape. Allow to dry thoroughly.

Apply second coat (fill) of joint compound over embedding coat, filling panel taper flush with surface. Cover tape and feather out at least 3" beyond joint center, edge of casing bead or nose of corner bead.

Spread third coat (finish coat) evenly over and extend 3" beyond second coat, feathering to a smooth uniform finish.

Where necessary, sand lightly between coats and following the final finish coat to provide a smooth face for decorating. Do not roughen face paper when sanding.

Finish fasteners by filling depression with joint compound and followed by a minimum of two additional coats to leave depression level with surface.

Review and coordinate with finish schedules and 09 90 00 Series sections to assure proper conditions to receive finishes as required and specified.

Gypsum Board Finish Levels:

Finish panels to levels indicated below according to ASTM C840:

Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, unless a higher level of finish is required for fire-resistance and sound rated assemblies

Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges where panels are substrate for acoustical tile.

Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges where panels are indicated to receive paint finish.

3.8 FIELD QUALITY CONTROL:

Above Ceiling Observations:

Before Contractor installs gypsum board ceilings, Architect will conduct an above-ceiling observation and report deficiencies in Work observed. Do not proceed with installation of gypsum board to support framing until deficiencies have been corrected.

Notify Architect 7 days in advance of date and time when Project, or part of Project, will be ready for above-ceiling observation.

Before notifying Architect, complete installation of the following in areas to receive gypsum board ceilings:

80% of lighting fixtures, powered for operation.
Insulation, and leak and pressure testing of water piping systems.
Air duct systems.
Air devices.
Mechanical system control-tubing.
Ceiling support framing.

3.9 PROTECTION OF WORK:

Refer to Sections 01 50 00 and 01 60 00.

END OF SECTION 09 29 00

SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Acoustical ceiling as shown on the drawings and in schedules for:

- Acoustical panel ceilings, exposed suspension.
- Acoustical tile ceilings, adhered to substrate.

Related Sections:

- Access doors and panels: Section 08 31 00
- Gypsum board base for acoustic tile: Section 09 29 00

1.2 SUBMITTALS:

Product Data:

Submit manufacturer's product specifications and installation instructions for each acoustical ceiling material required, and for each suspension system, including certified laboratory test reports and other data as required to show compliance with these specifications.

Samples:

Submit three 12" square samples or manufacturer's standard sample kit for each acoustical unit required. In each set of samples show the full range of exposed color and texture to be expected in the completed work.

Submit 12" long samples or manufacturer's standard sample kit of each exposed runner and molding.

Architect's review will be for color and texture only. Compliance with other requirements is the exclusive responsibility of the Contractor.

Certifications:

Submit certification that products furnished for this project are asbestos free.

Submit certification that products furnished for this project meet or exceed specification requirements.

1.3 QUALITY ASSURANCE:

Manufacturer:

Company specializing in the manufacture of acoustical ceiling tile and panels with 3 years minimum experience.

Installer:

Subcontract the installation of acoustical ceilings to an installation firm with a minimum of 3 years experience and which is acceptable to the manufacturer of the acoustical units, as shown by current written statement from the manufacturer.

Standards:

Terminology and Performance: Applicable publications by the Ceilings and Interior Systems Contractors' Association (CISCA), including former Acoustical Materials Association Standards issued by CISCA.

Acoustical Materials: ASTM E1264 and CISCA publications.

Fire Hazard Classification: UL tested, listed and labeled as "Class 0-25", smoke developed of 50 or less, ASTM E84.

1.4 MAINTENANCE:

Maintenance Instructions:

Submit manufacturer's recommendations for cleaning and refinishing acoustical units, including precautions against materials and methods which may be detrimental to finishes and acoustical performance.

Maintenance Stock:

At time of completing the installation, deliver stock of maintenance materials to the Owner. Furnish full size units matching the units installed, packaged with protective covering for storage, and identified with appropriate labels.

Acoustical Units: Furnish an amount equal to 15% of the amount installed of each type, pattern, color, but not less than 10 units. Do not use for replacement of damaged units prior to building occupancy or substantial completion whichever occurs later.

1.5 PROJECT/SITE CONDITIONS:

Do not install interior acoustical ceilings until space has been enclosed and is weathertight, and until wet-work in the space has been completed and is nominally dry, and until work above ceilings has been completed, and until ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

Armstrong World Industries, Inc.
Certainteed Ceilings
USG Interiors, Inc.

2.2 CEILING UNITS:

Acoustical Tile:

Size: 12" x 12" x 0.625", mineral tile by listed manufacturer, white color, and in texture and edge condition as required to match existing adjacent adhered tile ceilings to be patched.

NRC: Not less than 0.55.
CAC: Not less than 35.
Reflectance: Not less than 0.85.
Minimum Recycled Content: 29% by weight.

Include manufacturer's standard anti-microbial treatment.

Provide tile which is sag-resistant in high humidity environments.

Acoustical Panels:

24" x 48" x 0.75", high density mineral fiber lay-in boards with beveled tegular edges, Ultima Fine Texture No. 1915 by Armstrong or equal by listed manufacturer, white color.

NRC: Not less than 0.70.
CAC: Not less than 35.
Reflectance: Not less than 0.90.
Minimum Recycled Content: 66% by weight.

Include manufacturer's standard anti-microbial treatment.

Provide tile which is sag-resistant in high humidity environments.

2.3 CEILING SUSPENSION MATERIALS:

General:

Comply with ASTM C635, as applicable to the type of suspension system required for the type of ceiling units indicated. Coordinate with other work supported by or penetrating through the ceilings.

Structural Class: Intermediate Duty System.

Minimum Recycled Content: 30% by weight.

Finishes:

Provide manufacturer's standard finish for type of system indicated, unless otherwise required. For exposed suspension members and accessories with painted finish, provide white standard color.

Attachment Devices:

Hanger Wires: Galvanized carbon steel, ASTM A641, soft temper, prestretched, yield-stress load of at least 3 times design load, but not less than 12 gage (0.106").

System:

Armstrong World Industries, Inc. specified, or equals by Chicago Metallic Corp. or USG Interiors, Inc.

9/16" Suspension System: Suprafine ML, capped steel system with No. 7500 mains, No. ML7520 for 24" cross-tees, No. ML7540 for 48" cross-tees and No. 7804 edge moldings.

Edge Moldings: Use for edges and penetrations of ceiling.

2.4 MISCELLANEOUS MATERIALS:

Tile Adhesive:

Comply with ASTM D1779 or FS MMM-A-150, type recommended by tile manufacturer, bearing UL label for Class 0-25 flame spread.

VOC Content: Not more than 50 grams per liter.

Tile Joint Splines:

Type recommended by tile manufacturer to coordinate with tile installation support system and installation procedure.

Edge Trim Molding:

Metal or extruded PVC plastic, of the types and profiles indicated, white finish unless otherwise indicated.

PART 3 - EXECUTION

3.1 PREPARATION:

Coordination of Work:

Coordinate layout and installation of acoustical ceiling units and suspension system components with other work supported by or penetrating through, ceilings, including light fixtures, HVAC equipment, fire-suppression system components (if any), and partition system (if any).

Layout:

Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid the use of less-than-half width units at borders, and comply with reflected ceiling plans. In case of conflict between above criteria and reflected ceiling plans or field conditions and other requirements, obtain Architect's direction for resolution before proceeding.

3.2 INSTALLATION:

General:

Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations, fire resistance rating requirements as indicated, and industry standards applicable to the work.

Arrange acoustical units and orient directionally-patterned units (if any) in the manner shown by reflected ceiling plans.

Install tile with pattern running in one direction.

Suspension System:

Install suspension system to comply with ASTM C636, with hangers supported only from building structural members as indicated.

Locate hangers near each end (within 12") and spaced not more than 4'-0" along each carrying channel or direct-hung runners, unless otherwise indicated. Install additional hanger wires at

recessed light fixtures, HVAC diffusers and other items resting on same ceiling component or supported by cross tees on more than two sides.

Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws or other devices which are secure and appropriate for the substrate, and which will not deteriorate or fail with age or elevated temperatures.

Install edge moldings of the type indicated at edges of each acoustical ceiling area, and at locations where edge of units would otherwise be exposed after completion of the work.

Secure moldings to building construction by fastening with screw-anchors or staples into the substrate in vertical leg. Space holes not more than 3" from each end and not more than 16" o.c. along each molding.

Level moldings and ceiling suspension system, to a level tolerance of 0.125" in 12'-0".

Miter corners of moldings accurately to provide hairline joints, securely connected to prevent dislocation.

Except at edge moldings cope exposed flanges of intersecting exposed suspension system members, so that flange faces will be flush.

Acoustical Tile Adhered to Substrate:

Install acoustical tile by cementing to substrate, using amount of adhesive and procedure recommended by tile manufacturer. Install splines in joints between tiles and level to 0.125" in 12'-0" tolerance. Maintain tight butt joints, aligned both directions, and coordinated with ceiling fixtures and penetrations.

In general, center tile joints on centers of exposed fixtures, to the greatest extent possible.

Scribe and cut tile to fit accurately at edges of ceiling and around penetrations in the ceiling.

Lay-In System:

Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members.

Scribe and cut panels to fit accurately at penetrations and perimeter.

Install edge trim moldings where indicated, and elsewhere as needed to conceal edges of acoustical units which would otherwise be exposed to view after completion of the work. Anchor with fasteners or, if not possible, secure in place with permanent adhesive.

3.3 CLEANING AND PROTECTION:

Clean exposed surfaces of acoustical ceilings, including trim, edge moldings and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage.

Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

The Installer shall advise the Contractor of required protection for the acoustical ceilings, including temperature and humidity limitations and dust control, so that the work will be without damage and deterioration at the time of substantial completion.

END OF SECTION 09 51 00

SECTION 09 65 00
RESILIENT FLOORING

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Resilient flooring and accessories as shown on the drawings and in schedules for:

- Resilient floor tiles
- Resilient base and accessories

Related Sections:

- Final Cleaning: Section 01 74 23
- Cast Underlayment: Section 03 54 00

1.2 SUBMITTALS:

Product Data:

Submit manufacturer's technical data and installation instructions for each type of resilient flooring and accessory. Include certification of fire test compliance.

Certification:

Certify that products furnished for this project are asbestos free.

Certify that products meet or exceed specification requirements.

Samples:

Submit a minimum of 3 samples of each type, color and finish of resilient flooring, resilient base and accessory required. Provide 12" square samples of sheet flooring and 6" long sample of resilient base or accessory. Include full range of flooring color and pattern variation.

1.3 QUALITY ASSURANCE:

Manufacturer:

Provide each type of resilient flooring and accessories as produced by a single manufacturer, including recommended primers, adhesives, sealants, and leveling compounds.

Installer:

Engage an Installer with not less than 3 years successful experience in the installation of resilient flooring of the types required for this project.

Fire Test Performance:

Unless otherwise indicated, provide resilient flooring which complies with the following test performance criteria as determined by an independent testing laboratory acceptable to authorities having jurisdiction.

Critical Radiant Flux (CRF): Not less than 0.45 watts per sq. cm., per ASTM E648.

Flame spread not more than 75 per ASTM E84.

Smoke density not more than 450, ASTM E662.

Single Source Responsibility:

Provide each type of resilient flooring, installation compounds and accessories produced by a single manufacturer.

1.4 DELIVERY, STORAGE AND HANDLING:

Deliver materials to the project site in the manufacturer's original unopened containers, clearly marked to indicate pattern, gage, lot number and sequence of manufacture.

Carefully handle all materials and store in original containers at not less than 65° F. for at least 48 hours before start of installation.

1.5 PROJECT/SITE CONDITIONS:

Continuously heat areas to receive flooring to minimum 65° F. for at least 48 hours prior to installation, when project conditions are such that heating is required. Maintain 65° F. minimum temperature continuously during and after installation as recommended by flooring manufacturer, but for not less than 48 hours. Subsequently maintain 55° F. minimum temperature.

Install resilient flooring and accessories after other finishing operations, including painting, have been completed. Moisture content of concrete slabs, building air temperature, and relative humidity must be within limits recommended by resilient flooring manufacturer.

1.6 MAINTENANCE:

Maintenance Instructions:

Submit manufacturer's written instructions for recommended maintenance practices for each type of resilient flooring and accessory.

Replacement Material:

After completion of work, deliver to the project site replacement materials from same manufactured lot as materials installed and as follows:

Sheet flooring, 2% of total square footage installed, but not less than one full roll, for each type, width, and color installed.

Resilient base, not less than 120 lineal feet (one carton) for each color and type installed.

PART 2 - PRODUCTS

2.1 COLORS AND PATTERNS:

Provide colors and patterns as indicated in the Finish Legend on the drawings, or if not indicated, as selected by Architect from manufacturer's standards.

2.2 SHEET FLOORING:

Vinyl Sheet Flooring:

Vinyl Sheet Floor Covering with Backing: ASTM F1303, Relay RE by Mannington Commercial or approved equal with high performance wear layer with urethane aluminum oxide topcoat cured by UV process to eliminate the need for polish over an extended period of time.

Minimum Recycled Content: 20% post-consumer and 15% pre-consumer, by weight.

Type (Binder Content): Type II, minimum binder content of 34 percent.

Wear-Layer Thickness: Grade 2.

Overall Thickness: As standard with manufacturer.

Interlayer Material: None.

Backing Class: Class B (nonfoamed plastic).

Wearing Surface: Embossed with embedded abrasives as specified above.

Sheet Width: 6 feet.

Seaming Method: Standard.

Provide vinyl sheet flooring which is FloorScore certified.

2.3 ACCESSORIES:

Resilient Base:

Provide base complying with ASTM F1861, Type TS (rubber, vulcanized thermoset) or TP (rubber, thermoplastic), Group I (solid, homogeneous) or II (layered), smooth surface with matching end stops and preformed or molded corner units, 0.125" gage, 4" high.

Legths: Coils in manufacturer's standard length.

Provide topset style with cove base toe at all locations.

Provide resilient base manufactured by Johnsonite or approved equal by Burke, Flexco Company or Roppe Corporation.

Resilient Edge and Transition Strips:

0.125" thick, homogenous vinyl or rubber composition, tapered or bullnose edge, color to match flooring, or as selected by Architect from standard colors available; not less than 1" wide.

Provide transitions of flush design similar to Johnsonite CTA Series or approved equal by Burke, Flexco Company or Roppe Corporation.

Adhesives, Compounds:

Cement or adhesive of types specifically recommended by flooring manufacturer only to suit material and substrate conditions. Use adhesives that comply with the following VOC content:

Sheet Vinyl Flooring: Not more than 50 grams per liter.
Rubber Base: Not more than 50 grams per liter.

Concrete Slab Primer: Non-staining type as recommended by flooring manufacturer.

VOC Content: Not more than 100 grams per liter.

Leveling Compound: Latex type which can be feather edged, as recommended by flooring manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION:

Require Installer to inspect subfloor surfaces to determine that they are satisfactory. A satisfactory subfloor surface is defined as one that is smooth and free from cracks, holes, ridges, coatings preventing adhesive bond, and other defects impairing performance or appearance.

Perform moisture tests on concrete slabs to determine that concrete surfaces are sufficiently cured and ready to receive flooring. Record test method, locations and results and submit with record documents.

Do not allow resilient flooring work to proceed until subfloor surfaces are satisfactory.

3.2 PREPARATION:

Prior to laying flooring, broom clean or vacuum surfaces to be covered and inspect subfloor. Start of flooring installation indicates acceptance of subfloor conditions and full responsibility for completed work.

Use leveling compound as recommended by flooring manufacturer for filling small cracks and depressions in subfloors.

Remove coatings from subfloor surfaces that would prevent adhesive bond, including curing compounds incompatible with resilient flooring adhesives, paint, oils, waxes and sealers.

Broom clean or vacuum surfaces to be covered.

Apply concrete slab primer, if recommended by flooring manufacturer, prior to application of adhesive. Apply in compliance with manufacturer's directions.

3.3 INSTALLATION:

General:

Place flooring with adhesive cement in strict compliance with manufacturer's recommendations. Butt tightly to vertical surfaces, thresholds, nosings and edgings. Scribe around obstructions including permanent fixtures, built-in furniture, pipes, outlets and building components and to produce neat joints, laid tight, even and straight. Extend flooring into toe spaces, door reveals, and into closets and similar openings.

Tightly cement flooring to subbase without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections.

Sheet Flooring:

Lay sheet flooring to provide as few seams as possible with economical use of materials. Match edges for color shading and pattern at seams in compliance with manufacturer's recommendations, such as reversing adjoining sheets of same roll, so that abutting edges are from same edge of roll.

Adhere sheet flooring to substrates using method approved by flooring manufacturer for type of sheet flooring and substrate condition indicated.

Use conventional full spread adhesive method.

Prepare seams in vinyl sheet flooring in accordance with manufacturer's instructions for most inconspicuous appearance, sealing continuously with fluid-applied sealant or adhesive as standard with manufacturer.

3.4 ACCESSORIES:

Base:

Apply resilient base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required.

Install base in as long lengths as practical, with preformed external corner units. Internal corners may be preformed or fabricated from base materials mitered and coped.

Tightly bond base to backing throughout the length of each piece, with continuous contact at horizontal and vertical surfaces.

On masonry surfaces, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.

Edge Strips:

Place resilient edge strips tightly butted to flooring and secure with adhesive. Install edging strips at all unprotected edges of flooring, unless otherwise shown.

Transition Strips:

Place resilient transition strips tightly butted to flooring and secure with adhesive. Install transition strips at all changes in flooring, unless otherwise shown.

3.5 CLEANING AND PROTECTION:

Cleaning:

Remove any excess adhesive or other surface blemishes, using neutral type cleaners as recommended by flooring manufacturer.

Perform following operations immediately upon completion of resilient flooring:

Sweep or vacuum floor thoroughly.

Do not wash floor until time period recommended by resilient flooring manufacturer has elapsed to allow resilient flooring to become well-sealed in adhesive.

Damp mop floor being careful to remove black marks and excessive soil.

Clean resilient flooring not more than 4 days prior to date scheduled for Completion inspection in each area of project. Clean resilient flooring by method recommended by resilient flooring manufacturer and to comply with requirements of Section 01 74 23.

Apply two coats of sealer and three coats of finish to resilient floor tile complying with the requirements of Section 01 74 23.

Protection:

Protect flooring against damage during construction period to comply with resilient flooring manufacturer's directions.

Protect resilient flooring against damage from rolling loads for initial period following installation by covering with plywood or hardboard. Use dollies to move stationary equipment or furnishings across floors.

Cover resilient flooring with undyed, untreated building paper until Completion inspection.

END OF SECTION 09 65 00

SECTION 09 68 16
SHEET CARPETING

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Sheet carpeting as shown on the drawings and in schedules for:

- Direct glue-down installed carpet.
- Carpet accessories.

Related Sections:

- Final Cleaning: Section 01 74 23
- Cast Underlayment: Section 03 54 00
- Resilient flooring and base: Section 09 65 00
- Entrance Floor Mats and Frames: Section 12 48 13

1.2 REFERENCES:

General Information Standard:

Refer to "Standard for Installation of Commercial Textile Floorcovering Materials" (CRI 104) by the Carpet and Rug Institute for general information and recommendations and for definitions of terminology.

Accessibility Standards:

American National Standards for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People ANSI A117.1.

Uniform Federal Accessibility Standards.

1.3 PERFORMANCE REQUIREMENTS:

General:

All carpet must meet the testing and product requirements of the Carpet and Rug Institute's Green Label Plus program.

All carpet adhesive must not exceed the VOC content limit of 50 g/L.

Fire Performance Standards:

Provide carpeting that is identical to that tested for the following fire performance requirements, according to test method indicated, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.

Flammability: Passing methenamine pill test, ASTM D2859.

Critical Radiant Flux: 0.45 minimum, ASTM E648.

Smoke Density: Less than 450, ASTM E662.

Other Standards:

Static Resistance: Rating of 3.5 KV or less, 20% R.H. at 70° F., AATCC 134.

1.4 SUBMITTALS:

Product Data:

Submit manufacturer's data on carpet and carpeting materials, showing that materials comply with requirements of specifications; also including installation instructions and maintenance recommendations.

Include certified laboratory test report for flammability and static tests as specified.

Samples:

Submit 18" x 27" samples of each type, color, texture and pattern of carpet required. Architect's review of samples will be for color, pattern and texture only.

Shop Drawings:

Submit layout drawings showing seam locations, pattern, and nap direction, location and type of edge treatment. Indicate columns, doorways, walls, built-in cabinets, carpet cut-out locations and detail of special conditions.

Certification:

Submit manufacturer's certification stating that carpet materials furnished comply with specified requirements.

Include listing of mill register numbers for carpet furnished.

Include supporting certified laboratory test data indicating that carpet meets or exceeds specified fire performance test requirements.

1.5 QUALITY ASSURANCE:

Installer:

Firm with not less than 5 years successful experience in carpet installations similar in size and type to the carpeting requirements of this project.

Manufacturer:

Firm (carpet mill) with not less than 5 years of production experience with carpet manufacturing similar to types specified in this section; and whose published product literature clearly indicates general compliance of products with requirements of this section.

1.6 DELIVERY, STORAGE AND HANDLING:

Deliver carpeting materials in original mill protective wrapping with identification tags intact, showing brand, quality and lot number. Store inside, protected from weather, moisture and soiling, distortion and warping. Maintain minimum ambient/temperature of 40° F.

Carpet may be unwrapped, inspected and precut at the Installer's shop. Notify Architect 16 working hours in advance if such action is taken. Retain mill tags and attach to the appropriate roll for delivery to job.

1.7 PROJECT/SITE CONDITIONS:

Do not commence with carpet installation until painting and finishing work is complete and ceilings, piping and overhead work has been tested, approved and completed.

Maintain room temperature at minimum 65° F. for at least 24 hours prior to and 72 hours after installation and relative humidity at approximately that at which the area is to be maintained, but not more than 65%.

1.8 MAINTENANCE:

Overrun and Maintenance Stock:

Provide 2% overrun on calculated yardage (carpet needed for proper installation including waste and excess usable scraps) in full width roll for each type, color, texture and pattern required.

The Owner will review all carpet scraps and retain chosen pieces for future repairs. Selected remnants, usable scraps and overage shall be packaged and identified. The balance shall be removed from the job site.

Deliver specified overrun and usable scraps of carpet to Owner's designated storage space.

Maintenance Manual:

Submit manual of carpet manufacturer's complete recommendations for the care, cleaning and maintenance of each type of carpeting; prepared after detailed analysis of Owner's intended occupancies and resulting traffic conditions.

1.9 WARRANTY:

Provide special warranty, signed by Contractor, Installer and Manufacturer (Carpet Mill), agreeing to repair or replace defective materials and workmanship of carpeting work during 2-year warranty period following substantial completion. Attach copies of product warranties.

Furnish manufacturer's written warranty agreeing to supply replacement carpet for the following:

Lifetime warranty against face weight loss in any area exceeding 10%.
Lifetime warranty for colorfastness to light.
Lifetime warranty against static propensity exceeding specified limit.
10 year warranty for colorfastness to atmospheric contaminants.
10 year warranty against staining.

PART 2 - PRODUCTS

2.1 CARPET:

General:

Provide carpet meeting "Green Label Plus" requirements of the Carpet and Rug Institute.

Environmental Requirements:

Total VOC Emission for Carpet: Not greater than 0.5 $mg/m^2/hr$.

Formaldehyde Emission for Carpet: Not greater than 0.05 $mg/m^2/hr$.

4 - Phenylcydohexene Emission: Not greater than 0.05 $mg/m^2/hr$.

Styrene Emission: Not greater than 0.4 $mg/m^2/hr$.

2 Ethyl - 1 Hexanol Emission: Not greater than 3.00 $mg/m^2/hr$.

Provide No. BC288 End Result Style, by Bigelow or approved equal, color as scheduled in the Finish Legend on the drawings.

Pile Height: Conform to UFAS or ANSI A117.1 for maximum height, whichever is stricter.

Carpet Construction for Roll Goods:

Method: Tufted.

Style: Textured heathered loop.

Fiber and Yarn: Colorstrand SD nylon.

Soil and Stain Protection: Sentry Plus.

Pile Height: 0.116".

Stitches: 11.0 per inch minimum.

Gage: 1/10 minimum.

Face Weight: 22 oz. per sq. yd. minimum.

Backing: ActionBac.

2.2 ACCESSORIES:

Carpet Edge Guard and Transition Strips:

As specified in Section 09 65 00.

Adhesives:

Provide water-resistant, mildew-resistant, non-staining, non-gassing (low VOC) type adhesive as recommended by the carpet manufacturer, specifically formulated for intended use and which complies with flame spread rating required for the carpet installation.

Adhesive must be acceptable to the Owner.

Environmental Requirements for Adhesives:

VOC Emission: Not greater than 10.0 mg/m^2/hr.

Formaldehyde Emission: Not greater than 0.05 mg/m^2/hr.

4 - Phenylcydohexene Emission: Not greater than 0.05 mg/m^2/hr.

Styrene Emission: Not greater than 0.05 mg/m^2/hr.

2 Ethyl - 1 Hexanol Emission: Not greater than 3.00 mg/m^2/hr.

Miscellaneous Materials:

Concrete-Slab Primer: Non-staining type as recommended by carpet manufacturer.

VOC Content: Not greater than 100 grams per liter.

Provide the types of seaming tape, thread, nails, adhesives, and other accessory items recommended by the carpet manufacturer and Installer for the conditions of installation and use, without failure during the life of the carpet.

Provide low VOC seam sealer as required to ensure carpet will not experience edge ravel.

PART 3 - EXECUTION

3.1 EXAMINATION:

Ensure concrete floors are free from scaling and irregularities and exhibit neutrality relative to acidity and alkalinity. Check for any conditions detrimental to carpet installation. Do not proceed until satisfactorily corrected.

Test concrete which is less than 6 months old for moisture content in accordance with referenced standard.

3.2 PREPARATION:

Measure each space to receive carpeting, as a basis of supplying, cutting and seaming the carpet. Do not scale the Architect's drawings or calculate sizes from dimensions shown.

Clear away debris, oils, paint, solvents and scrape off cementitious deposits from surfaces to receive carpeting.

Use an approved cementitious filler to patch minor surface irregularities, cracks, small holes and for leveling. Grind or smooth offsets to eliminate wear points.

Vacuum substrate immediately prior to carpet installation, and remove all grit, dirt and other deleterious substances which would interfere with the installation or be harmful to the work. If concrete shows evidence of dusting, apply sealer to remedy this condition.

Sequence carpeting with other work so as to minimize the possibility of damage and soiling of carpet during the remainder of the construction period.

3.3 INSTALLATION:

General:

Comply with CRI 104 and manufacturer's instructions and recommendations. Place seams in the directions indicated, and as accepted on shop drawings. Maintain direction of pattern and texture, including lay of pile. Do not seam weft to warp, except as directed.

Lay out rolls of carpet full for Architect's approval.

Check matching of carpet before cutting and ensure there is no visible variation between dye lots.

Cut carpet, where required, in a manner to allow proper seam and pattern match. Ensure cuts are straight and true and unfrayed.

Lay carpet on floors with run of the pile in same direction of anticipated traffic.

At doors, center seams under doors; do not seam in traffic direction at doorways.

Extend carpet under open-bottomed and raised-bottom obstructions, and under removable flanges of obstructions. Extend carpet into closets and alcoves of rooms indicated to be carpeted, unless another floor finish is indicated for such spaces. Extend carpet under all movable furniture and equipment, unless otherwise indicated.

Install carpet edge guard at every location where edge of carpet is exposed to traffic, except where another device, such as an expansion joint cover system or threshold, is indicated with an integral carpet binder bar.

Install transition strips at all changes of flooring type.

Provide cut-outs where required and bind cut edges properly where not concealed by edge guards or overlapping flanges.

Glued-Down Installation for Roll Goods:

Cut and fit sections of carpet of each room or space, prior to application of adhesive.

Apply adhesive to cut edges of backing to prevent raveling of face yarn and backing.

Apply adhesive in accordance with manufacturer's instructions. Butt carpet seams and edges tightly together, eliminate air pockets, and roll to ensure uniform bond everywhere. Remove adhesive promptly from face of carpet.

3.4 CLEANING AND PROTECTION:

Remove debris from installation, carefully sorting pieces to be saved from scraps to be disposed of.

Vacuum carpet with a commercial machine, with rotating agitator or beater in the nozzle. Remove soiled spots or replace carpet where spots cannot be removed. Remove any loose or protruding face yarn using sharp scissors.

Refer to Sections 01 50 00 and 01 60 00 for protection of work.

END OF SECTION 09 68 16

SECTION 09 69 00
ACCESS FLOORING

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Access flooring consisting of a series of modular floor panels on an elevated supporting system with accessories and of the following type:

Gravity-held panels, understructure with bolted stringers.

Related Sections:

Summary: Section 01 10 00
Alternates: Section 01 23 00
Sheet metal cladding of select access flooring panels: Section 05 58 00
Joint Sealants: Section 07 92 00
Concrete sealing (below floor panels): Section 09 90 00
Insulated floor panels: Section 13 21 33
Electrical grounding connection for understructure: Division 26 sections

1.2 REFERENCES:

Requirements of Regulatory Agencies:

National Fire Protection Association (NFPA) Standard No. 75.

Testing: Flame spread rating of 25 for assembly per ASTM E84.

1.3 SYSTEM PERFORMANCE REQUIREMENTS:

Structural Performance:

Test method for structural performance shall be in accordance with "Recommended Test Procedures for Access Floors" as published by CISCA/AF.

Provide manufacturer's standard access flooring system which, when installed, complies with the following minimum requirements:

Floor Panels: Units including those with cutouts capable of supporting a 1250 lb. concentrated static load on 1" sq. area located anywhere on the panel with a deflection under load not more than 0.080", and a permanent set not to exceed 0.010". Floor panels to support a uniform load of 300 psf and have an ultimate capacity of 2500 lbs.

Rolling loads of following description with a combination of local and overall deformation not to exceed 0.040" measured across panel's 24" span and a permanent beam set not to exceed 0.010" after exposure to rolling load over path A or B, whichever path produces greatest top surface deformation.

3" diameter wheels with hard phenolic tread, 1-13/16" wide for 10 passes and load of 500 lbs. (base bid) or 1000 lbs. (alternate).

6" diameter wheels with hard alathane tread, 2" wide for 10,000 passes and load of 500 lbs. (base bid) or 1000 lbs. (alternate).

Pedestals: Assemblies, capable of resisting a 6000 lb. axial load (base bid) or 5000 lb. axial load (alternate) and 1000 inch pound overturning moment per pedestal without panels or other supports in place.

Grid System: Stringers capable, without panels in place, of supporting a concentrated load of 450 lbs. (base bid) or 200 lbs. (alternate) at center of span with a permanent set not to exceed 0.010".

Ultimate Strength or Safety Factor: Capable of sustaining twice the static concentrated load at ultimate strength (failure).

Electrical Resistance to Ground of System:

Provide not more than 10 ohms resistance between panel and understructure.

1.4 SUBMITTALS:

Product Data:

Submit manufacturer's product data for each type of access flooring required. Include manufacturer's recommended maintenance and cleaning instructions.

Shop Drawings:

Submit shop drawings showing complete layout for access flooring based on field-verified dimensions, including dimensional relationships to adjoining work and installation tolerances. Include plans indicating proposed panel installation layout, and accessories, details with descriptive notes indicating material, finishes, fasteners, typical and special edge conditions, understructure and other data. Indicate sizes and locations of cutouts, grilles, registers, closures, and offsets.

Samples:

Submit samples of each exposed metal finish.

In addition, submit one complete full-size floor panel of color and finish required.

Certification and Test Data:

Submit manufacturer's certification including supporting laboratory test data that access flooring provided complies with indicated performance requirements.

Certify that products furnished for this project are asbestos free.

Submit certification of flame spread rating as tested by testing organization, indicating rating designation of materials and assembly.

Submit certification of specified design strengths and electrical resistance as tested by testing organization.

Submit certification that products provided meet the Environmental Performance requirements specified in Section 01 10 00 including for no off-gassing and no degradation of performance due to the presence of high amounts of UV and for temperature up to 60° Celsius.

Installer Qualifications:

Submit Installer qualifications indicating compliance with specified requirements including list of at least five complete access floor installations utilizing an underfloor plenum.

1.5 QUALITY ASSURANCE:

Installer Qualifications:

Firm with not less than 5 years of experience who is approved by access flooring manufacturer for installation of flooring systems of type similar to this Project. Installer must have successfully installed not less than 5 access floor installations utilizing underfloor plenum for air supply.

Regulatory Requirements:

NFPA Standard: Provide access flooring which, when installed, complies with NFPA No. 75 requirements for raised flooring.

Comply with all requirements of applicable accessibility standards.

Field Constructed Mock-Up:

Prior to installation of access flooring, construct mock-up of access flooring assembly in one environmental chamber, to represent completed work for qualities of appearance, materials and installation.

Acceptable mock-up may be incorporated into completed work.

Do not damage, destroy, remove or otherwise revise approved mock-up unless approved by the Architect in writing.

Coordination of Work:

Coordinate location of access flooring pedestals to prevent interference with mechanical and electrical work in underfloor cavity.

1.6 PROJECT CONDITIONS:

Environmental Conditions:

Do not proceed with installation of access flooring until area has an ambient temperature of between 40 deg F and 90 deg F, and a relative humidity of not more than 70 percent.

Field Measurements:

Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting of the work. Show recorded measurements on final shop drawings.

Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with preparation of shop drawings for access flooring without field measurements. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions.

1.7 DEMONSTRATION:

Provide demonstration to Owner's personnel of methods for resealing of the floor system, changing system configuration, general maintenance and other items.

1.8 EXTRA MATERIALS:

Deliver extra material to Owner. Furnish material matching products installed, packaged with protective covering for storage and identified with appropriate labels.

Standard Solid Field Panels: Furnish quantity of standard field panels equal to 20% of amount installed.

Perforated Air Flow Panels: Furnish twelve perforated air flow panels.

Directional Air Flow Panels: Furnish quantity of directional air flow panels equal to 20% of amount installed.

Standard Understructure: Furnish quantity of understructure components (pedestals, stringers and related components) to support them equal to 5.0% of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

Provide access flooring by one of the following:

ASM Modular Floors, Inc.
Mult-A-Frame Corp., Maxcess Technologies, Inc.
Tate Access Floors, Inc.

2.2 GENERAL:

Recycled Content: Materials/products shall contain the maximum amount of recycled content allowed that retains material integrity.

Local/Regional Materials: Preference shall be given to materials that are manufactured, harvested, extracted, mined, quarried, etc. within a 500 mile radius of the project site.

Provide products will not degrade under the use conditions indicated including in the presence of high ultraviolet light and temperatures up to 60 degrees Celsius. Provide products which do not off-gas in accordance with the requirements of Section 01 10 00.

2.3 FLOOR PANELS:

General:

Provide modular 24" x 24" standard field panels of construction indicated which are interchangeable with other standard field panels, easily placed and removed without disturbing adjacent panels or understructure by one person using a portable lifting device, free of exposed metal edges in installed position with floor covering in place.

Fabricate from non-combustible materials throughout.

Recycled Content: Not less than 30% by weight.

Fabrication Tolerances:

Fabricate panels to the following tolerances with squareness tolerances expressed as the difference between diagonal measurements from corner to corner.

Size and Squareness: Plus or minus 0.010" (base bid) or 0.075" (alternate) of required size, with a squareness tolerance of plus or minus 0.015".

Flatness (Base Bid): Plus or minus 0.025" measured along edges.

Flatness (Alternate): Plus or minus 0.030" corner to corner and all four corners; plus or minus 0.060" measured on a diagonal on top of panel.

Formed Steel Panels: (Base Bid)

Manufacturer's standard all-steel panel construction with die-cut flat cold-rolled steel top sheet welded to die-formed and stiffened cold-rolled steel bottom sheet, fabricated entirely of non-combustible material.

Fabricate panels for fastening to pedestal heads by the use of a machine screw which is specially designed to be self capturing within the body of the panel.

Provide panel construction of die-cut welded steel type which creates a consistent panel-to-panel seam width along the entire edge of the panel when installed in accordance with normal installation procedures.

Finish: Chrome plated to achieve a mirror-like bright finish in accordance with FS QQ-C-320, Type 1, Class 1, and ASTM B456.

Die-Cast Aluminum Panels: (Alternate)

Manufacturer's standard panel construction die-cast from aluminum, but not less than the strength and corrosion resistant properties of UNS A03800 per ASTM SC84B or UNS A03830 per ASTM SC102 to produce one piece units with flat solid surface on top and symmetrically-spaced crisscrossing ribs on bottom; edge-machined after casting to tolerances indicated.

Fabricate panels for fastening to pedestal heads by the use of stainless steel fasteners. Panels shall remain positively positioned onto the pedestal head without the fasteners in place.

Finish: Unfinished natural aluminum.

Individually clean and individually pack panels within a moisture absorbing plastic bag sealed with tape. Place the panels on a pallet with plastic sheet separators between each bagged panel to prevent damage to bags. Cover the entire stack in a plastic bag and add cardboard corner protectors to the corners. Use a cardboard sleeve to cover the entire stack of panels and then tightly band.

Individually clean and pack understructure within a shipping carton lined with a moisture absorbing plastic bag. Place plastic sheet separators between layers of understructure. Seal the bag, close the carton and tightly band.

2.4 UNDERSTRUCTURE:

Pedestals:

Manufacturer's standard pedestal assembly including a base not less than 16 sq. inches in area, column with provision for height adjustment and head (cap); made of steel, aluminum or a combination of both.

Provide vibration proof mechanism for making and holding fine adjustments in height for leveling purposes over a range of not less than 1". Include means of locking leveling mechanism at a selected height, which requires deliberate action to change height setting and prevents vibratory displacement.

Fabricate units of sufficient height to provide required underfloor clearance and to achieve an overall system depth as shown on the drawings.

Head: Of proper type for grid system indicated with direct bolted panels with four threaded holes each. Provide fasteners and fittings.

Base: Square or circular with not less than 16 square inches of bearing area.

Base Bid: Provide Type 2A pedestal base by Tate.

Alternate: Die cast aluminum pedestal base with aluminum tube support designed to engage head, Type 600 pedestal base by Tate.

Stringer Systems:

Base Bid: Steel stringers, interlocking with pedestal heads to form a grid pattern for supporting each edge of each floor panel, and with a pedestal under each corner of each floor panel. Galvanize steel components to prevent corrosion. All coatings must be resistant to temperatures up to 60 degrees Celsius, not off-gas and comply with the Environmental Performance requirements of Section 01 10 00.

Alternate: All aluminum construction, designed and fabricated to mount to the pedestal head and to form a modular grid pattern with members under edges of all field floor panels. Stringer to be bolted to the pedestal head using a stainless steel grade fastener.

Conform to the following for either stringer system:

Bolted Stringers: System of main and cross stringers connected to pedestals with threaded fasteners accessible from above.

Provide stringers which support each edge of each panel where required to meet design load criteria and are continuous for 2 spans in a basketweave pattern.

Grounding System:

Provide positive electrical grounding system meeting specified performance requirements.

2.5 FLOOR SYSTEMS:

Base Bid: Provide complete system, All Steel AS1250 by Tate with chrome-plated, gravity panels, bolted stringers, or approved equal system by listed manufacturer.

Add Alternate: Provide complete system, All Aluminum FF1250 by Tate with unfinished, gravity panels, bolted stringers, or approved equal system by listed manufacturer.

2.6 ACCESSORIES:

Extreme Heat and UV Resistance:

All accessories must be capable of regular exposure to extreme amounts of heat and UV as required by the Owner's laboratory application without deterioration over the lifetime of the accessory.

Cutouts:

Fabricate cutouts in floor panels to accommodate cable penetrations and service outlets, if any. Comply with requirements indicated for size, shape, number and location. Provide reinforcement or additional support, if needed, to make panels with cutouts comply with standard performance requirements.

Trim openings with metal matching the panel faces or from stainless steel. Do not use plastic molding, rubber gaskets and similar items.

Service Outlets:

Manufacturer's standard UL-listed and -labeled assemblies, for recessed mounting flush with top of floor panels, designed and fabricated to accommodate power, communication and signal cables, and complying with following requirements:

Cover and Box Type: Grommet with twist-close cover and including steel junction box for mounting of electrical receptacle with provision for passage or housing of telephone amphenol connectors and signal cables.

Location: Locate each outlet in center of panel quadrant.

Receptacles and Wiring: Electrical receptacles and wiring for service outlets are specified in Division-26 sections.

Perforated Panels:

Manufacturer's standard load-bearing perforated air flow metal panels interchangeable with standard field panel and have 25% open area. Provide 765 cfm at 0.1-inch of H_2O (static pressure) air distribution capability. Equip panel with directional vanes for angular air flow across the entire face of a typical 78" high IT rack, providing a rack Total Air Capture (TAC) index of 93%.

Provide No. FF1250 perforated panels by Tate or approved equal by listed manufacturer.

Design Load: Panel supported on actual understructure shall be capable of supporting a safe working or design load of 1250 lbs. placed on a one square inch area, using a round or square indenter, at any location on the panel without yielding.

Safety Factor: Two times design load.

Impact Load: 150 lbs.

Directional Airflow Panels:

Provide welded steel grate design for static and rolling loads which are interchangeable with standard field panels. Provide directional grate panels with 68% open area with the following air distribution capability without a damper: 2594 CFM at 0.1-inch of H_2O (static pressure). Equip the panel with directional vanes with pressure equalizing perforation for even flow to produce an angular air flow. Provide directional grate panels with the following load bearing capacities and installed with all four perimeter edges fully supported on a steel roll formed stringer:

Provide Directional Airflow Panels by Tate or approved equal by listed manufacturer.

Design Load: Directional grate supported on actual understructure shall be capable of supporting a safe working or design load of 2500 lbs. placed on a one square inch area, using a round or square indenter, at any location on the panel without yielding.

Safety Factor: Two times design load.

Rolling Load: Directional grate supported on actual understructure shall be capable of withstanding the following rolling loads at any location on the panel without developing a local and overall surface deformation greater than 0.040 inches. Note: Wheel 1 and Wheel 2 tests shall be performed on two separate panels.

Wheel 1: Ten passes of a 3" dia x 1-13/16" wide wheel with 2000 lb. weight.

Wheel 2: Ten thousand passes of a 10" dia x 4" wide wheel with 2000 lb. weight.

Impact Load: 200 lbs.

Plenum Dividers:

Furnish manufacturer's standard metal plenum dividers where indicated, to divide under floor plenum.

Panel Lifting Device:

Furnish manufacturer's standard panel lifting device of proper type for panel finish material. Provide one per room.

Perimeter Support:

Provide manufacturer's standard aluminum extrusion to support panel edge and form transition between access flooring and adjoining floor covering at same level as access flooring.

PART 3 - EXECUTION

3.0 EXAMINATION:

Refer to Section 01 73 00 for examination of substrate and job conditions.

Do not start construction of access flooring until concrete floor has been sealed by applicator of Section 09 90 00.

Start of this work constitutes acceptance of substrates as suitable for satisfactory performance of work of this Section.

3.1 INSTALLATION:

Install floor system and accessories under supervision of the manufacturer's authorized representative to ensure rigid, firm installation free of vibration, rocking, rattles, squeaks, and other unacceptable performance. Comply with manufacturer's standard details for each type of system required unless otherwise noted.

Lay out floor panel installation with floor grid to match grid shown on the drawings. Scribe panel assemblies at perimeter to provide a close fit with no voids greater than 1/16" where panels abut vertical surfaces. Seal all joints between panels and adjacent wall surfaces with sealant specified in Section 07 92 00.

Locate each pedestal and complete any necessary subfloor preparation, and vacuum clean the subfloor of all dust, dirt and construction debris before starting installation.

Set pedestals by mechanically anchoring to environmental chamber panels as recommended by the floor manufacturer to provide full bearing of the pedestal base on the subfloor.

Secure stringer members to pedestal heads in accordance with manufacturer's instructions.

Accurately scribe and fit plenum dividers to subfloor. Do not seal with mastic. Minor leakage of plenum dividers will be acceptable.

Thoroughly vacuum clean the subfloor area as installation of floor panels proceeds. Extend cleaning under installed panels as far as possible.

Cutting and trimming or other dirt-or-debris producing operations will not be permitted in the rooms where the floor is being installed.

Level installed access floor to within 0.10" of true level over the entire area and within 0.0625" in any 10' distance.

Provide positive electrical grounding of the entire access flooring system. Ensure grounding occurs for each room.

No exposed, rough edges of cut panels are acceptable. All cuts must be trimmed with metal matching panel face.

3.2 CLEANING, PROTECTION:

After completion of installation, vacuum clean the entire floor system and cover with continuous sheets of reinforced paper or plastic. Maintain and repair damages to protective covering until directed to be removed by the Architect.

Replace access floor panels which are chipped, broken, stained, scratched, or otherwise damage, or do not conform to specified requirements.

3.3 FIELD QUALITY CONTROL:

Below-Flooring Observations:

Before Contractor installs access floor panels, Owner, Architect and his consultants as applicable will conduct an observation of all below-flooring areas and report deficiencies in Work observed. Do not proceed with installation of access floor panels to supports until deficiencies have been corrected and the work re-observed and found to be acceptable to the Architect.

Observations will be made to determine the following and to ensure all work is in compliance with the Contract requirements prior to covering:

- Cleanliness of subfloor.
- Installation of plenum dividers.

Notify Architect 7 days in advance of date and time when Project, or part of Project, will be ready for below-flooring observation.

Before notifying Architect, complete installation of the following in areas to receive access flooring:

- Sealing of concrete floor slab.
- Installation of insulated floor panels.
- Cleaning of underfloor spaces.
- Installation of all fire protection, mechanical, plumbing, electrical and IT components.
- Installation of access floor pedestals and plenum dividers (anchored to pedestals).

END OF SECTION 09 69 00

SECTION 09 90 00
PAINTING AND COATING

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Field painting work as shown on the drawings and schedules, and as follows:

Painting and finishing of interior and exterior exposed items and surfaces throughout the project.

Surface preparation, priming and finish coats of paint specified are in addition to shop priming and surface treatment specified in other sections.

Painting of exposed bare and covered pipes and ducts, hangers, exposed steel and iron work, and primed metal surfaces of equipment installed under the mechanical and electrical work. Coordinate with Division 21, 22, 23, 26, 27 and 28 Installers for color coding.

Painting of mechanical grilles, registers, louvers (except aluminum), and panel covers and frames for electrical work and systems.

Painting roof mounted equipment including aluminum and factory finished items.

Painting all exposed surfaces whether or not colors are designated in "schedules", except where the natural finish of the material is specifically noted as a surface not to be painted.

Where exposed surfaces are not specifically mentioned, paint these the same as adjacent similar materials or areas. If color or finish is not designated, the Architect will select these from standard colors or finishes.

Related Sections:

Metal support assembly finishing: Section 05 45 00.
Shop priming steel doors and frames: Section 08 11 13.
Factory finished wood doors: Section 08 14 33.
Surface preparation of gypsum board systems: Section 09 29 00.
Factory finishing of casework: Division 12 sections.
Factory finishing of environmental chamber panels: Section 13 21 33.
Painting of fire protection, plumbing, mechanical, electrical and electronic safety and security work: Division 21, 22, 23, 26 and 28 sections.

1.2 PAINTING NOT INCLUDED:

The following categories of work are not included as part of the field-applied finish work:

Shop Priming:

Surface preparation and shop priming of ferrous metal items and shop manufactured equipment is included under the various specification sections.

Mechanical and Electrical Work:

Pipe and raceway identification taping or stenciled painting is specified in Division 21, 22, 23, 26, 27 and 28 sections.

Pre-Finished Items:

Do not include painting when factory-finishing or Installer finishing is specified for such items as:

Stile and rail wood doors.
Acoustic materials.
Factory finished wood and metal casework.
Factory finished environmental chamber panels.
Mechanical equipment, except equipment mounted on roof.
Electrical equipment.
Light fixtures.
Main switchgear and distribution cabinets.

Concealed Surfaces:

Painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundation spaces, crawl space, furred areas, pipe spaces, duct shafts and elevator shaft.

Finished Metal Surfaces:

Metal surfaces of anodized aluminum, factory painted aluminum, stainless steel, chromium plate, copper, bronze, and similar finished materials will not require finish painting, unless otherwise indicated.

Painting of finished metal surfaces of mechanical equipment on roof is required.

Operating Parts:

Moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor, and fan shafts will not require finish painting.

Labels:

Do not paint over any code-required labels, such as Underwriters' Laboratories, Factory Mutual, or other code required labels, or any equipment identification, performance rating, name or nomenclature plates.

Unfinished Areas:

Do not paint floors, walls or ceilings of rooms or spaces scheduled as unfinished.

1.3 DEFINITIONS:

Standard terminology relating to paint coatings defined in ASTM D16 apply to this section.

"Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

1.4 SUBMITTALS:

Product Data:

Submit manufacturer's technical information including paint label analysis and application instructions for each material specified. Include block fillers and primers.

Material List:

Submit an inclusive list of required coating materials. Identify each material with manufacturer's product number and generic classification. Follow the same system identification as listed in the Paint Systems schedule at the end of this section.

At beginning of project, provide a complete summary list of specific manufacturer's products, color identification numbers, manufacturer technical data sheets and MSDS Sheets that will be applied in this project. List shall compare each color number with each specified or selected color number. A copy of this list shall be given to the appropriate UCB Project Manager and Structural Analyst in Work Management Group.

Verification Samples:

Submit samples for Architect's review of color and texture on the following substrates:

For painted concrete masonry, wood, gypsum board or ferrous metals, provide two 12" x 12" hardboard samples of each color and material, with texture to simulate actual conditions.

Resubmit each sample as requested until acceptable sheen, color and texture is achieved.

On actual wall surfaces and other exterior and interior building components, duplicate painted finishes of prepared samples. Comply with procedures specified in DPCA P5. On at least 100 sq. ft. of surface as directed, provide full-coat finish samples until required sheen, color and texture is obtained; simulate finished lighting conditions for review of in-place work.

Final acceptance of colors will be from samples applied on the job.

Certification:

Submit certification and test reports by manufacturer that products comply with local and Federal regulations controlling use and specified limits of volatile organic compounds (VOC).

Submit certified research and development test reports showing compliance to the specified "anti-corrosive" coatings. Include generic type, solid content (by volume), VOC content (unthinned), dry film thickness, abrasion resistance, adhesion, hardness, humidity, salt spray (fog), fresh water exposure and exterior exposure.

No coating will be considered that decreases specified dry film thickness or changes generic type.

1.5 QUALITY ASSURANCE:

Standards:

Where not otherwise specified, follow recommendations of "Architectural Specifications Manual" by Painting & Decorating Contractors of America.

Provide paint systems complying with requirements of GS-11 Green Seal Environmental Standard for Paints by Green Seal, Inc. except where specifically noted otherwise.

Provide paint systems for metals, unless otherwise indicated, complying with requirements of GC-03 Green Seal Environmental Standard for Anti-Corrosive Paints by Green Seal, Inc.

Single Source Responsibility:

Obtain block fillers, primers and other undercoat paint produced by same manufacturer as finish coats.

Coordination of Work:

Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.

1.6 DELIVERY, STORAGE AND HANDLING:

Deliver all materials to the job site in original, new and unopened packages and containers bearing manufacturer's name and label, and name of material, FS number if applicable, stock number, date of manufacture, contents by volume for pigment and vehicle constituents, thinning and application instructions, color number and name, and VOC content. Do not remove or make label information illegible.

Store materials not in use in tightly covered containers in an adequately illuminated and ventilated room. Follow applicable safety laws and regulations. Maintain minimum ambient temperature above 45° F and maximum ambient temperature of 90°F.

1.7 PROJECT/SITE CONDITIONS:

Apply water-base paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50° F. and 90° F.

Apply solvent-thinned paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50° F. and 95° F.

Do not apply paint in snow, rain, fog or mist; or when relative humidity exceeds 85%; or to damp or wet surfaces.

Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.

1.8 EXTRA MATERIALS:

Deliver extra materials to Owner not less than 1% of installed finish paint in each color and type used, but not less than one gallon. Furnish from same production run as materials applied.

Containers to be unopened, factory sealed, and clearly labeled describing contents. Identify location where product was used. Provide one and five gallon containers only.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

Subject to compliance with requirements, provide products indicated in the Paint System schedule by one manufacturer for each of the lines listed.

Consumer Lines:

Benjamin Moore and Co.
Diamond Vogel
ICI Dulux Paints (Devoe Coatings, Devoe Paint, Fuller-Obrien, Glidden)
Kwal Howells, Inc./Comex Paints
PPG Industries.
Sherwin-Williams Co.

"Anti-Corrosive" Lines:

Ameron Protective Coatings Division
Carboline Company
Tnemec Company Incorporated

Manufacturers listed under consumer lines are not acceptable for "anti-corrosive" lines.

2.2 MATERIALS:

General:

Local/Regional Materials: Preference shall be given to materials that are manufactured, harvested, extracted, mined, quarried, etc. within a 500 mile radius of the project site.

Quality:

Provide the best quality grade of the various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying the manufacturer's product identification will not be acceptable.

Material Compatibility:

Provide block fillers, primers, undercoats and finish coats which are compatible with substrate and one another.

Accessory Materials:

Provide linseed oil, turpentine, paint thinners and other materials recommended by coatings manufacturer.

Patching:

Provide latex fillers as recommended by coatings manufacturer necessary for surface preparation.

Color Pigments:

Pure, non-fading, applicable types to suit the substrates and services indicated. Limit lead content as required by law.

VOC Content and Environmental Requirements:

Within the Environmental Chambers, all paints, coatings and sealers used must not have a VOC content greater then 0 grams per liter.

For other locations, limit VOC content of solvent borne and waterborne paint materials and coatings to the following limits as determined in accordance with EPA Method 24 or ASTM D3960:

Flat Finish: 0 grams per liter (comply with GS-11).
Non-Flat Finishes (Excluding Epoxy and Anti-Corrosive Coating): 0 grams per liter (comply with GS-11).
Non-Flat Finishes (Epoxy): Not more than 150 grams per liter (comply with GS-11).
Concrete Sealer (Outside of Chambers): Not more than 100 grams per liter (not intended to comply with GC-03 or GS-11).
"Anti-Corrosive" Coating for Interior Metals: Not more than 250 grams per liter (not intended to comply with GS-11; comply with GC-03).
Primers with Flat Sheen: 0 grams per liter (comply with GS-11).
Primers with Non-Flat Sheen (Epoxy): Not more than 150 grams per liter (comply with GS-11).
Primers with Non-Flat Sheen (Anti-Corrosive Coatings): Not more than 250 grams per liter (comply with GC-03).

Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).

Restricted Components: Paints and coatings shall not contain any of the following:

Acrolein.
Acrylonitrile.
Antimony.
Benzene.
Butyl benzyl phthalate.
Cadmium.
Di (2-ethylhexyl) phthalate.
Di-n-butyl phthalate.
Di-n-octyl phthalate.
1,2-dichlorobenzene.
Diethyl phthalate.
Dimethyl phthalate.
Ethylbenzene.
Formaldehyde.
Hexavalent chromium.
Isophorone.
Lead.
Mercury.
Methyl ethyl ketone.
Methyl isobutyl ketone.
Methylene chloride.
Naphthalene.
Toluene (methylbenzene).
1,1,1-trichloroethane.
Vinyl chloride.

Colors:

Interior Locations: Provide colors of the finish paint systems as indicated in the Finish Legend on the drawings and, where not scheduled, as selected by Architect from manufacturer's standard colors.

Exterior Locations: To match color of similar equipment or items on the building as approved or directed by the Owner's Project Manager.

Volume Solid Contents:

When applied at a rate of 400SF per gallon-obtaining a MIL thickness when dry of a minimum of 1.3 MILS, the minimum acceptable Volume Solid Content must be A (see list below) minimum and angular specular sheen should be B (see list below).

	A	B
-For Flat finish	38%	0-5 @ 60º
-For Eggshell or Satin finish	36%	16-32 @ 60º
-For Semi-Gloss finish	34%	30-60 @ 60º
-For Gloss finish	34%	60-80 @ 60º

These could apply to both interior and exterior products, with the possible "satin" or "pearl" addition.

Reflectance:

Maintain the following minimum reflectance of wall and ceilings surfaces following the application of paint materials:

Walls: 50%.
Ceilings: 80%.

2.3 SYSTEMS:

Refer to schedule of surfaces and systems at the end of this Section covering materials to be used. Proprietary names are listed to establish materials and quality required. Equivalent materials, subject to the Architect's approval, may be used. Unless otherwise indicated, product identification numbers or names are those of ICI Dulux Paint.

For epoxy and "anti-corrosive" coatings, product identification number and names are those of Tnemec.

PART 3 - EXECUTION

3.0 EXAMINATION:

Refer to Section 01 73 00 for examination of substrate and job conditions.

Starting of painting work will be construed as the Applicator's acceptance of the surfaces and conditions within any particular area.

Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to the formation of a durable paint film.

Measure moisture content of surfaces using an electronic moisture meter. Apply coatings when moisture content of surfaces is below the following maximum values:

Gypsum Board: 12%.
Masonry: 12%.
Wood: 15%.
Horizontal Concrete: 8%.

3.1 PREPARATION:

General:

Perform surface preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate condition.

Mask off or remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish painted. Following completion of painting of each space or area, remove masking. Reinstall all removed items by workmen skilled in the trades involved.

Surfaces shall be perfectly dry, clean and smooth before starting work. Fill cracks, holes or checks full and make smooth before finish is applied to surfaces. Fill any cracks, which occur after walls are sized.

Provide barrier coats over incompatible primers or remove and reprime as required. Notify the Architect in writing of any anticipated problems using specified coating systems with substrates primed by others.

Remove mildew from impervious surfaces by scrubbing with solution of trisodium phosphate and bleach. Rinse with water and allow substrate to dry.

Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program the cleaning and painting so that contaminants from the cleaning process will not fall onto wet, newly-painted surfaces.

Cementitious Surfaces:

Remove efflorescence, chalk, dust, dirt, grease, oils and release agents from cementitious materials. Roughen as required to remove any glaze.

Wood Surfaces:

Remove dirt and foreign substances from wood to receive opaque finish.

Ferrous Metal Surfaces:

Remove oil, grease, dirt, loose mill scale, and other foreign substrates. Use solvent or mechanical cleaning methods complying with Steel Structure Painting Council (SSPC) recommendations.

Galvanized Surfaces:

Remove oils and surface contaminants with non-petroleum based solvents. Remove pretreatment from sheet metal coil stock by mechanical methods.

Aluminum Surfaces:

Remove surface contamination by steam or high pressure water. Remove oxidation by acid etching and solvent washing. Apply primer when cleaned surface is dry.

3.2 SURFACES:

Seal tops and bottoms of metal doors with primer.

3.3 MATERIALS:

Store, mix and prepare painting materials in accordance with manufacturer's directions.

Stir materials before application to produce a mixture of uniform density, and stir as required during the application of the materials.

Do not stir surface film into the material. Remove the film and if necessary, strain the material before using.

3.4 APPLICATION:

General:

Apply paint in accordance with the manufacturer's directions. Use applicators and techniques best suited for the substrate and type of materials being applied.

Form true, straight lines against other materials, finishes and color changes.

Apply additional coats when undercoats, stains or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance. Give special attention to ensure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

Sand wood and metal surfaces between coats to assure smoothness and adhesion of subsequent coats. Use extra fine sandpaper to avoid cutting the edges when sanding. Apply putty or spackling compound after surfaces are primed and primer is dry. Bring material flush with adjoining surfaces.

Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only before final installation of equipment.

Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

Scheduling Painting:

Apply the first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

Prime Coats:

Apply a prime coat to material which is required to be painted or finished. Omit prime coat on shop primed metal surfaces. Touch-up shop prime coat.

Provide prime coat of contrasting color from finish coat.

Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.

Pigmented (Opaque) Finishes:

Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.

Completed Work:

Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

3.5 CLEANING:

Remove from the site all discarded paint materials, rubbish, cans and rags at the end of each work day.

Upon completion of painting work, clean glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

3.6 PROTECTION:

Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to the Architect.

Furnish and lay drop cloths or mask off areas where finishing is being done to protect floors and other work from damage during the execution of work.

Remove oily rags and waste from the building every night. Do not allow to accumulate.

Provide "Wet Paint" signs as required to protect newly-painted finishes.

Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.

At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.7 PAINT SCHEDULE:

SURFACE	SYSTEM	PREPARATION
Exterior		
Primed metal	EM-5	Remove rust, touch up shop coat
Galvanized	EM-6	SSPC-SP1, solvent clean
Aluminum	EM-6	SSPC-SP1, solvent clean
Interior		
Primed steel, general	IM-1	Remove rust, touch up shop coat
Primed steel, "anti-corrosive"	IM-2	Remove rust, touch up shop coat
Galvanized, "anti-corrosive"	IM-3	Chemical phosphate etch, solvent clean
Wood, paint	IW-1	Fill, sand, seal knots with shellac
Concrete floors, seal (below all insulated floor panels below access flooring)	IC-1	Clean
Concrete floors, seal (other locations)	IC-2	Clean
CMU, eggshell	IC-2	Clean, neutralize surfaces
Gyp. B'd. - Ceilings	IG-1	Clean
Gyp. B'd. - Walls (unless otherwise noted)	IG-2	Clean
Gyp. B'd. - Epoxy	IG-3	Clean
Insul. pipes	IP-1	Clean

Existing Surfaces

Clean, fill, patch, sand as required. Roughen glossy surfaces and prepare for finish painting as recommended by manufacturer for surface and finish to be applied. Provide texture on patched surface to match existing adjacent surfaces. Prime or seal patched areas and apply one or two finish coats as scheduled for same or similar surfaces.

3.8 PAINT SYSTEMS:

System	Mfr	Type	Prime*	Finish*	Gloss	Dry Film (Mils)	Notes (H)
EM-5	T	Acrylic urethane	1 135	1 1075U	Semi	7.0	B
EM-6	T	Epoxy urethane	1 27WB	1 1075U	Semi	6.5	B
IM-1	I	Low VOC enamel		2 1506	Semi	4.0	
IM-2	T	Acrylic urethane	1 135	1 1075U	Semi	5.5	B
IM-3	T	Acrylic urethane	1 27WB	1 1075U	Semi	6.5	B
IW-1	I	Low odor acrylic	1 3210	2 LM9300	Eggshell	2.8	
IC-1	D	Acrylic sealer		2 DurasealZero			
IC-2	E	Acrylic sealer		2 EverClear VOX			
IC-2	I	Acrylic latex	1 4000	2 LM9300	Eggshell	2.8	J
IG-1	I	Low odor acrylic	1 LM9116	2 LM9100	Flat	2.0	A
IG-2	I	Low odor acrylic	1 LM9116	2 LM9300	Eggshell	2.8	A
IG-3	T	Water base epoxy	1 L69	1 L69	Semi	5.0	B
IP-1	I	Low odor acrylic	1 LM9116	2 LM9300	Eggshell	2.8	

Notes:

A = Apply light orange peel texture with roller.
B = Spray apply.
J = Apply block filler by spray and backroll to fill all voids and pin holes.

Specified dry film thicknesses are minimum required.

* First number in "prime" and "finish" columns indicates number of coats required followed by manufacturer's system number.

Manufacturers:

D = Enviroseal Corporation
E = The Euclid Chemical Company
I = ICI (Glidden Professional)
T = Tnemec

END OF SECTION 09 90 00

SECTION 10 11 00

VISUAL DISPLAY SPECIALTIES

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary General Conditions and Division-01 Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Visual display boards as shown on the drawings including:

- Markerboards.

1.2 SUBMITTALS:

Product Data:

Submit manufacturer's technical data and installation instructions for each material and component part. Include methods of installation for each type of substrate to receive units.

Include manufacturer's recommendations for cleaning and maintenance.

Samples:

Submit sets of samples for each type and color of visual display board including trim and accessories required. Provide 12" square sample of sheet materials and 12" lengths of trim members. Architect's review of samples will be for color, pattern and texture only. Compliance with all other requirements is the exclusive responsibility of Contractor.

Shop Drawings:

Submit shop drawings for visual display board units. Include full-scale sections of typical trim members and dimensioned elevations. Show anchors, grounds, reinforcement, accessories and installation details.

1.3 QUALITY ASSURANCE:

General:

Furnish all visual display boards by one manufacturer for the entire project.

In addition to the requirements of these specifications, comply with manufacturer's instructions and recommendations for all phases of the work, including preparation of substrate, installation of grounds and anchors, and application of materials.

Provide colors and textures of materials for visual display boards as indicated, or, if not indicated, as selected by the Architect from manufacturer's standard colors and patterns.

1.4 PROJECT/SITE CONDITIONS:

Field Measurements:

Take field measurements prior to preparation of shop drawings (if any) and fabrication where possible, to ensure proper fitting of the work. However, do not delay job progress; allow for trimming and fitting wherever the taking of field measurements before fabrication might delay the work.

1.5 WARRANTY:

Provide written 25 year warranty, signed by manufacturer, agreeing to replace porcelain enamel markerboards which do not retain original writing and erasing qualities, defined to include surfaces which exhibit crazing, cracking or flaking; provided manufacturer's instructions for handling, installing, protecting and maintaining markerboards have been adhered to during the warranty period. Replacement is limited to material replacement only and does not include labor for removal and reinstallation after the first year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

APCO
Claridge Prods. & Equipment Co.
Ghent Manufacturing, Inc.
Indoff/Allen Hutton
Division of A. Lawer Corp.
Lemco Corp.
Nelson Adams
PolyVision

2.2 VISUAL DISPLAY BOARD UNITS:

Claridge or equal by listed manufacturer. Fabricate in modular units as indicated. Colors for all components to be selected by Architect from manufacturer's full lines.

Markerboards:

Liquid Chalk Writing Surface: Manufacturer's special writing surface with gloss finish intended for use with liquid chalk markers on 24 gage enameling grade steel.
Core: Fiberboard, 0.5" thick complying with ANSI A208.2, Grade MD.
Backing: .015" aluminum sheet.
Unit Thickness: 0.5".
Color: White.

Trim:

	Claridge	PolyVision	Lemco
Perimeter:	Series 4	602I	Type 3
Chalktrough:	No. 262	12TM	No. 21
Maprail:	No. 51	253T	No. 58
Vertical Joints:	Series 4	67T	No. 67
Hooks:	No. 51c	6500T	No. 731

Provide end caps for all trim as applicable.
One hook per each two lineal feet of maprail.
Finish: Natural anodized finish.

2.3 FABRICATION:

Provide factory-assembled visual display board units.

Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, balanced around center of board, as acceptable to the Architect.

Provide manufacturer's standard vertical joint system between abutting sections of writing boards.

PART 3 - EXECUTION

3.1 INSTALLATION:

Install visual dispaly boards in locations and at mounting heights as shown on the drawings and in accordance with the manufacturer's instructions. Install writing boards with chalk tray 36" above finished floor with top no higher than 7'-0" above finished floor except as otherwise shown on the drawings.

Provide all grounds, clips, backing materials, brackets and anchors, trim, and accessories for a complete installation.

Deliver factory-built visual display board units completely assembled in one piece without joints, whenever possible. Where dimensions exceed panel size, provide 2 or more pieces of equal length, as acceptable to the Architect.

When overall dimensions require delivery in separate units, prefit at the factory, disassemble for delivery and make final joint at site. Use splines at joints to maintain surface alignment and smooth joints.

Install units with concealed hangers plumb and level, in accordance with the manufacturer's printed instructions.

Package maphooks and similar loose items together, deliver to Owner and obtain receipt signed by authorized party. Submit copies of receipt with closeout documents.

3.2 ADJUST AND CLEAN:

Verify accessories required for each unit have been properly installed.

Clean units in accordance with manufacturer's instructions, breaking in only as recommended. Break in all writing boards.

END OF SECTION 10 11 00

SECTION 10 14 00
SIGNAGE

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Panel signs.

Related Sections:

Illuminated exit signs: Division 26 sections.

1.2 SUBMITTALS:

Product Data:

Submit manufacturer's technical data and installation instructions for each type of panel sign required.

Samples:

Submit samples of each panel sign form and material showing finishes, colors, surface textures and qualities of manufacture and design of each panel sign component including graphics.

Submit full-size sample unit of typical room panel sign. Acceptable units may be installed as part of the work.

Shop Drawings:

Submit shop drawings for fabrication and installation of panel signs. Include plans, elevations, and large scale details of sign wording and lettering layout. Show anchorages and accessory items.

Furnish schedule with proposed sign wording, room numbers and locations. Coordinate final room numbers with the Owner.

1.3 QUALITY ASSURANCE:

Manufacturer:

Furnish products of a single manufacturer with a minimum of 3 years successful experience in the types of panel signs required.

Standards:

Provide life safety signage in compliance with the 2009 Edition of the International Building Code.

Fabricate panel signs to meet Americans with Disabilities Act Accessibility Guidelines (ADAAG) and the Uniform Federal Accessibility Standards.

Fabricate panel signs to comply with the University of Colorado at Boulder Campus Facilities Identification System guidelines.

PART 2 - PRODUCTS

2.1 MATERIALS:

Acrylic Sheet:

Provide flexible modified acrylic sheet with matte finish.

Provide Gravo-Tac 2-Ply as manufactured by New Hermes (800-843-7637 or www.gravograph.com) or approved equal specifically acceptable to the Owner's Sign Shop. Material must be able to be duplicated easily by the Owner's Sign Shop.

Aluminum Extrusions:

Alloy and temper recommended by aluminum producer or finisher for type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B221 for 6063-T5.

Vinyl Film:

Opaque non-reflective vinyl film, 0.0035" minimum thickness, with pressure sensitive adhesive backing, suitable for exterior as well as interior applications.

VOC Content: Not greater than 50 grams per liter.

ABS Plastic:

High impact thermoplastic composed of copolymers of acrylonitrile, butadiene and styrene.

Provide Gravo-Ply as manufactured by New Hermes (800-843-7637 or www.gravograph.com) or approved equal specifically acceptable to the Owner's Sign Shop. Material must be able to be duplicated easily by the Owner's Sign Shop.

Accessories:

Mounting Tape: Heavy Duty 1" x 1" Mounting Squares by 3M or approved equal.

VOC Content: Not greater than 50 grams per liter.

2.2 FABRICATION OF PANEL SIGNS:

General:

Fabricate panel signs to comply with requirements of referenced standards, as indicated below, or as specifically approved.

Produce smooth, even, level sign panel surfaces, constructed to remain flat under installed conditions within a tolerance of ±1/16" measured diagonally from corner to corner.

Locations:

Provide one panel sign at each interior door location (either single door or paired door location) at all new and existing rooms within the project area, except at the following locations:

Cross-corridor doors.

Provide one panel sign at each stair opening including stairs without doors.

Provide combination room number and room name signs with braille mounted on the wall adjacent to the entry door at all locations unless otherwise indicated.

Provide 1" x 6" slot signs, mounted below 6" x 6" signs required above, for occupant identification at all:

Offices.
Unisex Toilet Rooms.

Include applicable code related signage such as emergency and life safety signage, accessibility signage and maximum occupancy signage.

Interior Room Signs:

Fabricate black plastic room signs with edges mechanically and smoothly finished with square cut edges and 3/8" radiused corners. Sign face shall be edged with a recessed 1/8" border.

Size: 6" x 6" for room number signs.

Letters shall be white in color and in the Helvetica Medium letter style raised from the background not less than 0.03125" thick as required by ADAAG.

Provide 1.125" letter height for room numbers, centered 2" from the top of the letter to the top of the sign. Center a ½" wide black braille lettering panel 3/8" from the bottom of the sign.

Provide raised copy and recessed braille lettering in copy thickness not less than 0.03125" thick as required by ADAAG.

Fabricate black anodized aluminum sleeve inserts for occupant use.

Size: 1" x 6" open-ended horizontal sleeve.

Provide a blank white 90 pound card stock insert covered with a clear acrylic matte strip 0.625" high, 1/16" thick.

Where required for informational signage, provide 6" x 6" black anodized insert sleeve open at the top.

Provide a blank white 90 pound card stock insert covered with a clear acrylic matte strip 0.625" high, 1/16" thick for 6" x 6" insert sleeve.

Provide symbol for handicapped access on signage designating those areas accessible for the handicapped in conformance with Society for Environmental Graphic Designers (SEGD) recommendations for accessible signage, most recent edition.

2.3 FACTORY FINISHES:

Colors and Surface Textures: For exposed sign materials which require selection of materials with integral or applied colors, surface textures or other characteristics related to appearance, provide color matches indicated, or if not otherwise indicated, as selected by Architect from manufacturer's standards.

Metal Finishes: Comply with NAAMM "Metal Finished Manual" for finish designations and application recommendations.

Aluminum Finishes:

Class I Colored Anodized Finish: AA-M12C22A42/A44, (minimum thickness of 0.7 mils), integral color or electrolytically deposited color, anodized finish complying with AAMA 606.1 or 608.1, black color.

2.4 LIFE SAFETY SIGNAGE:

Provide specified panel signs as required by applicable Building Code and Fire Department regulations for life safety.

PART 3 - EXECUTION

3.1 INSTALLATION:

Locate sign units and accessories per approved submittals, using mounting methods of type described and in compliance with manufacturer's instructions, unless otherwise indicated.

Install sign units level, plumb and at height indicated, with sign surfaces free from distortion or other defects of appearance.

Wall-Mounted Units: Attach panel signs to wall surfaces using methods indicated below:

Vinyl-Tape Mounting: Attach panel signs to wall surfaces using mounting tape squares in each corner of the sign except at each top corner and one centered at bottom of sign for 6" x 6" units.

Locate surface-mounted signs on the wall adjacent to the latch side of the door (or the nearest adjacent wall) at 60" above finished floor from the centerline of the sign (any size) and out of the swing of the door. Mount signs with right edges 4" from inside face of the door jamb. Verify exact locations with the Architect prior to installation. Do not locate signage on doors unless approved by the Architect.

3.2 CLEANING AND PROTECTION:

At completion of installation, clean soiled sign surfaces in accordance with manufacturer's instructions. Protect units from damage until acceptance by Owner.

END OF SECTION 10 14 00

SECTION 10 21 23
CUBICLES

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Ceiling mounted cubicle curtain tracks and curtains for dust protection.

Related Sections:

Suspended ceiling system: Section 09 51 00

1.2 SUBMITTALS:

Product Data:

Submit product data on physical characteristics, durability, resistance to fading and flame resistance of curtains.

Submit manufacturer's product data on track system and accessories.

Shop Drawings:

Indicate location, layout, track types, anchorage details and accessories.

Field verify curtain lengths and indicate in shop drawing submittal.

Samples:

Submit 18" x 18" sample patch of clear and solid curtain material with representative hem stitch detail, heading with reinforcement and carrier attachment to curtain header.

Maintenance Data:

Submit maintenance data for inclusion in "Operating and Maintenance Manual" specified in Division 01.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

Provide products manufactured by AmCraft Manufacturing, Inc., 167 Joey Drive, Elk Grove Village, Illinois, (847) 439-4565, or approved equal.

2.2 GENERAL:

Recycled Content: Materials/products shall contain the maximum amount of recycled content allowed that retains material integrity.

Regional Materials: Preference shall be given to materials that are manufactured, harvested, extracted, mined, quarried, etc. within a 500 mile radius of the project site.

2.3 TRACK AND ACCESSORIES:

Track:

"C" section ceiling mounted track fabricated from 10 gage galvanized steel in configuration required to accommodate required accessories.

Splicing Clamps and Mounting Hardware: 10 gage commercial quality low carbon steel matching track.

Finish: Unfinished galvanized steel.

Track Accessories:

Provide end caps, connectors, end stops, coupling sleeves and other accessories as required for secure and operational installation. Provide a quantity of carriers for 6-inch spacing for the entire length of curtain.

Carriers: Nylon trolleys with zinc-plated steel axle, rivets and 0.5" hook.

2.4 CURTAINS:

Curtain Fabric:

Provide fabric that is inherently and permanently flame resistant for the life of the fabric and launderable to a temperature of not less than 95 degrees F.

Fire Performance Characteristic: Test for the following fire performance requirement, according to test method indicated, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.

Rating: Flame resistant.

Test Method: NFPA 701.

Emissions: Provide curtain material which is low in out-gassing.

Configuration: From finished floor to 48" above finished floor solid vinyl; from 48" above finished floor to 96" above finished floor clear vinyl; from 96" above finished floor to ceiling solid vinyl.

Valence: 12" solid vinyl.

Clear Vinyl: 40 mil clear sheet complying flammability and emissions requirements.

Solid Vinyl: 13 ounces per square yard minimum, 1000 x 1000 denier, complying with flammability and emissions requirements.

Solid Vinyl Color: As selected by Architect from manufacturers standards.

2.5 FABRICATION:

Manufacture curtains of one piece sized to 10% minimum wider than track length. Extend curtain to 1" from floor.

Curtain heading of triple thickness 2" wide, with metal grommeted holes for carriers 6" o.c., bottom hem 2" wide. Lockstitch in two rows all seams and turn edges.

Curtain Tie Back: Wall-mounted, nickel-plated brass chain.

Operating Wand: 1/4" diameter, 30" long fiberglass baton.

PART 3 - EXECUTION

3.1 INSTALLATION:

Install units with clips and anchorages suited to mounting and substrate indicated.

Install ceiling-mounted tracks at intervals of not less than 3 feet.

Adjusting:

Adjust for unencumbered operation of hardware.

END OF SECTION 10 21 23

SECTION 10 26 00
WALL PROTECTION

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Wall protection systems as follows:

Corner guards.

Related Sections:

Wood blocking: Section 06 10 00.
Kick plates: Section 08 71 00.

1.2 SUBMITTALS:

Product Data:

Submit manufacturer's product data for each wall protection system component and installation accessory required, including installation methods for each type of substrate. Provide written data on each required component including physical characteristics, such as durability, resistance to fading, and flame resistance.

Maintenance Data:

Submit maintenance data for wall protection system components as specified in Section 01 78 23.

1.3 QUALITY ASSURANCE:

Installer Qualifications:

Engage an experienced Installer who has previously installed wall protection systems similar in material, design, and extent to the systems indicated for this Project.

Manufacturer Qualifications:

Firm experienced in manufacturing wall protection system components that are similar to those required for this Project and that have a record of successful in-service performance.

Single Source Responsibility:

Obtain each color, grade, finish, and type of wall protection system component from a single source with resources to provided products of consistent quality in appearance and physical properties without delaying progress of the Work.

1.4 DELIVERY, STORAGE, AND HANDLING:

Deliver materials to Project site in original factory wrappings and containers, clearly labeled with identification of manufacturer, brand name, quality or grade, and fire hazard classification.

Store wall protection materials in original undamaged packages and containers inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.5 PROJECT/SITE CONDITIONS:

Environmental Conditions:

Do not install wall protection system components until the space is enclosed and weatherproof and until the ambient temperature within the building is maintained at not less than 70 deg F. for not less than 72 hours prior to beginning of the installation. Do not install rigid plastic wall protection systems until that temperature has been attained and is stabilized.

1.6 MAINTENANCE:

Maintenance Instructions:

Provide the manufacturer's instructions for maintenance of installed work. Include recommended methods and frequency for maintaining optimum condition under anticipated traffic and use conditions. Include precautions against cleaning materials and methods that may be detrimental to finishes and performance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

Balco, Inc.
Boston Retail Products
InPro Corp.
Koroseal Wall Protection Systems
Pawling Corporation.
Wilkerson

2.2 MATERIALS:

General:

Recycled Content: Materials/products shall contain the maximum amount of recycled content allowed that retains material integrity.

Local/Regional Materials: Preference shall be given to materials that are manufactured, harvested, extracted, mined, quarried, etc. within a 500 mile radius of the project site.

Stainless Steel:

AISI Type 304, stainless steel plate, minimum 16 gauge.

Recycled Content: Minimum 30% by weight.

Fasteners:

Provide nonmagnetic stainless steel screws compatible with items being fastened.

2.3 CORNER GUARDS:

Stainless Steel Corner Guards:

Provide manufacturer's standard paper-covered satin finish, 0.059-inch (16 gauge) minimum, stainless steel sheet corner guards, 48" height. Provide 90-degree turn, unless otherwise indicated, and formed edges.

2.4 FABRICATION:

General:

Fabricate wall protection systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thicknesses of components.

Preassemble components in the shop to the greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.

Fabricate components with tight seams and joints with exposed edges rolled. Provide surfaces free of evidence of wrinkling, uneven coloration, dents, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.5 FINISHES:

General:

Comply with NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.

Stainless Steel:

Provide AISI No. 4 finish (bright directional polish).

PART 3 - EXECUTION

3.1 EXAMINATION:

General:

Examine areas and conditions in which wall protection components will be installed.

Complete all finishing operations, including painting, before beginning installation of wall protection system materials.

3.2 PREPARATION:

Prior to installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION:

Install wall protection units plumb, level, and true to line without distortions.

Do not use materials with stains or other defects that might be visible in the finished work.

3.4 CLEANING:

Immediately upon completion of installation, clean metal components in accordance with the manufacturer's recommendations.

Remove excess adhesive using methods and materials recommended by manufacturer.

Remove surplus materials, rubbish, and debris resulting from installation upon completion of work and leave areas of installation in neat, clean condition.

3.5 SCHEDULE:

Corner Guards:

Stainless Steel Corner Guards; 1.5" Wing Size: Provide Model 180 by InPro Corp or approved equal by listed manufacturer with 0.125" corner radius.

Mount with countersunk screws at 8" o.c.

END OF SECTION 10 26 00

SECTION 10520

FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Fire extinguishers and cabinets.

Fire protection accessories.

Relocation of existing fire extinguisher and cabinet.

Related Sections:

Salvage of existing fire extinguisher and cabinet: Section 02 41 19.
Blocking for wall mounted brackets and cabinets: Section 06 10 00.
Fire Protection Systems: Division 21 sections.

1.2 SUBMITTALS:

Product Data:

Manufacturer's technical data and installation instructions for each type of new fire extinguisher and cabinet required. Include dimensions and clearances required.

Fire Extinguishers: Include rating and classification.

Cabinets: Include mounting method and details, door hardware, cabinet type, trim style and panel type.

Samples:

Manufacturer's color charts showing full range of colors, textures, and patterns available.

1.3 QUALITY ASSURANCE:

Standards:

Fabricate and label new fire extinguishers conforming to NFPA Standard No. 10.

List and label new fire extinguishers for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

Provide new fire extinguishers which are UL approved, U.S. Department of Transportation approved and compliant with current National Fire Code standards for portable fire extinguishers.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

Provide products by one of the following:

Ansul
J.L. Industries, Inc.
Larsen's Manufacturing Company
Modern Metal Products, Division of Technico
Potter-Roemer, Division of Smith Industries, Inc.

2.2 FIRE EXTINGUISHERS:

Reuse existing fire extinguisher salvaged under the work of Section 02 41 19.

Provide new fire extinguishers for each new extinguisher cabinet and other locations as shown on the drawings. Furnish only new fire extinguishers which are listed and labeled.

Fabricate new fire extinguishers from one piece steel or aluminum. Fabricate head, handle and valve assembly from metal components only (nylon or plastic not acceptable).

Provide red color.

Fill and service extinguishers in accordance with governing authorities.

Provide required type mounting brackets for wall mounted extinguishers, if any, red color.

Multi-Purpose Dry Chemical in Steel Container: UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

Provide MP Multi-Purpose Dry Chemical Series by Larsen's Manufacturing Company or approved equal by listed manufacturer.

2.3 FIRE EXTINGUISHER CABINETS:

Reuse existing fire extinguisher cabinet salvaged under the work of Section 02 41 19.

Provide new fire extinguisher cabinets to match design and finish of existing fire extinguisher cabinet to be reused and suitable for housing one standard fire extinguisher. Provide as follows unless otherwise required to match existing fire extinguisher cabinet to be reused:

Cabinet Material: Enameled steel sheet.

Mounting: Semi-recessed.

Trim Style: Exposed.

Rolled, 2-1/2".

Door and Trim Material: Steel sheet.

Door Glazing: Clear tempered float glass.

Door Style: Horizontal duo with frame, pull handle and roller catch. Provide single-piece doors, 0.5" thick, with continuous stainless steel piano hinge.

Key all cabinets alike and match keying of cabinet to be reused. Provide two keys per cabinet.

Accessories: Manufacturer's standard identification decals for each cabinet.

All adhesive decals must utilize low-emitting adhesives complying with the requirements of Section 01 10 00.

Color and Texture:

Steel: Baked enamel, white color.

PART 3 - EXECUTION

3.1 INSTALLATION:

Install in locations and at mounting height to comply with governing authorities. Unless otherwise indicated, mount top of fire extinguisher cabinet 60" above finished floor. Coordinate recesses with carpentry or framing trades as appropriate. Prepare recesses in walls as required. Securely fasten items to structure, square and plumb, in accordance with manufacturer's instructions.

Wherever exact location of units is not shown, locate as directed by Architect.

Fill and charge extinguishers just prior to substantial completion.

3.2 PROTECTION AND CLEANING:

Adjust cabinet doors that do not swing or operate freely.

Clean fire extinguisher cabinets and repair minor damage to finishes. Replace units damaged beyond satisfactory repair as determined by Architect.

Provide protection measures necessary to protect fire extinguishers and cabinets during subsequent construction.

END OF SECTION 10 44 00

SECTION 10 56 13

METAL STORAGE SHELVING

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Steel storage shelving as shown on the drawings.

Perform installation under Section 06 10 00 as herein specified.

Related Sections:

Summary: Section 01 10 00

1.2 SUBMITTALS:

Product Data:

Submit manufacturer's data and installation instructions for each type of shelving unit required.

Shop Drawings:

Submit shop drawings for storage shelving showing plans, elevations, ends, cross-sections, location and type of shelves. Show details and location of anchorages and fitting to floors and walls. Include layout of units with relation to surrounding walls, doors, partitions and other building components.

Samples:

Submit 3" x 5" samples of specified finish. Samples will be reviewed by Architect for color, texture, and pattern only. Compliance with other specified requirements is the exclusive responsibility of the Contractor.

Certification:

Submit certification that products provided meet the Environmental Performance requirements specified in Section 01 10 00 including for no off-gassing and no degradation of performance due to the presence of high amounts of UV and for temperature up to 60° Celsius.

1.3 QUALITY ASSURANCE:

Standards:

Provide storage shelving complying with SMA and ANSI MH 28.1-1982.

1.4 DELIVERY, STORAGE AND HANDLING:

Deliver storage shelving after wet operations in building are complete.

Protect finished surfaces from soiling and damage during handling and installation.

PART 2 - PRODUCTS

2.1 STORAGE SHELVING:

General:

Provide products will not degrade under the use conditions indicated including in the presence of high ultraviolet light and temperatures up to 60 degrees Celsius. Provide products which do not off-gas in accordance with the requirements of Section 01 10 00.

Open Type Shelving System:

"Clipper Industrial Shelving" by Penco Products, Inc. or approved equal, solid galvanized steel sheet, friction assembled units in shelf lengths, shelf depths and layouts as shown.

Furnish all shelf surfaces, supports and accessories in galvanized (after fabrication) finish.

Provide manufacturer's standard heavy duty standard and bracket system in finish matching shelving similar to K&V No. 87 heavy duty standards with No. 187 heavy duty brackets.

PART 3 - EXECUTION

3.1 INSTALLATION:

Verify field conditions to assure correct sizes, locations, details, adequacy and proper locations for backing, supports, bracing.

Include all anchors, accessories, trim and similar items required for complete, functional installation. Install per manufacturer's recommendations.

3.2 CLEANING AND PROTECTION:

Repair or remove and replace defective work as directed upon completion of installation.

Protection: Advise Contractor of procedures and precautions for protection of materials and installed storage shelving from damage by the work of other trades.

END OF SECTION 10 56 13

SECTION 11 31 00
RESIDENTIAL APPLIANCES

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Residential appliances as shown on the drawings.

Related Sections:

Requirements for Owner furnished Contractor installed items: Section 01 10 00.
Plumbing rough-ins and final connections: Division 22 sections.
Exhaust ducts and connections: Division 23 sections.
Electrical rough-ins and final (hard wired) connections: Division 26 sections.

1.2 STORAGE AND HANDLING:

Protect finishes from damage during storage, handling, installation and construction of other work.

PART 2 - PRODUCTS

2.1 APPLIANCES:

The Owner will furnish a freezer for installation by the Contractor. Contractor will be required to move the freezer from its existing location on the East Campus to its new location shown on the drawings.

The Owner will furnish other refrigerators and freezers for installation by the Contractor.

See Section 01 10 00 for additional requirements related to Owner furnished Contractor installed items.

PART 3 - EXECUTION

3.0 INSPECTION:

Refer to Section 01 73 00 for examination of substrate and job conditions.

Verify rough-ins of plumbing, mechanical and electrical services for sizes, locations and adequacy.

3.1 INSTALLATION:

Crate or protect, load, move, unload, uncrate or remove protection, move into position, level and align. Set item in position as indicated. Secure in position, provide required anchors, trim, accessories for complete installation. Final plumbing and wiring connections are included in Divisions 22 and 26.

3.2 ADJUSTING AND CLEANING:

Test residential appliance to verify proper operation. Notify Owner if residential appliance is not operating properly.

Leave residential appliances in clean condition, ready for operation.

END OF SECTION 11 31 00

SECTION 11 52 13
PROJECTION SCREENS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Projection screens as shown on the drawings for:

- Electrical operation.
- Manual operation.

Perform installation under Section 06 10 00 as herein specified.

Related Sections:

- Projectors: Section 11 52 16.
- Electrical rough-ins and final connections: Division 26 sections.

1.2 SUBMITTALS:

Product Data:

Submit manufacturer's product data describing the materials, systems and their installation.

Samples:

Submit sets of samples for each type and color of projection screen, trim and accessory required. Provide 12" square sample of sheet materials and 12" lengths of trim members. Architect's review of samples will be for color, pattern and texture only. Compliance with all other requirements is the exclusive responsibility of Contractor.

Shop Drawings:

Provide detailed and dimensioned shop drawings for the projection screens and attachment to other building elements. Field measure all openings to determine exact unit sizes. Include wiring diagrams and control point locations.

PART 2 - PRODUCTS

2.1 PROJECTION SCREENS:

Manual Units:

Provide "Model B" as manufactured by Da-Lite or approved equal by Draper or Knox. Provide unit which is fabricated for surface mounting on ceiling. Provide unit with the following options:

- Size: 96" wide by 96" high.

Provide pull cord for manual operation at all locations. Attach Velcro pad on top of adjacent marker board and bottom of pull cord.

Provide bottom panel to cover screen when rolled up.

Provide with black masking borders and top extension as required to allow screen to come to 48" above finished floor.

Provide matte white surface.

Electric Units:

Provide "Tensioned Advantage Electrol" manufactured by Da-Lite or approved equal by Draper or Stewart Filmscreen Corp. Provide unit which is UL listed and which is fabricated for recessed ceiling mounting. Provide unit with the following options:

Size: 80" wide by 45" high.

Provide 16:9 aspect ratio with a tab guide cable system on each side of the fabric to maintain even lateral tension and hold projection surface flat.

Provide unit with motor in roller which can stop in any position, controlled by a 3-position control switch and automatic top and bottom limit switch.

Provide fire retardant and mildew resistant projection surface with black masking borders and 12" high top extension (black drop).

Provide two stage construction assembly which allows the projection screen enclosure to be installed early in the construction process, and the screen/roller assembly to be installed later in the construction process.

Provide seamless Da-Mat projection surface.

Provide rubber mounting system for quiet operation of the sealed motor-in-the-roller design.

PART 3 - EXECUTION

3.1 EXAMINATION:

Verify field conditions to assure correct sizes, locations, details, adequacy and proper locations for backing, supports, bracing.

Coordinate sizes, types and locations for electrical rough-ins and verify actual installation. Verify power requirements and ensure compatibility with building power.

3.2 INSTALLATION:

Set items accurately in position, level, plumb, square and aligned with other building elements.

Provide required backer plates, screws, anchors, bolts as necessary for secure installation.

Include all anchors, accessories, trim, and similar items required for complete, functional installation. Install per manufacturer's recommendations.

After installation is complete, including final connections of services under other sections, test, adjust and put all equipment in full operating condition.

END OF SECTION 11 52 13

SECTION 11 52 16
PROJECTORS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Projectors, including required mounts, as shown on the drawings.

Perform installation under Section 06 10 00 as herein specified.

Related Sections:

Requirements for Owner furnished Contractor installed items: Section 01 10 00.
Projection Screens: Section 11 52 13.
Electrical rough-ins and final connections: Division 26 sections.

1.2 SUBMITTALS:

Product Data:

Submit manufacturer's product data for projector mounts.

Shop Drawings:

Provide detailed and dimensioned shop drawings for the projectors, mounts and attachment to other building elements. Field measure all conditions relating to installation including adjacent walls and ceilings and structural support. Include wiring diagrams.

1.3 QUALITY ASSURANCE:

Installation shall be performed by an installer experienced in similar projector work having completed at least 5 similar successful installations for institutional applications.

PART 2 - PRODUCTS

2.1 PROJECTORS:

Projectors will be furnished by the Owner for installation by the Contractor.

2.2 PROJECTOR MOUNTS:

Provide the following video projector mounting brackets as manufactured by Peerless or approved equal by Bretford or Da-Lite in black color as required to accommodate the projectors furnished by the Owner:

Wall Locations: Vector Pro Projector Wall Mount Model No. PWA 14.
Ceiling Locations: Vector Pro Spider Universal Projector Ceiling Mount Model No. PJC UNV.
Anchorage Kit: As recommended by the manufacturer for the substrate indicated.

PART 3 - EXECUTION

3.1 EXAMINATION:

Verify field conditions to assure correct sizes, locations, details, adequacy and proper locations for backing, supports, bracing.

Coordinate sizes, types and locations for electrical rough-ins and verify actual installation. Verify power requirements and ensure compatibility with building power.

3.2 INSTALLATION:

Set items accurately in position, level, plumb, square and aligned with other building elements.

Provide required backer plates, screws, anchors, bolts as necessary for secure installation.

Include all anchors, accessories, trim, and similar items required for complete, functional installation. Install per manufacturer's recommendations.

After installation is complete, including final connections of services under other sections, test, adjust and put all equipment in full operating condition.

3.3 DEMONSTRATION:

Instruct the Owner's personnel in the complete operation of the projectors and its controls and adjustments.

3.4 PROTECTION:

Advise the Contractor of required protection of projectors and mounts until Project completion.

END OF SECTION 11 52 16

SECTION 11 53 13
LABORATORY FUME HOODS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Relocation of existing laboratory fume hoods and related service fixtures as indicated on drawings.

Related Sections:

Salvage of existing fume hoods: Section 02 41 19.
Laboratory casework: Section 12 35 53.19.
Plumbing, mechanical and electrical work: Division 22, 23 and 26 sections.
Fume hood vent connections (from hood duct collar to hood exhaust system): Division 23 sections.
Plumbing connections: Division 22 sections.

1.2 SUBMITTALS:

Shop Drawings:

Submit shop drawings for relocation of fume hoods showing plans, elevations, ends, cross-sections, service run spaces, location and type of service fixtures with lines thereto; details and location of anchorages and fitting to floors, walls, countertop and base cabinets; layout of units with relation to surrounding walls, doors, windows, lighting and air-conditioning fixtures, and other building components; connection to hood exhaust system; location of access doors, cut-off valves, junction boxes.

Coordinate shop drawings with other work involved.

Provide roughing-in drawings for mechanical and electrical services.

1.3 STORAGE AND HANDLING:

Protect finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering.

PART 2 - PRODUCTS

2.1 MATERIALS AND CONSTRUCTION:

General:

Reuse fume hoods salvaged under the work of Section 02 41 19.

Provide miscellaneous fasteners and accessories as required to put salvaged units into fully operational state after relocation.

Modify fume hoods as required to accommodate services scheduled on the plumbing drawings.

PART 3 - EXECUTION

3.1 INSTALLATION:

General:

Relocate fume hoods so they are plumb, level, rigid, securely anchored to building and adjacent furniture in proper location. Install closures neatly. Securely attach access panels but provide for easy removal and secure re-attachment.

Coordinate sequence of work with mechanical and electrical trades and laboratory casework and fixtures specified in Division 12.

3.2 FIELD QUALITY CONTROL:

Field Test:

Field test each relocated unit after completion of installation to verify proper operation of hoods in accordance with specified requirements. Perform field tests in accordance with Section 7 of Scientific Apparatus Makers Association Standard LF-10. Submit field test results to the Architect.

3.3 ADJUST AND CLEAN:

Moving Parts: Carefully check and adjust moving parts to ensure smooth, near-silent, and accurate sash operation with one hand and with uniform contact of rubber bumpers; ensure counterbalances operate without interference.

Clean surfaces, including both sides of glass.

Damaged Work: Repair as acceptable to Architect.

END OF SECTION 11 53 13

SECTION 12 20 00
WINDOW COVERINGS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Project requirements for window coverings.

1.2 SUBMITTALS:

Protection Plan:

Submit a plan for the protection of existing window coverings during the course of the work of this Contract.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 IN-PLACE PROTECTION:

Where possible, place window coverings in most compact position and wrap with plastic or use other acceptable means to protect window coverings in place from damage and soiling due to the work of this Contract.

3.2 REMOVAL/INSTALLATION:

Where in-place protection is not possible, carefully remove window coverings, temporarily label to coincide with applicable window opening and store in a location which is protected.

Once work is complete, reinstall window coverings into original window openings matching original installation.

Install window coverings level and square and securely anchored to substrates. Position to provide clearance for operations without damage to window frame or window covering and to allow proper air spaces.

Clean and adjust each window covering for proper operation.

END OF SECTION 12 20 00

SECTION 12 35 53.13

METAL LABORATORY CASEWORK

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Fabrication and installation of standard metal casework components of acid (corrosive) storage cabinets and solvent (flammable) storage cabinets in the following locations (one cabinet of each type at each location):

Lab Room 301.
Source Room 302.
Cylinder Storage 349B.

Related Sections:

Laboratory fume hoods: Section 11 53 13
Wood laboratory casework: Section 12 35 53.19
Laboratory Countertops and Sinks: Section 12 36 53
Laboratory service fixtures: Provided and installed under Plumbing and Electrical Work of Division 22 and 26 sections.
Plumbing, mechanical and electrical work: Division 22, 23 and 26 sections respectively.

1.2 SUBMITTALS:

Product Data:

Submit manufacturer's data and installation instructions for each type of chemical storage unit.

Include independent laboratory certification that applied finish complies with specified chemical and physical resistance requirements.

Samples:

Submit 3, 6" x 6" samples of specified finish. Samples will be reviewed by Architect for color, texture, and pattern only. Compliance with other specified requirements is the exclusive responsibility of the Contractor.

Shop Drawings:

Submit shop drawings for chemical storage cabinets showing plans, elevations, ends, and cross-sections. Show details and location of anchorages and fitting to floors and walls. Include layout of units with relation to surrounding walls, doors, windows, and other building components.

1.3 QUALITY ASSURANCE:

General:

Provide chemical storage cabinets manufactured by a single manufacturer.

Catalog Standards:

Manufacturer's catalog numbers are specified for convenience in identifying certain units. Unless modified by notation on the drawings or otherwise specified, the catalog description for the indicated number constitutes the requirements for each such unit.

The use of catalog numbers, and the specific requirements set forth in drawings and specifications, are not intended to preclude the use of any other acceptable manufacturer's product or procedures which may be equivalent, but are given for the purpose of establishing a standard of design and quality for materials, construction and workmanship.

1.4 DELIVERY, STORAGE AND HANDLING:

Deliver chemical storage cabinets after wet operations in building are complete.

Protect finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering.

1.5 WARRANTY:

The manufacturer shall guarantee all materials and workmanship provided for a period of 1 year from date of substantial completion. Any defects due to the use of improper material or workmanship on the part of manufacturer occurring within that time shall be promptly rectified, by repair or replacement of the defective materials or correction of defective workmanship by manufacturer at his own expense, after notification by the Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

Provide chemical storage cabinets produced by one of the following:

South Coast Enterprises
Eagle
Fisher Hamilton Scientific, Inc.
James
Justrite
Kewaunee Scientific Corp.
Or approved equal

2.2 MATERIALS:

Metal:

Prime furniture steel, stretcher or roller leveled, free of scales, buckles, or other defects; ASTM A366, Class 1 (matte) finish.

Minimum Recycled Content: 30% by weight.

Minimum Metal Gage: Provide steel chemical storage cabinet components of the following minimum U.S. Standard gages.

18 Gage: Sides, ends, fixed backs, doors, bottoms and tops. Bottoms may be 20 gage if reinforced. Other items not otherwise noted.

2.3 FABRICATION:

General:

Provide chemical storage cabinets of modern design, constructed in accordance with the best practices of the Scientific Laboratory Equipment Industry.

Fabricate units of flush front construction with intersection of vertical and horizontal case members, such as end panels, top rails, bottoms and vertical posts in same plane without overlap. Spot and arc weld exterior corners of metal cabinets with heavy back up reinforcement at exterior corners. Arc weld face joints of metal cabinets and grind smooth to provide a continuous flat plane. Side and back panels of metal cabinets may be formed of one-piece wrap around construction.

Rabbet metal case openings on all four sides for hinged doors to provide a dust resistant case.

Construct all units with a cleanable smooth interior. Enclose front and rear posts, reinforcing members or channel uprights full height on all cupboard openings. Provide pan type bottoms for metal cabinets with both sides and back formed up for easy cleaning or turned down where wrap around construction is used.

2.4 HARDWARE AND TRIM:

Door Pulls:

Provide door pulls of modern design, offering a comfortable hand grip, securely fastened to doors with vandal-proof screws. All pulls shall be satin finish aluminum, with a clear, lacquer finish or brushed anodized aluminum finish. Use of plastic pulls (molded or extruded) or a design not compatible for usage by the handicapped will not be acceptable.

Hinges:

Stainless steel with brushed satin finish of institutional type with a 5-knuckle bullet-type barrel. Attach hinges to both door and case with 2 screws through each leaf. Welding of hinges to door or case will not be accepted. Provide 1 pair of 2.5" high hinges for doors under 36" high, 1.5 pair of 2.5" high hinges for doors over 36" high.

Locks:

Apply locks to all doors. Provide lock system to guarantee security by restricting the duplicating of keys to registered locksmiths. Match exposed surfaces of locks with other cabinet trim.

Friction Catches:

For doors, provide adjustable nylon roller type friction catches with strike.

Shelf Adjustment Clips:

Nickel plated steel.

Up-and-Down Bolts:

Provide right hand door with an active knob and up-and-down bolt assembly. And left hand door with an astragal strip, allowing the door to be opened only when right hand door is open. Provide left hand door with a dummy knob. Conceal up-and-down bolts in the stiles of glazed doors and between pans of solid panel doors.

2.5 SPECIAL PURPOSE STORAGE CABINETS:

Acid (Corrosive) Storage Cabinets:

Fabricate acid (corrosive) storage cabinets of gages of metal and construction features specified above, except with 1.5" insulating air space with self-closing doors. Provide seamless liner on all interior walls, ceiling, sump, inside doors and shelves to protect exposed cabinet surfaces from rust and corrosion. Provide dual vents for each cabinet. Vent each cabinet into separate building vent with a 1.5" corrosion resistant PVC vent pipe. Fabricate to achieve a minimum of ten air changes per hour and with a minimum flow of 20 CFM. Furnish with electrical grounding connection.

ChemCor Lined Acid Safety Cabinets: Provide Self-Closing Model No. 8917222 as manufactured by Justrite or approved equal by listed manufacturers.

Size: 24"H x 43"W x 18"D.
Capacity: 17 gallons.
Number of Doors: Two.
Number of Shelves: One.
Exterior Color: Light Blue.
Installation: Piggyback over flammable safety cabinet specified below.

Safety Cabinets for Flammables:

Metal cabinet fabricated for the storage of flammable and combustible liquids in compliance with OSHA and NFPA No. 30. Fabricate bottom, top, sides and doors of 18 gage steel and with double wall construction with 1.5" air space between panels. At door fronts fill air space with sound deadening material. Furnish with self-closing doors, adjustable shelves, vent ports and vent assembly to building system as indicated to achieve a minimum of four ten air changes per hour. Furnish with electrical grounding connection.

Flammable Liquid Storage Cabinet: Provide Self-Closing Model No. 893020 as manufactured by Justrite or approved equal by listed manufacturers.

Size: 44"H x 43"W x 18"D.
Capacity: 30 gallons.
Number of Doors: Two.
Number of Shelves: One.
Exterior Color: Yellow.

2.6 METAL CABINET FINISH:

Pretreatment:

After assembly, thoroughly clean all surfaces of grease, dirt, oil, flux and other foreign matter by physical and chemical means. Treat entire unit with metallic phosphate process leaving surfaces with uniform, fine-grained, crystalline phosphate coating providing excellent bond for subsequent finish. Rinse with water and apply passivating sealant spray if required by manufacturer.

Immediately dry all treated parts in heated ovens and gradually cool.

Top Coat:

Apply high-bake chemical-resistant enamel by electrodeposition in paint tank or electrostatically applied powder coat to provide a hard and smooth, satin luster finish to all treated surfaces.

Oven bake the coating to provide performance test requirements for Chemical and Physical Resistance of Finish.

Color: As scheduled above.

2.7 ASSEMBLY:

Assemble units in the shop.

Install hardware uniformly and precisely after final finishing is complete. Set hinges snug and flat in mortises unless otherwise indicated. Turn screws to flat seat. Adjust and align hardware so that moving parts operate freely and contact points meet accurately. Allow for final field adjustment after installation.

PART 3 - EXECUTION

3.1 INSTALLATION:

General:

Install plumb, level, true and straight with no distortions. Use adjustable leveling devices. Where cabinets abut other finished work, scribe and apply filler strips for accurate fit with all fasteners concealed where practicable.

Adjust chemical storage cabinets and hardware so that doors operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

3.2 CLEANING AND PROTECTION:

Repair or remove and replace defective work as directed upon completion of installation.

Clean shop-finished surfaces, touch-up as required, and remove or refinish damaged or soiled areas, as acceptable to the Architect.

Protection: Advise Contractor of procedures and precautions for protection of materials and installed chemical storage cabinets from damage by the work of other trades.

END OF SECTION 12 35 53.13

SECTION 12 35 53.19

WOOD LABORATORY CASEWORK

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Fabrication and installation of standard wood casework components of base cabinets, wall cabinets, upper cabinets, cabinet understructures for fume hoods, shelf units, and other units and equipment as indicated.

Modifications to existing wood casework components to accommodate new layout as indicated.

Tops and sinks common to laboratory casework.

Laboratory accessories.

Service fixtures are supplied and installed under Divisions 22 and 26 sections.

Related Sections:

Wood blocking for anchoring casework: Section 06 10 00.
Metal reinforcement for anchoring casework: Section 09 29 00.
Resilient base: Section 09 65 00.
Laboratory Fume Hoods: Section 11 53 13.
Metal Laboratory Casework: Section 12 35 53.13.
Laboratory Countertops and Sinks: Section 12 36 53.
Laboratory Service Fixtures: Provided and installed under Plumbing and Electrical Work of Division 22 and 26 sections except where provided as part of premanufactured items.
Electrical Work: Division 26 for furnishing and installing electrical service fixtures except where provided as part of premanufactured items.

1.2 DEFINITIONS:

The following definitions apply to wood casework units.

Exposed portions of casework including end panels and all surfaces visible when doors and drawers are closed, bottoms of cases more than 42" above floor, top of cases less than 72" above floor, and visible members in open cases or behind glass doors.

Semi-exposed portions of casework includes those surfaces behind solid doors, such as shelves, divisions, interior faces of ends, case back, drawer sides, backs and bottoms and the interior face of doors. Tops of cases 6'-0" or more above floor and bottom of cabinets more than 30" but less than 42" above floor shall be considered as semi-exposed.

Concealed portions of casework include sleepers, web frames, dust panels, and other surfaces not usually visible after installation or cabinets less than 30" above finished floor.

1.3 SYSTEM DESCRIPTION:

Provide wood laboratory casework that has been designed and fabricated to comply with descriptions listed below.

Cabinet Front and Drawer Style:

Partial overlay with intermediate rails, combination wood grain pattern, and radiused door and drawer edges as required to match existing adjacent wood laboratory casework.

Veneer Type:

Plain sliced Red Oak to match existing adjacent wood laboratory casework.

Grain Pattern:

Combination of horizontal grain on drawer fronts and vertical grain on door fronts and end panels, unless otherwise required to match existing adjacent wood laboratory casework.

Cabinet Core for Sides and Bottom:

Veneer core plywood.

Cabinet Top Frame:

Full top frame with front and rear horizontal rails plus horizontal side rails.

Intermediate Rails:

With front intermediate rail for lipped overlay design with locks.

Front and rear intermediate rails with security panel for cabinets with locks keyed differently.

Drawer Construction:

Chuck and bore joinery with lifetime warranty.

Drawer Suspension System:

Accuride 150 lb. full extension telescoping ball bearing suspension with lifetime warranty, for file drawers.

Drawer and Door Pulls:

Manufacturer's standard as required to match existing adjacent wood laboratory casework pulls.

Door Hinges:

5-knuckle US26D chrome plated hinges.

Shelf Depth:

Half depth shelves mounted to rear of cabinet in base cabinets and full depth shelves in wall and tall cabinets.

Shelf Thickness:

3/4" thickness with 75 lb. rating for less than 36" wide.

1" thickness with 100 lb. rating for more than 36" wide.

Shelf Clips:

Plated pin and socket shelf clips, 4 per shelf.

Catches:

Magnetic catches.

Locks:

National 5-disc designed for up to 225 primary key changes.

Label Holders:

Manufacturers standard.

Levelors:

Manufacturers standard.

Glass:

1/8" clear float glass.

Removable Back Panels:

Two pieces removable panel behind drawer units.

1.4 SUBMITTALS:

Product Data:

Submit manufacturer's data and installation instructions for each type of wood laboratory casework unit.

Include independent laboratory certification that applied finish complies with specified chemical and physical resistance requirements.

Shop Drawings:

Submit shop drawings for wood laboratory casework showing plans, elevations, ends, cross-sections, utility run spaces, location and type of service fixtures with lines thereto. Show details and location of anchorages, blocking, and fitting to floors, walls, and base.

Include layout of units with relation to surrounding walls, doors, windows, other building elements, and laboratory equipment.

Coordinate shop drawings with other work involved.

Samples:

Submit 3" x 5" samples of all available standard stain colors and natural finish. Samples will be reviewed by Architect for color, texture, and pattern only. Compliance with other specified requirements is the exclusive responsibility of the Contractor.

Test Reports:

Submit test reports from qualified independent testing laboratory showing compliance with laboratory casework finishes specified for chemical and physical resistance.

1.5 QUALITY ASSURANCE:

General:

Provide wood laboratory casework manufactured or furnished by the same company for single responsibility.

Manufacturer's Qualifications:

Manufacturer with updated plant and proper tools, dies, fixtures and skilled workmen to produce high quality laboratory casework and meeting construction schedule time restraints. Manufacturer must have a minimum of 10 years experience in manufacturer of wood laboratory casework and at least 10 successful installations of equal or greater complexity as indicated.

Installer's Qualifications:

Installer must be certified by the manufacturer and have successfully completed at least 5 installations of wood laboratory casework of equal or greater complexity as indicated.

Testing Laboratory Qualifications:

Independent testing laboratory must demonstrate to Architect's satisfaction that it has experience and qualifications to conduct testing based upon documentation according to ASTM E548.

Catalog Standards:

Manufacturer's catalog numbers may be shown on drawings for convenience in identifying certain cabinet work. Unless modified by notation on the drawings or otherwise specified, the catalog description for the indicated number constitutes the requirements for each such cabinet.

The use of catalog numbers, and the specific requirements set forth in drawings and specifications, are not intended to preclude the use of any other acceptable manufacturer's product or procedures which may be equivalent, but are given for the purpose of establishing a standard of design and quality for materials, construction and workmanship.

Chemical and Physical Resistance of Finish:

Submit an independent testing laboratory report certifying that the (exterior) finish of wood casework is capable of withstanding the following tests, with no change, or slight change of gloss, slight discoloration, or slight temporary softening of the film with no loss of adhesion and no loss of film protection as defined in the Performance Ratings.

Performance Ratings:

(NE) No effect: No detectable change in surface material.

(EX) Excellent:	Slight detectable change in color or gloss, but no change to the function or life of the working surface material.
(G) Good:	A clearly discernable change in color or gloss, but no significant impairment of working surface function or life.
(F) Fair:	Objectionable change in appearance due to surface discoloration or function over an extended period of time.
(FL) Failure:	Pitting, cratering or erosion of working surface material. Obvious and significant deterioration.

Acids: Not less than 5 drops (0.25cc) of each reagent applied to 12" x 38" vertical test panel which has 50 rectangular sections. After 2 hours, wash, dry and evaluate.

Acetic Acid (50% or 75%)	(EX)
Acetic Acid, Glacial	(EX)
Formic Acid	(EX)
Hydrochloric Acid (37%)	(NE)
Hydrofluoric Acid (48%)	(NE)
Hydrogen Peroxide (30%)	(NE)
Nitric Acid (30%)	(G)
Phosphoric Acid (75%)	(EX)
Sulfuric Acid (50% or 70%)	(EX)

Solvent: Not less than 5 drops (0.25cc) of each reagent applied to 12" x 38" vertical test panel which has 50 rectangular sections. After 2 hours, wash, dry and evaluate.

Acetone (EX)	Gasoline (NE)
Amyl Acetate (NE)	Kerosene (NE)
Butyl Alcohol (NE)	Methyl Ethyl Ketone (EX)
Ethyl Alcohol (NE)	Monochlorobenzene (NE)
Methyl Alcohol (EX)	Napthalene (NE)
Cresol (G)	Phenol (EX)
Dimethyl Formamide (G)	Silver Nitrate (10%) (NE)
Dioxane (NE)	Sodium Sulfide, saturated (NE)
Ethyl Acetate (NE)	Tincture of Iodine (G)
Ethyl Ether (NE)	Toluene (NE)
Formaldehyde (NE)	Trichlorethylene (NE)
Furfural (EX)	Xylene (NE)

Bases and Salts: Not less than 5 drops (0.25cc) of each reagent applied to 12" x 38" vertical test panel which has 50 rectangular sections. After 2 hours, wash, dry and evaluate.

Ammonium Hydroxide (15%, 20%, or 25%) (NE)
Glycerine (NE)
Potassium Hydroxide (25%, 35%, or 45%) (NE)
Saturated Sodium Carbonate (NE)
Saturated Sodium Chloride (NE)
Saturated Zinc Chloride (NE)
Sodium Hydroxide (40% or 50%) (NE)
Sodium Hypochlorite, (5.25%) (NE)

Moisture and Heat Resistance: No visible effect when finish surface exposed to the following:

Hot water at a temperature of 190° F. to 205° F., trickled down the surface at 45° angle for 5 minutes.

Constant moisture using a 2" x 3" x 1" cellulose sponge, soaked with water, in contact with the surface for 100 hours.

1.6 DELIVERY, STORAGE AND HANDLING:

Deliver wood casework only after wet operations, utility rough-ins, and similar operations that could damage casework have been completed in installation areas.

Store completed wood casework in a ventilated place, protected from the weather, with relative humidity therein of 50% or less at 70° F. and maximum interior building temperature of 80° F. Avoid frequent or excessive changes in temperature or humidity level.

Protect finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering. Protect tops with corrugated cardboard securely taped in place.

1.7 PROJECT/SITE CONDITIONS:

Humidity and Temperature Controls:

Advise Contractor of requirements for maintaining heating, cooling and ventilation in installation areas as required to reach relative humidity necessary to maintain optimum moisture content.

Overhead Construction:

Do not start installation of laboratory casework until overhead construction of plumbing, ductwork, ceilings, and lighting is complete.

1.8 WARRANTY:

The manufacturer shall guarantee all materials and workmanship provided for a period of 1 year from date of substantial completion. Any defects due to the use of improper material or workmanship on the part of manufacturer occurring within that time shall be promptly rectified, by repair or replacement of the defective materials or correction of defective workmanship by manufacturer at his own expense, after notification by the Owner.

Furnish drawer construction and drawer guides with limited lifetime warranty.

1.9 EXTRA MATERIALS:

Furnish complete touch-up kit for finish of laboratory casework. Include scratch fillers, stains, finishes, and other materials necessary to perform permanent repairs to damaged finish.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

Provide wood laboratory casework produced by one of the following:

Collegedale
Fisher Hamilton Scientific, Inc.

Flinn Scientific, Inc.
Kewaunee Scientific Corp.; Laboratory Division
Mohon International, Inc.; Campbell Rhea

2.2 MATERIALS:

General:

Carefully and thoroughly air-dry all woods, then kiln dry by the laboratory casework manufacturer in humidity controlled kilns to a moisture content of 4.5%. Temper kiln dried lumber to a moisture content of 6% before use. Maintain moisture content throughout production.

Recycled Content: Materials/products shall contain the maximum amount of recycled content allowed that retains material integrity.

Minimum Recycled Content for Composite Wood Products: 80% by weight.

Local/Regional Materials: Preference shall be given to materials that are manufactured, harvested, extracted, mined, quarried, etc. within a 500 mile radius of the project site.

Composite Wood: All composite wood products shall be free of urea-formaldehyde resin binders.

Certified Wood: Wood based products shall be made from wood obtained from forests certified by an FSC accredited certification body to comply with the Forest Stewardship Councils "Principles and Criteria" except for recycled, reclaimed and salvaged wood content which may be from any source. Wood from other certification programs such as Sustainable Forest Initiative (SFI) are not acceptable.

Locations currently certified are available at www.fscus.org/faq/fsc_products.php?link=4.

Particleboard manufactured from certified wood materials is available from the following:

Collins Wood, Kalamath Falls, Oregon, (800) 547-1793.
Columbia Forest Products, Inc., Portland, Oregon, (800) 547-1791.
Phoenix Organics, Phoenix, Oregon, (541) 535-1134.
Uniboard Canada, Inc., Laval, Quebec, Canada, (800) 263-5240.

Fiberboard manufactured from certified wood materials is available from the following:

Cambium Forest Products, Calgary, Alberta, (403) 236-9740.
Columbia Forest Products, Inc., Portland, Oregon, (800) 547-1791.
Johnson International Hardwood Company, Kent, Washington, (253) 479-9900.
Phoenix Organics, Phoenix, Oregon, (541) 535-1134.

Exposed Materials:

Do not use exposed faces of lighter-than-average color joined with exposed faces of darker-than-average color. Do not use two adjacent faces which are noticeably dissimilar in grain, figure, and natural character markings.

Solid Wood: Clear, dry, sound, plain sawn, selected for compatible grain and color, no defects, of the following species:

Red Oak

Plywood Face Veneer: Same species as exposed solid lumber, clear, plain sliced, selected for grain and color compatible with exposed solid lumber, no defects. Provide HPVA HP-1, Grade

AA faces at least 1/50" thick and Grade J crossbands. Provide solid crossbandings without voids using water resistant resin glue. Edge band exposed edges with 3 mm solid wood of same species as face veneer.

Plywood Core: 7 ply veneer core.

Glue: Water resistant resin glue.

Semi-Exposed Materials:

Solid Wood: Dry, sound, plain sawn, selected to eliminate appearance defects. Any species of hardwood of similar color and grain to exposed portions.

Plywood: Hardwood, HPVA HP-1, Grade C faces and Grade J crossbands, plain sliced, any species to match color and grain of exposed members.

Concealed Materials:

Solid Wood or Plywood: Of any species, with no defects affecting strength or utility.

Hardboard: AHA A135.4, Class 1, tempered.

Concealed Framing, Connectors: Manufacturer's standard.

Glass:

Clear Float Glass: ASTM C1036, Type I, Class 1, 0.125" thickness, quality q3 (glazing select).

2.3 ACCESSORIES:

Hardware:

Provide manufacturer's standard, satin finish, commercial-quality, heavy-duty hardware units, unless otherwise indicated.

Drawer Suspension System: Provide nylon-tired, ball-bearing roller, except steel ball bearings at full extension drawer guides, with metal guide channels and integral stops to eliminate accidental removal of drawer. Furnish guides designed to provide self-closing of drawer and to prevent rebounding action when drawers are closed. Comply with BHMA A156.9, Type B05091.

Provide drawer guides as follows:

All File Drawers: Full extension with overtravel, 150 lb. static and dynamic load, zinc plated Accuride 3832 series.

Pulls for Drawer and Hinged Doors:

To match pulls on existing adjacent wood laboratory casework as acceptable to the Architect and available from manufacturer's standard lines.

Mount with 2 screws fastened from back. For sliding doors, provide recessed flush stainless steel pulls. Provide 2 pulls for drawers over 24" wide.

Hinges: Institutional type, 5 knuckle, wrap-around type, BHMA 156.9, Grade 1. Provide one pair for doors less than 4 ft. high and 1½ pair for doors over 4 ft. high. Attach with screws.

Finish: Chrome plated.

Adjustable Shelf Clips: Metal pin and socket, 5 mm wide 13 gage angle, bright zinc plated finish, and 0.25" diameter by 0.375" long pins. Round all edges.

Door Catch: Dual self-aligning, permanent magnet catches. Provide 2 catches on doors over 4 ft. high.

Catches permitting rebound opening are not acceptable.

Elbow Catch: BHMA B83021, cadmium plated, or spring loaded surface latch bolts with strike plates, located on left-hand door bottom of double-door units of tall cabinets.

Drawer and Cupboard Locks: Half-mortise type, heavy duty cylinder with round cylinder only exposed with stamped number, brass with plated finish. Provide keying and master keying as later scheduled. Provide two keys for each keyed different lock, 3 for each group keyed alike and 2 each master keys for each system. The lock system shall guarantee security which restricts the duplicating of keys to registered locksmiths.

Master Key System: 5-Disc tumbler and deadbolt with capacity of 225 primary key changes. Master key one level with capability of 40 different, non-interchangeable master key groups.

Include rekeying of existing casework locks to remain to operate on a single master key system.

Sliding Door Hardware Sets: Manufacturer's standard, to suit type and size of sliding door units.

Label Holders: Provide for all doors and drawers, size to receive standard label cards approximately 1" x 2-1/2" nominal size, steel finished to match other exposed hardware, and pinned to drawer or door fronts.

Provide one on each single or double door and one on each drawer.

"Stick-on" label holders are not acceptable.

Other Items:

Sink Supports: Provide casework manufacturer's standard metal bracket supports for all lab sinks except stainless steel.

Support Struts: Provide two 16 gage channel uprights fastened top and bottom by 2 adjustable "U" shaped spreaders. Where required, provide struts with hangers to support mechanical service piping and drain lines. Furnish in black acid resistant enamel finish.

Leg Shoes: Vinyl or rubber, black open bottom type with provision for floor clips.

2.4 WALL SHELVING:

Shelving Above Casework: 0.75" or 1" thick particleboard as shown, faced both sides with wood veneer to match adjacent wood laboratory casework, all exposed edges to have matching 3 mm solid wood edge banding.

Shelving at Other Locations: 0.75" or 1" thick particleboard as shown, faced both sides with high pressure, 0.050" thick, plastic laminate finish complying with NEMA LD3 on both sides, all four edges 3 mm PVC edge banding hot melt glue applied.

Color: White or black to match existing shelving as directed by the Architect.

VOC Content: Not more than 30 grams per liter.

Adjustable Shelf Supports: Surface-type steel standards and shelf brackets with epoxy powder coat finish, BHMA A156.9, Type B04102 and B04112.

2.5 ACCESSORIES:

Gas Cylinder Storage Units:

Provide USA Safety (877-805-8650) Model No. GB100FS or approved equal as follows:

Mounting: Wall.
Cylinder Capacity: One 4" to 14" diameter cylinder.
Bracket: Powder coated steel.
Protection: Reinforced vinyl edge guarding.
Securing Mechanism: 54" long polypropylene strap with steel cinch buckle.
Quantity: As shown on the drawings.

2.6 FABRICATION:

General:

Furnish wood casework fabricated to the quality standards of Fisher Hamilton Scientific, Inc. Oak Laboratory Furniture which identifying numbers are used on the drawings and in the schedules.

Fabricate wood casework following System Description and to dimensions, profiles, and details shown.

Interior of units to be fabricated to provide a smooth flush finish. Do not offset cabinet bottom with front face frame.

Dowel, glue, and screw all joints, except for drawer fronts, sides and backs, using precision jigs and clamps to insure square corners and plumb vertical surfaces. For drawer fronts, sides, and backs use chuck and bore construction at 32 mm on centers.

Assemble units in the shop in as large components as practicable to minimize field cutting and jointing.

Provide scribes and fillers as required.

Install hardware uniformly and precisely after final finishing is complete. Set hinges snug and flat in mortises unless otherwise indicated. Turn screws to flat seat. Adjust and align hardware so that moving parts operate freely and contact points meet accurately. Allow for final field adjustment after installation.

Base Units:

Ends shall be 0.75" Oak plywood with 3 mm Oak banding on front edges. Bore interior faces for security panels, rails and bored for shelf support clips.

Provide 4 metal corner gusset levelers with threaded adjustment screws and floor pad on all base units.

Front top rail, 1" x 3" solid hardwood, exposed member solid Oak, 8 mm dowels, glued and screwed to cabinet ends.

Vertical back top rail shall be solid hardwood, 0.75" x 3.75", with 8 mm dowels, glued and screwed to cabinet ends.

Provide top side rails 1.5" x 0.75" thick hardwood between front horizontal and back vertical rail.

Front toe space, hardwood, 3.75" x 0.75", mounted between end panels forming toe space, 4" high x 2.5" deep, closed to cupboard bottom. Secure rails to cabinet end panels with dowels.

Bottoms, base unit, shall be seven ply fir plywood, 0.75" thick, set flush, and joined to cabinet ends panels with 8 mm dowels spaced 96 mm on centers and metal fasteners. Seven ply, Oak veneered plywood, 0.75" thick, in open units. Tempered hardboard bottoms are not acceptable. Band front edge with 0.5 mm banding.

Backs, base unit, shall be 3/16" hardboard; 0.25" Oak veneered hardboard in open units. All backs are full width, non-structural and easily removable from cupboard interior for access to service lines. Fixed backs are not acceptable.

Provide removable 3/16" hardboard split back panels on drawer units.

Full height vertical dividers, 1.5" thick solid core plywood, glued and screwed in place top and bottom. Provide 3 mm Oak banding on front edge.

Shelves: Provide veneer core plywood as follows with 3 mm Oak banding on front edge, adjustable 32 mm centers on pin and socket supports. Shelves in open units shall be Oak plywood.

0.75" thick half depth, 7-ply.

Drawer box back, front, and sides shall be 0.5" 9-ply Birch plywood banded on top edge with 7 level polyester acrylic finish. Bottoms shall be 0.25" thick PVC clad welded fiber board, grooved into sides, back and front and sealed with hot melt glue around perimeter.

Chuck and bore construction on 32 mm centers.
Multiple dovetail construction.

Fabricate drawer head and solid doors using the following construction:

Full Overlay: 3-ply, 0.75" thick, solid core plywood with veneer on both faces and 3 mm banding on all edges.

Wall, Upper and Tall Cases:

Fabricate using materials and joinery similar to base units, and as follows:

Tops: 3/4" thick, 7-ply veneer core plywood with 3 mm Oak banding on front edge.

Wall and Upper Case Bottoms: 1" thick, 9-ply veneer core plywood with veneer on both sides and with a 3 mm Oak banding on the front edge.

Tall Case Bottoms: 3/4" thick plywood with veneer on both sides and with a 3 mm Oak banding on the front edge.

Bottom Kick Rail: Hardwood rail on tall cases 5-1/8" high joined to cabinet sides with 8 mm dowels.

Backs: Minimum 3/16" thick with backs recessed 7/8" and set into top, bottom, and ends and sealed with hot melt glue process around entire perimeter.

Shelves: 3/4" thick, 7-ply veneer core plywood.

Provide 3 mm Oak banding on front edge of all shelves. Unit shelves are to be adjustable on 32 mm centers.

Solid Door Construction:

Partial Overlay: 3-ply, 3/4" thick solid core plywood framed with hardwood lumber and surfaced with veneer on both sides.

Framed-Glass Doors: Solid core construction, 3/4" x 2-3/4" frame stock machined to accept glass. Provide extruded vinyl retaining molding designed so glass can be replaced without tools. Meeting edges of pairs of doors to include overlapping astragals: right over left.

Where indicated, provide sliding, framed glass doors on cabinet.

Sink Supports:

Provide casework manufacturer's standard metal bracket supports for all lab sinks except stainless steel, drop-in epoxy resin sinks and at fume hoods.

Support Struts:

Provide two 16 gage channel uprights fastened top and bottom by 2 adjustable "U" shaped spreaders. Furnish struts to support fume hood superstructures, or other abnormal loads. Where required, provide struts with hangers to support mechanical service piping and drain lines. Furnish in black acid resistant enamel finish.

Utility Space Framing:

Manufacturer's standard steel framing units consisting of 2 cold-rolled C-channel uprights, not less than 1-5/8" square by 0.10" thick, connected together top and bottom by U-shaped brackets made from 1-1/4" x 1-1/4" flat bars or by welding C-channel into rectangular frames instead of using U-shaped brackets.

Finish:

Finish on all wood equipment with manufacturer's standard low-emissions chemical resistant finish in accordance with the following:

All surfaces to be finished shall be sanded smooth, free from dirt, defects, and mill marks resulting from machining.

All finishing materials shall be free from all dirt and foreign matter, of superior quality, highly chemical resistant, evenly applied under proper room temperatures. They shall be completely dried under controlled conditions before applying subsequent coats.

Finish for exterior and exposed portions of casework shall consist of an application of clean stain of the required color and multiple coats of highly chemical resistant acrylic urethane

finish, force dried, sanded and wiped clean between coats. The resultant coating shall be a smooth, satin luster finish of not less than 1.5 mils dry film thickness.

Interior finish for all cases where semi-exposed to view shall be the same as for exteriors, except 1.0 mils dry film thickness.

Finish for drawer head exteriors to be three coats of chemically resistant acrylic urethane. Two coats of chemically resistant acrylic urethane to be applied to drawer sides and back. Finish drawer interior with 7 level polyester acrylic finish.

Exterior finish shall be water clear and bright. Cloudy, muddy or finishes carrying tinting pigments are not acceptable.

Finish, exterior and interior, shall be force dried in a dust free atmosphere.

Completed finish shall be resistant to acids, alkalis, salts, and solvents in accordance with the tests specified in this section.

Stain Color: To match color of existing adjacent wood laboratory casework.

2.7 TOPS AND SINKS:

Provide tops and sinks as specified in Section 12 36 53.

PART 3 - EXECUTION

3.0 EXAMINATION:

Refer to Section 01 73 00 for examination of substrate and job conditions.

Verify rough-ins for mechanical and electrical services for sizes, locations and adequacy; blocking and supports for wall mounted items and floors for compliance with specified tolerances.

3.1 PREPARATION:

Condition wood casework to average prevailing humidity conditions in installation areas prior to installing.

3.2 INSTALLATION:

General:

Install plumb, level, true and straight with no distortions. Shim as required, using concealed shims. Where wood casework abuts other finished work, scribe and cut for accurate fit. Secure with concealed fasteners. Before making cutouts, drill pilot holes at corners.

Utility Space Framing:

Secure to floor with 2 fasteners per frame. Fasten to partition framing, wood blocking or metal reinforcement in partitions, and to base cabinets.

Base Cabinets:

Set cabinets straight, plumb, and level. Adjust cabinet top-frame within 1/16" of a single plane. Fasten each individual cabinet to floor at toe space, with fasteners spaced 24" o.c. Bolt continuous cabinets together. Secure individual cabinets with not less than 2 fasteners into floor, where they do not adjoin other cabinets.

Where required, assemble units into one integral unit with joints flush, tight and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16".

Wall Cabinets:

Securely fasten to hanging strips, masonry, partition framing, blocking or reinforcement in partitions. Anchor, adjust and align wall cabinets as specified for base cabinets. Align tops and fronts of cabinets to a tolerance of 1/16".

Fasten each cabinet through back, near top, at not less than 24" o.c.

Reinforcement of stud walls to support wall-mounted cabinets will be done during wall erection by trade involved, but responsibility for accurate location and sizing of reinforcement is part of this work.

Trim and Moldings:

Install in single, unjointed lengths for openings and for runs less than maximum length of material available. For longer runs, use only one piece less than maximum length available in any straight run. Stagger joints in adjacent members. Provide matching fillers and scribe strips as indicated or required to fit cabinet runs to spaces provided.

Hardware:

Install hardware uniformly and accurately with hinges set snugly in mortises.

Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

Accessories:

Install accessories according to approved shop drawings and manufacturer's written instructions.

Securely fasten adjustable shelving supports and pegboards to partition framing, wood blocking, or reinforcements in partitions.

Install shelf standards plumb and at heights to align shelf brackets for level shelves. Install shelving level and straight and closely fitted to other work.

3.3 CLEANING AND PROTECTION:

Repair or remove and replace defective work as directed upon completion of installation.

Clean wood surfaces, repair minor damage per manufacturer's recommendations. Replace other damaged parts or units.

Protection: Advise Contractor of procedures and precautions for protection of materials and installed wood casework from damage by the work of other trades until acceptance of the work by the Owner.

Advise Contractor of the required temperature/humidity conditions which must be maintained during the remainder of the construction period.

Cover casework with 6-mil polyethylene film, for protection against soiling and deterioration during remainder of construction period.

END OF SECTION 12 35 53.19

SECTION 12 36 53
LABORATORY TOPS AND SINKS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Laboratory tops and sinks as shown on the drawings and in the schedules including patching of existing epoxy resin countertops to remain or to be relocated.

Related Sections:

Laboratory Fume Hoods: Section 11 53 13.
Metal Laboratory Casework: Section 12 35 53.13.
Wood Laboratory Casework: Section 12 35 53.19.
Laboratory Service Fixtures: Provided and installed under Plumbing and Electrical Work of Division 22 and 26 sections except where provided as part of premanufactured items.

1.2 SUBMITTALS:

Product Data:

Submit manufacturer's data and installation instructions for each type of top and sink.

Include independent laboratory certification that material complies with specified chemical and physical resistance requirements.

Samples:

Submit 3, 6" x 6" samples of each type of top with specified finish. Samples will be reviewed by Architect for color, texture, and pattern only. Compliance with other specified requirements is the exclusive responsibility of the Contractor.

Shop Drawings:

Submit shop drawings for tops and sinks coordinated with requirements for laboratory casework. Coordinate shop drawings with other work involved.

1.3 QUALITY ASSURANCE:

Provide laboratory tops and sinks (for integration with laboratory casework as required) furnished by the same supplier as for casework for single responsibility.

Chemical and Physical Resistance:

Provide an independent testing laboratory report certifying that the finish of laboratory tops and sinks are capable of withstanding the specified chemical and physical resistance requirements.

1.4 DELIVERY, STORAGE AND HANDLING:

Coordinate delivery of tops and sinks with laboratory casework items.

Protect finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering.

PART 2 - PRODUCTS

2.1 MATERIALS:

General:

Tops, Box Curbs, Splash Rim: Provide smooth, clean, exposed tops and edges, in uniform plane free of defects. Make exposed edges and corners uniformly rounded.

Top Sizes: Furnish tops in maximum practicable lengths, as follows, or longer if available.

Epoxy resin: 6 ft.

Top and Backsplash Thickness: Maintain 1.0" thickness with tolerance not exceeding ±1/32". Provide front and end overhang of 1" over base cabinets, formed with continuous drip groove on under surface 0.5" from edge.

2.2 CAST EPOXY RESIN:

Factory molded tops of modified epoxy resin formulation with fiber reinforcing, uniform texture throughout full thickness.

Color: Non-glaring black.

Content: Countertops shall contain no asbestos materials.

Include 2" high matching backsplashes for all abutting vertical surfaces.

Physical Properties: Flexural strength: 4000 psi; compressive strength: 14,000 psi; hardness, Rockwell M: 197; water absorption in 24 hours: 0.05%; heat distortion point: 400° F.; highly resistant to thermal shock; flammability or rate of burning ATB: 0 per ASTM D794.

Chemical Resistance: Spot test of following reagents in laboratory concentrations indicated, by weight, in contact with finished top for 24 hours, effect as indicated below:

REAGENT	RATING
Hydrochloric Acid 37%	Excellent
Sulfuric Acid 33%	No Effect
Sulfuric Acid 77%	No Effect
Sulfuric Acid 96%	Failure
Formic Acid 90%	Excellent
Nitric Acid 20%	Excellent
Nitric Acid 30%	Excellent
Nitric Acid 70%	Good
Hydrofluoric Acid 48%	Fair
Phosphoric Acid 85%	No Effect
Chromic Acid 60%	Failure
Acetic Acid 98%	Excellent

REAGENT	RATING
3 & 8 Equal Parts	Excellent
Ammonium Hydroxide 10%	No Effect
Sodium Hydroxide 10%	No Effect
Sodium Hydroxide 20%	No Effect
Sodium Hydroxide 40%	No Effect
Sodium Hydroxide Flake 100%	No Effect
Sodium Sulfide 100%	Excellent
Zinc Chloride 100%	No Effect
Tincture of Iodine 100%	Excellent
Silver Nitrate 100%	No Effect
Methyl Alcohol 100%	No Effect
Ethyl Alcohol 100%	No Effect
Butyl Alcohol 100%	No Effect
Benzene 100%	Excellent
Xylene 100%	No Effect
Toluene 100%	Excellent
Gasoline 100%	No Effect
Dichlor Acetic Acid 100%	Good
DiMethyl Formamide 100%	Excellent
Ethyl Acetate 100%	No Effect
Amyl Acetate 100%	Excellent
Acetone 100%	Excellent
Chloroform 100%	Excellent
Carbon Tetrachloride 100%	No Effect
Phenol 100%	Excellent
Cresol 100%	Excellent
Formaldehyde 100%	No Effect
Trichloroethylene 100%	Excellent
Ethyl Ether 100%	Excellent
Furfural 100%	Good
Methylene Chloride 100%	Excellent
Mono Chlor Benzene 100%	Good
Dioxane 100%	Excellent
Methyl Ethyl Ketone 100%	Excellent
Acid Dichromate 100%	Fair
Hydrogen Peroxide 100%	No Effect
Naphthalene 100%	Excellent

Workmanship: Cast surfaces very smooth, with factory cut-outs for sinks and drip grooves. Plain butt type joints assembled with epoxy adhesive and prefitted, concealed metal spline.

Products: Provide Cast Epoxy Resin units as manufactured by one of the following:

"Corrocast": Fisher-Hamilton
"Metcon": NII
"Kemresin": Kewaunee
"RheaResin": Campbell Rhea
"Durcon": Durcon
"Epoxyn": Epoxyn Products
"ContouraTop": Laboratory Tops, Inc.

2.3 SINKS:

General:

Sizes: As indicated on the drawings or manufacturer's closest stock size of equal or greater volume, as acceptable to the Architect.

Outlets: 1.5" diameter, 6" minimum length, fabricated of either silicon iron, cast epoxy resin, stainless steel, glass, or lead; of same material as sink wherever possible, or as otherwise acceptable to the Architect.

Overflows: Furnish hereunder for sinks, except cup sinks, of standard beehive or open top type with separate strainer. Height 2" less than sink depth. Of same material as sink.

Cast Epoxy Resin Sinks:

Molded in one piece with surfaces smooth, corners coved and bottom sloped to outlet. Minimum physical properties and chemical resistance as specified for cast epoxy resin tops. Thickness: 0.5" minimum.

PART 3 - EXECUTION

3.0 EXAMINATION:

Verify rough-ins for mechanical and electrical services for types, sizes, adequacy and locations.

Refer to Section 01 73 00 for examination of substrate and job conditions.

3.1 INSTALLATION:

Field Jointing:

Where practicable, make in same manner as factory jointing using dowels, splines, adhesives, and fasteners recommended by manufacturer. Locate field joints as shown on accepted shop drawings, factory prepared so that there is no job site processing of top and edge surfaces.

Fastenings:

Secure epoxy tops to cabinets with epoxy cement applied at each corner and along with perimeter edges at not more than 48" o.c.

Workmanship:

Abut top and edge surfaces in one true plane, with internal supports placed to prevent any deflection. Provide flush hairline joints in top units using clamping devices.

Where necessary to penetrate tops with fasteners, countersink heads approximately 0.125" and plug hole flush with material equal in chemical resistance, color, hardness and texture to that of adjacent countertop surface.

Patch epoxy resin countertops to remain or to be relocated with material equal in chemical resistance, hardness and texture to that of adjacent countertop surface.

After installation, carefully dress joints smooth, remove any surface scratches, clean and polish entire surface.

Provide all holes and cut-outs as required for mechanical and electrical service fixtures and as otherwise required.

Provide scribe moldings for closures at junctures of top, curb and splash with walls as recommended by manufacturer for materials involved.

Use chemical resistant, permanently elastic sealing compound where recommended by manufacturer.

3.2 SINK INSTALLATION:

Underside Installation:

Use manufacturer's recommended adjustable support system for table-type and cabinet-type installations.

Set top edge of sink unit firmly pressed to countertop, set in manufacturer's recommended chemical resistant sealing compound to produce a tight and fully leakproof joint.

Adjust sink and securely support to prevent movement.

END OF SECTION 12 36 53

SECTION 12 48 13

ENTRANCE FLOOR MATS AND FRAMES

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Entrance mats as shown on the drawings including transition strips.

1.2 SUBMITTALS:

Product Data:

Submit manufacturer's specifications and installation instructions for entrance mat and edge strip.

Samples:

Submit samples for type and color of entrance mat. Provide 12" square samples of mat materials with required edging on two sides. Architect's review of samples will be for color, pattern and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

1.3 QUALITY ASSURANCE:

In addition to the requirements of these specifications, comply with manufacturer's instructions and recommendations for preparation of substrate and application of entrance mats.

PART 2 - PRODUCTS

2.1 MATERIALS:

Tile Mats:

Provide heavy duty carpet tile matting material specifically designed for installation as an entry mat, Step in Style as manufactured by Lees or approved equal complying with the following:

Provide entrance mat meeting "Green Label Plus" requirements of the Carpet and Rug Institute.

Recycled Content: Not less than 34.8% post-industrial and not less than 0% post-consumer.

Provide entrance mat that complies with the following limits for VOC content when tested according to ASTM D5116:

Total VOC Emission for Carpet: Not greater than 0.5 $mg/m^2/hr$.

Formaldehyde Emission for Carpet: Not greater than 0.05 $mg/m^2/hr$.

4 - Phenylcydohexene Emission: Not greater than 0.05 $mg/m^2/hr$.

Styrene Emission: Not greater than 0.4 mg/m^2/hr.

2 Ethyl - 1 Hexanol Emission: Not greater than 3.00 mg/m^2/hr.

Tile Size: 24" x 24".

Construction: Tufted.

Pile: Textured patterned cut and loop.

Face Yarn: 100% Fortis Nylon 6,6 with Nylon 6,6 scraper yarn and Sentry Soil Protection treatment.

Yarn Weight: 32 oz./sq. yd. minimum.

Gage: 1/12 minimum.

Stitches: 10 per inch minimum.

Average Pile Density: 8930 minimum.

Average Pile Height: 0.129".

Total Thickness: 0.435".

Backing: ICT-RC - Fiberglass Reinforced Thermoplastic Composite Tile

Color: As indicated in the Finish Legend on the drawings or, if not indicated, as selected by the Architect from manufacturer's full line of standards.

Adhesive: Manufacturer's recommended water based adhesive for substrate indicated.

VOC Content: Not more than 50 grams per liter.

PART 3 - EXECUTION

3.1 INSTALLATION:

Install entrance mats as a surface mount installation at the locations shown, complying with the manufacturer's instructions.

Install tile mats with adhesive as recommended by manufacturer.

Install edge guard at every location where edge of carpet mat is exposed to traffic or joins to another material.

END OF SECTION 12 48 13

SECTION 13 21 33
ENVIRONMENTAL CHAMBERS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-Specification sections, apply to work of this section.

1.1 SUMMARY:

Section Includes:

Environmental chambers and related equipment as indicated on the drawings.

Related Sections:

Owner furnished and installed chamber curtains: Section 01 10 00
Environmental performance of chambers: Section 01 10 00
General Commissioning Requirements: Section 01 91 13
Metal Support Assemblies: Section 05 45 00
Metal fabrications for ports: Section 05 50 00
Sheet metal cladding of chamber side of wall and ceiling panels: Section 05 58 00
Joint Sealants: Section 07 92 00
Resilient Flooring: Section 09 65 00
Access Flooring: Section 09 69 00
Metal Storage Shelving: Section 10 56 13
Plumbing connections: Division 22 sections
HVAC connections: Division 23 sections
Electrical work and final connections: Division 26 sections
Lighting (including specialty lab lighting): Division 26 sections

1.2 SUBMITTALS:

Product Data:

Submit manufacturer's specifications and technical product data for each component required for the construction of the environmental chambers.

Shop Drawings:

Submit shop drawings indicating the environmental chamber locations and dimension drawings to fully indicate all information required for installation. Indicate sizes and locations of mechanical and electrical equipment necessary for the chamber's performance in accordance with manufacturer's requirements.

Include details, gasket locations and types, and hardware for man-doors and access doors.

Include details for port openings. Clearly indicate work provided under this section versus work under other sections. Clearly annotate trade to provide work and coordinate requirements with that trade.

Certification:

Submit certification that products provided meet the Environmental Performance requirements specified in Section 01 10 00 including for no off-gassing and no degradation of performance due to the presence of high amounts of UV and for temperature up to 60° Celsius.

Operation and Maintenance Data:

Submit operation and maintenance manual as specified in Section 01 78 23.

1.3 QUALITY ASSURANCE:

Standards:

Provide all panel systems with a flame spread rating of 25 or less.

Manufacturer:

An established organization and production facility that has been specializing in the type of environmental chamber construction for a minimum of 5 years.

Pre-Installation Conference:

Conduct conference at the project site in accordance with Section 01 31 19.

Require Owner, Architect, Contractor, manufacturer, supplier, Installer and related trades including metal support assembly installer, access flooring installer, metal storage shelving installer, fire protection installer, mechanical installer and electrical installer to attend the conference.

Discuss approved submittals, installation requirements, sequencing and protection of components until the end of construction.

Coordination:

Confirm anticipated loading from access flooring pedestals from the access flooring manufacturer. Modify design of floor panels or traffic surface on the floor panels as required to accommodate the loading of the access floor system along with any deflection requirements.

Include in submittal package certification that products provided meet the requirements outlined above. Include design changes in submittals as required to achieve these requirements.

1.4 DELIVERY, STORAGE AND HANDLING:

Protect all project materials during transit, delivery, storage and handling to prevent damage, soiling and deterioration. Any materials or equipment that is damaged before project acceptance will be rejected.

1.5 PROJECT/SITE CONDITIONS:

Installer will visit and inspect the project site before manufacturing the environmental chambers to ensure no existing site conditions will adversely effect the installation and performance of the environmental chambers.

Verify all dimensions in the field and advise Contractor of any discrepancy before performing work.

1.6 WARRANTY:

All components furnished shall be guaranteed for a period of one year from the date of substantial completion thereof against defective materials, design and workmanship. All prefabricated panels installed for the environmental chambers shall carry a 10 year warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

Provide environmental chambers fabricated from ThermalSafe Fire Resistant Panels manufactured by one of the following or approved equal:

Bally
Kolpak
Nor-Lake

2.2 GENERAL:

Provide environmental chambers as shown on the drawings using modular panel construction. Use no structural metal, wood or fiberglass between interior and exterior wall and ceiling skins. Floor panels may have non-heat-conducting structural reinforcement as required to support the required load. Furnish environmental chambers with ceiling height shown on the drawings.

General:

Provide products will not degrade under the use conditions indicated including in the presence of high ultraviolet light and temperatures up to 60 degrees Celsius. Provide products which do not off-gas in accordance with the requirements of Section 01 10 00.

Basis of Design: Bally Box by Bally.

2.3 CONSTRUCTION:

Panel Design:

Environmental chambers to consist of precision constructed modular 4" thick wall panels, 4" thick floor panels and 4" thick ceiling panels, rigid insulated interchangeable panels. The panels shall be designed for easy, modular installation.

Include additional framing supports in wall and ceiling panels to accommodate man-doors, access doors, port locations, shelving supports, metal support assemblies and similar items of the work which require structural support for anchorage.

Coordinate support locations and types with Installer of related items where applicable.

Provide framing supports on all four sides of man-door locations and access door locations.

Insulation:

Insulation shall be 4" thick, rigid, non-ozone-depleting urethane foamed-in-place with 2.5 lbs. per cubic feet design density, "K" factor no more than 0.114, "R" factor a minimum of 34.00, insulation 97% closed cell structure and be a self-extinguishing type.

Foam-in-place insulation manufactured using chlorofluorocarbons (CFCs) or hydrochlorofluorocarbons (HCFCs) is not acceptable.

VOC Content: Not more than 0 grams per liter.

Wall and Ceiling Panel Construction:

Panels shall consist of 100% urethane insulation bonded by adhesive to the interior and exterior metal panel skins and heat cured, tongue and groove edges, and a positive seal between panels. Cam-action latches shall be precisely located and foamed into place for perfect alignment of panels when connected together. The cam-action latches shall be actuated from the interior of the chamber. Provide special lock wrench and lock wrench hole covers. Panel gasket shall be foamed-in-place, continuous one piece construction.

Floor Panel Construction:

Panels shall consist of 100% urethane insulation bonded by adhesive to the lower metal panel skin and upper plate flooring surface and heat cured, tongue and groove edges, and a positive seal between panels, including adjacent wall panels. Cam-action latches shall be precisely located and foamed into place for perfect alignment of panels when connected together. The cam-action latches shall be actuated from the interior of the chamber. Provide special lock wrench and lock wrench hole covers. Panel gasket shall be foamed-in-place, continuous one piece construction.

Walking Surface: Rigidized aluminum diamond plate.

Design Weight: 1200 psf uniformly distributed and 2000 pound wheel load (such as from a forklift).

Door Construction: (Man-Doors and Access Doors)

Furnish doors as scheduled mounted in a typical panel, flush mounted infitting type. Construct door to incorporate a heavy duty molded ABS breaker strip permanently foamed-in-place. Equip with 1.5 pair of butt hinges on man-doors, 1 pair of butt hinges on access doors, positive door closer, door lockset with levers on both the interior and exterior faces. Equip with cylinder lock capable of accepting building standard door hardware cylinder as specified in Section 08 71 00. Interior lever shall allow free operation of locked man-door.

Provide man-doors with door threshold mounted 12" above finished floor to be flush with adjacent access floor surface. Coordinate exact height with Section 09 69 00.

Furnish door jamb fully coved with extruded continuous load-bearing member designed for easy cleaning. Breaker strip shall be heavy duty molded PVC permanently foamed-in-place.

Attach all hardware to extra thick tapping plates.

Fit doors with gasket on sides and top, incorporating magnetic strips on the latching side and top. Gasket to be easily replaceable. Seal bottom of door with a "dual seal" adjustable sweep gasket, designed to provide a complete seal between door, threshold and door jamb.

Kickplates:

Provide exterior and interior kickplates 12" high and fabricated from 16 gage, Type 304 stainless steel with a #3 finish.

Closure Panels and Trim Strips:

Provide closure panels and trim to meet specific needs and paint to match surrounding color.

Wall and Ceiling Port Locations:

Fabricate panels to accommodate steel pipe ports as detailed on the drawings. Factory core panels to actual diameter of each steel pipe port plus 0.125". Include factory applied sheet metal sleeve to protect insulation from installation of steel pipe port.

Fire Protection Systems:

Coordinate and accommodate fire protection services as shown on the drawings and as specified in Division 21 sections.

Mechanical Systems:

Coordinate and accommodate mechanical services as shown on the drawings and as specified in Division 23 sections.

Electrical and Lighting Systems:

Coordinate and accommodate electrical systems and lighting as shown on the drawings and as specified in Division 26 sections.

Joint Sealants:

Comply with the requirements of Section 07 92 00.

Finishes:

Exterior Faces: Manufacturer's standard baked polyester coil coating in color as selected by the Architect from manufacturer's standards.

Interior Faces: Manufacturer's standard baked polyester coil coating in white color.

Standard coating must be of sufficient thickness and durability to prevent galvanic action in humidified space between interior face panels and sheet aluminum cladding specified in Section 05 58 00.

PART 3 - EXECUTION

3.1 EXAMINATION:

Refer to Section 01 73 00 for examination of substrate and job conditions.

3.2 INSTALLATION:

General:

Install environmental chambers plumb, level, rigid, securely anchored to building and adjacent construction, in proper location and in accordance with manufacturer's instructions. Install closures neatly. Securely attach access panels but provide for easy removal.

Coordinate sequence of Work with mechanical and electrical trades or other related work.

Installation:

Includes erection of environmental chamber panels and door panels, door thresholds, closure panels, trim strips and all else as specified or indicated.

Field cut the panels prior to installation to structural steel members.

Install sealants where indicated to clean dry surfaces only without skips or voids, to ensure system meets the requirements of the fire resistant certification.

See Section 07 92 00 for installation of joint sealants.

3.3 FIELD QUALITY CONTROL:

Testing and Commissioning:

Comply with the requirements of Section 01 91 13.

END OF SECTION 13 21 33