PROJECT MANUAL

COLUMBUS METROPOLITAN LIBRARY
KARL ROAD BRANCH LIBRARY
5590 KARL ROAD
COLUMBUS, OHIO 43229

PREPARED FOR:

PREPARED BY:

MOODY•NOLAN
300 SPRUCE STREET, SUITE 300
COLUMBUS, OHIO 43215
614-461-4664

TEC STUDIO
7510 SLATE RIDGE BLVD
COLUMBUS, OHIO 43068

REALM COLLABORATIVE
LANDSCAPE ARCHITECTS
31 EAST FIFTH AVENUE
COLUMBUS, OHIO 43201

KABIL ASSOCIATES
STRUCTURAL ENGINEERS
5900 SHARON WOODS BLVD, # B
COLUMBUS, OHIO 43229

AEC ENGINEERING
MEP ENGINEERS
1405 DUBLIN ROAD
COLUMBUS, OHIO 43215

TURNER CONSTRUCTION CO.
CONSTRUCTION MANAGEMENT
262 HANOVER STREET
COLUMBUS, OHIO 43215

MOODY ENGINEERING
CIVIL ENGINEERS
300 SPRUCE STREET, SUITE 300
COLUMBUS, OHIO 43215

VOLUME 1
CD PROGRESS
NOVEMBER 13, 2019
TABLE OF CONTENTS
Columbus Metropolitan Library – Karl Road Branch

Cover Sheet
Table of Contents

Volume 1

00 43 25 - Substitution Procedures
00 43 26 - Substitution Request Form

DIVISION 01 - GENERAL REQUIREMENTS

01 33 23 Shop Drawings, Product Data, Samples
01 40 00 Quality Requirements
01 56 39 Temporary Tree and Plant Protection
01 60 00 Product Requirements
01 73 00 Execution Requirements
01 73 29 Cutting and Patching
01 74 00 Cleaning

DIVISION 02 – EXISTING CONDITIONS

02 41 13 Selective Site Demolition
02 41 16 Structure Demolition

DIVISION 03 - CONCRETE

03 01 30 Concrete Cleaning and Sealing
03 30 00 Cast-In-Place Concrete
03 35 43 Polishing Concrete Floors

DIVISION 04 - MASONRY

04 00 00 Masonry

DIVISION 05 - METALS

05 10 00 Structural Metal Framing
05 20 00 Steel Joists
05 30 00 Metal Deck
05 40 00 Cold-Formed Metal Framing
05 50 00 Metal Fabrications
05 50 05 Site Metal Fabrications
05 70 00 Decorative Metals

DIVISION 06 – WOOD, PLASTICS AND COMPOSITES

06 10 50 Wood Blocking
06 20 00 Finish Carpentry
06 40 00 Architectural Woodwork

TOC - 1
DIVISION 07 - THERMAL & MOISTURE PROTECTION

07 10 00 Waterproofing
07 19 00 Site Water Repellents
07 21 00 Thermal Insulation
07 27 26 Fluid Applied Membrane Air Barrier
07 42 44 Metal Composite Materials
07 46 10 Metal Siding
07 54 23 Thermoplastic Polyolefin Roofing
07 62 00 Sheet Metal Flashing and Trim
07 72 33 Roof Hatch
07 84 00 Firestopping
07 92 00 Joint Sealants

DIVISION 08 - DOORS & WINDOWS

08 11 13 Hollow Metal Doors and Frames
08 14 00 Wood Doors
08 31 13 Access Doors
08 36 13 Sectional Doors
08 41 13 Aluminum - Framed Entrances and Storefronts
08 42 29 Sliding Automatic Entrances
08 43 14 Interior Aluminum Storefront
08 44 13 Glazed Aluminum Curtainwalls
08 71 10 Door Hardware
08 81 00 Glass and Glazing

DIVISION 09 - FINISHES

09 21 16 Gypsum Board Systems
09 30 00 Tile
09 51 13 Acoustical Panel Ceilings
09 54 23.13 Baffle Metal Ceilings
09 65 00 Resilient Flooring
09 68 00 Carpeting
09 84 33 Fixed Sound Absorptive Panels
09 91 00 Painting

DIVISION 10 - SPECIALTIES

10 21 14 Plastic Toilet Compartments
10 22 21 Demountable Glass Partitions
10 22 26 Folding Panel Partitions
10 26 00 Wall Protection
10 28 13 Toilet Accessories
10 41 16 Emergency Key Cabinets
10 43 13 Defibrillator Cabinets
10 44 00 Fire Extinguishers and Cabinets
10 51 13 Metal Lockers

DIVISION 11 - EQUIPMENT
11 51 13 Book Depositories

DIVISION 12 - FURNISHINGS
12 24 13 Roller Window Shades
12 33 55 Plastic Laminate Faced Casework
12 93 00 Site Furnishings

DIVISION 14 - CONVEYING EQUIPMENT
14 21 23 Electric Traction Machine Roomless Elevator

Volume 2

DIVISION 21 - FIRE SUPPRESSION
21 05 17 Sleeves and Sleeve Seals for Fire Protection Piping
21 05 18 Escutcheons for Fire-Suppression Piping
21 05 23 General-Duty Valves for Fire Protection Piping
21 05 29 Hangers and Supports for Fire Protection Piping and Equipment
21 05 53 Identification for Fire-Suppression Piping and Equipment
21 13 13 Wet-Pipe Sprinkler Systems

DIVISION 22 - PLUMBING
22 05 13 Common Motor Requirements for Plumbing Equipment
22 05 17 Sleeves and Sleeve Seals for Plumbing Piping
22 05 18 Escutcheons for Plumbing Piping
22 05 19 Meters and Gages for Plumbing Piping
22 05 23 General-Duty Valves for Plumbing Piping
22 05 29 Hangers and Supports for Plumbing Piping and Equipment
22 05 53 Identification for Plumbing Piping and Equipment
22 07 19 Plumbing Piping Insulation
22 11 16 Domestic Water Piping
22 11 19 Domestic Water Piping Specialties
22 11 24 Facility Natural-Gas Piping
22 13 16 Sanitary Waste and Vent Piping
22 13 19 Sanitary Waste Piping Specialties
22 14 13 Facility Storm Drainage Piping
22 14 23 Storm Drainage Piping Specialties
22 14 29 Sump Pumps
22 34 00 Fuel-Fired, Domestic-Water Heaters
22 40 00 Plumbing Fixtures

DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)
23 00 00 HVAC General Requirements
23 05 13 Common Motor Requirements for HVAC Equipment
23 05 29 Hangers and Supports for HVAC Piping and Equipment
23 05 53  Identification for HVAC Piping and Equipment
23 05 93  Testing Adjusting and Balancing for HVAC
23 07 13  HVAC Duct Insulation
23 07 19  HVAC Piping Insulation
23 09 00  Instrumentation and Control For HVAC
23 31 13  Metal Ducts
23 33 00  Air Duct Accessories
23 33 46  Flexible Ducts
23 34 16  Centrifugal HVAC Fans
23 37 13  Diffusers, Registers, and Grilles
23 74 33  Dedicated Outdoor-Air Units
23 81 29 -  Variable-Refrigerant-Flow HVAC Systems
23 82 39.19  Wall and Ceiling Unit Heaters

DIVISION 26 - ELECTRICAL

26 00 10  Electrical General Requirements
26 00 15  Submittals
26 00 20  Basic Electrical Materials and Methods
26 05 19  Low-Voltage Electrical Power Conductors and Cables
26 05 26  Grounding and Bonding for Electrical Systems
26 05 29  Hangers and Supports for Electrical Systems
26 05 33  Raceways and Boxes for Electrical Systems
26 05 43  Underground Ducts and Raceways for Electrical Systems
26 05 53  Identification for Electrical Systems
26 05 72  Short Circuit Coordination Arc Flash Study
26 05 81  Manholes, Handholes And Underground Pull Boxes
26 09 23  Lighting Control Devices
26 09 43  Relay-Based Lighting Controls
26 24 16  Panelboards
26 27 26  Wiring Devices
26 28 13  Fuses
26 28 16  Enclosed Switches and Circuit Breakers
26 28 17  Elevator Safety Switches
26 29 13  Enclosed Controllers
26 43 13  Surge Protection for Low-Voltage Electrical Power Circuits
26 51 19  LED Interior Lighting
26 56 00  Lighting System
26 56 19  LED Exterior Lighting

DIVISION 27 - COMMUNICATIONS

27 00 01  General Requirements for Communications
27 05 02  Basic Materials and Methods for Communications
27 05 26  Grounding and Bonding for Communications
27 05 28  Pathways for Communications
27 05 53  Identification for Communications
27 11 16  Communications Cabinets, Racks, Frames and Enclosures
27 11 23  Communications Cable Management and Ladder Rack
27 11 26  Communications Rack Mounted Power Protection and Power Strips
27 13 23  Communications Fiber Optic Backbone Cabling
27 15 13  Communications Copper Horizontal Cabling
DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

28 13 00 Access Control
28 16 00 Intrusion Detection
28 20 00 Video Surveillance
28 31 11 Digital, Addressable Fire-Alarm System

DIVISION 31 – EARTHWORK

31 00 00 Site Work
31 15 00 Site Preparation
31 25 00 Erosion and Sediment Control
31 30 00 Earthwork

DIVISION 32 – EXTERIOR IMPROVEMENTS

32 01 90 Operation and Maintenance of Planting
32 12 16 Asphalt Paving
32 13 13 Concrete Paving
32 13 13 Concrete Paving
32 13 73 Site Joint Sealants
32 91 13 Soil Preparation
32 92 00 Turf and Grasses
32 93 00 Plants

DIVISION 33 – UTILITIES

33 11 00 Water Distribution
33 31 00 Sanitary Sewer
33 41 00 Storm Sewer System
33 49 00 Storm Drainage Structures

CUT SHEETS
This page intentionally blank
SECTION 00 43 25A

SUBSTITUTION PROCEDURES

1.01 GENERAL

A. This Section applies to substitute products and procedures requested by the Bidder to be added during the Bid period.

B. Requirements of this Section are in addition to the requirements of Instructions to Bidders, General Conditions and Supplementary Conditions.

C. Requirements of this Section are part of the requirements specified in Section 00 43 25B - Substitution Request Form.

1.02 LIMITATIONS ON SUBSTITUTIONS

A. Substitutions will NOT be considered unless Section 00 43 25B - Substitution Request Form attached in this Project Manual is used and the requirements of this Section and their Substitution Request Form are fully complied with.

1. Other types of forms are NOT acceptable.

B. Substitutions will NOT be considered when requested directly by subcontractor or supplier.

C. Architect will determine the acceptability of all substitutions.

1.03 REQUEST FOR SUBSTITUTIONS

A. Bidder's Representation

1. Request for substitution constitutes a representation that the Bidder has investigated the proposed product and has determined that it is equal to or superior in all respects to the specified product.

2. Request for substitution constitutes a representation that the Bidder will provide same type of warranty for substitution as for specified product.

3. Request for substitution constitutes a representation that the Bidder will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

4. Request for substitution constitutes a representation that the Bidder waives all claims for additional costs related to substitutions which consequently become apparent.

5. Request for substitution constitutes a representation that the cost data is complete and includes all related cost under his Contract.

6. Request for substitution constitutes a representation that the Bidder has
thoroughly investigated the proposed substitute to determine if license fees and royalties are pending on the proposed substitute.

B. Request for substitutions shall be submitted on Section 00 43 25B - Substitution Request Form attached in this Project Manual. Legible copies of this form shall be made as required for Bidder's submittals. Each submittal request form shall be complete with data substantiating compliance of proposed substitution with requirements of Contract Documents including the following information:

1. Project title and Architect's project number.
2. Identification of product specified including specification section and paragraph number.
3. Identification of proposed substitute complete with manufacturer's name and address, trade name of product, model or catalog number and product data.
4. List of fabricator and supplier (with address and phone number) for proposed substitute.
5. The affect of substitution on dimensions, material thickness, wiring, piping, ductwork, etc. indicated in Contract Documents.
6. The affect of substitution on other trades.
7. The affect of substitution on construction schedule.
8. Differences in quality and performance between specified product and proposed product.
9. Comparison of manufacturer's guarantees of specified product and proposed substitute.
10. Availability of maintenance services and replacement materials for proposed substitute.
11. License fees and/or royalties pending on proposed substitute.

1.04 SUBMITTAL PROCEDURES

A. Submit a separate Section 00 43 25B - Substitution Request Form for each substitution.

1. Form shall be completely and properly filled in. If form is incomplete, the Architect reserves the right to reject and return form to Bidder for completion and compliance with this section and Form 00 43 25B.
2. Submit to Architect two copies of the completed and signed form.

B. Requests for substitutions of products will be considered no later than ten (10) days prior to Bid Opening Date to allow time for Architect's evaluation of substitutions and the preparation of an addendum, if required.

C. Architect will issue the Addendum to all Bidders to notify them of the Architect's decision to accept the requested substitution.
END OF SECTION
SECTION 00 43 25B

SUBSTITUTION REQUEST FORM

GENERAL: This form is part of the substitution requirements specified in Section 00 43 25A.

PROJECT TITLE & NO. ____________________________________________________________


TO: MOODY NOLAN INC.
   300 Spruce Street, Suite 300
   Columbus, Ohio 43215
   Telephone (614) 461-4664  FAX (614) 280-8881
   Contact and Email:

   ATTN: ________________________________________________________________

SPECIFIED ITEM ____________________________________________________________

   Section ___________________   Paragraph ___________________

PROPOSED SUBSTITUTE _______________________________________________________

   Attach complete description, catalog, spec data, and laboratory tests if applicable

1. What effect will substitution have on dimensions, gauges, weights, etc. indicated in
   Contract Documents?
   ________________________________________________________________

2. What effect will substitution have on wiring, piping, ductwork, etc. indicated in Contract
   Documents?
   ________________________________________________________________

3. What effect will substitution have on other trades?
   ________________________________________________________________
4. What effect will substitution have on construction schedule? _________________________________

5. What are the differences in quality and performance between proposed substitute and specified product? _________________________________

6. Manufacturer's guarantees of the specified products and proposed products are:
   Same: ______ Different (Explain) _________________________________

7. List (on separate sheet), if applicable, the availability of maintenance services and replacement materials for proposed substitute.

8. List (on separate sheet) names, addresses and phone numbers of fabricators and suppliers for proposed substitutes.

9. There [are ___] [are no ___] license fees and royalties pending on the proposed substitute. (Explain) _________________________________

11. The undersigned certifies that this substitution meets all requirements of the Contract Documents except as specifically noted herein.

   SUBMITTED TO BIDDER BY: (Supplier/Fabricator)

   Firm _____________________________________________
   Address _____________________________________________
   Name and Title of Person Signing _________________________________
   Signature ______________________________________________
   Telephone No. ______________________ Date ______________________

   SUBMITTED TO ARCHITECT BY: (Bidder)

   Firm _____________________________________________
   Address _____________________________________________
   Name and Title of Person Signing _________________________________
   Signature ______________________________________________
Telephone No. ___________________________ Date ________________________

FAX No. ___________________________ Email ______________________________

12. ARCHITECT/ENGINEER'S REVIEW COMMENTS:

___ Tentatively Accepted ___ Rejected due to
(pending issuance of incomplete form.
Addendum)

___ Not Accepted ___ Received Too Late

Signature ______________________________________________________________

Date ___________________________________________________________________

Remarks
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

END OF SECTION
SECTION 01 33 23

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.02 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Architect's responsive action.

B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.03 GENERAL REQUIREMENTS

A. Requirements of this Section are in addition to the requirements of the General Conditions.

B. This Section includes procedures for processing:

1. Shop drawings.
2. Product data.
3. Samples.
4. Certificates of compliance.
5. Reports.
7. Design data.
8. Other submittals listed.

C. Submittals as approved do not constitute a change order.

D. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

E. Submittals Schedule: See Section 01 32 16, Construction Schedules, for list of submittals and time requirements for scheduled performance of related construction activities.

1. Submittals received prior to receipt of the initial Submittals Schedule will be rejected.
2. Submittals received prior to the time they are indicated on the Submittal Schedule to be submitted will be rejected.

F. Make all submittals far enough in advance of scheduled dates for installation to provide sufficient time for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.

1. Delays caused by the tardiness of the Contractor in preparing and forwarding submittals will not be an acceptable basis for an extension of the Contract completion date or for consideration of alternate products which do not meet the specified requirements of this Project Manual.
2. Initial Review: Allow 14 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
3. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
4. Resubmittal Review: Allow 14 days for review of each resubmittal.
5. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is necessary, allow 14 days for initial review of each submittal.
6. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 14 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.

G. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Include the following information on label for processing and recording action taken:
   a. Project name.
   b. Date.
   c. Name and address of Architect.
   d. Name and address of Contractor.
   e. Name and address of subcontractor.
f. Name and address of supplier.
g. Name of manufacturer.
h. Submittal number or other unique identifier, including revision identifier.
   1) Submittal number shall use Specification Section number.
i. Number and title of appropriate Specification Section.
j. Drawing number and detail references, as appropriate.
k. Location(s) where product is to be installed, as appropriate.
l. Other necessary identification.

H. Notify Architect in writing at time of submittal of deviations from the requirements of the Contract Documents. In addition, highlight, encircle, or otherwise specifically identify deviations.

I. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.

1. Transmittal Form: Provide locations on form for the following information:
   a. Project name.
   b. Date.
   c. Destination (To:).
   d. Source (From:).
   e. Names of subcontractor, manufacturer, and supplier.
   f. Category and type of submittal.
   g. Submittal purpose and description.
   h. Specification Section number and title.
   i. Drawing number and detail references, as appropriate.
   j. Submittal and transmittal distribution record.
   k. Remarks.
   l. Signature of transmitter.

2. On an attached separate sheet, prepared on Contractor’s letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.

J. Resubmittals: When Architect requires that a submittal be resubmitted, comply with requirements of this section.

1. Identify changes made since the previous submittal.

K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

L. Electronic Files: At Contractor’s written request, copies of Architect’s electronic files will be provided to Contractor for Contractor’s use in connection with Project, subject to the following conditions:
1. Execute Electronic File Transfer Agreement provided by the Architect to obtain files.
2. The electronic files are provided for the Contractor’s convenience and their use will be at the Contractors risk.
   a. There are no assurances that the information in the electronic files is current. All dimensions must be field-verified.

1.04 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

B. Product Data

1. Submit only pages which are pertinent.
   a. Mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Article number.
   b. Show reference standards, performance characteristics, and capacities; wiring and piping diagrams and controls; component parts; finishes; dimensions; and required clearances.
2. Modify manufacturer’s standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the work. Delete information not applicable.
3. Stamp and sign each set of manufacturer’s product data before submitting to Architect to certify compliance with Contract Documents.
4. Number of Copies Required: Submit two paper copies of Product Data, and in portable data file (.pdf) format, unless otherwise indicated. When submitting for Concurrent Consultant Review, submit two copies to Consultant and one copy to Architect. Architect will return one copy. Mark up and retain returned copy as a Project Record Document.
   a. Reproduction and cost of reproduction of processed Product Data for distribution to concerned parties is Contractor’s responsibility.

C. Shop Drawings

1. Reproduction of any portion of the Contract Documents for use as submittals for Shop Drawings is not acceptable.
2. Submit Shop Drawings in a clear and thorough manner.
   a. Title each drawing with Project name.
   b. Identify each element of drawings by reference to sheet number and detail, schedule, or room number of Contract Documents.
3. Identify the following:
   a. Requirements of the individual section of Project Manual.
   b. Field measurements.
   c. Field construction criteria.
   d. Relation to adjacent or critical features of the Work or products.
   e. Conformance of submittal with requirements of Contract Documents.
4. Each sheet of Shop Drawings shall be stamped and signed by Contractor before submitting to Architect. Certify compliance with requirements of Contract Documents.

5. Review by the Architect shall not relieve Contractor from his responsibility in preparing and submitting proper Shop Drawings in accordance with his current obligations.

6. All submissions which, in the opinion of the Architect are incomplete, contain errors or have not been checked or only superficially checked, will be returned unchecked by the Architect for resubmission.

7. Fabrication of products or start of work before required Shop Drawings are approved by Architect and returned to Contractor shall be at Contractor's risk.

8. Number of Copies Required: Submit two paper copies of each submittal, and in portable data file (.pdf) format, unless indicated otherwise. When submitting for Concurrent Consultant Review, submit two copies to Consultant and one copy to Architect. Architect will return one copy. Mark up and retain one returned copy as a Project Record Drawing.
   a. Reproduction and cost of reproduction of processed Shop Drawings for distribution to concerned parties is Contractor's responsibility.
   b. This procedure is to be followed for each submission of a drawing or group of drawings until they are finally approved by the Architect.

D. Office Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.

2. Identification: Attach label on unexposed side of Samples that includes the following:
   a. Generic description of Sample.
   b. Product name and name of manufacturer.
   c. Sample source.
   d. Number and title of appropriate Specification Section.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

4. Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified,
and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

a. Number of Samples Required: Submit two sets of Samples. Architect will retain one Sample set; the other will be returned.
   1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
   2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least two sets of paired units that show approximate limits of variations.

E. Mock-Up Samples: Where samples are specified in the individual specification sections for use in constructing mock-ups, comply with requirements for "Office Samples", and process transmittal forms for mock-ups to provide a record of activity.

F. Submittals Schedule: See Section 01 32 16, Construction Schedules.

G. Schedule of Values and Application for Payment: See Section 01 29 00, Payment Procedures.

1.05 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

   1. Number of Copies: Submit one copy of each submittal, unless otherwise indicated. Architect will not return copy.
   2. 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.
   3. Test and Inspection Reports: See Section 01 45 29, Testing Laboratory services.

B. Coordination Drawings: See Section 01 31 21, Coordination Drawings.

C. Contractor’s Construction Schedule: See Section 01 32 16, Construction Schedules.

D. 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.

E. 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.

F. 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.

G. 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.

H. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

I. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

J. 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.

K. 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.

L. 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. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

M. 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.
N. 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.

O. 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.

P. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. See Section 01 78 23, Operation and Maintenance Data.

Q. 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.

R. 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. Include the following, as applicable:

1. Preparation of substrates.
2. Required substrate tolerances.
3. Sequence of installation or erection.
4. Required installation tolerances.
5. Required adjustments.
6. Recommendations for cleaning and protection.

S. Manufacturer's Field Reports: Prepare written information documenting factory authorized service representative's tests and inspections. Include the following, as applicable:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.
T. 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.

U. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Architect, except as required in "Action Submittals" Article. Retain copies at jobsite.

1.06 DELEGATED DESIGN

A. 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.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit two 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. When submitting for Concurrent Consultant Review, submit two copies to Consultant and one copy to Architect.

1. 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

3.01 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

3.02 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Reference the General
Conditions for Architect's review responsibilities. Approval of a specific item does not indicate approval of an assembly of which the item is a component. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:

1. REVIEWED
2. APPROVED
3. APPROVED AS CORRECTED
4. REVISE AND RESUBMIT
4. REJECTED.

C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION
SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1  GENERAL

1.01  SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.

2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.

3. Requirements for Contractor to provide quality-control services required by A/E, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.02  RELATED SECTIONS

A. Cutting and Patching (for repair and restoration of construction disturbed by testing and inspecting activities): Section 01 73 29.

B. Specific test and inspection requirements: Divisions 02 through 49 Sections.

1.03  DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by A/E.

C. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Mockups establish the standard by which the Work will be judged.
D. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Using a term such as "carpentry" does not 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 requirements specified apply exclusively to tradespeople of the corresponding generic name.

J. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.04 DELEGATED DESIGN

A. 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.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to A/E.

1.05 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to A/E for a decision before proceeding.
B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to A/E for a decision before proceeding.

1.05 SUBMITTALS

A. Shop Drawings: For integrated exterior mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.

1. Indicate manufacturer and model number of individual components.
2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit 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, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

C. Testing Agency Qualifications: For testing agencies specified in “Quality Assurance” Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

D. Reports: Prepare and submit certified written reports that include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Ambient conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and re-inspection.

E. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.
1.06 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar to those indicated for this Project in material, design, and extent.

F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

   1. Requirement for specialists shall not supersede building codes and regulations governing the Work.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.

   1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
   2. NVLAP: A testing agency accredited according to NIST’s National Voluntary Laboratory Accreditation Program.

H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:
   a. Provide test specimens representative of proposed products and construction.
   b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
   c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
   d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
   e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
   f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to A/E, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by A/E.
2. Notify A/E seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain A/E’s approval of mockups before starting work, fabrication, or construction.
   a. Allow seven days for initial review and each re-review of each mockup.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
   a. Cover mock-ups to protect them from deterioration and weathering.
6. Demolish and remove mockups when directed, unless otherwise indicated.

1.07 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner’s responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged.
2. Payment for these services will be made by the Owner.
3. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
   a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

E. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.


1. Notify A/E and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.

3. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to A/E, Engineer and Owner with copy to Contractor and to authorities having jurisdiction.

4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.

5. Do not perform any duties of Contractor.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field-curing of test samples.
5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
6. Security and protection for samples and for testing and inspecting equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.08 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by [OBC] [IBC] as the responsibility of the Owner, and as follows:

B. Special Tests and Inspections: Conducted by a qualified special inspector as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
2. Notifying A/E and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality control service to A/E with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

**PART 2**  
PRODUCTS (Not Used)

**PART 3**  
EXECUTION

**3.01 TEST AND INSPECTION LOG**

A. Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to A/E.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for A/E’s reference during normal working hours.

**3.01 REPAIR AND PROTECTION**

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Comply with requirements of Section 01 73 29, Cutting and Patching.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor’s responsibility, regardless of the assignment of responsibility for quality-control services.

**END OF SECTION**
SECTION 015639

TEMPORARY TREE AND PLANT PROTECTION

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

1.2 DEFINITIONS

A. Caliper: Diameter of a trunk measured by a diameter tape at 6 inches above the ground for trees up to, and including, 4-inch size; and 12 inches above the ground for trees larger than 4-inch size.

B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.

C. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and defined by a circle concentric with each tree with a radius 1 times the diameter of the drip line unless otherwise indicated.

D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.3 SUBMITTALS

A. Qualification Data: For qualified arborist and tree service firm.

B. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

C. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
   1. Use sufficiently detailed photographs.
   2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

1.4 QUALITY ASSURANCE

A. Arborist Qualifications: Certified Arborist as certified by ISA.

B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.

1.5 PROJECT CONDITIONS

A. The following practices are prohibited within protection zones:
   1. Storage of construction materials, debris, or excavated material.
   2. Parking vehicles or equipment.
   3. Foot traffic.
   4. Erection of sheds or structures.
   5. Impoundment of water.
   6. Excavation or other digging unless otherwise indicated.
   7. Attachment of signs to or wrapping materials around trees or plants unless otherwise
B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Topsoil: Provide in conformance with Section 329113 - Soil Preparation.

B. Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
   1. Type: Shredded hardwood.
   2. Size Range: 3 inches maximum, 1/2 inch minimum.

PART 3 – EXECUTION

3.1 PREPARATION

A. Locate and clearly identify trees, and other vegetation to remain or to be relocated. Tie a 3-inch yellow-vinyl tape around each tree trunk at 54 inches above the ground.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

3.2 TREE- AND PLANT-PROTECTION ZONES

A. Maintain protection zones free of weeds and trash: and remove standing water at root zone.

B. Repair or replace trees and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Landscape Architect.

3.3 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Division 31 Section for earthwork.

B. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.4 ROOT PRUNING

A. Prune roots that are affected by temporary and permanent construction. Prune roots that are affected by temporary and permanent construction. Prune roots as directed by arborist and as follows:
   1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
   2. Cut Ends: Coat cut ends of roots more than 1-1/2 inches in diameter with an emulsified asphalt or other coating formulated for use on damaged plant tissues and that is acceptable to arborist.
   3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
   4. Cover exposed roots with burlap and water regularly.
5. Backfill as soon as possible according to requirements in Division 31 Section "Earth Moving."

B. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

3.5 CROWN PRUNING

A. Prune branches that are affected by temporary and permanent construction.
   1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
   2. Pruning Standards: Prune trees according to ANSI A300 (Part 1), and the following:
      a. Type of Pruning: As directed by arborist.
      b. Specialty Pruning: Restoration.
   3. Cut branches with sharp pruning instruments; do not break or chop.
   4. Do not apply pruning paint to wounds.
   5. Chip removed branches and dispose of off-site.

3.6 REGRADING

A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.
   1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.

C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

D. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

3.7 REPAIR AND REPLACEMENT

A. General: Repair or replace trees and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.
   1. Submit details of proposed root cutting and tree repairs.
   2. Have arborist perform the root cutting, branch pruning, and damage repair of trees.
   3. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
   4. Perform repairs within 24 hours.
   5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Landscape Architect.

B. Trees: Remove and replace trees indicated to remain that are more than 66 percent dead or in an unhealthy condition or are damaged during construction operations that Landscape Architect determines are incapable of restoring to normal growth pattern.
   1. Small Trees: Provide new trees of same size and species as those being replaced for each tree that measures 4 inches or smaller in caliper size.
   2. Large Trees: Provide two new tree(s) of 6-inch caliper size for each tree being replaced that measures more than 6 inches (150 mm) in caliper size.
      a. Species: Species selected by Landscape Architect.
   3. Plant and maintain new trees as specified in Division 32 Section "Plants."
3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

END OF SECTION
SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Requirements of this Section apply to the Work of all other Sections.

B. Section Includes:

1. Transportation and Handling.
2. Storage and Protection.
3. Standards.
4. Manufacturers and Types.
5. Fabrications.
7. Prohibited Materials and Methods.

1.02 RELATED SECTIONS

A. Quality Requirements: Section 01 40 00.

B. Cutting and Patching: Section 01 73 29.

C. Shop Drawings, Product Data and Samples: Section 01 33 23.

D. Execution Requirements: Section 01 73 00.

1.03 STANDARDS

A. Standards, codes and regulations published by Manufacturer's Associations, governmental agencies and other regulatory authorities form a part of these Specifications as minimum requirements. Such references include the latest issue and all amendments up to 30 days prior to the Bid Date.

B. "Governing Authority" means all federal, state and local laws and regulations.

C. Where differences occur between the Contract Documents and such standards, the most restrictive requirement shall apply.

D. Supply all materials and perform all work in accordance with the Manufacturer's Specifications and installation procedures, and in conformance with published trade and manufacturer's association standards, unless specifically noted otherwise herein.
1.04 TRANSPORTATION AND HANDLING

A. Arrange deliveries of products in accordance with construction schedules and installation, coordinate to avoid conflict with work and conditions at the site.

1. Transport products by methods to avoid product damage.
2. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
3. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and accepted submittals, and that products are properly protected and undamaged.

B. Provide equipment and personnel to handle products by methods to prevent soiling or damage.

1.05 DELIVERY, HANDLING, STORAGE AND PROTECTION

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected. Reject damaged and defective items.

B. Storage products in accordance with manufacturer's instructions.

1. Store products with seals and labels intact and legible.
2. Store products to allow for inspection and measurement of quantity or counting of units.
3. Store products subject to damage by the elements in weathertight enclosures.
4. Maintain temperature and humidity within the ranges required by manufacturer's instructions.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

C. Exterior Storage
1. Store fabricated products above the ground, on blocking or skids, to prevent soiling or staining. Cover products which are subject to deterioration with impervious coverings. Provide adequate ventilation to avoid condensation.

2. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign materials.

3. Store foam plastic away from exposure to sunlight, except to extent necessary for period of installation and concealment.

D. Arrange storage in a manner to provide access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage.

E. Protection After Installation: Provide coverings as necessary to protect installed products from damage from traffic and subsequent construction operations. Remove when no longer needed.

**PART 2  PRODUCTS**

2.01 GENERAL PRODUCT REQUIREMENTS

A. Products include materials, equipment and systems.

B. Products incorporated into the work:

1. Comply with specifications and referenced standards as minimum requirements.

2. Manufactured and fabricated products:

a. Design, fabricate and assemble in accordance with the best engineering and shop practices.

b. Manufacture like parts of duplicate units to standard sizes and gages, to be interchangeable.

c. Two or more items of the same kind shall be identical, by the same manufacturer.

d. Products shall be suitable for service conditions.

e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing by the Architect.

4. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

5. New and unused at time of installation, except as otherwise indicated.

6. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.

7. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2.02 MANUFACTURER AND PRODUCT SELECTION PROCEDURES

A. Specified Product: Where specifications name a single manufacturer and product or refer to a single manufacturer and product indicated on the drawings, provide the named product. Comparable products or substitutions for Contractor's convenience will not be considered.

B. Specified Manufacturer: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

C. Multiple Specified Products: Where more than one manufacturer and specific product is listed, provide one of the products named. No substitutions will be permitted after signing the contract. Comparable products or substitutions for Contractor's convenience will not be considered.

D. Multiple Manufacturers: Where specifications include a list of manufacturers names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

E. Basis of Design: Where specifications name a Basis of Design or refer to a Basis of Design product indicated on the drawings, the design is based on the product listed. Subject to compliance with requirements, provide the specified product or a product manufactured by one of the other manufacturers listed.

1. The characteristics of the Basis-of-Design Product establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

2. Equipment or materials from these manufacturers will be acceptable contingent upon their meeting the design, appearance and functional standards established by the specified items. If equipment or a material of an acceptable manufacturer requires changes; electrically, mechanically, structurally, from what is indicated on the drawings, it shall be the responsibility of the Contractor requiring such change, to pay all costs involved with no additional costs to the Owner.

3. Submit evaluations as follows:
   a. Submit proposed comparable products for evaluation by the Architect at least two weeks prior to awarding contract to the manufacturer of a comparable product.
   b. Obtain samples of Basis-of-Design product.
   c. Select comparable products that comply with the characteristics specified. Submit evidence demonstrating compliance.
   d. Submit samples of comparable products displayed side-by-side with samples of Basis-of-Design products.
Architect will determine whether the proposed comparable product is acceptable. Architect is not obligated to prove non-equivalence of proposed comparable products.

F. Where a performance is specified and no manufacturer is listed, submit through the Shop Drawing procedure the name of the manufacturer, the product proposed, and detailed information showing its characteristics. Such proposal shall meet or exceed the specification, line item by line item, or be rejected.

G. Equivalent components (articles, devices, materials, forms of construction, fixtures, etc.) may be submitted to the Architect for approval prior to bidding regardless of listed manufacturers.

H. Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.03 FABRICATION

A. Fabricate all items in the shop insofar as practicable. Where items cannot be completely shop fabricated and assembled for shipment, assemble and fit in shop, disassemble and ship. Identify parts for field assembly.

B. Fabricate items to be straight, square, in proper alignment, and with hairline joints where joints are necessary and permitted. Pre-plan field joints to be as inconspicuous as possible; coordinate locations with Architect.

2.04 SHOP PRIMING

A. Shop prime or seal surfaces of all products to receive paint materials in accordance with the requirements of Section 09 91 00.

B. Apply a primer or sealer compatible with the specified paint materials.

C. In the event such a primer is determined to be incompatible with the specified finish paint system, provide a barrier coat or remove the primer and reprime as directed, at no additional cost to the Owner.

2.05 PROHIBITED MATERIALS AND METHODS

A. The following items are expressly prohibited:

1. Attachment Related Items
   a. Powder Fasteners: Powder fasteners are defined as anchors which are driven into place by any device which produces an impact force by use of a powder charge, compressed air, gas or any other propellant. Powder fasteners prohibited for the following conditions:
      1) Attachment of structural members.
      2) Where public may be endangered by misuse.
b. Plug anchorage by use of wood, lead or plastic.
c. Perforated steel strap iron for pipe or other support or anchorage.
d. Suspension systems that are not independently supported.
   1) Ceiling grid systems shall not be supported from ductwork, electrical conduit, heating or plumbing lines, and vice versa.
   2) Each utility system and the ceiling system shall be a separate installation, each independently supported from the building structure.
   3) Where interference occurs, provide trapeze type hangers or other suitable supports for each system.
   4) Locate hangers and supports where they will not interfere with access to mixing boxes, fire dampers, valves, and other appurtenances requiring servicing.

2. Methods Related Items
   a. The penetration of floors and walls by pipes, ducts, or other penetrations unless openings are appropriately fire stopped by fire doors or fire dampers, and voids around pipes, ducts, conduits, etc. are sealed with fireproof materials.
   b. The use of ink marking pens on surfaces of any kind of materials receiving paint or other finish in exposed location.

3. Materials Related Items
   a. Asbestos or asbestos containing materials.
   b. Barbed wire in construction fencing.
   c. Water soluble treatment of insulation jackets or facings, to impede or retard smoke or flames.

4. Earthwork Related Items
   a. Use of explosives is prohibited.

**PART 3 EXECUTION**

Not Applicable

**END OF SECTION**
PART 1  GENERAL

1.01  SUMMARY

A. Requirements of this Section apply to the Work of all other Sections.

B. Section Includes:

1. Examination of Substrate.
2. Preparation.
3. Installation.
4. Workmanship.
5. Protection.

1.02  RELATED SECTIONS

A. Quality Control: Section 01 45 00.

B. Cutting and Patching: Section 01 73 29.

C. Shop Drawings, Product Data and Samples: Section 01 33 23.

D. Product Requirements: Section 01 60 00.

1.03  STANDARDS

A. Standards, codes and regulations published by Manufacturer's Associations, governmental agencies and other regulatory authorities form a part of these Specifications as minimum requirements. Such references include the latest issue and all amendments up to 30 days prior to the Bid Date.

B. "Governing Authority" means all federal, state and local laws and regulations.

C. Where differences occur between the Contract Documents and such standards, the most restrictive requirement shall apply.

D. Supply all materials and perform all work in accordance with the Manufacturer's Specifications and installation procedures, and in conformance with published trade and manufacturer's association standards, unless specifically noted otherwise herein.
1.05 NON-CONFORMING WORK

A. Faulty work or work not in conformance with the Contract Documents will not be permitted by the Architect.

1. It is the responsibility of the Contractor to propose a remedy by means of detailed drawings and written documentation and submit such documentation to the Architect for comments.

2. All costs for the removal and reconstruction of such work, as well as additional services of the Architect, shall be paid for by the Contractor.

PART 2 PRODUCTS - NOT APPLICABLE

PART 3 EXECUTION

3.01 EXAMINATION OF SUBSTRATE

A. Examine the substrates or structure to which a product is to be applied or installed. Do not proceed until unsatisfactory conditions have been corrected. Starting the work indicates acceptance of conditions and the installer assumes full responsibility for results.

B. Check the substrate or structure for proper tolerances and clearances. Tolerances are listed under individual specification Sections.

3.02 PREPARATION

A. Substrate: Where the products are applied to a substrate, prepare the substrate as recommended by the product manufacturer. That generally includes the following:

1. Bringing substrate to a uniform surface by smoothing uneven surfaces and filling holes, cracks and depressions with recommended filler or compatible type material.

2. Depressed Slabs: Bring to required elevation to receive finished materials where finished materials cannot completely fill depression. Use approved cementitious filler or compatible type material. Coordinate depressed slab locations with finish material locations.

3. Remove substances such as dust, oils and other foreign matter, not compatible with the product.

4. Surfaces shall be dry, unless moisture content or wetting requirement is specified or recommended.

B. Concrete Slabs: Provide steel shot abrasive cleaning of concrete slabs receiving designated finish flooring materials.

1. Designated Finish Flooring Materials
   a. Cementitious or cementitious set materials.
b. Sheet flooring materials.
c. Waterproofing materials.
d. Paint materials.
e. Polymer or epoxy type seamless flooring.

2. Equipment: Electric powered portable unit with self-contained dust collection system. Size(s) of unit(s) and shot media suitable for conditions and proposed finish materials. WHEELABRATOR CORP. "Blastrac" or similar type system by SASE COMPANY INC., BW MANUFACTURING or INNOVATECH.

3. Cleaning: Remove concrete surfaces to sufficient depth to remove bond breakers and contaminants such as curing compounds, oils, and other foreign matter which may be detrimental to the completed flooring installation.
   a. Work smoothly and evenly over entire surface; avoid creating dips, ridges, or other imperfections which would show or telegraph in the completed installation.
   b. Small transitions for different flooring materials may be obtained by multiple passes if carefully executed to create smooth even slope of not more than 1/8" in 2 feet.

4. Clean floor as near as possible to flooring installation to avoid contamination from work of other trades. Protect clean floor from soiling with suitable sheet materials. Reclean soiled areas.

C. Inserts and Anchorages

1. Anchorages where not detailed are the responsibility of the installer to design a suitable connection, structurally sound, and aesthetically acceptable to the Architect. Furnish calculations, drawings and product data when requested by the Architect. Such information may or may not be returned as indicated in Section 01 33 23.

2. It is the responsibility of the installer to furnish built-in fastening devices for his/her product to the proper trade for installation as the work proceeds.

3. In the event such devices are not furnished in time to be built-in, it is the installer's responsibility to provide other methods for attaching their product. Submit drawings and other required data to the Architect.

D. Templates: Provide templates, diagrams and other coordinating documents to the proper Contractor, manufacturer or supplier of related items affecting the Work.

E. Dimensions

1. If the exact location of an item is not indicated by dimension on the Drawings or noted in the Specifications, the Architect reserves the right to determine such location in the field prior to roughing-in.

2. If the exact dimensions of a product are not indicated, the Architect reserves the right to determine dimensions prior to the ordering or fabrication of a product.

3. Such dimensional changes shall not be a basis for changes in the Contract Sum.
4. Where miscellaneous devices, such as thermostats, switches, controls, grilles, pipes, or outlets of any nature are not specifically located by the Contract Documents, request such location or obtain approval of the location prior to installation. If approval has not been obtained, the Architect may direct the relocation of such devices at the expense of the installer.

3.03 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
   a. Where pipes occur in partitions, furred-out spaces and chases, determine exact location and size and fit entirely concealed into allotted space. Report conflicts to Architect prior to installation.
   b. Where two or more pipes are to installed in parallel, or parallel to the piping of other trades, the piping shall be installed with sufficient space between the pipes to allow for the proper application of pipe covering, painting, and servicing.
   c. Furnish advance information on locations and sizes of frames, boxes, sleeves and openings needed for the Work to installers.
4. Install work to allow for installation of future work identified on drawings.
5. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.

B. Install products in accordance with manufacturer's recommendations or the requirements of trade associations, listed standards, Shop Drawings and Contract Documents.

C. If a conflict exists between these references, the most strict requirements govern. If printed instructions are not available, consult with the manufacturer or the manufacturer's field representative, where applicable.

D. Provide hangers, auxiliary framing, and other means for installing ceiling suspension systems, lighting fixtures, diffusers, and other equipment in ceilings to avoid ductwork, piping, etc.

1. Suspend from structural members (i.e. joists, beams, etc.), and not from ductwork or piping.
2. Provide supplemental framing members (i.e. angles, tubes, light gage steel framing, etc.) to span between structural members where required to support items of this paragraph C.

E. Install work that will not interfere with the proper installation of the Work of other
trades.

F. Install work in a manner to facilitate operating, servicing and repairing.

G. 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.

H. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect for final decision.

3.04 SPACE PREFERENCE

A. Carefully check and coordinate the location and level of all Work to avoid conflicts between all contractors. Where conflicts occur, the following preferences shall generally govern:

1. Recessed electrical light fixtures
2. High and medium pressure ductwork
3. Low pressure ductwork
4. Soil, waste, vent and storm piping
5. Sprinkler piping
6. Liquid heat transfer and refrigerant piping
7. Domestic water piping
8. Electrical conduits from branch circuits

B. However, no ductwork or liquid heat transfer main shall have preference over plumbing piping below plumbing fixtures, nor over electrical conduits above or below electrical switchgear and panels. No piping conveying liquids shall be installed directly over electrical or elevator equipment. No piping shall be installed in electrical or elevator equipment rooms.

C. Where headroom or space conditions resulting from application of these preferences appear inadequate, notify the Architect prior to installing the Work.

D. Coordinate the mounting heights of busways, electrical equipment and raceways to clear the opening heights of doors, the height of vehicles and the heights of equipment which needs to be routinely removed, and out of paths required for maintenance.

3.05 WORKMANSHIP

A. Install products straight, plumb, level and in line. Securely attach items to the substrate, using recommended adhesives, mechanical fasteners or other devices. Where holes are provided for attachment, do not field drill or cut new holes without the approval of the Architect.
B. Where applicable, match finished work to the approved samples or mock-ups.

C. Conceal fasteners wherever possible, unless exposed fasteners are permitted or specified.

D. Weld in accordance with AWS standards; comply with AWS for qualifications of operators and for workmanship.

E. 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 Architect for final decision.

F. Recheck measurements and dimensions, before starting each installation.

3.06 PROTECTION

A. Protect finished surfaces of product being installed and surrounding products from damage during installation. Provide protective devices as required and as recommended by the manufacturer. Cover work subject to damage at the end of each day's work.

B. Coat concealed surfaces of metal products with a bituminous or other approved coating to prevent contact between dissimilar metals or other material which can cause deterioration.

C. Correct damage by repairing or replacing as directed by the Architect. Repairing will be permitted only where the repair is undetectable and does not cause structural damage or interfere with proper functioning of the part.

D. Protect finish of installed products until Substantial Completion of the Project by use of wrappings, covers or other approved protective devices. Remove such protection immediately prior to final cleaning.

E. Limiting Exposures: Coordinate and 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. Maintain exposures within the manufacturers recommended limits. Where applicable, such exposures include, but are not limited to, the following:

1. Excessive static or dynamic loading
2. Excessive internal or external pressure
3. Excessive high or low temperatures
4. Thermal shock
5. Excessively high or low humidity
6. Air contamination or pollution
7. Water or ice
8. Solvents
9. Chemicals
10. Light
11. Radiation
12. Puncture
13. Abrasion
14. Heavy traffic
15. Soiling, staining and corrosion
16. Bacteria
17. Rodent and insect infestation
18. Combustion
19. Electrical current
20. High speed operation
21. Improper lubrication
22. Unusual wear or other misuse
23. Contact between incompatible materials
24. Destructive testing
25. Misalignment
26. Excessive weathering
27. unprotected storage
28. Improper shipping
29. Theft
30. Vandalism

F. Take precautions to protect existing concrete and asphalt pavement from damage due to vehicle loads, parking, and storage.
   1. Schedule loading to minimize pavement material consolidation during hot weather. Distribute wheel loads to the greatest extent possible.

3.07 OVERHEAD ATTACHMENTS

A. Where overhead hangers are required, and not indicated on the drawings, provide one or more of the following as required:
   1. Concrete inserts prior to placement of concrete or drilled type inserts after concrete is placed.
   2. Trapeze from adjacent structure with suitable steel framing.
   3. Connections to Structure: Suitable anchorage devices with a minimum load carrying capacity of 250 pounds plus safety factor of 4:1 for the applied load.
      a. Concrete: Steel expansion anchors. See Prohibited Material and Methods specified in Section 01 60 00.
      b. Steel: Bolted or welded connections to steel structure.

B. Where metal deck is furnished with hanger tabs or similar devices, applied total load, including work of other trades, not to exceed 75 pounds for each device. Loads in excess of permitted limit to be supported by trapeze framing as specified above.

C. Verify support requirements of heavy or unusual loads not specifically shown on drawings with Architect.
3.08 OPERATION AND MAINTENANCE

A. Contractor shall maintain all systems and equipment operated during construction. The contractor responsible for the installation of the system shall operate and maintain it. Make all repairs and perform all maintenance to assure Work is turned-over to Owner in first class condition.

B. Maintenance work includes:

1. Lubrication
2. Adjustments
3. Filter replacements

END OF SECTION
SECTION 01 73 29
CUTTING AND PATCHING

PART 1  GENERAL

1.01  DESCRIPTION

A. Execute cutting, fitting or patching of Work, required to:
   1. Make several parts fit properly.
   2. Uncover Work to provide for installation of ill-timed Work.
   3. Remove and replace defective Work.
   4. Remove and replace Work not conforming to requirements of Contract Documents.
   5. Remove samples of installed Work as specified for testing.
   6. Install specified Work in existing construction.

B. In addition to contract requirements, upon written instructions of Architect:
   1. Uncover Work to provide for Architect's observation of covered Work.
   2. Remove samples of installed materials for testing.
   3. Remove Work to provide for alteration of existing Work.

C. Do not endanger any Work by cutting or altering Work or any part of it.

1.02  SUBMITTALS

A. Prior to cutting which affects structural safety of Project, submit written notice to Architect, requesting consent to proceed with cutting, including:
   1. Identification of Project.
   2. Description of Affected Work.
   4. Affect on other Work, on structural integrity of Project.
   5. Description of proposed Work. Designate:
      a. Scope of cutting and patching.
      b. Contractor and trades to execute work.
      c. Products proposed to be used.
      d. Extent of refinishing.
   6. Alternative to cutting and patching.

B. Should conditions of Work, or schedule indicate change of materials or methods, submit written recommendation to Architect, including:
   1. Conditions indicating change.
   2. Recommendations for alternative materials or methods.

C. Submit written notice to Architect, designating time Work will be uncovered, to provide observation.

**PART 2 PRODUCTS**

2.01 MATERIALS

A. Patching of materials and surfaces shall be in accordance with the requirements of the Contract Documents. Where not otherwise defined, patching shall match adjacent surfaces and proper materials shall be provided accordingly.

**PART 3 EXECUTION**

3.01 INSPECTION

A. Inspect existing conditions of Work, including elements subject to movement or damage during cutting and patching.

B. After uncovering Work, inspect conditions affecting installation of new products.

3.02 PREPARATION PRIOR TO CUTTING

A. Provide shoring, bracing and support as required to maintain structural integrity of Project.

B. Provide protection for other portions of the Project, including all Contractors' personnel.

3.03 PERFORMANCE

A. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances, finishes.

B. Execute cutting and demolition by method which will prevent damage to other Work, and will provide surface to receive installation of repairs and new Work.

1. No cutting shall be performed which will, in any way, reduce the structural strength of the building. Should such cutting be necessary, consult Architect and do not proceed with such operation unless written approval is given.

2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.

3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

C. Restore Work which has been cut or removed; install new products to provide completed Work in accord with requirements of Contract Documents.
D. Patching of materials and surfaces shall be in accordance with the requirements of the Contract Documents. Where not otherwise defined, patching shall match existing or adjacent surfaces and proper materials shall be provided accordingly.

1. Wherever existing walls, floors, ceilings, etc., are cut, the exposed surfaces must be neatly finished by patching, painting, wall covering, etc., as required to blend patched areas into adjacent existing surfaces. Patched areas shall not be visible when viewing entire wall surface.
   a. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

2. Where painting or finishing of patched surfaces or application of wall or floor covering is required, finish the entire plane of surface in which patched area occurs.

3. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

4. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

3.04 SLEEVES AND OPENINGS

A. Where pipes, conduits, ductwork or other materials pass through new walls, partitions, floors, roof or ceilings, provide suitable sleeves in these elements or provide openings where sleeves are not practical.

B. Close sleeves and openings to prevent passage of smoke or fire using approved methods and materials to maintain the fire rating of the construction being penetrated. See Section 07 84 00.

1. Unless otherwise indicated, extend floor sleeves 2" above finished floor.

C. Where pipes, conduit, ductwork etc., pass through, behind, or above existing construction, provide all cutting, patching, and refinishing for doing this work as specified herein.

D. Lintels: Provide steel or precast concrete lintels to span openings in masonry walls sized in accordance with schedule shown or as detailed on structural drawings. In general, lintels are not required for openings less than the width of masonry unit in which wall is being constructed. Penetrations under beams or other concentrated loads require approval of Architect.

3.05 CLEANING

A. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.
SECTION 01 74 00

CLEANING

PART 1  GENERAL

1.01  GENERAL REQUIREMENTS

A. Execute cleaning, during progress of the work and at completion of the work, as required by Contract Documents.

1.02  RELATED SECTIONS

A. Cutting and Patching: Section 01 73 29.

B. Cleaning for Specific Products or Work: Specification section for the work.

1.03  CLEANING AND DISPOSAL REQUIREMENTS

A. Standards: Maintain project in accord with the following safety and insurance standards:

1. Applicable Federal and State Requirements.

B. Hazards Control: Each Prime Contractor shall comply with the following requirements:

1. Store volatile wastes in covered metal containers, and remove from premises daily.
2. Prevent accumulation of wastes which create hazardous conditions.
3. Provide adequate ventilation during use of volatile or noxious substances.

C. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

1. Do not burn or bury rubbish and waste materials on project site.
2. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary sewers.
3. Do not dispose of waste into streams or waterways.
4. Wet down dry materials and rubbish to prevent dust.

D. Clean streets, highways, and private properties of all mud, earth, rubbish, rocks, refuse or other debris of any kind resulting from such work or related transportation to and from the work site.

PART 2  PRODUCTS
2.01 MATERIALS

A. Select and use cleaning materials and equipment with care to avoid scratching, marring, defacing, staining or discoloring surfaces cleaned.

B. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.

1. Use cleaning products that meet Green Seal GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

C. Use cleaning materials only on surfaces recommended by the cleaning material manufacturer.

PART 3 EXECUTION

3.01 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

B. Provide, maintain and empty 55 gallon metal and dumpster type containers for collection of waste materials, debris and rubbish. Locate containers as directed by Architect.

1. Provide containers with adequate capacity to accommodate anticipated needs. If containers do not have adequate capacity, increase intervals of waste removal or capacity of containers until adequate capacity is provided.

C. At reasonable intervals during progress of Work, but in no case less than once a week, dispose of waste materials, debris and rubbish.

D. Site: Maintain Project site free of waste materials and debris.

E. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.

2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

F. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

G. Direct Special Attention To:
1. Provide non-staining layout lines and other markings on masonry and concrete. Use chalk lines wherever possible and remove when no longer needed.
2. Remove all stains from concrete surfaces, including floors.
3. Shop marks shall not appear on exposed surfaces of any item.
4. Remove concrete, mortar and paint spatters.
5. Clean both brick and concrete unit masonry.
6. Protect aluminum frames during construction and thoroughly clean upon completion of the installation.

H. Clean interior surfaces before start of finish painting and continue cleaning on an as-needed basis until painting is finished.

I. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces.

J. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.

K. Vacuum interior building areas where work is performed prior to painting and other finish work. Continue vacuum cleaning on an as-needed basis until building is ready for occupancy.

L. Protect interior of ductwork during construction from accumulation of dirt, dust or debris.

M. Clean trash from all chases and concealed spaces before final enclosure.

3.02 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

1. Leave Project clean and ready for occupancy.

B. Employ experienced workmen, or professional cleaners for final cleaning.

C. At the completion of the work, remove all surplus material, false work, temporary structures, including foundations thereof, plants of any description and debris of every nature resulting from their operations and put the site in a neat and orderly condition.

D. Clean exposed interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition.

E. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision obscuring materials.
Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

F. Sweep concrete floors broom clean in unoccupied spaces.

G. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.

H. Remove grease, dust, dirt, stains, labels, fingerprints and other foreign materials from sight-exposed interior and exterior surfaces, including light fixtures and lenses; polish surfaces so designated to a shine finish.

1. Clean finishes free of dust, stains, films and other foreign substances.
2. Clean transparent and glossy materials to a polished condition; remove foreign substances. Polish reflective surfaces to a clear shine.

I. Remove temporary protection and labels not required to remain.

J. Clean surfaces of equipment; remove excess lubrication.

K. Remove debris, rubbish, dirt, etc. from open concealed spaces, chases and above ceilings.

L. Repair, patch and touch-up marred surfaces to specified finish, to match adjacent surfaces.

M. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.

N. Remove waste, foreign matter, and debris from roofs, gutters, areaways, and drainage systems.

O. Clean plumbing fixtures to a sanitary condition.

P. Clean permanent filters of ventilating equipment and replace disposable filters when units have been operated during construction; in addition, clean ducts, blowers, and coils when units have been operated without filters during construction.

Q. Clean light fixtures and lamps; polish lenses.

R. Clean dirt and debris from interior of all electrical panels and user accessible electrical enclosure boxes prior to installation of covers or in the case of hinged access doors, before final cleaning of adjacent space. Clean the exterior surfaces of all switchgear located in Mechanical and Electrical Rooms and spaces.

S. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
T. Clean dirt and dust from interior of air handling units before installing final filters. Wipe down the exterior surfaces of all HVAC equipment located in Mechanical Rooms and spaces.

1. Exposed painted ductwork to be brushed clean of dust.

U. Site/Exterior Items: Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

1. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
2. Rake grounds that are neither planted nor paved to a smooth, even textured surface.
3. Remove tools, construction equipment, machinery, and surplus material from Project site.
4. Clean exposed hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces.

V. Maintain cleaning until Final Completion.

W. Prior to Final Completion, or Owner occupancy, Contractor shall conduct an inspection of sight exposed interior and exterior surfaces, and all work areas, to verify that the entire work is clean.

END OF SECTION
This page intentionally blank
SECTION 02 41 13

SELECTIVE SITE DEMOLITION

PART 1  GENERAL

1.01  WORK INCLUDED

A. The extent of demolition work is indicated on drawings, and includes, but is not necessarily limited to, the following:

1. Selective breaking up, dismantling and/or removal of existing site work items.
2. Salvage of selected existing materials to be turned over to Owner as may be determined by the Owner.
3. Cutting and patching.
4. Clean up.

B. Additional Plumbing, HVAC and Electrical demolition information is specified in Divisions 22, 23 and 26.

1.02  PROJECT CONDITIONS

A. The Owner assumes no responsibility for actual condition of items to be removed.

1. Conditions existing at time of inspection for bidding purposes will be maintained by Owner insofar as practicable.
2. It is solely the Contractor's responsibility to determine demolition procedure and sequence and to insure the safety adjacent items designated to remain during demolition. This includes the addition of whatever shoring, sheeting, temporary bracing, guys or tie-downs which might be necessary. Such material shall maintain the Contractor's property after completion of the project.
3. It is solely the Contractor's responsibility to follow all applicable safety codes and regulations during all phases of the work.

B. Coordination

1. Demolition sequence, phasing and methods must be approved by Architect prior to start of demolition work.
2. Coordinate shoring with structural modifications. Shoring to be left in place until completion of structural work permits it's removal.

C. Title to Removed Property

1. All removal items, unless otherwise indicated for salvage or reuse will become the property of the Contractor and shall be removed from the Site.
During the demolition operations, Owner reserves the right to add to, or delete from, the list of items designated for reuse or salvage.

2. Items to be salvaged for the Owner or for reinstallation are indicated on the drawings.

3. Site storage or sale of Contractor owned removed items will not be permitted.

D. Traffic: Conduct demolition operations and removal of debris to ensure minimum interference with roads, streets, walks and other adjacent occupied or used facilities.

   1. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.

E. Protections: Ensure safe passage of persons around area of demolition. Conduct operations to prevent injury to adjacent buildings, structures, other facilities, and persons.

F. Damages: Promptly repair damages caused to adjacent facilities by demolition operations at no cost to Owner.

G. Utility Services

   1. Locate and identify electrical and mechanical services passing through or located within affected area and serving areas outside the work limits.
   2. Maintain existing utilities and protect against damage during demolition operations.
   3. Notify corporations, companies, individuals and local authorities owning conduits running to property. Arrange for removal of wires running to and on property. Remove pipes and sewers in accordance with instructions of above Owners.
   4. Protect and maintain conduits, drains, sewers, pipes and wires that are to remain on the property.
   5. Shut-off Active Utilities
      a. Where existing utilities are to be permanently abandoned, shut-off and cap or arrange with proper utility company for shut-off.
      b. Where existing utilities are to be rerouted: Where utilities remaining in service interfere with demolition or future construction, shut-off, disconnect, remove, relocate and reconnect as indicated or as required.
   6. Shut-down periods
      a. Arrange timing of shut-down periods of all in-service utilities with the Owner. Do not shut down any utility without prior written approval.
      b. Keep shut-down period to a minimum or use intermittent period as directed.
      c. Some shut-down hours may be required after normal working hours. No extra compensation will be made for Work after normal working hours, weekends or holidays.
H. Explosives: Not permitted.

I. Scheduling: Conduct work so as to avoid interference with operations and work on areas of site which are to remain in service.

J. Permits, Fees and Inspections: Obtain and pay for all permits, fees and inspections required by governing authorities.

**PART 2 PRODUCTS**

2.01 MATERIALS

A. Fill Materials (For filling voids resulting from demolition operations): See Section 31 00 00, Earthwork.

B. Shoring Materials: As determined by Contractor.

**PART 3 EXECUTION**

3.01 PROTECTION

A. Use water sprinkling, temporary enclosures and other approved methods to limit the amount of dust and dirt rising and scattering in the air to the lowest practical level. Comply with governing regulations pertaining to environmental protection.

1. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, pollution and electrical shock.

2. Clean adjacent structures and improvements of dust, dirt and debris caused by demolition operations, as directed by the Architect. Return adjacent areas to conditions existing prior to the start of the work.

B. In removal of existing materials, take care not to damage work remaining in place, salvageable materials or equipment. Repair or replace any existing construction, materials or equipment damaged during demolition to Owner's satisfaction at no additional cost.

3.02 DEMOLITION

A. Site Items

1. General
   a. Items specified herein or indicated on drawings.
   b. Where indicated to be removed and either turned over to Owner or reinstalled, use methods for removal which will provide the least potential damage to adjacent materials to remain.
   c. Miscellaneous Items: Material or equipment encountered during construction which must be removed to aid in construction operations or that which will not be used in completed facilities.

2. Concrete: Where cut line will be exposed in the finished work and where physically feasible, make edges by saw cutting.
3. Asphalt: Where cut line will be exposed in the finished work or where new asphalt is placed contiguous with existing asphalt, existing asphalt edge shall be saw cut to provide vertical surface.

3.03 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Remove from site, debris, rubbish and other materials resulting from demolition operations that is not permitted as fill material as determined by Geotechnical Engineer.

1. Burning of removed materials from demolished structures will not be permitted on site.

B. Removal: Transport materials removed and dispose of off site except as follows:

1. Transport material indicated to be "salvaged" to storage areas as directed by Architect. Storage areas are within a 10 mile radius of the project site.
2. Store salvaged materials, protected from dirt and damage.

C. Clean Up

1. Leave exterior areas "rake clean."
2. Remove barricades as directed.
3. Remove shoring.

END OF SECTION
SECTION 02 41 16

STRUCTURE DEMOLITION

PART 1  GENERAL

1.01  WORK INCLUDED

A. General

1. Buildings and other surface structures as located within work limits indicated on drawings.
2. Buried structures, piping, foundations and miscellaneous items as indicated on drawings.
3. Site items as indicated on Demolition Drawings and/or as specified herein.
4. Concrete and asphalt paving, sidewalks and curbs.
5. Demolition indicated on the drawings is shown in general to indicate the extent of demolition and is not to be considered as a record drawing of existing conditions. Accordingly, the Contractor shall be responsible for complete demolition of the area indicated including all buried items (to the depths indicated) and items not indicated on the drawings.
a. Before demolition and before submission of proposed demolition methods and operations, Contractor shall be responsible to obtain, for reference, all available existing record drawings and to conduct all appropriate field testing to determine the nature of the existing structures to be demolished.
6. Salvage of items indicated or specified. Use non-destructive methods to remove items, materials and systems designated for salvage. Owner reserves the right to add to or delete from list of salvage items at any time during the demolition operations.
7. Salvage materials resulting from demolition operations for recycling. The use of recycling in the construction process is encouraged. Concrete, asphalt, brick and concrete masonry rubble should be taken to recycling facilities. Recycled aggregate materials are encouraged for use as backfill or other functions normally performed by virgin aggregate.
8. Protect existing work to remain in place.
9. Protect the public.
10. Maintain dust protection.
11. Repair or restore to original sound condition all items or portions of structures which are not noted to be demolished but are damaged by Work under this Contract.
12. Clean-up.

B. Complete Structure Demolition: Remove structures complete, including foundations and footings.
C. Fill, compact and grade excavated areas resulting from the demolition of structures, piping and miscellaneous items. See Section 31 30 00, Earthwork for approved fill material and compaction requirements.

D. Mechanical Systems and Equipment
1. All existing mechanical, plumbing, HVAC and fire protection systems and equipment, complete.
2. Piping in tunnels.
3. Site items including, but not limited to, below grade (buried) piping, valves, manholes, and drainage structures.
4. Identify insulation and similar type materials before attempting demolition. Comply with requirements of EPA regulations, National Emissions Standards, and OHSA regulations, as well as applicable State and City laws, codes and ordinances.

E. Electrical Systems and Equipment
1. Building electrical systems and equipment, complete.
2. Site electrical including, but not limited to, power and duct banks, manholes, handholes, conduit, wire, cable, transformers, substation and general electrical equipment.
3. Coordinate demolition requirements and operations with local power and telephone utility companies for proper service termination.

F. Removal of hazardous materials, including asbestos, PCB's, diesel fuel tanks, gasoline fuel tanks, is not a part of this Contract. Hazardous materials are being removed by the Owner under a previous contract. If a hazardous material is encountered during demolition, Contractor shall halt demolition operations in that area and notify Architect.

G. Except as indicated below, all materials to be salvaged by the Owner will have been done so before demolition work begins. All materials in the buildings indicated to be demolished is the property of the Contractor.

H. Submit copies of all required permits for waste hauling and disposal to the Architect.

I. Submit receipts from waste disposal sites to the Architect.

1.02 RELATED SECTIONS

A. Sustainable Design Requirements: Section 01 81 13.2.

B. Construction Waste Management and Recycling: Section 01 74 19.2.

C. Earthwork: Section 31 30 00.
D. Selective Building Demolition: Section 02 41 19.

E. Selective Site Demolition: Section 02 41 13.

1.03 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

1. Contractor must have a minimum of 10 years experience and must have successfully completed a minimum of five (5) implosion projects similar in size and scope to this project. This experience requirement applies to all Contractors and subcontractors.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

D. Pre-demolition Conference: Conduct conference at Project site to comply with meeting requirements in Division 01. Review methods and procedures related to building demolition including, but not limited to, the following:

1. Inspect and discuss condition of construction to be demolished.
2. Review structural load limitations of existing structures.
3. Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review and finalize protection requirements.

1.03 PROJECT CONDITIONS

A. Condition of Structures: Owner assumes no responsibility for actual condition of structures to be demolished.

1. Conditions existing at time of inspection for bidding purposes will be maintained by Owner insofar as practicable. However, variations within the structure(s) may occur from natural deterioration or by Owner's removal and salvage operations prior to the start of the Demolition work.

2. It is solely the Contractor's responsibility to determine demolition procedure and sequence and to insure the safety of the building and its component parts during demolition. This includes the addition of whatever shoring, sheeting, temporary bracing, guys or tie-downs which might be necessary. Such material shall maintain the Contractor's property after completion of the project.

3. It is solely the Contractor's responsibility to follow all applicable safety codes and regulations during all phases of the work.

B. Coordination: Demolition sequence, phasing and methods must be approved by
Architect prior to start of demolition work. Submit schedule of demolition operations to Owner a minimum of two (2) weeks prior to beginning demolition operations.

C. Title to Removed Property

1. Except for items indicated for salvage or reuse, all removal items will become the property of the Contractor and be removed from the Site.
2. On site storage or sale of Contractor owned removed items will not be permitted.
3. No right, title, property, or interest of any kind whatsoever in or to the land or premises upon which such structures stands is created, assigned, conveyed, granted or transferred to the Contractor, or any other person or persons, except only the license and right of entry to remove such structures in strict accordance with the contract.

D. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

E. Traffic: Conduct demolition operations and removal of debris to ensure minimum interference with roads, streets, walks and other adjacent occupied or used facilities.

1. Do not close or obstruct streets, walks or other occupied or used facilities without permission from Owner.

F. Protection

1. Ensure safe passage of persons around area of demolition. Conduct operations to prevent injury to adjacent buildings, structures, other facilities, and persons.
2. Provide shoring, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.

G. Damages: Promptly repair damages caused to adjacent facilities by demolition operations at no cost to Owner. In the event damages are incurred by the Owner, those costs will be charged to the Contractor.

H. Utility Services

1. Locate and identify electrical and mechanical services passing through or located within affected area and serving areas outside the work limits.
2. Existing Utilities to Remain: Maintain in service and protect against damage during demolition operations.
3. Notify corporations, companies, individuals and local authorities owning conduits running to property. Arrange for removal of wires running to and
on property. Remove pipes and sewers in accordance with instructions of above Owners.

4. Protect and maintain conduits, drains, sewers, pipes and wires that are to remain on the property.

5. Shut-off Active Utilities
   a. Where existing utilities are to be permanently abandoned, shut-off and cap or arrange with proper utility company for shut-off.
   b. Where existing utilities are to be rerouted: Where utilities remaining in service interfere with demolition or future construction, shut-off, disconnect, remove, relocate and reconnect as indicated or as required.
   c. Include X-Y-Z coordinate as-built drawings immediately following the work.

6. Shut-down periods
   a. Arrange timing of shut-down periods of all in-service utilities with the Owner. Do not shut down any utility without prior written approval.
   b. Keep shut-down period to a minimum or use intermittent period as directed.
   c. Some shut-down hours may be required after normal working hours. No extra compensation will be made for Work after normal working hours, weekends or holidays.

I. Explosives: Not permitted.

J. Permits, Fees and Inspections: Obtain and pay for all permits required by governing authorities.

1. Inspections will be made at each site at the following stages for the work:
   a. At completion of structure removals.
   b. At completion of backfill.
   c. At completion of site clean-up and grading.

K. Asbestos Abatement

1. Regulations: Comply with OSHA 29 CFR 1926.11, EPA, NIOSH, and applicable ORC Sections (including 3710.10 and 3745.20) for monitoring, safety, removing, transporting and disposing of asbestos. Provide certified compliance of proper EPA waste disposal.

2. Qualifications: Abatement subcontractor must have a minimum 10 years experience in asbestos abatement. Job site personnel must be accredited by the State of Ohio to the asbestos removal classification levels required for work on this project.

3. Permits: Apply for, obtain and pay for all EPA permits.

PART 2 PRODUCTS

2.01 MATERIAL AND FILL

A. The Contractor shall furnish all materials, tools, equipment, supplies and labor required to perform the work in accordance with the Drawings and Specifications
and within the time limits as specified. All work done under this contract shall conform to all current standards, building codes and ordinances. American National Standard for Demolition Operations – Safety Requirements, ANSI A10.6 (latest edition), is included by reference.

B. All materials, equipment, fixtures and debris become the property of the Contractor and must be removed from the site.

1. Existing broken masonry and concrete may be used in filling excavations if approved by Geotechnical Engineer as specified in Section 310000. Do not use any other kind of debris as fill material.
2. Refer to Section 31 30 00 for fill material requirements and compaction requirements.
3. Use satisfactory soil materials consisting of stone, gravel, and sand, free from debris, trash, frozen materials, roots and other organic matter.

[B. On-Site Spoils Disposal: Area indicated on Drawings.]

PART 3 EXECUTION

3.01 PROTECTION

A. Use water sprinkling and other approved methods to limit the amount of dust and dirt rising and scattering in the air to the lowest practical level. Comply with governing regulations pertaining to environmental protection.

1. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, pollution and electrical shock.
2. Clean adjacent structures and improvements of dust, dirt and debris caused by demolition operations, as directed by the Architect. Return adjacent areas to conditions existing prior to the start of the work.

3.02 PROCEDURES

A. General

1. Proceed with demolition in a systematic manner and coordinate all trades involved.
2. Break-up and remove concrete slabs-on-grade.

B. Utilities

1. Mechanical Contractor: Disconnect or shut-off and cap services to buildings indicated to be removed.
2. Electrical Contractor: Disconnect or shut-off and cap services to buildings indicated to be removed.

C. Below Grade Structures: Remove below grade construction to the depths specified hereinbefore.
D. Filling Footing Excavations, Basements and Voids

1. Prior to placement of fill materials, ensure that areas to be filled are free of standing water, frost, frozen material, trash and debris.
2. Place fill materials in horizontal layers not exceeding 8" in loose depth. Compact each layer at optimum moisture content of the fill material to a density equal to the original adjacent ground, unless subsequent excavation for new work is required. Compact each layer at optimum moisture content of the fill material to a density specified in Section 31 30 00.
3. After fill placement and compaction, grade surfaces to meet adjacent contours and to provide flow to surface drainage structures.

3.03 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Remove from site, debris, rubbish and other materials resulting from demolition operations that is not permitted as fill material as determined by Geotechnical Engineer.

1. Burning of removed materials from demolished structures will not be permitted on site.
2. Asbestos: EPA approved disposal site.

B. Clean Up

1. Leave areas "rake clean."
2. Remove barricades as directed.

3.04 FIELD QUALITY ASSURANCE/MONITORING PROGRAM

A. To be performed by Owner’s Independent Testing and Inspection Agency

B. Before commencement of excavation and demolition, take color digital photographs of Project Site and surrounding facilities, including existing items to remain during construction from different vantage points, as necessary to show the condition of the existing facilities prior to the start of work. Surrounding facilities shall include, but not be limited to the Aquatics Center, the E/W six court gymnasium facility, surrounding sidewalks and streets to remain.

C. Show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by the absence of, the installation of, or the performance of temporary excavation support and permanent foundation support systems, Building Mass Demolition procedures, Selective demolition procedures

D. Submit prior to the beginning of the Work.

E. Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures and site features. Establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing
elevations.

F. During installation of excavation support systems, permanent foundation support systems, mass demolition and selective demolition regularly resurvey benchmarks, maintain an accurate log of surveyed elevations, and positions for comparison with original potions and elevations.

G. Promptly notify CM and A/E if changes in elevations or positions occur or if cracks, sags or other damage is evident in adjacent construction.

END OF SECTION
SECTION 03 01 30

CONCRETE CLEANING AND SEALING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Clean concrete surfaces and seal with clear compound specified herein. Coordinate sealer application with concrete curing compound (See Section 03 30 00).

1.02 REFERENCES

A. ACI 515.1R - Guide to the Use of Waterproofing, Dampproofing, Protective, and Decorative Barrier Systems for Concrete.

1.02 SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, chemical composition, physical properties, test data, and mixing, preparation, and application instructions.

1.03 QUALITY ASSURANCE

A. Manufacturer: Certify in writing that proposed materials meet or exceed specifications and are appropriate for intended use.

B. Test Sample: Identify an area approximately 36" x 36" where a test cleaning can be performed and sealer application can be applied. Obtain Architect's approval of test area prior to start of test. Clean area and apply sealer using materials and methods proposed for the project. Repeat sample applications until approval by Architect. After sample's acceptance by the Architect, sample will be regarded as the minimum standard of workmanship/finish acceptable for the project.

1.04 PROJECT CONDITIONS

A. Do not apply materials when temperature is expected to be below 40° F within 48 hours or when rain is imminent.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Store materials in a clean, dry area in accordance with manufacturer's instructions.
C. Keep product from freezing.

D. Avoid direct contact with this product as it may cause mild-to-moderate irritation of the eyes and/or skin.

E. Protect materials during handling and application to prevent damage or contamination.

F. Use product full strength from the container.

G. Dispose of material according to all local, state and federal regulations.

**PART 2 PRODUCTS**

2.01 MATERIALS, GENERAL

A. Source Limitations: Obtain each color, grade, finish, type, and variety of product from single source with resources to provide products of consistent quality in appearance and physical properties.

B. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

2.02 CONCRETE CLEANING MATERIAL

A. Description: Pre-mixed, pre-packaged degreaser/stripper.

B. Manufacturer and Product: Citrex by L & M CHEMICAL or Ultrite Degreaser by W. R. MEADOWS. Products by CHEM MASTERS, DAYTON SUPERIOR; MASTER BUILDERS SOLUTIONS; SURE BUILDING CHEMICALS or CONPROCO are acceptable providing they meet the requirements specified.

C. Properties

1. Appearance: Clear.
2. pH: 10.9.
3. Biodegradable: 100% after dilution.

2.03 CONCRETE SEALER

A. Description: Clear, one component, transparent, acrylic copolymer sealer. 2-coat application.

B. Primer: Type as recommended by sealer manufacturer.

C. Properties

1. VOC Content: Less than 170 g/L.
2. Solids: 30%.
3. ASTM C 1315, Type 1, Class A

D. Manufacturer and Product: Dress and Seal WB 30 by L & M CHEMICAL or equal products by CHEMMASTERS, DAYTON SUPERIOR; MASTER BUILDERS SOLUTIONS; SURE BUILDING CHEMICALS; W. R. MEADOWS or CONPROCO.

PART 3  EXECUTION

3.01  PROTECTION

A. Take precautions to protect concrete slabs from damage, spills and stains during entire construction process. Slabs to be free of defects for final sealing and cleaning.

3.02  EXAMINATION

A. Examine surfaces to receive concrete degreaser. Notify architect if surfaces are not acceptable. Do not begin application until unacceptable conditions have been corrected.

3.03  SURFACE PREPARATION

A. Protect adjacent surfaces not designated to receive concrete degreaser.

B. Follow ACI Guide 515.1R (Section 3.4.2) for severe oil and grease stains.

C. Clean surfaces of residual flooring adhesive and other foreign deposits using warm water, scraping, adhesive removing chemicals or similar methods.

3.04  APPLICATION

A. Cleaner

1. Conform to manufacturer's requirements and recommendations. Apply in number of applications as required.

2. Finish cleaned surface to match test sample area.

B. Sealer

1. Verify that slab surfaces have been cleaned in accordance with sealer manufacturer requirements.

2. Conform to manufacturer's requirements and recommendations. Provide two coats. Apply first coat at approximately 300 square feet per gallon; second coat at approximately 400 square feet per gallon.

3. Do not thin material.

3.05  CLEANUP

A. Dispose of material according to local, state, and federal regulations.
B. Clean all tools and equipment with water.

END OF SECTION
SECTION 03 30 00
MISCELLANEOUS CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Section includes cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.02 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

C. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Reinforcing bars as noted on drawings.

D. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance with requirements indicated, based on comprehensive testing of current materials:

1.03 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed concrete work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
C. Source Limitations: Obtain each type of cement of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

D. Comply with ACI 301, "Specification for Structural Concrete," including the following, unless modified by the requirements of the Contract Documents.
1. General requirements, including submittals, quality assurance, acceptance of structure, and protection of in-place concrete.
2. Formwork and form accessories.
3. Steel reinforcement and supports.
4. Concrete mixtures.
5. Handling, placing, and constructing concrete.

E. Mechanical Anchor and Adhesive Anchor Installer Qualifications:
1. Qualification: Post-installed anchors/dowels shall be installed by personnel having minimum of 3 years experience performing similar installations and having applicable certificate or other evidence of previous training from anchor product manufacturer, subject to approval of Architect/Engineer.
2. Training (As Alternate to Above Qualification): Conduct training (with manufacturer or manufacturer’s representative) for installer(s) on project. Training to consist of review of complete installation process for drilled-in anchors, to include but not limited to: hole drilling process/bits; hole preparation/cleaning; adhesive dispenser/injection technique(s); rebar dowel preparation; and proof loading/torqueing.
3. Maintain Qualification/Training records on site. Subject to Testing Agency and/or Architect/Engineer review on request.
4. Substitution of products or modifications of details, if proposed by Contractor, shall be submitted for approval in sketch form prior to submission of shop drawings, and such substitutions shall be made only when approved by Architect, and at no additional cost to Owner. Total amount of credit, if any, shall be stated in writing with submission.
5. Substitution of drilled-in anchors for cast-in-place anchors, or alternate type drilled-in anchors for specified type, where indicated, shall not be made without advance proposed substitution and Architect/Engineer’s approval.
6. Corrections for conflicts or inaccuracies that result in change from Structural Drawings or final approved shop drawing details shall be submitted in sketch form for approval. Such substitutions or corrections shall be made only when approved by Architect.
7. Where drilled-in anchors must be substituted for specified anchors due to mis-placement or other reason, Contractor shall be responsible for design/re-design and cost for design/re-design. Assume “cracked” concrete unless otherwise advised in writing by Architect/Engineer. Include seal/signature of Engineer responsible for design and licensed to practice in jurisdiction of Project.
1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 – PRODUCTS

2.01 FORM-FACING MATERIALS

A. Furnish formwork and form accessories according to ACI 301.

B. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
   1. Plywood, metal, or other approved panel materials.
   2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
      a. High-density overlay, Class 1, or better.
      b. Medium-density overlay, Class 1, or better, mill-release agent treated and edge sealed.


D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.02 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.

C. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.


2.03 CONCRETE MATERIALS
A. Portland Cement: ASTM C 150, Types I or II.
   1. Fly Ash: ASTM C 618, Class C or F.
   2. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Normal-Weight Aggregate: ASTM C 33, uniformly graded, not exceeding 1 ½ inch nominal size. For slab with thickness less than 3 inches use max. 3/8” aggregate. For masonry fill use 3/8” aggregate.

C. Water: Potable and complying with ASTM C 94.

D. Lightweight Aggregate: ASTM C330

E. Synthetic Fiber: Provide fiber reinforcement in addition to the WWR in slab on grade and precast topping polypropylene 100% collated fibrillated fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III with an average ¾” long long.

2.04 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cement and to be compatible with other admixtures. Do not use admixtures containing calcium chloride.


C. Water-Reducing Admixture: ASTM C 494, Type A.

D. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.

F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

2.05 RELATED MATERIALS

A. Vapor Retarder: Plastic sheet, ASTM E 1745, Class A or B.

B. Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils thick; or plastic sheet, ASTM E 1745, Class C.
C. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

2.06 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.07 CONCRETE MIXES

A. Comply with ACI 301 requirements for concrete mixtures.

B. Prepare design mixes, proportioned according to ACI 301, for normal-weight concrete determined by either laboratory trial mix or field test data bases, as follows:
   1. Minimum Compressive Strength: 3500 psi at 28 days. Minimum Portland Cement 500 lbs.
   2. Maximum Water-Cementitious Materials Ratio: 0.45
      a. Slump Limit for Concrete Containing High-Range Water-Reducing Admixture: Not more than 8 inches after adding admixture to plant- or site-verified, 2- to 3-inch slump.
5. Air Content: Maintain within range permitted by ACI 301 (ACI 301M). Do not allow air content of trowel-finished floor slabs to exceed 3 percent.

6. Max. Fly Ash: 20%

C. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate but not less than a rate of 1.5 lb/cu. yd. (0.90 kg/cu. m)

D. For masonry fill (grouting), 2500 psi at 28 days with superplasticizer.

E. For all exterior concrete conform to ODOT Item 499 Class C.

F. Lightweight concrete shall be 3,000 psi at 28 days. Maximum weight is 115lbs/cubic foot. All other requirements same as B.

2.08 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.09 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M [and ASTM C 1116/C 1116], and furnish batch ticket information.
1. When air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

2.10 BONDING AGENT

A. Film-forming, freeze-thaw resistant acrylic latex admixture and bonding agent suitable for brush or spray application, complying with ASTM C881. Where epoxy bonding agent is indicated, provide bonding agent with minimum 1500 PSI bond strength from the listed manufacturers. Subject to compliance with requirements, provide one of the following:
1. Adbond (J40); Dayton Superior Corp., Oregon, Illinois.
2. Eucoweld; Euclid Chemical, Cleveland, Ohio.
3. Everbond; L&M Construction Chemicals, Omaha, Nebraska
4. Acrylic Additive; Sonneborn Building Products, Shakopee, Minnesota
6. Strong Bond; Conspec Marketing & Manufacturing Co., Inc., Kansas City, Kansas
7. SIKA Corp. – Various

2.11 ADHESIVE ANCHOR
A. Concrete Inserts:
  1. Wedge Type Inserts:
     a. Description: Malleable iron, with 1-1/2 inch stainless steel askew head bolt. Standard or long as required by location.
     b. Acceptable manufacturers and product(s):
        1) Heckmann Building Products, Inc., Cat. No. 425
        2) Hohmann & Barnard, Inc., No. HW340 and LW340
        3) Dayton/Richmond, Shelf Angle Wedge Inserts – F-7 and F-7-L
  2. Dovetail Anchor Slots: Heckmann Building Products, Inc. No. 100, 1 inch wide back, 1 inch deep, 5/8 inch throat, 20 gage galvanized steel with removable filler.

B. Expansion Anchors for Bolted Connections to Concrete (Mechanical Anchor):
  1. Only expansion anchors with ICC-ES approval and tested to meet the provisions of ACI 355.2 and ICC-ES Acceptance Criteria (AC) 193 are acceptable for use.
  2. Size and Embedment: As indicated on Drawings. Where embedment is not indicated, submit proposed embedment prior to installation to Engineer for approval.
  3. Drawing Reference: Drawing reference to “expansion anchor(s) shall indicate the use of anchors specified by this paragraph. Sleeve, adhesive, and other type anchors shall only be provide if specifically reference or otherwise approve in advance of the Work.
  4. Material for Bolts, Nuts, and Washers:
     a. Carbon Steel with Zinc-Plating: ASTM B 633, Type III, Fe/Zn 5. Use at permanent interior environments free of moisture or other potentially corrosive conditions.
     b. ASTM A 276 or ASTM A 493, Type 316 Stainless Steel: Use at potentially corrosive environments, including but not limited to following:
        1) Exterior exposed conditions
        2) Potentially wet environments
        3) Attachment of exterior cladding materials
  5. Subject to compliance with requirements, provide one of following:
     a. HILTI, Inc. – “Kwik Bolt TZ” (ICC ESR-1917)
     b. SIMPSON Strong-Tie Company, Inc. – “Strong Bolt 2” (ICC ESR-3037)

C. Heavy Duty Sleeve Anchors for Bolted Connections to Concrete (Mechanical Anchor):
  1. Only heavy duty sleeve anchors with ICC-ES approval and tested to meet the provisions of ACI 355.2 and ICC-ES Acceptance Criteria (AC) 193 are acceptable for use.
  2. Anchors shall consist of hex head bolts or threaded studs with hex head nut, along with spacer sleeve, expansion sleeve, expansion cone, and washer.
3. Anchors shall be torque controlled expansion type bolts exhibiting follow-up expansion under load, with provision for rotation prevention during installation, and specifically designed for high performance in static and dynamic applications.

4. Size and embedment: As indicated on Drawings. Where embedment is not indicated, submit proposed embedment prior to installation to Engineer for approval.

5. Materials: Use carbon steel with zinc-plating at interior environments free of moisture or other potentially corrosive conditions. Use stainless steel at potentially corrosive environments, including but not limited to exterior exposed conditions, potentially wet environments, and attachments for exterior cladding materials.

6. Subject to compliance with requirements, provide following:
   a. HILTI, Inc. – “HSL-3 Heavy Duty Expansion Anchor” (ICC ESR-1545)

7. Where specific anchor manufacturer/type is shown on drawings, substitution of alternate anchor is subject to Engineer’s approval.

D. Screw Anchors for Bolted Connections to Concrete (Mechanical Anchor):
   1. Only screw anchors with ICC-ES approval and tested to meet the provisions of ICC-ES Acceptance Criteria (AC) 193 are acceptable for use.
   2. Pre-drilling of hole requires standard ANSI drill bit with same diameter as anchor and installing anchor will be done with impact wrench.
   3. Anchors shall have diameter and length marked on head.
   4. Size and embedment: As indicated on Drawings. Where embedment is not indicated, submit proposed embedment prior to installation to Engineer for approval.
   5. Materials: Use carbon steel, heat treated with zinc-plating or mechanically galvanized at interior environments free of moisture or other potentially corrosive conditions. Screw anchors shall not be used in potentially corrosive environments, including but not limited to exterior exposed conditions, potentially wet environments, and attachments for exterior cladding materials.
   6. Screw anchors once tightened may be loosened maximum of one turn and re-tightened with torque wrench. Loosening or removal beyond this limitation will void screw anchor.
   7. Subject to compliance with requirements, provide following:
      a. HILTI, Inc. – “Kwik HUS-EZ” (ICC ESR-3027)
      b. SIMPSON Strong-Tie Company, Inc. – “Titen HD” (ICC ESR-2713)
   8. Where specific anchor manufacturer/type is shown on drawings, substitution of alternate anchor is subject to Engineer’s approval.

E. Adhesive Anchors for Bolted Connections to Concrete:
   1. Only adhesive anchor systems with ICC-ES approval and tested to meet the provisions of ACI 355.4 and ICC-ES Acceptance Criteria (AC) 308 are acceptable for use.
   2. Adhesive anchor system consists of threaded steel rod, nut, washer, two component epoxy or hybrid adhesive injection system and
manufacturer’s installation instructions.

3. Material for Bolts, Nuts and Washers:
   a. Carbon steel conforming to ASTM A36, or better, except as noted below.
   b. ASTM F 593, Type 316 Stainless Steel: Use at potentially corrosive environments, including but not limited to following:
      1) Exterior exposed conditions.
      2) Potentially wet environments.
      3) Attachment of exterior cladding materials.

4. Size and Embedment: As indicated on Drawings. Where embedment is not indicated, use embedment of 12 x anchor diameter, or, submit proposed embedment prior to installation to Engineer for review.

5. Subject to compliance following products are considered acceptable for use:
   a. HILTI, Inc. – “HIT RE 500-SD Adhesive System (ICC ESR-2322)
   b. HILTI, Inc. – “HIT HY 200 SAFE SET” Anchoring System (ICC ESR-3187), using one of following techniques:
      1) HIT-Z Anchor Rods in drilled holes
      2) Standard threaded rods in holes drilled with Hilti Hollow Drill Bit and VC 20/40 Vacuum System
   c. SIMPSON Strong-Tie Company, Inc. – “SET-XP Epoxy-Tie Adhesive System” (ICC ESR-2508)

6. Above epoxy adhesive systems require special attention to ambient conditions and cure time prior to loading. Where ambient or other project conditions require alternate product, such as acrylic based adhesive, other product(s) of listed manufacturers may be considered by Engineer. Consult with product manufacturer and submit proposal for review/approval by Engineer prior to use.

7. Where specific anchor manufacturer/type is shown on drawings, substitution of alternate anchor is subject to Engineer’s approval.

F. Adhesive Anchors for Rebar Doweling:
   1. Only adhesive anchor systems with ICC-ES approval and tested under ICC-ES Acceptance Criteria (AC) 308 are acceptable for use.
   2. Adhesive anchor system consists of Grade 60 reinforcing bar, two component epoxy injection adhesive injection system and manufacturer’s installation instructions.
   3. Size, length and embedment of dowel as indicated on Drawings. Where embedment is not indicated, use embedment of 12 x rebar diameter (inches), or submit proposed embedment prior to installation for Engineer for review.
   4. Subject to compliance following products are considered acceptable for use where rebar doweling with adhesive anchorage is indicated on Drawings:
      a. HILTI, Inc. – “HIT RE 500-SD Adhesive System” (ICC ESR-2322)
      b. HILTI, Inc. – “HIT HY 200 SAFE SET” Anchoring System (ICC ESR-3187), using following technique:
         1) Standard rebar dowel in holes drilled with Hilti Hollow Drill Bit and VC 20/40 Vacuum System
      c. SIMPSON Strong-Tie Company, Inc. – “SET-XP Epoxy-Tie
Adhesive System" (ICC ESR-2508)

5. Above epoxy adhesive systems require special attention to ambient conditions and cure time prior to loading. Where ambient or other project conditions require alternate product, such as acrylic based adhesive, other product(s) of listed manufacturers may be considered by Engineer. Consult with product manufacturer and submit proposal for review/approval by Engineer prior to use.

6. Where specific anchor manufacturer/type is shown on drawings, substitution of alternate anchor is subject to Engineer’s approval.

G. Cast-In Place Internally Threaded Rods:
   1. Following Product is considered acceptable for use.
      a. HILTI, Inc. – “HCI-WF” (Wood Form) Cast-in Anchor
      b. HILTI, Inc. – “HCI-MD” (Metal Deck) Cast-in Anchor
      c. SIMPSON Strong-Tie Company, Inc. – “Blue Banger Hanger – Wood Form (BBWF)”
      d. SIMPSON Strong-Tie Company, Inc. – “Blue Banger Hanger – Metal Deck (BBMD)”

PART 3 – EXECUTION

3.01 FORMWORK

A. Design, construct, erect, shore, brace, and maintain formwork according to ACI 301.

3.02 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.03 VAPOR RETARDERS

A. Install, protect, and repair vapor retarders according to ASTM E 1643; place sheets in position with longest dimension parallel with direction of pour.
   1. Lap joints 6 inches and seal with manufacturer recommended adhesive or joint tape.

3.04 STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
   1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
3.05 CONCRETE PLACEMENT

A. Comply with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.

B. Do not add water to concrete during delivery, at Project site, or during placement.

3.06 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Contraction Joints in Slabs-on-Grade: Form weakened-plane, sawed contraction joints, sectioning concrete into areas as indicated. Where not specifically indicated, joint shall be 2.5 times thickness of slab. For exterior, max 10' C/C. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness.

C. Isolation Joints: Install joint-filler strips at junctions with slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
   1. Extend joint fillers full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

3.07 CONCRETE PLACEMENT

A. Comply with ACI 301 for placing concrete.

B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

C. Do not add water to concrete during delivery, at Project site, or during placement.

D. Consolidate concrete with mechanical vibrating equipment.

E. For all exterior concrete, conform to ODOT Item 499 Class C.

3.08 FINISHING FORMED SURFACES
A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding 1/2 inch (13 mm).
   1. Apply to concrete surfaces (not exposed to public view).

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch (3 mm).
   1. Apply to concrete surfaces exposed to public view, or to receive a rubbed finish.

C. Rubbed Finish: Apply the following rubbed finish, defined in ACI 301 (ACI 301M), to smooth-formed finished as-cast concrete where indicated:
   1. Smooth-rubbed finish.
   2. Grout-cleaned finish.
   3. Cork-floated finish.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.09 FINISHING UNFORMED SURFACES

A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface.
   1. Do not further disturb surfaces before starting finishing operations.

C. Scratch Finish: Apply scratch finish to surfaces indicated and surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes, unless otherwise indicated.

D. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, fluid-applied or direct-to-deck-applied membrane roofing, or sand-bed terrazzo.
E. Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.

F. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

G. Nonslip Broom Finish: Apply a nonslip broom finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

3.10 TOLERANCES

A. Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

3.11 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure formed and unformed concrete for at least seven days by a curing compound.
   1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
      a. Water.
      b. Continuous water-fog spray.
c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer’s written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.12 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Tests: Perform according to ACI 301 (ACI 301M).
   1. Testing Frequency: One composite sample shall be obtained for each day’s pour of each concrete mix exceeding 5 cu. yd. (4 cu. m) but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
   2. Testing Frequency: One composite sample shall be obtained for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mix placed each day.

3.13 REPAIRS

A. Remove and replace concrete that does not comply with requirements in this Section, at no additional cost to Owner.

END OF SECTION 03 30 00
PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Grinding of the slab surface to receive clear reactive, penetrating liquid hardener/densifier.
   2. Application of clear reactive, penetrating liquid hardener.
   3. Progressively polishing and burnishing of the slab surface to achieve Finish Requirements.

B. Intent of this specification is to match concrete polishing from Architect sample.

1.02 RELATED SECTIONS:

A. Section 03 30 00: Cast-in-Place Concrete.

B. Section 07 90 00: Joint Sealants.

1.03 SYSTEM DESCRIPTION

A. Installation of polished concrete floor system for new interior concrete floors by wet grinding and polishing with various size grit metal-bonded and resin-bonded diamonds and application of concrete densifier.

B. Performance Requirements: Improve performance of floor by installation of polished concrete floor system as measured by the following criteria:
   1. Static Coefficient of Friction, ASTM C 1028:
      a. Dry Surface: .6
   2. Aggregate Exposure:
      a. Type 2 Salt and Pepper: Medium aggregate exposure.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer’s product data sheets on all products to be used for the work. All Specified Concrete Surface Treatments.

B. Test Reports: Provide test reports confirming compliance with specified performance criteria.

1.05 QUALITY ASSURANCE

A. Mockups: Prior to applying special concrete finishes, construct mockup for each finish required to verify selections made under the sample submittals and to
demonstrate aesthetic effects. Build mockups to comply with the following requirements, using materials for final unit of the work.

1. Locate mockups on-site in the location and size indicated or, if not indicated, as directed by the Architect. Provide an area of 4’x4’ min. in a typical floor condition to be used as a control sample.

B. Installer Qualifications: Engage an experienced terrazzo grinder and finisher with a minimum of 5 years experience and who has completed special concrete finish work similar in material, design and extent to that indicated for this project and with a documented record of successful in-service performance.

C. Pre-Installation Meeting: Shall convene before the start of work on new concrete slabs, patching of existing concrete slabs and start of application of concrete finish system. Review the following:

1. Physical requirements of completed concrete slab and slab finish.
2. Locations and time of test areas.
3. Protection of surfaces scheduled for finish application.
5. Application procedure.
6. Quality control.
7. Cleaning.
8. Protection of concrete slab prior to and post-finish system.
9. Coordination with other work.

1.06 PROJECT CONDITIONS

A. Environmental limitations: Comply with manufacturer’s written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting performance and finishing requirements.

1. Close areas to traffic during floor application and after application for time period recommended in writing by manufacturer.
2. The completed slab shall be protected to prevent damage by the other trades during floor completion.

B. Temperature Limitations: Do not apply when surface and air temperature are below 40 degrees F (4 degrees C) or above 95 degrees F (35 degrees C) unless otherwise indicated by manufacturer’s written instructions.

1. Do not apply when surface and air temperatures are not expected to remain above 40 degrees F (4 degrees C) for a minimum of 8 hours after application, unless otherwise indicated by manufacturer’s written instructions.
2. Do not apply under windy conditions such that the concrete surface treatment may be blown to surfaces not intended.
3. Do not apply to frozen substrate. Allow adequate time for substrate to thaw if freezing conditions exist before application.
4. Do not apply earlier than 24 hours after rain or if rain is predicted for a period of 8 hours after application, unless otherwise indicated by manufacturer’s written instructions.

5. Temporary Heat: Ambient temperature of 50 degrees F (10 degrees C) minimum.

C. Ventilation: Provide adequate ventilation in confined or enclosed areas in accordance with manufacturer’s instructions.

**PART 2  PRODUCTS**

2.01 MATERIALS

A. Basis of Design Manufacturer: Following products are manufactured by EZ POLISH SYSTEM

B. Other Manufacturers: Products by PROSOCO, GEMITE PRODUCTS, INC., TROCAL, DYNAMIT-NOBEL are acceptable provided they are comparable to basis of Design products as determined by the Architect

C. All products to be from single source manufacturer.

D. Pre-Densifier Concrete Cleaner: Shall remove dirt, oil, grease, and other stains from existing slab surface.

   1. Auto Scrubber Machine: Equipment used for cleaning operations, as required to produce specified results.

E. Penetrating Concrete Hardener/Densifier: Lithium silicate hardener/densifier shall penetrate and react with concrete to produce insoluble calcium silicate hydrate within the concrete pores. The penetrating concrete hardener shall reduce dusting, increase abrasion resistance and not contribute to surface crazing/surface EZ POLISH SYSTEM Densefier. Subject to compliance with the following requirements:

   1. Living Building Challenge 2.0/2.1 Red List Compliant.
   3. Comply with national, state and district AIM VOC regulations and be 50 g/L or less.
   4. Registered as an approved NSF International/Nonfood Compound Registration.
   5. Abrasion Resistance: >50% improvement over untreated samples when tested in accordance with ASTM C1353.
   6. Achieve ‘High Traction Range’ readings when tested in accordance with ANSI B101.1.
   7. Coefficient of Friction: >0.60 dry, >0.60 wet when tested in accordance with ASTM C1028.
   8. Adhesion: >10% increase in pull-off strength when compared to an untreated sample when tested in accordance with ASTM D4541.
9. Water Vapor Transmission: 100% retained when compared to untreated samples when tested in accordance with ASTM E96/96M Method B (Water Method).

10. UV Stability: No degradation or yellowing of material when tested in accordance with ASTM G154.

F. Profiling Solution: Diamond profiling solution / slurry that has nano abrasives that remove surface scratches during the grinding and cutting process. EZ POLISH SYSTEM Green Cut.

1. Cleaning Solution: EZ POLISH SYSTEM Eco-Quick Gel

G. Concrete Sealer Stain Protector: Clear, highly concentrated, quick drying penetrating water & oil repellent sealer specifically designed to deeply impregnate the surface pores and chemically bond with the concrete floor to increase durability. EZ POLISH SYSTEM Super Guard

2.02 EQUIPMENT

A. Auto Scrubber Machine: equipment used for cleaning operations, as required to produce specified results.

B. Hand Grinder for edge grinding/polishing.

C. Polishing Equipment:

1. Polishing machines shall be in full operating condition during the duration of the work to achieve specified Finishing Requirements and must grind to within 1/8” of walls and edges.

2. Dry grinding/polishing machines must include a dust extraction system, including HEPA filtration vacuum.

3. Diamond Heads Types:
   a. Metal Diamonds: 30, 50, 80 and 150.
   b. Hybrid Style Diamonds: 50 or 100.

4. Resin Bonded, Phenolic Diamonds: 100, 200, 400, 800, 1500, and 3000 (if necessary).

5. Burnishing Machine and Burnishing Pads shall be used to produce specified results.

6. Burnishing Machine: High speed burnisher, generating pad speeds of 1,500 RPM or higher, as recommended by protective treatment manufacturer. Dust skirt must be installed at time of work.

7. Burnishing Pads: as recommended by protective treatment manufacturer. White Burnishing Pad, non-abrasive

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrate with installer present for conditions affecting performance of finish. Correct conditions detrimental to timely and proper work. Surfaces that are
in question or that will affect the execution or quality of work must be brought to
the attention of the Owner’s Representative before work may begin.

3.02 PREPARATION

A. Clean dirt, dust, oil, grease and other contaminants that interfere with penetration
or performance of specified product from surfaces. Use appropriate concrete
cleaners approved by the concrete surface treatment manufacturer where
necessary. Rinse thoroughly using pressure water spray to remove cleaner
residues. Allow surfaces to dry completely before application of product.

B. Repair, patch and fill cracks, voids, defects and damaged areas in surface as
approved by the Architect. Allow repair materials to cure completely before
application of product.

C. Variations in substrate texture and color will affect final appearance and should
be corrected prior to application of sealer/hardener system and the polishing
steps.

D. Protect surrounding areas prior to application. If product is accidentally
misapplied to adjacent surfaces, flush with water immediately before material
dries.

E. Avoid contact in areas not to be treated. Avoid contact with metal, glass and
painted surfaces.

F. Seal open joints in accordance with Section 07 90 00 – Joint Sealants.

G. Apply specified sealants and caulking and allow complete curing before
application of Penetrating Concrete Hardener/Densifier.

3.03 GENERAL REQUIREMENTS

A. Dry and wet grinding/polishing is acceptable when industry standard polishing
procedures are adhered to.

B. Between and after final polishing passes, thoroughly scrub and rinse slab surface
with clean water and vacuum with auto-scrubber.

C. Sequential progression of diamond polishing steps shall be required and limited
to no more than double the grit value of the previous diamonds used.

D. Overlap adjacent polishing passes by 25%.

E. Perform each pass perpendicular to the other pass north/south then east/west;
multiple passes may be needed.

F. Include all work necessary to achieve specified Finish Requirements and to
match approve mockup.
G. Progressively grind and polish the slab surface utilizing approved diamond segments as necessary to produce Finishing Requirements while meeting the general requirements.

3.05 CLEANING, FINISHING, AND PROTECTING

A. Clean ground concrete after initial sealing operations are complete, complying with sealer manufacturer’s instructions.

B. Apply hard surface seal and liquid floor finish to cleaned ground concrete surfaces to comply with manufacturer’s instructions and approved mockup.

C. Protection
   1. Upon completion, the work shall be ready for final inspection and acceptance by the Owner.
   2. The General Contractor shall protect the finished floor from damage and wear from the time that the concrete grinder completes the work.

3.06 FINAL CLEANING

A. Clean ground concrete finished areas as recommended by the manufacturer of the sealer and finisher.

END OF SECTION
SECTION 04 00 00

MASSONRY

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide the following:

1. Face brick.
2. Concrete masonry units.
   a. Standard
   b. Fire-rated
3. Masonry lintels and setting of steel angles furnished under Section 05 50 00.
4. Setting bearing plates supported and embedded with masonry furnished under Section 05 50 00.
5. Provide masonry fill concrete and reinforcing steel where indicated on drawings. See Section 03 30 00.
6. Wall reinforcing and accessories.
7. Built-in collars, sleeves, inserts, anchors, ties, sockets, bolts, blocking, miscellaneous metal work, etc., in contact with, supported on or enclosed by masonry. When these items are furnished by others, they shall include information for setting.
8. Through-wall flashing.
9. Mortar and grout.

1.02 RELATED SECTIONS

A. Sealants: Section 07 92 00

1.03 DEFINITIONS

A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.04 SUBMITTALS

A. Product Data: For each different masonry unit, accessory and other manufactured products specified.

B. Shop Drawings: Show fabrication and installation details for the following:

1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, “Details and Detailing of Concrete Reinforcement”. Show elevations of reinforced walls.
2. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
C. Samples: Provide samples of items specified herein to be used in the work.

D. Submit certification that fire resistant concrete units conform to the requirements specified herein for Fire Resistant Concrete Block.

E. Brick Cleaner

1. Applicator Qualifications: Submit qualifications of applicator.
   a. Certification stating applicator is experienced in the application of the specified products.
   b. List of recently completed masonry cleaning projects, including project name and location, names of owner and Architect, description of cleaning products used and substrates, applicable local environmental regulations, and application procedures.

2. Environmental Regulations: Submit description for testing, handling, treatment, containment, collection, transport, disposal, and discharge of hazardous wastes and cleaning effluents. Describe any hazardous materials to be cleaned from substrates. Submit applicable local environmental regulations.

3. Protection: Submit description for protecting surrounding areas, landscaping, building occupants, pedestrians, vehicles, and nonmasonry surfaces during the work from contact with masonry cleaners, stain removers, residues, rinse water, fumes, wastes, and cleaning effluents.

4. Surface Preparation: Submit description for surface preparation of substrates to be completed before application of masonry cleaners and stain removers.


F. Material Test Reports: From a qualified testing agency indicating and interpreting test results of the following for compliance with requirements indicated.

1. Each type of masonry unit required.
   a. Include size-variation data for brick, verifying that actual range of sizes falls within specified tolerances.
   b. Include test results, measurements, and calculations establishing net-area compressive strength of masonry units.

2. Mortar complying with property requirements of ASTM C270.

3. Grout mixes complying with compressive strength requirements of ASTM C476. Include description of type and proportions of grout ingredients.

G. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Each type of masonry unit required.
   a. Include test data, measurements, and calculations establishing net-area compressive strength of masonry units.
2. Each combination of masonry unit type and mortar type. Include statement of net-area compressive strength of masonry units, mortar type, and net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
3. Each material and grade indicated for reinforcing bars.
4. Each type and size of joint reinforcement.
5. Each type and size of anchor, tie, and metal accessory.

H. Cold-Weather Procedures: Detailed description of methods, materials and equipment to be used to comply with cold-weather requirements.

1.05 QUALITY ASSURANCE

A. Supervisor: A supervisory journeyman mason shall be appointed for the project and shall be present at all times masonry work is being performed and:
   1. have a minimum of 5 years experience on masonry projects of this type and size.
   2. be thoroughly familiar with the design requirements, types of materials being installed, referenced standards and other requirements.

B. Use only skilled journeyman masons for cutting and placing of masonry; no allowance shall be made for lack of skill on the part of the workmen.

C. Consult other trades and make provisions that shall permit the installation of their work in a manner to avoid cutting and patching. Build-in work under other sections, as necessary, and as the work progresses.

D. Unit Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602, 2013 Edition “Specifications for Masonry Structures”. Maintain one copy of the standard in project field office at all times during construction. Contractor’s supervisory personnel shall be thoroughly familiar with the material as it applies to this Project.

E. Concrete Unit Masonry Construction: Comply with the National Concrete Masonry Association (NCMA) “TEK Bulletins”, and other requirements specified.
   1. NCMA TEK Bulletin 3-02A “Grouting for Concrete Masonry Walls”.
   2. NCMA TEK Bulletin 8-02A “Removal of Stains from Concrete Masonry Walls”.
   4. NCMA TEK Bulletin 10-01A “Crack Control in Concrete Masonry Walls”.
   5. NCMA TEK Bulletin 10-02C “Control Joints for Concrete Masonry Walls”.
   6. NCMA TEK Bulletin 14-2 “Reinforced Concrete Masonry”.
   7. NCMA TEK Bulletin 19-04A “Flashin Concrete Masonry”.
   8. NCMA TEK Bulletin 19-05A “Use of Flashing in Concrete Masonry Walls”.

F. Brick Industry Association (BIA)
   1. BIA Technical Notes No. 8 and 8B: Mortar for Brickwork.
   2. BIA Technical Notes No. 20: Cleaning Brick Masonry.
   3. BIA Technical Notes No. 28B: Brick Veneer.
G. Sample Panels

2. Panel shall be at least 6 feet long by 6 feet high and shall show full color range, joint detail, reinforcement, through-wall flashing and drips, cavity drainage material, weeps and all other details of construction that will be used in the completed work. Include at least one 90° corner.
   a. Include brick masonry.
   b. Clean sample panel using the same methods and materials that will be utilized for cleaning the building masonry.
3. Construct additional panels as required by Architect if original panel construction is not acceptable.
4. Do not start masonry construction until the sample panel is approved by the Architect.
5. Retain acceptable sample as reference standard for the project.
6. Demolish and remove panel from site after acceptance of work.

1.06 DELIVERY, STORAGE AND HANDLING

A. Store cement and lime materials and masonry units off the ground, under cover and protected from weather damage. If units become wet, do not install until they are dry. Do not use cementitious materials that have become damp.

C. Stockpile and store aggregates to prevent contamination from foreign materials, in locations where grading and other required characteristics can be maintained.

D. Use care in handling units to avoid chipping and breakage.

E. Locate storage areas where they will not be disturbed or damaged by construction operations.

F. Protect finished floor areas from damage.

1.07 COLD WEATHER CONSTRUCTION

A. Comply with recommended practices for cold weather construction of the International Masonry Industry All-Weather Council and requirements contained in ACI 530.1/ASCE 6/TMS 602.

B. Do not build on frozen or snow covered work. Remove and replace masonry work damaged by frost or freezing.

C. Requirements During Construction: Provide the following minimum requirements for the air temperatures listed:

1. Above 40° F: Normal masonry procedures.
2. 40° F to 32° F: Heat mixing water to produce mortar temperatures between 40° F and 120° F. Produce consecutive batches of mortar with the same temperatures falling within this range. Do not heat mortar to greater than
3. Below 32° F to 25° F: Heat sufficient mortar ingredients to produce mortar temperatures between 40° F and 120° F. Produce consecutive batches of mortar with the same temperatures falling within this range. Maintain mortar temperatures after mixing above 40° F. Do not heat mortar to greater than 120° F.

4. Below 25° F to 20° F: Heat sufficient mortar ingredients to produce mortar temperatures between 40° F and 120° F. Produce consecutive batches of mortar with the same temperatures falling within this range. Maintain mortar temperatures after mixing above 40° F. Do not heat mortar to greater than 120° F. Maintain masonry above freezing using auxiliary heat. Provide enclosure when wind is in excess of 15 mph.

5. Below 20° F: Heat sufficient mortar ingredients to produce mortar temperatures between 40° F and 120° F. Produce consecutive batches of mortar with the same temperatures falling within this range. Maintain mortar temperatures after mixing above 40° F. Do not heat mortar to greater than 120° F. Maintain masonry above freezing using enclosure and auxiliary heat.

D. Protection Requirements for Completed Masonry (and masonry not being worked on): Provide the following minimum requirements for the mean daily air temperatures listed:

1. Above 40° F: Normal masonry procedures.
2. 40° F to 32° F: Protect from rain or snow for 24 hours with weather-resistant membrane.
3. Below 32° F to 20° F: Completely cover with weather-resistant membrane and maintain above freezing for 24 hours.
4. Below 20° F: Provide weather-resistant enclosure and auxiliary heat to maintain above freezing for 24 hours.

E. Requirements During Grouting Operations (Vertically Reinforced Walls): Provide the following minimum requirements for the air temperatures listed:

1. Above 32° F: Normal masonry procedures. Cover at end of work day with weather-resistant membrane.
2. 32° F to 20° F: Heat grout materials to 90° F so grout has in-place temperature of 70° F at end of work day. Cover at end of work day with weather-resistant membrane and 1/2" thick insulating blanket.
3. Below 20° F: Heat grout materials to 90° F so grout has in-place temperature of 70° F at end of work day. Cover at end of work day with weather-resistant membrane and 1" thick insulating blanket or maintain heated enclosure to 40° F for a period of 48 hours.
   a. Grout Containing Type III Cement: Maintain 40° F temperature for 24 hours.

1.08 HOT WEATHER CONSTRUCTION

A. Protect masonry construction from direct exposure to wind and sun when erected
in an ambient air temperature of 90° F., or greater in shade with relative humidity less than 50%. Provide artificial shade and wind breaks and use cooled materials as required. Provide artificial shade, wind breaks, use cooled materials and other procedures outlined in BIA Tech Notes #1.

1.09 PROJECT CONDITIONS

A. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

1. Brace unsupported and newly laid masonry walls. Maintain bracing in place until building structure provides permanent bracing.

B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar and soil that become in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface.
2. Protect sills, ledges and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt on completed masonry.

PART 2 PRODUCTS

2.01 CLAY MASONRY UNITS

A. Face Brick

1. Reference: Select exterior building brick conforming to ASTM C216, Grade SW.
3. Manufacturer/Color
   a. Field Brick: BELDEN BRICK Black Diamond Velour.
   b. Other Manufacturers: Brick by other manufacturers may be used providing the above requirements are met or exceeded. Color and texture must be equal as approved by the Architect prior to bid.
4. Special Shapes: Provide solids, shelf angle bricks and other special shapes as indicated or required so as no brick cores are exposed to view. Color and texture to match face brick or accent brick as applicable.

2.02 CONCRETE MASONRY UNITS

A. General

1. Curing: Cure for at least 7 days and units must be at least 28 days old when used in the work.
2. Corners (Interior Walls): Provide bullnose edges at all outside corners.
unless otherwise indicated or directed.

3. Integral Water Repellents: Use in units exposed to weather. Amount as recommended by water repellent manufacturer as approved by concrete block manufacturer.
   a. Type: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514 as a wall assembly made with mortar containing integral water-repellent manufacturer’s mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.
   b. Products/Manufacturers: Subject to compliance with requirements, provide W. R. GRACE Dry-Block; MASTER BUILDERS’ INC. Rheomix-Rheopel; ACME-HARDESTY CO. Acme-Shield; KRETE INDUSTRIES KreteControl 202 Internal Water Repellent; EUCLID CHEMICAL Hydrapel System.

B. Hollow Load Bearing, Solid Load Bearing (75%) and Fire Resistant Concrete Masonry Units

1. Type: Hollow, load bearing, standard modular size and shapes, thoroughly cured and dried.
2. References: ASTM C90.
3. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
4. Weight Classification: Normal weight, unless otherwise indicated.
5. Linear Shrinkage: Not to exceed 0.065 percent, ASTM C426.
7. Fire Resistant
   a. Rating: Design for fire ratings indicated on drawings.
   b. Manufacturer
      1) Listed in the Building Materials List published by the Underwriters’ Laboratories, Inc.
      2) In lieu of above, provide a report from a nationally recognized testing agency stating that the units are equivalent in fire rating to those furnished by the producers as listed above.
   c. Location: Where indicated.

2.03 MORTAR

A. Materials

1. Portland Cement: ASTM C150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated or selected.
2. Masonry Cement: ASTM C91, provide non-staining type for stonework.
3. Hydrated Lime: ASTM C207, Type S.
4. Aggregate: ASTM C144, clean masonry sand, not over 10% to pass No.
100 sieve for general use.

5. Water: Clean, fresh and free of deleterious amounts of acids, alkalis and foreign organic matter.

6. Water Repellent Admixture: W. R. GRACE Dry-Block, RHEOMIX - Rheopel Mortar Admixture; MASTER BUILDERS, INC., KRETE INDUSTRIES KreteGuard 390. Manufacturer must submit certification that water repellent admixture meets or exceeds requirements specified herein.
   b. Type: Integral polymeric water-repellents (IPWR).

7. Color Additive: Inorganic pigments as required to produce colored mortar as selected by Architect. SGS Colors by SOLOMON GRIND CHEM SERVICE; DAVIS COLORS or equal.
   a. Resistant to alkali, light and weather
   b. Unaffected by cement and free of water soluble salts.

8. Cold Weather Additive: Non-chloride, non-corrosive, accelerating admixture complying with ASTM C494, Type C or ASTM C1384 and recommended by the manufacturer for use in masonry mortar of composition indicated.

B. Proprietary Mortar Cement: Conform to ASTM C91, containing hydrated lime.

1. Certification: Submit certified laboratory data substantiating conformance with structural requirements for mortars as specified; and that no adverse chemical reaction will occur with the specified masonry accessories and reinforcing. Certification must be received and approved by Architect prior to mortar use.

2. Suitable products are acceptable from the following manufacturers:
   a. MIAMI
   b. LEHIGH HANSON
   c. ESSROC MATERIALS, INC. (Brixment)
   d. QUIKRETE

C. Mixes - Unit Masonry

1. Provide water repellent admixture in all mortar used for exterior CMU masonry work. Add to mix in accordance with manufacturer's recommendations.

2. Type M Mortar
   a. Use: Provide for CMU work below grade or in contact with earth.
   b. Proportions: ASTM C270 proportions by volume. Minimum average compressive strength at 28 days of 2,500 psi.
   c. Color: Natural color.

3. Type S Mortar
   a. Use: Provide for all CMU work,
   b. Proportions: ASTM C270 proportions by volume. Minimum average compressive strength at 28 days of 1,800 psi.
   c. Colors
      1) Concealed work and natural colored concrete masonry units: Natural color.
      2) Colored concrete masonry units: As selected by Architect.

4. Type N Mortar
a. Use: Provide for brick veneer.
b. Proportions: ASTM C270 proportions by volume. Minimum average compressive strength at 28 days of 750 psi.
c. Colors: As selected by Architect.

2.05 GROUT

A. Masonry Grout - Mix

1. Fine Grout for Reinforced Masonry: Mix with mechanical mixer with sufficient water to the desired consistency in accordance with ASTM C476 Proportion Specifications.
   a. Portland Cement: 1 part
   b. Hydrated Lime: 0 to 1/10 part
   c. Fine Aggregate: 2-1/4 to 3 times the sum of the volumes of the cementitious materials

2. Coarse Grout for Reinforced Masonry: Mix with mechanical mixer with sufficient water to the desired consistency in accordance with ASTM C476 Proportion Specifications.
   a. Portland Cement: 1 part
   b. Hydrated Lime: 0 to 1/10 part
   c. Fine Aggregate: 2-1/4 to 3 times the sum of the volumes of the cementitious materials.
   d. Coarse Aggregate: 1 to 2 times the sum of the volumes of the cementitious materials.

3. Hand Mixing: Not acceptable.

2.06 REINFORCING

A. Manufacturers: DUR-O-WALL; HECKMANN BUILDING PRODUCTS; HOHMANN & BARNARD; MASONRY REINFORCING CORPORATION OF AMERICA (WIREBOND). Where products are specified referencing a particular manufacturer, equal products from the manufacturers listed are acceptable providing the product meets the requirements indicated.

1. Where a manufacturer is listed below for a specific product, it is to establish a level of quality. Similar products of equal quality from the above listed manufacturers are acceptable.

B. Horizontal Joint Reinforcement

1. General
   a. Type: Ladder type, standard weight, galvanized.
   b. Width: Approximately 2 in. less than nominal wall thickness.
   c. Spacing: Continuous along horizontal joint, spaced 16 inches on center vertically, unless otherwise indicated.

2. Longitudinal Wire
   b. Multi-wythe Walls:
      1) Each wythe less than 6 inches wide: 1 wire.
2) Each wythe 6 inches and wider: 2 wires.

C. Metal "Z" Ties: 3/16" galvanized steel "Z" shaped wire ties, 2" narrower than wall width. For use in block wythes at control joints.

D. Adjustable Veneer Anchor

1. Steel Stud or Structural Steel Back-Up: Two piece, adjustable loop type anchor and tie. Anchors and ties shall be carbon steel, devices, hot dip galvanized after fabrication, coating conforming to ASTM A153, Class B2, 1.5 ounce coating per square foot. Manufacturer to provide oversized hole as required to accommodate diameter of screws without abrasion of zinc coating.
   a. Anchor
      1) Steel Stud/1" Sheathing Back-Up: Screw-on galvanized steel strap anchor with stand-off legs for 1" insulation sheathing board. X-SEAL by HOHMANN & BARNARD or similar type design manufactured by HECKMANN, AA WIRE PRODUCTS, DUR-O-WAL, INC., NATIONAL WIRE PRODUCTS INDUSTRIES. Seal insulation face with reinforced polyolefin base, laminated to a polypropylene layer tape. Alternate design attachment must be specifically designed for insulated sheathing.
      2) Fasteners: Hot-dipped galvanized steel bolt, nut and washer.
   b. Ties: Triangular tie, fabricated from 3/16" diameter galvanized cold drawn steel wire. Provide ties long enough to engage the anchor and be embedded not less than 2" into the bed joint of the masonry veneer. HECKMANN 316 Series.

2. Concrete Masonry Back-Up (Tie and Anchor): Ladder type reinforcing with double eye ties welded at each cross wire 15" o.c. to extend into cavity of the two wythe wall. A two pronged hook tie shall be inserted into the eye holes creating a positive connection to restrain compression and tension. Lox All Adjustable Eye Wire HOHMANN & BARNARD.

F. Wire Mesh: Wire Mesh: 1/4" mesh of galvanized steel wire (min. 16 gage) or galvanized metal lath, cut into strips 1-1/2" narrower than wall width where used. For use at intersection of masonry walls.

G. Reinforcing Steel - Bond Beam and Wall Reinforcement: Uncoated steel reinforcing bars; ASTM A615/A; ASTM A616, including Supplement 1; or ASTM A617/A, Grade 60.

I. Partition Top Anchors: 12 gage galvanized steel plate with 7/16-inch diameter holes. HOHMANN & BARNARD PTA 422 or equal.

2.07 MISCELLANEOUS ITEMS

A. Through-Wall Flashing: Provide one of the following types:
1. Copper Composite  
a. Characteristics:  
1) Type: Copper core with polymer fabric laminated to copper face on both sides with non-asphalt adhesive.  
2) Copper: ASTM B370, CDA Alloy 110  
3) Weight: 5 oz  
4) Fabric: polymer fabric; laminated both faces of copper core.  
b. Mastic/sealant: One part 100% solids, solvent-free formulated silyl-terminated polyether (STPE), ASTM C920, Type S, Grade NS, Class 50.  
c. Termination Strip: Provide type recommended by flashing manufacturer.  
d. Manufacturers/Products  
1) YORK MANUFACTURING, INC.; Multi-Flash  
2) STS COATINGS, INC.; Gorilla Flash GF-500  
3) WIRE-BOND, INC.; Copper Seal  
4) ADVANCED BUILDING PRODUCT; Copper Sealtite  

2. Rubber Sheet  
b. Mastic: Rubberized asphalt-based mastic.  
c. Surface Primer (Conditioner): Type as recommended by manufacturer.  
d. Manufacturer: Perm-A-Barrier by W. R. GRACE, Sando-Seal by SANDELL MANUFACTURING COMPANY, IPCO Wall Flashing; ILLINOIS PRODUCTS CORPORATION, CCW 705 TWF; CARLISLE COATINGS AND WATERPROOFING, POLYGUARD 400 TWF, ADVANCED BUILDING PRODUCTS Strip –N -Flash  

3. Stainless Steel Core Flexible Flashing with Drainage Fabric (SSCFF).  
1) Stainless steel: type 304, ASTM A240  
2) Polymer fabric; laminated back face to stainless steel core.  
b. Manufacturer: YORK MANUFACTURING, INC.; York Flash-Vent SS, STS COATINGS, INC.; Wall Guardian Venting Stainless Steel TWF, BUILDING MATERIALS WEST COMPANY, INC.; Evacu-Flash SS  
c. Note: Eliminate cavity protection material if SSCFF used.  
d. Note: Eliminate drip edge by terminating at brick face and sealing down the flashing if SSCFF used. However, provide drip edges above windows and doors for replacement ease.  

B. Sheet Metal Drip Edge: Fabricated from 0.015” thick by minimum 3” wide stainless steel with hemmed edge. Comply with requirements specified in Section 07 62 00 - Flashing and Sheet Metal.
1. Product: HECKMAN BUILDING PRODUCTS, IPCO stainless steel drip edge, ILLINOIS PRODUCTS CORPORATION or HOHMANN & BARNARD, INC.

C. Preformed Masonry Control Joint Filler

2. Flange: Where applicable, locate as required for the particular joint configuration.
3. Manufacturer: Rapid Regular Control Joint by DUR-O-WALL; HOHMANN & BARNARD, or equal.

D. Brick Cleaning Compound: PROSOCO Sure Klean 600 Detergent; or equal commercial cleaning solution by NATIONAL CHEMSEARCH or AMERICAN CALMAL that will not harm masonry or adjacent materials and is acceptable to the masonry manufacturer. Cleaners containing muriatic acid are not acceptable.

E. Weep Vent: Polypropylene Model #QV Quadro Vent by HOHMANN & BARNARD; Model D/A 1006 by DUR-O-WALL or equal by HECKMANN. Color as selected by Architect.

F. Isolation Liners: Locate between steel columns and masonry. Asphalt impregnated cellular paper, similar to WILLIAMS PRODUCTS Columns Boxboard, 1/4” single thickness or 1/2” double thickness. Use double thickness except where wall dimensions do not permit, then use single thickness.

G. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142” steel wire, hot-dipped galvanized after fabrication.

1. D/A 811 DUR-O-WALL
2. D/A 816 DUR-O-WALL
3. No. 376 Rebar Positioner HECKMAN
4. #RB Rebar Positioner HOHMANN & BARNARD
5. #RB-Twin Rebar Positioner HOHMANN & BARNARD
6. Double O-Ring Rebar Positioner MASONRY REINFORCING CORPORATION OF AMERICA
7. O-Ring Rebar Positioner MASONRY REINFORCING CORPORATION OF AMERICA

H. Adhesive Anchor Bolts

1. In hollow CMU: Adhesive anchor systems with nylon or stainless steel screen inserts. Use 1/2 inch diameter anchors with 4-1/4 inch embedment. (Minimum allowable shear 900 pounds; minimum allowable tension 250 pounds/anchor.)
2. In solid grouted CMU: Adhesive anchor systems. Use 1/2 inch diameter anchors with 4-1/4 inch embedment; (minimum allowable shear 2600 pounds; minimum allowable tension 2000 pounds/anchor).

I. Cavity Protection Material: Minimum 1” thick, reticulated, nonabsorbent mesh, made from polyethylene strands and shaped to maintain drainage at weep holes without being clogged by mortar droppings.

1. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
   a. Mortar Net; MORTAR NET USA, LTD.
   b. Mortar Break; ADVANCE BUILDING PRODUCTS
   c. Mortar Net; MASONRY REINFORCING CORPORATION OF AMERICA.
   d. Mortar Net; HOHMANN & BARNARD, INC.
   e. CavClear Masonry Mat; ARCHOVATIONS
   f. Mortar Stop; POLYTITE MANUFACTURING CORP.
   g. Mortar Grab; IPCO PRODUCTS.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine the substrates, structure, and installation conditions. Do not proceed with unit masonry work until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Brick

1. Wet brick having ASTM C67 absorption rates greater than 0.025 oz. per square inch per minute. Use wetting methods which ensure that each masonry unit is nearly saturated, but surface dry when laid. During freezing weather, comply with the recommendations of BIA.

2. Except for absorbent units specified to be wetted, lay masonry units dry.

B. Concrete Masonry Units: Lay masonry units dry. Do not wet concrete masonry units.

C. Establish lines, levels, and coursing.

D. Coordination: Identify items that are to be built-in to masonry wall as specified in other section of these specifications. Verify that these items are available prior to commencing masonry work in these areas. Coordinate sizes of required openings. Items include, but are not necessarily limited too:

1. Access doors
2. Recessed fire extinguisher cabinets
3. Recessed toilet accessories
3.03 INSTALLATION - GENERAL

A. Build walls to the full thickness shown. Build single wythe walls to the actual thickness of the masonry units, using units of nominal thickness shown or specified.

B. Cut masonry units using motor-driven masonry saws to provide clean, sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full-size units without cutting wherever possible. Provide 100% solid units where webs would be exposed.

C. Construction Tolerance: Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:

1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than ¼” in 20 feet, nor ½” maximum.
2. For vertical alignment of exposed head joints, do not vary from plumb by more than ¼” in 10 feet, nor ½” maximum.
3. For conspicuous horizontal lines, such as exposed lintels, sills, parapets, and reveals, do not vary from level by more than ¼” in 20 feet, nor ½” maximum.
4. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8”, with a maximum thickness limited to ½”. Do not vary from bed-joint thickness of adjacent courses by more than 1/8”.
5. For exposed head joints, do not vary from thickness by more than plus or minus 1/8”. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8”.

D. Openings: Form all chases and openings required for piping and other trades. After work is completed, close openings with masonry and seal around penetration.

E. Seal all anchor penetrations and tears in the vapor barrier as a result of the work installed under this section.

3.04 ERECTION - BRICK AND CONCRETE MASONRY

A. Masonry

1. Layout walls in advance for accurate spacing of surface bond patterns, with uniform joint widths, and to properly locate returns and offsets. Avoid the use of less than half-size units at corners, jambs and other locations.
2. Lay up walls plumb and true to comply with specified tolerance. Provide courses level, accurately spaced and coordinated with other work.
3. Pattern Bond: Lay exposed masonry in running bond with vertical joint in each course centered on units in courses above and below. Bond and interlock each course of each wythe at corners. Do not use units with less than 4” of horizontal face dimensions at corners.
4. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings.
and slabs. Maintain 3/8" joint widths, except for minor variations required to maintain bond alignment.

5. Joints
   a. Exposed: Cut flush and finish (tool) with hardened metal tool to form a concave compressed joint. Same methods and types of tools to be used by all masons working on project.
   b. Concealed: Cut flush and trowel point.

6. Compress and cut joints flush for masonry foundation walls.

7. Lay brick masonry units with completely filled bed and head joints. Butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints.

B. Horizontal Wall Reinforcement: Provide continuous masonry joint reinforcement as indicated. Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement not more than 16 inches o.c.
2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
   a. Reinforcement above is in addition to continuous reinforcement.
4. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
5. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.
6. Provide additional reinforcement continuous in first joint above openings and in first joint below openings not extending to floor. Extend additional reinforcement a minimum of 4'-0" beyond opening.

C. Brick Veneer/Metal Stud Wall Ties: Install in accordance with manufacturer's instructions. Locate one tie per every two square feet of wall surface and in accordance to BIA Technical Notes No. 44B.

D. Wall Construction

1. Keep the air space clear and clean of all mortar droppings and other debris.
2. Provide weeps spaced 24 inches apart.
3. Provide cavity drainage protection or similar methods to ensure that weeps are clear of mortar droppings and drain to the building exterior.
4. Make weep holes by methods subject to Architect's approval
   a. Gray Mortar: Louvered PVC weep, similar to HOHMANN & BARNARD #343 located in brick head joints.
   b. Colored Mortar: Cellular weep vents located in brick head joints.
   c. Tube and Cotton Wick: Medium Density Polyethylene
5. Provide top of wall weep ventilation with cellular vent.
E. Door Frames: Fill all frames installed in masonry with mortar.

F. Bearing Points: Where a lintel, bar joist or similar member bears directly on concrete masonry, fill the cores of the two blocks courses directly under the member with grout to a limit of 16 inches beyond the end of the member.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.

H. Control and Expansion Joints: Provide control joints for exterior and interior masonry construction in accordance with NCMA-TEK Bulletins 10-1A and 10-2B and BIA Technical Notes 18B.

1. Unless otherwise indicated, provide control joints in masonry walls at maximum 24 foot intervals for exterior walls, maximum 30 foot intervals for interior walls, and at intersections of walls, except corners.
   a. Exact locations as determined by the Architect if not specifically dimensioned.
   b. If drawings do not indicate all control joints based on these maximums, allow for additional joints to be determined by the Architect prior to commencement of masonry work.
   c. Locate control at steel columns.

2. Provide 3/8" wide control joints, unless otherwise indicated. For joints in exterior walls, build in control joint filler strips as masonry wall is laid up allowing 3/4" for sealant and backup on each side of wall. For interior control joints, no filler is required; rake joint approximately 3/4" deep and install sealant and backup. See Section 07 92 00, Sealants.

3. Do not carry horizontal joint reinforcement through control joint.

4. Maintain lateral support of continuous wall at control joint in concrete block backup walls by using control joint filler, tongue and groove type control joint block, or similar type approved method. In cavity walls, place metal “Z” wall ties 16” on-center vertically in brick on each side of control joint.

5. Maintain lateral support of intersecting interior masonry walls with wire mesh ties placed across joint between walls, spaced 16" on-center vertically.

I. Thru-Wall Flashing

1. Provide at the following locations:
   a. In first course above steel supports and shelf angles.
   b. In first course above lintels at louvers, windows and doors.
   c. In first course above grade around entire building perimeter.
   d. In exterior walls that project above adjacent lower roof.
   e. Below sills of window, louver and similar type wall openings.
   f. Below parapet wall caps.
   g. Other through wall flashing conditions where indicated.

2. Ensure that flashings drain to exterior.

3. Prepare masonry surfaces smooth and free of projections which could puncture flashing.

4. Lay on slurry of fresh mortar and cover with mortar.
5. End Dams: Provide end dams at all locations where flashing terminates within a wall. Over openings, carry minimum 6" beyond end of steel lintel and turn up edges to form pan. All corners folded, not cut.

6. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.

7. Top Edge Concealed Terminations: 8 inch minimum above drainage plane.

8. Seal around all penetrations with mastic before covering with mortar.

9. Joints
   a. Install in longest lengths and with fewest joints possible but not less than 20 feet between joints.
   b. Lap ends minimum 6 inches and seal with full bed of mastic.

10. Continue flashings around corners and other gaps in shelf angles to prevent discontinuity.

11. Continue flashing through expansion joints.

12. Provide weeps at all thru-wall flashing locations. Space weeps as specified hereinbefore.

J. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material specified herein.

K. Masonry, non-bearing walls carried to structure above: Terminate at normal joint width below surface and leave joint open for sealants.

1. At fire-rated partitions, install firestopping in joint between top of partition and underside of structure above to comply with Section 07 84 00, Firestopping.

L. Stopping and Resuming Work: In each course, rack back one-half-unit length for one-half running bond or one-third-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar before laying fresh masonry.

M. Built-in Work: As construction progresses, build in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.

N. Steel Lintels: Install steel lintels at all masonry opening, whether indicated on the drawings or not. Provide minimum bearing of 8" an each jamb, unless otherwise indicated.

3.05 MORTAR

A. General

1. Batch Size: Controlled so that all material used within two (2) hours.

2. Mortar on Board
   a. Keep well tempered with water so long as its cementing material has not started to set.
b. Do not retemper if initial set of cementing material has been reached, or if mortar has stiffened greatly.

4. Water Repellent Admixture: Use with brick and concrete block exposed to exterior, mix as recommended by manufacturer.

B. Mixing

1. Machine mix dry in a batch mixer with care taken in adding water to mix to avoid overwetting.
2. Do not retamper in mixer at any time.
3. Continue mixing for a minimum of five (5) minutes after all materials are in mixer.

C. Recharging: Completely empty and clean mixer before recharging.

3.06 PROTECTION

A. Brace all walls while in green condition.

B. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day’s work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

3.07 REINFORCED MASONRY INSTALLATION

A. Placing Reinforcement: Comply with requirements of ACI 530.1/ASCE 6/TMS 602.

1. General: Clean reinforcement of loose rust, mill scale, earth, ice or other materials which will reduce bond to mortar or grout. Do not use reinforcement bars with kinks or bends not shown on drawings or final shop drawings, or bars with reduced cross-section due to excessive rusting or other causes.

B. Grouting: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.

1. Comply with requirements of ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Use "Fine Grout" per ASTM C 476 for filling spaces less than 4" in one or both horizontal directions.
3. Use "Coarse Grout" per ASTM C 476 for filling spaces 4" to 10" in both
horizontal directions.

4. Use 3000 psi concrete for filling spaces 10" or larger in both horizontal directions.

C. Bond Beams: Reinforce as indicated and fill with grout. Position reinforcement accurately at the spacing indicated. Place horizontal reinforcement as the masonry work progresses.

D. Reinforced Concrete Masonry Walls: Install and align grout block units to provide continuous vertical voids in walls. Install reinforcing steel as work progresses. Use horizontal bars to position vertical bars. Fill grout block units cores solid with concrete fill.

1. Place concrete fill in maximum 4'-0" vertical lifts. Recess top of fill minimum 1-1/2" below top of course to form a key with the following lift. Comply with NCMA TEK Bulletins 3-2, 3-3A and 14-2 recommendations.

2. Coordinate placement of reinforcement and concrete fill with cast-in-place concrete and precast concrete work to provide continuous vertical and horizontal reinforcement full height of indicated walls.

3.09 FIELD QUALITY CONTROL

A. Owner will engage a qualified independent testing agency to perform source quality-control testing indicated below:

1. Retesting of materials failing to meet specified requirements shall be done at Contractor’s expense.

B. Testing Frequency: Tests and Evaluations listed in this Article will be performed during construction for each 5000 sq. ft. of wall area or portion thereof.

C. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C780.

D. Grout will be sampled and tested for compressive strength per ASTM C1019.

E. Prism-Test Method: For each type of wall construction indicated, masonry prisms will be tested per ASTM C1314, and as follows:

1. Prepare 1 set of prisms for testing at 7 days and 1 set for testing at 28 days.

3.10 REPAIR, POINTING AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged. Provide new units to match adjoining units and install in fresh mortar pointed to eliminate evidence of replacement.

B. During the tooing of joints, enlarge all voids or holes, and completely fill with mortar. Point up all joints at corners to provide a neat, uniform appearance.
C. Cleaning - Brick Masonry: Clean all exposed brick masonry. Cleaning agents and methods subject to Architect's approval. Protect all stone. Damaged materials and work replaced at Contractor's expense.

1. Before full-scale application, review manufacturer's product data sheets to determine the suitability of each product for the specific surfaces. Apply each masonry cleaner to test panel areas to determine dilution rates, dwell times, number of applications, compatibility, effectiveness, application procedures, effects of pressure rinsing, and desired results.

2. Apply masonry cleaners and stain removers to test panels in accordance with manufacturer's written instructions. Allow 48 hours or until test panels are thoroughly dry before evaluating final appearance and results. Do not begin full-scale application until test panels are inspected and approved by the Architect.

3. Test Area Requirements:
   a. Size: Minimum 5 feet by 4 feet each.
   b. Locations: As determined by the Architect.
   c. Masonry Cleaners: Number of test panels as required to completely test each masonry cleaner with each type of substrate to be cleaned.

4. Test all cleaning effluents generated by the masonry cleaning of the test panels to determine any hazardous characteristics. Comply with applicable federal, state, and local environmental regulations including testing, handling, treatment, containment, collection, transport, disposal, and discharge of hazardous wastes.

5. Muratic acid cleaning of brick masonry not permitted. Install and protect installed brick masonry so that acid cleaning is not required at completion of the work.

D. Cleaning – Concrete Masonry: During construction of exposed CMU, minimize mortar and grout smears on exposed surfaces. Dry brush CMU surfaces at the end of each day's work and after final pointing. Remove mortar stains and dirt from exposed surfaces.

1. Cleaning Solutions: Where cleaning solutions are required, they shall be provided at no additional cost to the Owner. Cleaning solutions must be approved by Architect and spot tested prior to use.

E. Area Cleaning: Clean floors of all mortar droppings, including floor surfaces of accessible chases.

END OF SECTION
SECTION 03 30 00
MISCELLANEOUS CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Section includes cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.02 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

C. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Reinforcing bars as noted on drawings.

D. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance with requirements indicated, based on comprehensive testing of current materials:

1.03 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed concrete work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
C. Source Limitations: Obtain each type of cement of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

D. Comply with ACI 301, "Specification for Structural Concrete," including the following, unless modified by the requirements of the Contract Documents.
1. General requirements, including submittals, quality assurance, acceptance of structure, and protection of in-place concrete.
2. Formwork and form accessories.
3. Steel reinforcement and supports.
4. Concrete mixtures.
5. Handling, placing, and constructing concrete.

E. Mechanical Anchor and Adhesive Anchor Installer Qualifications:
1. Qualification: Post-installed anchors/dowels shall be installed by personnel having minimum of 3 years experience performing similar installations and having applicable certificate or other evidence of previous training from anchor product manufacturer, subject to approval of Architect/Engineer.
2. Training (As Alternate to Above Qualification): Conduct training (with manufacturer or manufacturer’s representative) for installer(s) on project. Training to consist of review of complete installation process for drilled-in anchors, to include but not limited to: hole drilling process/bits; hole preparation/cleaning; adhesive dispenser/injection technique(s); rebar dowel preparation; and proof loading/torqueing.
3. Maintain Qualification/Training records on site. Subject to Testing Agency and/or Architect/Engineer review on request.
4. Substitution of products or modifications of details, if proposed by Contractor, shall be submitted for approval in sketch form prior to submission of shop drawings, and such substitutions shall be made only when approved by Architect, and at no additional cost to Owner. Total amount of credit, if any, shall be stated in writing with submission.
5. Substitution of drilled-in anchors for cast-in-place anchors, or alternate type drilled-in anchors for specified type, where indicated, shall not be made without advance proposed substitution and Architect/Engineer’s approval.
6. Corrections for conflicts or inaccuracies that result in change from Structural Drawings or final approved shop drawing details shall be submitted in sketch form for approval. Such substitutions or corrections shall be made only when approved by Architect.
7. Where drilled-in anchors must be substituted for specified anchors due to mis-placement or other reason, Contractor shall be responsible for design/re-design and cost for design/re-design. Assume “cracked” concrete unless otherwise advised in writing by Architect/Engineer. Include seal/signature of Engineer responsible for design and licensed to practice in jurisdiction of Project.
1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 – PRODUCTS

2.01 FORM-FACING MATERIALS

A. Furnish formwork and form accessories according to ACI 301.

B. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
   1. Plywood, metal, or other approved panel materials.
   2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
      a. High-density overlay, Class 1, or better.
      b. Medium-density overlay, Class 1, or better, mill-release agent treated and edge sealed.


D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.02 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.

C. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.


2.03 CONCRETE MATERIALS
A. Portland Cement: ASTM C 150, Types I or II.
   1. Fly Ash: ASTM C 618, Class C or F.
   2. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Normal-Weight Aggregate: ASTM C 33, uniformly graded, not exceeding 1 ½ inch nominal size. For slab with thickness less than 3 inches use max. 3/8” aggregate. For masonry fill use 3/8” aggregate.

C. Water: Potable and complying with ASTM C 94.

D. Lightweight Aggregate: ASTM C330

E. Synthetic Fiber: Provide fiber reinforcement in addition to the WWR in slab on grade and precast topping polypropylene 100% collated fibrillated fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III with an average ¾” long long.

2.04 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cement and to be compatible with other admixtures. Do not use admixtures containing calcium chloride.


C. Water-Reducing Admixture: ASTM C 494, Type A.

D. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.

F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

2.05 RELATED MATERIALS

A. Vapor Retarder: Plastic sheet, ASTM E 1745, Class A or B.

B. Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils thick; or plastic sheet, ASTM E 1745, Class C.
C. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

2.06 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.07 CONCRETE MIXES

A. Comply with ACI 301 requirements for concrete mixtures.

B. Prepare design mixes, proportioned according to ACI 301, for normal-weight concrete determined by either laboratory trial mix or field test data bases, as follows:
   1. Minimum Compressive Strength: 3500 psi at 28 days. Minimum Portland Cement 500 lbs.
   2. Maximum Water-Cementitious Materials Ratio: 0.45
      a. Slump Limit for Concrete Containing High-Range Water-Reducing Admixture: Not more than 8 inches after adding admixture to plant- or site-verified, 2- to 3-inch slump.
5. Air Content: Maintain within range permitted by ACI 301 (ACI 301M). Do not allow air content of trowel-finished floor slabs to exceed 3 percent.
6. Max. Fly Ash: 20%

C. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate but not less than a rate of 1.5 lb/cu. yd. (0.90 kg/cu. m)

D. For masonry fill (grouting), 2500 psi at 28 days with superplasticizer.

E. For all exterior concrete conform to ODOT Item 499 Class C.

F. Lightweight concrete shall be 3,000 psi at 28 days. Maximum weight is 115lbs/cubic foot. All other requirements same as B.

2.08 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.09 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M [and ASTM C 1116/C 1116], and furnish batch ticket information.

   1. When air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

2.10 BONDING AGENT

A. Film-forming, freeze-thaw resistant acrylic latex admixture and bonding agent suitable for brush or spray application, complying with ASTM C881. Where epoxy bonding agent is indicated, provide bonding agent with minimum 1500 PSI bond strength from the listed manufacturers. Subject to compliance with requirements, provide one of the following:

   1. Adbond (J40); Dayton Superior Corp., Oregon, Illinois.
   2. Eucoweld; Euclid Chemical, Cleveland, Ohio.
   3. Everbond; L&M Construction Chemicals, Omaha, Nebraska.
   4. Acrylic Additive; Sonneborn Building Products, Shakopee, Minnesota.
   6. Strong Bond; Conspec Marketing & Manufacturing Co., Inc., Kansas City, Kansas.
   7. SIKA Corp. – Various.

2.11 ADHESIVE ANCHOR
A. Concrete Inserts:
   1. Wedge Type Inserts:
      a. Description: Malleable iron, with 1-1/2 inch stainless steel askew head bolt. Standard or long as required by location.
      b. Acceptable manufacturers and product(s):
         1) Heckmann Building Products, Inc., Cat. No. 425
         2) Hohmann & Barnard, Inc., No. HW340 and LW340
         3) Dayton/Richmond, Shelf Angle Wedge Inserts – F-7 and F-7-L
   2. Dovetail Anchor Slots: Heckmann Building Products, Inc. No. 100, 1 inch wide back, 1 inch deep, 5/8 inch throat, 20 gage galvanized steel with removable filler.

B. Expansion Anchors for Bolted Connections to Concrete (Mechanical Anchor):
   1. Only expansion anchors with ICC-ES approval and tested to meet the provisions of ACI 355.2 and ICC-ES Acceptance Criteria (AC) 193 are acceptable for use.
   2. Size and Embedment: As indicated on Drawings. Where embedment is not indicated, submit proposed embedment prior to installation to Engineer for approval.
   3. Drawing Reference: Drawing reference to “expansion anchor(s) shall indicate the use of anchors specified by this paragraph. Sleeve, adhesive, and other type anchors shall only be provide if specifically reference or otherwise approve in advance of the Work.
   4. Material for Bolts, Nuts, and Washers:
      a. Carbon Steel with Zinc-Plating: ASTM B 633, Type III, Fe/Zn 5. Use at permanent interior environments free of moisture or other potentially corrosive conditions.
      b. ASTM A 276 or ASTM A 493, Type 316 Stainless Steel: Use at potentially corrosive environments, including but not limited to following:
         1) Exterior exposed conditions
         2) Potentially wet environments
         3) Attachment of exterior cladding materials
   5. Subject to compliance with requirements, provide one of following:
      a. HILTI, Inc. – “Kwik Bolt TZ” (ICC ESR-1917)
      b. SIMPSON Strong-Tie Company, Inc. – “Strong Bolt 2” (ICC ESR-3037)

C. Heavy Duty Sleeve Anchors for Bolted Connections to Concrete (Mechanical Anchor):
   1. Only heavy duty sleeve anchors with ICC-ES approval and tested to meet the provisions of ACI 355.2 and ICC-ES Acceptance Criteria (AC) 193 are acceptable for use.
   2. Anchors shall consist of hex head bolts or threaded studs with hex head nut, along with spacer sleeve, expansion sleeve, expansion cone, and washer.
3. Anchors shall be torque controlled expansion type bolts exhibiting follow-up expansion under load, with provision for rotation prevention during installation, and specifically designed for high performance in static and dynamic applications.

4. Size and embedment: As indicated on Drawings. Where embedment is not indicated, submit proposed embedment prior to installation to Engineer for approval.

5. Materials: Use carbon steel with zinc-plating at interior environments free of moisture or other potentially corrosive conditions. Use stainless steel at potentially corrosive environments, including but not limited to exterior exposed conditions, potentially wet environments, and attachments for exterior cladding materials.

6. Subject to compliance with requirements, provide following:
   a. HILTI, Inc. – “HSL-3 Heavy Duty Expansion Anchor” (ICC ESR-1545)

7. Where specific anchor manufacturer/type is shown on drawings, substitution of alternate anchor is subject to Engineer’s approval.

D. Screw Anchors for Bolted Connections to Concrete (Mechanical Anchor):
   1. Only screw anchors with ICC-ES approval and tested to meet the provisions of ICC-ES Acceptance Criteria (AC) 193 are acceptable for use.
   2. Pre-drilling of hole requires standard ANSI drill bit with same diameter as anchor and installing anchor will be done with impact wrench.
   3. Anchors shall have diameter and length marked on head.
   4. Size and embedment: As indicated on Drawings. Where embedment is not indicated, submit proposed embedment prior to installation to Engineer for approval.
   5. Materials: Use carbon steel, heat treated with zinc-plating or mechanically galvanized at interior environments free of moisture or other potentially corrosive conditions. Screw anchors shall not be used in potentially corrosive environments, including but not limited to exterior exposed conditions, potentially wet environments, and attachments for exterior cladding materials.
   6. Screw anchors once tightened may be loosened maximum of one turn and re-tightened with torque wrench. Loosening or removal beyond this limitation will void screw anchor.
   7. Subject to compliance with requirements, provide following:
      a. HILTI, Inc. – “Kwik HUS-EZ” (ICC ESR-3027)
      b. SIMPSON Strong-Tie Company, Inc. – “Titen HD” (ICC ESR-2713)
   8. Where specific anchor manufacturer/type is shown on drawings, substitution of alternate anchor is subject to Engineer’s approval.

E. Adhesive Anchors for Bolted Connections to Concrete:
   1. Only adhesive anchor systems with ICC-ES approval and tested to meet the provisions of ACI 355.4 and ICC-ES Acceptance Criteria (AC) 308 are acceptable for use.
   2. Adhesive anchor system consists of threaded steel rod, nut, washer, two component epoxy or hybrid adhesive injection system and
3. Material for Bolts, Nuts and Washers:
   a. Carbon steel conforming to ASTM A36, or better, except as noted below.
   b. ASTM F 593, Type 316 Stainless Steel: Use at potentially corrosive environments, including but not limited to following:
      1) Exterior exposed conditions.
      2) Potentially wet environments.
      3) Attachment of exterior cladding materials.

4. Size and Embedment: As indicated on Drawings. Where embedment is not indicated, use embedment of 12 x anchor diameter, or, submit proposed embedment prior to installation to Engineer for review.

5. Subject to compliance following products are considered acceptable for use:
   a. HILTI, Inc. – “HIT RE 500-SD Adhesive System (ICC ESR-2322)
   b. HILTI, Inc. – “HIT HY 200 SAFE SET” Anchoring System (ICC ESR-3187), using one of following techniques:
      1) HIT-Z Anchor Rods in drilled holes
      2) Standard threaded rods in holes drilled with Hilti Hollow Drill Bit and VC 20/40 Vacuum System
   c. SIMPSON Strong-Tie Company, Inc. – “SET-XP Epoxy-Tie Adhesive System” (ICC ESR-2508)

6. Above epoxy adhesive systems require special attention to ambient conditions and cure time prior to loading. Where ambient or other project conditions require alternate product, such as acrylic based adhesive, other product(s) of listed manufacturers may be considered by Engineer. Consult with product manufacturer and submit proposal for review/approval by Engineer prior to use.

7. Where specific anchor manufacturer/type is shown on drawings, substitution of alternate anchor is subject to Engineer’s approval.

F. Adhesive Anchors for Rebar Doweling:
1. Only adhesive anchor systems with ICC-ES approval and tested under ICC-ES Acceptance Criteria (AC) 308 are acceptable for use.
2. Adhesive anchor system consists of Grade 60 reinforcing bar, two component epoxy injection adhesive injection system and manufacturer’s installation instructions.
3. Size, length and embedment of dowel as indicated on Drawings. Where embedment is not indicated, use embedment of 12 x rebar diameter (inches), or submit proposed embedment prior to installation for Engineer for review.
4. Subject to compliance following products are considered acceptable for use where rebar doweling with adhesive anchorage is indicated on Drawings:
   a. HILTI, Inc. – “HIT RE 500-SD Adhesive System” (ICC ESR-2322)
   b. HILTI, Inc. – “HIT HY 200 SAFE SET” Anchoring System (ICC ESR-3187), using following technique:
      1) Standard rebar dowel in holes drilled with Hilti Hollow Drill Bit and VC 20/40 Vacuum System
   c. SIMPSON Strong-Tie Company, Inc. – “SET-XP Epoxy-Tie Adhesive System” (ICC ESR-2508)
Adhesive System” (ICC ESR-2508)

5. Above epoxy adhesive systems require special attention to ambient conditions and cure time prior to loading. Where ambient or other project conditions require alternate product, such as acrylic based adhesive, other product(s) of listed manufacturers may be considered by Engineer. Consult with product manufacturer and submit proposal for review/approval by Engineer prior to use.

6. Where specific anchor manufacturer/type is shown on drawings, substitution of alternate anchor is subject to Engineer’s approval.

G. Cast-In Place Internally Threaded Rods:

1. Following Product is considered acceptable for use.
   a. HILTI, Inc. – “HCI-WF” (Wood Form) Cast-in Anchor
   b. HILTI, Inc. – “HCI-MD” (Metal Deck) Cast-in Anchor
   c. SIMPSON Strong-Tie Company, Inc. – “Blue Banger Hanger – Wood Form (BBWF)”
   d. SIMPSON Strong-Tie Company, Inc. – “Blue Banger Hanger – Metal Deck (BBMD)”

PART 3 – EXECUTION

3.01 FORMWORK

A. Design, construct, erect, shore, brace, and maintain formwork according to ACI 301.

3.02 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.03 VAPOR RETARDERS

A. Install, protect, and repair vapor retarders according to ASTM E 1643; place sheets in position with longest dimension parallel with direction of pour.
   1. Lap joints 6 inches and seal with manufacturer recommended adhesive or joint tape.

3.04 STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
   1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
3.05 CONCRETE PLACEMENT

A. Comply with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.

B. Do not add water to concrete during delivery, at Project site, or during placement.

3.06 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Contraction Joints in Slabs-on-Grade: Form weakened-plane, sawed contraction joints, sectioning concrete into areas as indicated. Where not specifically indicated, joint shall be 2.5 times thickness of slab. For exterior, max 10’ C/C. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness.

C. Isolation Joints: Install joint-filler strips at junctions with slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

   1. Extend joint fillers full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

3.07 CONCRETE PLACEMENT

A. Comply with ACI 301 for placing concrete.

B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

C. Do not add water to concrete during delivery, at Project site, or during placement.

D. Consolidate concrete with mechanical vibrating equipment.

E. For all exterior concrete, conform to ODOT Item 499 Class C.

3.08 FINISHING FORMED SURFACES
A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding 1/2 inch (13 mm).
   1. Apply to concrete surfaces (not exposed to public view).

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch (3 mm).
   1. Apply to concrete surfaces exposed to public view, or to receive a rubbed finish.

C. Rubbed Finish: Apply the following rubbed finish, defined in ACI 301 (ACI 301M), to smooth-formed finished as-cast concrete where indicated:
   1. Smooth-rubbed finish.
   2. Grout-cleaned finish.
   3. Cork-floated finish.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.09 FINISHING UNFORMED SURFACES

A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface.
   1. Do not further disturb surfaces before starting finishing operations.

C. Scratch Finish: Apply scratch finish to surfaces indicated and surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes, unless otherwise indicated.

D. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, fluid-applied or direct-to-deck-applied membrane roofing, or sand-bed terrazzo.
E. Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.

F. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

G. Nonslip Broom Finish: Apply a nonslip broom finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

3.10 TOLERANCES

A. Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

3.11 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure formed and unformed concrete for at least seven days by a curing compound.
   1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
      a. Water.
      b. Continuous water-fog spray.
Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.12 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Tests: Perform according to ACI 301 (ACI 301M).
   1. Testing Frequency: One composite sample shall be obtained for each day's pour of each concrete mix exceeding 5 cu. yd. (4 cu. m) but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
   2. Testing Frequency: One composite sample shall be obtained for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mix placed each day.

3.13 REPAIRS

A. Remove and replace concrete that does not comply with requirements in this Section, at no additional cost to Owner.

END OF SECTION 03 30 00
PART I GENERAL

1.01 RELATED DOCUMENTS
A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

1.02 SUMMARY
A. The Work required under this Section consists of structural steel, steel erection, shop painting, field touch-up painting, and related items necessary to complete the Work indicated.

B. Miscellaneous angles, channels, anchor bolts, bent plates, sleeves, sag rods, leveling plates, bearing plates for structural steel and steel joists, and other incidental items of structural steel required to be built into concrete or masonry shall be provided as indicated or specified and be furnished to respective trades at proper time; including instructions and templates for their installation.

C. Provide, where specifically called for, loose lintels, steel shelf angles, perimeter angle closure, and accessories.

D. For openings in metal deck 12 by 12 inches and larger, provide steel reinforcing members on all sides of opening. Reinforcing shall be not less than 3 by 3 inches by 3/8 inch angles, unless otherwise indicated. Openings in deck shall be cut under Section 05300 - Metal Deck.

E. Related Work Specified Elsewhere
1. Division I — Quality Control.
2. Section 05 50 00 — Metal Fabrications: For miscellaneous steel framing.
3. Section 09 91 00 — Painting.
4. Section 03 30 00 -- Cast-in-Place Concrete

F. Refer to Section Division I for Alternates that may affect the Work of this Section.

1.03 SUBMITTALS
A. Approved manufacturer’s published complete product data for:
   1. Proposed base plate grout.

B. Complete shop drawings by approved fabricator including dimensioned plan layouts of columns and anchor bolt locations, dimensioned erection diagrams, and shop detail drawings. Symbols and indications used for structural components on design drawings must appear identically on submitted shop drawings. Types of electrodes proposed for welding processes must also appear thereon.
1. The fabricator must review and check shop drawings prepared by the fabricator or the fabricators subcontractors prior to submission to the Structural Engineer (SE).

2. AutoCAD drawings, for use in preparation of erection plans and shop drawings:
   Drawings may be available from the SE. The Contractors requiring this service must contact the SE to verify availability and receive a price quote.

3. Changes to shop drawings for resubmissions shall be “clouded” or “flagged” to clearly indicate all changes, additions, or deletions to the previous submission. Resubmissions will be reviewed only to verify those items clouded or flagged. All other information will be assumed to be unchanged from the previous submission.

C. Letter from a Professional Engineer (PE) licensed within the state of construction activities certifying that he has carefully studied the design drawings, that shop drawings have been prepared under his direct guidance and supervision, and that provided components and connections will meet or exceed loading requirements, where loads are shown at element ends. PE’s full signature and seal of authenticity must evidence such letter of certification. It should not be expected that Structural Engineer’s (SE’s) review of shop drawings will begin until such certification has been received. This certification is to verify the adequacy of members and connections designed by the fabricator and are not intended to require verifications of the design of structural elements shown in the plans.

1.04 QUALITY ASSURANCE

A. Structural fasteners shall be manufactured in the United States. Fabricator shall furnish proof of U.S. manufacturer. If it becomes necessary to use imported fasteners, each size, type, and each large quantity package (500 pcs. or more) shall undergo a random sampling of a minimum 5 pieces for testing, and the test results to be provided to SE. Test shall be performed by an independent testing agency, and the cost shall be included in the Base Bid. If inferior fasteners are discovered, all fasteners of that type shall be removed and replaced with acceptable fasteners at no cost to the Owner. If possible, fasteners shall be tested prior to use in construction.

B. Comply with the provisions of applicable building codes as well as the following specific requirements: (Latest Edition)
   1. AISC “Code of Standard Practice for Steel Buildings and Bridges.”
   2. AISC “Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings” and including the “Commentary of the AISC Specification,” and the current supplements.
   5. ASTM A6 “General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piping, and Bars for Structural Use.”

C. Structural Steel Alignment Quality Control: Refer to Division 1 - Quality Control.

D. See Section 3.05 – Field Quality Control for additional requirements.
1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site at such intervals to insure uninterrupted progress of work.

B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not delay work.

C. Store materials to permit easy access for observation and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.
   1. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 PRODUCTS

2.01 FABRICATORS

A. Firms acceptable as fabricators for structural steel work under this Section shall be certified in the category of “Conventional Steel Buildings (Sbd)” by the American Institute of Steel Construction. The fabricator shall cooperate with and make available to the testing agency records and documents which focus on general management, engineering and drafting, procurement, operations and quality control and shall allow access to facilities to allow the testing agency to examine actual fabrication work in the shop and drafting room at the time of the inspection.

2.02 MATERIALS

A. Structural Steel Angles, Plates, and Bars: ASTM A572 Grade 50, unless otherwise noted.

B. Rolled Steel Shapes (Wide Flanges and WT Shapes): ASTM A992 (Fy=50 ksi).

C. Hollow Structural Sections
   1. Square, Rectangular, and Special Shapes: ASTM A500, Grade B (Fy=46 ksi).
   2. Round, Structural Steel Pipe: ASTM A53, Type E or S, Grade B or ASTM A500, Grade B (Fy=46 ksi).

D. High-Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, as follows:
   1. Quenched and tempered medium-carbon steel bolts, nuts, and washers, complying with ASTM A325. Use 3/4 inch bolts, unless noted otherwise on the Drawings.
   2. Direct tension indicator washers may be used at Contractors option per ASTM F959.


F. Electrodes and Flux for Submerged Arc Welding: AWS Code and ASTM A588, Series F60 and F70 as required.
G. Structural Steel Primer Paint: Steel Structures Painting Council (SSPC) - Paint 15.

H. Shrinkage-Resistant Grout (SR-G): CE (Corps of Engineers) CRD-C621 latest edition (formerly CRD-588) and ASTM C 1107, premixed, factory-packaged, flowable, mortar grouting compound with a minimum compressive strength of 9000 psi at 28 days. Products offered by manufacturers to comply with the requirements include the following:
   1. Non-Ferrous Aggregate
      b. Crystex; L&M Construction Chemicals, Inc., Omaha, Nebraska.
      c. Sure-Grip High Performance Grout; Dayton Superior Corp., Miamisburg, Ohio.
      d. Sonnogrut 10K; Sonneborn Building Products, Shakopee, Minnesota.
      f. Enduro 50; Conspec Marketing & Manufacturing Co., Inc., Kansas City, Kansas.

I. Masonry Bearing Plates
   1. All joists shall bear on masonry bearing plates with anchor rods embedded in the masonry below. Weld joists to bearing plates in accordance with SJI Specifications. See Framing Details and Plans for bearing plate sizes.
   2. All beams shall bear on masonry bearing plates with anchor rods embedded in the masonry below. Weld beams to bearing plates unless otherwise noted.
   3. Bearing plates are to be set under the work of Division 4 – Masonry.

J. Where plate girders are indicated, they shall be full length members or members with needed bolted moment splices, welded with full-penetration welds ground flush with grinding in the direction of applied stress and with weld soundness established by radiographic or ultrasonic observation in accordance with the requirements of 9.25.2 or 9.25.3 of AWS D1.1. Splices in the center third section of these girders will not be permitted.

K. Where trusses are indicated with continuous members, they shall be full length without splices or welded with full-penetration shop or field welds ground flush with grinding in the direction of applied stress and with weld soundness established by radiographic or ultrasonic observation in accordance with the requirements of 9.25.2 or 9.25.3 of AWS D1.1. Splices will not be permitted at points of maximum stress. Field splices of tension members shall be designed to develop 110 percent of the spliced sections and shall be full-penetration welds as described above. All field splices shall be full-penetration welds as described above.

L. Anchor bolts - threaded rods per ASTM A307.

M. Structural Slide Bearings: Amscott Structural Products Corp., Dover, New Jersey; AMSLIDE AB-AS12-C2 or a proposed equal product from Con-Serv, Inc., Georgetown, South Carolina or Seismic Energy Products L.P., Athens, Texas.
   1. Product shall perform in accordance with the following properties:
      a. Teflon to Teflon; Coefficient of Friction: .04 to .06.
      b. Compressive Creep After 24 Hours at 200 psi (unbonded), ASTM D-621-59: 3.9 percent.

2. Bearing plates shall be sized to limit bearing pressures to 1000 psi for concrete and 250 psi for masonry.

N. Adhesive Anchor Bolts
1. Concrete Base Material: Refer to Section 03 20 00 - Concrete Reinforcing.
2. Masonry Base Material: Refer to Section 04 05 19 - Masonry Anchorage and Reinforcing.

O. Preformed Joint Material: Provide closed cell polyethylene expansion joint material equal to the following manufacturers:
1. Sonoflex F; Sonnebom Building Products, Shakopee, Minnesota.

2.03 FABRICATION

A. General: Fabricate items of structural steel in accordance with AISC Specifications and as indicated on the final shop drawings. Provide camber in structural members as shown.
1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
2. Where finishing is required, complete the assembly, including riveting and welding of units, before start of finishing operations.

B. Connections
1. Weld or bolt shop connections as shown.
2. Bolt field connections, except where welded connections or other connections are shown or specified.

C. High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with AISC “Specifications for Structural Joints.”

D. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work. Assemble and weld built-up sections by methods which will produce true alignment of axis without warp.

E. Galvanizing
1. Provide a zinc coating for those items shown or specified to be galvanized, as follows:
   a. ASTM A123 for galvanizing rolled, pressed, and forged steel shapes, plates, bars, and strip 1/8 inch thick and heavier.

2. Lintels in exterior walls and in other walls exposed to moist environments shall be hot-dipped galvanized.
   a. Lintels consisting of a plate and rolled beam W16 and smaller shall have both plate and beam galvanized after welding.
   b. Lintels consisting of a plate and rolled beam larger than W16 shall have plate galvanized and beam painted a cold applied mill galvanizing.
F. Holes for Other Work: Provide holes required for securing other work to structural steel framing, such as nailers, plates, and for the passage of other work through steel framing members, as shown on the final shop drawings. Provide threaded nuts welded to framing and other specialty items as shown to receive other work.

2.04 FINISHES

A. General: Shop paint structural steel work, except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel which is partially exposed on the exposed portions and the initial 2 inch of embedded areas only. Do not paint contact surfaces that are to be welded or high-strength bolted with friction-type connections. Coat with tar all steel encased in concrete and/or masonry below adjacent slab on grade.

B. Surface Preparation: After observation and before shipping, clean steel work to be painted. Remove loose rust, mill scale, and spatter, slag or flux deposits. Clean steel in accordance with SSPC (Steel Structures Painting Council) as follows:
1. SP-2 “Hand Tool Cleaning”

C. Painting: immediately after surface preparation, apply structural steel rust inhibitive primer paint in accordance with the manufacturer’s instructions and at a rate to provide a uniform dry film thickness of 1.5 mils. Use painting methods that will result in full coverage of joints, comers, edges, and exposed surfaces.

D. Galvanizing: Joints between plates and beams and between intermittent welds shall be touched-up with cold applied galvanizing coating as required to insure uniform coating.
1. Galvanized Repair Paint: High-zinc-dust-content paint for regalvanizing welds and repair painting galvanized steel, with dry film containing not less than 93 percent zinc dust by weight, and complying with DOD-P-21 035A or 95 PC-Paint 20.

2.05 SOURCE QUALITY CONTROL

A. The materials and workmanship to be furnished under this Specification shall be subject to observation in the mill, shop, and field by the SE. Observation will be conducted without expense to the Contractor; however, observation in the mill or shop shall not relieve the Contractor of his responsibility to furnish materials and workmanship in accordance with contract requirements.

B. Refer to Division 1- Quality Control.

PART 3 EXECUTIONS

3.01 EXAMINATION

A. Erector must examine the areas and conditions under which structural steel work is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Erector.
3.02

**ERECUTION**

A. General: Comply with the AISC Specifications and Code of Standard Practice and with specified requirements.

B. Surveys and Bench Marks: Establish permanent bench marks as shown and as necessary for the accurate erection of structural steel. Check elevations of concrete and masonry bearing surfaces and locations of anchor bolts and similar devices before erection work proceeds and report measurement discrepancies to the A/E. Do not proceed with erection until corrections have been made or until compensating adjustments to the structural steel work have been agreed upon with the NE.

C. Temporary Shoring and Bracing: Provide temporary shoring and bracing members as required, with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of the structures as erection proceeds.

D. Temporary Planking: Provide temporary planking and working platforms as required and as necessary to effectively complete the work.

E. Anchor Bolts: Furnish anchor bolts and other connectors required for securing structural steel to foundations and other in-place work.
   
   1. Furnish templates and other devices as necessary for presetting bolts and other anchors to accurate locations.
   2. Refer to Division 3 of these Specifications for anchor bolt installation requirements in concrete, and Division 4 for masonry installation, if required.
   3. Where anchor bolts are broken after installation, the concrete shall be removed around the remaining portion of the bolt in the concrete to a depth of 1/2 inch below the top of the bolt. A new segment of bolt of the same steel strength shall be full penetration welded to the remaining bolt in the concrete. The new segment of bolt shall be tapered on the welded end to a 30 degree bevel all around to leave a thickness at the beveled end of 1/4 inch.

   4. Where anchor bolts are incorrectly located in the concrete or masonry which encases them, the following procedures shall be used.
      
      a. For bolt misalignment less than 5/16 inch: offset the column with base plate as required to locate column correctly. The 5/16 inch oversized holes in the column base plates will allow this movement without modification to the column or the anchor bolts.
      b. For bolt misalignment more than 5/16 inch and less than 2 inches: cut and remove base plate from column, relocate base plate and reweld to column.
      c. For bolt misalignment more than 2 inch and less than 6 inches: cut off anchor bolts flush with surface of concrete or masonry and install adhesive anchor bolts as specified in Division 4 for masonry and Division 3 for concrete base material.

F. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean the bottom surface of base and bearing plates.

   1. Setting Plate Procedure
      
      a. Set loose and attached base plates and bearing plates for structural
members on wedges or other adjustable devices.

b. Tighten the anchor bolts after the supported members have been positioned and plumbed. Do not remove wedges or shims, but, if protruding, cut off flush with the edge of the base or bearing plate prior to packing with grout.

c. Pack bedding grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow curing in strict compliance with the manufacturers instructions, or as otherwise required.

2. Double Nut Procedure

a. Install lower nuts and washers to required elevation.
b. Erect column and install upper nuts and washers.
c. After structure has been erected and plumbed, adjust lower nuts to relieve racking, adjust elevation, and distribute load equally to all anchor bolts.
d. Tighten upper nuts.
e. Pack bedding grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure in strict compliance with the manufacturers instructions, or as otherwise required.

G. Field Assembly: Set structural frames accurately to the lines and elevations indicated. Align and adjust the various members forming a part of a complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of the structure within specified AISC tolerances.
2. Splice members only where shown or specified, unless approved otherwise by the A/E or his representative.

H. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds, and grind smooth at exposed surfaces.

I. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and the removal of paint on surfaces adjacent to field welds.

1. Do not enlarge unfair holes in members by burning or by the use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

J. Gas Cutting: Do not use gas cutting torches in the field for correcting fabrication errors in the structural framing.

K. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of the shop paint. Apply paint to exposed areas with the same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 1.5 mils.

L. Lintels and Shelf Angles: Weld or bolt members together where so indicated.

1. Lintels shall have 8 inch bearing at each end, minimum, unless shown otherwise. Bearing pressures shall not exceed the allowable stress for masonry.
2. Where shelf angles are attached to concrete with bolts and adjustable inserts, provide slotted holes of proper size and spacing in the vertical leg of shelf angles.

3.03 HIGH STRENGTH STEEL BOLTS

A. Structural joints using high strength bolts, hardened washers, and nuts shall be tightened to a high tension; the materials, methods of installation and tension control, type of wrenches to be used, and observation methods shall conform to specifications for "Structural Joints using ASTM A325 or A490 Bolts," as approved by the Research Council on Structural Connections of the Engineering Foundation, Latest Edition.

B. The high strength bolts used shall have a suitable identifying mark placed on top of the head before leaving the factory.

C. All high strength bolted connections shall be “snug-tight” connections, unless otherwise indicated on the Drawings.
   1. “Snug-tight” is defined as the tightness that exists when all plies in a joint are in firm contact and can be attained with a few impacts of an impact wrench or by the full effort of a person using an ordinary spud wrench.

D. Where specifically noted on the Drawings, bolted connections shall be installed “slip-critical”.
   1. Tightening of nuts shall be done by the turn-of-nut method, according to the Specifications for Structural Joints" using ASTM A325 or A490 bolts," endorsed by AISC, unless direct tension indicator washers are used, in which case tightening will terminate when the proper gap is attained.
   2. For the “turn-of-nut” method, bolts that have been “snug-tight” shall be marked on both the bolt head and the nut with an identifying symbol, and then given an additional fraction of a turn as specified in Table 5 of the above referenced specification. Marks shall be such that visual observation can be made of finished connections. Snug-tight is defined as the tightness developed by the full effort of a man using a spud wrench on all bolts in the connections.
   3. Slotted holes will be allowed in following locations, only and shall have snug tight bolted connections:
      a. The outstanding legs of angles used in beam shear splices.
      b. Hip and valley beams where both ends frame into steel members in an all steel frame.
      c. Diagonal or skewed beams where both ends frame into steel members in an all steel frame.
      d. Other connections where specifically detailed in the drawings.
      e. All other holes shall be standard bolt holes (1/16 inch larger than bolt).

3.04 ERECTION ALIGNMENT

A. Framing: The framing shall be carried up true, plumb, and level within a tolerance of 1:500; and temporary bracing shall be introduced, wherever necessary, to take care of loads to which the structure may be subjected, including erection equipment and its operation. Such bracing shall be left in place as long as may be required for safety. The Contractor as part of his equipment shall finally remove it. As erection progresses, the Work shall be securely connected to take care of dead load, wind, and erection stresses.
3.05 FIELD QUALITY CONTROL

A. Contractor shall retain an independent testing agency to check connection and (Note retained by contractor of owner) fastening as specified herein. Conform to Division One — Quality Control.

B. Steel (includes work for metal joists and metal deck).

C. Structural Steel
   1. The Testing Agency shall conduct and interpret tests and state in each report whether test specimens comply with the requirements, and specifically state any deviations from requirements.
      a. Contractor shall provide access for the Testing Agency to places where structural steel is being fabricated or produced so inspection and testing can be accomplished.
   2. Bolted Connections: Inspection in accordance with AISC Specification for Structural Joints, as follows:
      a. Visually inspect all bolts
      b. Check for proper torque with a calibrated ‘torque wrench
         Minimum two bolts of alternate design connections between floor beams and girders. Minimum two bolts of every connection between girders and columns.
      c. All bolted connections that fail shall be corrected and all bolts in that connection shall be retested. The cost of retests on connections that fail shall be borne by the contractor.
   3. Field Welding: During erection of structural steel, inspect and test assemblies in accordance with AWS Structural Welding Code and as follows:
      a. Perform visual inspection of all welds and test those which are questionable.
      b. Perform non-destructive tests of weld as required above, as follows:
         1) Fillet Welds: One spot test per member. Magnetic particle testing may be used.
         2) Partial Penetration Welds: One spot test per weld using ultrasonic testing techniques.
         3) Full Penetration Welds: One spot test per weld for shop welds and the entire length of all field welds. Use radiographic or ultrasonic testing techniques.
      c. Ultrasonic inspection shall be performed on all welds subject to tension in moment connections. See drawings for locations. In addition, any other welds in question or selected at random by the inspector or Structural Engineer shall be tested by this method. When ultrasonic inspection is used, 100 percent of the length of the weld shall be inspected. Any retesting required shall be paid for by the Contractor responsible for work being tested.
      d. Re-inspect and retest defective welds which have been re-welded. The cost of re-welding, re-inspection and retesting shall be paid by the Contractor.
END OF SECTION
This page intentionally blank
SECTION 05 20 00
METAL JOISTS

PART I            GENERAL

1.01            RELATED DOCUMENTS
A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

1.02            SUMMARY
A. The Work required under this Section consists of steel joists, steel truss accessories, and related items necessary to complete the Work indicated.
B. When outriggers, angles, or other components are attached to the open web steel joists in the shop, in such a way that they actually are a component part of the joists, they are to be provided under this Section.
C. The Work includes bridging and bridging anchors, sag rods, wall anchors, and beam anchors.
D. Related Work Specified Elsewhere
   1. Section 05 10 00 — Structural Metal Framing—: For field welding quality control.
   2. Ends of joists resting on masonry require steel bearing plates furnished under Section 05 10 00 - Structural Metal Framing and installed under Division 4 Masonry over a leveling bed of mortar.
E. Refer to Section 01 23 00 for Alternates that may affect the Work of this Section.

1.03            PERFORMANCE REQUIREMENTS
A. Structural Performance: Provide special joists and connections capable of withstanding design loads within limits and under conditions indicated.
B. Design joists to withstand design loads with total load deflections no greater than the following:
   1. Floor Joists: Vertical deflection of 1/240 of the span, max 1” unless approved otherwise.
   2. Roof Joists: Vertical deflection of 1/240 of the span, max 1.5” unless approved otherwise.

1.04            SUBMITTALS
A. Shop Drawings by Approved Fabricator: Include plan layouts of joists, joist girders, and special joist locations, loading diagrams, and shop detail drawings. Symbols and indications used for structural components on design drawings must appear identically on submitted shop drawings. Types of electrodes proposed for welding
processes shall also appear thereon.
1. Indicate locations and details of anchorage devices and bearing plates to be embedded in other construction.
2. Comprehensive engineering analysis certified by the qualified professional engineer responsible for its preparation.

B. Certification Letter: Professional Engineer licensed within the state of construction activities certifying that has carefully studied the design drawings, that shop drawings have been prepared it under his direct guidance and supervision, and that provided components and connections will meet or exceed loading requirements. Such letter of certification shall be evidenced by A/E’s full signature and seal of authenticity. A/E’s review of shop drawings will not begin until such certification has been received.

C. Welding Certificates: Copies of certificates for welding procedures and personnel.

D. Manufacturer Certificate: Signed by joist manufacturer certifying that products furnished comply with SJI standard specifications and is certified by SJI to manufacturer joists.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing joists similar to those indicated for this Project and with a record of successful in-service performance.
1. Manufacturer must be certified by SJI to manufacturer joists similar to those indicated for this Project and with a record of successful in-service performance.
2. Assumes responsibility for engineering special joists to comply with performance requirements. This responsibility includes preparation of shop drawings and comprehensive engineering analysis by a qualified professional engineer.
3. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installation of joists that are similar to those indicated for this Project in material, storage, and extent.

B. Provide joists fabricated in compliance with the following and as herein specified.
1. SJI “Standard Specifications and Load Tables” for KCS, LH, and DLH Series Open Web Steel Joists, latest edition, sizes as indicated on the Drawings.
2. Customized joists / truss profile as indicated. Special top chord, bottom chord profile as shown.

C. Qualification of Field Welding Work
1. Qualify welding processes and welding operators in accordance with the AWS DI .1, “Structural Welding Code-Steel” and AWS DI .3, “Structural Welding Code— Sheet Steel”. Welders shall be certified to perform the type of work required.
1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle steel joists as recommended in SJI and AISC “Standard Specifications,” in a manner to avoid excessive stresses or deforming of members. Joists shall be supported on timbers such that no part of the joist touches the ground. Timbers shall be located under joist panel points.

B. Bent or damaged joist members shall be cause for joist rejection. Rejected joists shall be repaired or replaced within 10 working days of notification.

C. Joists shall be lifted from trucks to the storage timbers with a crane or other lifting device. Joists shall not be dropped or slid off of trucks to the ground.

1.07 PROJECT CONDITIONS

A. During the construction period, Contractors shall provide means for the adequate distribution of concentrated loads so that the carrying capacity of any joist is not exceeded.

PART 2 PRODUCTS

2.01 MATERIALS

A. Steel: Comply with SJI and AISC “Standard Specifications.”
   1. Yield strength used as a basis for the design stresses shall be as follows:
      a. Chords = 50,000 psi
      b. Webs = 36,000 psi or 50,000 psi
   2. Evidence that the steel furnished meets or exceeds the design yield strength shall be provided, on A/E’s request, in the form of certified test reports.
   3. Deduct the area of holes in chords from the area of the chord when calculating the strength of the member.
   4. Bolts: Carbon or high-strength carbon steel

2.02 FABRICATION

A. General: Fabricate steel joists in accordance with SJI and AISC “Standard Specifications,” and as follows:
   1. Shop connections and splices shall be welded with either arc or resistance welding. Shop-bolted connections are not acceptable. Field bolted splices are acceptable where shown on the Drawings.
   2. Top and bottom chords shall be of uniform size throughout their full length.

B. Top Chords: Shall be absolutely flat across its full width and length for application of metal decking.

C. Bottom Chords: Shall be extended and connected to columns or webs of girders at column lines and where shown on structural drawings.
D. Joist Ends: Shall be beveled when slope exceeds 1/4 inch in 12 inch or sloped shoes shall be provided.

E. Extended Ends, Headers, and Ceiling Extensions: Shall be provided where indicated on the Drawings, in conformance with manufacturer's standards and applicable SJJ and AISC “Standard Specifications.”

F. Camber joists according to SJI's “Specifications”, unless otherwise noted.

G. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.

H. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's “Specifications” for type of joint, chord size, spacing, and span. Note additional bridging requirements indicated on the drawing.

I. Provide additional bridging (diagonal or horizontal) at next to the last bay.

2.03 FINISHES

A. Remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories before application of shop paint.

B. Paint: Comply with SJI and AISC “Standard Specifications,” except asphalt type paint is not permitted. Provide Type 1, red oxide, steel joist shop paint conforming to Steel Structure Painting Council (SSPC) - Paint 15.

C. Apply one shop coat of steel joist primer paint to steel joists and accessories by spray, dipping, or other method to provide a continuous dry paint film thickness of not less than 1.0 mil.

PART 3 EXECUTIONS

3.01 EXAMINATION

A. Examine supporting substrates, embedded bearing plates, and abutting structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Roof joist anchorage shall be designed to resist net uplift force as indicated.
B. Joist anchorage for unenclosed areas and roof overhangs shall be designed to the upward pressure indicated on the Drawings, or as per OBC, whichever is stricter.

3.03 INSTALLATION

A. General: Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI’s “Specifications,” joist manufacturer’s written recommendations, and requirements in this Section.
   1. Before installation, splice joists delivered to Project site in more than one piece.
   2. Space, adjust, and align joists accurately in location before permanently fastening.
   3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
   4. Delay rigidly connecting bottom chord extensions to columns or supports until dead loads have been applied.

B. Spacing: Set joists at specified slope and to spacing shown with the specified end bearing at supports. Check alignment, plumbness and uninterrupted slopes prior to the installation of the deck.

C. End Anchorage
   1. At steel supports the joist ends shall extend not less than 2-1/2 inches over beams, or as specified in the SJI “Standard Specifications.”
   2. At masonry the joist ends shall extend not less than 4 inches over walls, or as specified in the SJI “Standard Specifications.” The center line of bearing of the joist shall coincide with the center line of the masonry bearing plate and the masonry wythe on which it bears, except where 2 joists from opposite sides bear on the same wythe.
   3. Ends shall be anchored as specified in the SJI “Standard Specifications.”

D. Bridging: Shall be installed prior to release of hoisting cable.
   1. Do not hang piping, ducts, or other equipment from bridging.

E. Anchors: Bridging shall extend to walls or beams and shall be anchored thereto before construction loads are placed on the joists. Bridging connections to masonry wall shall be with adhesive anchors as specified in Division 4. Mechanical or wedge type anchor shall not be used.

F. Field Welding
   1. The total length of weld at a cross-section shall not exceed 50 percent of the overall developed width of cold-formed members.
   2. Extreme caution shall be exercised during welding. Completely cover and protect masonry and concrete in place from damage during welding.
   3. Field welds will be visually inspected according to AWS Dl. 1. and in accordance with specification Section 05 10 00.

G. Touch-Up Painting
   1. After joist installation, paint field bolt heads and nuts and abraded or rusty
surfaces on joists and steel supporting members. Wire brush surfaces and clean with solvent before painting. Use the same type of paint as used for shop painting.

H. Support of Other Work
   1. Suspension wires, straps, chains, etc. used to support lights, ceiling grid, ductwork piping conduit, etc. shall be hung from top or bottom chord panel points.

END SECTION
PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

1.02 SUMMARY

A. The Work of this Section consists of providing all metal decking and related items necessary to complete the Work indicated.

1. Metal roof deck unit.

B. Related Work Specified Elsewhere

1. Section 05 10 00 - Structural Metal Framing for field welding quality control.
2. The cutting, drilling, or punching of openings smaller than 12 by 12 inches for passage of pipes, ducts, and the attachment of other items shall be performed in the field by the respective trades requiring same.
3. For openings 12 by 12 inches and larger, each shall be predetermined and provided or cut under this Section. Steel framing members indicated or required around openings 12 by 12 inches and larger through decks shall be provided and erected under Section 05 10 00.
4. Section 05 20 00 - Metal Joists.

C. Refer to Division I for Alternates that may affect the Work of this Section.

1.03 SYSTEM DESCRIPTION

A. Design Requirements

1. Compute the properties of metal roof deck sections on the basis of the effective design width as limited by the provisions of the SDI specifications. Provide the deck section properties, including section modulus and moment of inertia per foot of width.
2. Allowable Deflection: Design and fabricate deck for a maximum deflection of 1/240 of the clear span under the uniform live load.

1.04 SUBMITTALS

A. Product Data: For each type of deck, accessory, and product specified.

B. Shop Drawings: Show layout of deck panels, anchorage details, and every condition requiring closure panels, supplementary framing, special jointing, or other accessories.

C. Product Certificates: Signed by steel deck manufacturers certifying that products
furnished comply with requirements.

D. Welding Certificates: Copies of certificates for welding procedures and personnel.

1.05 QUALITY ASSURANCE

A. Qualification of Welding Work
1. Qualify welding processes and welding operators in accordance with the AWS “Standard Qualification Procedure.”
2. Decking welded in place is subject to inspection and testing. Remove and replace work found to be defective and not complying with requirements.

B. Codes and Standards
1. Comply with the provisions of the following codes and standards, except as otherwise shown or specified:
   a. AISI “Specification for the Design of Cold-Formed Steel Structural Members”
   b. AWS “Structural Welding Code,” AWS D1.1
   c. SDI “Steel Roof Deck Design Manual”
   d. Comply with Factory Mutual requirements, Class I fire rating and Class I-90 windstorm ratings.
   e. Conform to testing as per Section 05 10 00 – Structural Metal Framing.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Products of the following manufacturers will be considered, providing their products equal or exceed the quality specified; and they can provide products of the type, size, function, and arrangement required:
1. Wheeling Steel Corporation, Wheeling, West Virginia
3. United Steel Deck, Inc., Summit, New Jersey
4. Consolidated Systems, Inc., Columbia, South Carolina
5. Epic Metals Corporation, Rankin, Pennsylvania

B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. Requests for A/E approval must be accompanied by the “Substitution Request Form” and complete technical data for evaluation. All materials for evaluation must be received by the Project Manager and Specification Department at least 10 days prior to bid due date. Additional approved manufacturers will be issued
1. Refer to Division 1- Instruction To Bidders and Section 01 33 00 - Substitution Request Form for additional requirements.

2.02 MATERIALS

A. Steel for Galvanized Deck: ASTM A653, Structural Quality Grade 33 or higher, G60 Zinc Coating.

B. Miscellaneous Steel Shapes: ASTM A36.
   1. Galvanizing for Roof Deck, Floor Deck, and Metal Accessories: ASTM A525, G60 (.60 oz. per sq.ft.).

C. Galvanizing Repair Paint: SSPC Paint 20 or DOD-P-21 035, with dry film containing a minimum of 94 percent zinc dust by weight.

D. Flexible Closure Strips: Manufacturers standard vulcanized, closed-cell, synthetic rubber.

E. Acoustic Sound Barrier Closures: Manufacturers standard mineral fiber closures.

F. Self-Drilling Screws: No. 10 self-drilling screws by Hilti or ITW Buildex with lengths adequate for thickness of base material.

G. Powder Actuated Fasteners: Hilti ENP2 or X-EDNI9/X-EDNK22/ENP2K pins, ITW Buildex BXI4 fasteners, Pneutek SDK-series, or proposed equal.

H. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0598 inch thick with factory punched hole of 3/8 inch minimum diameter.

2.03 FABRICATION

A. General: Form deck units in lengths to span 3 or more support spacings, with flush, telescoped or nested 2 inch end laps and nesting side laps, unless otherwise shown or specified. Provide deck configurations complying with SDI “Basic Design Specification” and as specified herein.

B. Metal Roof Deck Units
   1. For all roof slopes, provide galvanized Type WR (1-1/2 inches deep) or 3” inches deep as specified by the Steel Deck Institute. Depth and gauge shall be as indicated on the Drawings.

Composite Metal Floor Deck Units: Fabricate with integral embossing or raised pattern to furnish mechanical bond with concrete slabs. Fabricate open-beam deck units with fluted section having interlocking side laps of metal thickness, depth, and width as shown. All composite deck to be galvanized.

C. Metal Cover Plates: Fabricate metal cover plates for end-abutting floor deck units of galvanized sheet steel not less than same thickness as decking. Form to match contour of deck units and approximately 6 inches wide.
D. Ridge and Valley Plates: Fabricate ridge and valley plates of galvanized sheet steel of the same quality as the deck units; not less than 6 inches wide, bent to provide tight fitting closure with deck units. Provide plates in 10 foot lengths where possible.

E. Metal Closure Strips: Fabricate metal closure strips of galvanized sheet steel of the same quality and gauge as the deck units; except not less than 18 gauge. Form to the configuration required to provide tight fitting closures at open ends and sides of decking.

F. Roof Sump Pans: Shall be fabricated from a single piece of galvanized sheet steel of the same quality as the deck steel and shall be of not less than 0.0747 inch thick before galvanizing.
   1. Pans shall have an overall dimension of not less than 29 by 33 inches. Pans shall have a recessed surface of not less than 1-1/2 inch to receive roof sump.
   2. Bearing flanges for metal deck shall be not less than 3 inches wide.
   3. Pans shall be formed to provide flat (level) sump surface in relationship to the roof slope.

G. Accessories: Provide closure plate, pour stop, edge strip, and other accessories required for complete installation.

PART 3 EXECUTIONS

3.01 EXAMINATION

A. Installer must examine the areas and conditions under which metal roof decking items are to be installed. Notify the NE in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

B. Install deck panels and accessories according applicable specifications and commentary of SDI Publication No. 29, manufacturer’s recommendations, and requirements of this Section.

3.02 INSTALLATION

A. General: Install roof deck units and accessories in accordance with manufacturers’ recommendations and final shop drawings and as specified herein.

B. Placing Roof Deck
   1. Do not start placement of roof deck units before supporting members are installed. Place deck units on supporting steel framework and adjust to final position with ends bearing on supporting members and accurately aligned end to end before being permanently fastened.
      a. Lap ends of 1-1/2 inch roof deck units not less than 2 inches centered over supports.
      b. Butt ends of 3 inch roof deck units centered over supports.
      c. Do not stretch or compress the side-lap interlocks.
d. Place deck units flat and square, secured to adjacent framing without warp or excessive deflection.

2. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.

3. Do not use deck units for storage or working platforms until permanently secured in position.

C. Placing Composite Floor Deck Units

Do not start placement of composite floor deck units before supporting members are installed. Place deck units on supporting steel framework and adjust to final position with ends bearing on supporting members and accurately aligned end to end before being permanently fastened.

Butt ends of deck units centered over supports.

Tape gaps at butted ends.

Do not stretch or compress the side-lap interlocks.

Place deck units flat and square, secured to adjacent framing without warp or excessive deflection.

Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.

Do not use deck units for storage or working platforms until permanently secured in position.

D. Fastening Roof Deck Units

1. To structural steel supporting members:
   a. Permanently fasten roof deck units to steel supporting members by not less than 5/8 inch diameter puddle welds spaced 6 inches o.c. at end laps, and 12 inches o.c. at intermediate supports unless otherwise noted.
      i. Use weld washers for weld fastening deck with an uncoated minimum steel thickness of less than 0.028 inch.
   b. Comply with AWS requirements and procedures for manual shielded metal-arc welding, the appearance and quality of welds, and the methods used in correcting welding work.
   c. Lock side laps between adjacent deck units with No. 10 self-tapping screws at intervals not exceeding 24 inches o.c., unless otherwise noted.
   d. Install and anchor roof deck units to resist gross uplift loading of 45 lbs. per sq.ft. at eave overhang and 30 lbs. per sq.ft. for other roof areas.

2. To cold formed supporting members (trusses, cee joists)
   a. Roof deck to be mechanically fastened at support and at sidelaps.
   b. Use No. 12 or No. 14 self-tapping screws as support fasteners. Provide fasteners at a 36/5 layout pattern at all intermediate support locations and 36/7 layout pattern (every flute at all end boundaries, edge zones, end walls and overhangs.)
c. use No. 10 self tapping screws as sideload fasteners. Provide spacing of sideload fasteners per the following:
   i. Two (2) No. 10 screws at support span of 2'-0"
   ii. Three (3) No. 10 screws at support span of 3'-0"
   iii. Four (4) No. 10 screws at support span of 4'-0"
   iv. 12" o.c. for all spacing above 4'-0"

3. Pneumatic fasteners may be submitted as an alternative for approval by Engineer of Record and Deck Supplier.
   a. Acceptable manufactures:
      i. Itilti
      2. Simpson Strong-Tie

E. Fastening Composite Floor Deck Units
   Permanently fasten composite floor deck units to steel supporting members by not less than 5/8 inch diameter puddle welds spaced 12 inches center to center, unless otherwise noted.

   Use weld washers of weld fastening deck with an uncoated minimum steel thickness of less than 0.028 inch.

   Comply with AWS requirements and procedures for manual shielded metal-arc welding, the appearance and quality of welds, and the methods used in correcting welding work.

   Lock side laps between adjacent deck units with No. 10 self-tapping screws at mid-span or 36 inch intervals (whichever is smaller), unless otherwise noted.

D. Cutting and Fitting
   1. Cut and fit roof deck units and accessories around other work projecting through or adjacent to the decking. Provide neat, square, and trim cuts.

E. Reinforcement at Openings
   1. Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking, and support of other work, unless otherwise shown.
   2. Reinforce roof decking around openings less than 12 inches in any
dimension by means of a flat steel sheet placed over the opening and fusion welded to the top surface of the deck. Provide steel sheet of the same quality as the deck units, not less than 20 gauge and at least 12 inches wider and longer than the opening. Provide welds at each corner and spaced not more than 12 inches o.c. along each side.

F. Roof Sump Pans
   1. Place roof sump pans over openings provided in the roof decking and weld to the top decking surface. Space welds not more than 12 inches o.c. with at least one weld in each corner and at center along perimeter. Cut opening in the bottom of the sump to accommodate the drain size indicated.

G. Ridge and Valley Plates
   1. Weld ridge and valley plates to the top surface of the roof decking. Lap end joints not less than 3 inches, with laps made in the direction of water flow. Minimum gauge shall be 14.

H. Closure Strips
   1. Provide metal closure strips at open uncovered ends and edges of roof decking and in the voids between decking and other construction. Weld into position to provide a complete decking installation.
   2. Provide metal joint covers at abutting ends and changes in direction of floor deck units, except where taped joints are required.
   3. Provide flexible closure strips instead of metal closures, at Contractors option, wherever their use will ensure complete closure. Install with adhesive in accordance with manufacturers instructions.

I. Touch-Up Painting - Galvanized Deck
   1. After roof decking and metal accessory installation, wire brush, clean, and paint scarred areas, welds, and rust spots on the top and bottom surfaces of decking units, and supporting steel members with galvanizing repair paint, applied in accordance with manufacturer’s instructions and ASTM A780.

J. Repair of Blow Holes in Deck
   1. Holes up to 1 1/2 inch in diameter, fill with urethane or silicone sealant and cover with duct tape.
   2. Holes above 1/2 inch diameter require sheet metal plate patches fastened to deck.

K. Support of Other Work
   1. Suspension wires, straps, and chains such as those used to support acoustical ceilings, ductwork, and lights shall not be attached to or through steel roof decks.

END OF SECTION
This page intentionally blank
SECTION 05 40 00

COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections and Drawings, apply to this section.

1.02 SUMMARY

A. Work Included:
   1. Types of cold-formed metal framing units include the following:
      a. C-shaped steel joists.
      b. Accessories, fasteners, stiffeners, slips and braces as required.

1.03 SYSTEM DESCRIPTION

A. Component Design: Design cold formed framing system according to requirements of the Ohio Building Code. Design all components, including, but not limited to, sizes, gages, supports, track, anchorage, framing, connections within system and connections to adjacent building structure.

B. Design Criteria:
   1. Design system to accommodate live and dead loads imposed by secondary components attached to system.
   2. Maximum Deflection:
      b. Wind loads except where brick masonry occurs: L / 360.
      c. Wind load where masonry veneer occurs: L / 600.

C. Design framing member size using depth and maximum spacing indicated on Drawings.

1.04 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data and installation instructions for each item of cold-formed metal framing and accessories.

C. Shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other sections.
   1. Where installed metal fabrications are indicated to comply with certain OBC design loadings, include structural computations, material properties, and other information needed for structural analysis that has been signed and
sealed by the qualified professional engineer who was responsible for their preparation.

1.05 QUALITY ASSURANCE

A. Component Design: Calculate structural properties of studs and joists in accordance with American Iron and Steel Institute (AISI) "Specification for Design of Cold-Formed Steel Structural Members."


C. Fire-Rated Assemblies: Where framing units are components of assemblies indicated for a fire-resistance rating, including those required for compliance with governing regulations, provide units that have been approved by governing authorities that have jurisdiction.

D. Engineer Qualifications: Professional engineer licensed to practice in jurisdiction where project is located and experienced in providing engineering services of the kind indicated that have resulted in the successful installation of metal fabrications similar in material, design, and extent to that indicated for this Project.

E. Pre-Installation Conference: Prior to start of installation of metal framing systems, meet at project site with installers of other work including door and window frames and mechanical and electrical work. Review areas of potential interference and conflicts, and coordinate layout and support provisions for interfacing work.

1. Coordinate with provisions of Division 1 Section Project Meetings.

F. Deflection Criteria: L/600 for exterior brick veneer, or maximum 3/10 inch under full live and dead loads, whichever is less.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide products of one of the following:

1. Alabama Metal Industries Corp.
2. Dale/Incor Industries, Inc.
3. Dietrich Industries, Inc.
4. Marino Industries, Inc.
5. Superior Steel Studs, Inc.
6. Unimast, Inc.
7. United States Steel
8. Wheeling Corrugating Co.

2.02 METAL FRAMING

A. System Components: Manufacturers' standard load-bearing steel joists of type, size, shape, and gage as indicated or as required by manufacturer's engineer, whichever is stricter. With each type of metal framing required, provide manufacturer's standard, steel runners (tracks), blocking, lintels, clip angles,
shoes, reinforcements, fasteners, and accessories for applications indicated, as needed to provide a complete metal framing system.

B. Materials and Finishes:

1. For 16-gage and heavier units, fabricate metal framing components of structural quality steel sheet with a minimum yield point of 50,000 pounds per square inch; ASTM A 653, A 570, or A 611.

2. For 18-gage and lighter units, fabricate metal framing components of commercial quality steel sheet with a minimum yield point of 33,000 pounds per square inch; ASTM A 653, A 570, or A 611.

C. Fasteners: Provide nuts, bolts, washers, screws, and other fasteners with corrosion-resistant plated finish.

D. Electrodes for Welding: Comply with AWS Code and as recommended by stud manufacturer.

2.03 FABRICATION

A. General: Framing components may be prefabricated into assemblies before erection. Fabricate panels plumb, square, true to line, and braced against racking with joints welded. Perform lifting of prefabricated units to prevent damage or distortion.

B. Fastenings: Attach similar components by welding. Attach dissimilar components by welding, bolting, or screw fasteners, as standard with manufacturer.

C. Wire tying of framing components is not permitted.

D. Fabrication Tolerances: Fabricate units to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet.

PART 3 EXECUTION

3.01 INSTALLATION

A. General: Install metal framing systems in accordance with manufacturer’s printed or written instructions and recommendations.

B. Runner Tracks: Install continuous tracks sized to match studs. Align tracks accurately to layout at base and tops of studs. Secure tracks as recommended by stud manufacturer for type of construction involved, except do not exceed 24 inches on center spacing for nail or power-driven fasteners or 16 inches on center for other types of attachment. Provide fasteners at corners and ends of tracks.

C. Reinforce ends with end clips, steel hangers, steel angle clips, steel stud section, or as otherwise recommended by the manufacturer.
D. Field Painting: Touch-up damaged shop-applied protective coatings. Use compatible primer for prime-coated surfaces; use galvanizing repair system for galvanized surfaces.

END OF SECTION
SECTION 05 50 00

METAL FABRICATIONS

PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide miscellaneous metals as indicated on the drawings and specified herein. Work includes, but is not limited to:

1. Ladders and alternating stairs
2. Stairs; work includes design.
3. Loose steel lintels.
4. Steel railings and handrails; work includes design.
5. Downspout boot castings.
6. Loose leveling and bearing plates.
7. Stair nosing.
8. Miscellaneous steel framing and supports which are not indicated as part of structural steel work.
9. Miscellaneous steel members to be embedded in concrete.
10. Concrete filled steel pipe protection posts (pipe bollards).
11. Curb and floor opening angles.
12. Elevator sill angles and elevator intermediate structural supports.
13. Counter supports.
14. Supports above ceilings for ceiling hung items

1.02  RELATED SECTIONS

A. Structural Steel: Section 05 12 00.
B. Cold-Formed Metal Framing: Section 05 40 00.
C. Painting: Section 09 90 00.
E. Decorative Metal Railing: Section 05 70 00.

1.03  REFERENCES

B. American Welding Society (AWS):
   1. AWS D1.1 - Structural Welding Code - Steel.
   2. AWS D1.3 – Structural Welding Code – Sheet Steel.
   3. AWS D1.2 – Structural Welding Code – Aluminum.
   4. AWS D1.6 – Structural Welding Code – Stainless Steel
C. American Society for Testing and Materials (ASTM).

1. ASTM A36 - Structural Steel.
2. ASTM A53 - Pipe, Steel, Black and Hot-Dipped, Zinc-coated Welded and Seamless.
4. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
5. ASTM A283 – Low and Intermediate Tensile Strength Carbon Steel Plates.
6. ASTM A307 - Carbon Steel Bolts and Studs Externally and Internally Threaded Fasteners, 60,000 PSI Tensile Strength.
8. ASTM A500 – Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
9. ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
11. ASTM A653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
12. ASTM A569 - Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip, Commercial Quality.
13. ASTM A570 - Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality.
14. ASTM A611 - Steel Sheet, Carbon, Cold-Rolled, Structural Quality.
15. ASTM A780 - Practice for Repair of Damaged Hot-Dip Galvanized Coatings.
16. ASTM A786 - Rolled Steel Floor Plates.

D. American National Standards Institute (ANSI)

1. ANSI A14.3 - Safety Requirements for Fixed Ladders
2. ANSI Z49.1 – Safety in Welding, Cutting and Allied Processes

E. National Association of Architectural Metal Manufacturers, (NAAMM).

F. Society for Protective Coatings (SSPC)

1. SSPC-SP1 - Solvent Cleaning
2. SSPC-SP2 - Hand Tool Cleaning
3. SSPC-SP3 - Power Tool Cleaning
4. SSPC-SP6 - Commercial Blast Cleaning
5. SSPC-SP11 - Power Tool Cleaning to Bare Metal

1.04 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design metal stairs and railings and ladders, including
comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

1.05 SUBMITTALS

A. Shop Drawings - General: Submit for all items.

B. Shop Drawings – Stairs and Handrails: Indicate in detail construction, gages of metals, jointing, methods of installation, fastening and supports, location and sizes of welds, anchors, hangers and other pertinent information and data.

1. In addition, submit plans and details of stairs and handrails, drawn to scale not less than 1/4 inch per foot.
2. Shop drawings shall contain design, type of steel and load assumption, bearing the seal of a licensed professional engineer registered in the State of Ohio.

C. Samples: Submit samples of materials or workmanship, if requested by the Architect.

D. Stair manufacturer’s certificate of compliance with the Architectural Products Division of the National Association of Architectural Metal Manufacturer’s AMP 510 Metal Stairs Manual materials, construction and installation specification.

1.06 QUALITY ASSURANCE

A. Fabricate and install metal items in accordance with applicable standards of AISC and NAAMM. Welding and related procedures in accordance with AWS.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1 - Structural Welding Code - Steel.
2. AWS D1.2 - Structural Welding Code - Aluminum.

C. 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. Clearly mark units for reassembly and coordinated installation.

D. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry for installation of miscellaneous metal work. Provide setting drawings, templates, instructions and directions for installation of
anchorage devices. Coordinate delivery with other work to avoid delay.

1.07 PROJECT CONDITIONS

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

1.08 COORDINATION

A. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry for installation of miscellaneous metal work. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

1.09 STORAGE AND HANDLING

A. Protect from corrosion.

B. Store materials in a weathertight and dry place until ready for use in the work.

C. Store packaged materials in their original unbroken package or container.

PART 2 PRODUCTS

2.01 MATERIALS

A. Ferrous Metals

1. Steel Shapes, Bars and Plates: ASTM A36.

2. Steel Plates to be Bent or Cold Formed: ASTM A283, Grade C.

   a. Pipe Bollards: Heavy weight, schedule 80.

4. Steel for Gratings: ASTM A569 or A36.

5. Steel Tubing: ASTM A500, Grade A, cold-formed; or ASTM A501, hot-formed.

6. Steel Sheets: Hot-rolled ASTM A570, Class 1, Grade 36; or cold-rolled ASTM A611, Grade C, Type 1.

7. Galvanized Steel Sheets: ASTM A653 Grade 33, G90 coating.

B. Gray Iron Castings: ASTM A48, minimum Class 30B.

C. End Welded Studs

1. Material: Compatible with material to which it is attached.

2. Type: Automatically end welded in the shop or field, head or bent top.

4. Size: Diameter and length as indicated.

D. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded

2.02 FASTENERS

A. General

1. Provide fasteners of types as required for assembly and installation of fabricated items.
2. Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941; Class Fe/Zn 5; at exterior walls.

B. Bolts, Nuts and Washers: Regular hexagon head type, externally and internally threaded fasteners; include necessary nuts and plain hardened washers. Provide the following materials/finishes:

1. Steel: ASTM A307 Grade A bolts; A563 nuts. For members for support of structural members or connection thereto, provide ASTM A325 bolts.
2. Stainless Steel: ASTM F 593 for bolts and ASTM F 594 for nuts, Alloy Group 1

C. Expansion Anchors: Stainless steel "DH Bolts" or "Ankr Tite" devices by WEJ-IT or similar by REDHEAD, HILTI or SIMPSON. Length as required to provide minimum 2-1/2" embedment into sound masonry.

D. Adhesive Type Anchor Bolts – In Hollow CMU: Chemically grouted adhesive anchor systems with nylon or stainless steel screen inserts. Use 1/2 inch diameter anchors, unless otherwise noted.

1. HIT HY-70 Adhesive Anchors, HILTI, INC.
2. EPCON System, ITW/RAMSET/RED HEAD
3. Chem-Stud Adhesive Anchors, RAWLPLUG COMPANY, INC.
4. Simpson Set Epoxy-Tie Adhesive Anchors, SIMPSON STRONG-TIE COMPANY, INC.

E. Adhesive Type Anchor Bolts - In solid grouted CMU and Concrete: Chemically grouted adhesive anchor systems. Use 3/4 inch diameter anchors, unless otherwise noted.

1. HIT HY 200 or RE-500 V “Safe Set System” Adhesive Anchors, HILTI, INC.
2. EPCON System, ITW/RAMSET/REDHEAD
3. Chem-Stud Adhesive Anchors, POWERS FASTENERS, INC.
4. Simpson Set Epoxy-Tie Adhesive Anchors, SIMPSON STRONG-TIE COMPANY, INC.

F. Cast-In Place Anchors: Steel internally threaded headed cast-in inserts which
receive threaded insert elements such as threaded rods and bolts ½-inch, 3/8-inch, ½-inch, 5/8-inch and ¾-inch diameters.

1. Interior Use: Unless otherwise indicated on the Drawings, provide carbon steel anchors with zinc plating equivalent to minimum 5.1 µm (.0002 inch) zinc coating.

G. Miscellaneous Fasteners

1. Lag Bolts: ANSI B18.2.1.
4. Plain Washers: Round, carbon steel, ANSI B18.22.1
5. Toggle Bolts: Tumble-wing or spring wing type, FS FF-B-588, type, class, and style as required.

2.03 MANUFACTURED ITEMS

A. Downspout Boot Casting

1. Material: Gray cast iron.
2. Type: NEENAH Series R-4929-03, offset shape; JORDAN IRON WORKS; FLOCKHART, or equal.
3. Size: Accepts 3" x 4" downspout.
4. Length: As indicated on drawings. If not indicated, provide 32" high boots.

B. Concrete Stair Nosings

1. Use: Concrete panfilled treads and cast-in-place concrete stairs.
   a. Provide only at stair treads that are not scheduled to receive floor finish.
2. Type: Extruded aluminum with aluminum oxide/silicone carbide abrasion anti-slip filler strips and integral anchor.
3. Size: 3" wide by 1/4" thick by full length of tread for panfilled and 6" less than width of tread for cast-in-place (3" each end).
5. Manufacturer: WOOSTER PRODUCTS, Type 231BF for panfilled and cast-in-place; AMERICAN ABRASIVE METALS COMPANY; BALCO; NYSTROM.

2.04 FABRICATION

A. General

1. Workmanship
   a. Construct all items to ensure ease of installation and minimal field adjustment.
   b. Use materials of size and thickness shown, or, if not shown, of required size and thickness to produce strength and durability in
finished product. Ease exposed edges to a radius of approximately 1/32 inch. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

c. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces. Grind crotches to 1/8" radius.

d. Form exposed connections with hairline joints, flush and smooth.

2. Field Measuring: Field measure all items required to obtain proper fit.

3. Exposed mill names and logos not permitted in finished work.

B. Steel Stairs

1. General: Construct stairs to conform to sizes and arrangements shown: Join pieces together by welding unless otherwise indicated. Provide complete stair assemblies, including metal framing, hangers, railings, struts, clip brackets, bearing plates and other components for the support of stairs and platforms and as required to anchor and contain the stairs on supporting structure.

2. Design: Comply with all applicable building laws and ordinances. Stairs to be designed to sustain a live load of 100 psf and a concentrated load of 300 lbs. Sizes of members shown on drawings are minimums. Furnish heavier members if necessary to meet design requirements.

3. Stair Framing: Fabricate stringers of structural steel channels. Provide closures for exposed ends of stringers. Construct platforms (landings) of structural steel channel headers and miscellaneous framing members as shown. Bolt or weld headers to stringers and framing members to strings and headers; fabricate and join so bolts, if used, do not appear on finish surfaces.

4. Pan-Filled Stairs
   a. Metal Pan Risers, Subtreads, and Subplatforms (Landings): Shape metal pans for risers and subtreads to conform to configuration shown. Provide thicknesses of structural steel sheet for metal pans indicated but not less than that required to support total design loading. Form metal pans of hot-rolled or cold-rolled carbon steel sheet, unless otherwise indicated.
   b. Attach risers and subtreads to stringers by means of brackets made of steel angles. Weld brackets to strings and weld metal pans to brackets.
   c. Provide subplatforms of configuration and constructions indicated, or if not indicated, of same metal as risers and subtreads and in thicknesses required to support design loading. Attach subplatform to platform framing members with welds.


C. Ladders and Alternating Stairs

1. Fabricate for the locations shown with dimensions, spacings, details and anchorages as indicated. Comply with the requirements of ANSI A14.3 and OSHA, except as otherwise indicated.
a. Unless otherwise shown on the drawings, provide 1/2 inch x 2-1/2 inch continuous structural steel flat bar stringers with eased edges, spaced 18 inches apart.

b. Provide 1 inch diameter solid structural steel bar rungs, spaced maximum 12 inches on center.

2. Center rungs on stringers, plug weld and grind smooth on outer rail faces.

3. Coat top of each rung with aluminum oxide granules set in epoxy adhesive to provide non-slip surface.


5. Provide semi-circular safety cages with flared bottom where ladders height exceeds 20'-0". The back of the cage must extend between 27 and 30 inches from each ladder rung, measured from the center of the rung. Cage shall be connected to the ladder, or to the structure to which the ladder is fixed, by horizontal bands, and there shall be a horizontal band at least every 4 feet. Provide vertical bars, no more than 9.5 inches from each other, connecting the horizontal bands. The vertical bars must also be connected to the inside of the horizontal bands. Locate bottom of cage between 7'-0" and 8'-0".

6. At public access locations and where indicated, provide expanded metal hinged security gate at gage bottom with lockable hasp.

7. Alternating Tread Stair Treads: shall be capable of withstanding a single concentrated 1000 pound load without permanent deformation; or 100 pounds per square foot or 300 pounds on an area of 4 square inches without exceeding the allowable working stress of the material.

8. Alternating Tread Stair Guard and Handrail: shall be capable of withstanding a single concentrated load of 200 pounds or a uniform load of 50 pounds per linear foot applied in any direction at any point on the rail without exceeding the allowable working stress of the material.

9. Alternating Tread Stair Stringers: shall be capable of withstanding a single concentrated load of 1000 pounds at any point on the stair without permanent deformation; or a uniform live loading of 100 pounds per square foot applied in a downward direction to all tread surfaces or a 300 pound load on an area of 4 square inches without exceeding the allowable working stress of the material.

E. Handrail/Guardrail: Fabricate as indicated on the drawings.

1. Material: Steel pipe or shapes as detailed; meeting the requirements specified herein for the specific material.

2. Loadings: Steel guardrails and handrails shall meet the following load requirements:
   a. Welded construction, fabricated, complete with connectors to structure designed for a concentrated load of 200 pounds applied at any point and in any direction on the handrail and at the top of the guardrail and in compliance with OBC.
   b. Guardrails: Designed and constructed for a load of 50 pounds per lineal foot applied horizontally at the required guardrail height and a simultaneous load of 100 pounds per lineal foot applied vertically downward at the top of the guardrail.
   c. Guardrails: Designed and constructed to resist a 200 pound
concentrated horizontal load applied on a one foot square area at any point in the system including intermediate rails or other elements serving this purpose.

d. Handrails: Designed and constructed for a load of 50 pounds per lineal foot applied in any direction and in compliance with the OBC.

e. Loading conditions in paragraphs a, b, c and d shall not be applied simultaneously, but each shall be applied to produce maximum stress in each of the respective components or any of the supporting components.

3. Verify dimensions on site prior to shop fabrication.

4. Railing system shall be assembled in a shop in largest sizes for delivery to site and for installation; to minimize field-splicing and assembly.
   a. Rails shall be disassembled only as necessary for shipping and handling.
   b. Rails shall be marked for re-assembly and coordinated installations.

5. Close open ends of railings, not scheduled to be closed with finials, with close fitting steel plates welded in place and ground smooth.

6. Welded Connection: Cope intersections of rails and posts, weld joints and grind smooth. Butt weld end-to-end joints of railings, or use welding connections at fabricator's option.

7. Form simple and compound curves by bending pipes in jigs to produce uniform curves.
   a. Maintain profile of pipes throughout entire bend without buckling, twisting or otherwise deforming exposed surfaces.

8. Space posts and wall brackets as indicated. If not indicated, 7'-0" maximum center to center.

9. Brackets, Flanges and Anchors: Provide for railing posts and handrail supports. Provide inserts and sleeves as required for anchorage to concrete or masonry.

10. Provide wall returns at ends of wall mounted rails.

11. For Exterior Installations: Provide weepholes or other means for evacuation of water trapped in pipe rails.

12. Expansion Joints: Provide expansion joints at locations indicated. If not indicated, locate at intervals not to exceed 40 feet.
   a. Provide slip-joint interval sleeve extending beyond joint on each side; secure sleeve to one side.
   b. Do not locate expansion joints closer than 6" from post.

13. Toe Boards: Where indicated, provide toe boards around openings and at edge of open-sided floors and platforms.
   a. Fabricate to dimensions and details shown.

F. Miscellaneous Steel Lintels: Provide sizes and shapes as indicated with 8" minimum bearing each jamb, unless otherwise noted. When lintel is fabricated of two or more members to accommodate thickness of wall, weld adjacent members to form a single unit.

1. Unless otherwise indicated, provide one 3-1/2" wide angle leg for each nominal 4" wythe of masonry.

G. Miscellaneous Embedded Items: Provide steel members of shapes and size
required per drawings. Equip members to be anchored into concrete or masonry with welded on anchor straps or weld studs as shown or required. Spacing and location of anchors per drawings, but if not otherwise detailed, provide at ends and at maximum intervals of 12" with minimum two per member.

H. Miscellaneous Framing and Supports

1. Provide as indicated on drawings.
2. Fabricate members and assemblies to size, shape and dimensions detailed with provisions to receive adjacent construction supported by such items.

I. Miscellaneous Loose Steel Items: Provide steel shapes such as channels, angles, plates, protection posts, etc., as indicated on drawings.

J. Accessories: Provide all clips, bolts, anchors, fasteners, etc., as required for completion of miscellaneous metal work. Type, size and strength as noted or as suitable for conditions and construction involved.

K. Stair Nosings: Provide single length sections; no joints permitted within the width of a stair tread. Provide only at stair treads that are not scheduled to receive floor finish.

L. Counter Supports:

1. Surface Mounted: 1/8" steel with 45 degree notch that allows for wall cleat and wire run clearance.
   a. Load to Deformation: 1500 lbf/pair minimum.
   c. Manufacturer: A&M HARDWARE or approved equal

2. In-Wall Mounted (Concealed): Fabricate from steel angles and welded in sizes indicated or as required.
   a. Load to Deformation: 650 lbf/pair minimum.

3. Accessories: Provide all required fasteners to structure type provided.

2.05 FINISHES

A. Preparation: Grind all exposed cut surfaces as required to remove burrs and sharp edges.

B. Galvanizing

1. Galvanize all ferrous metal items exposed to weather, embedded in masonry or concrete, and where indicated.
2. Hot-dip galvanize after fabrication in accordance with ASTM A123; provide minimum of 2 oz. of galvanizing (Grade 85) per sq. ft. of subsurface. Prepare and pretreat surfaces as recommended by galvanizer. Do not weld after galvanizing.
3. Galvanizing Repair Paint: Minimum 79% zinc dust by weight in dried film. TNEMEC COMPANY, INC., No. 92 Tneme-Zinc; ZRC Cold Galvanizing
Compound by ZRC, Zinc-rich Galvax by ALVIN PRODUCTS.

4. Do not use stainless steel or other non-galvanized fasteners in the assembly of galvanized components.

C. Shop Painting (Non-galvanized Ferrous Metal)

1. Cleaning: After fabrication, clean all items of loose scale, rust, oil, dirt or other foreign matter.
4. Paint: One shop coat of paint compatible with the finish paint system. Section 09 91 00.

PART 3 EXECUTION

3.01 PREPARATION

A. Coordinate and furnish anchorages, settings drawings, diagrams, templates, instructions and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.02 INSTALLATION

A. General

1. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
2. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and level. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.
3. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
4. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work. Comply with the following requirements:
a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
b. Obtain fusion without undercut or overlap.
c. Remove welding flux immediately.
d. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

5. Protection from Dissimilar Materials: Coat all aluminum surfaces in contact with steel, concrete or masonry with one coat of heavy bodied bituminous paint. Where aluminum contacts steel surfaces, and only where specifically approved, the painting required on the steel surface may be substituted for the bituminous paint.

B. Handrail

1. Adjust railings prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated or specified herein. Plumb posts in each direction. Secure posts in each direction. Secure posts and railing ends to building construction as follows.

2. Anchor posts to concrete as indicated on the drawings.

3. Weld posts to channels as indicated.

4. Secure handrails to wall with wall brackets. Provide brackets with not less than 1-1/2" clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required for design loading. Secure wall brackets and wall return fittings to concrete or masonry with expansion bolts.

C. Stair Nosings: Use on all concrete and concrete pan filled treads.

3.03 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

END OF SECTION
SECTION 055005
SITE METAL FABRICATIONS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Threaded Rod, Nuts, and Washers for Anchorage.
   2. Adhesive to Anchor Threaded Rods into Concrete.
   3. Anchors embedded in concrete for work indicated on landscape drawings.

1.2 DEFINITIONS

A. Acceptance, Acceptable, or Accepted: Acceptance by the Landscape Architect in writing.

B. Excessive Compaction: Planting area soil or soil mix compaction greater than 75 percent maximum dry density as determined by ASTM D 1557.

1.3 SUBMITTALS

A. Product Data:
   1. Threaded Rod.
   2. Nuts.
   4. Screws.
   5. Washers.

B. Shop Drawings:
   1. Submit Shop Drawings of fabricated items for acceptance prior to fabrication.
   2. Show shop and erection details including dimensions, sizes, thicknesses, gauges, finishes, joining, attachments, holes, welds, bolts, elevations and relationship of work to adjoining construction, including finished soil grades and finished paving surfaces.
   3. Where welded connectors, concrete, or masonry inserts are required to receive Work, show exact locations required.
   4. Where items must fit and coordinate with finished surfaces and/or constructed spaces, take measurements at site and not from Drawings. Indicate welded connections using standard AWS A2.4 welding symbols.
   5. Furnish accepted Shop Drawings to the trades responsible for installing the connectors or inserts.

C. Certificates: Welder’s Certificates documenting AWS qualification within the previous 12 months.

1.4 QUALITY ASSURANCE

A. Installer and Fabricator Qualifications: Workmanship shall be best standard practice of trades and shall be performed by mechanics skilled in type of Work required.

B. Regulatory Requirements: Meet requirements of applicable laws, codes, and regulations required by authorities having jurisdiction over Work.

1.5 DELIVERY, STORAGE AND HANDLING

A. Protective Pads: Use protective pads to prevent damage to metal finish when lifting, handling and shipping.

B. Handling: Provide adequate support and attachments during handling to prevent structural damage.
1.6 SITE CONDITIONS

A. Field Measurements: Secure field measurements required for adequate fabrication and installation of the Work covered by this Section.

1.7 WARRANTY

A. General Description: In addition to manufacturer’s warranties, warrant Work for a period of one year from the Date of Final Completion against defects in materials and workmanship.

B. Additional Items Covered: Warranty shall also cover repair of damage to other materials and workmanship resulting from defects in materials and workmanship.

C. Exceptions: Contractor shall not be held responsible for failures due to normal wear, neglect by Owner, vandalism, and other causes outside Contractor’s control.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Threaded Rods for Anchorage of Stainless Steel Plates and Angles: ASTM A 193 Type 304 or 316, stainless steel, with 70,000-PSI minimum tensile strength.

A. Threaded Rod and Bolts for Anchorage of Trench Drain Frame Angles and Grate Frame Retention Angles: Hot-dip galvanized steel, minimum 58,000 psi tensile strength.

B. Hex Nuts and Coupling Nuts for Stainless Steel Threaded Rod and Stainless Steel Bolts: ASTM A 194 Type 304 or 316, stainless steel.

C. Adhesive for Anchoring Threaded Rods in Concrete: ASTM C 881, 2 component, chemical-resistant, structural epoxy bonding system formulated for exterior use in anchoring threaded rods, bolts, reinforcing bars, and smooth dowels into solid material.
   1. Hilti.
   2. Epcon by ITW Ramset/Redhead.

D. Set Screw for Bollards: Socket set screw, cup point, coarse thread, Type 313 stainless steel.

2.2 SHOP FABRICATION

A. Accepted Shop Drawings: Do not fabricate or deliver metal fabrications to the site before Shop Drawings have been accepted.

B. Field Measurements: Verify measurements in field prior to fabrication.

C. Fabrication:
   1. Fabricate items per accepted Shop Drawings.
   2. Fabricate items accurately fitted free from distortion or defects.
   3. Miter corners and angles of frames unless indicated otherwise.

D. Templates: Furnish templates for exact location of anchor bolts, and other items to be embedded in concrete, with setting instructions required for installation of embedded items.

E. Shop Welding Stainless Steel:
   1. Meet requirements of AWS D1.6.
   2. Prior to final finish, grind visible welds of bollards smooth and finish so that joints are not visually detectable.

PART 3 – EXECUTION

3.1 EXAMINATION
A. Verification of Conditions: Examine site and verify that conditions are suitable to receive Work and that no defects or errors are present which would cause defective installation of products or cause latent defects in workmanship and function.

B. Notification: Before proceeding with Work, notify the Owner’s Representative in writing of unsuitable conditions.

3.2 PREPARATION

A. Protection:
   1. Use every possible precaution to prevent damage to existing conditions to remain such as structures, utilities, irrigation systems, plant materials and paving on or adjacent to the site of the Work.
   2. Use every possible precaution to prevent excessive compaction of planting area soil and soil mixes within or adjacent to the areas of Work.
   3. Provide barricades, fences or other barriers to protect existing conditions to remain from damage during construction.
   4. Do not store materials or equipment, permit burning, or operate or park equipment under the branches of existing plants to remain.
   5. Submit written notification of conditions damaged during construction to the Owner’s Representative immediately.

B. Embedded Items: Supply metal items required to be cast into concrete or embedded in masonry with setting templates to appropriate trades.

3.3 INSTALLATION

A. Attachment:
   1. Coordinate site metal fabrications with adjoining work for details of attachment, fittings, etc.
   2. Do cutting, drilling, threading, tapping, etc., required for attachment of site metal fabrications to adjacent Work.
   3. Install anchors, bolts, washers, inserts, lag screws, and other miscellaneous steel or iron fastenings required for installation, completion of Work, as indicated on Drawings, details and schedules, at time scheduled for Work.

B. Field Welding Stainless Steel:
   1. Meet requirements of AWS D1.6.
   2. Welding will be permitted only where indicated or accepted on the Shop Drawings.
   3. Grind visible welds smooth and finish so that joints are not visually detectable.

C. Exposed Moldings and Frames: Miter corners and angles of exposed moldings and frames unless otherwise noted.

D. Field Assembly:
   1. Install items plumb and level, accurately fitted, free from distortion or defects.
   2. Meet requirements of accepted Shop Drawings.
   3. Brace and carefully handle shop fabricated items subject to damage to prevent distortions or other damage.
   4. After assembly, align and adjust the various members forming parts of a completed frame or structure accurately before being fastened.
   5. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
   6. Obtain acceptance prior to site cutting or making adjustments not scheduled.

E. Fastening:
   1. Provide miscellaneous fastenings necessary for the complete assembly and installation.
   2. Install fasteners as specified.
3.4 THREADED RODS

A. Threaded Rods Anchored in Concrete with Adhesive:
   1. Anchor in drilled holes with adhesive.
   2. Drill holes to diameter recommended by adhesive manufacturer’s current printed instructions.
   3. Install adhesive in accordance with adhesive manufacturer’s current printed installation instructions.
   4. Install rod lengths such that at least 1/4-inch length of rod projects beyond nut, after nut is tightened to final position.

3.5 ERECTION TOLERANCES

A. Maximum Variation from Plumb: 1/8-inch.
B. Maximum Offset from True Alignment: 1/16-inch.

3.6 CLEANING

A. Finished Metal Fabrication Surfaces: Remove soil and foreign matter from finished surfaces and keep clean until the Owner accepts maintenance.

3.7 PROTECTION

A. Metal Fabrications: Apply protective coverings to prevent damage until date of Final Completion.

END OF SECTION
PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide all miscellaneous ornamental metal items specified hereunder, including all design, materials, fabrication, fastenings and accessories required for finished installations, where indicated on drawings or otherwise necessary for completion of the project. Work includes the following:

1. Decorative stainless steel framework, railings and cable infill.
2. Display casework frames.
3. Perforated metal panels for display casework.

1.02 REFERENCE STANDARDS

A. The following publications of the issues listed below, but referred to hereinafter by basic designation only, form a part of this specification to the extent indicated by the references thereto.

   a. A167 Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
   c. A312 Seamless and Welded Austenitic Stainless Steel Pipe.
3. American Welding Society (AWS)
   a. D1.1 Structural Welding Code - Steel.
   b. D1.3 Structural Welding Code - Sheet Steel.

1.04 SUBMITTALS

A. Product Data: Manufacturer's literature may be submitted for standard proprietary products in lieu of shop drawings. Data to fully explain product indicating materials, sizes and finishes, and installation procedures.

B. Samples: Samples to be reviewed for color, texture and reflectivity and general appearance. Compliance with all other requirements is the responsibility of the Contractor.
1. Finish: Submit for approval minimum 6" x 6" or 12" length of each required metal finish.
2. Weld: Submit samples of welded joint showing quality of work. Samples to be of same form, alloy, temper and hardness to be used in the work.
3. Sample: Submit a 2'-0" long sample of completed rail system.

C. Shop Drawings: Show details of fabrication and installation. Indicate materials, alloys and tempers, thicknesses of materials, gages, sizes, dimensions, methods of joining and fastening, welds, finishes, details of reinforcement and embedment, attachments, anchorages, miscellaneous metal items incidental to basic fabrication shown, provisions for work of other trades and other pertinent information as requested by the Architect.

D. Maintenance Instructions: Submit manufacturers'/fabricators' recommendations for maintenance of exposed finishes.

E. Certifications: Submit certifications that products comply with applicable design loadings.

F. Welder Certifications: Qualify welding process and welders in accordance AWS Codes referenced herein.

   1. Certify that each welder has successfully passed AWS qualification tests for the welding processing involved and, if pertinent, has undergone recertification.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Fabricator must have a minimum of 5 years experience and be regularly engaged in type of work specified. Must employ only skilled personnel using proper equipment to produce the work in high quality. Must be approved by Architect.

B. Installer Qualifications: Fabricator of products.

C. Single Source Responsibility: Handrails and railing systems shall be designed, fabricated and installed by the same source.

D. Perform all work in strict accordance with applicable local, state and federal codes.

   1. Completed railing to withstand the following loads applied to top railing:
      a. 200 pounds applied at any point in any direction.
      b. 50 pound per linear foot horizontal and vertical load.

   2. Infill of Guards
      a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
      b. Infill load and other loads need not be assumed to act concurrently.
PART 2  PRODUCTS

2.01 MATERIALS

A. Provide materials which have been selected for their surface flatness, smoothness and freedom from surface blemishes where exposed to view in the finished unit. Exposed-to-view surfaces which exhibit pitting, seam marks, roller marks, "oil-canning", stains, discolorations or other imperfections on finished units will not be acceptable.

B. Stainless Steel

1. Type: Type 302/304 except items exposed to exterior or high moisture conditions to be Type 304.
2. Bar Stock: ASTM A743
3. Plate: ASTM A666 Type 304.

C. Aluminum - Material and Description: Provide as detailed or as required to maintain design intent as indicated on drawings. Aluminum extruded shapes and bent aluminum sheet, minimum 0.063", unless otherwise indicated or specified, finished after fabrication.


D. Welding: Electrodes and filler metal to be of type and alloy as recommended by producer of metal to be welded, and as required for color match, strength and compatibility in the fabricated items.

E. Fasteners: Provide fasteners of types as required for assembly and installation of fabricated items. In general, fasteners to be concealed from view. Exposed fasteners, where permitted or required, to conform to the following:

1. Fasteners to be of basic metal and alloy, matching finished color and texture as metal being fastened, unless otherwise indicated.
2. Provide Phillips flat head screw/bolts for exposed fasteners.

F. Miscellaneous Materials: Provide all incidental accessory materials, tools, methods and equipment required for fabrication and installation of metal items as indicated on drawings, and not furnished by other sections.

G. Guardrail and Terminal Fittings:

1. Provide stud adjusters, tensioners and other type fittings, washers and nuts as required; stainless steel, ASTM A 666 Type 316.
2. Basis of Design Manufacturer: SECO SOUTH SPI 2000 or equal by
JACOB, LOOS AND COMPANY, or DÉCOR CABLE.

3. Wire Rope: Wire complying with ASTM A 492, Type 316.

2.02 FABRICATION

A. Preliminary: Verify dimensions prior to fabrication.

B. Forming: Form metal items to accurate sizes and configurations as indicated on drawings and otherwise required for proper installation. Make with all lines straight and angles sharp, clean and true. Drill, countersink, tap and otherwise prepare items for connections with work of other trades as required.

C. Fasteners: Make permanent connections with work of other trades, as required. Avoid using exposed bolts or screws unless specifically indicated or approved.

D. Joints: Construct items with joints milled to a tight, hairline fit. Cope or miter corner joints. Where exposed to weather, form to exclude water.

E. Welding: Comply with AWS for recommended practices in shop welding.

   1. Provide welds behind finished surfaces without distortion or discoloration of exposed side.
   2. Clean exposed welded joints of all welding flux and dress on all exposed and contact surfaces to match adjacent surfaces.

F. Cut, reinforce, drill and tap miscellaneous metal as indicated to receive hardware, screws, and similar items. Countersunk screw holes to set screw heads flush, unless indicated otherwise.

2.03 ASSEMBLIES

A. Railings

   1. Design to meet NAAMM standards and requirements of applicable codes, but not less than 200 lbs. applied at any point in any direction.
   2. Shop fabricated with minimum field splicing allowed.
      a) All construction welded per AWS.
      b) Welds, where shown, to be continuous. Grind and add weld as required to provide uniform and smooth transition between pieces. Buff, polish and blend as required to match finish of railing.
   3. Quality of welds to meet National Ornamental & Miscellaneous Metals Association - NOMMA Guideline #1, Joint Finish #2.
   4. Finish: As specified under Shop Finish herein.

B. Display Framing

   1. Provide as indicated on drawings.
   2. Fabricate members and assemblies to size, shape and dimensions detailed with provisions to receive adjacent construction supported by such items.
   3. Quality of welds to meet National Ornamental & Miscellaneous Metals
Association - NOMMA Guideline #1, Joint Finish #2.

C. Accessories: Provide all clips, bolts, anchors, fasteners, etc., as required for completion of miscellaneous metal work. Type, size and strength as noted or as suitable for conditions and construction involved.

2.04 SHOP FINISHES

A. Protect mechanical finishes on exposed surfaces from damage by application of strippable, temporary protective covering prior to shipment.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are not acceptable if they are noticeable variations in the same piece. Variations in appearance of other components are acceptable, subject to Architect's approval.

C. Stainless Steel Surfaces

1. Exposed Surfaces: #4 satin finish.
2. Concealed Surfaces: No requirements.

D. Aluminum Surfaces

1. Shop paint aluminum surfaces with baked-on organic polymer thermosetting powder coating applied over conversion coating.
2. Finish Coating Properties
   a. Hardness: H or better in accordance with ASTM D3363.
   b. Crosshatch Adhesion: In accordance with ASTM D3359.
   c. Salt Spray Resistance: 1,000 hours, tested in accordance with ASTM D117.
   d. Humidity Resistance: 1,000 hours tested in accordance with ASTM D2247.
   e. Detergent Immersion: 1,000 hours tested in accordance with ASTM D2248.
3. Colors: As selected by Architect.

PART 3 EXECUTION

3.01 INSTALLATION

A. Set handrail and railing work accurately as measured from established building lines and levels, plumb and in true alignment with previously completed work. Brace temporarily or anchor securely in formwork where work is to be built into concrete, masonry or similar construction.

B. Anchor securely in place in the manner shown, using concealed anchorage wherever possible.

C. Fit mechanical joints together accurately to form tight joints and uniform reveals and spaces for joint fillers and sealants. Restore any finishes that have been
damaged by shipment and installation.

D. Do not cut or abrade finishes which cannot be completely restored in the field, including special finishes. Return units with special finishes that cannot be field restored to the shop for required alterations, followed by complete refinishing.

F. Remove protective coverings when there is no longer any danger of damage to the railing work from other work yet to be performed in the same location. Restore protective coverings which have been removed or damaged during shipment or installation of the work, if such other work is yet to be performed.
SECTION 06 10 50

WOOD BLOCKING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Roof blocking, cants and nailers.

B. Concealed blocking for support of accessories, equipment, specialty items, cabinets, fixtures, trim, facing materials and similar type items.

1.02 REFERENCES

A. Standards

1. American Wood Protection Association (AWPA): Treatment Standards.
   a. AWPA U1 - Use Category System: User Specification for Treated Wood

   a. A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
   b. D3498 - Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems
   c. D2898 - Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing

3. American Plywood Association (APA): Grades and Standards

1.03 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

B. Preservative Treated Wood: Submit certification by treating plant stating chemical and process used and conformance with applicable standards.

C. Fire Retardant Treatment: Submit certification by treating plant that fire retardant treatment materials comply with governing ordinances and that treatment will not bleed through finish surfaces.

1.04 QUALITY ASSURANCE

A. Softwood Lumber: Grading rules and wood species shall conform with the
voluntary Product Standards PS 20 including grading rules of the following associations, as applicable:

2. Douglas Fir, Western Larch and Hemlock: Western Lumber Grading Rules, published by Western Wood Products Association (WWPA), Standard Grading and Dressing Rules for West Coast Lumber Inspection Bureau (WCLIB) or National Lumber Grades Authority (NLGA).
3. Western Spruce, Pine and Fir: Western Spruce-Pine-Fir Association (WSPFA) and current Canadian Grading Rules by National Grades Association, Canada.

B. Softwood Plywood: Grading rules and wood species shall conform with Product Standard PS 1.

C. Grade Marks

1. General: Identify all lumber and plywood by official grade mark.
2. Lumber: Grade stamp to contain symbol of grading agency, mill number or name, grade of lumber, species or species grouping, or combination designation, rules under which graded, where applicable and condition of seasoning at time of manufacture.
   a. Type, grade, class and identification index.
   b. Inspection and testing agency mark.

1.05 STORAGE AND HANDLING

A. Store off the ground.
B. Protect from direct contact with the weather.
C. Provide proper ventilation.

PART 2 PRODUCTS

2.01 SOFTWOOD LUMBER

A. Species: Any commercial softwood.

1. 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":

B. Moisture Content: Maximum 19% at time of manufacture.

1. Fire Retardant Treated Materials: Kiln-dry all materials after treatment to maximum 15% moisture content.
C. Dimensions

1. Specified lumber dimensions are nominal unless otherwise indicated.
2. Actual dimensions conform to industry standards established by the American Lumber Standards Committee and the rules writing agencies.

D. Surfaces: Surface four sides (S4S) unless specified otherwise.

E. Grading: Construction grade.

2.02 PLYWOOD

A. Plywood Blocking: Provide exterior grade plywood for exterior use and interior type with exterior glue for interior use. Formaldehyde free.

1. Exterior: APA-CD-EXT.

2.03 FIRE-RETARDANT WOOD TREATMENT

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Use treatment that does not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.

C. After treatment, kiln-dry lumber to maximum 19% moisture content and plywood to maximum 15% moisture content. Inspect each piece of lumber and plywood after drying and discard damaged or defective pieces.

D. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.

2.03 PRESERVATIVE WOOD TREATMENT
A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC3b.
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
   2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark each piece of treated lumber with AWPB Quality Mark designation denoting conformance to the appropriate specification.
   1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.

D. Application: Treat items indicated on Drawings, and the following:
   1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
   2. Wood sills, sleepers, blocking, [furring,] [stripping,] and similar concealed members in contact with masonry or concrete.

2.04 ROUGH HARDWARE

A. General: Provide all necessary spikes, screws, nails, bolts and other hardware for satisfactory erection of work. Except where noted to be stainless steel, provide hot-dipped galvanized finish complying with ASTM A153 for hardware exposed to exterior, located in toilet rooms, in contact with treated wood or in contact with roofing or flashing.

   1. Nails: ASTM F1667. Common wire nails, except where noted otherwise on drawings; sizes as noted or specified herein.
   2. Attachment to Concrete or Masonry: Metal expansion type shields or inserts; sizes as required to accommodate applied fastener; spacing as indicated on drawings.
      a. "DH" or "Ankr-Tight" by WEJ-IT or equal by RED HEAD or HILTI.
      b. Sleeve type for masonry.
      c. Wedge type for concrete.
   3. Adhesive Type Anchor Bolts – In Hollow CMU: Chemically grouted adhesive anchor systems with nylon or stainless steel screen inserts. Use 1/2 inch diameter anchors, unless otherwise noted.
      a. HIT HY20 Adhesive Anchors, HILTI, INC.
      b. EPCON System, ITW/RAMSET/RED HEAD
      c. Chem-Stud Adhesive Anchors, RAWLPLUG COMPANY, INC.
d. Simpson Set Epoxy- Tie Adhesive Anchors, SIMPSON STRONG-TIE COMPANY, INC.

4. Adhesive Type Anchor Bolts - In solid grouted CMU and Concrete: Chemically grouted adhesive anchor systems. Use ¾ inch diameter anchors, unless otherwise noted.
   a. HIT HY200A Adhesive Anchors, HILTI, INC.
   b. EPCON System, ITW/RAMSET/REDHEAD
   c. Chem-Stud Adhesive Anchors, POWERS FASTENERS, INC.
   d. Simpson Set Epoxy-Tie Adhesive Anchors, SIMPSON STRONG-TIE COMPANY, INC.

5. Attachment to Steel Studs: Self tapping screws of sufficient length and strength to perform the functions for which they are used.

6. Roof Construction
   a. Wood-to-Wood Attachment: 300 Series stainless steel, flat head.
      1) Plywood to Nailers: Minimum #8 x 1-3/4".
   b. Wood-to-Metal Deck Attachment: Hot dip galvanized in accordance with ASTM A153; machine bolts, locknuts and washers; minimum 3/8" diameter.
   c. Wood-to-Concrete Attachment: 300 Series stainless steel expansion anchors as specified above. Minimum 3/8" diameter, length as required for minimum 2" concrete embedment.

2.05 ADHESIVE

A. Adhesives: Water- and mold-resistant formulation complying with ASTM D3498 that is approved for use indicated by adhesive manufacturer.

PART 3 EXECUTION

3.01 CONDITIONS OF SURFACES

A. General: Verify that surfaces to receive blocking are prepared to exact grades and dimensions.

3.02 INSTALLATION

A. Align and anchor blocking with countersunk bolts, washers, nuts, or nails, as applicable.

B. Locate blocking to facilitate installation of finishing materials, fixtures, specialty items and trim.

C. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

3.03 WOOD TREATMENT

A. Preservative Treated Wood Products: Provide pressure treatment for all lumber and plywood as specified hereinbefore.
1. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
   a. Use inorganic boron for items that are continuously protected from liquid water.
   b. Use copper naphthenate for items not continuously protected from liquid water.

B. Fire Retardant Treated Wood Products: Provide fire retardant treatment on all lumber and plywood as specified hereinbefore.

3.04 CLEAN UP

A. Clean up debris and cuttings on a regular daily basis. Remove and dispose of excess materials and debris created by wood blocking.

B. Maintain the building and site free of accumulations of cutting and waste materials in a neat orderly condition acceptable to the Architect.

3.05 WASTE MANAGEMENT

A. Do not burn scraps of treated wood. Do not mix treated wood scraps with untreated wood. Hazardous wastes shall be separated, stored, and disposed of according to local regulations.

END OF SECTION
SECTION 06 40 00

ARCHITECTURAL WOODWORK

PART 1  GENERAL

1.01 WORK INCLUDED

A. Provide architectural woodwork as indicated and specified. Work includes:

1. Custom case work. Provide in the following areas:
   a. All other plastic laminate casework: Section 12 33 55.
2. Solid surfacing countertops and fabrications.
3. Miscellaneous fasteners and hardware.

1.02 RELATED SECTIONS

A. Wood Blocking: Section 06 10 50
B. Plastic Laminate Casework: Section 12 33 55.

1.03 REFERENCES

A. Standards: Wherever the following abbreviations are used herein, they shall refer to the corresponding standard:

2. AWI: Architectural Woodwork Institute.
3. NEMA: National Electrical Manufacturer's Association.

1.04 SUBMITTALS

A. Product Data: Submit for all items.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Provide large scale details.
2. Indicate methods of fabrication, edging, location and construction of joints.
3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections

C. AWI Quality Standards: A photo-copy of the applicable portions of the AWI publication "Architectural Woodwork Quality Standards", latest edition, shall be submitted with each set of shop drawings.
1. Each copy must be marked to clearly show all details, specifications and finishes proposed for this work.

D. Submit samples of all finish materials, including the following:
   1. Plastic laminate for texture and color selections. (8” x 10”).
   2. Cabinet hardware (1 of each type).
   3. Lumber with transparent finish for each species and cut. (12”)
   4. Solid surface material.

E. Manufacturer’s product data describing type and quality of the following:
   1. Plastic laminate (face grade and liner grade).
   2. Cabinet hardware (each type).

F. Submit certification that fire-retardant treatment materials comply with governing ordinances and meet or exceed ASTM E84 tests. Include certification by treating plant that treatment will not bleed through finish surfaces. Materials shall bear UL label showing Flame Spread 25 or less and smoke developed 40 or less. Mill certification is not acceptable.

1.05 DEFINITIONS

A. Exposed Portions of Casework: Include surfaces visible when doors and drawers are closed. Bottoms of casework more than 4 feet above floor and tops less than 6 feet 6 inches above floor shall be considered as exposed. Visible members in open cases or behind glass doors also shall be considered as exposed portions.

B. Semi-Exposed Portions of Casework: Includes those members behind opaque doors, such as shelves, divisions, interior faces of ends, case back, drawer sides, backs and bottoms, and back face of doors. Tops of casework 6 feet 6 inches or more above floor shall be considered semi-exposed.

C. Concealed Portions of Casework: Include sleepers, web frames, dust panels, and other surfaces not usually visible after installation.

1.06 QUALITY ASSURANCE

A. Fabricator qualifications: A firm specializing in the fabrication of millwork with a minimum of 5 years experience and a satisfactory record of performance on projects of comparable size and quality. Shop is in compliance with all AWI’s Quality Certification Program requirements.

B. Installation: Performed only by skilled finish carpenters with a minimum of 3 years experience in installing custom millwork similar to that required for this project.

C. All solid surface material type work shall be performed by a Manufacturer Certified fabricator.
D. Provide lumber factory marked with type, grade, mill and grading agency identification on concealed surfaces. Omit marking and submit mill certificates for materials to receive transparent finishes that cannot be marked on a concealed surface.

E. Quality Grade: Materials and fabrication shall be "custom grade" unless otherwise indicated on the drawings or specified herein as "premium grade", both in accordance with "Quality Standard Illustrated," of the AWI conforming to the following sections:

1. Section 100: Solid wood members.
2. Section 200: Plywood and particleboard.
3. Section 400: Casework and tops.
4. Section 1700: Installation of architectural woodwork.

1.07 DELIVERY, STORAGE AND HANDLING

A. Protect woodwork materials and items during delivery, storage and handling to prevent damage, soiling and deterioration.

B. Do not deliver woodwork materials and items until concrete, masonry, painting, grinding and other similar wet work has been completed and is thoroughly dry, outside door openings are permanently watertight, exterior windows are glazed and, in case of temperature dropping below 60°F, until temporary heating and ventilating systems are in operation.

C. Store materials in dry, well-ventilated spaces with constant minimum temperature of 60°F, and maximum relative humidity of 55%.

1. Do not store adhesives with materials that have a high capacity to absorb VOC emissions (i.e., materials which are woven, fibrous or porous in nature, such as acoustical ceilings, carpets, textiles, etc.).
2. Do not store adhesives in occupied spaces.

1.08 PROJECT CONDITIONS

A. Provide and maintain a constant temperature and humidity before, during and after installation as required to maintain optimum moisture content of installed materials.

B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed, and indicate measurements on Shop Drawings.

C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide
allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.09  COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that cabinets can be supported and installed as indicated.

PART 2  PRODUCTS

2.01  MATERIALS

A. Lumber

1. Provide lumber surfaced four sides (S4S) and worked to profiles and patterns shown. Nominal sizes are as shown, except where detailed dimensions are indicated.

2. Moisture Content: Provide materials kiln-dried to maximum moisture content of 6% complying with AWI Standards, Section 100-G-3.

   a. Western Red Cedar, Ponderosa Pine, White Pine: Western Lumber Grading Rules, published by Western Wood Products Association (WWPA), or Standard Grading Rules for West Coast Lumber, No. 16, published by West Coast Lumber Inspection Bureau (WCLIB).

4. Species: Fabricator’s option.

B. Softwood Plywood: Thickness as indicated. Formaldehyde free.


2. Comply with PS-1, "Construction and Industrial Plywood".

C. Particle Board (Substrate for Laminate Surfaces): High density industrial grade with a minimum density of 45 pounds per cubic foot and a moisture content between 12% maximum and 8% minimum, meeting or exceeding ANSI A208.1 or ASTM D1037; formaldehyde-free. ASTM E84, Class A.

1. ARAUCO Vesta FR Particleboard
2. SIERRAPINE Encore FR
3. PANEL SOURCE INTERNATIONAL Pyroblock Platinum Particleboard

D. Medium Density Fiberboard (MDF): Thickness as specified unless otherwise indicated on Drawings. Moisture content between 12% maximum and 7% minimum. Formaldehyde free. Meet the following minimum standards:

1. Internal Bond: 90 psi.
2. Modulus of Rupture: 2,500 psi.
4. Density: Minimum 40 pounds per cubic foot.
5. Fire Rating: ASTM E84 Class A
   a. Smoke Developed: 95
   b. Flame Spread: 15
6. Manufacturers
   a. ARAUCO Vesta FR MDF
   b. ROSEBURG FOREST PRODUCTS Medite FR
   c. PANEL SOURCE INTERNATIONAL Pyroblock Platinum MDF

E. Plastic Laminate: Conform to the requirements of the National Electrical Manufacturer’s Association (NEMA) Publication Number LD-3.
   1. General Purpose Grade: 0.05 inches thick.
   2. Backing Sheet Grade: 0.02 inches thick.
   3. Post-Forming Grade: 0.042 inches thick.
   4. Cabinet Liner: 0.02 inches thick.
   5. Provide solid color type where indicated on drawings.
   6. Fill and seal plastic laminate joints with Seamfil by KAMPEL ENTERPRISES, INC. or equal. Colors to match plastic laminate.

J. Hardware Items:
   1. Drawer Slides: Self-closing, side mounting type with nylon tire, steel ball-bearing rollers. Manufactured by BLUM, GRASS, AMEROCK, KNAPE & VOGT; ACCURIDE. Load capacity as follows:
      a. 75 pounds: Drawers up to 3-1/2 inches deep: Similar to ACCURIDE Series 2132.
      b. 100 pounds: Drawers up to 8 inches deep: Similar to ACCURIDE Series 2832.
      c. 150 pounds: Drawers over 8 inches deep, all file drawers: Similar to ACCURIDE Series 4034.
   2. Drawer and Door locks: 5-pin tumbler, dead bolt. KENSTAN; BEST; COMPX NATIONAL; CORBIN. Provide 2 keys per cylinder.
   3. Concealed Hinges: European style, self-closing, type as required for construction. HAFELE; GRASS; PRAMETE; BLUM.
   4. Drawer and Door Pulls: As indicated.
   5. Adjustable Cabinet Shelf Supports – Spoon Type: 5mm; nickel plated.
   6. Catches: Magnetic, STANLEY #45 or equal by NATIONAL LOCK or EPCO.

K. Nails
   1. Provide steel nails with diamond point for soft woods and blunt point for hardwoods.
   2. Interior Work - Finishing Nails: 6d for 3/4" material; 9d or 10d for 5/4" material; and 12d for 1-1/2" material.

L. Adhesive: Low-VOC, FS MMM-A-125C, Type II, water- and mold-resistant; complying with required VOC regulations.

M. Solid Surface Material: 1/2” or 3/4” inch thick sheets.
1. Provide thicknesses as indicated on the drawings.
2. Surface burning characteristics in accordance with ASTM E 84: Class I or A, and as follows:
   a. Flame spread: <25.
   b. Smoke developed: <25.
3. Joints: Provide watertight, fused joints as recommended by manufacturer.
4. Edge Treatment: As detailed on drawings. Ease all exposed edges not otherwise detailed.
5. Make field cut-outs as required to install plumbing items and toilet accessories. See Division 22 and Section 10 28 13.
6. Joint Adhesive: Manufacturer's recommended adhesive to create inconspicuous, nonporous joints, with chemical bond.

2.02 FABRICATION

A. General: Except as specified hereinafter, fabricate all work in accordance with AWI quality standards as specified. Work not specified with a level of quality shall be not less than "Custom" quality per AWI.

B. Custom Casework

1. Quality Standard: Custom Grade per AWI Section 400.
2. "Flush Overlay" design as shown in AWI Architectural Casework Details.
3. Core Materials
   a. Particle Board: Typical for plastic laminated finish materials.
   b. Plywood Core: Typical for wood veneered surfaces.
   c. Solid Hardwood: Typical for all drawer construction, except drawer faces.
   d. Hardboard or Luan Plywood: Drawer bottoms.
4. Plastic Laminate Facing
   a. All exposed surfaces: Plastic laminate, general purpose grade. Include on exposed face and edges of all cabinets except where detailed otherwise on the drawings. Apply to all edges of doors and drawer fronts. Doors shall have laminate on both faces. Cabinet elements (tops, counters, face panels, end panels, rails, etc.) that are finished with laminate on the exposed surfaces shall have laminate balancing sheets on the concealed or semi-concealed faces.
   b. A vinyl catalyzed factory finish (AWI Finish System No. 4) shall be applied to all semi-concealed surfaces that do not have a pressure laminate finish or a balancing sheet finish. This includes drawer interior and drawer sides, ends, edges and adjustable semi-concealed shelving.
   c. At Contractor's option, the use of .025" thick cabinet Liner Grade laminate and .030" thick Backing sheet grade laminate may be used in lieu of AWI Finish System No. 4.

5. All casework material in 3/4" thick, excluding facing material thickness, unless otherwise detailed, required for stability, or doors in excess of 48" in any dimension. Drawer sides to be 1/2" thick; front and back 3/4"; bottom
1/4” thick.

6. Adjustable Shelves: Install supports at each end of all shelves and intermediate supports at all shelves over 30”.

7. Design
   a. Configuration of casework is indicated on drawings.
   b. Detailing and design required to provide rigid, solid and structurally adequate casework is the responsibility of the fabricator; all within parameters of AWI specifications and as approved by the Architect.
   c. The following conditions require special attention:
      1) Casework exceeding 42” in width between supports.
      2) Sink and/or equipment cutouts and supports.
      3) Countertops exceeding 24” unsupported.
      4) Wall and Ceiling Mounted Casework: Provide integral framing in casework of size, strength, and in locations which allow unit to be screw attached to proper substrate and remain rigidly in place.

C. Solid Surface Material Countertops: Fabricate to profiles, sizes and edge conditions indicated on drawings and as directed by manufacturers requirements.

   1. Solid Surface: Back and side splashes, where indicated, to be fused to top to ensure watertight joint.
   2. Fabricate to dimensions, profiles and details indicated with openings and mortises precut, where possible to receive fixtures, accessories and other similar items of work.
   3. Ease edges as indicated on the drawings.
   4. Fabricate components in shop to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and solid surface manufacturer requirements.
   5. Where countertops do not have a continuous substrate, locate and provide closure strips to prevent openings from countertop underside to top of support casework.
   6. Where joint design intent indicated is to be seamless, provide manufacturers recommended adhesive to create inconspicuous, nonporous joints, with chemical bond.

**PART 3  EXECUTION**

3.01 PREPARATION

   A. Condition architectural woodwork materials, items and products to average prevailing humidity conditions in installation areas before installing.

   B. Install blocking and anchoring devices built into substrates for anchorage of architectural woodwork.

   C. Deliver inserts and anchoring devices to be built into substrates well in advance of time substrates are to be built.

   D. Before installing woodwork, examine shop-fabricated work for completion and back
priming.

E. Ventilation for Adhesives: Comply, at a minimum, with the adhesive manufacturers’ recommendations for space ventilation during and after installation. Maintain the following ventilation conditions during the adhesive curing period or for 72 hours after installation (whichever is longer): 1) supply 100% outside air 24 hours a day; 2) supply airflow at a rate of 6 air changes per hour, when outside air temperatures are between 55°F and 85°F and humidity is between 30% and 60%; and 3) supply airflow at a rate of 1.5 air changes per hour, when outside air conditions are not within the range stipulated in the previous item 2.

3.02  INSTALLATION

A. Quality: Comply with AWI Section 1700.

B. Install woodwork materials and products plumb, level, true and straight with no distortion. Shim as required using concealed shims. Install to a tolerance of 1/8” in 8’-0” for plumb and level (including countertops, window stools and shelves), and with 1/16” maximum offset in flush adjoining surfaces, 1/8” maximum offsets in revealed adjoining surfaces.

C. Scribe and cut work to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.

D. Install countertops level, true to alignment, accurately fit to wall conditions and securely fastened to base units and other support systems as indicated.

1. Solid Surface Type Countertops: Form joints using tinted adhesive as recommended by top manufacturer.

E. Casework: Install without distortion so that doors and drawers will fit openings properly and be accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.

F. Anchor woodwork to anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk concealed fasteners and blind nailing as required for a complete installation. Use fine finishing nail for exposed nailings, countersunk and filled flush with woodwork.

3.03  CLEANING AND PROTECTION

A. Repair damaged and defective millwork to eliminate functional and visual defects. Where not possible to repair properly, replace millwork as directed by the Architect.

1. Chipped, scratched or patched plastic laminate will not be accepted and must be replaced.

B. Clean hardware, lubricate and make final adjustments for proper operation.
C. Protect installed work during remaining construction operations.

D. Clean woodwork on exposed and semi-exposed surfaces. Touch-up shop applied finishes to restore damaged or soiled areas.

E. Cover completed casework with 4-mil polyethylene film protective enclosure, applied in a manner that will allow easy removal and without damage to woodwork or adjoining work. Remove cover immediately before the time of final acceptance.

END OF SECTION
This page intentionally blank
PART 1 GENERAL

1.01 WORK INCLUDED

A. Whether indicated on the drawings or not, provide waterproofing in the following applications and areas:

1. Elevator pit walls: Semi-liquid or sheet membrane, Contractor's option.
2. Elevator pit bottom slab: Sheet membrane.

B. Surface preparation, primers, and protective covering.

1.02 RELATED SECTIONS

A. Sealants: Section 07 92 00.

1.03 SUBMITTALS

A. Shop Drawings: Submit details of special joint or termination conditions and conditions of interface with other materials. Edge terminations, flashing details, treatment of joint penetrations or projections at large scale. Details shall reference each material, sequence of placement and application procedure.

1. Include setting drawings showing layout, sizes, sections, profiles, and joint details of pedestal-supported concrete pavers.

B. Product Data: Submit for all items. Include construction details, material descriptions, and tested physical and performance properties of waterproofing and manufacturer's written instructions for evaluating, preparing, and treating substrate.

C. Samples: For each exposed product and for each color and texture specified, including the following products:

1. 8-by-8-inch square of waterproofing and flashing sheet.
2. 8-by-8-inch square of insulation.
3. 4-by-4-inch square of drainage panel.
4. Plaza-deck paver, 4-by-4-inch square, in each color and texture required.
5. Paver pedestal assembly.

D. Statement of Application: Submit statement signed by Contractor and installer, stating that work complies with these specifications and that the installation
methods complied with the manufacturer's printed specifications and instructions for the conditions of installation and use on this project.

E. Applicator's License Certificate: Copy of "Certificate of License" issued to system applicator by manufacturer.

F. Sample warranty.

G. Contamination Profile: Manufacturer shall provide the Installer, Contractor and Owner with a tabular profile of chemicals, solutions, oils, compounds or materials which are injurious to the fluid-applied membrane system. This profile shall be established by generic (or trade name) basis, including those materials normally found to exist in the work environment or likely to occur on this work. The system should not be exposed to materials (directly or indirectly) as established by the Contamination Schedule during application or after completion of the work.

1.04 QUALITY ASSURANCE

A. Manufacturer: Company specializing in the manufacture of specific type of waterproofing membrane systems specified with ten years minimum experience.

B. Installer/Applicator: Company specializing in application of specified waterproofing with five years minimum experience and trained and approved by waterproofing manufacturer.

C. Obtain primary materials for each waterproofing type required from single manufacturer. Provide secondary materials only as recommended and approved by manufacturer of primary materials.

D. Pre-Waterproofing Conference

1. Contractor: Prior to installation of waterproofing and associated work, schedule and administer a pre-installation meeting at the project site to review the material selections, installation procedure, special details, flashings, coordination, inspection procedures, and protection and repairs.

   a. Attendance: Architect, Contractor, Installer, manufacturers' representatives and trades requiring coordination with the work.
   b. Contractor: Take minutes and provide copies to all attendees.

E. Manufacturer's Representative (primary material manufacturer): Furnish services of manufacturer's technical representative at the job site at the start of installation, periodically as work progresses and after completion as necessary to advise on every phase of the waterproofing work.

1. Install entire system in accordance with the manufacturer's instructions except where more stringent requirements are indicated or specified, then the more stringent requirements shall govern.

F. Contractor: Notify Architect 72 hours in advance of scheduled waterproofing work.
G. Installer to advise General Contractor of finish and curing requirements of concrete surfaces, as relates to application of the waterproofing materials, prior to installation of those substrates.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original, unopened packaging fully identified with brands, type, grade, class and other qualifying information including instruction for use and identifying numbers.

B. Storage waterproofing materials in a dry area away from high heat, flames or sparks. Provide weatherproof covering on top and all sides, allowing for adequate ventilation.

C. Store protection board flat and off the ground, preferably on a wood platform. Provide weatherproof covering on top and all sides.

D. Store only as much material at point of use as required for each day's work.

E. Handling: Handle all materials in a manner to prevent damage of any kind. Remove damaged material from the site and replace with new specified material.

1.06 JOB CONDITIONS

A. Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.

1. Surfaces to receive membrane shall be free of water, dew, frost, snow and ice.

B. Ventilation: Provide positive ventilation for enclosed areas continuously throughout the application and for a minimum of 8 hours afterward or until coatings have completely cured.

C. Do not allow waste products (petroleum, grease, oil, solvents, vegetable or mineral oil, etc.) to come in contact with the membrane. Exposures to foreign materials or chemical discharges must be presented to membrane manufacturer for evaluation to determine impact on membrane. See "Contamination Profile" specified under paragraph 1.03G herein.

D. Special Precautions: Allow no open fires or spark-producing equipment in the application area until vapors and fumes have dissipated. Post "No Smoking" signs in area during application and maintain for at least 8 hours following application.

1.07 WARRANTY

A. Manufacturer's Warranty: Manufacturer's standard materials-only warranty in
which manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.

1. Warranty Period: Five (5) years from date of Substantial Completion.

B. Installer's Special Warranty: Provide warranty for two (2) years against leaks, failures and defects. Upon notification of such defects, within the warranty period, make necessary repairs and replacements at the convenience of the Owner without additional cost to the Owner.

1. Warranty includes removing and reinstalling protection board, drainage panels, insulation, pedestals, and pavers on plaza decks.

PART 2 PRODUCTS

2.01 MATERIALS

A. Semi-Liquid Applied System

1. Membrane: Elasticized rubberized asphaltic compound, self-bonding to normal substrates, hot poured, quick setting.

2. Physical Properties
   a. Water Vapor Permeability - ASTM E96, Procedure E: 0.027 perms.
   c. Water Absorption - CGSB 37-GP-50M: Gain in weight 0.35 g maximum. Loss in weight 0.18 g maximum.
   d. Penetration - ASTM D5329: At 77 degrees F, maximum 110; at 122 degrees F, maximum 200.
   e. Elongation - ASTM D5329: 1000% minimum.
   f. Low Temperature Crack Bridging Capability - CGSB 37-GP-50M: No cracking, adhesion loss, or splitting.

3. Miscellaneous Materials: Primer, detail coatings, flashing, bonding adhesive, splicing cement, lap sealant, water cut-off mastic, pipe seals, pourable sealer, and other related items as recommended by membrane manufacturer.
   a. Primer: Cut-back solvent type conforming to ASTM D41.
   b. Reinforcing Sheet: EPDM/Butyl laminate sheet in uncut rolls.
      1) Heavy Duty: 63 mils.

4. Miscellaneous: As required to complete installation.

5. Manufacturers
   a. Liquid Membrane 6125 by AMERICAN HYDROTECH
   b. TremProof 6100 by TREMCO
   c. CCW-500R by CARLISLE
   d. 790-11 by HENRY
   e. STRATASEAL HR by CETCO
B. Sheet Membrane System

1. Membrane: Self-adhering laminated sheet comprised of rubberized asphalt and polyethylene film; minimum 60 mil thickness. Furnish in 36" wide x 60' long rolls with release paper.

2. Physical Properties
   a. Tensile Strength, Film - ASTM D882: 5000 psi.
   c. Pliability, 180 degree bend over 1" mandrel - ASTM D1970: -25 degrees F.
   d. Cycling over 1/4" crack, 100 cycles - ASTM C836: At -25 degrees, no effect.
   e. Permeance - ASTM E96, Method B: 0.05 perm.
   f. Water Absorption: ASTM D570: 0.1% (weight/72 hours).

3. Miscellaneous Materials: Primer, detail coatings, flashing, bonding adhesive, splicing cement, lap sealant, water cut-off mastic, pipe seals, pourable sealer, and other related items as recommended by membrane manufacturer.

4. Cants: At all inside corners; minimum face 3/4".

5. Miscellaneous: As required for complete installation.

6. Manufacturers
   a. Bituthene 4000 by W.R. GRACE
   b. Mel-Rol System by W.R. MEADOWS
   c. CCW MiraDri 860/861 by CARLISLE
   d. WP-200 by HENRY
   e. Polyguard 650 by POLYGUARD PRODUCTS
   f. ENVIROSHEET by CETCO

C. Underslab Sheet Membrane: Reinforced, composite waterproofing sheet specifically designed for pre-applied underslab waterproofing conditions.

1. Performance Properties
   d. Water Absorption – ASTM D570: 0.5% maximum.

2. Miscellaneous Materials: Primer, detail coatings, flashing, bonding adhesive, splicing cement, lap sealant, water cut-off mastic, pipe seals, pourable sealer, and other related items as recommended by membrane manufacturer.

3. Manufacturer: The following products are acceptable provided they meet the specified performance properties:
   a. Polyguard Underseal Underslab by POLYGUARD PRODUCTS
   b. Preprufe 300 Membrane by W.R. GRACE.
   c. Mel-Rol Precon Membrane by W. R. MEADOWS.
   d. Miraply H by CARLISLE CCW
   e. ULTRALEASE by CETCO

D. Accessories

1. Vertical Protection Board
a. **Vertical Protection Board** - At Elevator Pit Walls: Asphaltic hardboards "Protection Course" by W.R. MEADOWS or W.R. GRACE; 1/4" thick; one layer required.

2. **Horizontal Protection/Drainage Board**
   a. Description: 3/8" thick high impact polystyrene drainage core with filter fabric adhered to core.
   b. Adhesive and Tape: Types as recommended by drainage board manufacturer.
   c. Manufacturer: Hydroduct HSF by W.R. GRACE; Amerdrain 650 by AMERICAN WICK DRAIN CORPORATION; CCW Miradrain 6200XL by CARLISLE; Hydrodrain by HYDROTECH; PolyFlow 18 by POLYGUARD PRODUCTS, AQUADRRAIN 30H by CETCO.

3. **Expansion Joint Fillers**: Provide membrane support and additional membrane length at joints.
   a. Above Grade: Sponge foam tubing, size and properties as recommended by waterproofing membrane manufacturer.
   b. Below Grade: Closed cell neoprene gaskets; ASTM D1056 Class SC (oil resistant and medium swell), 2 to 5 psi compression deflection.

---

**PART 3 EXECUTION**

3.01 **EXAMINATION**

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the waterproofing.

1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D4263.
3. Verify that compacted subgrade is dry, smooth, sound, and ready to receive waterproofing sheet.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 **PREPARATION OF SUBSTRATES**

A. Prepare, fill, prime, and treat substrates to receive waterproofing membrane, including joints, cracks, corners and penetrations according to manufacturer's written instructions and recommendations. Remove dust and dirt from joints and cracks according to ASTM D 4258.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction. Mask termination elevations to prevent application of waterproofing materials on surfaces exposed to view.
C. Remove grease, oil, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, and other projections and fill honeycomb, aggregate pockets, and other voids.

E. Semi-Liquid Membrane: Close off deck drains and other deck penetrations to prevent spillage and migration of waterproofing fluids.

F. Outside Corners: Bevel or round outside corners of substrate by grinding to produce a minimum 3/4” face or radius if not provided under Division 03 or use other means to treat outside corners approved by waterproofing manufacturer.

G. Inside Corners: Prepare and treat using methods recommended by manufacturer.

H. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to manufacturer's written instructions and recommendations and ASTM D 6135 (for sheet membrane).

3.03 INSTALLATION - SEMI-LIQUID SYSTEM

A. General

1. Comply with manufacturer's instructions and details, except where more stringent requirements are indicated or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.

2. Terminate membranes above wearing surface as indicated and where concealed by subsequent finish materials. Where concealment is not possible, terminate slightly below wearing surface (approximately ½”).

B. Flashing

1. Install elastomeric flashing sheets at terminations of waterproofing membrane according to manufacturer's written instructions.

2. Prime substrate with surface conditioner.

3. Install elastomeric flashing sheet and adhere to deck and wall substrates in a layer of hot rubberized asphalt.

4. Extend elastomeric flashing sheet up walls or parapets a minimum of 8 inches above and 6 inches onto deck to be waterproofed.

5. Install termination bars and mechanically fasten to top of elastomeric flashing sheet at terminations and perimeter of waterproofing.

C. Membrane

1. Apply surface conditioner, at manufacturer's recommended rate, over prepared substrate and allow to dry.

2. Heat and apply rubberized asphalt according to manufacturer's written instructions.
3.04 INSTALLATION - SHEET MEMBRANE SYSTEM

A. General

1. Comply with manufacturer's instructions and details, except where more stringent requirements are indicated or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.

2. Terminate membranes above wearing surface as indicated and where concealed by subsequent finish materials. Where concealment is not possible, terminate slightly below wearing surface (approximately ½").

B. Comply with ASTM D6135.

C. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.

D. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch- minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight installation.

   1. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F.

E. Horizontal Application: Apply sheets from low to high points of decks to ensure that laps shed water.

F. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.

G. Seal edges of sheet-waterproofing terminations with mastic.
H. Install sheet-waterproofing and auxiliary materials to tie into adjacent waterproofing.

I. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches beyond repaired areas in all directions.

J. Immediately install protection course with butted joints over waterproofing membrane.

3.05 INSTALLATION – UNDER SLAB SHEET MEMBRANE

A. Preparation: As recommended by membrane manufacturer. Compact substrate as specified in Division 31, Earthwork. Remove loose aggregate or sharp protrusions. Fill gaps or voids greater than ½”. Remove standing water prior to membrane applications.

B. Installation: In accordance with manufacturer’s instructions.

3.07 INSTALLATION OF DRAINAGE AND PROTECTION ASSEMBLY

A. Exposed Waterproofing System: Provide protection assemblies as follows:

1. Horizontal Surfaces: After all curing, testing and repair work is complete, install protection/drainage board assembly as follows:
   a. Install drainage panels over membrane, with tight butt joints and completely covering membrane. Adhere with adhesive as recommended by panel manufacturer.
   b. Overlap fabric onto previous panel. Adhere overlapped filter fabric with tape or mastic as recommended by manufacturer.
   [c. Place pavers and pedestals over insulation and protection/drainage board.]

2. Vertical Surfaces
   a. Elevator Pit Walls: After all curing and repair work is complete and prior to backfilling, install one layer of 1/4” thick protection board over membrane, placing boards with tight butt joints and completely covering membrane.
   b. All Other Walls
      1) After all curing and repair work is complete and prior to backfilling, install one layer of drainage/protection board over membrane, placing boards as recommended by manufacturer with tight butt joints and completely covering membrane.
      2) Rigid Insulation: Provide rigid insulation in addition to drainage/protection board. See Section 07 21 00.
   c. Do not nail or otherwise penetrate membrane to attach protection boards. Use suitable adhesive compatible with membrane.

3.11 CLEANING, PROTECTION AND REPAIR
A. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

B. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

END OF SECTION
PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: Provide saline water-repellent treatment for the following exterior exposed surfaces:
   1. New exterior cast-in-place concrete work including, but not limited to, the following:
   2. Paving, walks, slabs, walls and curbs subject to deicing salts.

1.2 PERFORMANCE REQUIREMENTS

A. General Performance: Water repellents shall meet performance requirements indicated without failure due to defective manufacture, fabrication, or installation.

B. Water Repellents: Comply with performance requirements specified, as determined by preconstruction testing on manufacturer's standard substrate assemblies representing those indicated for this Project.

C. Masonry: Water leakage values for treated masonry surfaces shall exhibit no leakage, when compared to similar untreated masonry surfaces when tested in accordance with ASTM C 1338.

D. Concrete: Water absorption values for treated concrete surfaces shall not exceed 1 percent moisture after 48-hour submersion in water, when compared to similar untreated concrete surfaces with approximately 4.8 percent moisture after 48-hour submersion in water, according to ASTM C 642.

E. No surface staining, discoloration, darkening or texture change is permitted as a result of treatment used.

F. Treatment shall allow treated substrates to retain vapor permeability.

G. Not detrimental to asphalt based products.

1.3 PRECONSTRUCTION TESTING

A. Preconstruction Testing: Installed water repellents shall comply with performance requirements indicated, as evidenced by reports of tests performed on manufacturer's standard substrate assemblies by a qualified testing agency.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For each type of water repellent and substrate indicated.

C. Product certificates.


E. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer: Firm with at least three years of successful experience in application of water repellents of types required on substrates similar to those of this project; authorized by manufacturer and approved by Landscape Architect.
B. Preinstallation Conference: Conduct conference at Project site.

C. Field Sample:
   1. Where directed by Landscape Architect, apply water repellent to test area of each type of material required to receive water repellent, including specified sample panels and mock-ups. Comply with installation requirements of this Section. Application to test effectiveness, confirm application rate and visual appearance of surfaces after treatment, and be representative of product's effect. Obtain Landscape Architect's approval before proceeding with installation.
   2. Test for effectiveness of water-repellent treatment minimum 5 days after application by flooding with fresh water or using suitable water absorption measuring device.
   3. Test compatibility of coated masonry flashing.

D. Mockups: Apply water repellent to each type of substrate required.
   1. Locate each test application on concrete mock-ups as directed by Landscape Architect.
   2. Final approval by Landscape Architect of water-repellent application will be from test applications.

1.6 PROJECT CONDITIONS

A. Limitations: Proceed with application only when the following existing and forecasted weather and substrate conditions permit water repellents to be applied according to manufacturers' written instructions and warranty requirements.

B. Revise subparagraphs below for specific material required or if manufacturer has established different limitations.

C. Concrete surfaces and mortar have cured for not less than 28 days.
   1. Ambient temperature is above 40 deg F (4.4 deg C) and below 100 deg F (37.8 deg C) and will remain so for 24 hours.
   2. Substrate is not frozen and substrate-surface temperature is above 40 deg F (4.4 deg C) and below 100 deg F (37.8 deg C).
   3. Rain or snow is not predicted within 24 hours.
   4. Not less than 24 hours have passed since surfaces were last wet.
   5. Windy conditions do not exist that might cause water repellent to be blown onto vegetation or surfaces not intended to be treated.

D. Protection:
   1. Protect plants and vegetation from overspray.
   2. Protect asphalt-based materials.
   3. Verify compatibility with all adjacent materials. Obtain letters from respective manufacturers indicating no objection to contact between water repellent and their product. Advise Landscape Architect of conflicts and provide suitable protection to susceptible materials. Investigate the following:
      a. Roof membrane and flashings.
      b. Waterproof membranes.
      c. Glazing systems including glass, framing, and glazing sealants.
      d. Sealants.

1.7 WARRANTY PROPOSAL

A. Submit for Owner's consideration, proposal for manufacturer to provide 5-year labor and materials warranty covering the work. Proposal to fully describe all terms and associated costs. Work to be furnished by the Owner to be fully described. Include sample warranty form.

1. Submit proposal with bid.

PART 2 – PRODUCTS

2.1 MATERIALS
A. Concrete Pavement Surfaces:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide WR Meadows, Inc. “SEAL CURE 309-25”
   2. Comparable product approved by Landscape Architect during concrete mock-ups.
   3. Finish: Semi-Gloss finish
   4. Locations:
      a. Exposed surfaces of concrete paving.

B. Other Concrete Surfaces:
   a. Basis-of-Design Product: Subject to compliance with requirements, provide WR Meadows, Inc. “SEAL CURE 309-25”
   b. Comparable product approved by Landscape Architect during concrete mock-ups.
   c. Finish: Semi-Gloss finish
   d. Locations:
   e. Rest of concrete surfaces

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements and conditions affecting performance of the Work.
   1. Verify that surfaces are clean and dry according to water-repellent manufacturer’s requirements. Check moisture content in representative locations by method recommended by manufacturer.
   2. Inspect for previously applied treatments that may inhibit penetration or performance of water repellents.
   3. Verify that there is no efflorescence or other removable residues that would be trapped beneath the application of water repellent.
   4. Verify that required repairs are complete, cured, and dry before applying water repellent.

B. Test pH level according to water-repellent manufacturer’s written instructions to ensure chemical bond to silica-containing or siliceous minerals.

3.2 PREPARATION

A. Cleaning: Before application of water repellent, clean substrate of substances that could impair penetration or performance of product according to water-repellent manufacturer’s written instructions.

B. Coordination with Mortar Joints: Do not apply water repellent until pointing mortar for joints adjacent to surfaces receiving water-repellent treatment has been installed and cured.

C. Coordination with Sealant Joints: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.
   a. Water-repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent and sealant materials identical to those required.

3.3 WATER REPELLENT APPLICATION

A. Manufacturer’s Field Service: Engage a factory-authorized service representative to inspect the substrate before application of water repellent and to instruct Applicator on the product and application method to be used.

B. Apply a heavy-saturation coating of water repellent, on surfaces indicated for treatment, using low-pressure spray to the point of saturation. Remove excess material; do not allow material to puddle beyond saturation. Comply with manufacturer’s written instructions for application procedure unless otherwise indicated.
C. Apply a second saturation coating, repeating first application. Comply with manufacturer's written instructions for limitations on drying time between coats and after rainstorm wetting of surfaces between coats. Consult manufacturer's technical representative if written instructions are not applicable to Project conditions.

3.4 CLEANING

A. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses. Correct damage to work of other trades caused by water-repellent application.

B. Comply with manufacturer's written cleaning instructions.

END OF SECTION
SECTION 07 21 00

THERMAL INSULATION

PART 1   GENERAL

1.01  WORK INCLUDED
   A. Insulated sheathing at exterior and masonry veneer walls.
   B. Perimeter and under slab insulation.
   C. Spray polyurethane foam insulation.
   D. Glass fiber blanket wall insulation.
   E. Sound attenuation blankets in stud/gypsum board walls.
   F. Spandrel glass/curtainwall insulation.

1.02  RELATED SECTIONS
   A. Wood Nailers: Section 06 10 50.
   B. Roof Insulation: Section 07 54 23.
   C. Firestopping (Safing): Section 07 84 00.

1.03  SUBMITTALS
   A. Product Data: Submit for all items.
   B. Spray Foam Insulation Qualification Data: For qualified installer.

1.04  QUALITY ASSURANCE
   A. Insulation Thermal Properties: Thermal conductivity k-factors and thermal resistance R-values indicated are values at 75 degrees F., mean temperature.

   1. Where insulation is identified by R-value, provide thickness required to achieve indicated R-value. Foam insulation R-values are "aged" thermal values in accordance with LTTR – Long Term Thermal Resistance predicted by ASTM C1289.

   B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver insulation materials in manufacturer's original, unopened, and labeled packages.

B. Store insulation materials at the site inside storage trailers or the building in a dry, ventilated place. Exterior storage not permitted. Comply with manufacturer's recommendations for handling and protection during installation.

C. Remove fibrous batt insulation that has become wet before or after installation. Replace with new, dry insulation.

D. Protect plastic insulation from excessive exposure to sunlight. Protect at all times against ignition. Complete installation and covering of plastic insulation materials as rapidly as possible in each area of work.

PART 2 PRODUCTS

2.01 RIGID BOARD INSULATION - POLYSTYRENE

A. Extruded-Polystyrene Board Insulation: ASTM C578, Type IV, 25 psi, 1.6 p/cf.; maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.

B. Thicknesses: Provide the following unless otherwise indicated on the drawings.
   1. Perimeter/Under Slab Application: 2 inch.

C. Adhesive: Types as recommended by insulation manufacturer for substrates and substrate coating materials where applicable.

D. Manufacturer: Subject to compliance with requirements, provide products by DOW CHEMICAL - DUPONT Styrofoam; OWENS CORNING Foamular; KINGSPAN GreenGuard; DIVERSIFOAM PRODUCTS Certifoam

2.02 GLASS-FIBER BLANKET INSULATION

A. Type: Glass fiber blanket designed to friction fit with metal. Manufacturers standard lengths; widths as required to fit framing conditions. Provide facings as follows:
   1. Unfaced: Conform to ASTM C665 Type I, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E84; passing ASTM E 136 for combustion characteristics.
   2. Kraft Facing: Areas where insulation is not exposed (concealed behind gypsum board). Conform to ASTM C665 Type II, Class C, Category 1.
   3. Flame Resistant Foil Facing: Areas where insulation is exposed (not covered by gypsum board or concealed interstitial space between faced
insulation and gypsum wall board face). Conform to ASTM C665 Type III, Class A, Category 1; flame-spread index of 25 or less.

B. Thickness: As indicated.

D. Manufacturer: Subject to compliance with requirements, provide products by JOHNS MANVILLE, OWENS-CORNING FIBERGLASS, CERTAINTEED, GUARDIAN BUILDING PRODUCTS or KNAUF INSULATION.

E. Tape: Type as approved by insulation manufacturer.

2.03 SOUND ATTENUATION BLANKETS

A. Type: Unfaced semi-rigid mineral fiber or glass fiber blankets. Conform to ASTM C665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

B. Thickness: 3 inch, unless otherwise indicated.

C. Manufacturer: Subject to compliance with requirements, provide products by JOHNS MANVILLE; THERMAFIBER, OWENS-CORNING FIBERGLAS, CERTAINTEED, ROXUL or FIBREX.

2.04 SPANDREL GLASS/CURTAINWALL INSULATION

A. Manufacturer: Subject to compliance with requirements, provide products by JOHNS MANVILLE, OWENS-CORNING FIBERGLAS, CERTAINTEED, GUARDIAN BUILDING PRODUCTS or KNAUF INSULATION; fiberglass insulation with factory-applied facing.

B. Type: Unfaced, Glass-Fiber Board Insulation: ASTM C 612, Type IA; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E84, passing ASTM E136 for combustion characteristics.

1. Nominal density of 2.25 lb/cu. ft., thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F.
2. Thickness: As indicated on drawings.

C. Foil-Faced, Glass-Fiber Board Insulation: ASTM C612, Type IA; faced on one side with foil-scrim-kraft or foil-scrim-polyethylene vapor retarder, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E84.

1. Nominal density of 2.25 lb/cu. ft., thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F.
2. Thickness: As indicated on drawings.

D. Dark-Surfaced, Glass-Fiber Board Insulation: ASTM C612, Type IA; faced on one side with black glass-fiber mat or black polymer finish; maximum flame-
spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E84.

1. Nominal density of 2.25 lb/cu. ft., thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F.
2. Thickness: As indicated on drawings.

2.06 SPRAY POLYURETHANE FOAM INSULATION

A. Closed-Cell Type

1. Material: ASTM C1029, Type III, closed cell polyurethane foam insulation containing no CFC’s, HCFC’s and VOC’s.
2. Physical Properties
   a. Density (ASTM D1622): Minimum 2.0 pcf
   b. Closed cell content (ASTM D6226): >90%
   c. Thermal Conductivity: R-Value = 6.4/inch. R-values are "aged" thermal values in accordance with PIMA Bulletin #101 and RIC/TIMA Bulletin #281-1 conditioning procedures
   f. Fire performance in accordance with ASTM E84 and UL 723 flame spread 25 or less and smoke development 450.
3. Thickness: As indicated or as required to fill voids where applicable.
4. Primer: Type as recommended by insulation manufacturer for adjacent and substrate surfaces. Ensure adjacent wall framing members are not deflected after installation and cure.
5. Where foam insulation is left exposed to building interior, provide approved 15 minute thermal or ignition barrier meeting the requirements of NFPA 286 and IBC Section 2603.4 (minimum ½" gypsum board, intumescent coating or similar code complying material).
   a. Bonding Agent: Provide suitable agent to ensure adequate bond between spray foam insulation and thermal barrier.
6. Transition Membrane between Air Barrier Membrane and Roofing and Other Adjacent Materials: As recommended by manufacturer and comply with both air barrier manufacturer’s recommendations and roofing material manufacturer’s recommendations (as applicable).
7. Manufacturers: Subject to compliance with specified requirements, provide products by HENRY, DOW - DUPONT, JOHNS MANVILLE, BASF, CERTAINTEED, GACO-WESTERN or ICYNENE.

2.08 INSULATED SHEATHING

A. Material: Polyisocyanurate, foil faced, conforming to ASTM C1289, Type I, Class 1 or 2, minimum density 1.9 pcf.; foam-plastic core and facings shall have a flame-spread index of 25 or less when tested individually.

3. Water Absorption – ASTMC206: Maximum 0.05% by volume.
4. Water Vapor Permeance – ASTM E96: <0.03 perms.

B. Thickness: As indicated.

C. Fasteners and Adhesive: Types as recommended by insulation manufacturer.

D. Manufacturer: Thermax DOW CHEMICAL - DUPONT; Energy Shield by ATLAS ROOFING; Isoshield Silver by APACHE PRODUCTS; AP Foil by JOHNS MANVILLE; R-MAX Ecomax: Xci by HUNTER.

PART 3 EXECUTION

3.01 PREPARATION

A. Examine substrates and installation conditions. Do not proceed with insulation work until unsatisfactory conditions have been corrected.

B. Verify substrate surfaces are dry and free of irregularities or substances harmful to insulation. Clean substrates of substances that are harmful to insulation or that interfere with insulation attachment.

C. Verify mechanical and electrical services within walls have been installed and tested.

D. Fill miscellaneous voids and spaces in wall framing and at window and door framing with batt insulation loosely stuffed in place.

E. Spray-On and Spray Foam Insulations: Provide masking, drop cloths or other satisfactory coverings for all materials/surfaces which are not to receive insulation to prevent damage from overspray.

3.02 INSTALLATION OF RIGID BOARD INSULATION - CAVITY WALL

A. Place insulation horizontally within cavity between brick and concrete block. Place on exterior surface of concrete block.

B. Place to ensure tight joints between all insulation panels installed.

C. Use manufacturer's suggested adhesive to bond the insulation panel to the concrete block wall.

D. Place insulation panels to clear wall ties, yet maintain a tight joint between the panels.


F. Use type of fasteners and space fasteners as recommended by insulation board manufacturer.
3.03 INSTALLATION OF RIGID BOARD INSULATION - PERIMETER INSULATION

A. Place at all slab-on-grade conditions at building perimeter.

B. Adhere to substrate as required to maintain insulation in final location prior to backfilling.

C. Coordinate placement of insulation with placement of vapor barrier. See Section 07 26 00.

3.04 INSTALLATION OF BLANKET/BATT INSULATION

A. Install blanket type insulation with tight fitting butt joints. Provide supplementary support at vertical and horizontal installations when required to maintain insulation in permanent proper location.

1. Spot adhere insulation to inside face of exterior sheathing or similar back-up material as required to maintain insulation in its proper location.

B. Fit insulation between members.

C. Locate facing to room side, where applicable.

D. Install interior wall sound attenuation at interior partitions where indicated on floor plans or wall types.

3.07 INSTALLATION SPANDREL GLASS/CURTAINWALL INSULATION

A. In Curtainwall Frames at Spandrel Glass

1. Install insulation board behind spandrel glass. Leave 2" space between glass and insulation, unless otherwise detailed.

2. Screw-attach aluminum clip angles to storefront frames at 16" on centers.

3. Friction-fit the insulation between curtainwall frames against the clip-angles.

4. After insulation is properly fitted, apply a continuous piece of foil-scrim tape against insulation board and storefront frame.

5. Apply continuous tape over spliced joints in insulation (if any).

B. Coordinate with placement of perimeter fire safing. See Section 07 84 00.

3.07 SPRAY FOAM INSULATION

A. Prepare surfaces as recommended by insulation manufacturer. Remove substances from metal deck or other metal surfaces that will prohibit insulation/metal bond. Apply primer where required by manufacturer.

B. Spray-Applied Insulation: Install Spray-application of polyurethane foam in accordance with ULC S705.2 and the manufacturer’s instructions. Install in areas where indicated on the drawings. Fill all voids for a complete solid installation.
C. Trim, as needed, any excess thickness that would interfere with the application of cladding/covering system by other trades.

D. Clean-up all overspray from adjacent surfaces and floor.
END OF SECTION
SECTION 07 27 26

FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Fluid-applied vapor retarding air barrier.

1.02 RELATED SECTIONS

A. Gypsum Board Assemblies for wall sheathings and wall sheathing joint-and-penetration treatments: Section 09 21 16.

B. Building Insulation for foam-plastic board insulation: Section 07 21 00.

C. Joint Sealants for joint-sealant materials and installation: Section 07 92 00.

D. Through-Wall –Flashing Membrane: Section 04 00 00.

1.03 DEFINITIONS

A. ABAA: Air Barrier Association of America.

B. Air Barrier Assembly: The collection of air barrier materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.04 REFERENCES

A. The following standards are applicable to this section:


3. ASTM E1677 Specification for Air Retarder (AR) Material or System for Low-Rise Framed Building Walls


1.06 SUBMITTALS

A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of air barrier.

B. Shop Drawings: Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strip, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction. Include details of interfaces with other materials that form part of air barrier. Include details of mockups.

C. Product Certificates: For air barriers, certifying compatibility of air barrier and accessory materials with Project materials that connect to or that come in contact with the barrier; signed by product manufacturer.

D. Qualification Data: For Applicator.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barriers.

1.07 QUALITY ASSURANCE

A. Applicator Qualifications: A firm experienced in applying air barrier materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Mockups: Before beginning installation of air barrier, apply air barrier to masonry mock-up constructed under section 04 00 00 to demonstrate surface preparation, crack and joint treatment, and sealing of gaps, terminations, and penetrations of air barrier membrane.

1. Coordinate construction of mockup to permit inspection by testing agency of air barrier before external insulation and cladding is installed.
2. Include junction with foundation wall intersection.
3. If Architect determines air barrier applications to mockups do not comply with requirements, reapply air barrier until approved.

C. Preinstallation Conference: Conduct conference at Project site.

1. Include installers of other construction connecting to air barrier, including roofing, waterproofing, architectural precast concrete, masonry, sealants, windows, glazed curtain walls, and door frames.
2. Review air barrier requirements including surface preparation, substrate condition and pretreatment, minimum substrate curing period, forecasted weather conditions, special details and sheet flashings, mockups, installation procedures, sequence of installation, testing and inspecting procedures, and protection and repairs.
D. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations and where applicable, tie-ins to installed waterproofing], and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by air barrier manufacturer.

B. Remove and replace liquid materials that cannot be applied within their stated shelf life.

C. Store rolls according to manufacturer's written instructions.

D. Protect stored materials from direct sunlight.

1.09 PROJECT CONDITIONS

A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air barrier manufacturer. Protect substrates from environmental conditions that affect performance of air barrier. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

1.10 WARRANTY

A. Submit manufacturer's 10 year material warranty.

PART 2 PRODUCTS

2.01 FLUID-APPLIED MEMBRANE AIR BARRIER – TYPE 1

A. Class 1 Fluid-Applied, Vapor-Retarding Membrane Air Barrier: Cold-applied, elastomeric membrane.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. HENRY COMPANY; Air-Bloc 16MR.
   b. CARLISLE COATINGS & WATERPROOFING; Barriseal.
   c. MEADOWS, W. R., INC.; Air-Shield LM.
   d. STO CORPORATION; Sto Guard Vapor Seal.
   e. RUBBER POLYMER CORP. Rub-R-Wall Airtight.
   f. BASF Enershield – I
   g. Subject to compliance with the specified performance requirements, products manufactured by others are acceptable upon Architects
2. Physical and Performance Properties
   a. Air Permeability ASTM E2178: 0.004 cfm / ft² @ 1.57 lbs / ft² and have no increased air leakage when subjected to a sustained wind load of 10.5 lbs/ft² for 1 hour and gust wind load pressure of 62.8 lbs/ft² for 10 seconds when tested at 1.6 lbs/ft² to ASTM E331
   b. Water vapor permeance: 0.09 perms to ASTM E96
   c. Wet Film Thickness: Per manufacturer as required to achieve performance and code compliance.
   d. Surface Burning: ASTM E 84 Class A flame spread and smoke developed.

B. Self-adhering transition membrane: SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film. Membrane shall have the following physical properties:
   1. Air leakage: <0.0001 CFM/ft² @ 1.6 lbs/ft² to ASTM E283
   2. Vapor permeance: 0.05 perms to ASTM E96
   3. Membrane Thickness: 0.0394” (40 mils)
   4. Low temperature flexibility: -22 degrees F to CGSB 37-GP-56M
   5. Elongation: 200% to ASTM D412-modifed

2.02 AUXILIARY MATERIALS

A. Primer and block filler: Liquid waterborne or solvent-borne primer recommended for substrate by manufacturer of air barrier material.

B. Through-Wall Flashing and Transition Membrane (Self-Adhering): SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film. Membrane shall have the following physical properties:
   1. Membrane Thickness: 0.0394 inches (40 mils)
   2. Film Thickness: 4.0 mils
   3. Flow (ASTM D5147): Pass @ 212 degrees F
   4. Puncture Resistance: 134 lbf to ASTM E154
   5. Tensile Strength (film): 5723 psi ASTM D882
   6. Tear Resistance: 13lbs. MD to ASTM D1004
   7. Low temperature flexibility: -22 degrees F to CGSB 37-GP-56M

C. Joint Reinforcing Strip: Air barrier manufacturer's glass-fiber-mesh tape.

D. Substrate Patching Membrane: Manufacturer's standard trowel-grade substrate filler.

E. Adhesive and Tape: Air barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.

F. Stainless-Steel Sheet: ASTM A240, Type 304, 0.0187 inch thick, and Series 300 stainless-steel fasteners.

G. Sprayed Polyurethane Foam Sealant: 1- or 2-component, foamed-in-place,
polyurethane foam sealant, 1.5 to 2.0 lb/cu. ft density; flame spread index of 25 or less according to ASTM E162; with primer and non-corrosive substrate cleaner recommended by foam sealant manufacturer.

H. Preformed Silicone-Sealant Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates.

I. Joint Sealant: ASTM C920, single-component, neutral-curing silicone; Class 100/50 (low-modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O. Comply with Section 07 92 00.

J. Other materials as recommended by barrier manufacturer for a complete air and water tight barrier.

**PART 3 EXECUTION**

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.

1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
2. Verify that concrete has cured and aged for minimum time period recommended by air barrier manufacturer.
3. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D4263.
4. Verify that masonry joints are flush and completely filled with mortar.
5. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 SURFACE PREPARATION

A. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.

B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate patching membrane.

E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

F. At changes in substrate plane, apply sealant or termination mastic beads at
sharp corners and edges to form a smooth transition from one plane to another.

G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

3.03 JOINT TREATMENT

A. Concrete and Masonry: Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C1193 and air barrier manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D4258 before coating surfaces.

1. Prime substrate and apply a single thickness of preparation coat strip extending a minimum of 3 inches along each side of joints and cracks. Apply a double thickness of air barrier membrane and embed a joint reinforcing strip in preparation coat.

B. Gypsum Sheathing: Fill joints greater than 1/4 inch with sealant according to ASTM C1193 and with air barrier manufacturer's written instructions. Apply first layer of fluid air barrier membrane at joints. Tape joints with joint reinforcing strip after first layer is dry. Apply a second layer of fluid air barrier membrane over joint reinforcing strip.

3.04 TRANSITION STRIP INSTALLATION

A. Install strips, transition strips, and auxiliary materials according to air barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.

1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.

2. Install transition strip so that a minimum of 3 inches of coverage is achieved over both substrates.

B. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Reprime areas exposed for more than 24 hours.

1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.

C. Connect and seal exterior wall air barrier membrane continuously to roofing membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

D. At end of each working day, seal top edge of strips and transition strips to
substrate with termination mastic.

E. Apply joint sealants forming part of air barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

F. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply manufacturer's recommended transition strip so that a minimum of 3 inches of coverage is achieved over both substrates. Maintain 3 inches of full contact over firm bearing to perimeter frames with not less than 1 inch of full contact.

1. Transition Strip: Roll firmly to enhance adhesion.
2. Elastomeric Flashing Sheet: Apply adhesive to wall, frame, and flashing sheet. Install flashing sheet and termination bars, fastened at 6 inches o.c. Apply lap sealant over exposed edges and on cavity side of flashing sheet.
3. Preformed Silicone-Sealant Extrusion: Set in full bed of silicone sealant applied to walls, frame, and membrane.

G. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air barrier membrane with foam sealant.

H. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.

I. Seal top of through-wall flashings [, specified in Section 04 00 00,] to air barrier with an additional 6-inch- wide, strip.

J. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.

K. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.

3.05 AIR BARRIER MEMBRANE INSTALLATION

A. Apply air barrier membrane to form a seal with strips and transition strips and to achieve a continuous air barrier according to air barrier manufacturer's written instructions.

B. Apply air barrier membrane within manufacturer's recommended application temperature ranges.

C. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Reprime areas exposed for more than 24 hours.

1. Prime glass-fiber-surfac ed gypsum sheathing with number of prime coats
needed to achieve required bond, with adequate drying time between coats.

D. Apply a continuous unbroken air barrier to substrates according to the following minimum thickness. Apply membrane in full contact around protrusions such as masonry ties.

1. Membrane Air Barrier: 40-mil dry film thickness or greater thickness as required to meet specified performance properties.

E. Apply strip and transition strip a minimum of 1 inch onto cured air membrane according to air barrier manufacturer's written instructions.

F. Do not cover air barrier until it has been tested and inspected by testing agency

G. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

3.06 FIELD QUALITY CONTROL

A. Inspections: Air barrier materials and installation are subject to inspection for compliance with requirements. Inspections may include the following:

1. Continuity of air barrier system has been achieved throughout the building envelope with no gaps or holes.
2. Continuous structural support of air barrier system has been provided.
3. Masonry and concrete surfaces are smooth, clean and free of cavities, protrusions, and mortar droppings.
4. Site conditions for application temperature and dryness of substrates have been maintained.
5. Maximum exposure time of materials to UV deterioration has not been exceeded.
6. Surfaces have been primed, if applicable.
7. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
8. Termination mastic has been applied on cut edges.
9. Strips and transition strips have been firmly adhered to substrate.
10. Compatible materials have been used.
11. Transitions at changes in direction and structural support at gaps have been provided.
12. Connections between assemblies (membrane and sealants) have complied with requirements for cleanliness, preparation and priming of surfaces, structural support, integrity, and continuity of seal.
13. All penetrations have been sealed.

B. Remove and replace deficient air barrier components and retest as specified above.

3.07 CLEANING AND PROTECTION
A. Protect air barrier system from damage during application and remainder of
   construction period, according to manufacturer's written instructions.

   1. Protect air barrier from exposure to UV light and harmful weather
      exposure as required by manufacturer. Remove and replace air barrier
      exposed for more than 60 days or install additional, full-thickness, air-
      barrier application after repairing and preparing the overexposed
      membrane according to air-barrier manufacturer's written instructions.

   2. Protect air barrier from contact with incompatible materials and sealants
      not approved by air barrier manufacturer.

B. Clean spills, stains, and soiling from construction that would be exposed in the
   completed work using cleaning agents and procedures recommended by
   manufacturer of affected construction.

C. Remove masking materials after installation.
**SECTION 07 42 13.23**

**METAL COMPOSITE MATERIALS WALL PANELS**

**PART 1 GENERAL**

1.01 SCOPE OF WORK

A. Provide all labor, materials, equipment, and services necessary for the installation of a preformed metal wall panel system, complete and weather tight. Work shall include but not be limited to panels, stiffeners, fasteners, and weather seals required for a complete installation of panels to the support system provided for this scope of work.

1. Furnish and install a preformed, prefinished composite wall panel system
2. Accessory items such as panel subgirt system, clips, flashings, sealants, and gaskets.
3. Integral coping system

B. Shop Fabricated MCM Rout and Return Dryjoint System: Incorporating a pressure equalized system on a complete air and vapor seal, allowing air and vapor which enters the panel chamber to drain to the exterior of the wall, and allowing air into the pressuring chamber to provide instantaneous pressure equalization. Vents and drain holes shall be inconspicuously located and in such positions as not to contribute to staining, streaking or marking of the panel face.

1.02 RELATED SECTIONS

A. Miscellaneous Steel Framing: Section 05 50 00.
B. Cold-Formed Metal Framing: Section 05 40 00.
C. Sealant: Section 07 90 00.
D. Aluminum Curtainwall: Section 08 44 13.

1.03 DESIGN AND PERFORMANCE CRITERIA

A. General Performance: Wall panel assemblies shall comply with performance requirements without failure due to defective manufacturing, fabrication, installation, or other defects in construction.

1. Design, fabricate, and erect a pressure equalized wall panel system to meet the requirements of AAMA 508-7

B. Metal panel system: Designed by manufacturer so that attachment allows panels to successfully accommodate seismic and thermal movement without causing “oil-canning”, undue stress on fasteners, or failure of weather seals.
C. Structural Performance: Provide metal wall panel assemblies capable of withstanding the effects of the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 330.

2. Deflection Limits: Metal wall panel assemblies shall withstand wind loads with horizontal deflections no greater than 1/180 of the span.

D. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E283 at the following test-pressure difference:


E. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:


F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss

1. Provide for free and noiseless thermal movement and structure deflection of components as may be caused by a temperature variation.

G. Individual panels shall be removable without disturbing adjacent panels.

H. Panels shall not warp or buckle when under full design loads.

I. All fastenings and connectors shall be concealed.

J. Fire Performance

1. ASTM E 84 Flame Spread Index must be less than 25, Smoke Developed Index must be less than 450.
2. ASTM D 1929 A self ignition temperature of 650°F or greater

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum of (5) years experience in the design and manufacturing of preformed metal wall panel systems with a minimum of (3) projects of similar size and scope of this project, utilizing this type of dry-joint composite panel system.

B. Single Source Quality Control - Metal panel system manufacturer: Provide all design, engineering, panel fabrication, and assembly of panel system in manufacturing facility.
C. Installer Qualifications: Minimum of (5) years experience in the installation of the specified panel system type, and be an authorized installer of the preformed metal panel system manufacturer.

D. Metal Panel System Tolerances

1. Maximum panel bow shall not exceed 2% of panel dimensions in width or length, with an overall maximum tolerance of .1875" within panel face.
2. Face of panel shall not vary in plane to any adjacent panel greater that 1/16".
3. Maximum 1/32" between mitered panel extrusions.

E. Painted Finishes: Performed by an applicator specifically approved by the paint manufacturer. The applicator shall provide written notification of approval by paint manufacturer prior to application of the finish.

F. Mock-Up Panels: Prior to proceeding with the composite wall panel system work, construct a mock-up of the panel system at the job site, for the Architect's review and approval, to establish the general construction and appearance of the installed system. Include horizontal and vertical joint conditions, extrusions and flashings. Provide required back-up structure representative of actual project substrate conditions.

1. Size of mock-up as required accommodating elements specified above. However, mock-up must be a minimum of 6' x 6'.

1.06 SUBMITTALS

A. Manufacturer's Certification: Submit written certification that metal panel system manufacturer has a minimum of (5) years experience in the design, engineering, and manufacturing of the type of panel system specified. Submit (3) reference projects of similar size and scope utilizing the specified type of panel system.

1. Qualification Data: For Installer.

B. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

C. Samples: Submit physical samples as follows

1. (4) 12” square panels mounted with specified system attachments, paint finish for composite panel and for perimeter extrusion
2. (2) 12” samples of each perimeter extrusion to be used
3. (6) paint samples from composite panel manufacturers and paint applicator for perimeter extrusion
4. (2) 12” samples of extruded internal system gaskets
5. (6) standard color charts for specified silicone sealant manufacturer

D. Shop Drawings: Submit complete metal panel system shop drawings with keyed plans, elevations, and sections. Specific details shall be included for all panel
conditions and all interfaces with all other exterior wall systems. Included coordinated details from shop drawings for other exterior wall systems. Drawings shall also indicate method of attachment, location of internal stiffeners and weather seals, and drainage method for perimeter extrusion system.

D. Structural Calculations: Submit structural calculations for the design and performance of the metal panel system, including specified and building code windloads, deflections, in-place stresses, and capacity of fasteners. Calculations and submittal drawings shall be stamped by a Professional Engineer licensed in the State Of Ohio.

E. Sealant Adhesion Testing: Submit sealant manufacturer’s adhesion test results and recommendations for surface preparation to fluoropolymer paint finish.

1.07 WARRANTY

A. Special Warranty: Manufacturer’s standard form in which manufacturer agrees to repair or replace components of metal composite material panel systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
2. Structural failures including rupturing, cracking, or puncturing.
3. Deterioration of metals and other materials beyond normal weathering.
4. Warranty Period: Two years from date of Substantial Completion.

A. Special Warranty on Panel Finishes: Manufacturer’s standard form in which manufacturer agrees to repair finish or replace metal composite material panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
   a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS/FABRICATORS

A. Panel Manufacturers: Alucobond by 3A COMPOSITES USA, Reynobond by REYNOLDS METALS COMPANY, Larson by ALUCOIL, Alpolic by MITSUBISHI, CITADEL ARCHITECTURAL PRODUCTS or CHEMICAL AMERICA.

B. Panel System Fabricators/Installers: Provide rout and return dry-joint metal composite system designed and fabricated by the metal panel systems specified in paragraph 2.01A or by fabricators certified by the panel manufacturers. All
panel fabricators’ systems must meet the specified design and performance requirements and conform to the design intent indicated on the drawings.

1. **Basis of Design Fabricator - Panel System:** CENTRIA?
   
   ROYALTECH 3000.

### 2.02 MATERIALS

#### A. Panels: General Description

Two sheets of alloy AA3000 Series aluminum (0.019" thick) sandwiching a non-combustible core formed in a continuous process.

1. Thickness: .157" nominal.
2. Weight: 1.16 lbs/sf
3. Core: Manufacturers standard

4. **Tolerances**
   
   a. Panel Bow: Maximum 0.8% of any 72" panel direction.
   
   b. Deviation from Flatness: Maximum 1/8" in 60" in any direction for assembles unit; non-accumulative.

#### B. Metal Panel Subgirt System

Type, size quantity and spacing of all connectors, supporting track, girts, fasteners and other hardware and anchorage devices for panels as required to suit specified standards.

1. Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal composite material panel system.

#### C. Fasteners

Subgirt and panel fasteners shall be non-corrosive type as recommended by panel system manufacturer. Size and spacing shall be as required by structural calculations.

#### D. Providing matching custom factory-fabricated integral companion flashing, trims, end caps and finishing components from same material as the aluminum building panels.

### 2.03 FABRICATION

#### A. Machine fabricated all material in accordance with reviewed shop drawings with straight lines, square corners or smooth bends, free from twists, kinks, warps, dents, and other imperfections which may affect appearance or serviceability.

1. Fabricate panels to sizes and configurations as indicated on drawings. All panel joints shall occur exactly where indicated on drawings

#### B. Provide reinforced panels as required to meet the tolerances specified above.

#### C. Panels shall be aligned with no lap or reveal other than joint width to permit expansion and contraction.
D. Thickness of the metal and details of assembly and support shall provide sufficient strength and stiffness to resist distortion of finish surface. Exposed edges and ends of metal shall be dressed smooth, free from sharp edges and with no uniform minimum radius corners. Connections and joints exposed to weather shall be constructed to exclude water.

E. All necessary holes shall be drilled and clip attachments applied before application of finish.

F. Design and fabricate appropriate type, size, quantity and spacing of all sub-connectors, girts, fasteners and other anchorage devices as required to suit the specified standards.

G. Subgirts shall be perforated at regular intervals to permit drainage of cavity.

H. Panel stiffeners required for flatness and deflection shall be applied to the panel with structural silicone and compatible glazing tape.

I. Field fabrication of panels is not permitted.

2.03 PAINT FINISHES

A. Finishes

1. Exterior Face Sheet: Fluoropolymer finish containing not less than 70% PVDF (Kynar 500) resins; "Trinar" by AKZO; "Duranar" by PPG; "Fluropon" by VALSPAR. Total dry film thickness not less than 1.0 mils, or coatings meet or exceed the requirements of AAMA 2605.
   a. Color: Shop applied woodgrain coating.

2. Application: Apply coating systems in strict accordance with manufacturer's printed instructions and recommendations.

3. Strippable coating shall be clear color, 2-1/2 mils thick, applied to all exterior face sheet materials after finish painting and prior to embossing and roll forming.

4. Interior Face Sheet: White polyester paint suitable for field finish painting.

5. Trim: Extruded aluminum; finish to match panels.

B. To optimize panel finish uniformity, complete exterior panel elevations shall be finished from the same paint batch, in the same production run, utilizing directional arrows for consistency of application.

PART 3 EXECUTION

3.01 PRE-INSTALLATION CONFERENCE

A. Not less than two weeks before starting installation of materials in the section, the contractor will convene a meeting at project site with Architect, Construction Manager, Owner’s representative, Contractor installer foreman/superintendent, material manufacturer’s representative, and mechanical and electrical trades. Review project requirements, required submittals, status of substrate work, areas of potential conflict and interference, availability of materials, installer's personnel, equipment and facilities, construction schedule, weather and
forested weather conditions, and coordinate methods, procedures and sequencing requirements for proper installation, integration and protection of the work.

B. Examine substrates, areas, penetrations and conditions, for compliance with requirements for installation tolerances, metal composite material panel supports, and other conditions affecting performance of the Work.

3.02 INSTALLATION

A. Panel system installer shall be authorized by the metal panel system manufacturer and familiar with the specific details required for this project

B. Provide at least (1) person to be present at all times who is capable of providing layout for the metal panel system. Notify Architect of any dimensional discrepancies that may affect panel system installation.

C. Install metal panel system in accordance with fabricator's instructions and recommendations and the approved shop drawings for the project.

D. Install panel system to subgirt system with specified fasteners and within specified tolerances for joinery, level, and plumb.
   1. Maximum offset from true alignment of adjacent panels installed butting or in line shall by 1/16”.
   2. Panel to panel joints shall not vary greater than 1/16” of the joint size indicated on drawings.

E. Where required, install sealant with proper joint backing.
SECTION 07 46 10

METAL SIDING

PART 1   GENERAL

1.01   WORK INCLUDED

A. Provide metal exterior soffit/ceiling system consisting of interlocking metal plank panels, subframing, fasteners, trim, flashing and accessories for a complete installed assembly.

1.02   SUBMITTALS

A. Manufacturer's Data: Submit 2 copies of manufacturer's specifications and installation instructions for each component of the exterior ceiling system. Include reports and other data as may be required to show compliance with these specifications.

B. Shop Drawings: Submit for all items. Include the following:

1. Panel profile and gage.
2. Erection layout.
3. Openings.
4. Special framing details.

C. Maintenance Instructions: Submit manufacturer's recommendations for removal, replacement and cleaning of each component system of the ceiling system. Include precautions against materials and methods which may be detrimental to finishes.

D. Samples: Submit minimum 9" long by full width sample of panel showing finish, pattern, color, gage and profile.

1.03   QUALITY ASSURANCE

A. For the purpose of establishing minimum aesthetic, functional and quality standards for the work of this section, proprietary standards are specified.

B. The manufacturer, referred to as "Fabricator" shall assume undivided responsibility for all components of metal panel work, and shall demonstrate not less than 5 years successful experience in fabrication and installation of metal panel systems similar to work of this project.

C. Performance Test Standards: Provide metal panel systems which have been pretested and certified by manufacturer under installed conditions as indicated for
resistance as indicated to air and water infiltration and structural deflection and failure.

D. Qualifications of Installer: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section. The firm shall have not less than 5 years of successful experience in erection of metal panel systems similar to system required for this project.

E. Painted Finishes: Factory painted finish to be performed by an applicator specifically approved by the paint manufacturer. The applicator shall provide written notification of approval by paint manufacturer prior to application of the finish.

F. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:

1. Wind Loads: As indicated on Drawings.

G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, over stressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1.04 JOB CONDITIONS

A. System Layout: Coordinate layout with other work which penetrates or supported by the exterior wall system.

B. Installer shall consult other trades and Contractors involved prior to start of ceiling work, to determine areas of potential interference. Do not start installation until interference has been resolved to the satisfaction of the Installer.

1.07 WARRANTY

A. Prior to initial payment, metal wall panel manufacturer shall furnish the Owner with a written manufacturer's warranty certifying that all wall panel work was furnished and installed in complete accordance with the Contract Documents.

B. Manufacturer's warranty shall certify that the installation will be free of defects in design and failures of materials, and construction.

1. Failure of materials or workmanship includes excessive deflections, deterioration of finish or construction in excess of normal weathering, and defects in joint sealants, and other components of the work.

C. Finish: Warranted for 20 years from date of substantial completion against:
1. Color change more than 5 NBS units as determined in accordance with procedures set forth in ASTM D2244.
2. Crack, peel or otherwise lose adhesion, the term "crack" not to include minute facing defects which may occur during fabrication of the coating building products.
3. Chalk in excess of ASTM rating #8; the chalk rating to be determined in accordance with procedures outlined in ASTM D4214.

D. Should defects development during the warranty period, such defects will be repaired by the metal panel manufacturer at no expense to the Owner.

**PART 2 PRODUCTS**

2.01 **MATERIAL**

A. Description: Nominal 6" wide panel; provide maximum length panels as practicable.

B. Material: 3004 alloy aluminum sheet .032" formed to interlocking shape specified.

C. Joints: Interlocking.

D. Finish: Fluoropolymer baked enamel finish with Kynar 500 (70%) resins by ELF ATOCHEM OF NORTH AMERICA INC.; "Trinar" by AKZO; "Duranar" by PPG; "Fluropon" by VALSPAR. Total dry film thickness not less than 1.0 mils, or coatings meet or exceed the requirements of AAMA 2605.

1. Color: Wood grain - As selected by Architect from manufacturer's complete specified line.
2. Application: Apply coating systems in strict accordance with manufacturer's printed instructions and recommendations.

E. Trim: Provide corners, terminations, wall angles, cut-out trim and miscellaneous trim as required to complete installation. Match siding material and finish.

F. Accessories

1. Sub-framing Shapes: Minimum 16 ga., galvanized steel; provide with slotted holes for plumb adjustment.
2. Flashings and Trim: Same material, gage and finish as adjacent panel material.

G. Fasteners: Manufacturer's standard items, conforming to the following minimums:

1. Material: Type 305 stainless steel.
2. Size: As required for structural attachment.

2.02 **MANUFACTURER**

A. Basis of Design: Drawings and specifications are based on PURE + FREEFORM
Horizontal Flush Panels by ATAS.

B. Other Manufacturers: Subject to specified requirements, siding systems manufactured by others are acceptable

2.03 FABRICATION

A. General: All components of metal wall panel system shall be of the materials, design, sizes and thickness shown on approved shop drawings and/or specified herein.

B. Joints in Metal Work: Carefully match all exposed work to produce continuity of line and design, with all joints, unless otherwise shown or specified, being accurately fitted and rigidly secured.

C. Protection of Metals: Provide protection against galvanic action wherever non-compatible metals are in contact.

PART 3 EXECUTION

3.01 EXAMINATION

A. After lines and grades have been established, and before beginning installation, examine all parts of the structure affecting the installation of the metal siding panels. Should conditions be found which, in installer's opinion, will prevent the proper execution of the metal siding panel work, installer shall report such conditions, in writing, to the General Contractor.

B. Installation work shall not proceed in that area until such conditions are corrected or adjusted to the satisfaction of the Installing Contractor.

3.02 INSTALLATION

A. Siding Install in accordance with manufacturer's recommendations.

1. Erect in accordance with the drawings and manufacturer's instructions and recommendations.

2. Erect sheets true and plumb, in alignment with horizontal and vertical edges of the building. Final appearance of the wall shall be visually flat, straight and free from defect.

3. Seal all panel/panel, panel/trim, and accessory/panel joints to provide resistance to specified water penetration.

B. Flashing

1. Install watertight, without waves, warps, buckles, fastening stresses, or distortion allowing for expansion and contraction.

2. Hem exposed edges.

3. Angle bottom edges of exposed vertical surfaces to form drips.
4. Hold down clips: Install as indicated or required.

C. Trim: Provide trim at corners, openings, panel terminations, and other areas indicated.

3.03 ERECTION TOLERANCES

A. Provided the clearances shown on approved shop drawings are maintained and supporting substructure is installed to proper tolerances, all parts of the metal siding system, when completed, shall be within the following tolerances:

1. Maximum variation from plane or location shown on approved shop drawings: 1/4" per 12' of length, or 1/2" in any total length.
2. Maximum offset from true alignment between two identical members abutting end-to-end in line: 1/8".

3.04 DAMAGED PANELS

A. Do not install panels that are bent, chipped, or otherwise damaged.

B. Refinish all abraded surfaces to match original finish, using materials and methods recommended by siding manufacturer. Materials shall be fully compatible with the original finish system.

C. Repaired surfaces shall be uniform and free from variations in color and surface texture from that of adjacent, like surfaces.

D. If repaired sheet is not acceptable to the Associate, remove sheet and replace with a new sheet, at no additional cost to the Owner.

3.05 REMOVAL OF DEBRIS

A. All debris caused by or incidental to the installation work shall be removed from the jobsite as the work progresses. Waste debris will not be permitted to accumulate.

3.06 CLEANING AND PROTECTION

A. Cleaning: Clean finished surfaces as recommended by panel manufacturer, and in accordance with Section 01 74 00 requirements.

1. Clean siding surfaces of dirt, grime and other surface blemishes.

B. Protection: Installer shall advise Contractor of protection and surveillance procedures, as required to ensure that work of this section will be without damage or deterioration at time of substantial completion.

END OF SECTION
This page intentionally blank
PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide a thermoplastic membrane roofing system as shown and specified. Work includes:

1. Adhered, single ply polyester reinforced thermoplastic polyolefin (TPO) membrane.
2. Insulation.
3. Cover board.
4. Flashing, pipe seals, and roofing accessories.
5. Installing roof flashings and sheet metal furnished under Section 07 62 00.
6. Membrane flashing under metal copings.

1.02 RELATED SECTIONS

A. Wood Blocking: Section 06 10 50.
B. Flashing and Sheet Metal: Sections 07 62 00.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: To participate as a qualified company in production of Elasto/Plastic materials, the company must have a minimum of five (5) years as the sole manufacturer of the brand name. Manufacturer shall also furnish notarized certification that he has been in business and had roofs installed for a minimum of five (5) years.

B. Installer Qualifications: An experienced roofing installer approved or licensed by roofing materials manufacturer and with not less than five (5) years of successful experience installing thermoplastic membrane roofing systems similar to those required for this project.

C. Manufacturer's representative shall conduct timely inspection of the roof installation to satisfy all warranty requirements.

D. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

E. Insulation Thermal Properties: Thermal conductivity k-factors and thermal resistance R-values indicated are values at 75 degrees F., mean temperature.

1. Where insulation is identified by R-value, provide thickness required to achieve indicated R-value. Foam insulation R-values are "aged" thermal values in accordance with LTTR – Long Term Thermal Resistance predicted by ASTM C1289.

1.04 PERFORMANCE REQUIREMENTS

A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.

B. Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

C. FM Approvals Listing: Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system, and that are listed in FM Approvals' "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals markings.

1. Fire/Windstorm Classification: Class 1A-90.
2. Hail Resistance: SH.

D. Fire Classification: U.L. Class A.

1.05 SUBMITTALS

A. Product Data: Submit for all items.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Include as a minimum the following:

1. Layout of roof showing sheet sizes and field joint locations.
2. Location and type of penetrations.
3. Perimeter, penetration and special details.
4. Description of all materials.
5. Conformance to fire classifications requirements of IBC 1505.
6. Layout of tapered insulation, including slopes.
C. Manufacturer's Approval: Obtain manufacturer's written approval of final shop drawings prior to beginning roofing operations.

D. Samples: Submit samples of all roofing and flashing materials.

E. Submit certification from roofing manufacturer that the roofing membrane and the selected roofing insulation are compatible.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original, unopened, undamaged, labeled bundles or containers.

B. Store roofing materials, insulation and accessories at the site in storage trailers or the building in a dry, well-ventilated, weather tight place. Exterior storage not permitted. Comply with manufacturer's recommendations for handling and protection during installation.

1. Handle rolled goods to prevent damage to edge or ends.
2. Do not apply roofing materials to damp, frozen, dirty or dusty substrate surfaces.

C. Protection

1. Protect adjacent materials and surfaces from damage and soiling during roofing system installation.
2. Provide special protection or avoid heavy traffic on completed roofing work.
3. Protect paving and structure walls adjacent to hoists before starting work.
4. Do not overload the building structure with storage of materials or installation equipment on the substrate decking.
5. Handle and store materials and equipment to avoid damage to substrate decking.

1.07 PROJECT CONDITIONS

A. Environmental Conditions: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.07 WARRANTY

A. Contractor and roofing subcontractor shall warrant the total roofing system (membrane, insulation and flashing) with respect to workmanship and proper application for two (2) years from the date of acceptance by the Owner. Should any leaks covered under the warranty occur during this period, corrective action will be taken by the Contractor to repair the roof to the satisfaction of the owner and membrane manufacturer. ALL CORRECTIVE WORK WILL BE DONE AT NO COST TO THE OWNER. Work includes all components of membrane roofing system such as membrane roofing, base flashing, roof insulation, fasteners, substrate boards, vapor retarders, roof pavers, and walkway products.
B. The manufacturer(s) of the materials used shall provide a written **twenty (20)** year guarantee on the complete roof installation. Upon warranty inspection and acceptance of the roof, the guaranty will be turned over to the Owner on behalf of the Contractor, by an authorized representative of the manufacturer. The guaranty shall begin when the project is completed and accepted by the Owner. Submit final guaranty in triplicate.

1. Warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, substrate board, roofing accessories and other components of membrane roofing system.

C. Corrective measures on leaks shall be undertaken within seventy-two (72) hours after notification has been received by the Contractor or membrane manufacturer from the Owner.

**PART 2 PRODUCTS**

**2.01 MEMBRANE ROOFING**

A. Thermoplastic Polyolefin (TPO) Type

1. Thermoplastic Sheet Membrane: Reinforced single ply membrane factory fabricated into flexible sheets.
3. Thickness: Minimum 60 mils.
4. Physical Properties
   b. Elongation at Break - ASTM D751: 30%.
   c. Seam Strength - ASTM D751: 75 lbf.
   d. Retention of Properties After Heat Aging - ASTM D3045
      2) Elongation - ASTM D751: 25% of original.
   e. Tearing Strength - D1004: 156 lbg.
   f. Low Temperature Bend - D2136: Pass.
   g. Accelerated Weathering Test (Xenon Arc) - D2565: 10,000 hrs.
      1) Cracking (7x magnification): None.
      2) Discoloration (By Observation): Negligible.
      3) Crazing (7x magnification): None.
   h. Linear Dimensional Change - ASTM D1204: 0.1%.

B. Flashing: 60 mils nominal thick reinforced sheet factory fabricated to the required shapes and sizes to suit project conditions; furnished by sheet roofing membrane manufacturer.

1. Inside and Outside Corners and Vent Flashing: Preformed.
2. Provide asphalt compatible flashing membrane where asphalt contamination is anticipated.

C. Adhesive: Provide types as recommended by manufacturer for materials and conditions encountered.
   1. Provide asphalt compatible flashing membrane where asphalt contamination is anticipated.

D. Flashing Bars and Screws: Manufacturer's standard bars and fasteners. Spacings as required to meet design loads.

E. Mechanical Fasteners: As recommended by roofing manufacturer.

F. Splice Wash, Lap Sealant, Fastener Sealer, Etc.: Sheet material manufacturer's recommended materials for waterproof sealing of seams in membrane and waterproof sealing of joints between flashings and roofing membrane, adjoining surfaces, projections and penetrations through the roofing membrane. Compatible with materials with which used.

G. Membrane-covered Roof Expansion Joint Cover: Bellows type consisting of .06" thick membrane, support and attachment flanges.
   1. Joint Bellow Widths: As indicated.
   2. Membrane Cover: Material recommended by roofing manufacturer; compatible with roof membrane, integrally attached to bellow supports and attachment flange fabric.
   5. Provide matching factory-fabricated corners, transitions, intersections and terminations.

H. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. GEN FLEX ROOFING SYSTEMS
   2. JOHNS MANVILLE
   3. GAF
   4. CARLISLE
   5. FIRESTONE.
   6. VERSICO.

2.02 INSULATION

1. Tapered Insulation: 1/4" per foot. No slope under ¼" per foot will be permitted.
2. R-Value: Provide thickness for average R of 25 over entire roof area.
3. Minimum Thickness at Drain: 2".

B. Provide adhesives and mechanical fasteners as recommended by insulation manufacturer for substrates encountered.

C. Crickets (Tapered Insulation): Provide tapered insulation crickets sloped approximately ¼" per foot. Locate and arrange as indicated on drawings or as required to divert water at rooftop equipment or vertical obstructions.

1. Material: Polyisocyanurate; conform to requirements and manufacturers specified herein.

D. Coverboard: Provide one of the following:

1. ½" High Density Wood Fiberboard: ASTM C208 cellulosic-fiber insulating board, Type II, Grade 1. (adhered in hot asphalt)
2. ½” glass-mat, water-resistant gypsum substrate, primed surface; ASTM C1177, (adhered in adhesive). Dens-Deck by GEORGIA-PACIFIC, Secure Rock Roof Deck by USG, GlasRoc Roof Board by CERTAINTEED (adhered in adhesive)

2.03 MISCELLANEOUS ITEMS

A. Wood Members: Comply with requirements of wood blocking, Section 06 10 50, for wood members indicated as roofing system work. Provide wood pressure treated as specified.

B. Mastic: Type as recommended by roofing manufacturer.

C. PVC Walkway Membrane: Roof manufacturer’s recommended reinforced PVC heat weldable walkway membrane; minimum 30” wide x lengths indicated. Minimum 2.4mm thick (0.096”).

2.04 FASTENERS

A. Provide roofing membrane manufacturer’s recommended type mechanical fastener for deck. Type, size and spacing shall be as required to maintain manufacturer’s 15 year system warranty and FM I-90.

PART 3 EXECUTION

3.01 INSPECTION

A. Pre-Installation Conference: Not less than two weeks before start of roofing installation, meet at project site with Architect, Owner's representative, Contractor, roofing installer, and roofing material manufacturer's representative.
1. Review project requirements, required submittals, status of substrate work, areas of potential conflict and interference, availability of materials, installer's personnel, equipment and facilities, construction schedule, weather and forecasted weather conditions, and coordinate methods, procedures and sequencing requirements for proper installation, integration and protection of the work.

B. Examine substrates and installation conditions. Do not proceed with insulation and roofing work until unsatisfactory conditions have been corrected.

C. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 PREPARATION

A. Verify that work which penetrates roof deck, or requires men or equipment to traverse roof deck, has been completed.

B. Examine substrate surfaces for adequate anchorage, foreign materials, moisture and unevenness that would prevent the execution of roofing system specified.

C. Correct unsatisfactory conditions before starting roofing. Roof deck surface conditions shall comply with manufacturer's requirements and be acceptable to the roofing system installer.

D. Protect other work from spillage of roofing materials. Repair or replace other work damaged by installation of the thermoplastic membrane roofing system work.

3.03 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 inches or greater, install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 12 inches in each direction.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

G. Mechanically Fastened and Adhered Insulation for Metal Roof Deck: Install each layer of insulation and secure first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten first layer of insulation according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
2. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
3. Install subsequent layers of insulation in a cold fluid-applied adhesive.

H. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Stagger joints from joints in insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and fasten to roof deck.

1. Fasten according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
2. Fasten to resist uplift pressure at corners, perimeter, and field of roof.

3.04 ADHERED MEMBRANE INSTALLATION

A. Comply with roofing manufacturer's instructions and recommendations for handling and installing roofing system.

B. Flash and make watertight equipment curbs for mechanical equipment located on the roof.

C. General flashing details for roof penetrations, curbs, parapets and roof perimeters shall comply with roofing material manufacturer's standard details and recommendations for flashings.

1. Provide base flashing at perimeters and edges of membrane abutting walls, curbs or other construction. Provide prefabricated pipe seals for pipe and conduit penetrations, properly cemented to membrane and sealed to pipe or conduit with stainless steel clamp and top bead of sealant.
2. Mechanical fasteners below counterflashing, where required at perimeter flashings, to be fully enclosed with suitable membrane to form water tight seal.
3. Minimum height of membrane flashing terminations to be 8" above top of membrane, unless otherwise indicated.

D. Install roof flashing and sheet metal work provided herein and furnished under Section 07 62 00.
E. PVC Walkway Pads: Locate pads as indicated. Maintain approximately 4" between pads. Secure pads to membrane as recommended by membrane manufacturer.

F. Blocking Shim blocking solidly as required to make top surface of blocking level with top of insulation.

G. Perform test cuts at lap edges (seams) to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
   1. Perform test cuts after stoppages in the work and when recommended by roofing manufacturer after environmental changes.
   2. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

3.07 CLEANING AND PROTECTION

A. Patch installations by other trades and make all necessary repairs as required.

B. Upon completion of roofing work, clean gutters and drains of foreign materials and aggregate and remove all debris and surplus materials.

C. Protect finished roof areas from foot traffic and construction damage until Contract Completion.
END OF SECTION
SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide flashing and sheet metal work as shown and specified. Work includes:

1. Gutters, and downspouts including brackets and supports.
2. Manufactured gravel stops.
3. Flashing and counter flashing.
4. Miscellaneous flashings.
5. Miscellaneous rooftop concealed flashing.
6. Fasteners, sealants, solder and accessories to complete the work.

1.02  RELATED SECTIONS

A. Masonry Flashing: Section 04 00 00.

B. Aluminum Composite Materials: Section 07 42 44.

1.02  QUALITY ASSURANCE

A. Comply with Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) "Architectural Sheet Metal Manual" recommendations for fabrication and installation of the work.

B. Reference Standards

2. American Architectural Manufacturers Association (AAMA)
3. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA):
   a. SMACNA "Architectural Sheet Metal Manual".

C. Subcontractor: Subcontract sheet metal associated with roofing as a part of the roofing contract for undivided responsibility.

D. Attachments to or penetrations in roofing systems to be made only with full
approval of roofing manufacturer. Obtain approvals as required for installation of work under this section. Notify Architect if deviations from documents is required to obtain approval from roofing manufacturer prior to fabrication.

E. SPRI Wind Design Standard: Manufacture and install gravel stop and roof edge components tested according to SPRI ES-1 and capable of meeting the design pressures indicated on the Structural Drawings.

F. Painted Finishes: Factory painted finish to be performed by an applicator specifically approved by the paint manufacturer. The applicator shall provide written notification of approval by paint manufacturer prior to application of the finish.

1.03 SUBMITTALS

A. Shop Drawings and Product Data: Submit on all sheet metal work specified herein. Drawings to show all expansion joint details, joint details, waterproof connections to adjoining work and at obstructions and penetrations, methods of attaching to building and all formed sections. Include the following:

1. Gutter and downspout construction, including brackets, supports and gutter expansion joints.
2. Gravel stops.

B. Submit 8" square material samples for each type of sheet metal required.

C. Submit full width by 8" long samples of all manufactured and fabricated items. Provide with specified finish and color.

1.04 PROJECT CONDITIONS

A. Do not proceed with the installation of flashing and sheet metal work until substrate construction, blocking and other construction to receive the work are completed.

1. Metal roofing work is to follow progress of substrate as close as practical to limit exposure of insulation and wood materials.

1.05 WARRANTY

A. Contractor's warranty required for membrane roofing system work shall include all related roof flashing and sheet metal work. Refer to Section 07 54 23.

B. Provide Contractor's guarantee for all sheet metal work under this Section to be free from defects of material and workmanship for a period of two years. Work that is not water tight or is damaged by winds that do not exceed 90 mph will be considered defective.

C. Provide manufacturer's guarantee of paint finish against failure of paint finish. Failure includes blistering, peeling, cracking, flaking, checking, excessive color change and chalking. Color change shall not exceed 5 N.B.S. units (per ASTM
D523) and chalking shall not less than a rating of 8 per ASTM D4214.

1. Warranty Period: 20 years.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

A. Galvanized Steel Sheet - All Flashings Exposed to View

1. Material: Galvanized steel, ASTM A653, G90 coating with factory applied finish.
2. Finish
   a. Exposed Surfaces
      1) Material/Manufacturer: Fluoropolymer finish containing not less than 70% PVDF (Kynar 500) resins; "Trinar" by AKZO; "Duranar" by PPG; "Fluropon" by VALSPAR. Total dry film thickness not less than 1.0 mils, or coatings meet or exceed the requirements of AAMA 2605.
      2) Reference: Meet the requirements of AAMA 621, Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) and Zinc-Aluminum Coated Steel Substrates.
      3) Color: As selected by Architect from paint manufacturer's complete specified line.
      4) Application: Apply coating systems in strict accordance with manufacturer's printed instructions and recommendations. Refer to Quality Assurance in Part 1.
   b. Concealed Surfaces: Can be manufacturer's standard coating for concealed surfaces.

3. Thicknesses: Provide the following minimum thicknesses:
   a. Flashing and Counterflashing: 0.0276".
   b. Gutters and Downspouts: 0.0396".
   c. Others: 0.0276".

B. Miscellaneous Flashing - Not Exposed to View: Galvanized steel, ASTM A653 G60. Mill phosphatized for paint adhesion. 0.0276" minimum unless otherwise indicated.

C. Fasteners: Provide same metal as sheet metal or other non-corrosive compatible metal recommended by sheet metal manufacturer.

D. Joint Sealants: See Section 07 92 00. Color matched to factory finished materials at roofing, cornice, fascia, coping and similar type systems.

E. Metal accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work; matching or compatible with material installed, non-corrosive, size and gage as required for performance.

F. Underlayment
1. Membrane: Bituthene Ice and Water Shield by W. R. GRACE; Polyken 640 Underlayment Membrane by POLYKEN TECHNOLOGIES; Polyguard Deck Guard by POLYGUARD PRODUCTS; Weather Watch by GAF; Winterguard by CERTAINTEED, a modified bituminous membrane, minimum 40 mils thick, self-adhering, self-sealing moisture barrier.


G. Wood members: Comply with requirements of Wood Blocking, Section 06 10 50.

2.02 PREFABRICATED MATERIALS

A. Gravel Stop: Provide in custom shapes as indicated.

1. Fabricated in 10'-0" lengths to sizes indicated of 0.05" smooth aluminum, formed. Provide with galvanized spring clip (retainer) spaced at 12" on center.

2. Provide factory welded and mitered corners, butt joints and concealed .032" aluminum cover plates.

3. Basis of Design Manufacturers: METAL-ERA One Gravel Stop

4. Other Manufacturers:
   a. OMG ROOFING PRODUCTS,
   b. CARLISLE SYN Tec, INC
   d. FIRESTONE BUILDING PRODUCTS
   e. JOHNS MANVILLE, INC

B. Finish

1. Exposed Surfaces
   a. Material/Manufacturer: Fluoropolymer baked enamel finish with Kynar 500 (70%) resins by ELF ATOCHEM OF NORTH AMERICA INC.; "Trinar" by AKZO; "Duranar" by PPG, "Fluropon" by VALSPAR. Total dry film thickness not less than 1.0 mils
   c. Color: Color selected by Architect to match color selected for "Prefinished Sheet Aluminum".

2. Concealed Surfaces: Can be manufacturer's standard coating for concealed surfaces.

2.03 FABRICATION

A. Shop fabricate sheet metal work to comply with standard industry standards as shown by SMACNA in the "Architectural Sheet Metal Manual."
B. Form sections square, true and accurate to size and profile, free from distortion and other defects detrimental to appearance or performance.

1. Make all lines, edges, angles and moldings straight, sharp and true; reinforce for rigidity and strength.

C. Fabricate for watertight and weatherproof performance with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form exposed sheet metal work with exposed edges folded back to form hems.

1. Fabricate with seams overlapping in the direction of water flow.

D. Fabricate non-moving seams in sheet metal with flat lock or butt hairline joints except as otherwise indicated. Fabricate corners mitered, soldered and sealed as one piece. Locate corner joints 2'-0" from corners and intersections.

E. Seal movable non-expansion type joints with joint sealant. Form joints as indicated, when not indicated, in compliance with industry standards to receive joint sealants.

F. Provide for separation of metal from non-compatible or corrosive substrates by coating concealed surfaces with bituminous coating or other permanent separation as recommended by the sheet metal manufacturer.

G. Gutters

1. Form to size and shape as detailed or comply with (SMACNA) recommendations if not indicated. Provide adequate reinforcing, brackets, straps and fasteners for attachment to building as indicated and as required.

2. Provide downspout outlets as indicated on drawings.

H. Downspout: Form to size and shape detailed or comply with (SMACNA) recommendations if not indicated.

I. Trim for Roof Hatches: Provide galvanized sheet metal trim to cover all construction from bottom of roof deck to hatch or vent.

1. Trim to form 90° bend at bottom of roof deck with minimum 3-inch return and lap hatch or vent curb not less than 2".

2. Provide hemmed edge at curb.

3. Provide lapped covers for joints or corners if trim package fabricated from more than one piece. Joint covers to lap joints by minimum 2" and have hemmed edges.

PART 3 EXECUTION

3.01 PREPARATION
A. Examine substrates and installation conditions. Do not install flashing and sheet metal work until unsatisfactory conditions have been corrected.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

C. Coordinate flashing and sheet metal work with other work for the correct sequencing of items which make up the entire membrane or system of weatherproofing and rain drainage.

3.02 INSTALLATION

A. Comply with SMACNA "Architectural Sheet Metal Manual" recommendations, and drawing details for installation of the work.

B. Install prefabricated items in accordance with manufacturer's instructions and recommendations.

C. Anchor units securely in place by methods indicated, providing for thermal expansion. Conceal fasteners and expansion provisions whenever possible. Install joint sealants where indicated.

D. Set units true to lines and levels indicated. Install work with laps, joints and seams which will be permanently watertight and weatherproof.

E. Separate sheet metal work from dissimilar metals, treated wood, and cementitious materials. Provide roofing felt underlayment and rosin-sized paper slip sheet over treated wood surfaces.

F. Fabricate, support and anchor downspouts in a manner which will withstand thermal expansion, stresses and full loading by ice or water without damage, deterioration or leakage.

G. Continuously seal exposed joints where flashing or counter flashing terminates into reglets after sheet metal is adequately wedged and secured.

I. Metal flashings which may be built into masonry mortar joints shall be preformed with corrugations, ribs or crimps which will maintain integrity of mortar bond for masonry.

J. Roof Edge

1. Install membrane roofing flashing over top of parapet substrate prior to installing. See Section 07 53 23. Coordinate installation.

2. Apply continuous bead of sealant on both sides of joints immediately prior to setting coverplates.

END OF SECTION
SECTION 07 72 33

ROOF HATCH

PART 1  GENERAL

1.01  DESCRIPTION
   A. Provide roof hatch as indicated on drawings.
   B. Provide ladder extension device.
   C. Provide factory fabricated roof hatch rail system.

1.02  RELATED SECTIONS
   A. Roof Insulation: Section 07 54 23.
   B. Roof Membrane and Flashing: Section 07 54 23.
   C. Painting: Section 09 91 00.

1.03  QUALITY ASSURANCE
   A. Sheet Metal Standard: Comply with SMACNA’s "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.

1.04  SUBMITTALS
   A. Submit shop drawings and manufacturer's product data indicating sizes, dimensions, rough opening required, finish, material and gages.

1.05  COORDINATION
   A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

PART 2  PRODUCTS

2.01  ROOF HATCH
   A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1. MILCOR INC.
2. J. L. INDUSTRIES, INC.
3. O'KEEFFE'S INC.
4. BABCOCK-DAVIS.
5. BILCO COMPANY.

B. Size: As indicated on drawings.

C. Description

1. Material: Galvanized steel, 14 gage cover and curb, and 22 gage cover liner with 1" insulation and beaded flange, neatly welded.

2. 12" high curb with flange for securing to roof deck and full welded cap flashing for weather tightness.
   a. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, complying with AWPA C2; not less than 1-1/2 inches thick.
   b. Gaskets: Manufacturer’s standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.

3. Provide cover with heavy pintle hinges, compression spring operator enclosed in telescopic tubes, snap latch with turn handles, and padlock hasps inside and out, neoprene seal, automatic hold open arm and grip for release.

4. Finishes: Provide all galvanized surfaces factory prime painted. Provide cadmium plated hardware.

D. Metal in contact with concrete, masonry and other dissimilar materials: Provide contact surfaces with coating of zinc-chromate primer at 1.0 mil dry film thickness, in addition to other coatings previously specified.

E. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by roof accessory manufacturer. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners.

2.02 LADDER EXTENSION SAFETY DEVICE

A. Extending type climb assist post mounted on ladder or fixed type ladder extension mounted on outside of hatch curb.

1. Material: Galvanized steel; provide all mounting accessories, fittings and hardware.
2. Manufacturers: BILCO LadderUp; PS DOORS Hatch Grip; ACUDOR PRODUCTS Telescoping Safety Post or similar products by other listed access door manufacturers.

2.03 HATCH RAIL SYSTEM

A. Provide hatch rail system models sized to fit roof hatches.
1. Safety yellow color.
2. Attach to the capflashing of the roof hatch; do not penetrate any roofing material.
4. UV and corrosion resistant construction with a twenty-five year warranty.
5. Provide self-closing gate with hatch rail system.

B. Posts and Rails: Round pultruded reinforced fire retardant yellow fiberglass treated with a UV inhibitor.

C. Hardware: Mounting brackets shall be ¼" thick hot dip galvanized steel. Hinges and post guides shall be 6063T5 aluminum. Fasteners shall be Type 316 stainless steel.

**PART 3  EXECUTION**

3.01  EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.

1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored and is ready to receive roof accessories.
2. Verify dimensions of roof openings for roof accessories.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02  INSTALLATION

A. General: Install roof hatch and accessories according to manufacturer's written instructions. Anchor securely in place and capable of resisting forces specified. Use fasteners, separators, sealants, and other miscellaneous items as required for completing roof accessory installation. Install to resist exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Seal joints with elastomeric sealant as required by manufacturer of roof accessories.

C. Check roof hatch and accessories for proper operation. Adjust operating mechanism as required. Clean and lubricate joints and hardware.
PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide firestop systems consisting of a material, or combination of materials installed to retain the integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and/or hot gases through penetrations, blank openings, construction joints, or at perimeter fire containment in or adjacent to fire-rated barriers in accordance with the requirements of the Building Code for this project.

B. Firestop systems shall be used in locations including, but not limited to, the following:

1. Penetrations through fire resistance rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
2. Penetrations through fire resistance rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
3. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.
4. Sealant joints in fire resistance rated construction.
   a. Gaps between the top of walls and ceilings, floor or roof assemblies. Includes filling metal deck flutes where applicable.
   b. Openings around structural members which penetrate floors or walls.
   c. Control joints.
   d. Floor joints not requiring expansion joints.
5. Walls enclosing plenum spaces, rated and unrated.
   a. Gaps between the top of walls and ceilings or roof assemblies.
   b. Openings around items which penetrate walls.
6. Other locations indicated.

1.02  RELATED SECTIONS

A. Masonry: Section 04 00 00.
B. Gypsum Wallboard Partitions: Section 09 21 16.
C. Deflection tracks for metal stud fire walls: Section 09 21 16.
D. Plumbing: Division 22.
E. HVAC: Division 23.
F. Electrical: Division 26.

1.03 DEFINITIONS

A. Firestopping: Material or combination of materials (assembly) to retain integrity of fire rated construction by maintaining an effective barrier against the spread of flame, smoke, and gases.

B. Through-penetration: Any penetration of a fire-rated wall or floor that completely breaches the barrier.

C. Through-Penetration Firestop Systems: Material or combination of materials which are field constructed of fill, void, or cavity materials and forming materials, designed to resist fire spread when installed as a complete firestop system.

D. Through-Penetration Firestop Devices: Factory built products designed to resist fire spread. Complete when delivered to site; ready for installation.

E. System: The use of a specific firestop material or combination of materials in conjunction with a specific wall or flow construction type and a specific penetrant(s).

F. Barrier: Any bearing or non-bearing wall or floor that has an hourly fire and smoke rating.

G. Membrane-penetration: Any penetration in a fire-rated wall that breaches only one side of the barrier.

H. Fire Resistive Joint: Any gap, joint, or opening, whether static or dynamic, between two fire rated barriers including where the top of a wall meets a floor; wall edge to wall edge applications; floor edge to floor edge configurations; floor edge to wall.

I. Perimeter Barrier: Any gap, joint, or opening, whether static or dynamic, between a fire rated floor assembly and a non-rated exterior wall assembly.

1.04 REFERENCES

A. American Society for Testing and Materials (ASTM)
   4. E2174: Standard Practice for On-Site Inspection of Installed Fire Stops
B. National Fire Protection Association (NFPA)

1. 70: National Electrical Code (NEC)

C. Underwriters’ Laboratories (UL)

1. UL1479: Fire Tests of Through Penetration Fire Stops.
2. UL2079: Tests for Fire Resistance of Building Joint Systems

D. Firestop Design Classification References

1. Warnock Hersey Listing Manual
2. UL Fire Resistance Directory - Vol. 1

E. Factory Mutual (FM) Research

1. FM Approval Standard of Firestop Contractors – Class 4991

1.05 SYSTEM PERFORMANCE REQUIREMENTS

A. System Design and Product Selection: Contractor responsible for selection of products and tested designs that fulfill the firestopping requirements of this section.

B. 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 gasses.

C. F-Rated Through Penteration Firestop Systems: Provide through penetration firestop systems with F ratings indicated as determined per ASTM E814, UL 1479 but not less than that equaling or exceeding the fire resistance rating of the constructions penetrated.

D. 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 specified by codes or where the following conditions exist:

1. Where firestop systems protect penetrations located outside of wall cavities.
2. Where firestop systems protect penetrations located outside fire resistive shaft enclosures.
3. Where firestop systems protect penetrations located in construction containing doors required to have a temperature rise rating.
4. Where firestop systems protect penetrating items larger than a 4 inch diameter nominal pipe or 16 square inch in overall cross sectional area.
E. L-Rated Through-Penetration Firestop Systems: Provide firestop systems with L ratings, in addition to F and T ratings, as determined per UL 1479, where indicated by Code.

F. Fire Resitive Joint Sealants: Provide joint sealants with fire resistance ratings indicated, as determined per ASTM E119, UL 1479 and UL 2079 but not less than that equaling or exceeding the fire resistance rating of the construction in which the joint occurs.

G. For firestopping exposed to traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions and will meet load requirements.

1. For piping penetrations for plumbing and wet pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
3. For penetrations involving insulated piping, provide through-penetration firestop systems not required removal of insulation.

H. For through-penetration firestop systems exposed to view, provide products with flame spread of less than 25 and smoke developed ratings of less than 450, as determined per ASTM E 84.

I. Where there is no specific third party tested and classified firestop system available for an installed condition, obtain from the firestopping material manufacturer an Engineering Judgment (EJ) to be submitted to the Approving Authority and Authority Having Jurisdiction for approval prior to installation. The EJ shall follow International Firestop Council (IFC) guidelines.

J. Mold Resistance: Provide penetration firestopping with mold and mildew resistance rating of one (1) or less as tested per ASTM G21.

1.06 SUBMITTALS

A. Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of UL or other nationally recognized independent testing laboratories firestop systems to be used, and manufacturer's installation instructions.

1. Manufacturer's engineering judgement identification number and drawing details when no tested system is available.

B. Shop drawings detailing materials, installation methods, and relationships to adjoining construction for each through-penetration firestop system, and each kind of penetrating item. Include firestop design designation of qualified testing and inspecting agency evidencing compliance with requirements for each condition indicated.
1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop configuration for construction and penetrating items.

2. Where project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration approved by firestopping manufacturer with modifications marked.

C. Product certificates signed by manufacturers of firestopping products certifying that their products and installation comply with specified requirements. Certification shall be signed by the Installer.

D. Certification is required from manufacturer that Installer has been trained in the handling and installation of their products.

E. Firestopping installer shall provide a letter of certification stating that all firestopping systems have been installed in accordance with the Contract Documents.

1.07 QUALITY ASSURANCE

A. Meet requirements of ASTM E814 or UL 1479 tested assemblies that provide a fire rating equal to that of construction being penetrated and other ASTM Standards as applicable for the installation.


B. Requirements of Regulatory Agencies: Comply with the applicable requirements for fire separations and penetrations of the following:

1. OBC: See Chapter 6, Table 601 and 602 for the time rated construction requirements.

2. NFPA 70.


C. Installer: Specialist in the installation of type(s) of firestopping required; trained and approved by the firestop manufacturer.

1. Shown to have successfully completed not less than 5 firestop projects similar in type and size to that of this Project.

D. 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".
E. Do not use any product containing solvents that require hazardous waste disposal or which after curing dissolve in water.

F. Coordinating Work: Coordinate construction of openings and penetrating items to ensure that designated through-penetration firestop systems are installed per specified requirements.

G. Single Source Responsibility: Obtain firestop systems for each kind of penetration and construction condition indicated from a single primary firestop systems manufacturer.
   1. Materials of different manufacture than allowed by the tested and listed system shall not be intermixed in the same firestop system or opening.
   2. Tested and listed firestop systems are to be used before an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFRRA) is installed.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver firestopping undamaged products to project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacturer; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi-component materials.
   1. Comply with recommended procedures, precautions, or remedies described in material safety data sheets as applicable.

B. Store and handle firestopping materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

C. Do not use damaged or expired materials.

1.09 PROJECT CONDITIONS

A. Environmental Conditions: Do not install firestopping when ambient or substrate temperatures are outside limits permitted by firestopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilation: Ventilate firestopping per firestopping manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.

1.10 SEQUENCING AND SCHEDULING

A. Coordinate this Work as required with work of other trades. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
B. Do not cover up those firestopping installations that will become concealed behind other construction until Owner's inspection agency and authorities having jurisdiction, if required, have examined each installation.

**PART 2 PRODUCTS**

2.01 MANUFACTURERS

A. Provide products from one or more of the following manufacturers according to the suitability of the product for the intended purpose.

1. W.R. GRACE (Flamesafe System)
2. FYRESLEEVE INDUSTRIES
3. TREMCO
4. HILTI, INC.
5. SPECIFIED TECHNOLOGIES (STI).
6. 3M FIRE PROTECTION PRODUCTS.
7. THE RECTORSEAL CORPORATION (Metacaulk and Bio Fireshield).
8. NELSON FIRESTOP PRODUCTS.

2.02 MATERIALS - GENERAL

A. As selected by Contractor. See SYSTEM PERFORMANCE REQUIREMENTS in Part 1 hereinbefore.

B. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.

1. All materials shall comply with ASTM E814 or E 119 (UL 1429), and shall be manufactured of nontoxic, non-hazardous, asbestos free materials, and unaffected by water or moisture when cured.
2. Primers: Conform to manufacturer's recommendations for primers required for various substrates and conditions.
3. Backup Materials: Backup materials, supports, and anchoring devices shall be provided as required by UL testing.
4. Provide all firestopping sealant materials within the VOC limits specified in Section 01 81 13.

C. Accessories: Provide components for each firestopping system that are needed to install fill materials and to comply with "System Performance Requirements" in Part 1. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire resistance rated systems. Accessories include but are not limited to the following items:

1. Permanent forming/damming/backing materials must be noncombustible and may include the following:
a. Semi-refractory fiber (mineral wool) insulation.
   b. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
   c. Joint fillers for joint sealants.
2. Temporary forming materials.
5. Steel sleeves.

2.03 RATED STUD DEFLECTION ASSEMBLY

A. Deflection Track Ceiling Runner: See Section 09 21 16.
B. Gypsum Wallboard: See Section 09 21 16.
C. Insulation: Mineral wool, 3.5 PCF minimum density.
D. Firestopping Compound: Types as manufactured by listed manufacturers in 2.01A herein.
E. Accessories: Provide all fasteners, clips and other related installation accessories as required for a complete UL approved assembly.

2.04 MIXING

A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected.

1. Verify penetrations are properly sized and in suitable condition for application of materials.

3.02 PREPARATION

A. Surface Cleaning: Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the following requirements:
1. Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.
2. Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form release agents from concrete.

B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop systems seal with substances.

3.03 INSTALLING THROUGH-PENETRATION FIRESTOPS

A. General: Comply with the "System Performance Requirements" in Part 1 and the through-penetration firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.

B. Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross sectional shapes and depths required to achieve fire ratings of designated through-penetration firestop systems. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

C. Install fill materials for through-penetration firestop systems by proven techniques to produce the following results:

1. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.04 INSTALLING FIRE RESISTIVE JOINT SEALANTS

A. General: Comply with the "System Performance Requirements" in Part 1 with ASTM C1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.
B. 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.

C. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross sectional shapes and depths relative to joint width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.

D. Tool nonsag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

3.05 INSTALLING PERIMETER FIRE BARRIER SYSTEMS

A. General: Comply with “System Performance Requirements” article in Part 1 and with the firestop manufacture’s installation and drawings pertaining to products and applications indicated.

B. Install metal framing, curtain wall insulation, mechanical attachments, safining materials and firestop materials as applicable within the system design.

3.06 FIELD QUALITY CONTROL

A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.

B. Keep areas of work accessible until inspection by applicable code authorities.

C. Special Inspections Penetration Firestops. When required per IBC 1705, inspections of penetration firestop systems shall be conducted by an approved inspection agency in accordance with ASTM E 2174.

1. Fire-resistant joint systems. Inspection of fire-resistant joint systems shall be conducted by an approved inspection agency in accordance with ASTM E 2393.

E. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

F. Manufacturer’s Field Services: During installation, contractor shall have manufacturer’s representative provide periodic training and visual observations with written documentation of the results.
G. Do not proceed to enclose firestopping with other construction until inspection agency has verified that the firestop installation complies with the requirements.

H. Where deficiencies are found, repair or replace the firestopping so that it complies with requirements of tested and listed system design.

3.07 IDENTIFICATION

A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:

1. The words "Warning - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage".
2. Contractor's name, address, and phone number.
3. Through-penetration firestop system designation of applicable testing and inspecting agency.
4. Date of installation.
5. Through-penetration firestop system manufacturer's name.

3.08 IDENTIFICATION & DOCUMENTATION

A. The firestop contractor is to supply documentation for each single application addressed. This documentation is to identify each penetration and joint location on the entire project.

1. The Documentation form for through penetrations is to include:
   a. Sequential location number
   b. Date of installation
   c. Detailed description of the penetration’s location
   d. Tested system or engineered judgment number
   e. Type of assembly penetrated
   f. A detailed description of the size and type of penetrating item
   g. Size of opening
   h. Number of sides of assemblies addressed
   i. Hourly rating to be achieved
   j. Installer’s name

B. Compiled copies of these documents are to be provided to the Owner at the completion of the project.

3.09 CLEANING

A. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by
manufacturers of firestopping products and of products in which opening and joints occur.

B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Contract Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop system complying with specified requirements.

END OF SECTION
SECTION 07 92 00

JOINT SEALANTS

PART 1 GENERAL

1.01 SCOPE

A. General: Prepare joints and apply sealant at all locations which normally require sealing to prevent infiltration of air, water, and insects and to reduce transmission of sound.

B. Apply sealants to exterior and interior non-static joints. Do not seal normal drainage points or weep holes. Include the following:

1. masonry control and expansion joints
2. around louvers, exterior trim, windows, door frames, aluminum entrances and other penetrations or openings in exterior walls
3. threshold bedding
4. joints between different wall materials
5. termination njoints between wall materials and adjacent materials
6. perimeter seal of metal door and borrowed light frames where they abut masonry
7. other applications indicated

C. Sealing of joints in concrete construction, including sidewalk joints, concrete paving joints and floor joints, tile floor expansion joints and other floor joints as indicated.

D. Sealing of all exterior and interior locations where materials or equipment do not fit together or against the adjoining surface with a hairline joint.

E. Caulking of interior static joints. Include the following:

1. intersection of exposed structure or ceiling construction with masonry walls
2. perimeter seal of metal door and borrowed light frames where they abut drywall
3. intersection of grilles and louvers with adjacent surfaces
4. intersection of cabinets, casework and similar items applied to or recessed in walls
5. other applications indicated

F. Sealing between wall and wall mounted plumbing fixtures and floor and floor mounted plumbing fixtures.

G. Sealing at intersection of tops and side/backsplashes to each other and to wall.

H. Sealing at reglets and flashings set in sealant.
I. Seal penetrations through ceramic tile work.

J. Trim exposed masonry flashing.

K. Joints, perimeter, and penetrations in fire-rated assemblies. Use firestopping specified in Section 07 84 00.

L. Joints, perimeter, and penetrations in sound-rated assemblies. See Section 09 21 16.

1.02 GENERAL PERFORMANCE

A. Except as otherwise indicated, joint sealant is required to establish and maintain airtight and waterproof continuous seals on a permanent basis, within recognized limitations of wear and aging as indicated for each application.

B. Failures of installed sealant to comply with this requirement will be recognized as failures of both materials and workmanship.

1.03 SUBMITTALS

A. Submit manufacturer's product data and installation instructions.
   1. Certification, in the form of manufacturer's standard data sheet or by letter, stating that each type of compound and sealant to be furnished complies with these specifications.
   2. Statement that each product to be furnished is recommended for the application shown and is compatible with all materials to which applied.
   3. Instructions for handling, storage, mixing, priming, installation, curing and protection for each type of sealant.

B. Submit manufacturer's color chart for color selections.

C. Submit cured sealant samples in colors required for the work. Architect's approval will be for color only. Compliance with other requirements is the Contractor's responsibility.

1.05 STORAGE AND HANDLING

A. Prevent inclusion of foreign matter or the damage of materials by water or breakage.

B. Procure and store in original containers until ready for use.

C. Materials showing evidence of damage shall be rejected.

1.06 WARRANTY

A. Installer's Warranty: Contractor and joint sealant applicator shall jointly warranty
joint sealant work for two (2) years from date of final acceptance. Warranty shall include replacing joints which fail to perform as airtight; or fail in adhesion, cohesion, abrasion resistance, weather resistance, extrusion resistance, migration and stain resistance, general durability or any other form of apparent deterioration (excluding inherent qualities and limitations clearly specified in the manufacturer's submitted product data).

B. Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section for ten (10) years from date of final acceptance.

C. Warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.

C. Comply with these specifications for repair or replacement of work.

PART 2 PRODUCTS

2.01 MATERIALS

A. Definition: The term "sealant" will be understood to be an elastomeric type. The term "caulk" will be understood to be a synthetic resin base of highest quality acrylic latex compound.

B. General

1. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
2. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   a. Architectural Sealants: 250 g/L.
   b. Sealant Primers for Nonporous Substrates: 250 g/L.
   c. Sealant Primers for Porous Substrates: 775 g/L.
3. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
4. Colors: As selected by Architect from manufacturer's full range; selected
colors to match adjacent materials.

5. Where exposed to foot traffic, select materials of sufficient strength and hardness to withstand stiletto heel traffic without damage or deterioration of sealant system.

C. Manufacturers: BOSTIK; DOW CORNING CORPORATION; EUCLID CHEMICAL; TREMCO MANUFACTURING COMPANY; GENERAL ELECTRIC COMPANY/MOMENTIVE; SIKA CHEMICAL CO.; MAMECO INTERNATIONAL; BASF BUILDING SYSTEMS; VULCHEM.

1. Manufacturer's listed under the following applications are for basis of design. Equal products by above listed manufacturers are acceptable.

D. Exterior Vertical and Overhead Joints: Single-component neutral curing silicone sealant meeting ASTM C920, Type S, Grade NS, Class 50.

1. DOW 791
2. GE SCS9000 Silpruf NB
3. TREMCO Spectrum 2
4. PECORA 895 NST

E. Horizontal Wearing Expansion Joints; Interior and Exterior

1. Type: Two-part polyurethane based elastomeric sealant, complying with ASTM C920, Class 25, Type M, Grade P, Use T. Self-leveling or gun grade type as recommended by manufacturer for application shown.
2. Location: For joints in exterior concrete pavements, sidewalks and interior floors.
   a. BOSTIK Chem-Calk 555-SL
   b. EUCLID Eucolastic II
   c. SONNEBORN Sonolastic SL 2
   d. TREMCO THC 900/901

F. Interior Vertical and Overhead Joints: Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

1. DOW 799
2. GE SCS2000 SilPruf
3. TREMCO Spectrum 2
4. PECORA 895 NST

G. Sealants at Countertops, Backsplashes and Plumbing Fixtures: ASTM C920, Type S, Grade NS, Class 25. Provide with mildew resistive additive.

1. Sealant Colors
   a. Countertops and Backsplashes: Clear.
   b. Plumbing Fixtures: white, unless colored fixtures are selected, then sealant color shall match fixture color.
2. Manufacturers/Products
   a. DOW 786
b. GE SCS1700 Sanitary.
c. SONNEBORN Sonolastic Omniplus
d. TREMCO Tremsil 600
e. PECORA 898 Sanitary Sealant

H. Caulk Joints – Interior, Static - Paintable: High quality acrylic latex compound, non-staining non-bleeding complying with ASTM C834, as supplied by one of the above listed manufacturers.

2.02 ACCESSORIES

A. Joint Primer/Sealer: Non-staining type, recommended by sealant manufacturer; compatible with joint forming material.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming material.

C. Bond Breaker Tape: Pressure sensitive polyethylene or plastic tape, recommended by sealant manufacturer, to suit applications where bond to substrate should be avoided for proper joint sealant performance.

D. Joint Backing: Compressible rod stock conforming to ASTM C1330, Type B; material as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

E. Solvents: Cleaning agent recommended by the manufacturer of the sealant in writing to Architect.

PART 3 EXECUTION

3.01 INSPECTION

A. Pre-Installation Meeting

1. Prior to sealant installation, and at the Contractor's direction, meet at project site to review material selections, joint preparations, installation procedures, weather conditions and coordination with other trades.

2. Include sealant installer, Contractor, Architect, manufacturer's representative and representatives of other trades or subcontractors affected by the sealant installation.

B. Examine substrates and installation conditions. Do not proceed with joint sealant work until unsatisfactory conditions have been corrected.

C. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 PREPARATION
A. Clean, seal and prime surfaces in accordance with manufacturer's recommendations. Confine primer/sealant to areas of sealant bond.

B. Remove dust, dirt, loose coatings, moisture and other substances which could interfere with sealant bond.

C. Remove lacquers and protective films from metal surfaces.

D. Architectural Concrete and Stone: Apply masking around joints to protect adjacent surfaces from defacement and staining during sealing operations. Repair damaged masking until sealant is installed.

3.03 INSTALLATION

A. Apply joint sealant as late as possible in construction, preceding painting and following cleaning operations. Do not apply sealant during inclement weather conditions or when temperature is above or below manufacturer's limitations for installation.

B. Install joint sealant materials and accessories in strict accordance with manufacturer's installation instructions.

C. Set joint filler units at depth or position in joint as indicated to coordinate with other work. Do not leave voids or gaps between ends of joint filler units.

D. Install sealant backer rod, except where recommended to be omitted by sealant manufacturer for application indicated. Use rod diameter that will cause compression when installed.

E. Install bond breaker tape and where required by manufacturer's recommendations to ensure that sealants will perform as intended.

F. Apply joint sealants in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces on both sides. Fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. At horizontal joints between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt. Hand tool and finish all joints.

G. Install joint sealants within recommended temperature ranges and to depths indicated or when not indicated, as recommended by sealant manufacturer. For normal moving vertical and horizontal joints, fill joints to a depth equal to 50% of joint width, but not more than 1/2" deep nor less than 1/4" deep, measured at the center section of bead.

H. Confine materials to joint areas with masking tapes or other acceptable methods. Remove excess sealant materials promptly as work progresses and clean adjoining surfaces.

I. Masonry Flashing: Where sealant joint is in direct contact with flexible masonry flashing, trim flashing flush with face of masonry after sealant in installed and
cured. Verify during this procedure that weep holes have not been compromised during sealing operations.

3.04 CLEANING

A. Upon completion, remove and dispose of masking materials; remove all excess sealing materials; clean adjacent materials of all soil and stain resulting from sealing operations.

1. Replace damaged material and material which cannot be properly cleaned.
SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Standard steel doors and frames.
   2. Fire rated steel doors and frames.

1.02 RELATED SECTIONS

A. Wood Doors: Section 08 14 00.
B. Door Hardware: Section 08 71 10.

1.03 QUALITY ASSURANCE

A. Provide metal doors and frames fabricated by one manufacturer to ensure uniformity in appearance and construction.

B. Reference Standards: Wherever the following abbreviations are used herein, they shall refer to the corresponding standard.
   3. SDI: Steel Door Institute.
   4. DHI: Door and Hardware Institute.

C. Fire rated doors and frames: Provide units that comply with NFPA 80, are identical to door and frame assemblies tested for fire-test-response characteristics per ASTM E152, and are labeled and tested by Factory Mutual (FM), Underwriters Laboratories (UL), or other National Recognized testing agency. Units shall bear testing agency labels.
   1. Provide UL labels permanently fastened on each door and frame which is within the size limitations established by NFPA and UL for labeling.
   2. Provide anchors for UL labeled frames required by the authority having jurisdiction.

1.04 SUBMITTALS

A. Submit manufacturer's product data and installation instructions for each type of standard metal door and frame required.
B. Submit shop drawings. Identify doors and frames in accordance with drawing door schedule. Indicate:

1. Elevations of each door design.
2. Hardware locations, installation methods and hardware reinforcements.
3. Dimensions and shapes of materials, anchorage and fastening methods.
4. Door frame types, profile of molding and details.
5. Wall opening construction and connection to other work.

C. Certificates documenting:

1. Fire testing: Fire-rated units have been successfully tested in accordance with Paragraph 1.03C.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver metal doors and frames cartoned or crated for protection during transit and job delivery. Provide sealed wrapping for factory.

B. Store doors and frames inside the building in a dry, well-ventilated area. Protect from damage, wetting and deterioration in accordance with manufacturer's recommendations.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Manufacturer: STEELCRAFT MFG. CO; CECO CORP.; PIONEER INDUSTRIES; REPUBLIC BUILDERS PRODUCTS CORP.; CURRIES; BLACK MOUNTAIN DOOR.

2.02 MATERIALS AND COMPONENTS

A. Materials

1. Metallic-Coated Steel: Commercial quality, hot dipped, A-60 galvannealed steel in accordance with ASTM A653, “Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process”.

2. Cold-Rolled Steel: Commercial Steel in accordance with ASTM A1008, “Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High Strength Low-Alloy and High Strength with Improved Formability”; Type B; suitable for exposed applications.

3. Hot-Rolled Steel Sheet: Commercial Steel in accordance with ASTM A1011, “Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High Strength Low-Alloy with Improved Formability, and Ultra-High Strength”; Type B; free of scale, pitting, or surface defects; pickled and oiled.

4. Recycled Content of Steel Products: Postconsumer recycled content plus
one-half of preconsumer recycled content not less than 25 percent.

B Comply with SDI 100 material and fabrication recommendations and as specified.

C Standard Metal Doors

1. Provide flush seamless type doors with seamless faces and edges, 1-3/4” thick, internally reinforced. Top and bottom closed flush.
   a. Provide glass lites where indicated.

2. Exterior Doors: Provide doors complying with requirements of ANSI 250.8 for Level 3 (extra heavy duty) and Model 2 (seamless design) and ANSI A250.4 for physical endurance Level A.
   a. Fabricated from metallic-coated (galvanized) steel face sheets, mill phosphatized
   b. Core: Minimum 1-1/2 lb. density polyurethane or polyisocyanurate; thermal-resistance value (R-value) of not less than 2.1 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
   c. Tops and bottoms closed with flush galvanized steel caps.

3. Interior Doors: Provide doors complying with requirements of ANSI 250.8 for Level 3 (extra heavy duty) and Model 2 (seamless design) and ANSI A250.4 for physical endurance Level A
   a. Fabricated from cold rolled steel; stretcher-leveled standard flatness.
   b. Kraft resin impregnated honeycomb or polystyrene slab core bonded to door face sheets with thermal adhesive.

4. Hardware Reinforcements: Meet or exceed ANSI/SDI A250.6 requirements.

5. Edge Profile: 1/8” bevel in 2” core on hinge and lock edges.

6. Astragals for pairs of doors: Manufacturer’s standard for labeled and non-labeled openings. Factory prepare for hardware as scheduled in Section 08 71 10. Mount astragal to overlap on key side of doors.

7. Louvers: Inserted fixed type, minimum free area of 38%.

D Standard Metal Frames

1. Interior Frames: Fabricated from either commercial grade cold-rolled steel conforming to ASTM A1008 or commercial grade hot-rolled and pickled steel conforming to ASTM A1011, minimum 0.053” thick. Set-up and welded type, all miters clean cut, reinforced, fully seam welded with exposed welds ground smooth.

2. Exterior Frames: Fabricated from commercial grade metallic –coated (galvanized) steel conforming to ASTM A653, minimum 0.053” thick, and shall have an A-60 zinc coating (0.30 ounces per square foot per side). Set-up and welded type, all miters clean cut, reinforced, fully seam welded with exposed welds ground smooth.
   a. Back prime frames with asphaltic emulsion.

3. Profile: Double rabbet, jamb face and depth as indicated.

4. Hardware Reinforcements: Meet SDI 107 requirements.

5. Transoms and Sidelites: Provide for loose glazing stops to be secured with countersunk screws.
   a. Provide ¾” stops for sidelites and transoms where the individual
glass areas for fire rated openings exceeds the allowable area for 5/8" stops.

D. Fire Doors and Frames

1. Comply with Fire-Rated Door Requirements specified herein before (Paragraph 1.03C.
3. Classification: As indicated.
4. Conform to requirements of Standard Metal Door and Frames specified herein.

2.03 FABRICATION

A. Reinforce and prepare doors and frames to receive hardware. Fit for hardware at the factory to template. Do all necessary cutting, drilling and tapping. Comply with applicable requirements of ANSI A115 series specifications for door and frame preparation for hardware.

B. Provide surfaces smooth and free from defects, warp or buckle with arrises straight and sharp.

C. Reinforce doors and frames to receive surface applied hardware. Drilling and tapping for surface applied finish hardware may be done at project site.

D. Locate finish hardware as shown on drawings or, if not shown, in accordance with DHI "Recommended Locations for Builder’s Hardware."

E. Door and Frame Fabrication

1. Provide cutouts for mortised hardware, accurately located and made to fit hardware.
2. Punch frames for door silencers, three on strike side for single doors. Factory install plastic caps. Stick-on silencers are not acceptable.
3. Exterior and Interior Frames: Provide minimum three anchors of suitable design for each jamb. Provide galvanized anchors for units built into exterior walls.
4. Floor Anchors: Provide floor clip on bottom of each jamb. Provide angle spreaders at bottom of each set-up frame.
5. Conduit for Door Frames
   a. Shop install ¾” electrical conduit within hollow metal door frame where indicated or where required for electric strikes or similar type electrical frame mounted hardware.
   b. Route conduit in frame in the most direct and simple manner so that pulling wire can be performed with a minimum of bends and obstructions. Route conduit to avoid damage to conduit during field installation of frame and operations to grout frame solid.
   c. Connect conduit to electrical junction box or conduit embedded in building structure by means of a threaded coupling. The termination point of the conduit within the frame shall be free and
have enough slack to make final connection to embedded device.

F. Shop Painting

1. Clean, bonderize or chemically treat and paint exposed surfaces of steel door and frame units, including galvanized surfaces.
2. Clean steel surfaces of mill scale, rust oil, grease, dirt and other foreign materials before application of paint. Sand free of imperfections.
3. Apply one baked-on shop coat of rust-inhibitive prime paint in accordance with ASNI A224.1. Provide a smooth, uniformly finished surface ready to receive finish paint.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine substrates, rough openings and installation conditions. Do not proceed with metal door and frame work until unsatisfactory conditions have been corrected.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 INSTALLATION

A. Install metal doors and frames in accordance with manufacturer's instructions and recommendations.

B. Placing Frames

1. General
   a. Comply with ANSI/SDI A250.11 (SDI 105) "Recommended Erection Instructions for Steel Frames."
   b. Erect frames in proper position to receive partition work before construction of enclosing walls. Set frames accurately in position, plumbed, aligned with heads level and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders.
   c. Grout frames as indicated on the drawings. Coordinate grout placement with adjoining materials and door hardware.

2. At Masonry Construction: Locate wall anchors at 16" on center. Building-in of anchors and grouting of frames is specified in Section 04 00 00.

3. Fire-Rated Frames: In accordance with NFPA standard No. 80 and SDI 118.

4. Metal Stud Partitions: Install at least 3 wall anchors per jamb at hinge and strike levels. Attach wall anchors to studs with tapping screws.

C. Door Installation

1. Install doors plumb and in true alignment in prepared openings. Fit metal
doors accurately in frames, within clearances specified in ANSI/SDI A250.8 (SDI100).

2. Install fire-rated doors with clearances as specified in NFPA Standard No. 80 and SDI 118.

D. Immediately after erection, sand smooth rusted or damaged areas of door and frame coat and apply touch-up prime coat of compatible air-drying primer.

3.03 FIELD QUALITY CONTROL

A. Final Adjustment: Provide final adjustment as follows:

1. Door Contact with Silencers: Doors shall strike a minimum of two (2) silencers without binding lock or latch bolts in strike plate.
2. Head, Strike and Hinge Jamb Clearance: 1/8”.
3. Meeting Edge Clearance, Pairs of Doors: +1/16”
4. Bolts and Screws: Leave tight and firmly seated.

END OF SECTION
SECTION 08 14 00
WOOD DOORS

PART 1  GENERAL

1.01  WORK INCLUDED
A. Provide the following types of wood doors:
   1. Solid core
   2. Fire rated

1.02  RELATED SECTIONS
A. Hollow Metal Door Frames:  Section 08 11 13.
B. Door Hardware Section 08 71 10.

1.03  QUALITY ASSURANCE
A. Provide wood doors fabricated by one manufacturer to ensure uniformity in appearance and construction.
B. Reference Standards
   1. Underwriters' Laboratories - UL 10C (positive pressure) - Fire Tests of Door Assemblies
   2. Window and Door Manufacturers Association (WDMA):  WDMA IS 1A-04.
   4. NFPA 80 - Fire Doors and Windows
   5. NFPA 252 - Standard Methods of Fire Tests for Door Assemblies
C. Engineered Wood Products
   1. Determine formaldehyde concentrations in air from wood products under test conditions of temperature and relative humidity in accordance with ASTM D6007 or E1333.
   2. Determine Volatile Organic Compounds VOC), excluding formaldehyde, emitted from manufactured wood-based panels in accordance with ASTM D6330.

1.04  SUBMITTALS
A. Submit manufacturer's product data and installation instructions for each type of wood door required.
1. Include details of core and edge construction.
2. Include certification indicating compliance with specification requirements.

B. Submit Shop Drawings

1. Indicate location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking and other pertinent data.
2. Identify doors in accordance with drawing door schedule.

C. Submit sample corner section, 12" square, showing required veneer and edge construction.

D. Finish Samples

1. Factory Finished Doors: Submit three (3) flitch samples of each species of face veneer with factory applied stain and finish as specified and indicated illustrating expected range of color and grain variation.

1.05 DELIVERY, STORAGE AND HANDLING

A. Store and protect doors in accordance with manufacturer’s recommendations and WDMA.

B. Following are general guidelines. For more specific information refer to WDMA’s Appendix Section “Care and Installation at Job Site.”

1. Deliver doors in manufacturer’s original unopened protective packaging or wrapper.
   a. Store doors flat and off the floor on a level surface in a dry, well-ventilated building. Do not store on edge. Protect doors from dirt, water and abuse.
   b. Do not subject interior doors to extremes in either heat or humidity. HVAC systems should be operational and balanced, providing a temperature range of 50 to 90 degrees Fahrenheit and 30% to 50% relative humidity.
   c. When handling doors, always lift and carry. Do not drag across other doors or surfaces. Handle with clean hands or gloves.
   d. Each door will be marked on top rail with opening number.

1.06 LABEL DOOR REQUIREMENTS

A. Fire Ratings Compliance: Comply with the label requirements of NFPA and applicable local codes. Fabricate doors and frames in accordance with requirements of NFPA Standard No. 80 and U.L. Standards as follows:

1. Positive Pressure Testing UL 10C

B. Ratings Certifications
1. Provide U.L. labels permanently fastened on each door that is within the size limitations established by NFPA and U.L. for labeling.

2. Provide anchors for U.L. labeled frames required by the authority having jurisdiction.

1.07 WARRANTY

A. Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
   b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty Period for Solid-Core Exterior Doors: Two years from date of Substantial Completion.


PART 2 PRODUCTS

2.01 MATERIALS AND COMPONENTS

A. Interior Flush Doors Solid Core: Meet or exceed WDMA I.S.1A Industry Standard for Wood Flush Doors requirements and as specified. WDMA I.S.1A. Performance Grade – Heavy Duty.

1. Interior Flush Doors Solid Core – Non-Rated and 20 Minute Rated Fire Doors: Provide one of the following cores with hardwood veneers:
   a. Stave Lumber Core (SLC-5) may be a combination of solid, low-density hardwood lumber blocks or strips not more than 2-1/2” wide of one species of wood between 6% to 9% moisture content. Joints to be tight and staggered in adjacent rows. Lumber density is 25 to 27 lbs. per cubic foot. Formaldehyde free.
   b. Structural Composite Lumber Core (SCLC-5) is an engineered hardwood composite sometimes referred to as LSL (Laminated Strand Lumber). The material complies with WDMA minimum performance levels for interior applications with screw holding power of 540 lbs., modulus of rupture of 6,500 psi, modulus of elasticity of 1,300,000 psi and density of 38 lbs per cubic foot. Formaldehyde free.

2. Interior Flush Fire Doors – Above 20 Minute Rated: FD solid core with hardwood face veneer.
   a. Rating as indicated on drawings.
   b. Provide one of the above cores or the following as required to maintain fire rating:
      1) Non-combustible mineral composite material that is necessary for higher hourly ratings per manufacturer’s approval.
B. Moldings: Trim louver and glass openings with recessed bead type wood moldings, species matching door face veneer species. Profiles as selected by the Architect from manufacturer's standard profiles.

1. Glass Lites in Fire Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire rating indicated. Include concealed metal glazing clips where required for opening size and fire rating indicated.

2.02 FABRICATION

A. Flush Doors: Fabricate doors in accordance with WDMA I.S. 1A, Custom with Grade A faces Grade requirements for transparent stained finish. Formaldehyde free.

1. Core Construction: Bond stiles and rails to core and sand entire unit prior to assembly of face veneers.
2. Number of Plies: 5.
3. Face Veneers: Minimum 1/50" thick before sanding, plain sliced select white maple hardwood.
   a. Figure: Biological defects of grain, color and effects including but not limited to - blisters, flake, quilts, rope, burl, crotch, mottle patterns, shall not exceed approved veneer samples.
5. Adhesive: Type I, waterproof.
6. Edge Strips: Stile edges hardwood species matching face veneer; bonded to core; 1-1/8" minimum width after trimming. Top and bottom edges hardwood of mill option.
7. Match Between Veneer Leaves:
   a. Plain Sliced Veneer: Book matched for color and grain.
   b. Rift or Quarter Sawn Veneer: Slip match for color and grain.
8. Assembly of Veneer Leaves on Door Faces: Running match.
9. Hardware: Factory machine for mortise hardware using template provided by hardware manufacturer.
10. Reinforcement: Reinforce doors to receive hardware specified.
    a. Hinge Attachment: Stiles and rails to be continuously glue bonded to the core so that screw stress is transmitted directly to the core.
    b. Closure, Exit Device and Other Surface Mounted Hardware: Provide top rail 2-1/2" or more in width to hold closer fasteners and solid wood blocking for all other surface applied hardware.

B. Fire Rated Doors: Conform to "Flush Door" requirements specified above. Provide doors of U.L. classification indicated.

1. Reinforcement: Reinforce doors to receive hardware specified.
   a. Surface applied hardware that is located where screws cannot penetrate the above mentioned stiles or wood rails shall be through bolted.
C. Factory Finish

1. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
   a. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.

2. Finish: WDMA TR-4 conversion varnish.


4. Effect: Filled finish.

5. Sheen: Satin.

D. Individually package doors at factory with manufacturer's standard packaging or wrapping for delivery to job site.

E. Manufacturers: MARSHFIELD; ALGOMA; EGGERS; MOHAWK; OSHKOSH; VT INDUSTRIES, LAMBTON DOORS.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine substances, rough openings and installation conditions. Do not proceed with wood door installation until unsatisfactory conditions have been corrected.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 PREPARATION

A. Verify metal frame dimensions and hardware mortises in metal frames with metal frame manufacturer.

3.03 INSTALLATION

A. Condition doors to average prevailing humidity in installation area before hanging.

B. Install doors in accordance with manufacturer's installation instructions. Job fit and prepare doors to receive hardware. Bevel 1/8" in 2" at strike edges for clearance in arc of swing. Seal cut surfaces, tops, bottoms and edges with sanding sealer after fitting and machining.

C. Hang doors straight, plumb and square securely anchored into position. Adjust doors to provide uniform clearance and to contact stops uniformly. Remove and replace doors that are warped, bowed or otherwise damaged and cannot be properly fit to the opening.

D. Install fire-rated doors in corresponding fire-rated frames in accordance with
requirements of NFPA No. 80.

3.04 PROTECTION

A. Protect installed doors from soiling, staining and damage until final acceptance.

B. Repair or replace doors damaged beyond acceptable repair as directed by the Architect.

END OF SECTION
SECTION 08 31 13

ACCESS DOORS

PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide wall, partition and ceiling access doors for access to mechanical and electrical equipment as indicated.

1. Provide fire-rated where indicated or specified.

1.02  RELATED SECTIONS

A. Finish Painting: Section 09 91 00.

1.03  QUALITY ASSURANCE

A. Coordination: Furnish inserts and anchoring devices that must be built into other work for installation of access panels. Coordinate delivery with other work to avoid delay.

1.04  SUBMITTALS

A. Submit product data and shop drawings for each item. Include installation instructions for conditions involved.

PART 2  PRODUCTS

2.01  MATERIALS AND FABRICATION - WALL AND CEILING TYPES

A. General: Provide access panel assembly manufactured as an integral unit, complete with all parts and ready for installation. Fabricate units of continuous welded steel construction, unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of support shown.

B. Standard Access Door

1. Description: Minimum 14 gage steel panels with minimum 16 gage steel frames. Units to have concealed hinges.

2. Provide with exposed 1” frame flange.

3. Manufacturer: Provide panels by one of the following, subject to the above requirements.
   a. J. L. INDUSTRIES INC. Model TM
   b. LARSEN’S MANUFACTURING Model L-MPG
C. Fire-Rated Access Door

1. Description: Minimum 20 gage interior and exterior steel panels with minimum 16 gage steel frames and masonry wall type anchors welded to frame.
   a. Automatic Closing: Provide self-closing spring device to assure positive latching.
   b. Fire-Rating: U.L. label equal to wall rating indicated on drawing.
   c. Provide interior lock/latch release device.
   d. Core: Fire-rated mineral fiber.

2. Manufacturer: Provide panels by one of the following, subject to the above requirements.
   a. J. L. INDUSTRIES INC. Model FD
   b. LARSEN’S MANUFACTURING Model L-FRAP
   c. BABCOCK-DAVIS Model B-IT
   d. NYSTRON Model IT/IW/IP

D. Locks

1. Exposed to Public: Provide cylinder locks on all access doors; 7-pin removable core cylinders. Key in accordance with Section 08 71 10.
2. All Others: Screw drive type latching device.

E. Factory Prime Finish: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine areas and conditions under which access panels are to be installed.

B. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.02 INSTALLATION

A. Comply with manufacturer's instructions for installation of access panels.

B. Coordinate installation with work of other trades.

C. Set frames accurately in position and securely anchor to supports with face panels level in relation to adjacent finish surfaces.

3.03 ADJUST AND CLEAN

A. Adjust hardware and panels after installation for proper operation.
B. Remove and replace panels or frames that are warped, bowed or otherwise damaged.

END OF SECTION
This page intentionally blank
SECTION 08 36 13

SECTIONAL DOORS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Section includes:
   1. Glazed aluminum sectional overhead doors.
   2. Operating hardware, tracks and supports.
   3. Electric operations and controls

1.02 RELATED SECTIONS

A. Electrical: Division 26.

1.03 REFERENCES

A. American National Standards Institute (ANSI)

B. American Society for Testing and Materials (ASTM)
   1. ASTM A653: Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   2. ASTM B221: Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire

1.04 SYSTEM DESCRIPTION

A. Design Requirements
   1. Furnish sectional overhead doors that comply with ANSI/DASMA 102.
   2. Wind Loading: Design and reinforce sectional overhead doors to comply with ANSI/DASMA 102 criteria for wind loading.
   3. Insulated units.
   4. Full vision panels where indicated.

1.05 SUBMITTALS

A. Shop Drawings: Fully dimensioned and detailed drawings showing complete installation with components, materials and finishes, and accessories indicated.
B. Samples for Color Selection: Submit samples of door manufacturer's full range of metal finish colors on 4" x 6" piece of standard base metal.

C. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

D. Quality Control Submittals
   1. Certificates: For review and approval, submit manufacturer's written certificates indicating that doors comply with specified design criteria of ANSI/DASMA 102.
   2. Installer Qualifications: For review and approval, submit installer's written statement of compliance with installation experience requirement.

1.06 QUALITY ASSURANCE

A. Provide each sectional overhead door as a complete unit produced by one manufacturer, including frames, sections, brackets, guides, tracks, counterbalance mechanisms, motor operator, controls, hardware and installation accessories to suit openings and allowable headroom.

B. Provide sectional overhead door units by one manufacturer for entire project.

C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.

D. Installer Qualifications: Authorized representative of the manufacturer with minimum five years documented experience.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.07 WARRANTY

A. Provide manufacturer's standard 2-year product warranty covering door sections.

B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Warranty Period: 10 years.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Basis of Design Manufacturer: CHI OVERHEAD DOOR Model 3295

B. Other Manufacturers: Subject to compliance with requirements and an acceptable match to basis of design, provide doors by OVERHEAD DOOR COMPANY, HAAS, CLOPAY; COOKSON, WAYNE DALTON or ARM-R-LITE.

2.02 GLAZED ALUMINUM DOOR SECTIONS

A. Sectional Door Assembly: Aluminum stile and rail assembly secured with 1/4" diameter through rods. Design units to the following:

1. Thickness: 1-3/4".
2. Glazing: 1/4" tempered glass; see Section 08 81 00.
3. Aluminum: Minimum 0.065" thick, alloy 6063-T6.
4. Door Finish: Manufacturer's standard baked-on epoxy primer with polyester finish coating. Architectural Class 1, clear anodized coating; AA-M12C22A41, minimum 0.7 mil thickness.
5. Counterbalancing Mechanism: Torsion spring type.
6. Rollers: Case hardened steel rollers with inner and outer race.
8. Accessories
   a. Head and jamb weatherstripping.
   b. Full vision lites.
9. Door Layout: As indicated on the drawings.

2.04 COMPONENTS

A. Tracks

1. Provide manufacturer's standard galvanized steel track system, sized for door size and weight, and designed for clearances shown.
2. Provide complete track assembly including brackets, bracing and reinforcing for rigid support of ball-bearing roller guides.
3. Slot vertical sections of track at 2" on center for door drop safety device.
4. Slope tracks at proper angle from vertical, or otherwise design to ensure tight closure at jambs when door unit is closed.
5. Provide tracks and make provisions for extending above lay-in ceiling where indicated.

B. Track Reinforcement and Supports

1. Provide galvanized steel track reinforcement and support members.
2. Secure, reinforce and support tracks as required for size and weight of door to provide strength and rigidity, and to ensure against sag, sway and detrimental vibration during opening and closing of doors.
3. Support and attach tracks to opening jambs with continuous angle welded to tracks and attached to wall.

C. Counterbalancing Mechanism
1. Hang door assembly for operation by torsion spring counterbalance mechanism, consisting of adjustable-tension tempered steel torsion springs mounted on a case hardened steel shaft, and connected to door with galvanized air-craft type lift cables.

2. Provide cast aluminum or gray iron casting cable drums, grooved to receive cable.

3. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of shaft with one additional midpoint bracket for shafts up to 16' long and 2 additional brackets at one-third points to support shafts over 16' long, unless closer spacing is recommended by door manufacturer.

4. Include a spring-loaded steel or bronze cam mounted to bottom door roller assembly on each side, designed to stop door automatically if either cable breaks.

5. Provide either a compression spring or leaf spring bumper installed at end of each vertical track to cushion door at end of opening operation.

D. Weather Seals: Provide continuous rubber or flexible vinyl weatherstrip gasket at door bottom.

2.05 ACCESSORIES

A. Hardware: Provide heavy duty, rust-resistant hardware, with galvanized, cadmium plated, or stainless steel fasteners, to suit type of door.

1. Hinges
   a. Provide heavy steel hinges at each end stile and at each intermediate stile, per manufacturer's recommendations for size of door.
   b. Attach hinges to door sections through stiles and rails with bolts and lock nuts or with lock washers and nuts.
   c. Use rivets or self-tapping fasteners where access to nuts is not possible.

2. Rollers: Provide heavy-duty rollers, with steel ball bearings in case-hardened steel races, mounted with varying projections to suit slope of track.

2.06 ELECTRIC DOOR OPERATOR

A. General: Provide electric door operator assembly of size and capacity recommended and provided by door manufacturer; complete with electric motor and factory-prewired motor controls, gear reduction unit, solenoid operated brake, clutch and accessories required for proper operation.

B. Door Operator Type: Provide wall mounted door operator units consisting of electric motor, worm gear drive from motor to reduction gear box, chain or worm gear drive from reduction box to gear wheel mounted on counterbalance shaft, and a disconnect-release for manual operation. Provide motor and drive
assembly of horsepower and design as determined by door manufacturer for size of door required.

C. Electric Motors: Provide high-starting torque, reversible, constant duty, Class A insulated electric motors with overload protection, sized to move door in either direction, from any position at not less than 2/3' nor more than 1' per second.

1. Power: 115v, 1 phase, 60Hz; motor horsepower sized for application, minimum 1/3 hp.
2. Controls: Provide key operated switches where indicated.
   a. Photoelectric Sensor: Manufacturer’s standard system designed to detect an obstruction in door opening without contact between door and obstruction.
   b. Provide sensor in tamperproof enclosure as indicated.

PART 3 EXECUTION

3.01 INSPECTION

A. Installer must examine the supporting structure and the conditions under which the work is to be performed and notify the General Contractor in writing of conditions which are detrimental to proper and timely completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.02 INSTALLATION

A. Install door and operating equipment complete with necessary hardware, tracks, anchors, inserts, hangers and equipment supports in accordance with drawings and manufacturer’s instructions and recommendations.

3.03 FIELD ADJUSTMENT

A. Upon completion of installation including the work by other trades, test and adjust doors to operate easily, free from warp, twist or distortion.

END OF SECTION
This page intentionally blank
SECTION 08 41 13

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1  GENERAL

1.01  WORK INCLUDED

A. Work under this section includes the design of the aluminum entrance and window systems and all materials, labor and equipment for the complete installation of the work as shown on the drawings and specified herein. Work includes:

1. Aluminum entrance doors.
2. Aluminum entrance framing system for entrances and vestibule, including sidelight and transom frames as indicated.
3. Aluminum storefront system.
4. Aluminum windows.
   a. Fixed
5. Glass and glazing of the systems.
6. Hardware.
7. Anchors, fasteners, flashings, trim and accessories to complete the work.
8. Sealants required within entrance and window construction.
9. All gaskets, sealants and tapes required in final assembly of the work.
10. Installation of lock cylinders furnished under Section 08 71 10.

1.02  RELATED SECTIONS

A. Joint Sealants:  Section 07 92 00.
B. Glazing:  Section 08 81 00.
C. Hardware: Section 08 71 10.
D. Glazed Aluminum Curtainwalls:  Section 08 44 13.
E. Vapor/Air Barrier Transition Membranes:  Section 07 27 26.

1.03  QUALITY ASSURANCE

A. Provide aluminum doors and framing system manufactured by a single firm specializing in the production of this type of work.
B. Installer Qualifications:  Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

1.04  REFERENCES

1.05 SUBMITTALS

A. Submit the following:

1. Framing system details.
2. Door details.
3. Window details.
4. Installation instructions.
5. Itemized schedule of door hardware.
6. Finish samples.

B. Tests: Submit two copies of test reports made or witnessed by an independent testing laboratory showing the results of tests conducted on previously manufactured windows of the type used on this project. The reports shall verify conformance to thermal movement, air and water infiltration and structural properties as described herein.

C. Building Shop Drawings: Include complete evaluations of all systems including doors; details and methods of anchorage; details of construction finishes; methods of assembly; location and installation of hardware and reinforcement for same; size, shape and thickness of materials; joints and connections; details of joining with other work.

1. Scale: Include typical unit elevation of each system at 1/2" scale and details at full scale where practical.

D. Product Data: Submit manufacturer's specifications for materials and fabrication of work, and instructions and recommendations for installation and maintenance. Include certified test reports showing compliance with requirements where a test method is indicated.

E. Samples: Submit samples of each type and color and finish required by this Section, on 12" sections of extrusions or formed shapes and on 6" squares of sheet/plate. Include two or more samples in each set.

1. Architect reserves right to require fabrication samples showing prime members, joinery, anchorage, expansion provisions, glazing and similar details, profiles and intersections.

1.05 DELIVERY, STORAGE AND HANDLING

A. Pack, deliver, handle, store and protect materials from damage in accordance with AAMA Curtain Wall #10, "Care and Handling of Architectural Aluminum" recommendations.
1. Remove paper type wrappings when unloading.
2. Store materials inside the buildings whenever possible in clean, dry ventilated areas free of dust or corrosive fumes.
3. Stack members vertically or on edge, shim between components to provide water drainage and ventilation. Protect with adequate coverings, placed to provide adequate air circulation.
4. During installation, protect materials from lime mortar, run-off from concrete and copper, weld splatter, acids, roofing materials, solvents and abrasive cleaner.

1.06 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

1.07 WARRANTIES

A. Submit written warranty signed by manufacturer, Contractor, and installer agreeing to repair or replace work which fails in materials or workmanship within three (3) years of the date of project acceptance.

1. Failure of materials or workmanship shall include excessive leakage or air infiltration, excessive deflections and defects in accessories, weather seals and other components of work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Drawings and specifications are based on products by KAWNEER CO.

B. Other Acceptable Manufacturers: Equal products by the following manufacturers are acceptable providing they meet or exceed the requirements specified herein and conform to the design intent indicated on the drawings:

1. CRL – U.S. ALUMINUM
2. EFCO
3. OLDCASTLE BUILDING ENVELOPE
4. TUBELITE DIVISION, INDAL, INC.
5. YKK AMERICA

2.02 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.

B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36.
2. Cold-Rolled Sheet and Strip: ASTM A 1008.

2.03 STOREFRONT, WINDOW FRAMING AND ENTRANCE DOOR SYSTEMS

A. Type: An integrated system of extruded aluminum sections, glazing devices, sealing devices, doors and hardware and operable windows.

B. Materials: Provide aluminum alloy and temper for each shape as recommended by manufacturer and processor to comply with requirements of performance, fabrication, and application of finish.

1. Thickness: As required to meet design requirements with a minimum of 1/8" for major sections.

C. Framing: KAWNEER 451T, framing for 1" insulating glass.

1. Type: Thermally broken, outside glazed, fixed type framing as indicated on drawings.
2. Frame
   a. Members: Main frame members designated specifically for manufacture of aluminum windows extruded from 6063-T5 aluminum alloy.
   b. Glazing: Extruded snap-in type bead. Units to accept 1" insulating glass.
   c. Trim: Provide all trim, sills, flashings and closures to complete installation.
   d. Size
      1) Sightline: Nominal 2".
      2) Depth: 4-1/2".
   e. Provide subframing as required for power operated entrance door application. See Section 08 42 29.
3. Glazing Plane: Front
4. Special Framing Shapes: Provide as detailed or as required to maintain design intent as indicated on building elevations drawings and section drawings. Aluminum extruded shapes and bent aluminum sheet, minimum 0.063", finished after fabrication.
5. Vestibule Framing: Non-thermally broken; dimensions to match exterior framing. KAWNEER Trifab II 451. Units to accept 1/4" glass.
6. Interior Framing: Non-thermally broken. KAWNEER Trifab II 451. Units to
accept glass thickness indicated.

a. Designed to resist a 200 lb/SF concentrated load in any direction where indicated on the drawings.

b. Size
   1) Sightline: Nominal 2”.
   2) Sill Sightline: Nominal 4-1/2”
   3) Depth: 4-1/2”.

7. Provide extruded solid backed framing shapes where framing abuts solid wall conditions.

D. Performance Requirements: Exterior window wall system (excluding doors) shall meet or exceed the following performance requirements.

1. Wind loads: Provide storefront system; include anchorage, capable of withstanding wind load design pressures indicated on the drawings.

2. Thermal Movement: Window framing system shall be designed to provide for expansion and contraction of component materials caused by a surface temperature range of 180° F., without causing buckling, stresses on glass, failure of joint seals, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or other detrimental effects.
   a. Doors: Function properly over the above specified temperature range.

3. Air Infiltration: Air leakage shall not exceed 0.06 cfm per square foot of fixed wall area when tested in accordance; with ASTM E283 at test pressure not less than 6.24 psf.

4. Water Infiltration
   a. Provide drainage to exterior face of framing any water entering at joints.
   b. No uncontrolled water penetration shall occur when tested in accordance with ASTM E331, at test pressure not less than 8.0 psf.

5. Structural Properties - Uniform Load: A static air design load of 20 psf shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.

6. Thermal Properties
   a. Thermal Transmittance (U-factor): When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than (Glass to Center) 0.44 (low-e) BTU/hr/ft sq./degree F
   b. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than (Glass to Center) 62 frame and 68 glass (low-e)

E. Glazed Aluminum Entrance Doors: Wide style, single acting aluminum entrances. Drawings and specifications are based on KAWNEER Tuffline Series heavy duty types by the other listed manufacturers are acceptable provided they meet the requirements specified herein.

1. Sizes: As indicated. Provide single or pairs of doors as scheduled.
2. Exterior Entrance Weatherstripping: Manufacturer's standard continuous interlocking type. Locate weatherstripping at jambs, head and meeting stiles (as applicable). Provide bottom rail with EPDM blade gasket sweep. Size sweep to close against door threshold. Sweep housing finish to match door finish.

3. Glazing: 1/4”.

4. Section Wall Thickness: .185” for major components; .125” for glazing pockets.

5. Corners: Stiles through design, joined by concealed bolts and/or welds.

6. Provide complete with snap-in glazing stops and gaskets.

7. Thickness: 2” minimum.

2.04 FINISHES

A. All exposed aluminum surfaces shall receive an Architectural Class 1, black anodized coating; AA-M12C22A42 on exterior surfaces and clear anodized coating; AA-M12C22A41 on interior surfaces, minimum 0.018 mm thickness.

2.05 ENTRANCE DOOR HARDWARE

A. Prepare and reinforce doors and frames for hardware. Factory fit and install hardware in accordance with Section 08 71 10 and manufacturer's requirements.

2.06 ACCESSORIES

A. Fasteners: Aluminum, non-magnetic stainless steel or other materials warranted by manufacturer to be non-corrosive and compatible with aluminum components. Finish exposed fasteners to match aluminum work.

B. Flashing, Trim and Accessories: Provide as required to complete the work. Finish shall match aluminum entrances and storefront finishes. Work includes:

1. Aluminum closure panels, flashing and trim.
2. Concealed Flashing: Dead-soft stainless steel, 26 gauge minimum, type selected by manufacturer for compatibility.
3. All trim materials shall be finished after fabrication, unfinished exposed edges at holes and trim terminations are not acceptable.

C. Brackets and Reinforcements: Manufacturer's high strength aluminum units where feasible; otherwise, nonmagnetic stainless steel or hot-dip galvanized steel complying with ASTM A123.

D. Bituminous Coatings: Cold applied asphalt mastic complying with SSPC PS 12, compounded for 30 mil thickness per coat.

2.07 FABRICATION

A. Provide manufacturer's standard fabrication and accessories that comply with indicated requirements. Minor dimension differences will be accepted in order to utilize manufacturer's standard products.
B. Fit and assemble the work at the shop to the greatest extent possible. Disassemble only as required for shipment and erection. Maintain true continuity of line and accurate relation of planes and angles. Provide secure attachment and support at mechanical joints, with hairline fit of contacting members. Conceal fasteners wherever possible.

C. Reinforce aluminum work as necessary at points of support or anchorage and at mechanical joints and points of attachment to meet performance requirements and for support of the system. Separate dissimilar metals with bituminous paint or preformed separators that will prevent corrosion. Separate metal surfaces at moving joints with plastic inserts or other non-abrasive concealed inserts.

D. Coordinate work of this section with other work for proper sequence of construction without delays. Verify dimensions of supporting structure and other elements that precede wall system work before fabrication of required components. Provide for erection tolerances for other work where field measurements cannot be obtained.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine substrates supporting structure, and installation conditions. Do not proceed with aluminum entrances erection until unsatisfactory conditions have been corrected.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 INSTALLATION

A. General

1. Do not install component parts that are observed to be defective, including warped, bowed, dented, abraded and broken members.
2. Remove and replace members that have been damaged during installation or thereafter before time of acceptance.
3. Do not cut or trim component parts during erection, in a manner which would damage finish, decrease strength or result in a visual imperfection or a failure in performance of the work.

B. Install components in accordance with the manufacturer’s installation instructions and recommendations.

C. Install component parts level, plumb, true to line and with uniform joints and reveals. Secure to structure with non-staining and non-corrosive shims, anchors, fasteners, spacers and fillers.

D. Assembly and Anchorage: Anchor component parts securely in place, by bolting or other permanent mechanical attachment system, which will comply with
performance requirements and permits movements as required.

1. Anchor storefront sill to a continuous interior aluminum anchor.

E. Apply a bituminous coating or other suitable separator on concealed contact surfaces of dissimilar materials, before assembly or installation to prevent corrosive or electrolytic action.

F. Set sill members and entrance thresholds in a bed of sealant compound, or with joint fillers or gaskets to provide weathertight requirements.

G. Install glass and glazing, in accordance with Section 08 81 00 and the manufacturer's requirements.

H. Install joint sealants specified in Section 07 92 00, in accordance with the manufacturer's requirements.

I. Coordinate installation of storefront framing with installation of air/vapor barrier transition membrane.

J. Adjust operating hardware to function properly, without binding, and to provide tight proper fit at contact points and weatherstripping.

3.03 CLEANING AND PROTECTION

A. Protect glass from breakage immediately upon installation, by attachment of streamers to framing held away from glass. Do not apply markings of any type to surfaces of glass.

B. Remove protective coating when completion of construction activities no longer require its retention.

C. Immediately before acceptance of the work, clean the aluminum entrance systems thoroughly, inside and out. Demonstrate proper cleaning methods to Owner's maintenance personnel during final cleaning. Prepare a "Cleaning and Maintenance Manual" listing types of cleaning compounds, cleaning methods, sealants and glazing materials used for cleaning, repair and maintenance of work and turn over to Owner upon acceptance of the work.
END OF SECTION
This page intentionally blank
SECTION 08 42 29

SLIDING AUTOMATIC ENTRANCES

PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide automatic sliding door as a complete unit, including operator, header, track, jamb, sliding door panel(s), fixed sidelight panel(s), threshold, activating device and all accessories and miscellaneous components to provide an operating installation.

1. Limited access security equipment: Electric solenoid lock and concealed vertical rod exit device. Clarification: Locking and emergency exit device to be provided on exterior doors only. Vestibule (interior) doors will not be locked and are not to receive this locking option. However, interior doors are to have the same breakout capabilities as the exterior doors.

B. Coordinate automatic sliding entrance doors with aluminum storefront framing, Section 08 41 13.

1.02  RELATED SECTIONS

A. Aluminum Storefront Framing: Section 08 41 13.

B. Glass: Section 08 81 00.

C. Sealant: Section 07 92 00.

D. Electrical: Division 26.

1.03  QUALITY ASSURANCE

A. Reference Standards

1. ANSI A156.10 Standards: Comply with applicable requirements of Power Operated Pedestrian Door Standard.


B. Manufacturer’s Qualifications: Provide units produced by a firm with a minimum 3 years successful experience in the fabrication of automatic entrance doors of the
type required for this project.

C. Installer Qualifications: Approved and authorized by the door system manufacturer for both installation and maintenance.

1. Minimum Experience: Minimum 3 years experience in the installation and service of automatic entrance doors.
2. Maintenance Proximity: Not more than 3 hours normal travel time from installers place of business to project site.

D. Painted Finishes: Factory painted finish to be performed by an applicator specifically approved by the paint manufacturer. The applicator shall provide written notification of approval by paint manufacturer prior to application of the finish.

1.04 SUBMITTALS

A. Submit the following in accordance with the requirements of the General Conditions.

1. Product Data: Manufacturer's product data and standard details for automatic entrance doors, including fabrication, finishing, hardware, operators accessories and other components of the work. Include rough-in diagrams, wiring diagrams, parts lists, and maintenance instructions.
2. Furnish templates, diagrams and other data to fabricators and installers of related work, as needed for coordination of installation.
3. Shop Drawings: Submit for fabrication and installation of automatic entrance doors and associated components of the work. Indicate anchors, joint system, expansion provisions, hardware, glazing details and other components not included in manufacturer's standard data.
4. Samples
   a. Painted Finish: Samples of each type and color and finish required by this Section, on 12" sections of extrusions or formed shapes and on 6" squares of sheet/plate. Include two or more samples in each set, showing limits of variations (if any) in color and texture of finish.

1.05 WARRANTY

A. Provide manufacturer's guarantee of paint finish against failure of paint finish. Failure includes blistering, peeling, cracking, flaking, checking, excessive color change and chalking. Color change shall not exceed 5 N.B.S. units (per ASTM D523) and chalking shall not less than a rating of 8 per ASTM D4214.

1. Warranty Period: 20 years.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Basis of Design: Drawings and specifications are based on RECORD USA Series
B. Acceptable Manufacturers: The following manufacturers are acceptable providing the system proposed meets or exceeds the requirements of the specifications and drawings. Manufacturers are responsible for modifications and coordination of work required to make their systems properly function within the parameters indicated or specified.

1. BESAM, INC.
2. LCN.
3. HORTON AUTOMATICS.
4. STANLEY

2.02 DOOR UNIT

A. General: Unit includes operator, header and track, jambs, sliding door panel(s), fixed sidelight panel(s) and threshold.

1. Bi-Parting Entrances:
   a. Configuration: Two sliding leaves and two full sidelights.
   c. Emergency Breakaway Capability: Sliding leaves only.

B. Material: Extruded aluminum, 6063T-5 alloy, 0.125 inch thickness.

C. Header Section: Continuous, extruded aluminum. Conceal support track and ball-bearing wheels. Track must be replaceable without removing operator.

D. Emergency Breakaway: Provide release hardware that allows panels to swing out in direction of egress to full 90 degrees from any position in sliding mode. Maximum force to open panel shall be 30 lbf according to ANSI/BHMA A156.10. Interrupt powered operation of panel operator while in breakaway mode.
   1. Emergency breakaway feature shall include at least one adjustable detent device mounted in the top of each breakaway panel to control panel breakaway force.
   2. Limit Arms: Limit arms shall be provided to control swing of sliding or non-sliding panels on break-out; swing shall not exceed 90 degrees.

E. Weatherstripping: Manufacturer's standard type. Provide around complete perimeter of door panels.

F. Provide sliding panels with recessed exit device with cylinder. No bottom latching is required. Provide satin stainless steel finish. Key cylinder with building keying system as specified in Section 08 71 00.

G. Miscellaneous: Provide additional hardware items as required for a complete operating entrance door assembly.

2.03 OPERATOR
A. Description: Electro-mechanical type, header mounted and concealed with a securely attached removable cover.

1. Time Delay: Adjustable from 1 to 28 seconds.
2. Opening speed, closing speed, back check and latch check shall be fully and independently adjustable.
3. For protection in case of power failure, operator shall include automatic pressure relief to prevent closing on pedestrians; there shall be no springs or mechanisms to prevent free manual operation of the door.
4. Power "ON" and "OFF" switch shall be located on the inside of the header; serving a second function as a hold open for door.

B. Electrical: Provide door assembly complete with all internal wiring. Electrical Contractor shall provide all wiring to the operator. Door installation contractor shall make final connections to power.

1. Service: 115 volt, 60 cycle, 1 phase, 15 amp.

2.04 ACTIVATION AND SAFETY DEVICES

A. Motion Sensors: Motion sensors shall be mounted on each side of door header to detect pedestrians in the activating zone, and to provide a signal to open doors in accordance with ANSI/BHMA A156.10. Units shall be programmable for bi-directional or uni-directional operation and shall incorporate K-band microwave frequency to detect all motion in both directions.

B. Presence Sensors: Presence sensors shall be provided to sense people or objects in the threshold safety zone in accordance with ANSI/BHMA A156.10. Units shall be self-contained, fully adjustable, and shall function accordingly with motion sensors provided. The door shall close only after all sensors detect a clear surveillance field.

C. Photoelectric Beams: Photoelectric beams shall be pulsed infrared type, including sender receiver assemblies for recessed mounting. Beams shall be monitored by electrical controls for faults and shall be fail safe.

D. Access Control:

1. Provide manufacturers custom control package to include remote function to secure operation for one way exiting.

2.05 ELECTRICAL CONTROL

A. Electrical Control System: Electrical control system shall include a microprocessor controller and position encoder. The encoder shall monitor revolutions of the operator shaft and send signals to microprocessor controller to define door position and speed.

1. Programmable Controller: Microprocessor controller shall be programmable and shall be designed for connection to a local
configuration tool. Local configuration tool shall be a software driven handheld interface.

2.06 FABRICATION

A. Sizes: As indicated on drawing.

B. Sliding door unit is to be installed in coordination with aluminum entrance system framing. Coordinate opening size and installation details with framing system manufacturer.

C. Preassemble door unit to the greatest extent possible prior to shipment. Disassemble only to the extent necessary for shipment or installation.

D. Provide all concealed fasteners, unless approved by Architect.

2.07 FINISHES

A. All exposed aluminum surfaces shall receive an Architectural Class 1, clear anodized coating; AA-M12C22A41, minimum 0.018 mm thickness.

PART 3 EXECUTION

3.01 INSPECTION

A. Installer must examine areas and conditions under which automatic entrances are to be installed and notify Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with installations until unsatisfactory conditions have been corrected in a manner acceptable to the manufacturer.

3.02 INSTALLATION

A. Install in accordance with the manufacturer's instructions and recommendations.

B. Set units plumb, level and true to line, without warp or rack of frames or doors. Anchor securely in place.

C. Separate aluminum and other corrosible metal surfaces from sources of corrosion or electrolytic action at points of contact with dissimilar materials.

D. Set tracks, header assemblies, operating brackets, rails and guides level and true to location, with adequate anchorage for permanent support.

3.03 ADJUST AND CLEAN

A. Adjust door operators and controls for optimum operating condition and safety. Lubricate as recommended by manufacturer.

B. Clean aluminum surfaces after installation, exercising care to avoid damage to the
protective coating.

END OF SECTION
SECTION 08 43 14

INTERIOR ALUMINUM STOREFRONT

PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide aluminum storefront systems as shown and specified. Work includes:

1. Aluminum framing.
2. Glass and glazing of the systems.
3. Anchors, fasteners, flashings, trim and accessories to complete the work.
4. Sealants required within storefront construction.
5. All gaskets, sealants and tapes required in final assembly of the work.
6. Aluminum doors.

1.02  RELATED SECTIONS

A. Joint Sealants: Section 07 92 00.
B. Aluminum-Framed Entrances and Storefronts: Section 08 41 13.
C. Glass and Glazing: Section 08 81 00.
D. Door Hardware: Section 08 71 10.

1.03  REFERENCES

A. Architectural Aluminum Manufacturer's Association (AAMA)
B. American Society for Testing and Materials (ASTM)

1.04  QUALITY ASSURANCE

A. Provide interior aluminum storefront systems manufactured by a single firm specializing in the production of this type of work.

1.05  SUBMITTALS

A. Submit the following in accordance with the General Conditions and Section 01 33 23:
1. Framing system details.
2. Installation instructions.
3. Finish samples.

1.06 DELIVERY, STORAGE AND HANDLING

A. Pack, deliver, handle, store and protect materials from damage in accordance with AAMA Curtain Wall #10, "Care and Handling of Architectural Aluminum" recommendations.

1. Remove paper type wrappings when unloading.
2. Store materials inside the buildings in clean, dry ventilated areas free of dust or corrosive fumes.
3. Stack members vertically or on edge, shim between components to provide water drainage and ventilation. Protect with adequate coverings, placed to provide adequate air circulation.
4. During installation, protect materials from lime mortar, run-off from concrete and copper, weld splatter, acids, roofing materials, solvents and abrasive cleaner.

PART 2 PRODUCTS

2.01 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221.

2.02 STOREFRONT SYSTEM

A. Type: An integrated system of extruded aluminum sections, glazing devices, sealing devices.

B. Framing: "Trifab 450 CG." and "Trifab VG 450" by KAWNEER, 1-3/4" x 4-1/2" members. Equal products by VISTAWALL; EFCO, YKK AMERICA or TUBELITE are acceptable provided they comply with requirements stated herein.

1. Provide complete with snap-in glazing stops and gaskets for the thicknesses of glass units indicated or specified. Provide rectangular glazing stops; triangular or beveled not permitted.
2. Provide silicone glazed system framing members where indicated.

C. Provide door frame extrusions as required to fit in storefront framing system or as individual framed opening as scheduled.

2.03 DOORS
A. Glazed Aluminum Interior Doors: Wide stile, single acting, glazed aluminum entrances.

1. Sizes: As indicated. Provide single or pairs of doors as scheduled.
2. Stiles: Nominal 5-1/2” wide.
3. Rails
   a. Top: 5” high.
   b. Bottom: 10” high.
4. Section Wall Thickness: .125” for major components; 0.05” for glazing moldings.
5. Door Thickness: 1-3/4”.
6. Corners: Stiles through design, joined by concealed bolts and weld.
7. Provide complete with snap-in glazing stops and gaskets. Provide rectangular glazing stops; triangular or beveled not permitted.
8. Glazing: 1/4”, unless otherwise indicated.

2.03 FINISHES

A. All exposed aluminum surfaces shall receive an Architectural Class 1, clear anodized coating; AA-M12C22A41, minimum 0.7 mil thickness.

2.04 ACCESSORIES

A. Fasteners: Aluminum, non-magnetic stainless steel or other materials warranted by manufacturer to be non-corrosive and compatible with aluminum components. Finish exposed fasteners to match aluminum work.

B. Brackets and Reinforcements: Manufacturer's high strength aluminum units where feasible; otherwise, nonmagnetic stainless steel or hot-dip galvanized steel complying with ASTM A123.

C. Bituminous Coatings: Cold applied asphalt mastic complying with SSPC PS 12, compounded for 30 mil thickness per coat.

D. Clear Protective Coatings: Provide aluminum surfaces covered with strippable surfacing designed specifically for protection of aluminum finish.

2.05 FABRICATION

A. Aluminum Storefronts: Provide manufacturer's standard fabrication and accessories which comply with indicated requirements. Minor dimension differences will be accepted in order to utilize manufacturer's standard products.

B. Shop fabricate aluminum storefront systems. Fit and assemble the work at the shop to the greatest extent possible. Disassemble only as required for shipment and erection. Maintain true continuity of line and accurate relation of planes and angles. Provide secure attachment and support at mechanical joints, with hairline fit of contacting members. Conceal fasteners wherever possible.
C. Reinforce aluminum work as necessary at points of support or anchorage and at mechanical joints and points of attachment to meet performance requirements and for support of the system. Separate dissimilar metals with bituminous paint or preformed separators which will prevent corrosion. Separate metal surfaces at moving joints with plastic inserts or other non-abrasive concealed inserts.

D. Coordinate aluminum storefront systems work with other work for proper sequence of construction without delays. Verify dimensions of supporting structure and other elements which precede wall system work before fabrication of required components. Provide for erection tolerances for other work where field measurements cannot be obtained.

PART 3  EXECUTION

3.01  INSPECTION

A. Examine substrates supporting structure, and installation conditions. Do not proceed with aluminum storefront erection until unsatisfactory conditions have been corrected.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02  INSTALLATION

A. General

1. Do not install component parts which are observed to be defective, including warped, bowed, dented, abraded and broken members. Remove and replace members which have been damaged during installation or thereafter before time of acceptance.

2. Do not cut or trim component parts during erection, in a manner which would damage finish, decrease strength or result in a visual imperfection or a failure in performance of the work.

B. Install the aluminum storefront systems in accordance with the manufacturer's installation instructions and recommendations.

C. Install component parts level, plumb, true to line and with uniform joints and reveals. Secure to structure with non-staining and non-corrosive shims, anchors, fasteners, spacers and fillers.

D. Assembly and Anchorage: Anchor component parts securely in place, by bolting or other permanent mechanical attachment system, which will comply with performance requirements and permits movements as required.

E. Apply a bituminous coating or other suitable separator on concealed contact surfaces of dissimilar materials, before assembly or installation to prevent corrosive or electrolytic action.
F. Install aluminum storefront system glass and glazing, in accordance with Section 08 81 00 and the manufacturer's requirements.

G. Install joint sealants within the aluminum storefront systems work with elastomeric joint sealants specified in Section 07 92 00, in accordance with the manufacturer's requirements.

3.03 CLEANING AND PROTECTION

A. Protect glass from breakage immediately upon installation, by attachment of streamers to framing held away from glass. Do not apply markings of any type to surfaces of glass.

B. Remove protective coating when completion of construction activities no longer require its retention.

C. Immediately before acceptance of the work, clean the aluminum storefront systems thoroughly. Demonstrate proper cleaning methods to Owner's maintenance personnel during final cleaning. Prepare a "Cleaning and Maintenance Manual" listing types of cleaning compounds, cleaning methods, sealants and glazing materials used for cleaning, repair and maintenance of work and turn over to Owner upon acceptance of the work.

D. Prepare a "Cleaning and Maintenance Manual" listing types of cleaning compounds, cleaning methods, sealants and glazing materials used for cleaning, repair and maintenance of work and turn over to Owner upon acceptance of the work.
END OF SECTION
SECTION 08 43 33
ALUMINUM-FRAMED FOLDING GLASS WALL

PART 1  GENERAL

1.01  WORK INCLUDED

A. Sliding/folding aluminum and glass door system, including aluminum frame, threshold, panels, sliding/folding and locking hardware, weather stripping, glass and glazing.

1.02  RELATED SECTIONS

A. Joint Sealants: Section 07 92 00.
B. Glazing: Section 08 81 00.

1.03  REFERENCES

A. American Architectural Manufacturers Association (AAMA):
   1. AAMA 611.98, Voluntary Specification for Anodized Architectural Aluminum.

1.04  QUALITY ASSURANCE

A. Manufacturer: Minimum 10 years experience in providing folding/sliding door systems for large openings equal to that required for this project.
B. Performance Requirements: Unit to comply with applicable manufacturer's independently certified testing results. Testing results include air infiltration in accordance with ASTM E283, water penetration in accordance with ASTM E 547, structural loading in accordance with ASTM E330, and forced entry in accordance with AAMA 1303.5.
C. Installer Qualifications: Manufacturer's certified trained installer with a minimum of 3 projects of similar scale and complexity successfully completed in the last 3 years.

1.05  SUBMITTALS

A. Submit shop drawings for fabrication and installation of sliding glass doors. Include elevations and detail sections of every typical member. Show anchors and other elements not included in manufacturer's standard data. Include glazing details. Indicate dimensioning, direction of swing, configuration, swing panels,
typical head jamb, side jambs and sill details.

B. Product Data: Manufacturer's literature including independently tested data listing performance criteria and Owner's Manual with installation instructions.

C. Maintenance Data: Furnish written instructions describing recommended materials and methods for proper maintenance of door assembly. Provide special tools as required.

1.06 DELIVERY, STORAGE AND HANDLING

A. Pack, deliver, handle, store and protect materials from damage in accordance with AAMA Curtain Wall #10 "Care and Handling of Architectural Aluminum" recommendations.

1. Remove paper type wrappings when unloading.
2. Store materials inside the building whenever possible in clean, dry, ventilated areas free of dust or corrosive fumes.
3. Stack members vertically or on edge, shim between components to provide water drainage and ventilation. Protect with adequate coverings, placed to provide adequate air circulation.

B. Do not incorporate damaged materials into the work.

1.07 PROJECT CONDITIONS

A. Field verify measurements and conditions of installation. Examine all details. Provide proper fitting to details as indicated. Protect work from damage during and after installation until project acceptance.

1.08 WARRANTY

A. Provide manufacturer's standard warranty against defects in materials and workmanship.

B. Warranty Period: Ten years for rollers and for seal failure of insulated glass supplied. For all other components, two years from date of project completion.

PART 2 MATERIALS

2.01 MANUFACTURERS

A. Basis of Design Subject SL-45 manufactured by NANA WALL SYSTEMS, INC.

2.02 MATERIALS AND COMPONENTS

A. Frame and Panels: From manufacturer's standard profiles, provide head jamb, side jambs, and panels with dimensions shown on drawings.

1. Provide panels with one lite.
2. Aluminum Extrusion: Extrusions with nominal thickness of .078"; 6063-
3. Thermally broken with ¾" polyamide plastic reinforced with glass fibers.
4. Provide 6" Bottom rail with kickplate.

B. Finish: All exposed aluminum surfaces shall receive an Architectural Class 1, clear anodized coating; AA-M12C22A41, minimum 0.7 mil thickness.

C. Glass: Tempered glass, See Section 08 81 00.

D. Locking Hardware and Handles

1. Panel Hardware: Provide removable custodial handles and concealed two point locking hardware operated by 180 degree turn of handle between each pair. Face applied flush bolt locking will not be allowed.
   a. Provide key/key cylinder option. Thumbturn on the inside is not allowed.
   b. Provide handle height centered at 41 3/8’ from bottom of panel.
   c. Aluminum locking rods with standard fiber glass reinforced polyamide end caps at top and bottom. Rods to have a stroke of 15/16”.

2. Key all locks serving the same room or space alike. See Section 08 71 10 for keying and cylinder requirements.

E. Sliding/Folding Hardware: Provide manufacturer's standard combination sliding and folding hardware with top track, and flush bottom track. All running carriages to be with sealed, self-lubrication, ball bearing multi-rollers. Surface mounted hinges and running carriages will not be allowed. Weight of panels to be borne by the bottom of the track will not be allowed.

1. Provide upper guide carriage and lower running carriage with four vertical stainless steel wheels and two horizontal wheels. The vertical wheels to ride on top of sill track and lie above the water run-off level. Carrying capacity of lower running carriage to be 440 lbs.

2. Threshold: Thermally broken ADA compliant type.


4. Adjustment: Provide folding/sliding hardware capable of specified amount of compensation and adjustments without needing to remove panels from tracks, in width, 1/8" per hinge and in height, 3/16" up and down.

2.03 FABRICATION

A. Provide manufacturer's standard fabrication and accessories which comply with indicated requirements. Minor dimension difference will be accepted in order to utilize manufacturer's standard products.

B. Shop fabricate sliding glass door components. Fit and assemble the work at the shop to the greatest extent possible. Disassemble only as required for shipment and erection. Maintain true continuity of line and accurate relation of planes and angles. Provide secure attachment and support at mechanical joints, with
hairline fit of contacting members. Conceal fasteners wherever possible.

C. Coordinate folding glass door work with other work for proper sequence of construction without delays. Verify dimensions of supporting structure and other elements which precede sliding glass door work, before fabrication of required components. Provide for erection tolerances for other work where field measurements cannot be obtained.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine substrates, supporting structure and installation conditions. Do not proceed with sliding glass doors erection until unsatisfactory conditions have been corrected. Verify the structural integrity of the header such that the deflection with the live load is limited to the lesser of L/720 of the span and ¼".

3.02 INSTALLATION

A. General

1. Do not install component parts which are observed to be defective, including warped, bowed, dented, abraded and broken members. Remove and replace members which have been damaged during installation or thereafter before time of acceptance.

2. Do not cut or trim component parts during erection, in a manner which would damage finish, decrease strength, or result in a visual imperfection or a failure in performance of the work.

B. Install door assemblies in accordance with the manufacturer's installation instructions and final shop drawings. Properly flash and waterproof around the perimeter of the opening.

C. Install component parts level, plumb, true to line and with uniform joints and reveals. Secure to structure with non-staining and non-corrosive shims, anchors, fasteners, spacers and fillers.

D. Install glass and glazing, in accordance with the manufacturer's requirements.

E. Adjust operating hardware to function properly, without binding and to provide tight proper fit at contact points.

3.03 CLEANING AND PROTECTION

A. Immediately before acceptance of the work, clean the aluminum glass doors thoroughly.

END OF SECTION
PART 1  GENERAL

1.01  WORK INCLUDED

A. Work under this section includes the design and engineering of the curtain wall system and all materials, labor and equipment for the complete installation of the aluminum curtain wall system as shown on the drawings and specified herein. Work includes:

1. Aluminum curtain wall framing.
2. Glass and glazing of the aluminum curtain wall system and entrance doors.
3. Anchors, fasteners, flashings, trim and accessories to complete the work.

B. Provide reinforcing within curtain wall framing as required to meet design loads and span conditions.

C. Coordination and scheduling of Owner’s field performance tests.

1.02  RELATED SECTIONS

A. Joint Sealants: Section 07 92 00.

B. Glass and Glazing: Section 08 81 00.

C. Aluminum Entrance doors: Section 08 41 13.

D. Spandrel Insulation: Section 07 21 00.

E. Vapor/Air Barrier Transition Membranes: Section 07 27 26.

1.03  QUALITY ASSURANCE

A. Provide standard aluminum curtain wall framing system and aluminum doors manufactured by firms specializing in the production of this type of work that conforms to project requirements.

B. Coordination: Coordinate entrance doors, frames and subframes that are indicated to operate within curtain wall system. Include:

1. Aluminum finish systems. Colors selected must be an exact color match to aluminum entrance system finish, as determined by the Architect, from the same paint system manufacturer.
2. Door hardware.
C. Mockups: Build in-place, on-building mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockups of typical curtainwall area and punched openings as shown on Drawings.
2. Field testing shall be performed on mockups according to requirements in "Field Quality Control" Article.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

D. Field Testing Laboratory: Provide testing lab services in accordance with Section 01 45 29.

1.04 REFERENCES


1.05 SUBMITTALS

A. Submit the following:

1. Framing system details.
2. Installation instructions.
3. Finish samples.

B. Tests: Submit two copies of test reports made or witnessed by an independent testing laboratory showing the results of tests conducted on previously manufactured systems, including doors, of the type used on this project. The reports shall verify conformance to thermal movement, air and water infiltration and structural properties as described herein.

C. Building Shop Drawings: Include complete evaluations of all systems including doors; details and methods of anchorage; details of construction finishes; methods of assembly; location and installation of hardware and reinforcement for same; size, shape and thickness of materials; joints and connections; details of joining with other work.

1. Scale: Include typical unit elevation of each system at 1/2" scale and details at full scale where practical.
2. Calculations: Show full derivation of loads and successful resolution of loads on individual members, their connections, and fasteners to the connection to the building, showing conformance to specified criterion. Such calculations shall be done by a structural engineer licensed to practice in the State of Ohio. Calculation submission must coincide with
shop drawing submission.

D. Product Data: Submit manufacturer's specifications for materials and fabrication of work, and instructions/recommendations for installation and maintenance. Include a summary cover listing conformance to project conditions.

E. Samples: Submit samples of each type and color and finish required by this Section, on 12" sections of extrusions or formed shapes and on 6" squares of sheet/plate. Include two or more samples in each set.

1. Architect reserves right to require fabrication samples showing prime members, joinery, anchorage, expansion provisions, glazing and similar details, profiles and intersections.

G. Field Performance Tests: Submit copies of field performance test reports specified in Article 3.03 herein. See Section 01 45 29.

1.06 DELIVERY, STORAGE AND HANDLING

A. Pack, deliver, handle, store and protect materials from damage in accordance with AAMA Curtain Wall #10, "Care and Handling of Architectural Aluminum" recommendations.

1. Remove paper type wrappings when unloading.
2. Store materials inside the buildings whenever possible in clean, dry, ventilated areas, free of dust or corrosive fumes.
3. Stack members vertically or on edge, shim between components to provide water drainage and ventilation. Protect with adequate coverings, placed to provide adequate air circulation.
4. During installation, protect materials from all construction materials, including mortar, concrete, weld splatter, cleaning acids, roofing materials, solvents, abrasive cleaners and runoff from all the above.

1.07 PERFORMANCE REQUIREMENTS – CURTAINWALL

A. Performance Requirements: Exterior curtain wall system shall have been tested to meet or exceed the following performance requirements.

1. Wind loads: Provide curtain wall system; including glazing, panels and anchorage, capable of withstanding wind load design pressures derived from criteria indicated.
2. Air Infiltration: Air leakage shall not exceed 0.06 cfm per square foot of fixed wall area and 0.1 cfm for each lineal foot of crack of operable elements when when tested in accordance; with ASTM E283 at test pressure not less than 6.24 psi.
3. Water Infiltration
   a. Provide drainage to exterior face of framing any water entering at joints and any condensation occurring within window construction.
   b. Static Pressure: No uncontrolled water penetration when subjected to water spray at the rate of five gallons per hour per square foot at
a static pressure of 10 psf for 15 minutes when tested in accordance with ASTM E331.

c. Dynamic Pressure: No uncontrolled water penetration when subjected to water spray at the rate of five gallons per hour per square foot with wind from an aircraft engine generating a pressure of 10 psf for 15 minutes; tested in accordance with AAMA TM-1 and AAMA 501.1.

4. Structural Properties: No damage or failure shall occur when tested in accordance with ASTM E330. Standard test design loading shall be minimum 40 psf, positive and negative windload. A design deflection criteria of L/175 or 3/4" maximum for spans up to 13'-4", and L/240+1/4 inch for spans over 13'-4" shall apply to both positive and negative loads. At structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans or 1/16" at members shall occur.

5. Average Thermal Conductance: Provide glazed aluminum curtain-wall systems with average U-factor of not more than 0.44 Btu/sq. ft. x h x deg F when tested according to AAMA 1503.

6. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor for the frame shall not be less than 59 using low e glass (90% argon fill with warm edge spacer).

7. Thermal Requirements: Framing system designs to accommodate expansion and contraction movement due to surface temperature differential of 180°F without causing buckling, stress on glass, failure of joint seals, excessive stress on structural elements, reduction of performance or other detrimental effects.

1.08 WARRANTIES

A. Furnish written guarantee certifying that all work furnished and installed will be free of defects in materials and workmanship, and remain watertight for a period of three (3) years from date of Substantial Completion. Should any defect develop during the guaranty period due to faulty materials or improper workmanship, such defects will be repaired or replaced with new work at no expense to the Owner.

B. Provide 20 year manufacturer's guarantee of paint finish against failure of paint finish from paint manufacturer. Failure includes blistering, peeling, cracking, flaking, checking, excessive color change and chalking. Color change shall not exceed 5 N.B.S. units (per ASTM D523) and chalking shall not less than a rating of 8 per ASTM D4214.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Drawings and Specifications are based on 1600 Series manufactured by KAWNEER.

B. Other Manufacturers: Systems manufactured by the following are acceptable providing they meet the performance and dimensional requirements that are
specified herein and conform to the design intent indicated on the drawings.

1. CRL – U.S. ALUMINUM
2. EFCO
3. OLDCASTLE BUILDING ENVELOPE
4. TUBELITE DIVISION, INDL, INC.
5. WAUSAU
6. YKK AMERICA

2.02 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221.

2.03 CURTAIN WALL SYSTEM

A. Aluminum Framing Members: Alloys best suited to meet the performance requirements and structural characteristics as published by the Aluminum Association. Other alloys will be considered only if published literature is available by the primary producer of the material and justified by both the manufacturer and structural engineer for the curtainwall. Provide thicknesses, shapes and profiles as required to comply with performance requirements.

1. Shapes: extruded horizontal and tubular vertical framing sections; anchor mullions at framing structure as indicated. 0.125” inch thick minimum for primary structural members.
2. Special (Custom) Framing Shapes: Provide as detailed or as required to maintain design intent as indicated on building elevations drawings and section drawings. Aluminum extruded shapes and bent aluminum sheet, minimum 0.063”, unless indicated otherwise.

B. Size: 2-1/2” wide x depths indicated

C. Design system for exterior glazing of vision lites.

D. Anchorage: Provide anchorage to building structure for three directional adjustments for fabrication and construction tolerances. All connections must be bolted; screws are not permitted.

F. Trim and Closures: Visible aluminum trim and closures that are not extruded, shall be fabricated from .125” thick aluminum plate finished to match other aluminum curtain wall materials, unless noted otherwise on the drawings. Provide concealed fasteners wherever possible.

2.04 ALUMINUM DOORS AND SUBFRAMES
A. Type: A system of extruded aluminum subframe sections, sealing devices, and
doors and hardware integrated into the curtainwall system.

1. Provide subframe and doors compatible with aluminum curtain wall system.
2. See Section 08 41 13.

2.05 ACCESSORIES

A. Fasteners: 300 Series stainless steel for system joinery, zinc-plated for bolt
anchors if occurring interior of system’s water barrier. No exposed fasteners without
Architect’s permission. If exposed, finish exposed fasteners to match aluminum
work.

B. Sill Pan Flashing: Dead-soft stainless steel, 26 gauge minimum, type selected by
manufacturer for compatibility.

C. Brackets and Reinforcements: Manufacturer's high strength aluminum units where
feasible; otherwise, nonmagnetic stainless steel or hot-dip galvanized steel
complying with ASTM A386.

D. Separate dissimilar materials and metals with full face plastic shims or similar type
materials.

E. Slip Joint Linings: Provide plastic sheets, spacers or bearing pads to ensure free
movement between surfaces where expansion and deflection movements are
intended. Provide units of sizes and thicknesses as recommended by
manufacturer.

F. Structural Sealant: Designed to carry gravity loads of glazing and capable of
withstanding tensile and shear stresses imposed by structural-sealant-glazed
curtain walls without failing adhesively or cohesively. When tested for
preconstruction adhesion and compatibility, cohesive failure of sealant shall occur
before adhesive failure.

1. Structural Glazing Sealants: ASTM C1184, chemically curing silicone
formulation that is compatible with system components with which it
comes in contact, specifically formulated and tested for use as structural
sealant and approved by structural-sealant manufacturer for use in
curtain-wall assembly indicated.
   a. Color: As selected by Architect from manufacturer's full range of
colors.

2. Sealants used inside the weatherproofing system shall comply with the
testing and product requirements of the California Department of Public
Health's "Standard Method for the Testing and Evaluation of Volatile
Organic Chemical Emissions from Indoor Sources Using Environmental
Chambers."
G. Back-Pans: Minimum 0.040 inch painted aluminum back-pan where exposed, and 20 gauge galvanized steel where not exposed, with stiffeners as required for smooth level face.

1. Finish: Where exposed, provide finish color to match framing as approved by Architect.

2.05 FABRICATION

A. Comply with dimensions and profiles indicated on drawings.

B. Provide manufacturer’s standard fabrication and accessories that comply with indicated requirements. Minor dimension differences will be accepted in order to utilize manufacturer’s standard products.

C. Thermal Break Construction: Fabricate curtain wall framing with a concealed low conductance thermal barrier, located in a manner which eliminates direct metal-to-metal contact. Provide manufacturer’s standard construction that has been tested to demonstrate resistance to thermal conductance and condensation as specified, and has been tested to resist specified loads and differential movement.

D. Shop fabricate aluminum curtain wall assemblies. Fit and assemble the work at the shop to the greatest extent possible. Disassemble only as required for shipment and erection. Maintain true continuity of line and accurate relation of planes and angles. Provide secure attachment and support at mechanical joints, with hairline fit and flush alignment of contacting members. Conceal fasteners.

E. Reinforce aluminum work as necessary at points of support or anchorage and at mechanical joints and points of attachment to meet performance requirements and for support of the system. Separate metal surfaces at moving joints with plastic inserts or other non-abrasive concealed inserts.

F. Factory-Assembled Frame Units

1. Rigidly secure nonmovement joints.
2. Prepare surfaces that are in contact with structural sealant with manufacturer’s written instructions to ensure compatibility and adhesion.
3. Preparation includes, but is not limited to, cleaning and priming surfaces.
4. Seal joints watertight unless noted otherwise.
5. Install glazing to comply with requirements of Section 08 80 00.

2.04 FINISHES

A. All exposed aluminum surfaces shall receive an Architectural Class 1, black anodized coating; AA-M12C22A42 on exterior surfaces and clear anodized coating; AA-M12C22A41 on interior surfaces, minimum 0.018 mm thickness.

B. Steel Reinforcement: Manufacturer’s standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods
according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

**PART 3  EXECUTION**

3.01  INSPECTION

A. Examine substrates supporting structure and installation conditions. Do not proceed with curtain wall system erection until unsatisfactory conditions have been corrected.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

C. Preinstallation Conference

1. Prior to installation of curtain wall and associated work, meet at project site, or other mutually agreed location, with installer, representative of curtain wall manufacturer, installers of related work, and other entities concerned with performance, including test agencies, governing authorities, Construction Manager, Architect, and Owner.

2. Record discussions and agreements and furnish a copy to each participant.

3. Provide at least 72 hours advance notice to participants prior to convening installation conference.

4. Meeting agenda shall include:
   a. Construction
   b. Safety
   c. Installed curtain wall protection
   d. Damage to installed curtain wall
   e. Person responsible to inspection of substrate.

3.02  INSTALLATION

A. General

1. Do not install component parts that are observed to be defective, including warped, bowed, dented, abraded and broken members. Remove and replace members that have been damaged during installation or thereafter before time of acceptance.

2. Do not cut or trim component parts during erection without advanced permission of the Architect, and acceptance from structural engineer.

B. Install the curtain wall system in accordance with the manufacturer's installation instructions and recommendations.

C. Install component parts level, plumb, true to line and with uniform joints and reveals. Secure to structure with non-staining and non-corrosive structural shims, anchors and bolts; never attach to wood blocking or through wood spacers.
D. Erection Tolerances: Install glazed aluminum curtain-wall systems to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
3. Alignment:
   a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
   b. Where surfaces are separated by reveal or protruding element from ½ to 1 inch wide, limit offset from true alignment to 1/8 inch.
   c. Where surfaces are separated by reveal or protruding element of 1 inch wide or greater, limit offset from true alignment to 1/4 inch.
4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

E. Assembly and Anchorage: Anchor component parts securely in place, by bolting, which will comply with performance requirements and permits movements as required.

F. Install curtain wall system glass and glazing, in accordance with Section 08 81 00 and the manufacturer's requirements.

3.03 FIELD QUALITY CONTROL

A. Testing Agency: Owner will Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. All tests must be performed in the presence of the Architect, Construction Manager and Owner’s Representative. Provide a minimum of 72 hours notice prior to each test being performed.

C. Test Area: Perform tests on areas approximately 25 feet wide by one story high. Actual test areas to be coordinated with Architect.

D. Field Quality-Control Testing: Perform the following test on representative areas of glazed aluminum curtain walls.

1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to ASTM E1105 and shall not show evidence of water penetration.
   a. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 35, and 70 percent completion.
2. Air Infiltration: ASTM E 783 at 1.5 times the rate specified for laboratory testing in "Performance Requirements" Article but not more than 0.09 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft.
   a. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 35, and 70 percent completion.
3. Water Penetration: ASTM E1105 at a minimum uniform and cyclic static-air-pressure differential of 0.67 times the static-air-pressure differential.
specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft., and shall not evidence water penetration.

E. **Structural-Sealant Adhesion:** Test structural sealant according to recommendations in ASTM C 1401, Destructive Test Method A, "Hand Pull Tab (Destructive)," Appendix X2.

   1. Test a minimum of two areas on each building facade.
   2. Repair installation areas damaged by testing.

F. Repair or remove work where test results and inspections indicate that the work does not comply with specified requirements. Obtain authorization for remediation from Architect before accomplishing any repairs. Remediate and repeat test of that area, and test another similar area until all tests are successful.

G. Additional testing and inspecting, Contractor's expense, will be performed to determine compliance of replaced, remediated or additional work with specified requirements.

H. Prepare test and inspection reports.

3.04 CLEANING AND PROTECTION

A. Protect glass from breakage immediately upon installation. Attach streamers to framing. Do not apply markings or materials of any type to surfaces of glass.

B. Remove protective coating when completion of construction activities no longer require its retention.

C. Immediately before acceptance of the work, clean the aluminum curtain wall system thoroughly, inside and out. Demonstrate proper cleaning methods to Owner's maintenance personnel during final cleaning.

D. Prepare a "Cleaning and Maintenance Manual" listing types of cleaning compounds, cleaning methods, sealants and glazing materials used for cleaning, repair, deglazing and reglazing and maintenance of work and turn over to Owner upon acceptance of the work.

END OF SECTION
SECTION 08 71 00
DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY
   A. This Section includes the following:
      1. Commercial door hardware.
      2. Electrified door hardware.

1.2 SUBMITTALS
   A. Product Data: For each product indicated.
   B. Shop Drawings: Include details of electrified door hardware and wiring diagrams.
   C. Samples: For each exposed finish.
   D. Door Hardware Schedule: Organized into door hardware sets indicating type, style, function, size, label, hand, manufacturer, fasteners, location, and finish of each door hardware item. Include description of each electrified door hardware function, including sequence of operation.
   E. Keying Schedule: Detail Owner's final keying instructions for locks.
   F. Product certificates.

1.3 QUALITY ASSURANCE
   A. Supplier Qualifications: Person who is or employs a qualified DHI Architectural Hardware Consultant.
   B. Source Limitations: Obtain electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that are listed to perform electrical modifications, by a testing and inspecting agency acceptable to authorities having jurisdiction, are acceptable.
   C. Keying Conference: Conduct conference at Project site. Incorporate keying conference decisions into final keying schedule.
   D. Pre-Installation Conference: Conduct conference at Project site.
E. Keys: Deliver keys to Owner by registered mail.

F. Templates: Obtain and distribute templates for doors, frames, and other work specified to be factory prepared for installing door hardware.

G. Standards: Comply with BHMA A156 series standards, Grade 1.

H. Certified Products: Provide door hardware that is listed in BHMA directory of certified products.

1.4 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fails in materials or workmanship within warranty period from date of Substantial Completion.

   2. Warranty Period for Exit Devices: 3 years.
   3. All other hardware one year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Product: Subject to compliance with requirements, provide the product named for each door hardware item indicated in Door Hardware Sets.

B. Basis-of-Design Product: Product named for each door hardware item indicated in Door Hardware Sets establishes the basis of design. Provide either the named product or a comparable product by one of the manufacturers specified for each type of hardware item.

C. Manufacturers Used in the specification:

<table>
<thead>
<tr>
<th>Products</th>
<th>Manufacture Specified</th>
<th>Acceptable Equals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hinges</td>
<td>Ives</td>
<td>Hager, Stanley</td>
</tr>
<tr>
<td>Locksets</td>
<td>Schlage L9000</td>
<td>No substitutions</td>
</tr>
<tr>
<td>Exit Devices</td>
<td>Von Duprin 99 Series</td>
<td>No substitutions</td>
</tr>
<tr>
<td>Closers</td>
<td>LCN 4040XP MC</td>
<td>No substitutions</td>
</tr>
<tr>
<td>Overhead Stops</td>
<td>Glynn Johnson</td>
<td>Rixson, ABH</td>
</tr>
<tr>
<td>Stops</td>
<td>Ives</td>
<td>Hager, Rockwood</td>
</tr>
<tr>
<td>Flushbolts</td>
<td>Ives</td>
<td>Hager, Rockwood</td>
</tr>
<tr>
<td>Thresholds/Seals</td>
<td>Zero International</td>
<td>National Guard Products, Pemko</td>
</tr>
<tr>
<td>Power Transfers/Supplies</td>
<td>Von Duprin</td>
<td>No substitutions</td>
</tr>
</tbody>
</table>
2.2 DOOR HARDWARE

A. Scheduled Door Hardware: Provide door hardware according to Door Hardware Sets at the end of Part 3. Manufacturers' names are abbreviated.

2.3 HINGES

A. General: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.

B. Hinge Base Metal: Unless otherwise indicated, provide the following:

1. Exterior Hinges: Stainless steel, with stainless-steel pin.
2. Interior Hinges: Steel, with steel pin.
3. Hinges for Fire-Rated Assemblies: Steel, with steel pin.

C. Non-removable Pins: Provide set screw in hinge barrel that prevents removal of pin while door is closed; for out-swinging exterior doors.

D. Screws: Phillips flat-head screws; screw heads finished to match surface of hinges.

E. Metal Doors and Frames: Machine screws (drilled and tapped holes).

2.4 MECHANICAL LOCKS AND LATCHES

A. Mortise Locks:

1. Locks shall be ANSI A156.13, Grade 1 mortise locksets, Manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
2. Locks to have a standard 2-3/4” backset with a full 3/4” throw stainless steel mechanical anti-friction latch bolt. Deadbolt shall be a full 1” throw, constructed of stainless steel.
3. Lever trim shall be cast or forged in the design specified, with 2-1/8” diameter roses. Levers to be thru-bolted to assure proper alignment. Trim shall be applied by threaded bushing “no exposed screws”.

2.5 BOLTS

Shall have forged bronze faceplate with extruded brass lever wrought brass guide and strike. Flush bolts for hollow metal doors shall be extension rod type door up to 7’6” in height shall have 12” steel or brass rods, manual flush bolts for doors over 7’6”
in height shall be increased by 6" for each additional 6" of door height. Wood doors shall have corner-wrap type. Provide dust proof strikes for all bottom bolts.

2.6 EXIT DEVICES

A. Panic Exit Devices: Listed and labeled for panic protection, based on testing according to UL 305.

B. Fire Exit Devices: Complying with NFPA 80 that are listed and labeled for fire and panic protection, based on testing according to UL 305 and NFPA 252.

C. All lever design shall match mortise or cylindrical lock lever designs.

D. All devices to incorporate a security dead-latching feature. Provide roller strikes for all rim and surface mounted vertical rod devices, ASA strikes for mortise devices, and manufacturer’s standard strikes for concealed vertical rod devices.

E. Removable Mullions: BHMA A156.3.

   1. Fire-Exit Removable Mullions: Complying with NFPA 80 that are listed and labeled for fire and panic protection, based on testing according to UL 305 and NFPA 252. Mullions shall be used only with exit devices for which they have been tested.

F. Carry-Open Bars: Provide carry-open bars for inactive leaves of pairs of doors, unless automatic or self-latching bolts are used.

2.7 CLOSERS

A. Surface-Mounted Closers:

B. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed, and back check.

C. All closers will not be seen on the public side or hallway side of the door. The appropriate drop plate or mounting plates will be used as conditions dictate.

2.8 PROTECTIVE TRIM UNITS

A. Protective Trim Units: Sized 2" inches less than door width on push side and 1" inch less than door width on pull side, by height scheduled or indicated. Fasten with exposed machine or self-tapping screws.

2.9 STOPS AND HOLDERS
A. Stops and Holders: Provide floor stops for doors, unless wall or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic. Where floor or wall stops are not appropriate, provide overhead holders.

B. Silencers for Door Frames: Neoprene or rubber; fabricated for drilled-in application to frame.

2.10 DOOR GASKETING AND THRESHOLDS

A. Door Gasketing: Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled. Provide non-corrosive fasteners for exterior applications and elsewhere as indicated.

2.11 CYLINDERS, KEYING, AND STRIKES

A. Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

B. Keying System: Factory-registered keying system; grand master key system.

C. Keying: Key all cylinders/cores to Owner’s existing Medico master key system as directed by Owner or Architect.

2.12 FABRICATION

A. Base Metals: Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18 for finishes. Do not furnish manufacturer’s standard materials if different from specified standard.

B. Fasteners: Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated. Provide steel machine or wood screws or steel through bolts for fire-rated applications.

C. Spacers or Sex Bolts: For through bolting of hollow metal doors.

D. Fasteners for Wood Doors: Comply with requirements of DHI WDHS.2, "Recommended Fasteners for Wood Doors."

E. Finishes: Comply with BHMA A156.18.

PART 3 - EXECUTION

3.1 INSTALLATION
A. Examine doors and frames for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

B. Steel Door and Frame Preparation: Comply with DHI A115 series. Drill and tap doors and frames for surface-applied hardware according to SDI 107.

C. Wood Door Preparation: Comply with DHI A115-W series.

D. Mounting Heights: Comply with the following requirements, unless otherwise indicated:
   2. Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."

E. Adjust and reinforce attachment substrates as necessary for proper installation and operation. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
   1. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

F. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with accessibility requirements.
   1. Door Closers: Adjust sweep period so that from an open position of 70 degrees, the door will take at least three seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.

3.2 FIELD QUALITY CONTROL

A. Inspections: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.

3.3 DOOR HARDWARE SETS
### HDW SET: 01
**EACH TO HAVE:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Model/Serial</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 EA</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>652</td>
</tr>
<tr>
<td>1 EA</td>
<td>ELECTRIC HINGE</td>
<td>5BB1 4.5 X 4.5 TW8</td>
<td>652</td>
</tr>
<tr>
<td>1 EA</td>
<td>EU MORTISE LOCK</td>
<td>L9092LEU 07A CON 12/24 VDC</td>
<td>626</td>
</tr>
<tr>
<td>1 EA</td>
<td>CYLINDER</td>
<td>AS REQUIRED</td>
<td>626</td>
</tr>
<tr>
<td>1 EA</td>
<td>SURFACE CLOSER</td>
<td>4040XP REG OR PA AS REQ MC</td>
<td>689</td>
</tr>
<tr>
<td>1 EA</td>
<td>KICK PLATE</td>
<td>8400 8&quot; X 2&quot; LDW B-CS</td>
<td>630</td>
</tr>
<tr>
<td>1 EA</td>
<td>WALL STOP</td>
<td>WS406/407CVX</td>
<td>630</td>
</tr>
<tr>
<td>1 EA</td>
<td>POWER SUPPLY</td>
<td>PS902 120/240VAC</td>
<td>VON</td>
</tr>
</tbody>
</table>

*CREDENTIAL READER FURNISHED ELSEWHERE*

### HDW SET: 02
**EACH TO HAVE:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Model/Serial</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 EA</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>652</td>
</tr>
<tr>
<td>1 EA</td>
<td>FACULTY RESTROOM</td>
<td>L9485L 07A L583-363 L283-722</td>
<td>626</td>
</tr>
<tr>
<td>1 EA</td>
<td>CYLINDER</td>
<td>AS REQUIRED</td>
<td>626</td>
</tr>
<tr>
<td>1 EA</td>
<td>ELECTRIC STRIKE</td>
<td>6216 FSE 12/16/24/28 VAC/VDC</td>
<td>630</td>
</tr>
<tr>
<td>1 EA</td>
<td>OH STOP</td>
<td>100S</td>
<td>630</td>
</tr>
<tr>
<td>1 EA</td>
<td>SURFACE CLOSER</td>
<td>4040XP REG OR PA AS REQ MC</td>
<td>689</td>
</tr>
<tr>
<td>1 EA</td>
<td>KICK PLATE</td>
<td>8400 8&quot; X 2&quot; LDW B-CS</td>
<td>630</td>
</tr>
<tr>
<td>1 EA</td>
<td>MOP PLATE</td>
<td>8400 4&quot; X 1&quot; LDW B-CS</td>
<td>630</td>
</tr>
<tr>
<td>1 EA</td>
<td>WALL STOP</td>
<td>WS406/407CVX</td>
<td>630</td>
</tr>
<tr>
<td>1 EA</td>
<td>POWER SUPPLY</td>
<td>PS902 120/240VAC</td>
<td>VON</td>
</tr>
</tbody>
</table>

*CREDENTIAL READER FURNISHED ELSEWHERE*

### HDW SET: 03
**EACH TO HAVE:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Model/Serial</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 EA</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>652</td>
</tr>
<tr>
<td>1 EA</td>
<td>OFFICE/ENTRY LOCK</td>
<td>L9050L 07A L583-363 L283-722</td>
<td>626</td>
</tr>
<tr>
<td>1 EA</td>
<td>CYLINDER</td>
<td>AS REQUIRED</td>
<td>626</td>
</tr>
<tr>
<td>1 EA</td>
<td>WALL STOP</td>
<td>WS406/407CVX</td>
<td>630</td>
</tr>
</tbody>
</table>

### HDW SET: 04
**EACH TO HAVE:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Model/Serial</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 EA</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>652</td>
</tr>
<tr>
<td>1 EA</td>
<td>PRIVACY LOCK</td>
<td>L9040 07A L583-363 L283-722</td>
<td>626</td>
</tr>
<tr>
<td>1 EA</td>
<td>SURFACE CLOSER</td>
<td>4040XP REG OR PA AS REQ MC</td>
<td>689</td>
</tr>
<tr>
<td>1 EA</td>
<td>KICK PLATE</td>
<td>8400 8&quot; X 2&quot; LDW B-CS</td>
<td>630</td>
</tr>
<tr>
<td>1 EA</td>
<td>MOP PLATE</td>
<td>8400 4&quot; X 1&quot; LDW B-CS</td>
<td>630</td>
</tr>
<tr>
<td>1 EA</td>
<td>WALL STOP</td>
<td>WS406/407CVX</td>
<td>630</td>
</tr>
</tbody>
</table>
HDW SET: 05

**EACH TO HAVE:**

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
<th>Model</th>
<th>Brand</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>FACULTY RESTROOM</td>
<td>L9485L 07A L583-363 L283-722</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>CYLINDER</td>
<td>AS REQUIRED</td>
<td>626</td>
<td>MED</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC STRIKE</td>
<td>6216 FSE 12/16/24/28 VAC/VDC</td>
<td>630</td>
<td>VON</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4040XP REG OR PA AS REQ MC</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 8&quot; X 2&quot; LDW B-CS</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>MOP PLATE</td>
<td>8400 4&quot; X 1&quot; LDW B-CS</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS406/407CVX</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>POWER SUPPLY</td>
<td>PS902 120/240VAC</td>
<td></td>
<td>VON</td>
</tr>
</tbody>
</table>

**CREDENTIAL READER FURNISHED ELSEWHERE**

HDW SET: 06

**EACH TO HAVE:**

All hardware furnished by Door Supplier

HDW SET: 07

**EACH TO HAVE:**

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
<th>Model</th>
<th>Brand</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>PANIC HARDWARE</td>
<td>CD-99-1-07</td>
<td>626</td>
<td>VON</td>
</tr>
<tr>
<td>2</td>
<td>CYLINDER</td>
<td>AS REQUIRED</td>
<td>626</td>
<td>MED</td>
</tr>
<tr>
<td>1</td>
<td>OH STOP</td>
<td>100S</td>
<td>630</td>
<td>GLY</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4040XP REG OR PA AS REQ MC X DP X 61</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 8&quot; X 2&quot; LDW B-CS</td>
<td>630</td>
<td>IVE</td>
</tr>
</tbody>
</table>

HDW SET: 08

**EACH TO HAVE:**

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
<th>Model</th>
<th>Brand</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC HINGE</td>
<td>5BB1 4.5 X 4.5 TW8</td>
<td>652</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>EU MORTISE LOCK</td>
<td>L9092LEU 07A CON 12/24 VDC</td>
<td>626</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>CYLINDER</td>
<td>AS REQUIRED</td>
<td>626</td>
<td>MED</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4040XP REG OR PA AS REQ MC</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 8&quot; X 2&quot; LDW B-CS</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>MOP PLATE</td>
<td>8400 4&quot; X 1&quot; LDW B-CS</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS406/407CVX</td>
<td>630</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>POWER SUPPLY</td>
<td>PS902 120/240VAC</td>
<td></td>
<td>VON</td>
</tr>
</tbody>
</table>

**CREDENTIAL READER FURNISHED ELSEWHERE**

---

*Karl Road Branch*
*Columbus Metropolitan Library*
### HDW SET: 09

**EACH TO HAVE:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Model</th>
<th>Quantity</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 EA</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>1</td>
<td>652 IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>ELECTRIC HINGE</td>
<td>5BB1 4.5 X 4.5 TW8</td>
<td>1</td>
<td>652 IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>EU MORTISE LOCK</td>
<td>L9092LEU 07A CON 12/24 VDC</td>
<td>1</td>
<td>626 SCH</td>
</tr>
<tr>
<td>1 EA</td>
<td>CYLINDER</td>
<td>AS REQUIRED</td>
<td>1</td>
<td>626 MED</td>
</tr>
<tr>
<td>1 EA</td>
<td>SURFACE CLOSER</td>
<td>4040XP CUSH MC</td>
<td>1</td>
<td>689 LCN</td>
</tr>
<tr>
<td>1 EA</td>
<td>KICK PLATE</td>
<td>8400 8&quot; X 2&quot; LDW B-CS</td>
<td>1</td>
<td>630 IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>POWER SUPPLY</td>
<td>PS902 120/240VAC</td>
<td>1</td>
<td>VON</td>
</tr>
</tbody>
</table>

CREDENTIAL READER FURNISHED ELSEWHERE

### HDW SET: 10

**EACH TO HAVE:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Model</th>
<th>Quantity</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 EA</td>
<td>HINGE</td>
<td>5BB1HW 5 X 4.5</td>
<td>1</td>
<td>652 IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>ELECTRIC HINGE</td>
<td>5BB1HW 5 X 4.5 CON TW8</td>
<td>1</td>
<td>652 IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>EU MORTISE LOCK</td>
<td>L9092LEU 07A CON 12/24 VDC</td>
<td>1</td>
<td>626 SCH</td>
</tr>
<tr>
<td>1 EA</td>
<td>CYLINDER</td>
<td>AS REQUIRED</td>
<td>1</td>
<td>626 MED</td>
</tr>
<tr>
<td>1 EA</td>
<td>OH STOP</td>
<td>100S</td>
<td>1</td>
<td>630 GLY</td>
</tr>
<tr>
<td>1 EA</td>
<td>SURFACE CLOSER</td>
<td>4040XP REG OR PA AS REQ MC</td>
<td>1</td>
<td>689 LCN</td>
</tr>
<tr>
<td>1 EA</td>
<td>MOP PLATE</td>
<td>8400 4&quot; X 1&quot; LDW B-CS</td>
<td>1</td>
<td>630 IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>KICK PLATE</td>
<td>8400 8&quot; X 2&quot; LDW B-CS</td>
<td>1</td>
<td>630 IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>POWER SUPPLY</td>
<td>PS902 120/240VAC</td>
<td>1</td>
<td>VON</td>
</tr>
</tbody>
</table>

CREDENTIAL READER FURNISHED ELSEWHERE

### HDW SET: 11

**EACH TO HAVE:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Model</th>
<th>Quantity</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 EA</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>1</td>
<td>652 IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>ELECTRIC HINGE</td>
<td>5BB1 4.5 X 4.5 TW8</td>
<td>1</td>
<td>652 IVE</td>
</tr>
<tr>
<td>1 SET</td>
<td>AUTO FLUSH BOLT</td>
<td>FB41P</td>
<td>1</td>
<td>630 IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>DUST PROOF STRIKE</td>
<td>DP2</td>
<td>1</td>
<td>626 IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>EU MORTISE LOCK</td>
<td>L9092LEU 07A CON 12/24 VDC</td>
<td>1</td>
<td>626 SCH</td>
</tr>
<tr>
<td>1 EA</td>
<td>CYLINDER</td>
<td>AS REQUIRED</td>
<td>1</td>
<td>626 MED</td>
</tr>
<tr>
<td>1 EA</td>
<td>COORDINATOR</td>
<td>COR X FL X (2) MB</td>
<td>1</td>
<td>628 IVE</td>
</tr>
<tr>
<td>2 EA</td>
<td>SURFACE CLOSER</td>
<td>4040XP CUSH MC</td>
<td>1</td>
<td>689 LCN</td>
</tr>
<tr>
<td>2 EA</td>
<td>KICK PLATE</td>
<td>8400 8&quot; X 1&quot; LDW B-CS</td>
<td>1</td>
<td>630 IVE</td>
</tr>
<tr>
<td>1 EA</td>
<td>POWER SUPPLY</td>
<td>PS902 120/240VAC</td>
<td>1</td>
<td>VON</td>
</tr>
</tbody>
</table>

CREDENTIAL READER FURNISHED ELSEWHERE
HDW SET: 12

EACH TO HAVE:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Model Number</th>
<th>Color Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>PASSAGE SET</td>
<td>L9010 07A</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS406/407CVX</td>
<td>IVE</td>
</tr>
</tbody>
</table>

HDW SET: 13

EACH TO HAVE:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Model Number</th>
<th>Color Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>HINGE</td>
<td>5BB1HW 5 X 4.5 NRP</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>ELECTRIC HINGE</td>
<td>5BB1HW 5 X 4.5 CON TW8</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>EU MORTISE LOCK</td>
<td>L9092LEU 07A CON 12/24 VDC</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>CYLINDER</td>
<td>AS REQUIRED</td>
<td>MED</td>
</tr>
<tr>
<td>1</td>
<td>OH STOP &amp; HOLDER</td>
<td>100H</td>
<td>GLY</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4040XP REG OR PA AS REQ MC</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 8&quot; X 2&quot; LDW B-CS</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>GASKETING</td>
<td>328AA-S</td>
<td>AA ZER</td>
</tr>
<tr>
<td>1</td>
<td>RAIN DRIP</td>
<td>11A</td>
<td>A ZER</td>
</tr>
<tr>
<td>1</td>
<td>THRESHOLD</td>
<td>65A</td>
<td>A ZER</td>
</tr>
<tr>
<td>1</td>
<td>POWER SUPPLY</td>
<td>PS902 120/240VAC</td>
<td>VON</td>
</tr>
</tbody>
</table>

HDW SET: 14

EACH TO HAVE:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Model Number</th>
<th>Color Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>IVE</td>
</tr>
<tr>
<td>1</td>
<td>CLASSROOM LOCK</td>
<td>L9070L 07A L283-722</td>
<td>SCH</td>
</tr>
<tr>
<td>1</td>
<td>CYLINDER</td>
<td>AS REQUIRED</td>
<td>MED</td>
</tr>
<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS406/407CVX</td>
<td>IVE</td>
</tr>
</tbody>
</table>
HDW SET: 15

EACH TO HAVE:

<table>
<thead>
<tr>
<th>Qty</th>
<th>Item Description</th>
<th>Model Numbers</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>HINGE</td>
<td>5BB1 4.5 x 4.5</td>
<td>652 IVE</td>
</tr>
<tr>
<td>1</td>
<td>POWER TRANSFER</td>
<td>EPT10</td>
<td>689 VON</td>
</tr>
<tr>
<td>1</td>
<td>ELEC PANIC</td>
<td>RX-99-L-07-ALK 9-VOLT BATTERY</td>
<td>626 VON</td>
</tr>
<tr>
<td>2</td>
<td>CYLINDER</td>
<td>AS REQUIRED</td>
<td>626 MED</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4040XP REG OR PA AS REQ MC</td>
<td>689 LCN</td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 8&quot; X 2&quot; LDW B-CS</td>
<td>630 IVE</td>
</tr>
<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS406/407CVX</td>
<td>630 IVE</td>
</tr>
<tr>
<td>1</td>
<td>POWER SUPPLY</td>
<td>PS902 120/240VAC</td>
<td>VON</td>
</tr>
</tbody>
</table>

CARD READER EITHER SIDE SHUNTS ALARM ALLOWING UNRESTRICTED EGRESS/INGRESS.

HDW SET: 16

EACH TO HAVE:

<table>
<thead>
<tr>
<th>Qty</th>
<th>Item Description</th>
<th>Model Numbers</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>HINGE</td>
<td>5BB1 4.5 x 4.5 NRP</td>
<td>630 IVE</td>
</tr>
<tr>
<td>1</td>
<td>POWER TRANSFER</td>
<td>EPT10</td>
<td>689 VON</td>
</tr>
<tr>
<td>1</td>
<td>ELEC PANIC</td>
<td>RX-99-EO-ALK 9-VOLT BATTERY WITH HARDWIRED OPTION</td>
<td>626 VON</td>
</tr>
<tr>
<td>1</td>
<td>CYLINDER</td>
<td>AS REQUIRED</td>
<td>626 MED</td>
</tr>
<tr>
<td>1</td>
<td>OH STOP</td>
<td>100S</td>
<td>630 GLY</td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4040XP REG OR PA AS REQ MC</td>
<td>689 LCN</td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 8&quot; X 2&quot; LDW B-CS</td>
<td>630 IVE</td>
</tr>
<tr>
<td>1</td>
<td>RAIN DRIP</td>
<td>11A</td>
<td>A ZER</td>
</tr>
<tr>
<td>1</td>
<td>GASKETING</td>
<td>328AA-S</td>
<td>AA ZER</td>
</tr>
<tr>
<td>1</td>
<td>THRESHOLD</td>
<td>65A</td>
<td>A ZER</td>
</tr>
<tr>
<td>1</td>
<td>POWER SUPPLY</td>
<td>PS902 120/240VAC</td>
<td>VON</td>
</tr>
</tbody>
</table>

CARD READER PUSH SIDE SHUNTS ALARM ALLOWING UNRESTRICTED EGRESS.

HDW SET: 17

EACH TO HAVE:

<table>
<thead>
<tr>
<th>Qty</th>
<th>Item Description</th>
<th>Model Numbers</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>HINGE</td>
<td>5BB1 4.5 x 4.5</td>
<td>652 IVE</td>
</tr>
<tr>
<td>1</td>
<td>PRIVACY LOCK</td>
<td>L9040-07A L583-363 L283-722</td>
<td>626 SCH</td>
</tr>
<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS406/407CVX</td>
<td>630 IVE</td>
</tr>
</tbody>
</table>
### HDW SET: 18

**EACH TO HAVE:**

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Model</th>
<th>Quantity</th>
<th>Item Description</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>PANIC HARDWARE</td>
<td>99-L-NL-07</td>
<td>626</td>
<td>VON</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CYLINDER</td>
<td>AS REQUIRED</td>
<td>626</td>
<td>MED</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4040XP CUSH MC</td>
<td>689</td>
<td>LCN</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 8&quot; X 2&quot; LDW B-CS</td>
<td>630</td>
<td>IVE</td>
<td></td>
</tr>
</tbody>
</table>

### HDW SET: 19

**EACH TO HAVE:**

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Model</th>
<th>Quantity</th>
<th>Item Description</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>POWER TRANSFER</td>
<td>EPT10</td>
<td>689</td>
<td>VON</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>ELEC PANIC</td>
<td>RX-QEL-99-L-07 24 VDC</td>
<td>626</td>
<td>VON</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CYLINDER</td>
<td>AS REQUIRED</td>
<td>626</td>
<td>MED</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>OH STOP</td>
<td>100S</td>
<td>630</td>
<td>GLY</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4040XP REG OR PA AS REQ MC</td>
<td>689</td>
<td>LCN</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 8&quot; X 2&quot; LDW B-CS</td>
<td>630</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>POWER SUPPLY</td>
<td>PS902 900-2RS 120/240 VAC</td>
<td>VON</td>
<td>CREDENTIAL READER FURNISHED ELSEWHERE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>DOOR CONTACT(S) BY OTHERS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### HDW SET: 20

**EACH TO HAVE:**

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Model</th>
<th>Quantity</th>
<th>Item Description</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>MANUAL FLUSH BOLT</td>
<td>FB458</td>
<td>626</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>DUST PROOF STRIKE</td>
<td>DP2</td>
<td>626</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>STOREROOM LOCK</td>
<td>L9080L 07A</td>
<td>626</td>
<td>SCH</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>HALF DUMMY TRIM</td>
<td>L0170 07A</td>
<td>626</td>
<td>SCH</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CYLINDER</td>
<td>AS REQUIRED</td>
<td>626</td>
<td>MED</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>OH STOP &amp; HOLDER</td>
<td>100H</td>
<td>630</td>
<td>GLY</td>
<td></td>
</tr>
</tbody>
</table>

### HDW SET: 21

**EACH TO HAVE:**

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Model</th>
<th>Quantity</th>
<th>Item Description</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>HINGE</td>
<td>5BB1 4.5 X 4.5</td>
<td>652</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>PANIC HARDWARE</td>
<td>CD-99-L-07</td>
<td>626</td>
<td>VON</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>CYLINDER</td>
<td>AS REQUIRED</td>
<td>626</td>
<td>MED</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4040XP REG OR PA AS REQ MC</td>
<td>689</td>
<td>LCN</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 8&quot; X 2&quot; LDW B-CS</td>
<td>630</td>
<td>IVE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS406/407CVX</td>
<td>630</td>
<td>IVE</td>
<td></td>
</tr>
</tbody>
</table>
SECTION 08 81 00

GLASS AND GLAZING

PART 1  GENERAL

1.01  SCOPE

A. Work Included:  Provide glass and glazing for all exterior and interior openings as indicated on the drawings and specified herein. Work also includes the following:

1. Unframed mirrors

B. Work Not Included:  Glass and glazing not provided under this Section are as follows:

1. Framed Mirrors:  Section 10 28 13.

1.02  PERFORMANCE REQUIREMENTS

A. General:  Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass Design:  Glass thicknesses indicated or specified are minimums and are for detailing purposes only. Confirm glass thickness by analyzing project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet, as a minimum, the following criteria:

1. Glass Thicknesses:  Select minimum glass thicknesses to comply with ASTM E1300, according to the following requirements:
   b. Probability of Breakage for Vertical Glazing:  8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical under wind action.
      1) Load Duration:  60 seconds or less.
   c. Probability of Breakage for Sloped Glazing:  1 lite per 1000 lites set more than 15 degrees off vertical and under wind and snow action.
      1) Load Duration:  30 days.
   d. Maximum Lateral Deflection:  For the following types of glass supported on all four edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1", whichever is less.
      1) For monolithic glass lites, heat treated to resist wind loads.
2) For insulating glass.
3) For laminated glass lites.

   e. Minimum Glass Thickness for Exterior Lites” ¼”.

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

   1. Temperature Change (Range): 120° F, ambient; 180° F, material surfaces.

1.03 REFERENCED STANDARDS

A. Reference Standards: Wherever the following abbreviations are used herein, they shall refer to the corresponding standard.

   5. IGMA: Insulated Glass Manufacturers Alliance.

B. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations listed below, except where more stringent requirements are indicated herein.

   2. Insulated Glass Manufacturers Alliance (IGMA)
      a. TM-3000 "Vertical Glazing Guidelines"
      b. TB-3001 "Sloped Glazing Guidelines".
   3. American Architectural Manufacturers Association (AAMA)
      a. TIR-A7 "Sloped Glazing Guidelines"
      b. GDSG-1 "Glass Design for Sloped Glazing".

1.04 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this project.

B. Fire-Rated Door Assemblies: Provide assemblies 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.

1. Each lite shall bear permanent, non-removable label manufacturers designation of safety glazing standard for which it complies.

D. Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or on at least one component lite of unit with appropriate certification label of Insulating Glass Certification Council (IGCC).

E. Allowable Tolerances: Thicknesses of glass specified are nominal; provide glass manufactured to tolerances listed in GANA Manual.

F. Fire-Rated Glass: Each lite shall bear permanent, non-removable label of UL certifying it for use in tested and rated fire protective assemblies.

1.05 SUBMITTALS

A. Submit manufacturer's product data and installation instructions for each type of glass, glazing sealants and accessories required.

1. Indicate structural, physical and environmental characteristics, size limitations, special handling requirements, etc.

B. Submit insulating glass manufacturer's certification indicating units meet or exceed specified requirements.

C. Shop Drawings: Required data for shop drawings on glazing may be incorporated with shop drawings for framing members. Show thicknesses of glass; proposed "bites" in frames, sizes and locations of blocks, clips, beads, stops edge treatments; note quality, type and strength of each lite.

D. Samples: Submit and obtain approval of samples before proceeding with glass fabrication. Minimum two 12” x 12” samples of each glass type required, except clear monolithic glass. Submit color samples of exposed sealants and/or gaskets.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle glazing materials in accordance with manufacturer's recommendations to prevent damage and deterioration.

B. Various items to receive glazing as specified elsewhere may be factory-glazed or site-glazed at Contractor's option.

C. Deliver glazing compounds and sealants in manufacturer's unopened labeled containers.

D. Deliver glass with manufacturer's labels intact. Do not remove labels until glass has been installed.

1.07 PROJECT CONDITIONS

A. Field verify measurements and conditions of installations.
B. Examine all details. Provide proper fitting for details indicated.

C. Do not perform work under adverse weather or job site conditions. Install liquid sealants when temperatures are within lower or middle third of temperature range recommendations by manufacturer.

D. Protect work from damage during and after installation until project acceptance.

1.08 WARRANTY

A. Contractor to guarantee work under this Section against defects of materials, fabrication and installation. Guarantee period is one year, except where specified otherwise. Defects include, but are not necessarily limited to:

1. Weather tightness: Two (2) year warranty.

B. Insulating Glass: Submit manufacturer's written warranty that for ten (10) years from date of substantial completion, a replacement will be provided (furnished and installed) for any unit which develops edge separation, thermal stress cracks, or other defects which materially obstruct vision through the glass or affect thermal and physical integrity of insulating glass units, except warranty shall not cover glass breakage from other than natural causes. Defective units shall be replaced at no additional cost to the Owner.

C. Coated Glass: Submit manufacturer's written warranty that for five (5) years from date of substantial completion, a replacement will be provided for defective units. Defects are defined as peeling, cracking or deterioration in coating due to normal conditions and not due to handling or installation contrary to glass manufacturer's published instructions. Defective units shall be replaced at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Acceptable Manufacturers and Fabricators: Specifications herein are based on glass and materials manufactured or fabricated by the following companies. Not all firms listed manufacture or fabricate all the items specified herein. However, to ensure consistent quality of appearance and performance, provide each type or kind of glass or material from a single source. Manufacturers for specialty products are listed within the specification to establish a particular type, color, pattern, etc. Equal products by the manufacturers listed are acceptable providing they meet the type, color, pattern, etc. as approved by the Architect.

1. Manufacturers
   a. AGC FLOAT GLASS NORTH AMERICA
   b. VITRO
   c. GUARDIAN INDUSTRIES

2. Fabricators
a. VIRACON  
b. OLDCASTLE BUILDING ENVELOPE  
c. ARCH ALUMINUM & GLASS LLC  
d. TRULITE GLASS AND ALUMINUM

2.02 PRIMARY FLOAT GLASS  
A. Conformance: Type I, Class 1 for clear glass, Quality q3, conforming to ASTM C1036.
B. Thickness: 1/4", unless otherwise indicated.
C. Color: Clear.
   1. When used in insulating units, provide color specified under each insulating unit.

2.03 HEAT TREATED FLOAT GLASS  
A. Conformance: Condition A, Kind FT Type I, Class 1 for clear glass, conforming to ASTM C1048.
   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
   2. Roll Wave Maximum Distortion Tolerance: 0.003 inch target with 0.005 inch maximum peak to valley measurement.
B. Thickness: 1/4", unless otherwise indicated.
C. Color: Clear.
   1. When used in insulating units, provide color specified under each insulating unit.
D. Locations: Safety glazing locations as designated and required by applicable code(s) and where indicated.

2.04 COATED FLOAT GLASS  
A. General: Provide coated glass complying with this article and in schedules at the end of Part 3.
B. Low E, Sputter Coated Float Glass: Float glass with metallic-oxide or metallic nitride coating deposited by vacuum deposition process after manufacture and heat treatment (if any), complying with requirements specified in schedules at end of Part 3.
C. Coated Spandrel Float Glass:

2. Conformance: Condition B, Kind FT [Kind HS], Type I, Class 1, conforming to ASTM C1048.
3. Thickness: 1/4", unless otherwise indicated.
4. Color: [As selected by Architect] [VIRACON V903 Subdued Gray].

2.05 WIRE GLASS

A. Wire Glass: USE PROHIBITED.

2.06 INSULATING GLASS

A. Sealed Insulating Glass: General: Provide preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space and complying with ASTM E2190 for performance classification indicated as well as with other requirements specified for glass characteristics, air space, sealing system, sealant, spacer material, corner design and desiccant.

1. For properties of individual glass making up units, refer to requirements specified in schedule at the end of Part 3 as applicable to types, kinds, classes and conditions.
2. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites to comply with glass design requirements. Provide Kind FT (fully tempered) where safety glass is indicated or required.

B. Edge Construction: Double sealed with a primary seal of polyisobutylene and a secondary seal of silicone. Delete low-E coating prior to fabrication of insulating units according to coated glass manufacturer’s instructions.

1. Spacer to be black; clear aluminum color not permitted.

2.07 MISCELLANEOUS GLASS TYPES

A. Fire-Rated Glass

1. 20 Minute - For use in 20 minute rated doors only. Superlite I manufactured by SAFTI FIRST, PyroEdge-20 by AGC GLASS COMPANY, SGG Pyroswiss US by VETROTECH SAINT GOBAIN or Fireglass 20 by TECHNICAL GLASS PRODUCTS. ¼" thick tempered glass with a 20 minute fire-rating.
2. 45 Minute - For use in 45 minute door and window applications. Superlite II-XL manufactured by SAFTI FIRST, Pyrobel by AGC GLASS COMPANY, SGG Swissflam-45 by VETROTECH SAINT GOBAIN or Pyrostop by PILKINGTON. ¾" thick unit comprised of inboard and outboard tempered lites protecting a fire resistive interlayer.
3. 60 or 90 minute Doors - For use in 60 or 90 minute door applications, must
comply with CPSC Category I and limited to 100 square inches in size. Superlite X-90 manufactured by SAFTI FIRST, Pyran Platinum L by SCHOTT, SGG Keralite FR-L by VETROTECH SAINT GOBAIN or Firelite Plus by TECHNICAL GLASS PRODUCTS. ¾” thick safety rated glass.

4. All fire-rated glazing to have Logo: Each piece of fire-rated glazing shall be labeled with a permanent logo including name of product, name of manufacturer, testing laboratory, fire rating period, and safety glazing standards.

2.08 GLAZING MATERIALS AND ACCESSORIES

A. Glazing Sealants and Compounds

1. General: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the current VOC content limits of South Coast Air Quality Management District (SCAQMD) Rule #1168, AND all sealants used as fillers must meet or exceed the requirements of the Bay Area Air Quality Management District Regulation 8, Rule 51.

2. Comply with manufacturer's recommendations for selection of hardness. Select materials and variations or modifications for compatibility with surfaces contacted in the installation.

3. Exterior Glazing: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

a. Glazing Sealant: One-part neutral-curing silicone glazing sealant, ASTM C 920 Class A, Type S, Grade NS, Class 100/50, Use NT; for high movement joints at metal-to-metal and glass to metal.
   1) Dow Corning Corporation; 790
   2) GE Advanced Materials - Silicones; SilPruf LM SCS2700
   3) Pecora Corporation; 890
   4) Tremco Incorporated; Spectrem 1

b. Glazing Sealant: One-part neutral-curing silicone glazing sealant, ASTM C 920, Type S, Grade NS, Class 50, Use NT; for general applications in glazing installation subject to high movement including perimeter; use non-staining formula at absorbent perimeter applications.
   1) DOW CORNING CORPORATION; 795 or 756 SMS
   2) GE ADVANCED MATERIALS - SILICONES; SilPruf NB SCS9000 or SilPruf SCS2000
   3) PECORA CORPORATION; 864
   4) TREMCO INCORPORATED; Spectrem 2

c. Glazing Sealant: One-part neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT; for general applications in glazing installation including perimeter; use non-staining formula at absorbent perimeter applications.
   1) DOW CORNING CORPORATION; 791
2) GE ADVANCED MATERIALS-SILICONES; UltraGlaze SSG4000 or UltraGlaze SSG4000AC  
3) TREMCO INCORPORATED; Proglaze SSG or Tremsil 600  
d. Structural Glazing Sealant: ASTM C1184, chemically curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in glazing assembly indicated.  
1) DOW CORNING CORPORATION; 995.  
2) GE ADVANCED MATERIALS -SILICONES; UltraGlaze SSG4000.  
3) PECORA CORPORATION; 896.  
4) TREMCO INCORPORATED; Proglaze SG.  
3. Interior Glazing: Compound of polymerized butyl rubber and inert fillers, with or without polyisobutylene modification, solvent based, 95% solids, formed and coiled on release paper, tack-free in 24 hours, paintable, non-staining.

B. Miscellaneous Glazing Materials

1. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.  
2. Setting Blocks: Neoprene or EPDM, 80-90 durometer hardness, with proven compatibility with sealants used.  
3. Spacers: EPDM, 40-50 durometer hardness with proven compatibility with sealants used.  
4. Compressible Filler (Rod): Closed cell or waterproof jacketed rod stock of synthetic rubber or plastic form, compatible space with sealants used, flexible and resilient, with 5-10 psi compression strength for 25% deflection.

2.09 FABRICATION

A. General: Fabricate glass and other glazing products in sizes required to glaze openings indicated, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.  

1. Glass Thickness: Design analyze and comply with published recommendations of glass product manufacturers and organizations listed herein.  

B. Glass Cutting: Cut glass to accurate sizes and shapes as indicated on drawings. Allow edge clearances and tolerances in accordance with GANA recommendations.  

1. Edges: Provide factory-cutting and factory-formed edges for all butt-glazed, heat tempered and insulating glass. Provide ground edges for all drilled holes, notches and other fabrication or finishing techniques.  
2. Butt-Glazed Systems: All work in accordance with manufacturer's recommendations.
a. Edges Exposed to Air: Polished finish.


C. Heat Strengthened and Tempered Glass

1. Heat Strengthened: Heat treated to strengthen glass in bending to not less than 2.0 times annealed strength for the strengthened glass.

2. Tempered: Heat treated to strengthen glass in bending to not less than 4 to 5 times annealed glass strength for the strengthened glass.

3. Cut glass to required size before tempering. Comply with Glass Tempering Association recommendations.

4. Provide tongless tempered glass. When size limitations require tong edges, support each piece during tempering process so that tong marks will be concealed in the glazed system.

**PART 3 EXECUTION**

3.01 INSPECTION

A. Examine substrates, substructure and installation conditions. Do not proceed with glazing work until unsatisfactory conditions have been corrected.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 PROTECTION AND PREPARATION

A. Protect glass from edge damage during handling and installation. Remove and legally dispose damaged glass off of the project site. Damaged glass is defined as glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and/or appearance.

B. Do not cut, seam, nip or abrade tempered glass.

C. Inspect each piece of glass immediately before installation and eliminate any which have observable edge damage or face imperfections.

D. Unify appearance of each series of lights by setting each piece to match other pieces, as nearly as possible. Inspect each piece and set with pattern, draw, and bow oriented in same direction as other pieces.

E. Clean glazing channels and other framing members to receive glass immediately before glazing. Remove loose coatings. Apply primer to joint surfaces receiving sealants when recommended by sealant manufacturer.

3.03 INSTALLATION - GENERAL

A. Comply with combined recommendations and technical reports of manufacturer's of glass and glazing materials used with GANA "Glazing Manual", except when
more stringent requirements are indicated.

B. Install insulating units to comply with recommendations by IGMA, except as otherwise specifically indicated or recommended by glass and sealant manufacturers.

C. Glazing channel dimensions shown are intended to provide for necessary bite on glass, minimum edge clearance and adequate sealant thickness, with reasonable tolerance. Adjust as required by job conditions at time of installation.

D. Install setting blocks in sill rabbets, properly sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Install primers, sealants, tapes, and gaskets in accordance with manufacturer's recommendations. Set glass without springing and install securely to prevent rattling or breakage.

F. Where wedge-shaped gaskets are driven into one side of the channel to pressurize the sealant or gasket on the opposite side, provide adequate anchorage to ensure gasket will not "walk" out when subjected to dynamic movement. Anchor gasket to stop with matching ribs, or by proved adhesives, including embedment of gasket tail in cured heal bead.

1. Miter cut and bond gasket ends together at corners where gaskets will not pull away from corners and result in voids or leaks in the glazing system.

G. Glazing Sealants for Fire-Rated Glazing Products: Products that are approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

H. Coordinate aluminum framing systems work with other work for proper sequence of construction. Verify dimensions of supporting structure and other elements which precede wall system work before fabrication of required components. Provide for erection tolerances for other work where field measurements cannot be obtained.

3.04 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes edge-to-edge, but not necessarily in one continuous length. Do not stretch tapes to make them fit openings.

C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape
manufacturer.

E. Do not remove release paper from tape until just before each glazing unit is installed.

F. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

3.05 GASKET GLAZING (DRY)

A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Center glass lites in openings on setting blocks and press firmly against soft compression gaskets by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.06 SEALANT GLAZING (WET)

A. 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.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealant to provide a substantial wash away from glass.

3.07 PROTECTION AND CLEANING

A. Protect glass from breakage immediately upon installation by attachment of streamers to framing held away from glass. Do not apply markers of any type to surfaces of glass. Remove non-permanent labels and clean surfaces.

B. Maintain glass in a reasonable clean condition during construction so that it will not be damaged by corrosive action, and will not contribute (by wash off) to the deterioration of glazing materials and other work. Remove and replace glass which
is broken, chipped, cracked, abraded, or damaged in other ways during construction period, including natural causes, accidents and vandalism.

C. Wash and polish on both faces not more than four days before acceptance of the work. Comply with glass manufacturer's recommendations for final cleaning.

3.08 INSULATED GLAZING SCHEDULE

A. Basis of Design: VIRACON

B. Other Acceptable Fabricators: See 2.01.

C. Type 1 Clear: Provide 1 inch insulated annealed or tempered glass, as required by code, as follows:

1. Outboard Lite: 1/4 VRE1-85 #2 Low-E on clear glass.
2. Air Space: 1/2 inch warm edge spacer w/ argon gas grey silicone seal.
3. Inboard Lite: ¼ inch Clear
4. Performance Characteristics
   a. Visible Light Transmittance: 76%
   b. Solar Energy Transmittance: 47%
   c. U-V Transmittance: 26%
   d. Visible Light Reflectance Exterior: 12%
   e. Visible Light Reflectance Interior: 13%
   f. Solar Energy reflectance: 21%
   g. Winter Nighttime U-Value: .31
   h. Summer Daytime U-Value: .29
   i. Shading Coefficient: .63
   j. Solar Heat Gain Coefficient: .55
   k. Relative Heat Gain: 129 btu

D. Insulating Spandrel Glass

1. Description: Spandrel/clear.
2. Outer Pane: Low E coated glass as specified herein.
3. Inner Pane: Clear with spandrel coating as specified herein, on 4th surface.
4. Thickness: 1/4" each pane.
5. Air Space: 1/2".
6. Unit Thickness: 1".

END OF SECTION
SECTION 09 21 16

GYPSUM BOARD SYSTEMS

PART 1  GENERAL

1.01  SCOPE

A. Provide gypsum board systems consisting of wall board and framing as indicated and specified. Work includes:

1. Gypsum board wall systems.
2. Suspended gypsum board ceilings and soffits including suspension framing system.
3. Fire-rated gypsum board construction where indicated.
4. Exterior gypsum board sheathing.
5. Edge trim, corner beads, control joints, accent reveals, fasteners, joint treatment materials and other accessories required for a complete installation.
6. Includes installation of acoustical insulation specified in Section 07 21 00.
7. Installation of metal access doors, including those provided by Plumbing and HVAC Contractors. See Section 08 31 13 and Divisions 22 and 23.

1.02  RELATED SECTIONS

A. Tile Backer Board: Section 09 30 00.
B. Cold-Formed Metal Framing: Section 05 40 00.
C. Acoustical Insulation: Section 07 21 00.
D. Sealant: Section 07 92 00.
E. Firestopping: Section 07 84 00.
F. Wood Blocking: Section 06 10 50.

1.03  QUALITY ASSURANCE


B. Metal Framing System: Comply with ASTM C754 "Installation of Steel Framing Members to Receive Screw Attached Gypsum", and as specified.

C. Reference Standards: Wherever the following abbreviations are used herein they shall refer to the corresponding standard:
2. GA: Gypsum Association.

D. Fire-Rated Construction: Comply with fire resistance ratings indicated on drawings and as required by governing authorities and codes. Provide materials, accessories and application procedures that have been listed by Underwriters Laboratories or tested in accordance with ASTM E119 for the type of construction shown.

1. Electrical Boxes: Comply with IBC Section 712.3.2 for outlet box separation.

E. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

F. Guarantee: Submit written guarantee stating that cracks, delaminations or other imperfections in the drywall work which may develop within a period of 2 years from date of acceptance will be repaired at no cost to the Owner.

1.04 SUBMITTALS

A. Submit manufacturer's product data and installation instructions for each gypsum board system component.

B. Submit manufacturer's certification that fire-rated assemblies proposed meet project requirements, including evidence of approved test reports acceptable to governing building code enforcing authorities, that assemblies when installed with proposed materials, will meet or exceed fire ratings required.

C. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Steel Framing Industry Association (SFIA) or be a part of a similar organization that provides verifiable code compliance program.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original, unopened labeled containers.

B. Store, protect and handle materials in accordance with manufacturer's recommendations to prevent damage, soiling and deterioration. Protect cold-formed metal framing from corrosion, deformation and other damage during delivery, storage and handling per requirements of AISI's "Code of Standard Practice".

C. Protect adjoining surfaces against damage and soiling.

1.06 JOB CONDITIONS
A. Coordinate installation sequencing with work of other trades.

1. Verify completion of other work, including that of other trades, which will be concealed by gypsum drywall construction before installation of wallboard.

1.07 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer’s written recommendations, whichever are more stringent.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Gypsum Board: U.S. GYPSUM CO.; CERTAINTEED CORP.; GEORGIA-PACIFIC CORP.; NATIONAL GYPSUM COMPANY; CONTINENTAL BUILDING PRODUCTS.

B. Studs, Framing and Furring: CLARK DIETRICH BUILDING SYSTEMS; MARINOWARE; STATE BUILDING PRODUCTS.

C. Others as listed for specific products.

2.02 STEEL STUDS

A. Type: Screw type "C" shape, roll formed sheet steel members conforming to requirements of ASTM C645.

1. Material: ASTM A653 steel with minimum yield strength of 33 ksi.
   a. Coatings shall demonstrate equivalent corrosion resistance with an evaluation report acceptable to the authorities having jurisdiction.
3. Gage and Width – 3-5/8" to 6" Studs
   a. 25 gage x 3-5/8": Up to and including 14'-6" high.
   b. 20 gage x 3-5/8" 
      1) Over 14'-6" up to and including 16'-5" high
      2) At wall mounted cabinet locations
      3) At walls receiving ceramic tile
   c. 20 gage x 4": Over 16'-5" up to and including 17'-6" high
   d. 20 gage x 6": Over 17'-6" up to and including 24'-0".
   e. 16 gage at door jambs, heavy equipment locations, and interior partitions receiving masonry veneer.
   f. Provide other gages or widths as indicated on drawings.
4. Gage and Width – 1-5/8" to 2-1/2" Studs
a. 25 gage x 1-5/8": Maximum height 8'-4"
b. 20 gage x 1-5/8": Maximum height 9'-8"
c. 25 gage x 2-1/2": Maximum height 11'-3"
a. 20 gage x 2-1/2": Maximum height 12'-10"

5. Flange Width: Nominal 1-1/4".

B. Runners and Tracks: Designed and sized to receive studs. Thickness to match studs except deflection tracks. All thicknesses are minimum bare metal.

1. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; 0.0296" thickness and in width to accommodate depth of studs. Provide one of the following:
   a. #53 FlexTrack, 0.0359" typical, by SUPERIOR METAL TRIM PRODUCTS
   b. 0.0296" top track with 2" minimum legs and 0.0329" Spazzer 9200 Stud Spacer Bar by CLARK DIETRICH BUILDING SYSTEMS
   c. Slip Track (Slp Trk) by BRADY CONSTRUCTION INOVATIONS
   d. The System by METAL-LITE
   e. The Three Legged Dog by FLEX-ABILITY CONCEPTS.
   f. A double slip track, 0.0296", can be used in lieu of the proprietary deflection tracks specified above. Legs of tracks shall be minimum 2".

2. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; 0.0359" thickness and in width to accommodate depth of studs. Use only firestop top track seal product that has been UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, space requirements and fire-rating required for each application. Provide one of the following:
   a. Fire Trak System by FIRE TRAK CORPORATION.
   b. BlazeFrame DSL or MaxTrak by CLARKDIETRICH BUILDING SYSTEMS
   c. The system by METAL-LITE INC.
   d. CFS-TTS “Firestop Top Track Seal” by HILTI, INC.

C. “EQ” (Equivalent Gauge Thickness) Steel Studs and Runners: Members that can show certified third party testing with gypsum board in accordance with ICC ES AC86 (Approved August 2015) need not meet the minimum thickness limitation or minimum section properties set forth in ASTM C 645. The submission of an evaluation report is acceptable to show conformance to this requirement.

D. Backing Plates (Blocking): Steel sheet for blocking; width to fit framing spacing; height to be 6" unless otherwise indicated.

1. Base Metal Thickness: Minimum 0.0296".

E. Special Corner Plates: 0.0296” galvanized sheet metal break metal; 5” x 5” x
continuous length; one-piece. Provide at corner where studs cannot fill corners (i.e. 60 degrees corners, etc.).

2.03 CEILING/SOFFIT SUSPENSION SYSTEM

A. Provide the following materials unless otherwise indicated on the drawings. Metals used in exterior or areas subjected to moisture to be hot-dipped galvanized in accordance with ASTM A653 G40.

1. Main Runners: Cold-rolled steel channels; not less than 0.0538"; G90 galvanized finish for exterior and moist areas, black asphaltum painted for other areas. Spacing as required, but not to exceed 48" o.c.
   a. 1-1/2" deep where structural support framing is at 48" o.c. or less.
   b. 2" deep where structural support framing is over 48" and less than 66" o.c.
2. Cross Furring
   a. Cold-rolled steel channels, not less than 0.0538"; 3/4" size; same finish as main runners.
   b. Hat shape, 7/8" deep, 0.0179". ASTM C645 and ASTM A653 G40 hot-dipped galvanized.
   c. 2-1/2" x 0.0296", G40 galvanized steel studs. Provide for multiple layer applications. Provide 12" long nested studs at suspension points.
3. Wire: Stainless steel 304 alloy for exterior conditions; galvanized soft annealed steel wire for interior conditions. Galvanized coating to meet or exceed ASTM A 641.
   a. Tie Wire: Minimum 16-gage.

B. Optional Framing: At contractor’s option, proprietary furring system may be used in lieu of black iron system for dry interior conditions.

1. Description: Direct hung system consisting of interlocking main beams and cross-furring members and hanger wires, designed and manufactured specifically for suspending gypsum board ceiling.
   a. ASTM C645.
   b. Electrogalvanized, cold-rolled steel, 0.020" thick.
   c. Double web members; 1-1/2" high with 1-3/8" capped face.
2. Manufacturer: 640 System by CHICAGO METALLIC CORP.; Drywall Suspension System by USG, WORTHINGTON STEEL COMPANY, Watercheck CONTINENTAL BUILDING PRODUCTS, Furring Systems/Drywall by ARMSTRONG.

2.04 METAL FURRING

A. Material

1. Steel Sheet Components: Comply with ASTM C645 requirements for metal, unless otherwise indicated.
2. Protective Coating: Coating with equivalent corrosion resistance of ASTM A653, G40, hot-dip galvanized, unless otherwise indicated.

B. Rigid Furring Channels: Hat-shaped; minimum 0.022 inch uncoated metal thickness; 7/8" deep, unless otherwise indicated.

2.05 GYPSUM BOARD

A. General: Comply with ASTM C1396.

B. Fire Rated Gypsum Wallboard: Type "C" or "X" (special fire retardant) to meet fire ratings for construction shown. Tapered edges. Thickness 5/8" unless otherwise indicated. Use at all locations indicated as meeting a specific fire resistance rating.

1. Provide 5/8", Type X board at all locations not indicated to receive a specific type board.

C. Moisture and Mold Resistant Gypsum Wallboard

1. ASTM C1396 (Section 5), Type X.
2. Edges: Tapered.
3. Thickness: 5/8 inch, unless otherwise indicated.
4. Acceptable products: Mold Tough and Mold Tough Firecode (Type X) by USG; XP and XP Fire-Shield by NATIONAL; ToughRock and ToughRock Type X by GEORGIA-PACIFIC; Mold Defense and Mold Defense Type X by CONTINENTAL BUILDING PRODUCTS or equal by other gypsum board manufacturers listed in 2.01A.
5. Water Absorption: ASTM C473, the average water absorption for panels is not greater than 5 percent by weight after two-hour immersion.
7. Use on non-ceramic tiled walls, ceilings and soffits in toilet rooms, shower rooms and drying rooms; on ceramic tiled non-wet walls in toilet rooms; walls and partitions above ceilings. Maintain ratings where wall is required to be rated.

D. Exterior Sheathing and Ceiling Board: Use for exterior sheathing and where indicated on drawings. Provide in conformance with ASTM C1177, water repellent treated core and fiberglass face sheets.

1. Thickness: 5/8" thickness unless otherwise indicated.
3. Roof Parapets: Where used as roofing substrate, provide high density, water repellent treated core with fiberglass mat and specifically designed for roofing membrane adhesion. Dens-Deck Prime Roof Board by GEORGIA-PACIFIC, USG Gypsum Fiber or equal by other gypsum board manufacturers listed in 2.01A..
E. Tile Backer Board: See Section 09 30 00.

2.06 ACCESSORIES

A. Fasteners: Drywall screws and metal framing screws per manufacturer's instructions and recommendations for type and size, based on construction and conditions involved.

1. Steel Drill Screws: ASTM C1002.
2. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick specified in Section 05 40 00.

B. Trim: ASTM C1047.

1. Manufacturers
   a. Metal: BEADEX MANUFACTURING; CLARK DIETRICH BUILDING SYSTEMS; listed gypsum board manufacturers
   b. Vinyl: VINYL TECH; VINYL CORP.; TRIM TEX
2. Corner Beads - Outside, Square Corners: 1-1/4 inch x 1-1/4 inch heavy gauge galvanized steel or vinyl, perforated.
3. Corner Beads - Outside, Non-square Corners: BEADEX B-1 Splay Flexible Corner or equal. Concealed metal; two galvanized continuous strips laminated with paper trim; for application without mechanical fasteners.
4. Curved Edge Cornerbead: Notched or flexible edge.
5. Exposed Edges (Casing Beads): L-bead or LC-bead; exposed long flange receives joint compound. Size to suit wallboard. J-shaped bead that does not receive joint compound is not permitted.
6. Expansion (Control) Joints: Tape protected 1/4" wide x nominal 7/16" deep control slot.

C. Joint Treatment Materials: ASTM C475.

1. Joint Tape. Width to adequately cover joint.
   c. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
2. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
   a. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
   b. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
      1) Use setting-type compound for installing paper-faced metal trim accessories.
   c. Fill Coat: For second coat, use setting-type, sandable topping compound.
d. Finish Coat: For third coat, use setting-type, sandable topping compound.
e. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

3. Joint Compound for Exterior Applications:
a. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.
b. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.

4. Joint Compound for Tile Backing Panels:
a. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.
b. Cementitious Backer Units: Section 09 30 00.

D. Additional Item: All additional accessories to complete work including nails and anchors to secure frames to walls and floors.

E. Acoustic Materials

1. Insulation: See Section 07 21 00.
2. Sealant: Nonsag, paintable, nonstaining latex sealant complying with ASTM C834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.
   a. Manufacturers
      1) USG Acoustical Sealant
      2) TREMCO Acoustical Sealant
      3) PECORA BA-98
      4) BASF MasterSeal NP 520
3. Neoprene impregnated sealant tape.
4. Head of Wall Insulation: Pre-manufactured, high-density mineral fiber acoustical insulation shaped to fit the trapezoidal flutes, typical of metal decking and complying with ASTM E119 as safing insulation.

F. Electrical Box Pads: Moldable Polybutene pads, minimum 1/8 inch thick. 3M Putty Pads, 3M FIRE PROTECTION PRODUCTS or equal

**PART 3 EXECUTION**

3.01 PREPARATION

A. Provide adequate lighting and ventilation during installation and joint finishing treatment.

B. Coordination with Sprayed Fire-Resistive Materials

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide
continuous plates fastened to building structure not more than 24 inches o.c.

2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.02 INSPECTION

A. Examine substrates and installation conditions. Do not proceed with gypsum wallboard work until unsatisfactory conditions have been corrected.

1. Protrusions of framing, twisted framing members, or unaligned members must be repaired before installation of wallboard is started.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.03 FRAMING INSTALLATION

A. Comply with the requirements of ASTM C754 "Installation of Steel Framing Members to Receive Screw Attached Gypsum", and as specified.

B. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.

2. Rated Stud Deflection Assembly: Install in accordance with manufacturer's instructions to provide required fire ratings. Ensure that anchoring devices, back-up material, clip supports and other materials are as used in referenced fire tests.

3. Securely attach runner to floor with expansion anchors or other approved means.

C. Install all framing plumb and square with spacing as indicated.

D. Provide supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with recommendations of gypsum board manufacturer or, if none available, with United States Gypsum Company’s “Gypsum Construction Handbook”.

E. Bridging
1. Up to 10 ft. Wall Height: 1 row.
2. 10 ft. and Over Wall Height: 2 rows of bridging.

F. Provide a minimum of two (2) screws per connection.

G. **Shaftwall Framing**

1. Install "J" runners, "C-H" studs, "E" studs and 1" gypsum liner panels in accordance with manufacturer's recommendations and drawings.
2. Include additional bracing and blocking as required support of recessed or applied items.
3. Provide all openings in shaftwall in a manner consistent with shaftwall system manufacturer's published details with approval by the Architect and as required to maintain fire rating integrity of assembly.

### 3.04 FURRING INSTALLATION

#### A. Wall Application

1. Attach to masonry with expansion anchors or at mortar joints with concrete nails or expansion anchors.
2. Spacing shall be 16 in. o.c., unless otherwise indicated.
3. Run vertically or horizontally for maximum efficiency.

#### B. Ceiling Application: Install suspension system for ceilings and soffits, both interior and exterior, in accordance with manufacturer's instructions, recommendations and as follows:

1. Locate furring runners at 48" on center with hanger wires at 48" on center. Attach hanger wires to structural framing members specifically for this purpose. Attach hanger wires to framing wires using attachment devices whose suitability has been demonstrated by standard construction practice or by certified test data.
2. Connect furring runners with furring tees spaced at 24" on center. Locate additional tees or hanger support as required for surface mounted and recessed ceiling and soffit items such as light fixtures, diffusers, etc. Add additional hanger wires as required to support all such items at each corner.
3. Provide wall track wherever suspension meets a vertical surface.
4. Brace suspension system for exterior ceilings and soffits to structure above to resist wind up-lift using metal channels or metal studs. Install after system is completely suspended to level plane.
5. Do not support ceiling system from ductwork, electrical conduit, heating or plumbing lines, and vice versa. Each utility system and the ceiling system shall be a separate installation and each shall be independently supported from the building structure.

a. If an interference occurs, provide trapeze type hangers or other suitable supports for each system. Locate hangers where they will not interfere with access to mixing boxes, fire dampers, valves and other appurtenances requiring servicing.
Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.05 GYPSUM BOARD INSTALLATION

A. Gypsum Board Systems: Comply with ASTM C840.

B. General

1. Pre-installation Conference: Before start of gypsum board installation, meet at the project site with the Architect and installers of related work, including work requiring openings, chases, frames, access panels, support, similar integrated requirements and mechanical and electrical trades. Review potential interferences and conflicts and coordinate layout and sequencing requirements for proper installation and integration of the work.
   a. Do not proceed with gypsum board installation until blocking, framing, bracing and other supports for subsequently applied work have been installed, reviewed and accepted by the Architect.
   b. Do not install gypsum board until work concealed by gypsum board has been installed.

C. Application

1. Install gypsum board face side out. Do not install imperfect, damaged or damp boards.
2. Butt boards together for a light contact at edges and ends with not more than 1/16" open space between boards. Do not force into place.
3. Locate either edges or end joints over supports. Position boards so that both tapered edge joints abut. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.
4. Attach gypsum board to framing and blocking as required for additional support at openings and cutouts.
5. Floating Construction: Install gypsum board with "floating" internal corner construction, unless isolation of the intersecting board is indicated.
6. In addition to compliance with the standards, comply with specific requirements indicated for each type of arrangement of gypsum wallboard system shown. Space fasteners in accordance with manufacturer's recommendations and complying with referenced standards.
   a. Walls and Partitions: Apply sheets horizontally or vertically. Provide maximum sheet lengths to minimize end joints with edges or ends over supports. In two layer applications, stagger joints of second layer from joints of first layer.
   b. Cut and install panels to eliminate vertical joints in corners of door frames to ceiling.
   c. Make cutouts to fit within wall plate, register and grille flanged. All cutouts made by knife or saw.
   d. Make angles and corners clean, true, plumb and square; walls
plumb, flat and straight and ceilings flat and level.

e. Ceilings: Apply gypsum board on ceilings, before application on walls and partitions. Install in direction and manner to minimize end joints. Stagger end joints over supports. In two layer applications, stagger joints of second layer from joints of first layer.

3.06 EXTERIOR SHEATHING AND SOFFIT BOARD

A. Comply with GA-253 and with manufacturer's written instructions.

1. Install exterior sheathing board perpendicular to supports, stagger end joints over supports, use maximum lengths possible to minimize joints.
2. Install with 1/4 inch open space where boards abut other work.
3. Space screws 4 inches o.c. around perimeter of board and 8 inches o.c. on intermediate framing members and on diagonal braces. Locate fasteners minimum 3/8 inches from edges and ends of sheathing panels. Drive fasteners to bear tight against and flush with sheathing surface. Do not countersink.
4. Apply sealant around sheathing perimeter at interface with other materials.
5. Board Joints: Provide seam sealing tape or joint sealant at Contractor's option, as follows:
   a. Seam Sealing Tape, Horizontal Applications.
      1) Apply primer to joints and fasteners, allow to dry.
      2) Seal joints using tape specified herein or other similar type method recommended by board manufacturers for application indicated. Apply at time of sheathing, to sealed, dry, dust-free joints. Apply seam sealing tape along all edges, overlapping at intersections by width of tape.
      3) Apply sealant to exposed fasteners with a trowel so fasteners are completely covered.
      4) Seal other penetrations and openings.
      5) Coordinate sheathing and placement of through-wall flashing. Tape top of through-wall sealant to sheathing to provide a water-tight joint.
   b. Sealant
      1) Apply minimum 3/8" bead of sealant to joints and trowel to provide a layer approximately 2" wide by 1/16" thick spanning the joint. Apply enough to each fastener to cover completely when troweled flat. Use backer rod for openings larger than 1/8".
      2) Apply sealant to exposed fasteners with a trowel so fasteners are completely covered.
      3) Seal other penetrations and openings.
      4) Coordinate sheathing and placement of through-wall flashing. Tape top of through-wall flashing to sheathing to provide a water-tight joint.

3.07 INSTALLATION OF SOUND RATED PARTITIONS
A. Provide sound-rated construction where indicated.

B. Acoustic Insulation: Install single layer of acoustic batt insulation in designated partitions after one side of gypsum board is installed, filling width and height of partition completely. Attach to gypsum board with adhesive spots to prevent subsequent displacement.

C. Extend partition stud system through acoustical ceilings to substrate. Apply gypsum board base panels full height, both sides of partition.

D. Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

E. Seal partition perimeters. Provide continuous beads of acoustical sealant at juncture of both faces of runners or plates with floor and ceiling construction and wherever work abuts dissimilar materials. Seal prior to installation of sound attenuation insulation and gypsum board panels.

F. Provide continuous beads of sealant at juncture of gypsum board and abutting surface. Install gypsum board with 1/8” relief for sealant. Sealants to be contained within depth of gypsum board, not as a fillet.

G. At openings and cutouts, fill open spaces between edges of gypsum board and fixtures, cabinets, ducts, and other flush or penetrating items, with continuous bead of acoustical sealant.

H. If sound-rated partitions intersect non-sound-rated partitions, extend sound construction to completely close-off sound flanking paths through non-rated construction. Seal joints between face layers at vertical interior angles of intersecting partitions.

I. Exercise particular care at walls surrounding toilet areas and walls and ceilings surrounding mechanical spaces to provide properly constructed sound-rated gypsum board partition and ceiling systems.

J. Verify that electrical boxes are not located back-to-back; back-to-back boxes to be offset at least one stud space. Do not close off non-complying conditions before notifying and receiving direction from Architect.

3.08  TRIM AND ACCESSORIES

A. Install corner beads at external corners of gypsum wallboard and sheathing work. Use longest practical lengths.

B. Install edge trim wherever edge of gypsum board or sheathing would be exposed or semi-exposed.
1. Provide beaded trim to receive joint compound at all gypsum wallboard work.
2. Provide L-type trim where work is abutted to other work and Kerf-type where work is kerfed to receive kerf leg.
3. Provide U-type trim where edge is exposed, revealed, gasketed or sealant filled, including expansion joints.

C. Attach to framing with steel drill screws. Clinch attachment to wallboard not acceptable.

D. Control Joints

1. Install control joints to isolate gypsum board surfaces as recommended by ASTM C840. Verify locations with Architect prior to installation. Generally locate joints as follows when:
   a. Partition, furring or column fireproofing abuts a structural element (except floor) or dissimilar wall or ceiling.
   b. Ceiling abuts a structural element, dissimilar wall or partition or other vertical penetration.
   c. Construction changes within the plane of the partition or ceiling.
   d. Partition or furring run exceeds 30'.
   e. Ceiling dimensions exceed 50' in either direction with perimeter relief; 30' without relief.
   f. Exterior ceilings and soffits exceed 20' in either direction; align with window mullions, when applicable.
   g. Wings of "L", "U", and "T"-shaped ceiling areas are joined.
   h. Expansion or control joints occur in the base exterior wall.
   i. Differential Deflection Conditions: All locations where partitions are supported by two or more structural members and subject to differential deflection by live or dead loading:
      1) Typical Framing Floor to Structure: Provide "Ceiling Deflection Track".
      2) Framing over One Floor (stairs, shafts, etc.): Provide control joints where studs are interrupted by structure.
   j. Partition terminations at window mullions.
      1) Neoprene joint tape and caulking installed under Section 07 92 00. Provide break metal closure at partition end.
      2) Adjustable aluminum mullion closures. GORDON Mullion Mate or equal.

2. Provide framing immediately on both sides of joint and back with 2"+- gypsum board strips as required to maintain fire resistance rating.

3.09 FINISHING

A. Comply with manufacturer's instructions for mixing, handling and application of materials. Apply treatment at joints both directions, at flanges of trim accessories, penetrations of gypsum board (electrical boxes, piping and similar work), fastener heads, surface defects and elsewhere indicated. Apply in manner that will result in each of these items being concealed when applied decoration has been
completed.

B. Prefill open joints of more than 1/16” with special chemical-hardening type bedding compound, before bedding joint tape.

C. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.

D. Do not use topping compound for bedding joint tape.

E. Apply joint compound for the final coat of joint treatment, unless specifically recommended by the manufacturer for that use.

F. Walls Above Acoustical Ceiling Systems: Tape and fill joints with two coats of joint compound, sanding not required.

G. Leave all exposed surfaces smooth and even, ready for painting.

H. Provide where indicated on the drawings levels of finish as specified in ASTM C840, "Recommended Specification on Levels of Gypsum Board Finish". Levels of finish consist of:

1. Level 1 - **Areas Above Ceilings**: All joints and interior angles shall have tape embedded in joint compound. Provide surface free of excess joint compound. Tool marks and ridges are acceptable.

2. Level 2 – **As a Substrate for Ceramic Tile**: All joints and interior angles to have tape embedded in joint compound and one separate coat of joint compound applied over all joints, angles, fastener heads, and accessories. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.

3. Level 4 – **All Areas Not Indicated to Receive Levels 1, 2 or 5**: All joints and interior angles to have tape embedded in joint compound and three separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. All joint compound shall be smooth and free of tool marks and ridges.

4. Level 5 – **All Areas to Receive Semi-Gloss or Gloss Coatings**: All joints and interior angles to have tape embedded in joint compound and three separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. A thin skim coat of joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface. Excess material is to be removed leaving a film covering over the gypsum board paper surface.

### 3.10 ADJUST AND CLEAN

A. Remove any screw which does not engage into a framing member or spins freely.

B. When paper face is punctured, drive new screw approximately 1-1/2" from defective fastener and remove defective fastener. Fill damaged surface with
compound.

C. Ridging

1. Do not repair ridging until condition has fully developed: approximately 6 months after installation or one heating season.
2. Sand ridges to reinforcing tape without cutting through tape.
3. Fill concave areas on both sides of ridge with topping compound.
4. After fill is dry, blend in topping compound over repaired area.

D. Fill cracks with compound and finish smooth and flush.

E. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

3.11 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
END OF SECTION
This page intentionally blank
**SECTION 09 30 00**

**TILE**

**PART 1  GENERAL**

1.01  WORK INCLUDED

A. Extent of tile work is shown on drawings and schedules, and as specified herein.

B. Types of tile work required including the following:
   1. Quarry tile floor and base.
   2. Ceramic wall tile, floor tile and base.
   3. Porcelain wall tile, floor tile and base.
   4. Slate tile.
   5. Gauged porcelain tile and gauged porcelain tile panels/slabs
   7. Marble shower basin.

C. Section also includes:
   1. Stone thresholds installed as part of tile installations.
   2. Crack-suppression membrane for thin-set tile installations.
   3. Metal edge/transition strips installed as part of tile installations.
   4. Stair nosings installed as part of the tile installations.

1.02  RELATED SECTIONS

A. Sustainable Design Requirements: Section 01 81 13.

B. Sealant: Section 07 92 00.

C. Concrete slab preparation: Section 01 73 00.

1.03  QUALITY ASSURANCE

A. Manufacturer:  Provide tile of each type produced by a single manufacturer. Provide materials obtained from one source for each type and color of tile, grout, and setting materials.

B. Installer: A firm with not less than 5 years experience in installing tile in applications similar to those required for this work.

C. Ceramic Tile Manufacturing Standard: TCA 137.1. Furnish tile complying with Standard Grade requirements unless indicated otherwise.
D. Proprietary Materials: Handle, store, mix and apply proprietary setting and grouting materials in compliance with manufacturer's instructions.

E. Installer to verify locations of all flexible joints required by the provisions of this section, by the recommendations of TCA, and by the recommendations of the related manufacturers. See Article 3.06.

1. Joint locations may or may not be indicated on the drawings.

1.04 PERFORMANCE REQUIREMENTS

A. Dynamic Coefficient of Friction: For tile installed on walkway surfaces subject to traffic while wet, provide products with a dynamic coefficient of friction not less than 0.42 as determined by testing identical products per ANSI A137.1.

1.05 SUBMITTALS

A. Product Data: Submit manufacturer's technical information and installation instructions for materials required. Include certifications and other data to show compliance with these specifications.

B. Special Environmental Requirements: Submit the following in accordance with Section 01 81 13:

1. Product Data: For adhesives and epoxy, documentation indicating VOC Content

C. [Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.]

D. Samples: Submit manufacturer's color charts consisting of actual tiles or sections of tiles showing full range of colors available, for each type of tile specified. Include samples of grout and accessories requiring color selection. Submit full size sample for each type of trim, accessory and color. Submit samples of metal edge strip.

E. Certification: Furnish Master Grade Certificate for each type of tile, signed by manufacturer and Installer.

1.06 PRODUCT HANDLING

A. Deliver packaged materials and store in original containers with seals unbroken and labels intact until time of use, in accordance with manufacturer's instructions.

1.07 JOB CONDITIONS

A. Maintain environmental conditions and protect work during and after installation in accordance with referenced standards and manufacturer's printed recommendations.
PART 2  PRODUCTS

2.01  QUARRY TILE

A. Quarry Floor Tile: 1/2" thick, cushion-edged standard grade quarry tile conforming to ANSI 137.1. Colors as selected by Architect from manufacturer's full range of colors.

1. Sizes: As indicated.
2. Base: Where quarry tile base is scheduled provide 6" high, 1/2" thick quarry tile cove base with rounded bullnose top. Base pieces to be 6" long to match tile. Provide inside and outside corners and trim pieces as required. Color to match floor quarry tile.
3. Manufacturer: Provide quarry tile and base as manufactured by one of the following subject to the above requirements:
   a. AMERICAN OLEAN TILE.
   b. DAL-TILE CORPORATION.
   c. SUMMITVILLE TILES, INC.

2.02  CERAMIC TILE

A. Ceramic Wall and Floor Tile: Standard grade, impervious porcelain ceramic tile conforming to ANSI 137.1. Provide trim pieces as required.

1. Walls: [2" x 2"] [4" x 4"], glazed.
   a. Colors: Minimum of 2 colors per room will be used.
   b. Color Layout (Patterns): As indicated or as directed by Architect.
2. Floors: [1” x 1”] [2” x 2”], unglazed.
   a. Colors: Minimum of 2 colors per room will be used.
   b. Color Layout (Patterns): As indicated or as directed by Architect.
3. Base: Provide [1”] [2”] [4”] high, porcelain ceramic tile, cove base with [square top, for meeting wall tile] [and] [bullnose top at terminations]. Base pieces to be of length to match wall tile, or multiples of wall tile. Provide inside and outside corners and trim pieces as required.
   a. Color and finish to match wall tile as selected by Architect.
4. Manufacturer: Provide ceramic floor tile, wall tile and base as manufactured by one of the following subject to the above requirements.
   a. BUCHTAL.
   b. AMERICAN OLEAN TILE.
   c. DAL-TILE CORPORATION.
   d. MID-STATE TILE COMPANY.
   e. MONARCH TILE COMPANY.

2.02  CERAMIC TILE

A. Ceramic Wall Tile, Floor Tile and Base: Standard grade, impervious porcelain
ceramic tile conforming to ANSI 137.1. Provide trim pieces as required.

B. Manufacturer

1. Basis of Design: Colors indicated on the drawings are based on tiles manufactured by DAL-TILE CORPORATION.

2. Other Acceptable Manufacturers: Tile manufactured by the following companies are acceptable providing they meet the requirements specified herein and the colors are an acceptable match as determined by the Architect.
   a. BUCHTAL.
   b. AMERICAN OLEAN TILE.
   c. MID-STATE TILE COMPANY.
   d. MONARCH TILE COMPANY.
   e. LATCO

2.02 CERAMIC TILE

A. Ceramic Wall Tile, Floor Tile and Base: Standard grade, impervious porcelain ceramic tile conforming to ANSI 137.1. Provide trim pieces as required.

1. Basis of Design: Manufacturer, Styles and Colors: As indicated on the drawings.

2. Other Acceptable Manufacturers: Ceramic tile manufactured by other manufacturers will be considered if materials meet the requirements of the Basis of Design and the sizes and colors are an acceptable match as approved by the Architect prior to bid opening. These additionally approved manufacturers will be included by Addendum. An unacceptable pattern or color match is reason for disapproval of product and manufacturer. No substitutions will be considered after bid opening.

2.03 GAUGED PORCELAIN/THIN TILE

A. Gauged Porcelain Tile: ANSI A137.3 Tile panels/slabs are those that are one square meter in facial area or larger. Nominal thickness within the range of 3.5 to 4.9mm for walls and 5.0 to 6.5 mm for floors.

1. Basis of Design: Manufacturer, Styles and Colors: As indicated on the drawings.

2. Other Acceptable Manufacturers: Tile manufactured by other manufacturers will be considered if materials meet the requirements of the Basis of Design and the sizes and colors are an acceptable match as approved by the Architect prior to bid opening. These additionally approved manufacturers will be included by Addendum. An unacceptable pattern or color match is reason for disapproval of product and manufacturer. No substitutions will be considered after bid opening.

2.03 SLATE FLOORING

A. Floor Tiles: 12" x 12" x 1/2" thick, sawed edges.
B. Faces

1. Exposed (Wearing Surface): Natural cleft.
2. Bonding Face: Gaged.

C. Colors: Two required. Gray and black as selected by Architect.

D. Manufacturer: BUCKINGHAM-VIRGINIA SLATE CORPORATION or equal.

2.04 MORTAR, GROUT AND ACCESSORIES

A. See Tile Installation Systems in Part 3 of this Section. Setting mortar and grout to be from same manufacturer.

B. General - All Adhesives, Grouts and Epoxies: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the current VOC content limits of the South Coast Air Quality Management District (SCAQMD) Rule #1168; VOC limits effective July 1, 2005 and rule amendment date of January 7, 2005.

C. Modified Dry Set Cement Mortar - Thin Set: Factory mixed mortar of Portland cement/sand, field gauged with undiluted latex admixture. Conform to ANSI A118.4, Latex-Portland Cement Mortar. Provide type suitable for “medium-set” for tiles with a dimension larger than 15”.

1. Provide one of the following:
   a. BOSTIK, Durabond D-50 or D-60.
   b. MAPEI, Ultraflex 3.
   d. LATICRETE, 255 MultiMax.

2. Thinset Mortar for Glass Tile: Complies with ANSI A118.4 and A118.11.
   a. BOSTIC Glass-Mate Glass Tile Mortar with Admixture Product 425TM Multi-Purpose Acrylic Latex Admixture.
   b. Equal by MAPEI or LATICRETE

D. Dry-Set Mortar - Thin Set: Mixture of Portland cement with sand and latex, water imparting additive. Conform to ANSI A118.1, Standard Dry-Set Cement Mortar.

1. May be used in lieu of Modified Dry Set Cement Mortar for ceramic floor and wall tile.

E. Portland Cement Setting Mortar - Thick Set (ANSI 108.2): Provide waterproof membrane beneath floor setting beds. Provide cleavage membrane at floors without waterproofing membrane. Reinforce floor setting beds. Provide bed of a thickness as required to bring the tile to the required finish elevation as shown on the drawings. Provide materials as follows:

1. Underbed: Mix 1 part Portland cement to 5 parts loose, damp sand by volume.
b. Sand: ASTM C144.
c. Water: Clean, potable and free of deleterious substances.

2. Membrane Waterproofing: See Membrane Waterproofing herein


F. Grout - Ceramic Tile (ANSI A118.7): Integrally colored, sanded (unless otherwise indicated), polymer modified cement type, factory prepared (premixed) grout. Color as selected by Architect.

1. Provide one of the following:
   a. BOSTIC, Ceramic Tile Grout with BOSTIK 425 Acrylic-Latex Admixture.
   b. TEC (H.B. FULLER), TEC Power Grout.
   c. MAPEI, Ultracolor.
   d. LATICRETE, Permacolor Grout.

2. Colors: As selected by Architect.

3. Provide unsanded grout for glass tile and tile joints less than 1/8" wide.


1. Bond Coat: Two-component epoxy grout complying with ANSI A118.3. See manufacturers under "Grout for Floors and Base."

2. Grout for Floors and Base: Multi-component epoxy grout complying with ANSI A118.3. Color as selected by Architect. Provide one of the following:
   a. BOSTIC, U-poxy/AAR II.
   b. MAPEI, Kerapoxy.
   c. LATICRETE, Spectralock Pro.
   d. TEC (H.B. FULLER).

H. Membrane Waterproofing: Manufacturer's standard product, selected from the following, that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

   a. Products: Provide one of the following:
      1) BONSAL AMERICAN; B 6000 Waterproof Membrane with Glass Fabric
      2) BOSTIK, INC.; Hydroment Blacktop 90210.
      3) LATICRETE INTERNATIONAL, INC.; Hydro Ban Waterproof Membrane.
      4) MAPEI CORPORATION; Mapelastic HPG with MAPEI Fiberglass Mesh.

2. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer
a. Products: Provide one of the following:
1) BONSAL AMERICAN; B 6000 Waterproof Membrane.
2) BOSTIK, INC.; Hydroment Gold.
3) LATICRETE INTERNATIONAL, INC.; Latapoxy 24hr HydroProofing.
4) MAPEI CORPORATION; Mapelastic HPG.
5) TEC (H. B. FULLER COMPANY); HydraFlex - Waterproofing Crack Isolation Membrane


1. Products: Provide one of the following:
   a. MAPEI CORPORATION; Mapelastic SM.
   b. NATIONAL APPLIED CONSTRUCTION PRODUCTS, INC.; Strataflex.
   c. POLYGUARD; Tileguard.

J. Metal Edge Trim: L-shape, height to match tile and setting-bed thickness; stainless steel, ASTM A666, 300 Series. SCHLUTER, CERAMIC TOOL COMPANY, BLANKE

[K. Marble Thresholds: Honed Italian marble, 3/8" thick x 4" wide minimum x width of door opening. Provide thresholds free from cracks, chips, stains or defects; uniform in tone and coloring. Provide double bevel profile. Color as selected by Architect.]

[K. Solid Surface Thresholds: Corian by DU PONT, AVONITE, FORMICA, Gibraltar by WILSONART. Color as selected by Architect from manufacturer's full range. Thickness as required for compliant threshold condition.

1. Surface burning characteristics in accordance with ASTM E 84: Class I or A, and as follows:
   a. Flame spread: <25.
   b. Smoke developed: <25.

2. Edge Treatment: Ease all exposed edges.]

L. Stair Nosing

1. Description: Roll-formed brushed stainless steel type 304; self-adhesive, non-slip tread, 2-5/32 inch wide exposed surface with rounded leading edge, and integrated trapezoid-perforated anchoring leg.
2. Tread Color: As selected by Architect.
3. Height: As required to match tile thickness.
4. Manufacturer: SCHLUTER TREP-G or equal by CERAMIC TOOL COMPANY, BLANKE.

M. Grout Sealer: Low VOC, penetrating type as recommended by grout manufacturer that does not change color or appearance of grout.
N. Stone Sealer: Low VOC, penetrating type as recommended by grout manufacturer that does not change color or appearance of stone.

2.06 TILE BACKER BOARD

A. Description: Nominal 1/2” thick cementitious board with fiberglass mesh reinforcements conforming to the requirements of ANSI A118.9.

1. Provide cadmium plated screws, type as recommended by board manufacturer.
2. Joint Treatment Tape: 2” wide, 10x10 glass mesh type or similar type as recommended by board manufacturer.

B. Manufacturer: Wonder Board by MODULARS, INC.; Util-A-Crete by FIN PAN; Durock Interior Tile Backer Board by U.S. GYPSUM; Dens-Shield by GEORGIA PACIFIC.

2.08 MARBLE SHOWER BASIN

A. Manufacturer/Description

1. Basis of Design: CENTURA MARBLE.
2. Other Manufacturers: ROMA MARBLE INC., VERONA MARBLE COMPANY.
3. Color: “Coffee”
4. Surface: Textured Surface throughout

B. Textured Shower Base sloping to Floor Drain. Basin shall be installed AFTER completion of Wall tile installation. See drawings for details.

C. Field verify conditions and dimensions prior to fabrication and installation

D. Provide complete shop drawings prior to fabrication and installation, along w/ color and texture sample.”

PART 3 EXECUTION

3.01 INSPECTION

A. Examine surfaces to receive tile, setting beds and accessories before tile installation for the following:

1. Defects or conditions adversely affecting quality and execution of the installation.
2. Deviations beyond allowable tolerances of surfaces to receive tile.
3. Do not proceed with installation work until unsatisfactory conditions are corrected.

B. Conditions of surfaces to receive tile.
1. Surfaces to be firm, dry, clean, and free of oily or waxy films or curing compounds.
2. Grounds, anchors, plugs, hangers, bucks, electrical, plumbing and HVAC work in or behind tile to be installed prior to proceeding with tile work.

3.02 PREPARATION

A. Prepare surfaces to receive tile as required to achieve proper bond and as recommended by the Tile Council of America.
   1. See Section 01 73 00 for additional floor preparation requirements.

B. Fill cracks, low areas and pits in concrete with self-leveling fill of type recommended by tile manufacturer for substrate conditions encountered.

C. Lightly grind concrete subfloors with a terrazzo grinder to remove trowel marks, slab curl at saw cut joints or other surface irregularities or high spots which will telegraph to the flooring surface.

D. Sawcut or grind transition areas to install tile flush with adjacent finished floor materials.

E. Clean surfaces in a manner suitable for proper installation. Verify that slabs are free of curing membranes, oil, grease, wax, dust and other materials deleterious to tile installation.

F. Primers or other preparations required or recommended in accordance with manufacturer's instructions.

3.03 TILE BACKERBOARD

A. Location: Provide tile backerboard on metal stud walls as a substrate for ceramic tile products specified herein which are located [on shower walls] [on toilet room wet walls] [where indicated].

B. Install in strict accordance with manufacturer's recommendations and ANSI A108.11, Interior Installation of Cementitious Backer Units.
   1. Butt ends and edges of adjacent panels.
   2. Attach with screws spaced at 6 inch centers on perimeter and field.
      a. Maintain minimum 1/2 inch from screws to panel edge.
      b. At wainscot or similar location where tile terminates in same plane of wall, shim tile backerboard flush with adjacent wall board. Provide shims continuous along face of studs.
   3. Locate control and expansion joints in same locations as substrate and where required by wall tile.
   4. Apply glass mesh tape, or type recommended by board manufacturer, over joints. Embed tape in setting material indicated for specified tile finish.

3.04 INTERIOR WALL TILE INSTALLATION - SYSTEMS
A. Prepare surfaces, fit, set or bond, grout, and clean in accordance with Tile Council of America, "Handbook for Ceramic Tile Installation", 2011 Edition; and as follows:

C. Thin Set - Stud Walls - Over Tile Backerboard: TCA W244, dry-set mortar bond coat or latex Portland cement bond coat and grout.
   1. Tile: ANSI A108.5.
   3. Backerboard
      a. Joint Preparation: Fill joints completely with setting mortar and embed 2 inch wide coated fiberglass tape into skim coat of same mortar.
      b. Apply setting mortar in one layer, troweling skim coat with trowel's flat edge and then texturing with appropriate notched trowel. Troweling equipment must be appropriate for type of tile work and in good condition.

   1. Tile: ANSI A108.5.

D. Thin Set - Solid Back-Up Walls (concrete, CMU, etc.): TCA W202, dry-set mortar bond coat or latex Portland cement bond coat and grout.
   1. Tile: ANSI A108.5.

E. Thick Set - Solid Back-Up Walls (concrete, CMU, etc.) - Dry and Wet Areas: TCA W221, Portland cement mortar bed, metal lath, [waterproof membrane], dry-set mortar bond coat or latex Portland cement bond coat and grout.
   3. Install mortar bed to thickness indicated on drawings.

3.05 INTERIOR FLOOR TILE INSTALLATION - SYSTEMS

A. Prepare surfaces, fit, set or bond, grout, and clean in accordance with Tile Council of America, "Handbook for Ceramic Tile Installation", 2011 Edition; and as follows:

B. Thick Set with Waterproof Membrane: TCA design F121; waterproof membrane, Portland cement mortar bed, reinforcing, bond coat and grout.
   1. Tile: ANSI A108.1A.
   3. Mortar Bed Thickness: As indicated (min. 1-1/4"; max. 2").
   4. Wet areas; shower areas; drying areas; pool decks; other areas indicated
C. Thick Set with Cleavage Membrane: TCA design F111, Portland cement mortar bed, dry-set mortar bond coat or latex Portland cement bond coat, cleavage membrane, reinforcing and grout.

1. Tile: ANSI A108.1A.
3. Mortar Bed Thickness: As indicated (min. 1-1/4"; max. 2").
4. Pool decks; other areas indicated.


1. Install in strict conformance with waterproofing membrane manufacturer's written instructions and recommendations.
2. Tile: ANSI A108.5.
4. Wet areas; shower areas; drying areas; other areas indicated.

F. Thin Set: TCA design F113, latex Portland cement mortar and grout or dry-set mortar and grout.

1. Tile: ANSI A108.5.

G. Epoxy Mortar and Grout: TCA design F131; epoxy mortar and grout. ANSI A108.6.

1. Quarry tile; kitchen areas; other areas indicated.


3.06 TILE INSTALLATION - PROCEDURES

A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 Series
of tile installation standards for providing 95 percent mortar coverage:

a. Floors in wet areas
b. Swimming pool decks
c. Kitchen areas
d. Floor tiles 8” x 8” and larger
e. Rib-backed floor tiles

B. Extend tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures and other penetrations so that plates, collars or covers overlap tile.

D. Placement Methods: Install tile using the hereinbefore specified setting beds and grouts.

E. Jointing Pattern: Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are same size. Layout tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting.

1. Avoid tile layout with less than half width tiles at room/area perimeters, unless otherwise indicated on the floor layout drawings. Notify Construction Manager if layout not achievable per layout indicated on the drawings. Do not continue in room/area in question until approved by the Associate.
   2. Provide uniform joint widths, unless otherwise shown.
      a. Ceramic Mosaic Tile: 1/16 inch.
      b. Quarry Tile: 1/4 inch
      c. Large format Floor Tile: 1/8 inch.
      d. Glazed Wall Tile: 1/16 inch.


3.07 FLEXIBLE JOINTS

A. Locate flexible joints (expansion, control and isolation joints) prior to tile installation. See Quality Assurance in Part 1 herein.
B. Provide flexible joints as specified herein, unless more stringent requirements are indicated on drawings. Provide as specified, regardless if not indicated on drawings.

C. Joint to be continuous from face of tile to bottom of setting bed or leveling bed. Reinforcing to be discontinued at joint. Install continuous joint filler material in joint from setting or leveling bed to a point below face of tile adequate for proper placement of backing rod and sealant.

D. Joint Design: TCA design EJ171 as applicable. See Section 07 92 00 for sealant. Provide at the following locations:

1. Horizontal Surfaces
   a. Directly over expansion joints.
   b. Over anti-fracture membrane which is applied over structural slab cold joints, construction joints and control joints.
   c. Where tile work abuts restraining surfaces such as perimeter walls, curbs, columns, pipes, etc.
   d. Floor areas exceeding 12 feet in any direction for exterior work and 24 feet in any direction for interior work.
   e. Other locations where indicated.

2. Vertical Surfaces
   a. Directly over joints in wall substrate including cold joints, construction joints, control joints and expansion joints.
   b. At changes in substrate material.
   c. Where tile work abuts restraining surfaces such as perimeter walls, curbs, columns, pipes, etc.
   d. Where indicated.

E. Curing: Cure tile floor, base, and wall installations in accordance with manufacturer's recommendations, TCA recommendations, and in accordance with ANSI requirements.

F. Metal Edge Strips: Provide metal edge strips at openings without thresholds, and where exposed edges of tile floors meet other materials.

1. Except as otherwise indicated, where trim is located across door openings, locate trim on the door side in line with the edge of the door stop, terminating at the rabbet.

G. Marble Thresholds: Provide at openings where exposed edges of tile floors meet other materials.

3.07 REPAIR, CLEAN AND PROTECT

A. Repair, or remove and replace chipped, damaged or otherwise defective work to the satisfaction of the Architect.

B. Cleaning: Upon completion of placement and grouting, clean all tile surfaces so
that they are free of foreign matter.

1. Use methods and materials as recommended by tile manufacturer.
2. Replace tiles that cannot be satisfactorily cleaned.

C. Grout Sealer: Apply silicone grout sealer to grout joints according to grout sealer manufacturer’s written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer from joints and from tile faces by wiping with soft cloth.

D. Protection: When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with Kraft paper or other heavy covering during construction period to prevent damage and wear.

1. Prohibit foot and wheel traffic from using tiled floors for at least 3 days after grouting is completed.
2. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION
SECTION 09 51 13

ACOUSTICAL PANEL CEILINGS

1.01  WORK INCLUDED
   A. Provide acoustical lay-in panel ceiling system as shown and specified.

1.02  RELATED SECTIONS
   A. Gypsum Board Ceiling:  Section 09 21 16.

1.03  QUALITY ASSURANCE
   A. Workmanship:  Comply with Ceilings & Interior Systems Contractors Association (CISCA) “Ceiling Systems Handbook”.
   B. Installation:  Performed by an experienced authorized installer approved by acoustical material manufacturer.
   C. Fire Hazard Classification:  Provide acoustical materials which have been UL tested, listed and labeled Class 0-25, when tested in accordance with ASTM E84, Class A flame spread rating in accordance with ASTM E1264 requirements.
   D. Reference Standards:  Wherever the following abbreviations are used herein, they shall refer to the corresponding standards.
   E. Coordination Between Trades:  Quality assurance includes the cooperation with HVAC, Plumbing and Electrical Contractors in regards to ceiling grid layout.
      1. Procedures for submitting coordination drawings for ceiling work is included in Section 01 33 23 - Shop Drawings, Product Data and Samples.

1.04  SUBMITTALS
   A. Product Data
      1. Submit manufacturer's product data and installation instructions for each type of acoustical material and suspension system required.
      2. Submit manufacturer’s written instructions for recommended maintenance practices for each type of acoustical ceiling system required. Include recommendations for cleaning and refinishing acoustical units and precautions against materials and methods that may be detrimental to
finishes and acoustical performances.

B. Samples: Submit 12" square acoustical panel samples for each type of acoustical unit required. Provide 12" long suspension system and edge molding samples.

C. Certification: Submit manufacturer's certification of acoustical units fire hazard classification rating and performance requirements.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original, unopened protective packaging, with manufacturer's labels indicating brand name, pattern size, thickness and fire rating as applicable, legible and intact.

B. Store materials in original protective packaging to prevent soiling, physical damage or wetting.

C. Store cartons open at each end to stabilize moisture content and temperature.

D. Do not begin installation until sufficient materials to complete a room are received.

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Pressurized Plenums (to comply with CISCA’s recommendations for cleaning duct system and protecting ceiling units in pressurized plenums from damage and soiling caused by blowing dirt and dust that may be present when duct system is first operated): Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

1.07 EXTRA MATERIALS

A. Maintenance Stock: Under this Section furnish to the Owner prior to final acceptance, extra maintenance stock of acoustical materials, consisting of:

1. 1% of quantity for each type, composition, color, pattern and size. Not less than two full box of each.

B. This extra stock is for the Owner’s use after completion of the Project and is not to be used for repair or replacement required during the construction period. Properly package, seal, and identify extra stock material.

PART 2 PRODUCTS

2.01 SUSPENSION SYSTEM
A. Exposed "Tee" Grid System

1. Description: Cold-rolled electrogalvanized steel, factory applied white finish paint to match ceiling tile.
   a. 15/16" exposed face; DONN (USG INTERIORS) Model DX;
      CHICAGO METALLIC 200 Snap Grid System; ARMSTRONG Prelude.
   b. 9/16" exposed face; ARMSTRONG Suprafine; DONN (USG INTERIORS) Fineline;
      CHICAGO METALLIC Tempra 4000.

2. Description: Comply with ASTM C635. Provide systems adequate to support light fixtures, ceiling diffusers, and other normal accessories. Maximum deflection 1/360 of the span. All components of system from one manufacturer, die cut, and interlocking.
   b. Type of System: Direct Hung.
   c. Attachment Devices: Size for five times design load indicated in ASTM C635, Table 1 direct hung.
   d. Hanger Wires: ASTM A641 galvanized carbon steel, soft temper, prestretched not less than 12 gauge.
   e. Carrying Channels: 1-1/2" steel channels, hot-rolled or cold-rolled, not less than 0.475 lbs per linear foot, standard finish.
   f. Members: Provide manufacturer's standard exposed runners, cross runners and accessories of type and profiles indicated, with exposed cross runners coped to lay flush with main runners.

3. Edge Moldings: Hemmed edge wall angles, cold-rolled electrogalvanized steel, factory applied finish to match grid system.

4. Overhead Sectional Door: Provide reinforcing, supplemental framing and size members as required to span ceiling without suspension devices.

2.02 ACOUSTICAL UNITS

A. Acceptable Manufacturers: The following models listed are by ARMSTRONG.

1. Type ACT-1: Optima # 3151, 24" x 48" x 3/4", square edge, NRC .90, light reflectance LR-.90, with white, washable finish; 15/16” grid.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine substrates, structure and installation conditions. Do not proceed with acoustical ceiling systems work until unsatisfactory conditions have been corrected.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.
3.02 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling.

1. Avoid use of less than half widths units at borders.

B. Coordinate with ceiling layout on drawings.

C. Notify Architect of discrepancies between ceiling layout on drawings and ceiling layout proposed. Do not proceed until approved by Architect.

3.03 INSTALLATION

A. Suspension System: Comply with ASTM C636 requirements and be water or laser leveled, maximum deflection of 1/360 of span and maximum surface leveling tolerance 1/8" in 12'-0".

B. Rough Suspension

1. Hangers: Ceiling suspension systems shall not be supported from ductwork, electrical conduit, heating or plumbing lines or any other utility lines. Each utility and the ceiling suspension system shall be a separate installation and each shall be independently supported from the building structure. Where interferences occur, employ trapeze hangers or supports to avoid interferences with appurtenances requiring servicing. Support all four corners of suspension systems at fluorescent light fixtures.

2. Wall Molding

a. Provide edge trim molding at perimeter of acoustical ceiling installation and intermediate vertical surfaces. Use maximum lengths. Miter trim corners to provide tight, accurate joint. Connect moldings securely to substrate surfaces.

b. Connect moldings to substrate at intervals not over 16" on center and not more than 3" from ends, leveling with ceiling suspension system to tolerance of 1/8" in 12'-0".

C. Acoustical Units

1. Install acoustical lay-in panels level, in uniform plane, with joints accurately cut to ensure a snug and square fit. All panel faces and edges to be free from damage or soiling.

a. Fit border units accurately at borders and penetrations.

b. Recreate tegular and decorative edges at wall cuts and other cuts.

c. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and perimeter moldings.
d. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.

e. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.

2. Coordinate suspension systems grid layout with electrical lighting fixture lay-out and installation.

3.04 CLEANING

A. After installation, clean soiled or discolored surfaces of acoustical units and exposed suspension members. Comply with manufacturer's recommendations for cleaning and touch-up of minor finish damage.

B. Adjust all sags and twists which develop in ceiling systems. Remove and replace units which are improperly installed and damaged units which cannot be successfully cleaned and repaired to eliminate evidence of damage.

END OF SECTION
This page intentionally blank
SECTION 09 65 00

RESILIENT FLOORING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide resilient flooring as shown and specified. Work includes:

1. Vinyl composition tile flooring.
2. Rubber tile flooring.
3. Sheet vinyl flooring.
4. Base.
5. Stair treads and landing tiles.
7. Luxury vinyl tile
8. Adhesives and accessories to complete the work.

1.02 QUALITY ASSURANCE

A. Provide each type of resilient flooring and base material produced by one manufacturer, including recommended adhesives and leveling compounds.

B. Provide each type resilient flooring and base material from same production run. Colors shall be uniform throughout.

C. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

D. Reference Standards: Wherever the following abbreviations are used herein, they shall refer to the corresponding standard.

2. FS: Federal Specifications as established by the U.S. Government, General Services Administration.
4. ADA: Americans with Disabilities Act Accessibility Guidelines.

E. Slip Retardant Performance: Unless a greater performance is specified under a specific product, all floor materials must have a minimum static coefficient of friction of 0.6.

1.04 SUBMITTALS

A. Submit manufacturer's product data and installation instructions for each type of
resilient flooring, base and accessory required.

B. Samples

1. Tiles: Submit full sized samples of each type, color and pattern required to illustrate the full range of color variations.
2. Base: Provide 6" lengths of each type and color.
3. Sheet Flooring: Manufacturer’s standard sample size, but not less than 6" x 9" of each type, color and pattern required to illustrate the full range of color variations.
   a. Heat Welding Bead: Manufacturer’s standard sample size, but not less than 9" long of each color.
4. Stair Treads: 6" lengths of each type and color.

C. Shop Drawings: Show locations of each type and color of tile and tile pattern.

D. Submit manufacturer’s certification that resilient flooring furnished complies with required fire test performance and has been tested and meets indicated requirements.

E. Submit manufacturer’s written instructions for recommended maintenance practices for each type of resilient flooring, base and accessory material required.

F. Extra Stock: Furnish extra materials in the following quantities:

   1. Tiles and Base: Furnish 2% of the total quantity (but not less than 2 full sealed cartons) of each type, pattern and color. Provide 5% of colors with less than 5000 square feet. Properly package and identify each material.
   2. Sheet Goods: Furnish 10 linear feet in roll form for each 500 linear feet or fraction thereof, of each product, color and pattern. Package each roll with protective covering and identification labels describing contents.
   3. Stair Accessories: Furnish 5% of the total quantity of each type, pattern and color. Properly package and identify each material.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer’s original, unopened labeled containers.

B. Store, protect, and handle resilient flooring materials in accordance with manufacturer’s recommendations to prevent damage, soiling and deterioration.

C. Store materials in areas to receive resilient flooring for a minimum of 48 hours before installation.

1.06 PROJECT CONDITIONS

A. Maintain uniform room temperature range not less than 70 degrees F., in areas to receive resilient flooring for minimum 48 hours before installation and 48 hours after installation.
B. Provide adequate lighting and ventilation during installation and clean-up.

C. Protect adjoining surfaces from damage and soiling.

**PART 2 PRODUCTS**

2.01 RESILIENT FLOORING MATERIALS

The following floor types are materials and specifying methods from previous projects. Each project to have materials selected specific to the project.

A. Vinyl Composition Tile: ASTM F1066, Class 1 or 2 as applicable, 12" x 12" x 1/8", manufactured without asbestos.

1. Colors, Patterns and Manufacturers
   a. Basis of Design: Colors and types indicated on the drawings are based on Essentials manufactured by MANNINGTON.
   b. Other Acceptable Manufacturers: Products manufactured by ARMSTRONG or TARKETT are acceptable providing they meet the requirements specified herein and are an acceptable color match as approved by the Architect. Color match should be submitted to the Architect during bidding for inclusion by an Addendum.

1. Colors, Patterns and Manufacturers
   a. Basis of Design: As indicated on the drawings.
   b. Other Acceptable Manufacturers: Vinyl composition tile manufactured by other manufacturers will be considered if materials meet the requirements of the Basis of Design and the sizes and colors are an acceptable match as approved by the Architect prior to bid opening. These additionally approved manufacturers will be included by Addendum. An unacceptable pattern or color match is reason for disapproval of product and manufacturer. No substitutions will be considered after bid opening.

1. Manufacturer and Type: Imperial Texture Excelon by ARMSTRONG; Essentials manufactured by MANNINGTON; Expressions by TARKETT.

2. Colors: Selected by Architect from manufacturer's full color range.

B. Rubber Tile: Smooth rubber tile flooring complying with ASTM F1344, Class I, 1/8" thick, 12" x 12", integral marbleized colors.

1. Manufacturer and Type: No. 1000 T by R.C. MUSSON CO. or equal as approved by Architect as manufactured by BURKE FLOORING PRODUCTS; FLEXCO DIVISION TEXTILE RUBBER CO.; R.C.A. RUBBER CO.

C. Strip Vinyl Flooring

1. Type: Meets Reference Specification ASTM F1066, Composition 1, Class
2. Flooring shall contain a minimum of 90 percent recycled material.
3. Thickness: 1/8".
3. Style and Manufacturer  
   a. Basis of Design: Colors indicated on the drawings are based on Natural Creations - Mystic manufactured by ARMSTRONG.  
   b. Other Acceptable Manufacturers: Products manufactured by CENTIVA or SINCOL are acceptable providing they meet the requirements specified herein and are an acceptable pattern and color match as approved by the Architect. Color match should be submitted to the Architect during bidding for inclusion by an Addendum.  

D. Sheet Vinyl  
   1. Type: Commercial quality flooring composed of solid vinyl wear layer and a backing of filled fibrous composition.  
   2. Manufacturer and Model: Medintech by ARMSTRONG or equal as approved by Architect as manufactured by TARKETT or MANNINGTON.  
   3. Solid vinyl wear layer designs/pattern and color shall extend uniformly throughout the wear thickness.  
   4. Seams: Chemically bonded.  
   5. Smoke Development: 450 or less (ASTM E662).  
   6. Critical Radiant Flux: 0.45 watts/cm² or more (ASTM E648).  
   7. Size: 6 ft. wide roll stock.  

E. Sheet Vinyl  
   1. Type: Commercial quality flooring composed of solid vinyl wear layer and a backing of filled fibrous composition.  
   2. Style and Manufacturer  
      a. Basis of Design: Colors indicated on the drawings are based on Timberline manufactured by ARMSTRONG.  
      b. Other Acceptable Manufacturers: Products manufactured by TARKETT or MANNINGTON are acceptable providing they meet the requirements specified herein and are an acceptable pattern and color match as approved by the Architect. Color match should be submitted to the Architect during bidding for inclusion by an Addendum.  
   3. Solid vinyl wear layer designs/pattern and color shall extend uniformly throughout the wear thickness.  
   4. Seams: Chemically bonded.  
   5. Smoke Development: 450 or less (ASTM E662).  
   6. Critical Radiant Flux: 0.45 watts/cm² or more (ASTM E648).  
   7. Size: 6 ft. wide roll stock.  

F. Sheet Vinyl – Slip Resistant  
   1. Type: Commercial quality flooring composed of solid vinyl wear layer and a backing of filled fibrous composition.
2. Style and Manufacturer
   a. Basis of Design: Colors indicated on the drawings are based on MANNINGTON Assurance.
   b. Other Acceptable Manufacturers: Products manufactured by TARKETT or ARMSTRONG are acceptable providing they meet the requirements specified herein and are an acceptable pattern and color match as approved by the Architect. Color match should be submitted to the Architect during bidding for inclusion by an Addendum.

3. Solid vinyl wear layer designs/pattern and color shall extend uniformly throughout the wear thickness.

4. Seams: Chemically bonded.

5. Smoke Development: 450 or less (ASTM E662).

6. Critical Radiant Flux: 0.45 watts/cm² or more (ASTM E648).

7. Size: 6 ft. wide roll stock.

8. Gage: .080”.

9. Slip Retardant Performance
   a. ASTM D2047; conform to the following:
      1) Leather Dry (Wet): 0.72 (0.85)
      2) Neolite Dry (Wet): 0.88 (0.84)
      3) Rubber Dry (Wet): 1.08 (1.14)
   b. Meet ADA static coefficient of friction for accessible routes (Paragraph A4.5).

G. Terrazzo (Flexible) Tile

1. Description: Tiles comprised of stone chips embedded in flexible thermo-set resin matrix.

2. Size: 12” x 12” x 1/8”.

3. Stone Chips: Graded to 1/4” maximum size.

4. Physical Properties
   a. Abrasive Wear - Mil. Spec. MIL-F-52505, Tabor Abraser, CS-17 wheels, 1000 cycles with 1000 gram load: 0.0005” maximum wear loss.
   c. Hardness - Shore D Hardness: Resin 75-83, maximum
   d. Flame Resistance - ASTM E648: 0.45 wall/cm² minimum.

5. Manufacturer and Model: Fritztile Granite Tile GS5000 Series by FRITZ CHEMICAL COMPANY. Products by other manufacturers are acceptable providing they meet the requirements specified herein and are approved by the Architect, prior to bid, in accordance with the substitution/manufacturer approval process.

[6. As indicated on Drawings]

[6. Colors and Patterns
   a. Type A: GS5012 Royal White.
   b. Type B: GS5086 Emerald Green.
   c. Type C: GS5020 Staley Black.]

H. Sheet Linoleum
1. Type: Commercial quality flooring; 0.080” gage; ASTM F2034.
   a. Fire Test Data
      1) Critical Radiant Flux – ASTM E648: Class 1; 0.45 watts/cm²
      2) Smoke Developed – ASTM E662: 0.45 watts/cm² or more.

2. Manufacturer and Model: Marmorette by ARMSTRONG or equal as approved by Architect as manufactured by TARKETT or MANNINGTON.
   a. Colors: As selected by Architect.

I. Static Dissipative Vinyl Composition Tile: ASTM F1066, Class 2 (through pattern tile), 12” x 12” x 1/8”, manufactured without asbestos.

1. Fire Test Data
   a. Smoke Development: 450 or less (ASTM E662).
   b. Critical Radiant Flux: 0.45 watts/cm² or more (ASTM E648).

2. Electrical Properties: Installed system to conform to the following properties:
   a. Resistance
      1) Reference: ESD-S7.1 and ASTM F150
      2) Point-to-point and point-to-ground: 10⁶ to 10⁹ ohms.
   b. Static Generation
      1) Reference: ESD STM 97.2 (flooring in combination with footwear and a person)
      2) At 40% Relative Humidity with ESD Shoes: <10 volts
      3) At 12% Relative Humidity with ESD Shoes: <100 volts
   c. Static Decay
      1) Flooring in combination with footwear (ESD Shoes) and a person (5000 volts to zero): 0.5 seconds average
      2) Fed. Test 101C, Method 4046 (5000 volts to zero): <0.5 seconds

3. Colors, Patterns and Manufacturers
   a. Basis of Design: Colors and types indicated on the drawings are based on SDT Static Dissipative Tile manufactured by ARMSTRONG.


1. Thickness: 1/8”.
2. Colors, Patterns and Manufacturers
   a. Basis of Design: Premium vinyl tile strips indicated on the drawings are Bamboo pattern manufactured by CENTIVA.
   b. Other Acceptable Manufacturers: Vinyl tile strips manufactured by ARMSTRONG, SINCOL or other manufacturers will be considered if materials meet the requirements of the Basis of Design and the sizes, patterns and colors are an acceptable match as approved by the Architect prior to bid opening. These additionally approved manufacturers will be included by Addendum. An unacceptable pattern or color match is reason for disapproval of product and
manufacturer. No substitutions will be considered after bid opening.


1. Thickness: 1/8”.
2. Size: 18” x 18”.
3. Physical Properties
   b. Flooring Radiant Panel Test – ASTM E648: ≥0.45 critical radiant flux, Class 1.
4. Colors, Patterns and Manufacturers
   a. Basis of Design: Enhanced vinyl tile indicated on the drawings are Azrock Cortina Grande manufactured by TARKETT.
   b. Other Acceptable Manufacturers: Vinyl tile manufactured by ARMSTRONG, MANNINGTON or other manufacturers will be considered if materials meet the requirements of the Basis of Design and the sizes, patterns and colors are an acceptable match as approved by the Architect prior to bid opening. These additionally approved manufacturers will be included by Addendum. An unacceptable pattern or color match is reason for disapproval of product and manufacturer. No substitutions will be considered after bid opening.

L. Rubber Sheet Flooring – Drawing Reference RB-1: Smooth rubber flooring; non-laminated, single ply surface made from multiple colored reprocessed EPDM rubber.

1. Thickness: 4 mm
2. Format: 4'-0" rolls.
3. Manufacturer, Colors and Patterns
   a. Basis of Design: Colors indicated on the drawings are based on ECOEarth manufactured by ECO SURFACES.
   b. Other Acceptable Manufacturers: Products manufactured by other manufacturers are acceptable providing they meet the requirements specified herein and are an acceptable pattern and color match as approved by the Architect. Color match should be submitted to the Architect during bidding for inclusion by an Addendum.

M. Luxury Vinyl Strip and Tile Flooring

1. Type: Meets Reference Specification ASTM F1700, Type B, Class III
2. Thickness: 2.5 mm total with 28 mil urethane wearlayer.
3. Sizes: As indicated.
4. Properties:
   a. Static Load: ASTM F970 Meets Requirements
   b. Indentation – Residual (75 Lbs): Meets Requirements
   c. Coefficient Of Friction: ASTM D2047 0.65 (Dry)
   d. Fire Rating: ASTM E648 Class I
5. Colors, Patterns and Manufacturers
   a. Basis of Design: As indicated on the drawings.
   b. Other Acceptable Manufacturers: Vinyl flooring manufactured by other manufacturers will be considered if materials meet the requirements of the Basis of Design and the sizes and colors are an acceptable match as approved by the Architect prior to bid opening. These additionally approved manufacturers will be included by Addendum. An unacceptable pattern or color match is reason for disapproval of product and manufacturer.

2.02 BASE

   A. Vinyl Base: Complying with ASTM F1861, Type TV, Group 1, 4” high, 1/8” gage. Provide long length rolls and job formed corners. Standard top set cove (Style B) at resilient and other hard surface flooring and straight toeless (Style A) at all carpeted floors.

   A. Rubber Base: Complying with ASTM F1861, Type TP, Group 1, 4” high, 1/8” gage. Provide long length rolls and job formed corners. Standard top set cove (Style B) at resilient and other hard surface flooring and straight toeless (Style A) at all carpeted floors.

[1. Colors and Manufacturers
   a. Basis of Design: Colors and types indicated on the drawings are manufactured by JOHNSONITE/TARKETT.
   b. Other Acceptable Manufacturers: Products manufactured by VINYL PLASTIC, INC. (VPI) or ROPPE are acceptable providing they meet the requirements specified herein and are an acceptable color match as approved by the Architect. Color match should be submitted to the Architect during bidding for inclusion by an Addendum.]

[1. Colors and Manufacturers
   a. Basis of Design: As indicated on the drawings.
   b. Other Acceptable Manufacturers: Vinyl base manufactured by other manufacturers will be considered if materials meet the requirements of the Basis of Design and the colors are an acceptable match as approved by the Architect prior to bid opening. These additionally approved manufacturers will be included by Addendum. An unacceptable color match is reason for disapproval of product and manufacturer. No substitutions will be considered after bid opening.]

[1. Manufacturers: VINYL PLASTIC, INC.; JOHNSONITE/TARKETT; ROPPE.
2. Colors: Selected by Architect from manufacturer's full color range.]

B. Vinyl Base, Millwork Type: Thermoplastic rubber formulation designed specifically to meet the performance and dimensional tolerance requirements of ASTM F1861, Type TP, Group 1 (solid) Standard Specification
for Resilient Wall Base. Base shall contain a minimum of 90 percent recycled material.

1. Hardness - ASTMD 2240: 85 Shore A
2. Corners: Field miter cut.
3. Colors and Manufacturers
   a. Basis of Design: Colors and types indicated on the drawings are manufactured by JOHNSONITE/TARKETT.
   b. Other Acceptable Manufacturers: Products manufactured by VINYL PLASTIC, INC. (VPI) or ROPPE are acceptable providing they meet the requirements specified herein and are an acceptable color and style match as approved by the Architect. Color and style match should be submitted to the Architect during bidding for inclusion by an Addendum.

2.03 STAIR ACCESSORY MATERIALS

A. Stair Treads and Risers: Homogeneous, rubber treads with textured finish complying with ASTM F2169 TS or TP (rubber, thermoplastic). Provide Group 2 - contrasting color nosing per ANSI A117.1-2009, Section 504.5.1. where indicated or as required at designated accessible stairs.

   1. Thickness: ¼”.
   2. Hardness: ASTM D 2240 – Not less than 85 Shore A
   3. Abrasion Resistance: ASTM D 3389 – less than 1 gram weight loss
   4. Size: Lengths and depths to fit each stair tread and riser.
   5. Separate Risers: Smooth, flat; in height that fully covers substrate; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.
   6. Colors, Texture and Manufacturers
      a. Basis of Design: As indicated on the drawings.
      b. Other Acceptable Manufacturers: Stair Tread and Risers manufactured by other manufacturers will be considered if materials meet the requirements of the Basis of Design and the colors are an acceptable match as approved by the Architect prior to bid opening. These additionally approved manufacturers will be included by Addendum. An unacceptable color match is reason for disapproval of product and manufacturer. No substitutions will be considered after bid opening.

B. Landing Floor Tiles: Matching treads; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.

C. Stair Nosings

   1. Material: Homogeneous composition of polyvinyl chloride (PVC), high quality additives, and colorants to meet the performance requirements of ASTM F2169 Standard Specification for Resilient Stair Treads, Type TV, Class 1 and 2, Group 1 and 2.
2. Description: Visually Impaired Double Undercut Carpet Vinyl Stair Nosing, 2” hinged square nose configuration 3-3/16” tread depth with 2” co-extruded photo luminescent strip, undercut for 1/4” to 5/16” carpet on step and riser

3. Model and Manufacturer: JOHNSONITE/TARKETT Model VIVCD-XX.
   a. Other Acceptable Manufacturers: Products manufactured by VINYL PLASTIC, INC. (VPI) or ROPPE or other manufacturers are acceptable providing they meet the requirements specified herein and are an acceptable color and style match as approved by the Architect. Color and style match should be submitted to the Architect during bidding for inclusion by an Addendum.

2.04 ACCESSORIES

B. Leveling Compound: Non-staining latex modified, Portland cement based type, compatible with flooring, as provided or recommended by the flooring manufacturer.

C. Adhesives: Waterproof, stabilized type as recommended by the resilient flooring and base manufacturer to suit material and substrate conditions.

1. VOC Content: The volatile organic compound (VOC) content of adhesives shall not exceed the limits defined in Rule #1168 “Adhesive and Sealant Applications” of the South Coast Air Quality Management District (SCAQMD), of the State of California. All VOC limits are defined in grams per liter, less water and less exempt compounds (determined by U.S. EPA Reference Test Method 24). The VOC limits are as follows:
   a. Water-based contact cement: 250 g/L
   b. Water-based construction adhesive: 100 g/L

D. Resilient Edge/Transition Strips: Provide rubber or stainless steel transition strips by the following manufacturers.

   a. ROPPE, #56
   b. JOHNSONITE/TARKETT, CTA-XX-H
   c. VPI FLOORING, ACC12

2. Resilient-to-Concrete: Stainless steel
   a. SCHLUTER Reno U; stainless steel
   b. GREAT LAKES TILE PRODUCTS; Reducer.
   c. BLanke Corp.; Reducer Trim.

3. Where transition types are required for conditions other than those listed above, provide rubber type from the manufacturers listed to create a smooth transition or termination.

E. Cleaning and Polishing Materials: Polish and neutral cleaner as recommended by the floor material manufacturer.

F. Existing Adhesive Remover: Non-toxic type; similar to De-Sol-It by ORANGE-SOL
or equal by NAPIER ENVIRONMENTAL TECHNOLOGIES, INC., or CITRUS KING.

G. Terrazzo Tile Sealer and Finisher: FRITZ CHEMICAL COMPANY FCP-102 Secondary Coat Sealer and FCP-200 Buff-On or similar type products as recommended by tile manufacturer and approved by Architect.

**PART 3 EXECUTION**

3.01 INSPECTION

A. Examine substrates and installation condition. Do not proceed with resilient flooring work until unsatisfactory conditions have been corrected.

B. Subfloor surfaces shall be smooth, level, at the required finish elevation, and within the tolerances specified in Section 03 30 00.

C. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 PREPARATION

A. Prepare substrates according to floor manufacturer’s written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.

3. Perform tests recommended by flooring manufacturer. Proceed with installation only after satisfying manufacturer’s recommendations for test results.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install flooring until it is the same temperature as the space where it is to be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by flooring.

3.03 INSTALLATION

A. Install resilient flooring and accessories with adhesive in strict compliance with the
manufacturer's recommendations. Butt tightly to vertical surfaces, thresholds, nosings and edgings. Scribe around obstructions and to produce neat joints, laid tight, even and straight. Extend flooring into toe spaces, door reveals and into closets and similar openings.

B. Tile Flooring

1. Lay tile flooring with joints tight, in true alignment and parallel to walls of rooms and corridors.
2. Lay tile symmetrically about centerlines of space, without pattern or borders. Adjust layout to avoid use of cut widths less than one-half tile at room perimeter.
3. Match tile for color by using manufactured and packaged sequence.
4. Broken, cracked, or deformed tiles are not acceptable.
5. Immediately after installation, thoroughly roll tile with a 150 lb. sectional roller until a firm, uniform bond has been obtained.

C. Static Dissipative Tile Flooring: In addition to the above requirements, conform to ARMSTRONG Installation System Manual F-5061 or similar type recommended system by other approved manufacturer.

D. Base

1. Install at walls, column, casework and other permanent fixtures as scheduled. Install in as long of lengths as practicable. Tightly bond base to backing throughout length of each piece, with continuous contact at horizontal and vertical surfaces.
2. Provide terminal base ends beveled and toes rounded.
3. On masonry surfaces or other similar irregular surface, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.

E. Sheet Flooring

1. Install sheet flooring in accordance with latest edition of manufacturers' instructions.
2. Spread only enough adhesive to permit installation of sheet flooring before initial set.
3. Install flooring wall to wall before installation of floor-set cabinets, casework and similar moveable items.
4. Extend flooring into door recesses, closets, and similar openings as indicated on drawings.
5. Where adjacent floor finish is dissimilar, terminate sheet flooring at centerline of doors.
6. Scribe, cut, and fit to walls, columns, cabinets, pipes, built-in-furniture and cabinets to produce tight joints. Lay flooring to provide a minimum number of seams. Avoid cross seams, filler pieces, and strips.
7. Sheet flooring shall be installed over covers for telephone conduits, electrical conduits and other similar items which occur within the finished
8. Sheet flooring MUST be cut sharp and clean around these covers so that the covers can be removed when required.
9. Sheet flooring must be applied to covers in a solid application of adhesive.

F. Edge Strips: Place tightly butted to flooring and secure with adhesive. Install at edges of flooring which would otherwise be exposed.

G. Stair Treads and Accessories

1. Tightly fit tread nose against face of stair riser or nosing. Fill open spaces at the nosing between the stair and the rubber tread with manufacturer's approved caulk or similar material.
2. Roll surfaces until a firm bond is obtained.

3.04 CLEANING AND PROTECTION

A. Prohibit traffic on floor finish for 48 hours after installation.

B. After flooring has set, clean thoroughly. Remove excess adhesive or other surface blemishes from flooring, using neutral type cleaners as recommended by the flooring manufacturer.

C. Perform initial maintenance according to latest edition of manufacturer's maintenance manual and the following:

1. Vinyl composition Tile: Clean, apply polish, and buff with type of polish, number of coats and buffing procedures in accordance with manufacturer's instructions.

[2. Terrazzo Tiles: Seal all terrazzo tile areas with two coats of sealer. Apply sealer after adhesive has set (no sooner than 48 hours after installation, but prior to any use of the floor area). Buff terrazzo tile areas as recommended by tile manufacturer.]

D. Protect installed flooring from damage and staining with heavy duty non-staining Kraft paper or other covering at all traffic lanes. Protect completed work from traffic and damage until final acceptance.

END OF SECTION
This page intentionally blank
PART 1 GENERAL

1.01 WORK INCLUDED

A. Carpet, installation and all glue, edge guards, [pad] and accessories necessary for the installation of:
   1. Carpet tile
   2. Carpet sheet
   3. Walk off carpet

B. Work includes preparation of subsurfaces, cleaning, and protection of finished carpet.

1.02 RELATED SECTIONS

A. Sustainable Design Requirements: Section 01 81 13.

1.03 QUALITY ASSURANCE

A. Installer: Firm with not less than 5 years of carpeting experience similar to work of this Section.
   1. Work not in compliance with the manufacturer’s recommended standards and procedures shall be promptly corrected at the Contractor's expense.

B. Manufacturer: Firm (carpet mill) with not less than 5 years of production experience with similar types specified in this section; and whose published product data clearly indicates compliance of product with requirements of this Section.

C. General Standard: "Carpet Specifiers Handbook" by The Carpet and Rug Institute; for definitions of terminology not otherwise defined herein, and for general recommendations and information.

D. Fire Performance Characteristics: Provide carpet 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.
   2. Critical Radiant Flux - ASTM E684: Not less than 0.45 watts per square centimeter.
3. Smoke Density - ASTM E84: 450 or less.

1.04 REFERENCE STANDARDS

A. Carpet: Comply with the local building authority for flame spread and smoke contribution requirements and tested in accordance with ASTM E84.

1.05 SUBMITTALS

A. Samples

1. Broadloom: Submit 12" x 12" samples of each color and pattern selected.
2. Tiles: Submit full size tiles (samples) of each color and pattern selected.
3. Accessories: 12" long sample of each type exposed edge stripping and accessory item.

B. Product Data: Provide for all items. Include, product data covering carpet construction, physical characteristics, durability, resistance to fading, and flame resistance characteristics.

C. Shop Drawings

1. Broadloom: Submit seam diagram drawings and edge treatments.
2. Tiles: Submit drawings showing layout. Indicate pile or pattern direction and locations and types of edge strips.

D. Certifications: Contractor shall provide the following:

1. Manufacturer: Before carpet materials are ordered, submit 4 copies of test results from a recognized laboratory and 4 copies of a notarized statement, signed by an officer of the manufacturer, confirming that the carpet products proposed for use are those which have passed the required tests indicated under "Performance Standards" for the carpet and comply with the requirements of State and local fire authorities.
2. Installer: Submit 4 copies attesting that materials actually installed were the same as those certified as meeting specified requirements.

E. Special Environmental Requirements’: Submit the following in accordance with Section 01 81 13):

1. Recycled Content
   a. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product. Indicate percentage of recycled content per unit weight of product.
   b. Salvaged/Refurbished: Indicate percentage of salvaged and/or refurbished content per unit of product.
2. Local/Regional Materials
   a. Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
   b. Indicate location of extraction, harvesting, and recovery; indicate
distance between extraction, harvesting, and recovery and the project site.

3. **VOC Data**
   a. **Adhesives**
      1) Submit manufacturer's product data for adhesives. Indicate VOC limits of the product. Submit MSDS highlighting VOC limits.
      2) Submit Green Seal Certification to GS-36 and description of the basis for certification.
      3) Submit manufacturer’s certification that products comply with SCAQMD #1168.
   b. Carpet: Submit manufacturer's certification of compliance with Carpet and Rug Institute's Green Label Plus Testing Program.
   c. Carpet Cushion (where applicable): Submit manufacturer's certification of compliance with Carpet and Rug Institute's Green Label Test Program.

1.06 **PRODUCT DELIVERY AND STORAGE**

A. Deliver carpeting materials in original mill protective wrapping, and store inside protected from weather, moisture and soiling.

B. Investigate and resolve access restrictions, including elevator capacity, entrances and accessibility, to assure proper delivery and installation of materials.

C. Protect materials against damage of any kind. Damaged products, including soiled fabrics, will be rejected.

1.07 **MAINTENANCE**

A. Manufacturers: Provide three (3) copies of maintenance schedules, describing programmed maintenance procedures, including general maintenance, preventative maintenance, spot removal, traffic lane maintenance and overall cleaning.

B. Operational Service: Provide manufacturer's take-back program service for carpet installed in project. Service shall reclaim materials for recycling and/or reuse. Service shall not landfill or burn reclaimed materials.

1.08 **WARRANTY**

A. Special Project Warranty: Submit a written warranty, executed by the Contractor, Installer and the Manufacturer, agreeing to repair or replace carpeting which fails in materials or workmanship within the specified warranty period. This warranty shall be in addition to and not a limitation of other rights the Owner may have against the Contractor under the Contract Documents.

1. Warranty period is two years after date of substantial completion.
B. Carpet manufacturer’s material wear warranty: Ten years.

1.09 EXTRA MATERIALS

A. Broadloom: Provide quantity of full-width carpet equal to 5 percent of amount installed. In addition, turn over to Owner all usable scraps of carpet. Usable scraps are defined to include roll ends of less than 9 ft. length, and pieces of more than 3 sq. ft. area and more than 8 inches wide.

B. Tiles: Provide quantity of full tiles for each type of material equal to 5 percent of amount installed.

C. Deliver extra carpet materials to Owner’s designated storage space, properly packaged with protective covering and identified with labels describing contents.

PART 2 PRODUCTS

2.01 CARPET

A. Environmental Requirements

1. Carpet Systems
   a. Toxicity/IEQ: Carpet systems must meet or exceed the requirements of the Carpet and Rug Institute Green Label Plus Testing Program.
   b. Salvaged/refurbished: Carpet system fabricated from minimum 90 percent salvaged carpet or carpet tile.

2. Nylon Carpet Face Fiber
   a. Recycled Content: Minimum 5 percent post-consumer recycled content, or minimum 20 percent pre-consumer recycled content at contractor’s option.

3. Natural Carpet Face Fiber:
   a. Toxicity/IEQ: Chemical treatments, including moth treatment, are not permitted.
   b. Biobased content: Provide fiber manufactured from minimum 85 percent biobased materials.
      1) Wool

4. Carpet Backing
   a. Toxicity/IEQ: Carpet Backing/Cushion systems must meet or exceed the requirements of the Carpet and Rug Institute’s Green Label Testing Program.
      1) Biobased Content: Minimum 85 percent natural latex, jute, or cotton.
   b. Recycled Content: Minimum 5 percent post-consumer recycled content, or minimum 20 percent pre-consumer recycled content at contractor’s option.

[B. Manufacturers, Styles and Colors

1. Basis of Design: Manufacturers, styles and colors as indicated on the
drawings.

2. Other Acceptable Manufacturers: Carpet manufactured by other manufacturers will be considered if materials meet the requirements of the Basis of Design and the performance, characteristics, color and style are acceptable matches as approved by the Architect prior to bid opening. These additionally approved manufacturers and carpets will be included by Addendum. An unacceptable color match or style is reason for disapproval of product and manufacturer. No substitutions will be considered after bid opening.]

B. Types, Patterns and Colors: As indicated on Drawings.

[B. Manufacturers

1. Basis of Design: Carpets selected are based on carpet tiles by MILLIKEN, ATLAS and INTERFACE.
2. Other Acceptable Manufacturers: Carpet manufactured by manufacturers other than the basis of design will be considered if materials meet the requirements of the Basis of Design and the color and style are acceptable matches as approved by the Architect prior to bid opening. These additionally approved manufacturers and carpets will be included by Addendum. An unacceptable color match or style is reason for disapproval of product and manufacturer. No substitutions will be considered after bid opening.

C. Carpet Type CR-1 and CR-2

1. Carpet Properties
   a. Construction: Tufted, textured tip-shear
   b. Dye Method: Solution
   c. Face Fiber: 100% nylon.
   d. Tufted Face Weight: 28 oz/SY
   e. Gauge: 1/12
   f. Rows: 10.5/inch
   g. Finished Pile Height: 0.125 inch
   h. Density Factor: 403,428.
   i. Nominal Total Thickness: .36 inch
   j. Flammability (Radiant Panel ASTM E648): > 0.45 (Class I)
   k. Smoke Density (NFPA 258-T or ASTM E662): < 450

2. Manufacturer and Style: MILLIKEN Paste Up; Tessellate
3. Colors: As indicated on the drawings.

2.02 WALK-OFF CARPET TILE MAT

A. Manufacturers, Styles and Colors

1. Basis of Design: Manufacturers, styles and colors as indicated on the drawings.
2. Other Acceptable Manufacturers: Carpet manufactured by other
manufacturers will be considered if materials meet the requirements of the Basis of Design and the color and style are acceptable matches as approved by the Architect prior to bid opening. These additionally approved manufacturers and carpets will be included by Addendum. An unacceptable color match or style is reason for disapproval of product and manufacturer. No substitutions will be considered after bid opening.]

B. Types, Patterns and Colors: As indicated on Drawings.

A. [Carpet Properties/Manufacturer WM-1

2. Face Yarn: 82.5% nylon; 17.5% polyester
4. Finished Pile Thickness: .325"
5. Colors: As indicated on the drawings.
6. Manufacturers
   a. Basis of Design: INTERFACE.
   b. Other Acceptable Manufacturers: Carpet manufactured by ATLAS or MILLIKEN will be considered if materials meet the requirements of the Basis of Design and the color and style are acceptable matches as approved by the Architect prior to bid opening. It is anticipated that a custom carpet by these manufacturers will be required. These additionally approved manufacturers and carpets will be included by Addendum. An unacceptable color match or style is reason for disapproval of product and manufacturer. No substitutions will be considered after bid opening.]

[2.03 CARPET PADDING DOUBLE GLUE DOWN

A. Description: High density styrene-butadiene rubber carpet cushion designed for double direct glue installation.

B. Fire Test: Passes Methenane Pill Test (DOC-FF1-70 FF2-70).

C. Physical Characteristics

1. Density: 22 pounds per cubic foot.
2. Thickness: .25".
3. Profile: Flat.

D. Manufacturer: Tred-Mor #2568-2 by SPONGE-CUSHION, INC. or equal by AMOCO FABRICS AND FIBERS or CARPET CUSHION ASSOCIATES.]

[2.03 CARPET PADDING STRETCH-IN

A. Description: Grafted or densified primed bonded polyurethane-foam cushion.

B. Compression Force Deflection at 65 Percent per ASTM D 3574: 0.7 to 1.4 and as recommended by carpet manufacturer
C. Physical Characteristics: HUD/FHA UM72a Class: 1

1. Density: 6 lbs.
2. Polymer density lbs./cu. Ft. ±5% 2.2 to 2.7
3. Thickness: .375".
4. Profile: Flat.
5. Tensile Strength psi min: 10
6. Elongation %: 100
7. Comp. Set Max. % At 50% Deflection: 15.0

D. Emissions: Provide carpet cushion that complies with testing and product requirements of CRI's "Green Label" program.

2.04 ACCESSORIES

A. Carpet Edge Guard: Non-metallic type. Extruded or molded vinyl or rubber of size and profile indicated. Color as selected by Architect.

B. Adhesive: Non-toxic, waterproof, white latex base cement formulated for the installation of the manufactured materials. Type as recommended by carpet manufacturer.

1. Toxicity/IEQ: Adhesive must not have a VOC content greater than 50 g/L less water and exempted solids, as prescribed by South Coast Air Quality Management District Rule 1168.

B. Adhesive

1. Type 1: Pressure sensitive type for use between floor and pad.
   a. Manufacturer: Fultack TA-715 by H.B. FULLER; Parabond-M277 by PARA-CHEM; Release Stix #2230 by XL CORP; D2 by USG-DURABOND or equal.
2. Type 2: Premium quality carpet adhesive for use between carpet and pad. Waterproof, non-flammable type.
   a. Manufacturer: Perfect Putdown TA717 by H.B. FULLER; Parabond Commercial Grade - M433 by PARA-CHEM; Premium Multi-purpose Gold Stix #90 by XL CORP.; Floor Covering Adhesive D600 by USG-DURABOND or equal.

C. Seaming Cement: Hot-melt seaming adhesive or similar product recommended by carpet manufacturer, for taping seams and buttering cut edges at backing to form secure seams and prevent pile loss at seams.

D. Miscellaneous Materials: As recommended by manufacturer of carpet and other carpeting accessory products; selected by installer to meet project circumstances and requirements.

E. Leveling Materials and Crack Fill: Non-staining latex cementitious type, compatible with carpet adhesive, as recommended by the flooring manufacturer.
F. Carpet Stripping: Water-resistant plywood, in strips as required to match cushion thickness and that comply with CRI 104, Section 12.2.

G. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

[2.04 WALL CARPET

A. Manufacturer: Specifications are based on Tretford by EUROTEX or equal products by GENERAL FELT INDUSTRIES or MODERN CARPET INDUSTRIES conforming to the following:

2. Face Yarn: 80% goat hair, 15% nylon, 5% viscose.
3. Primary Backing: PVC.
5. Width: 6'-7".
6. Thickness: 1/4".
7. Total Weight: 80 ounce per square yard.
8. Flame Spread: Class A per ASTM E84.
9. Smoke Developed: Class A per ASTM E84.
10. NRC: .20 per ASTM C423.
11. Colors: As selected by Architect.]

PART 3 EXECUTION

3.01 PREPARATION

A. Installer must examine substrates for moisture content and other conditions under which carpeting is to be installed, and notify Contractor in writing of conditions detrimental to proper completion of the work.

1. Do not proceed until unsatisfactory conditions have been corrected.

B. Comply with CRI 2011 and with carpet manufacturer's written installation instructions for preparing substrates indicated to receive carpet installation.

C. Concrete Substrates

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by flooring manufacturer. Do not use solvents.
3. Perform tests recommended by flooring manufacturer. Proceed with installation only after satisfying manufacturer’s recommendations for test results.
D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

E. Broom or vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

F. Sequence carpeting with other work so as to minimize possibility of damage and soiling of carpet during remainder of construction period.

3.02 INSTALLATION

A. Install in accordance with recommendations of the manufacturers of materials and Carpet and Rug Institute’s methods specified in CRI 2011. Carpet manufacturer's current installation instructions shall be kept at job site and be followed explicitly.

1. Comply with manufacturer's recommendations for installation of carpet; maintain uniformity of carpet direction and lay of pile, unless otherwise indicated.

2. [Stretch-in Installation: Comply with CRI 104, Section 12, "Stretch-in Installations."]

B. Use modular carpet from the same dye lot in each room.

C. Lay carpet in accordance with the final shop drawings. No reversing of carpet direction shall be permitted.

D. Install modular carpet by trimming, cutting and prefitting units. Then apply adhesive in strict accordance with manufacturer's instructions, and place the carpet modules with the pile inclination in the direction as recommended by the manufacturer, or as otherwise indicated on the final layout drawings.

1. Application shall be full spread. Sprayed on adhesive is not permitted.

2. Install using a notched trowel.

E. Trim protruding ends of open loops so slightly below surrounding pile height.

F. Use edge molding where carpet terminates under doors and along edge of carpet where it abuts another floor material. Fasten edge moldings securely to the floor with glue manufactured for this specific purpose.

G. Roll entire area lightly to eliminate air pockets and ensure uniform bond.

[H. Double Glue-Down Installation

1. Layout cushion using the longest lengths possible.

2. Locate seams of carpet so they are not directly over cushion seams.
3. Butt cushion edges.
4. Place cushion in full bed of adhesive conforming to application and curing rates of adhesive.
5. Fit sections of carpet into each space prior to application of adhesive. Trim edges and butter cuts with seaming cement.
6. Apply adhesive uniformly to cushion in accordance with manufacturer's instructions. Butt carpet edges tightly together to form seams without gaps. Roll lightly to eliminate air pockets and ensure uniform bond. Remove adhesive promptly from face of carpet.]

[I. Wall Carpet Installation

1. Apply with adhesive as recommended by manufacturer.
2. "Back-tack" sheets along top; remove tacks when adhesive has dried.
3. Lightly roll each sheet with a vinyl roller.
4. Install with rib running vertically.]

3.03 CLEANING AND PROTECTION

A. Protect installed carpet to comply with CRI 2011 and carpet manufacturer recommendations.

B. Remove debris, sorting pieces to be saved from scraps to be disposed. Keep premises free and clear of waste material in connection with carpet work.

C. Vacuum carpet using commercial machine with face-beater element. Remove spots and replace carpet where spots cannot be removed.

D. Advise Contractor of protection methods and materials needed to ensure that carpeting will be without deterioration or damage at time of substantial completion.

E. Provide adequate protection for adjacent equipment, furnishings and materials.

[F. When entering, passing through, or working in any space in the building that contains finished materials, maintain proper protection for floors, walls, ceilings, fixtures, etc. Repair or replace damaged adjoining work as directed by the Architect at no additional cost to the Owner.]
PART 1  GENERAL

1.01  WORK INCLUDED
A. Provide wood veneer wallcovering faced polyester fiber acoustical wall panel system with all mounting accessories.

1.02  QUALITY ASSURANCE
A. Installation: Performed by an experienced authorized installer approved by acoustical material manufacturer.
B. Fire Hazard Classification: Provide acoustical materials which have been UL tested, listed and labeled Class 0-25, when tested in accordance with ASTM E84.
C. Reference Standards: Wherever the following abbreviations are used herein, they shall refer to the corresponding standards.

1.03  SUBMITTALS
A. Product Data: Submit manufacturer's product data and installation instructions for system specified.
B. Samples: Submit acoustical panel samples for each acoustical unit selected.
C. Certification: Submit manufacturer's certification of acoustical units fire hazard classification rating and performance requirements.

1.04  PRODUCT DELIVERY, STORAGE AND HANDLING
A. Deliver materials in original, unopened protective packaging, with manufacturer's labels indicating brand name, pattern size, thickness and fire rating as applicable, legible and intact.
B. Store materials in original protective packaging to prevent soiling, physical damage or wetting.

PART 2  PRODUCTS

2.01  ACOUSTICAL WALL PANELS
A. Wall Panels: Perforated facing bonded to acoustical core with hardened edges.
   1. Thickness: Nominally 1"
   2. NRC: 0.75 to 0.95 - ASTM C423-17:
   3. Color: As indicated.

B. Flame Spread Rating: Panels shall have a flame spread rating of 25 or less and smoke-developed rating of 200 or less according to ASTM E84.

C. Sizes: As indicated.

D. Sound Absorption Coefficient.
   1. 250 Hz: 0.47
   2. 500 Hz: 0.88
   3. 1000 Hz: 0.98
   4. 2000 Hz: 1.00

F. Basis of Design Manufacturers: KOROSEAL Performance Series.
   1. Finish: Wood Veneer Wallcovering

G. Mounting: Adhesive mounting as recommended by manufacturer.

**PART 3 EXECUTION**

3.01 INSPECTION OF SURFACES

A. Verify that surfaces to receive wall panels are smooth and have no conditions detrimental to successful application of wall panels.

B. Notify Architect of above referenced conditions.

3.02 ATTACHMENT

A. Securely fix wall panels by means adhesives vertically to wall.

3.03 DAMAGED PANELS

A. Damaged, soiled or discolored wall panels installed under work of this Section shall be cleaned or removed and replaced at no additional cost to the Owner.

**END OF SECTION**
SECTION 09 91 00

PAINTING

PART 1 GENERAL

1.01 SCOPE

A. Work Included

1. Surface preparation and painting or finishing of all interior and exterior exposed items and surfaces except as otherwise indicated. Work includes, but is not necessarily limited to, the following:
   a. Walls, ceilings and soffits.
      1) Gypsum board
   b. Concrete masonry walls.
   c. Hollow metal doors and frames.
   d. Exposed structure including deck and all framing.
   e. Exposed ferrous metal of any type, interior and exterior, including galvanized items.
   f. Exposed sheet metal, ductwork, conduit and piping in finished spaces; not mechanical equipment or electrical equipment rooms.
   g. Exposed prime coated or unfinished mechanical or electrical items outside of mechanical equipment rooms. Repaint factory finished mechanical or electrical items where specified.
   h. Stenciling of fire walls above ceilings.
   i. Other items noted or specified.

2. Surface preparation, priming and coats of paint specified are in addition to shop priming and surface treatment specified under other sections of the work.

B. Mechanical Equipment Rooms: Painting subject to the following requirements:

1. Paint finish on walls and ceiling, when scheduled on drawings, to be applied prior to installation of mechanical/electrical work as much as possible.
2. Spray painting not permitted after electric motors have been installed.

C. Work Excluded: Do not paint the following items unless specifically called for on the drawings or specified herein:

1. Concrete floors.
2. Shop or prime coats on items to which shop or prime coats have been applied by the fabricator, unless noted otherwise.
4. Items with factory finish or natural finish (brick, stone, stainless steel, aluminum, and others) unless noted or indicated elsewhere.
5. Colored concrete masonry units.
6. Wall areas permanently concealed by fixed equipment or accessories.
7. Equipment, sheet metal, ductwork and equipment in mechanical and electrical rooms; painting of these items, if required, provided under Divisions 23 and 26 as applicable.
8. Piping in mechanical rooms, except exposed gas and fire protection piping.
10. Factory finished equipment, except for touch-up, unless otherwise specified herein.
11. Concealed piping.
12. Communication and data wiring in cable trays
13. Items permanently concealed above ceilings.

D. Surface Preparation

1. It is the intention of this specification that new substrates will be ready for decoration as specified herein except for normal construction dust and soiling.
2. Surfaces and materials installed by other trades are required to be acceptable for work specified under Part 3, Surface Preparation. Specifically, new surfaces to be clean, sound, free from loose particles, dirt, loose mortar and grease.
3. Existing Surfaces: Unless otherwise specified, provide all surface preparation required for decoration.

1.02 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.03 QUALITY ASSURANCE

A. Application: Performed only by skilled, experienced painters.
B. Provide lead free prime and finish coatings. All top coatings shall be mold and mildew resistant.

C. Coordination: Provide finish coats compatible with prime paints used. Review other specification sections to ensure compatibility of total coating system with prime paints provided for the various substrates. Provide barrier coats over non-compatible primers or remove primer and reprime as required. Notify the Architect of anticipated problems using coating systems specified on substrates primed in accordance with other section requirements.

D. Reference Specifications

1. The following Society for Protective Coatings (SSPC) specifications are referenced by code number within this Section.

<table>
<thead>
<tr>
<th>Code</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP-1</td>
<td>Solvent Cleaning</td>
</tr>
<tr>
<td>SP-2</td>
<td>Hand Tool Cleaning</td>
</tr>
<tr>
<td>SP-3</td>
<td>Power Tool Cleaning</td>
</tr>
<tr>
<td>SP-6</td>
<td>Commercial Blast Cleaning</td>
</tr>
<tr>
<td>SP-11</td>
<td>Power Tool Cleaning to Bare Metal</td>
</tr>
<tr>
<td>SP-16</td>
<td>Brush-off Blast Cleaning of Non-Ferrous Metals</td>
</tr>
</tbody>
</table>

E. Job Mock-Ups: Mock-ups will serve as standard for acceptance of work. Leave approved mock-ups in place as part of completed project. Manufacturers’ representatives shall be available to advise applicator on proper application techniques and procedures. Locate mock-up areas as directed by Architect.

F. Paint walls prior to installing wall mounted signage.

G. Prepainting Walk-Through: In areas where ceilings and walls are scheduled or indicated to be field painted, and equipment, ductwork, piping, conduit and other wall/ceiling mounted or suspended items are exposed, the areas are to be reviewed to determine colors of the various items.

1. Attendance: Contractor, painter and Architect.
2. Items to be painted colors other than the background wall or ceiling will be identified.

1.05 SUBMITTALS

A. Submit a complete selection of manufacturer's color chips indicating color, texture and sheen for approval for each finish specified herein.

B. Submit a complete schedule for identifying manufacturer and specific brand name or number of products proposed for finishing specified surfaces.
1. Provide percent of solids by volume content data for each paint material.
2. Provide paint label analysis and application instructions for each type paint.

C. Provide one (1) unopened gallon of each type and color of paint and stain required for maintenance purposes. Provide original, unopened, labeled containers with color samples and a list of project use. Extra materials are not to be used for touch-up by Contractor.

D. Color/Finish Samples

1. After receiving color chips from the Contractor, the Architect will provide a complete schedule of colors and sheens desired.
2. Obtain schedule well in advance of commencing work and submit samples of specified finishes for approval.
3. Submit duplicate samples on the same kind of materials to which finishes will be applied. One half of the sample shall show the completed treatment and the other half shall show the successive steps, taken in producing the finish. When approved, samples will be so marked; one set will be retained by the Architect and one set will be returned for the painter's use.
4. No finishes shall be applied on the work until samples are approved. Approved samples shall be strictly duplicated in the work. Additional coatings, if required to reproduce approved samples, shall be applied without additional cost to the Owner.
5. Use representative colors when preparing samples for Architect's review.

E. Statement From Manufacturer

1. Contractor, in submitting the list of proposed subcontractors, shall include for approval, along with the name of the painting subcontractor, the names of the manufacturers whose materials the subcontractor proposes to use in the work.
2. Following tentative approval of the subcontractor and the materials manufacturers, notify the manufacturers, in writing, that the specifications require the manufacturers to submit to the Architect, a statement by a corporate officer of the manufacturer that coatings scheduled by the Architect are proper for the intended use and that the manufacturer's representative will be available to advise the Architect and the Contractor regarding applications of all coatings.

F. Close-Out Material List: Provide a list of all paint and coating materials used on the project. Include manufacturer, product number, color and room/location where used.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver all materials on the job site in original, new, unopened packages and containers bearing the manufacturer's name and label, and the following information:

1. Name or title of material.
2. Manufacturer's stock number and date of manufacture.
3. Manufacturer's name.
4. Contents by volume, for major pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.

B. Store, protect and handle materials in accordance with manufacturer's recommendations to prevent damage and deterioration. Store paint materials at minimum of 50°F.

C. Maintain paint material storage space as clean, non-hazardous and orderly. Place waste and soiled paint rags in tightly covered metal containers; safely dispose of at end of each working day. Take every precaution to avoid fire hazards and spontaneous combustion. Provide acceptable type of fire extinguisher immediately adjacent to paint storage area.

1.07 PROJECT CONDITIONS

A. Coordinate painting and finishing work with other trades to ensure adequate illumination, ventilation and dust-free environment during application and drying of paint and finish treatments.

B. Maintain uniform interior building temperature of minimum 50°F for 24 hours before, during and continuously for 48 hours after painting.

C. Do not apply coatings when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Provide adequate ventilation as required for specified paint and finish treatment materials in spaces scheduled. Maintain for time periods recommended by material manufacturer to provide proper drying.

E. Provide adequate illumination on surfaces to be finished. Maintain a minimum 80 foot candle lighting level measured mid-height at substrate surface.

F. Protect adjoining surfaces against damage or soiling.

G. Maintain work in neat and orderly condition, promptly removing empty containers, wrappings, soiled rags, waste and rubbish from site.

H. Material Safety Data Sheets (MSDS): Provide documents available to Owner's Representative and construction personnel at the job site. Comply with MSDS requirements.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Paint: SHERWIN WILLIAMS products to be provided.
1. Colors: As indicated on drawing; colors not indicated to be as selected by Architect.

2.02 MATERIAL GENERAL

A. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24)

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 150 g/L.
3. Dry-Fog Coatings: 150 g/L.
4. Primers, Sealers, and Undercoaters: 200 g/L.
5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.

B. Material Compatibility

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

2.03 ACCESSORY MATERIAL

A. Application Equipment: Not required to be new, but shall be adequate for the work and workmanship required herein.

B. Accessories: Provide all required ladders, scaffolding, drop cloths, masking, scrapers, tools, dusters and cleaning solvents as required to perform the work and achieve the results specified herein.

C. Secondary products not specified by name (i.e. turpentine, thinners, mineral spirits, fillers, linseed oils, etc.) shall be "best grade" or "first line" products.

1. Filler material shall be woodworker’s option of material that can be tinted and worked so as to match adjacent wood surfaces.

2.04 EXTERIOR PAINT AND FINISH MATERIAL SCHEDULE

A. Apply paint and finish materials to substrate surfaces indicated. Apply touch-up prime coats in addition to shop-applied prime coats. Provide additional job site prime coats when indicated.
B. Metals - Ferrous: Galvanized and Shop Primed (Semi-Gloss).

1. SW  

C. Metal – Ferrous: Unprimed (Semi-Gloss).

1. SW  

2.05 INTERIOR PAINT AND FINISH MATERIALS SCHEDULE

A. Apply paint and finish materials to substrate surfaces indicated. Apply touch-up prime coats in addition to shop-applied prime coats. Provide additional job site prime coats when indicated.

B. Gypsum Board and Plaster – Walls.

1. SW  
   . Surfaces: Gypsum board wall surfaces.

C. Gypsum Board and Plaster – Ceilings/Soffits.

1. SW  
   . Surfaces: Ceilings, soffits, bulkheads

D. Concrete Masonry Surfaces (Semi-Gloss).

1. SW  
   . Surfaces: New masonry walls, graphics (do not use in high humidity areas).

E. Metals - Ferrous: Shop Primed and Unprimed.

1. SW
a. Primer: S-W Pro Industrial Pro-Cryl Primer, B66-310 Series  

2. Surfaces: Hollow metal doors, frames, door mullions, ferrous metal surfaces.

F. Metals - Ferrous: Galvanized.

1. SW
   a. Primer: ProCryl Universal Metal Primer B66-310 Series  

2. Surfaces: Hollow metal doors, frames, door mullions, railings, galvanized metal surfaces.

G. Steel Stairs and Railings: Steel and Iron Finish

1. SW
   b. Finish Coat (All steel exposed to view): Water Based Acrolon 100 Urethane B65-720 Series. Two coats.

H. Exposed Structure - Ferrous (Eg-Shel): Dryfall

1. SW
   a. Primer: ProCryl Universal Primer, B66-310 Series  
   b. Finish: Low VOC Waterborne Acrylic Dry Fall, B42W82 Two coats.


I. Exposed Structure - Galvanized (Flat): Dryfall

1. SW
   a. Finish: Low VOC Waterborne Acrylic Flat Dry Fall, B42W81 Two coats.

**PART 3  EXECUTION**

3.01 INSPECTION

A. Examine substrate surfaces and installation condition. Report condition(s) that might affect proper application.

B. Do not proceed with painting work until unsatisfactory conditions have been corrected.

C. Initial application of paint to a surface constitutes acceptance of existing conditions and responsibility for satisfactory performance.

D. Examine specification sections of other trades and their provisions regarding painting. Surfaces left unfinished shall be painted or finished as part of the work of
3.02 SURFACE PREPARATION

A. General

1. Broom clean and remove excess dust before painting is started in any area.
2. Broom cleaning is not permitted after operations have begun in a specific area.
3. Surfaces shall be clean, dry and adequately protected from dampness.
4. Surfaces shall be free of any foreign materials that will adversely affect adhesion or appearance of applied coating.
5. Remove any mildew and neutralize the surface prior to applying coating.

B. Concrete Masonry and Concrete

1. Remove splatters, dust and dirt by brushing or water washing with clear water.
2. Remove misplaced mortar.
3. Cracks, abrasions and other defects shall be cut out, patched flush, and sanded smooth and sealed before applying prime coat.
4. Existing Surfaces
   a. Surfaces with minor loose or blistered paint: Remove loose, flaking, and blistered paint; clean as specified. Fill surface cracks with approved latex base filler. Apply primer-sealer over bare substrate and filled cracks.
   b. Multi-coated surfaces with major loose or blistered paint requiring complete paint removal: Remove paint down to bare substrate using chemicals, pressure methods, or other acceptable methods. Fill contraction and structural cracks with self-bonding filler or elastomeric sealant worked well into the cracks to prevent leaks, then wipe excess materials from the surface. Apply a latex base or other acceptable prime and fill material to fill all defects and holes, wipe excess material off surface; let filler material dry for 24 hours minimum before applying primer.
5. All Surfaces
   a. Clean all cementitious substrates pursuant to the requirements of SSPC-SP 13.

C. Structural Steel and Miscellaneous Ferrous Metal

1. Bare Metal Surfaces
   a. Remove grease, oil, dirt and other foreign material prior to prime coat application where necessary according to SP-1, SP-2 and/or SP-3.
   b. Power tool clean remove rust prior to prime coat application according to SP-11.
   c. Include all hangers and miscellaneous fabricated items.

2. Shop Primed Surfaces
   a. Fill open joints or abrasions in shop prime coat with filler; feather...
edges, sand smooth, and touch-up with primer compatible with shop primer. Extend primer beyond treated area.

b. Remove grease, oil, dirt and other foreign material prior to prime coat touch-up where necessary according to SP-1, SP-2 and/or SP-3.

c. Include all hangers and miscellaneous fabricated items.

D. Galvanized or Zinc-Coated Items

1. Pretreat surfaces prior to application of prime coat with phosphate pretreatment, similar to Great Lakes Labs, “Clean and Etch”, Dupont’s Metal Conditioner #5717 or PPG DX 579, unless prime coat material to be used is recommended by its manufacturer for direct application over zinc treated surfaces of the type at hand. Follow manufacturer's directions.

2. Remove dirt or grease on surfaces scheduled for paint finish according to SP-1. Wipe dry with clean cloths.

3. Roughen surface with steel wool as necessary to remove gloss.

E. Gypsum Board

1. Fill minor irregularities with spackling paste.

2. Sand to smooth level surface and dust off.

3. Avoid raising nap of paper.

F. Factory Primed Items: Verify compatibility between factory applied primer and finish painting system. If compatibility cannot be guaranteed, then provide barrier coat compatible with both finishes.

G. Aluminum and aluminum-alloy, lead, copper, and other nonferrous metal surfaces: Solvent clean in accordance with SSPC SP 1 and wash with mild non-alkaline detergent to remove dirt and water soluble contaminants. If aluminum does not come from the manufacturer with an approved paint grip finish, consult the coating manufacturer for the appropriate surface preparation requirements. Minimum requirement to meet SSPC SP 16.

3.03 APPLICATION

A. General

1. Only skilled mechanics shall be used.

2. Apply all paint in strict accordance with the manufacturer's instructions. Data sheets take precedence over these specifications if more restrictive.

3. Do not apply until preceding coat is dry to manufacturer's recommendations.

4. Do not apply to any surface unless it is thoroughly dry.

5. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes if moisture content of surface is greater than recommended by manufacturer.

6. Do not use material that has exceeded the pot life stated by the manufacturer.
7. Apply to the following workmanship requirements:
   b. Absence of ridges, sags, runs, drops, laps, unnecessary brush marks, holidays, air bubbles and excessive roller stipple.
   c. Thorough mixing of paint and limited use of thinners.
   d. Uniformity of film thickness.
   e. Proper drying time between coats.
   f. Protection of unpainted and finished surfaces.

8. Coverage and hide shall be complete. When color or undercoats show through final coat, recoat until the paint film is of uniform finish, color, appearance, and coverage, at no additional cost to Owner.

9. Edges of paint or finish adjoining other materials or colors shall be sharp and clean without overlapping.

B. Methods

1. Application may be by roller, brush, spray or other approved means.
2. When utilizing spraying, be careful not to use methods which will affect other trades work in adjacent areas.

C. Mixing

1. Mechanically mix before use.
2. Agitate during application as required.
3. Do not tint or shade in field unless permitted by Architect.

D. Thinning

1. Dilute only as required to achieve suitable application viscosity.
2. Use only type and amount recommended by manufacturer.

E. Approvals: Do not apply succeeding coat of paint until previous coat has been inspected and written approval is given.

F. Electrical Conduits

1. Do not paint any electrical conduit or boxes unless they are exposed and abutting a surface that is to be painted or stained.
2. Conduits and boxes to be painted shall be given a coat of galvanizing pretreatment followed by the paint system for the adjoining surface.

G. Protection of Surfaces

1. Provide covers, drop cloths and masking to protect unpainted surfaces previously finish painted. Use special care in protecting electrical and mechanical items which may be damaged by the painting operations (i.e., overspray and solvents that might damage the internals of the item).
2. If possible, remove items not to be painted such as hardware, accessories, electrical plates, lighting fixtures and/or trim, mechanical grilles and louvers and similar items in contact with painted surfaces.
3. Use caution when painting exterior work to avoid wind carrying overspray, drippings, etc., onto adjacent structures, facilities and vehicles.

4. Following completion of painting, reinstall removed items by workmen skilled in the trade involved and remove all covers, masking and drop cloths.

H. Fire and Smoke Partitions: Conform to OBC 703.7.

1. Identify partitions above ceilings on both sides of partitions except within shafts in letters not less than 3 inches high with a minimum 3/8 inch stroke in contrasting color.

2. Stenciled message: "SMOKE PARTITION or X HOUR FIRE PARTITION – PROTECT ALL OPENINGS" as applicable.

3. Locate within 15 feet of the end of each wall and at intervals not exceeding 30 feet measured horizontally along the wall or partition.

4. Use semi-gloss paint of color that contrasts with color of substrate.

5. Locate approximately 12" above ceiling tile.

END OF SECTION
SECTION 10 21 14

PHENOLIC TOILET COMPARTMENTS

PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide phenolic toilet partitions and urinal screens with related components and accessories for complete installations.

1.02  RELATED SECTIONS

A. Toilet Accessories: Section 10 82 13.

1.03  SUBMITTALS

A. Shop Drawings: Submit in accordance with the General Conditions and Section 01 33 23. Include the following:

1. Manufacturers product data.
2. Plans, elevations, details of construction, sizes of openings, anchoring devices, leveling details, hardware fittings, and fastenings.

B. Color Selector: Complete range of manufacturer's colors.

1.04  QUALITY ASSURANCE

A. Take field measurements prior to fabrication to assure proper fitting.

B. Provide setting drawings, templates, instructions and directions for installation of anchorage devices.

C. Installer Qualifications: Minimum five (5) years continuous experience installing toilet compartments on projects of equivalent size, quantity and complexity.

D. Regulatory Requirements: Conform to ANSI A117.1 code for access for the handicapped operation of toilet compartment door and hardware.

1.05  DELIVERY, STORAGE AND HANDLING

A. Deliver items in manufacturer's original unopened protective packaging. Store materials in original packaging to prevent soiling, physical damage or wetting.

B. Handle so as to prevent damage to finish surfaces.
PART 2 PRODUCTS

2.01 DESCRIPTION

A. General: Material and products to be manufactured regionally AND harvested, extracted, or recovered regionally within a radius of 500 miles from the project site.

B. Type: Floor mounted, overhead braced type, standard height, width as required to fit between walls or as indicated.

C. Materials: Provide manufacturer's standard doors, pilasters and panels fabricated specifically for the partition system.

1. Doors, Pilasters and Panels
   a. Cores: Solid phenolic. All edges shall be polished black.
   b. Face Finish
      1) High pressure, matte finish, melamine surface fused to core.
      2) Colors: As selected by Architect. As many as 4 colors may be selected on the project.

2. Recycled Content: Minimum 20 percent post-consumer recycled content.

D. Components

1. Doors, Pilasters and Panels
   a. Stiles: ¾” thick.
   b. Panels: ½” thick.
   c. Doors: ¾” thick
   d. Fire Classification: ASTM E84, Class II.
      1) Flame Spread: 70.
      2) Smoke Density: Under 100.

2. Hinges: Gravity type, adjustable to hold door open at any angle up to 90 degrees. 3 hinges per door.

3. Headrail: Aluminum extrusions, anodized with anti-grip configuration; fastened to the pilaster tops.

4. Latch: Minimum 14 gage. Recessed latch unit. Latch units shall have emergency access capability.
   a. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with accessibility requirements of authorities having jurisdiction. Provide units on both sides of doors at compartments indicated to be accessible to people with disabilities.

5. Keeper: Minimum 11 gage. Covers top and bottom of latch when door is in closed/locked position.

6. Stops: Minimum 11 gage. 2 required per door.

7. Brackets: U-shaped channels, aluminum, anodized and polished with 3 brackets per connection

8. Shoes: Nominal 4” high, one piece, stainless steel shoe to conceal leveling device on stiles. #4 finish.

9. Coat Hook: BOBRICK B-233

10. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-
swinging doors

11. Coat Hook: Manufacturer's standard at out-swinging doors.

E. Urinal Screen: Provide wall mounted type consisting of 3/4” thick screen panel and required fittings and hardware.

2.02 FABRICATION

A. Reinforcement

1. Provide threaded steel inserts and reinforcement for installation of hardware, fittings, brackets and accessories specified elsewhere.

2. Where grab bars attach to toilet partitions, reinforce as required to support 300 pounds, minimum.

B. Panels, Doors, Posts and Stiles

1. Provide leveling devices at floor, bolted to panels and concealed with removable shoes as specified below.
2. Ease edges for smooth surface, free of sharp corners.
3. Panels and doors to be approximately 58” high; provide bottom 12” above floor.
4. Door Dimensions: Unless otherwise indicated, furnish 24” wide in-swing doors for ordinary toilet compartments and minimum 32” wide (clear opening) out-swing doors for compartments that meet the requirements of the Americans with Disabilities Act (ADA).

2.03 MANUFACTURER

A. Subject to compliance with specified requirements, provide partitions by one of the following:

1. ACCURATE PARTITIONS CORPORATION.
2. AMPCO, INC.
3. BOBRICK
4. BRADLEY CORPORATION
5. GENERAL PARTITIONS MFG. CORP.
6. GLOBAL STEEL PRODUCTS CORP.
7. KNICKERBOCKER PARTITION CORPORATION.
8. METPAR CORP.
9. SPEC-RITE

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's specifications.
1. Field verify dimensions.
2. Securely fasten in place, neat, level and plumb.
3. Evidence of drilling, cutting and fitting to room finish shall be concealed in finished work.
4. Adjust doors to swing freely and to remain open approximately 6" when unlatched.
5. Set units with not more than 1/2" between pilasters and panels, and not more than 1" between panels or doors and walls.
6. Adjust bottoms of doors level when doors are in closed position.
7. Clean exposed surfaces and touch-up minor finish imperfections using materials and methods recommended by partition manufacturer and as acceptable to Architect.

END OF SECTION
SECTION 10 22 21

DEMOUNTABLE GLASS PARTITIONS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes unitized, movable partition system consisting of aluminum framed glass fixed panels and sliding glass doors.

1.02 REFERENCES


B. American Society for Testing and Materials (ASTM)
   2. C1396: Gypsum Wallboard.
   5. E90: Test for Laboratory Measurement of Airborne Sound transmission Loss of Building Partitions.
   6. E413: Classification for Rating Sound Insulation.


E. ICBO: Uniform Building Code


1.03 SYSTEM DESCRIPTION

A. Unitized Movable Partition System
   1. Product of manufacturer regularly engaged in Work of this Section.
   2. Unitized, full-height, movable partition system for interior use, designed to permit relocation, reconfiguration, and reuse of all parts.
   3. Non-progressive; allow for removal and reinstallation of panels from either side of partition and at any point in a given panel run without disturbance of adjacent panels.
   4. Panels, corner posts and finished end conditions to be joined with single flush panel connector.
5. Glass Module sizes available from 6" to 60" increments.
6. Erected and disassembled in a manner to prevent damage to adjacent building surfaces and elements, including floors, walls, ceilings, columns, and window mullions.
7. All panels of like module, regardless of type, to be interchangeable, utilizing the same panel connector post cap.
8. Panel connection system to accommodate addition of slotted standards and brackets for mounting of systems furniture wall units produced by various manufacturers.
9. Single sliding barn style aluminum framed glass doors Door units interchangeable with like sized panels using same connection method as panels.
10. Panels complete with unitized base that is factory installed to eliminate loose hardware on floor when panels are moved.
11. Floor Gripper Plates designed as an integral part of floor channel, not requiring activation or adjustment upon panel installation. Plates allow for left or right adjustment of each panel without lifting panel from the floor.
12. System components constructed and finished at factory, not requiring additional construction or finishing in the field.
13. Spring loaded wall starter channel units to be complete with integrated gasket to ensure tight fit for sound and light seal.

B. Performance Requirements

1. Acoustical Attenuation: Overall STC rating of 38 when tested in accordance with ASTM E90 and classified in accordance with ASTM E413.
3. Lateral Load Capacity: Wall panels to comply with partition design requirements for lateral load resistance as specified by the Uniform Building Code (Sections 1611.5 & 1632), the BOCA National Building Code Sections 1604.5.6, 1606.9, & 1610.6), the Standard Building Code (Sections 1604.5, 1607.6, & 1610.1), or the International Building Code (Sections 1604.3, 1607.13, & 1621). Glass framing to comply with requirements of Chapter 24 of each of the codes listed and with part 9 of the NBCC 1995.
4. Flame Spread Rating: Maximum 25 when tested in accordance with ASTM E84.

1.04 SUBMITTALS

A. Submit under the provisions of Division 01.

B. Shop Drawings: Include panel layout in plan and elevation, opening locations, special panels, conditions at adjacent construction, and accessories.

C. Product Data: Provide data on panel system, components, and accessories.

D. Samples: Submit 2 samples 12" long x full width indicating trim finish.
E. Manufacturers Installation Instruction: Indicate procedures, special conditions, and protection.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Installation performed by factory personnel or others authorized by partition system manufacturer.

B. Conform to ICC/ANSI A117.1 (ADA) for mounting heights and location of components and NBCC 1995 Section 3.8.

1.06 PROJECT CONDITIONS

A. Do not begin installation until site conditions provide complete protection from weather and environmental conditions in building are approximately equivalent to those which will exist after installation:

1. Temperature: 60 to 85 degrees F (16 to 29 degrees C).
2. Relative Humidity: Maximum 70 percent.

1.07 WARRANTY

A. Provide manufacturers warranty against defects in materials and workmanship for a period of 10 years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: HAWORTH Enclose

B. Other Manufacturers: Glass partitions manufactured by TEKNION, ALLSTEEL, DIRTT or STEELCASE will be considered if materials meet the requirements of the Basis of Design and design, type and style are an acceptable match as approved by the Architect.

2.02 MATERIALS

A. Aluminum Extrusions: Architectural Grade aluminum prime billet. Provide manufacturer's standard sizes, shapes and profiles for members of the systems and components.

1. Aluminum alloy and temper as recommended by manufacturer to comply with requirements of performance, fabrication, application of finish and control of color. Comply with ASTM B221 for extruded shapes.
2. Provide all miscellaneous extrusions to complete the sliding door and fixed sidelight assemblies.
3. Finish: All exposed aluminum surfaces shall receive an Architectural Class 1, clear anodized coating; AA-M12C22A41, minimum 0.7 mil thickness.
B. Fasteners: Aluminum or non-magnetic stainless steel. Provide concealed fasteners wherever possible. Provide Phillips flat-head machine screws where exposed. Finish exposed fasteners to match aluminum work. Other concealed fasteners may be zinc plated or cadmium plated steel.

C. Slide Door Units shall include fascia, header and track, finished opening frame, and sliding door. Track shall be aluminum. Roller assemblies will be steel, with high quality ball bearing wheels. Hardware assembly to include pneumatic braking mechanism and pull handles. Slide door track will be fully supported by wall structure, without requiring additional structural support from other architectural elements.

1. Captured glass frames shall be pre-glazed prior to arriving at site.

D. Glass and Glazing: Provide 1/4” thick tempered glass materials complying with Section 08 81 00 requirements. Glazing gaskets shall be manufacturer's standard vinyl extrusion.

2.03 HARDWARE

A. Prepare and reinforce doors for hardware. Factory fit and install door pulls on each side of door.

2.04 SIZES

A. Panel and door sizes and configurations as indicated on the drawings.

PART 3 PRODUCT

3.01 INSTALLATION

A. General

1. Do not install component parts which are observed to be defective, including warped, bowed, dented, abraded and broken members. Remove and replace members which have been damaged during installation or thereafter before time of acceptance.

2. Do not cut or trim component parts during erection, in a manner which would damage finish, decrease strength, or result in a visual imperfection or a failure in performance of the work.

B. Install all components in accordance with the manufacturer's installation instructions and recommendations.

C. Install component parts level, plumb, true to line and with uniform joints and reveals. Secure to structure with non-staining and non-corrosive shims, anchors, fasteners, spacers and fillers.

D. Install glass and glazing, in accordance with Section 08 81 00 and the manufacturer's requirements.
E. Adjust operating hardware to function properly, without binding and to provide tight proper fit at contact points.

3.03 CLEANING AND PROTECTION

A. Protect glass from breakage immediately upon installation, by attachment of streamers to framing held away from glass. Do not apply markings of any type to surfaces of glass.

B. Immediately before acceptance of the work, clean the aluminum sliding glass doors thoroughly. Demonstrate proper cleaning methods to Owner's maintenance personnel during final cleaning. Prepare a "Cleaning and Maintenance Manual" listing types of cleaning compounds, cleaning methods and glazing materials used for cleaning, repair and maintenance of work and turn over to Owner upon acceptance of the work.

END OF SECTION
This page intentionally blank
SECTION 10 22 26

FOLDING PANEL PARTITIONS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide sound insulated, manually operated, folding, flat panel operable walls as indicated, complete including required fasteners, fittings and accessories.

1.02 RELATED SECTIONS

A. Miscellaneous Metals (overhead framing): Section 05 50 00.

1.03 QUALITY ASSURANCE

A. Manufacturer’s Qualifications: The Manufacturer shall have successful experience in the fabrication and installation of sound rated operable partition assemblies, including no less than 5 years’ experience in the fabrication and installation of assemblies equal to the size and complexity of this work. Upon request, the manufacturer shall provide references and acoustical test reports for three similar recently completed projects.

B. Installer qualifications: Sound rated operable partition assemblies must be installed by manufacturer, manufacturer’s authorized distributor or an installer qualified in the installation and maintenance of specified equipment as approved by manufacturer.

C. Preparation of the opening shall conform to the criteria set forth per ASTM E557 Standard Practice for Architectural Application and Installation of Operable Partitions.

1.04 SUBMITTALS

A. Product Data: Submit Manufacturer’s specifications and other data needed to prove compliance with all specified requirements.

1. Product data to include: material descriptions, construction details, finishes, installation details, and operating instructions for each type of operable panel partition, component, and accessory specified.

2. Include data on acoustical performance, surface-burning characteristics, and durability.

B. Installation Instructions: Submit Manufacturer’s recommended installation instructions and procedures.
C. Shop Drawings: Show location and extent of operable panel partitions. Include plans, elevations, sections, details, attachments to other construction and accessories. Indicate dimensions; weights; conditions at openings and for storage; and required installation, storage, and operating clearances. Indicate location and installation requirements for hardware and track, and direction of travel. Show blocking to be provided by others.

D. Product Certificates: Submit letter signed by manufacturer certifying that operable walls to be furnished on this project comply with the requirements of the specification.

E. Operation and Maintenance Data: For the following to include in maintenance manuals specified in Section 01 78 23:
   1. Panel finishes and finishes for exposed trim and accessories. Include precautions for cleaning materials and methods that could be detrimental to finishes and performance.
   2. Seals, hardware, track, carriers, and other operating components.

F. Acoustical Laboratory Test Reports: Submit Manufacturer’s STC values for each of the specified operable partitions. Sound transmission loss and STC values shall be based on measurements conducted by a laboratory accredited for specific acoustical testing under the National Voluntary Laboratory Accreditation Program (NVLAP) and in accordance with ASTM E90.

1.05 ACOUSTICAL PERFORMANCE REQUIREMENTS

A. Provide operable partition assemblies (including pass doors, seals, etc) that provide a minimum Sound Transmission Class (STC) of 50 and Noise Isolation Class (NIC) of 42. Sound transmission loss and STC values shall be based on laboratory acoustical testing, which is performed by a National Voluntary Laboratory Accreditation Program (NVLAP) approved testing laboratory. Testing shall be performed in accordance with ATSM E90. NIC values shall be based on field acoustical testing performed by a qualified acoustical consultant who has a minimum of 5-years’ experience in sound isolation measurements.

1.06 DELIVERY, STORAGE AND HANDLING

A. Protect products during transit, storage and handling to prevent damage, soiling and deterioration. Comply with the requirements of the manufacturer’s instructions for storage and handling.

B. Deliver materials in order as required by schedule for installation.

C. Handle materials in accordance with manufacturer’s instructions.
1.07 PROJECT CONDITIONS

A. Field Measurements: Verify operable panel partition openings and storage arrangements by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.

1.08 WARRANTY

A. Provide written warranty by manufacturer of operable partitions agreeing to repair or replace any components with manufacturing defects.

B. Partition Warranty period: Two (2) years.

C. Suspension System Warranty: Five (5) years.

PART 2 PRODUCTS

2.01 FOLDING PARTITIONS

A. Manufacturer: Drawings and specifications are based on MODERNFOLD Acoustic-Seal 932. Subject to compliance with the specified requirements, products by EMCO; HUFCOR; KWIK-WALL, PANELFOLD and MODERCO INC. are acceptable.

B. Operation: Consists of a series of two panel hinged pair groupings, manually operated, flat steel panels, top supported with operable floor seals.

1. Final closure accomplished by expanding jamb from panel edge or hinged panel as required by each door condition (i.e. partitions with pocket doors require expanding jamb).

C. Panel Construction

1. Size: 3 inches thick in manufacturer's standard widths.
3. Core (Frame): 16 gage steel.
4. Top Channel Assembly: Reinforced to support suspension components.
5. Panel Trim: No vertical trim required or allowed on edges of panels; minimal groove appearance at panel joints.
6. Weight: Approximately 10 pounds per square foot.

D. Panel Finish: Factory applied, Class 1 rated material, as per OBC with flame spread 0-25 as determined by ASTM E84.

1. Provide reinforced vinyl with woven backing weighing not less than 30 ounces per linear yard. Color and pattern as selected by Architect.
E. Sound Seals

2. Horizontal Top Seals: Continuous contact extruded vinyl.
3. Bottom Seals: Automatic operable seals providing nominal 2-inch operating clearance with an operating range of +0.50-inch to -1.50-inch which automatically drop as panels are positioned, without the need for tools or cranks.

F. Suspension System: Continuous "C" channel shape steel track, supported by adjustable steel brackets connected to structural supports with threaded rods.

1. Panels supported by ball-bearing, steel wheel trolley assemblies.

2.02 POCKET DOOR

A. Manufacturer: Drawings and specifications are based on MODERNFOLD Stowaway Type III. Equal products by other acceptable manufacturers listed in 2.01A are acceptable providing they meet or exceed the requirements specified herein.

B. Door Construction

1. Size: Nominal 2.75 inches thick in equal widths to close opening.
2. Panel Skins: Class A Flame Spread Rated moisture resistant gypsum board.
3. Core (Frame): Extruded aluminum.
4. Top Channel Assembly: Reinforced to support suspension components.
5. Sound Seals: Gasketed astragal seals in vertical edges and jambs; fixed sweeps on horizontal edges.
6. Weight: Approximately 8 pounds per square foot (average hanging).
7. Hinges: Type and quantity as recommended by manufacturer for door height and weight.
   a. Finish: US26D.
8. Provide manufacturers standard latching type hardware.

PART 3 EXECUTION

3.01 INSPECTION

A. Verify that openings have been completely prepared in accordance with manufacturer's requirements. Notify Architect of conditions detrimental to operable wall installation and operation.

3.02 INSTALLATION

A. General: Comply with ASTM E557, operable panel partition manufacturer's
written installation instructions, Drawings, and approved Shop Drawings.

B. Install operable panel partitions and accessories after other finishing operations, including painting, have been completed.
END OF SECTION
SECTION 10 26 00

WALL PROTECTION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Work under this section includes the following:

1. Stainless steel corner guards.

2. Resilient wall panels

1.02 REFERENCE STANDARDS

2. ASTM E84 - Surface Burning Characteristics of Building Materials.
3. UL - Underwriters Laboratories Classifications.

1.03 QUALITY ASSURANCE

A. Manufacturer: Firm with minimum five years experience in successfully producing wall guards and wall panels similar to that indicated for this project.

B. Installer qualifications: Engage an installer who has no less than 3 years experience in installation of systems similar in complexity to those required for this project.

C. Fire performance characteristics: Provide engineered PETG wall protection system components with UL label indicating that they are identical to those tested in accordance with ASTM E84 for Class 1 characteristics listed below:

1. Flame spread: 25 or less
2. Smoke developed: 450 or less

D. Impact Strength: Provide assembled wall protection units that have been tested in accordance with the applicable provisions of ASTM F476.

E. Chemical and stain resistance: Provide wall protection system components with chemical and stain resistance in accordance with ASTM D543.

F. Single source responsibility: Provide all components of the wall protection system manufactured by the same company to ensure compatibility of color, texture and physical properties.

1.04 SUBMITTALS
A. Submit the following in accordance with Section 01 33 23.

B. Shop Drawings: Clearly indicate the following for each type of wall protector:
   1. Type of wall protector identified by manufacturer's model numbers including profiles, sizes, accessories and finish.
   2. Types and sizes of wall anchors for each type of wall construction.

C. Samples: 6" long full size samples representative of each type of wall protector specified.

D. Manufacturer's certification indicating compliance with ADA Accessibility Guidelines for Protruding Objects.

1.05 DELIVERY, HANDLING AND STORAGE

A. Products shall be delivered to job-site in original unopened packages bearing manufacturer's labels.

B. Store and protect products in accordance with manufacturer's recommendations.

PART 2 PRODUCTS

2.01 STAINLESS STEEL CORNER GUARDS

A. Description: 16 gauge, Type 304, stainless steel with satin finish. Provide with 1/8" radius corner.

B. Wing Width: 3 1/2" typical.

C. Angles: As indicated. Custom angles required.

D. Length: 4'-0".

E. Adhesive: Types as recommended by corner guard manufacturer for substrates encountered.

F. Fasteners: Types as recommended by manufacturer for substrates encountered.

D. Manufacturer: CONSTRUCTION SPECIALTIES, INC. CO-8 or equal by INPRO, BUCHANAN COMPANY, GAMCO, PAWLING CORPORATION.

2.02 WALL PANELS

A. Description: Vinyl/acrylic sheet (.040")

1. Edges: Provide with matching trim (inside corner, top and bottom) as required.

2. Color: As selected by Architect.
3. Finish: Suede.

B. Manufacturer: 4000 (Acrovyn) by CONSTRUCTION SPECIALTIES.

**PART 3 EXECUTION**

3.01 EXAMINATION

A. Verification of conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.

1. Do not proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Surface preparation: Prior to installation, clean substrate to remove dirt, debris and loose particles. Perform additional preparation procedures as required by manufacturer’s instructions.

B. Protection: Take all necessary steps to prevent damage to material during installation as required in manufacturer’s installation instructions.

3.03 INSTALLATION

A. General

1. Verify that existing conditions are ready to receive wall protectors.
2. Beginning of work means acceptance of existing conditions.

3.04 CLEANING

A. Remove protective material from all wall protectors and clean in accordance with manufacturer’s recommendations.

B. Remove surplus materials, rubbish and debris resulting from installation as work progresses and upon completion of work.

3.05 PROTECTION

A. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains.
END OF SECTION
**SECTION 10 28 13**

**TOILET ACCESSORIES**

**PART 1 GENERAL**

1.01 SCOPE

A. This section covers all toilet accessories. Extent of each type of accessory is indicated on the drawing and specified herein.

B. Included are accessories for:

1. Toilet rooms.
2. Janitor rooms.
3. Kitchens, Break Rooms and similar areas with sinks.

C. Coordinate toilet partition mounted items with partition manufacturer for proper fastener reinforcements.

1.02 WORK SPECIFIED IN OTHER SECTION

A. Unframed Mirrors: Section 08 81 00.

1.03 QUALITY ASSURANCE

A. Provide each type of products of one manufacturer. Provide locks with same keying for all accessory units in the project.

B. Stamped names or labels on exposed faces of units not permitted.

1.04 SUBMITTALS

A. Submit manufacturer's product data and installation instructions for each type of toilet accessory required.

1.05 DELIVERY, STORAGE AND HANDLING

A. Delivery accessory items in manufacturer's original, unopened packaging.

B. Store and handle materials in accordance with manufacturer's recommendations. Protect against soiling, damage and wetting.

1.06 PROJECT CONDITIONS
A. Furnish anchoring devices and inserts for installation of toilet accessories. Coordinate delivery of items which must be set or built into other work.

B. Provide setting drawings, templates and instructions for installation of anchorage devices.

1.07 WARRANTY

A. Submit mirror manufacturer's written ten year warranty against silver spoilage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Where a manufacturer's product is specified as a Basis of Design, equal products as manufactured by BOBRICK, BRADLEY, AJW, AMERICAN SPECIALTIES, may be used provided the product meets the requirements of the specifications, unless otherwise indicated.

2.02 ITEMS

A. Toilet Paper Holder - Employee

1. Double Roll: BOBRICK B-2888.
   a. Type: Surface Mount.
   c. Description: Dual roll standard core, ADA compliant, tumbler lock.

B. Toilet Paper Holder - Public

1. Double Roll: BOBRICK 2892.
   a. Type: Surface mount.
   b. Finish: 18 gage stainless steel.
   c. Description: Dual Jumbo Roll, ADA compliant, tumbler lock.

C. Soap Dispenser - Horizontal Tank Type: BOBRICK B-2112 or B-2111

1. Type: Vandal resistant valve operated liquid dispenser.
2. Capacity: 40 oz.

D. Handicap Bars: BRADLEY Series 812

1. Diameter: 1-1/2 inch.
3. Fasteners: Concealed.
4. Style and Length
   a. As indicated; where not indicated provide 42” long horizontal and
18” vertical bars.
   b. Provide both horizontal and vertical bars in conformance with ANSI A117.1, 604.5.

E. Paper Towel Dispenser: BOBRICK B-2620

1. Type: Surface mount with lockable hinged front cover.
2. Capacity: 525 multi or 400 C-fold towels.


1. Type: Surface mounted on toilet partition. Hinged bottom for disposable liner removal.

G. Robe/Towel Hook: BOBRICK B-233

1. Type: Wall mounted, exposed fastener.

H. Mirrors

1. Standard Framed Type: BRADLEY Model 780.
   a. Frame: Stainless steel angle, theft resistant concealed fasteners.
   b. Glass: Float 1/4” thick with full silver coating, copper coating and organic coating. Warranted by manufacturer 10 years against silver spoilage.
   c. Size: Width of counter, unless otherwise indicated or scheduled on the drawings.
2. Unframed Type: Section 08 81 00.

I. Mop Strip: BRADLEY Model 9953.

1. Description: Stainless steel, satin finish back plate with three spring activated rubber cam mop holders.
2. Location: Provide at each janitors sink. Coordinate height with Architect.

J. Electric Hand Dryer: DYSON Airblade V.

1. Casing construction: Polycarbonate-ABS casing
2. Rated power: 1400 W
3. Dry Time: 12 seconds
4. Operation: Touch-free infra-red activation
5. Airspeed: 120 mph

K. Infant Changing Table
1. Bacterial-resistant polyethylene with brushed 20 gauge stainless steel exterior. Rated to support static load of 250 lbs, tested to 390 lbs. Pneumatic gas shock mechanism
2. Molded Dual Liner Dispenser: 50 per dispenser

L. Janitor Closet Shelves: BRADLEY Model 7512
1. Type: Surface mounted.
3. Length: 24”.
4. Depth: 12”.

M. Step Up Devise: STEP N WASH SNW SS 975
1. Materials: Legs constructed from 14 gauge, type 304 stainless steel. Retractable step constructed from 16 gauge, type 304 stainless steel and reinforced with 2 stainless steel plates and 2 steel support bars. Step also features marine grade non-slip tread, ANSI compliant warning label and easy to read English, Spanish and French instruction label. Load rated at 600 lbs.

2.03 FABRICATION
A. Edges: All throat openings and similar type exposed edges of towel dispensers, seat cover dispensers, waste receptacles and similar type accessories to be hemmed or sufficiently rounded to preclude accidental cuts to users.
B. Miters: Provide one-piece seamless beveled or return flange; open miters, if not welded, must be worked to eliminate sharp edges; edges which may cut or snag are not acceptable.

2.04 SCHEDULE OF ACCESSORIES
A. Location, quantity and mounting height of accessories as indicated on drawings.
B. Keyed Units: Key all similar types of units alike. Provide two keys per unit.

PART 3 EXECUTION
3.01 INSPECTION
A. Installer: Examine substrates, previously installed inserts anchorages necessary for mounting of accessories and other conditions under which installation is to occur.
1. Notify Contractor in writing of conditions detrimental to proper and time completion of the work.
2. Do not proceed with work until satisfactory conditions have been corrected.
3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions using fasteners which are appropriate for substrate and recommended by manufacturer of unit. Install units and plumb and level, firmly anchored in positions indicated.

B. Provide concealed fasteners wherever possible of types required for substrate conditions encountered.

1. Metal Stud and Gypsum Board: Screws or bolts anchored to 16 gage (minimum) metal plate blocking or wood blocking located within stud space. See Section 09 21 16 or 06 10 50.
2. Concrete Masonry Units: Integral fasteners (i.e. expansion anchors, etc.).

C. Lead, plastic or fiber plugs are not acceptable.

D. Grab Bars: Coordinate grab bar locations as to right hand or left hand installations with field conditions.

1. Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F446.

E. Upon completion of installation, adjust each accessory unit for proper operation and clean exposed surfaces. Turn over keys to designated Owner's personnel.
END OF SECTION
SECTION 10 41 16
EMERGENCY KEY CABINETS

PART 1  GENERAL

1.01  WORK INCLUDED
A. Provide recessed cabinets for emergency access as shown.
   1. Knox box

1.02  QUALITY ASSURANCE
A. Reference Standards: Comply with the current edition of applicable provisions of the following published specifications and standards unless noted otherwise. Key boxes shall bear UL label.

1.03  SUBMITTALS
A. Submit manufacturer's product data and installation instructions.
   1. Include roughing-in dimensions, details showing attachment-mounting methods, relationships of box and trim to surrounding construction, door hardware, and cabinet type and style.

1.04  DELIVERY STORAGE AND HANDLING
A. Deliver key boxes to site in good condition, in original unopened packaging, and with labels intact. Inspect materials upon delivery and replace damaged or contaminated materials.
   1. Key boxes shall be shipped to contractor for installation. Coordinate with Owner shipping of keys and delivery.

PART 2  PRODUCTS

2.01  KNOX BOX
A. Recessed mount, plate steel housing, 1/2 inch thick steel door with interior gasket seal and stainless steel hinge, flange, and tamper-resistant fasteners; finish to be selected by Architect. Coordinate location with local Fire Department authority and Architect.
   1. Basis of Design Product: KNOX COMPANY; Knox Box, Series 3275 or approved equal.
   2. Key Capacity: 10
2.02 CABINET FABRICATION

A. General: Materials shall be free from defects impairing strength, durability or appearance.

B. Sections and shapes shall be rolled, formed, drawn or extruded as required for respective functions.

C. Molded work shall have sharply defined profile and shall be clean and straight. Plain work shall be leveled, straight and surfaces true and smooth. Edges, angles, and corners shall be square, clean and sharp, unless otherwise detailed.

D. Fastenings, exposed metal fastenings, and accessories, unless Underwriters’ prohibit for safety, shall be of same materials, texture, color and finish as the base metal to which applied.

E. Molds, trim, frames and other metalwork shall be proper dimensions to receive masonry block and tile, plaster, ceramic tile, etc.

PART 3 EXECUTION

3.01 COORDINATION

A. Coordinate location of cabinets prior to construction of concrete masonry walls. Verify recessed type installations and coordinate these locations with the masonry construction.

1. Provide mason with rough opening size of cabinets.

3.02 INSTALLATION

A. Install cabinets where indicated or as directed by Architect in accordance with manufacturer’s recommendations for wall substrate type encountered

END OF SECTION
SECTION 10 43 13

DEFIBRILLATOR CABINETS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide automated external defibrillator (AED) and cabinet as shown.

1.02 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.03 SUBMITTALS

A. Submit manufacturer's product data and installation instructions.

1. Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

PART 2 PRODUCTS

2.01 MATERIAL

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type

B. Stainless-Steel Sheet: ASTM A 666, Type 304.

C. Tempered Float Glass: ASTM C 1048, Kind KT, Condition A, Type I, Quality q3, 1/8 inch, Class I (clear).

2.02 DEFIBRILLATOR AND CABINETS

A. Basis of Design: HEARTSINE Samaritan PAD 450P. Provide with the following:

1. 2D AED wall sign
2. Emergency fast pack (1 pair-gloves, 1- razor, 1- cpr micro mask, 1- mini bandage scissors, 1- antiseptic towelette, 1-5x9 compress 1-2 in. gauze roll)
3. Adult battery/pad set
4. Pediatric battery/pad set.
5. Include (1) spare adult battery/pad for each AED and (1) inspection card.
B. Cabinet Type: Recessed Suitable for mounting AED.

C. Manufacturers
1. POTTER ROEMER LLC;
2. J. L. INDUSTRIES, INC.
3. LARSEN'S MANUFACTURING COMPANY;

D. Cabinet Size: 14" x 14" x 6-3/4" All cabinet components and equipment shall be accessible, removable and replaceable with the cabinet door in a 90 degree position.

E. Cabinet Material: Stainless-steel, sheet# 4 finish.

F. Door Glazing: Tempered float glass.

G. Door Hardware: Manufacturer’s standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
   1. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.

2.03 CABINET FABRICATION
A. Provide box with trim, frame, door and hardware to suit cabinet type, trim style and door indicated. Weld all joints and grind smooth; miter and weld door frames. Fabricate trim in one piece with corners mitered, welded and ground smooth. Open miters are not acceptable.

PART 3 EXECUTION
3.01 COORDINATION
A. Coordinate location of cabinets prior to construction of concrete masonry walls. Verify recessed type installations and coordinate these locations with the masonry construction.
   1. Provide mason with rough opening size of cabinets.

3.02 INSTALLATION
A. Install cabinets where indicated or as directed by Architect in accordance with manufacturer’s recommendations. Mount at heights indicated, when not indicated as directed by Architect.

3.03 ADJUSTING, CLEANING, AND PROTECTION
A. Adjust cabinet doors that do not swing or operate freely.

END OF SECTION
SECTION 10 44 00

FIRE EXTINGUISHERS AND CABINETS

PART 1  GENERAL

1.01  WORK INCLUDED

   A. Provide fire extinguishers and cabinets as shown and specified.

      1. Provide fire extinguishers with wall brackets in non-finished areas (i.e. mechanical rooms, electrical rooms, etc.).

1.02  QUALITY ASSURANCE

   A. Provide fire extinguishers complying with Fire Protection Association (NFPA) Pamphlet No. 10.

   B. Provide only new portable fire extinguishers fully loaded, tested and approved by Underwriter's Laboratories (UL), and ready for use.

1.03  SUBMITTALS

   A. Submit manufacturer's product data and installation instructions.

PART 2  PRODUCTS

2.01  ACCEPTABLE MANUFACTURERS

   A. Portable Fire Extinguishers

      1. AMEREX CORP.
      2. ANSUL INC.
      3. BUCKEYE FIRE EQUIPMENT COMPANY
      4. WALTER KIDDE, THE FIRE EXTINGUISHER CO.
      5. J. L. INDUSTRIES
      6. LARSEN'S MANUFACTURING COMPANY
      7. POTTER-ROEMER
      8. WATROUS

   B. Fire Extinguisher Cabinets

      1. J.L. INDUSTRIES
      2. LARSEN'S MANUFACTURING COMPANY
      3. POTTER-ROEMER
      4. WATROUS
      5. THE WILLIAMS BROTHERS CORP.
B. Where a specific manufacturer's product is specified herein it is to establish a level of quality. Products by the other manufacturers listed are acceptable providing they meet these specifications.

2.02 FIRE EXTINGUISHERS

A. Multipurpose Dry-Chemical Type: Fabricate in accordance with NFPA No.10, 10A, and 10L and UL Standards, except hose, gauge face cover, and horn cone parts shall be metal. No plastic or nylon valves, trigger/handle, casing, or gauge will be acceptable. Fire extinguishers, unless indicated otherwise, shall be 10 lb. multi-purpose dry chemical type for use on A, B, and C fires (4A-60BC), with hose and horn.

1. Provide this type throughout facility, unless noted otherwise.

B. Size: 21-1/2" high x 8-1/2" wide x 5" deep.

2.03 FIRE EXTINGUISHER CABINETS

A. Provide steel construction

B. Basis of Design: Drawings and specifications are based on LARSEN Architectural Line with full glass door. LARSEN catalog numbers are listed to establish a standard of quality and mounting type. Equal products may be provided from the listed acceptable manufacturers. Provide the following wall mounting types where a specific type of cabinet is indicated on the drawings.

2. Doors: Full glass

C. Coordinate final model size with fire extinguisher.

D. Finish: Baked enamel, white.

E. Mounting Brackets: Provide manufacturer’s standard plated finish, heavy duty mounting brackets for surface mounted fire extinguishers. Provide proper size and type for capacity of extinguishers indicated.

F. Fire Rated Cabinets: Listed and labeled to meet requirements of ASTM E814 for fire resistance rating of wall where it is installed.

1. Construct fire rated cabinets with double walls fabricated from 0.0478 inch thick, cold rolled steel sheet lined with minimum 5/8 inch thick, fire barrier material.

G. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate the words "FIRE EXTINGUISHER" vertically on cabinet door.
1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

H. Locks

1. Exposed to Public: Provide cylinder locks on all access doors; 7-pin removable core cylinders. Key in accordance with Section 08 71 10.

2.04 CABINET FABRICATION

A. Provide standard steel box with trim, frame, door and hardware to suit cabinet type, trim style and door indicated. Weld all joints and grind smooth; miter and weld door frames. Fabricate trim in one piece with corners mitered, welded and ground smooth. Open miters are not acceptable.

PART 3 EXECUTION

3.01 COORDINATION

A. Coordinate location of fire extinguisher cabinets prior to construction of concrete masonry walls. Verify recessed type installations and coordinate these locations with the masonry construction.

1. Provide mason with rough opening size of cabinets.

3.02 INSTALLATION

A. Install fire extinguishers and fire extinguisher cabinets where indicated or as directed by Architect in accordance with manufacturer's recommendations. Mount at heights indicated, when not indicated as directed by Architect.

B. Securely anchor brackets and cabinets to substrate construction with toggle bolts or expansion anchors. Lead, wood or plastic plugs and fasteners are not acceptable.

C. Fire extinguishers are to be fully charged and ready for use when building is turned over to the Owner. Extinguishers shall be certified as fully charged by an approved fire extinguisher service company and shall be tagged or labeled as such.

3.03 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust cabinet doors that do not swing or operate freely.

B. Refinish or replace cabinets and doors damaged during installation.

C. Provide final protection and maintain conditions that ensure that cabinets and doors are without damage or deterioration at the time of Substantial Completion.
SECTION 10 51 13

METAL LOCKERS

PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide metal lockers as shown and specified.

B. Provide five (5) per cent of lockers as ADA compliant. Coordinate location with Architect. Location to be coordinated with locker design and placement of shelves.

1.02  QUALITY ASSURANCE

A. Provide lockers as complete units produced by one manufacturer, including necessary mounting accessories, fittings and fastenings.

B. Contractor responsible for obtaining dimensions of locker space prior to manufacture and installation.

C. Reference Standards

1. American Society for Testing and Materials (ASTM)
   a. ASTM A366 "Commercial Quality (CS) Steel, Carbon, (0.15 Maximum Percent) Cold-Rolled".
   b. ASTM A569 "Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial".
   c. ASTM A653 "Steel Sheet, Zinc-Coated, (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process".
   d. ASTM D2092 “Standard Guide for Zinc-Coated (Galvanized) Steel Surfaces for Painting”.

2. Americans with Disabilities Act Accessibility Guidelines (ADA or ADAAG).

1.04  SUBMITTALS

A. Submit manufacturer's product data and installation instructions.

B. Submit shop drawings indicating materials, sizes, layouts, accessories, color, numbering and methods of installation.

C. Submit color charts for color selection.

1.05  DELIVERY, STORAGE AND HANDLING

A. Do not deliver lockers until buildings are permanently enclosed and ready for locker
installation.

B. Protect lockers from damage during delivery, storage, handling and installation.

**PART 2 PRODUCTS**

2.01 ACCEPTABLE MANUFACTURERS

A. Manufacturer: ASI, LYON METAL PRODUCTS, INC., PENCO, DeBOURGH, LIST INDUSTRIES, REPUBLIC.

2.02 MATERIALS AND COMPONENTS

A. Galvanized Sheet Steel: ASTM A653 commercial quality, minimized spangle, galvanized steel sheet with not less than Z275 G60 zinc coating. Prepare surface of sheet for painting in accordance with ASTM D2092, Method A.

1. Provide for all lockers located in moist or humid areas (i.e. Locker Rooms and Drying Rooms).

B. Sheet Steel: Cold-Rolled Steel Sheet: ASTM A 1008 "Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable," Commercial Steel (CS) Type B, suitable for exposed applications.

1. Provide for locker in areas other than those listed above.

C. Fasteners: Cadmium, zinc or nickel plated steel. Exposed heads slotless type. Provide self-locking nuts or lock washer for nuts on moving parts.

D. Hooks: Ball end, cadmium plated, forged steel.

E. Identification Plates: Provide each locker opening with aluminum number plate with approximately 3/8" high numerals. Rivet plate to door frame or door. Number lockers as directed by Architect.

2.03 SOLID DOOR TYPE LOCKERS

A. Lockers

1. Type: As indicated.

2. Unit Size: As indicated.

B. Lockers shall have a "quiet" lock bar assembly. Moving parts within door shall be cushioned by rubber or other means to achieve maximum sound suppression.

C. Frames: Minimum 16 gage channels or 12 gage angles, with corners welded to form a rigid one-piece structure. Form door stops at vertical members.
D. Backs and Sides: Minimum 18 gage steel. Flange backs on vertical edges and sides where they enter member with backs, making double flanged rear corners. Provide all lockers with full back panels.

E. Tops and Bottoms: Minimum 18 gage steel, flanged edges.

F. Doors: Minimum 16 gage steel, flanged at all edges. Construct doors to prevent springing when opening and closing. Fabricate doors to swing 180 degrees. Provide louverless solid door fronts with door perimeter ventilation equal to vent area provided by standard door louvers. Provide rubber door silencers at latches.

1. Provide door arrangement as indicated.

G. Door Hinges: Heavy duty, not less than 0.050" thick steel, full loop, five knuckle, tight pin, minimum 2" high. Weld hinges to inside of frame and secure to door with minimum two factory installed fasteners, completely secured and tamperproof when locker door is closed.

H. Latching Device: Positive automatic type locking device of pre-locking type.

1. Locking - Padlock: Manufacturer's standard recessed handle type containing hole for padlock attachment.

I. Equipment: Provide one hat shelf approximately 9" below top of locker, one double prong back hook and one single prong wall hook on each side of each locker opening.

1. ADA Compliant Lockers: Provide shelf at a maximum of 54" above floor (where side access is permitted) or 48" above the floor (where front access only is permitted); provide additional shelf where bottom of locker is less than 9" above the floor.

J. Exposed Sides: Provide minimum 16 gage end panels.

K. Provide all required closures and trims. Minimum 16 gage.

2.05 FABRICATION AND ACCESSORIES

A. Construction: Fabricate lockers square, rigid, without warp and with exposed metal faces flat and free of dents or distortions. Make all exposed metal edges safe to touch.

B. Solid Door Type: Weld frames together. Unless otherwise indicated, weld, bolt or rivet other joints and connections as standard with manufacturer.

2.06 STEEL SHEET FINISHES

A. Surface Preparation: Clean surfaces of dirt, oil, grease, mill scale, rust and other
contaminants that could impair paint bond.

B. Baked Enamel Finish: Immediately after cleaning and pre-treating, apply manufacturer's standard baked-on enamel finish consisting of a thermosetting topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum 1.4 mils dft on doors, frames and legs and 1.1 mils dft on other surfaces.

C. Colors: As selected by Architect. Paint interior the same color as exterior.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install lockers in accordance with manufacturer's instructions. Install units plumb, rigid and level, located as indicated on drawings.

B. Apply fastenings through back up reinforcing plates where necessary to prevent metal distortion. Conceal fasteners whenever possible.

C. Install recessed locker trim. Provide flush hairline joint against adjacent surfaces. Install trim with concealed fasteners.

D. Touch-up marred finished, using materials as recommended or furnished by manufacturer. Replace units that cannot be satisfactorily repaired as directed by the Architect.

E. Adjust doors and latches to operate easily without binding. Verify satisfactory operation of integral locking devices.

END OF SECTION
SECTION 11 51 16

BOOK DEPOSITORIES

PART 1  GENERAL

1.01  SCOPE

A. Provide through wall book depository system, including interior wall trim, faceplate, attached chute housing with entry chute; slide chute, and air blocking system for wall system thickness as required.

B. Provide arrangements, layouts and quantities as indicated on drawings.

1.02  SUBMITTALS

A. Submit manufacturer’s product data, layout drawings and installation instructions in accordance with the General Conditions.

PART 2  PRODUCTS

2.01  BOOK DEPOSITORY

A. Door: Mounted into a built in weather hood and opens inward and up. Door to be weather resistant with gravity and weight balanced allowing it to automatically close after materials have passed through. Lockable from interior.

B. Construction: 16-gauge stainless steel exterior faceplate and depository door. Brushed stainless steel finish with graffiti resistant clear coat.

1. Overall Dimensions: 20” W x 17- 3/16” D x 18- 3/16” H
2. Depository opening: 15- 1/8” W x 3- 7 /8” H

C. Chute: Four sides, extends from the faceplate and will cover the wall rough cuts when installed. Entry chute to have an upward angle to prevent theft. Provide air blocking devise/panels.

D. Fabrication: Provide units completely factory assembled, requiring no field assembly. Hone all edges.

E. Basis of Design Manufacturer: KINGSLEY # 10-8951.
PART 3  EXECUTION

3.01  INSTALLATION

A. Install and attach assembly in accordance with the manufacturer's recommendations. Anchor units securely to wall structure. Trim opening with flanged trim provided by manufacturer and seal as recommended.

END OF SECTION
SECTION 12 24 13

WINDOW ROLLER SHADES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Work includes:

1. Type 1: Manually operated interior roller-screen solar shades as indicated on the drawings.
2. Shade Type: Manually operated, double-shade system, interior roller-screen room darkening and solar shades on same bracket allowing for independent control of each shade as indicated on the drawings.

1.02 RELATED SECTIONS

A. Wood Blocking: Section 06 11 50.

1.03 PERFORMANCE REQUIREMENTS

A. Fire Test Characteristics: Provide shade fabrics tested in accordance with:


B. Anti-Microbial: Provide shade fabrics tested in accordance with:

1. ASTM G22 – Results for ATCC6538 and ATCC13388 indicating minimum 5mm indicating “No Growth Contact Area”.
2. ASTM G21 – Results for ATCC9642, ATCC9644, ATCC9348 and ATCC9645 indicating “No Growth”.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer’s product data sheets, performance data and installation instructions for each item.

B. Shop Drawings

1. Show location and extent of roller shades.
2. Include elevations, sections, details and dimensions.
3. Show installation details, mountings, attachment to other work, operational clearances and relationship to adjoining work.
C. Coordination Drawings: Coordinate with reflected ceiling plans. Show the following:
   1. Ceiling suspension system members and attachment to building structure.
   2. Ceiling mounted or penetrating items.
   3. Shade mounting assembly and attachment.
   4. Size and location of access to shade adjustable components.

D. Samples
   1. Selection Samples
      a. Submit 3” x 5” shade cloth fabric swatches for initial fabric color selection from manufacturer’s full range of available fabrics.
      b. Submit aluminum finish color samples from manufacturer’s full range of colors.
   2. Verification Samples
      a. Submit one fully operational window shade sample of each type required; approximately 30” x 30” complete with selected shade cloth.
      b. One complete set of all shade components, unassembled.

E. Test Reports, Design Data and Certifications: Current reports from independent testing laboratories demonstrating compliance with Article 1.03.

F. Installation Instructions: Submit for types of shades and mounting substrates encountered.

1.05 QUALITY ASSURANCE

A. Qualifications
   1. Manufacturer: 20 years minimum experience manufacturing products comparable to those specified.
   2. Installer: 5 years minimum experience installing products comparable to those specified.

B. Do not fabricate shades without obtaining field dimensions for each opening. Coordinate construction of surrounding conditions to allow for timely field dimension verification.

1.06 DELIVERY, STORAGE AND HANDLING

A. Do not deliver shades until painting, wet work, grinding and similar operations which could damage, soil or deteriorate shades have been completed in installation areas. If, due to unforeseen circumstances, shades must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

B. Deliver shades to project in labeled protective packaging. Label each shade for the appropriate opening. Schedule deliveries to prevent delays to completion of work
but to minimize on site storage time.

C. Store shades in a dry secure place. Protect from weather, surface contaminants, corrosion, construction traffic and other potential damage.

1.07 WARRANTY

A. Provide manufacturer’s warranty for the installed systems. Warranty shall provide for repair or replacement of defective roller shade system components, including excessive deterioration or failure of system components. Repair or replacement shall include all costs associated with verifying failures, removal of deteriorated or defective products, replacement, testing, transportation, travel and other expenses related to corrective measures.

1. Warranty Period: 5 years from date of substantial completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Drawings and specifications are based on shades manufactured by MECHOSHADE SYSTEMS INC.

B. Other Acceptable Manufacturers: Shades manufactured by LUTRON, DRAPER, SOLARFECTIVE PRODUCTS LIMITED, NYSAN SHADING SYSTEMS are acceptable providing the shade assemblies meet the requirements specified herein and the profile/arrangements indicated on the drawings.

2.02 COMPONENTS

A. Shadebands: Construction of shade bands includes fabric, hembar and hempocket, and the attachment of the shade band to the roller.

1. Visually transparent single-fabric shade cloth; MECHSHADE ThermoVeil Group, single thickness non-raveling 0.03” thick vinyl fabric, woven from 0.18” extruded vinyl yarn comprised of 21% polyester and 79% reinforced vinyl; colors as selected by Architect.
   a. Dense Basket Weave: 1300 Series, 5% open, 2 x 2 dense basket weave pattern; colors as selected by Architect.
3. Hembars and Hempockets: Fabric hempocket with RF-welded seams (including welded ends) and concealed hem weights. Provide continuous hem weights of appropriate size and weight for shadeband inside sealed hempocket.

B. Manually Operated Hardware and Shade Brackets:

1. Provide for regular and offset drive capacity (chain fall at front or rear of
bracket) on all shade drive end brackets.

2. Provide shade hardware system that allows for removal of shade roller tube from brackets without removing hardware from opening.

3. Provide shade hardware that allows for removal and re-mounting of the shade band without having to remove shade tube, drive or operating support brackets.

4. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connections are not acceptable.

5. Provide hardware construction of minimum 1/8” thick cadmium plated steel or heavier as required to support 150% of the full weight of each shade.

6. Drive Bracket/Brake Assembly: Manufacturer’s standard type that disengages to 90% during the raising and lowering of the shade and is capable of withstanding a pull force of 50 pounds in the stopped position.

C. Shade Roller and Shade Cloth Attachment

1. Extruded aluminum; diameter and wall thickness to support shade fabric as determined by manufacturer.

2. Provide for positive mechanical engagement with drive/brake mechanism.

3. Provide for positive mechanical attachment of shade band to roller tube without use of adhesives, adhesive tape, staples or rivets. A mounting method that does not allow the shade band to be removed from the shade tube while installed is not acceptable.

4. Attach shade bands to tube in a manner that allows removal and replacement of the shade band without removing either the tube from the brackets or without removing shade brackets.

D. Drive Chain: #10 Qualified stainless steel chain rated to 90 pound minimum breaking strength.

2.03 FABRICATION

A. Fabricate units to completely fill openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise. Comply with manufacturer’s edge clearance standards and recommendations.

B. Fabricate shadecloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8” in either direction per 8’ of shade height due to warp distortion or weave design.

2.04 FINISHES

A. Aluminum Components: Baked enamel; colors as selected by Architect.

B. Steel Components: Baked enamel; colors as selected by Architect.

PART 3 EXECUTION
3.01 EXAMINATION
A. Examine substrate and conditions for installation. Do no begin installation until conditions are satisfactory. Beginning installation indicates acceptance of site conditions by contractor. Notify Architect upon inspection when the project conditions are unacceptable for shade installation. Beginning of installation means acceptance of substrate and project conditions.

3.02 INSTALLATION
A. Install units to comply with manufacturer’s instructions for the type of mounting and operation required. Provide units plumb, true and securely anchored in place with recommended hardware and accessories to provide smooth, non-binding operation.

B. Install unit within the following tolerances:
   1. Maximum variation of gap at window opening perimeter: ¼” per 8’ (+/- 1/“) of shade height.
   2. Maximum offset from level: 1/16” per 5’ of shade width.

3.03 ADJUSTING
A. Adjust drive/brake mechanism for smooth operation. Adjust shade and shade cloth to hang flat without buckling or distortion. Replace units or components that do not hang properly or operate smoothly.

3.04 CLEANING
A. Touch-up damaged finishes and repair minor damage in order to eliminate evidence of repair. Remove and replace work that cannot be repaired to the Architect’s satisfaction.

B. Clean exposed surfaces, including metal and shade cloth, using non-abrasive materials and methods recommended by manufacturer. Remove and replace work that cannot be cleaned to the Architect’s satisfaction.

3.05 DEMONSTRATION
A. Demonstrate operation and instruct Owner’s personnel in the proper operation and maintenance of the shade systems.

END OF SECTION
This page intentionally blank
SECTION 12 33 55

PLASTIC LAMINATE FACED CASEWORK

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide plastic laminate casework as indicated on drawings. Countertops, fixed and adjustable shelving, and custom pieces are specified under Section 06 40 00.

B. Accessories common to casework are included as work of this section.

1.02 RELATED SECTIONS

A. Wood Blocking: Section 06 10 50.

B. Countertops: Section 06 40 00.

C. Custom Casework: Section 06 40 00.

D. Vinyl Base: Section 09 65 13.

1.03 QUALITY ASSURANCE

A. Fabricator qualifications: A firm specializing in the fabrication of millwork with a satisfactory record of performance on projects of comparable size and quality. Fabricator shall be acceptable to the Architect.

B. Installation: Performed only by experienced skilled finish carpenters.

C. Catalog Standards

1. Manufacturer's catalog numbers, where shown, are for convenience in identifying cabinet work.

2. Use of a specific manufacturer's catalog numbers is not to preclude the use of any other acceptable manufacturer's product or procedures that may be equivalent.

D. Reference Standards: Wherever the following abbreviations are used herein, they shall refer to the corresponding standard:


2. AWI: Architectural Woodwork Institute.

3. NEMA: National Electrical Manufacturer's Association.


5. CS: Commercial Standard.
E. Quality Grade: Materials and fabrication shall be "custom grade" in accordance with "Quality Standard Illustrated," of the AWI conforming to the following sections:

1. Section 200: Plywood and particleboard.
2. Section 400: Casework.

1.04 DEFINITIONS

A. Exposed Portions of Casework: Include surfaces visible when doors and drawers are closed. Bottoms of casework more than 4 feet above floor and tops less than 6 feet 6 inches above floor shall be considered as exposed. Visible members in open cases or behind glass doors also shall be considered as exposed portions.

B. Semi-Exposed Portions of Casework: Includes those members behind opaque doors, such as shelves, divisions, interior faces of ends, case back, drawer sides, backs and bottoms, and back face of doors. Tops of casework 6 feet 6 inches or more above floor shall be considered semi-exposed.

C. Concealed Portions of Casework: Include sleepers, web frames, dust panels, and other surfaces not usually visible after installation.

1.05 SUBMITTALS

A. Product Data: Submit manufacturer's/fabricator's data and installation instructions for each type of casework unit.

B. Samples: Submit samples of specified finishes.

C. Shop Drawings

1. Submit shop drawings for casework showing plans, elevations, ends and cross sections.
2. Show details and location of anchorages and fitting to floors, walls and base.
3. Include layout of units with relation to surrounding walls, doors, windows and other building components.

1.06 DELIVERY, STORAGE AND HANDLING

A. Protect casework during delivery, storage and handling to prevent damage, soiling and deterioration.

B. Do not deliver casework until concrete, masonry and other similar wet work has been completed and is thoroughly dry, outside door openings are permanently watertight, exterior windows are glazed and, in case of temperature dropping below 60 degrees F., until temporary heating and ventilating systems are in operation.

C. Store casework in dry, well-ventilated spaces with constant minimum temperature of 60 degrees F., and maximum relative humidity of 55%.
1.07 PROJECT CONDITIONS

A. Provide and maintain a constant temperature and humidity before, during and after installation as required to maintain optimum moisture content of installed materials.

B. Obtain measurements and verify dimensions and details before proceeding with finish carpentry.

1.08 WARRANTY

A. Plastic laminate faced casework to be guaranteed by manufacturer, and Contractor jointly and severally to the Owner for three years, to be free of defects due to faulty materials, workmanship, or performance.

B. Warranty not to include damage sustained as a result of abuse, negligence, use beyond that of it's intended function by the Owner, acts of God, or unnatural events or causes beyond the control of the manufacturer.

C. Include repair and replacement of defective materials and components at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 MATERIALS

A. Particle Board (Substrate for Laminate Surfaces): High density industrial grade with a minimum density of 45 pounds per cubic foot and a moisture content between 9% maximum and 6% minimum, meeting or exceeding ANSI A208.1 Grade M-3 or ASTM D1037.

B. Fiberboard: Uniform, medium density conforming to ANSI A208.2. Maximum moisture content of 8%. Meet the following minimum standards:

1. Internal Bond: 125 psi.
2. Modulus of Rupture: 4,000 psi.
3. Modulus of Elasticity: 400,000 psi.
5. Density: Minimum 50 pounds per cubic foot.

C. Hardboard: Tempered, smooth both sides; conforming to ANSI/AHA A135.4 Class 1.

D. Lumber: Optional framing material for concealed framing. Conform to AWI requirements premium grade; provide in suitable species of manufacturer's option.

E. Plastic Laminate: Conform to the requirements of the National Electrical Manufacturer's Association (NEMA) Publication Number LD-3. Plastic laminate shall be WILSONART, FORMICA, PIONITE, or NEVAMAR. Colors, patterns and finishes shall be as selected by Architect from the manufacturer's full range of
standard colors, patterns and finishes. Manufacturer, finish and color to match plastic laminate specified in Section 06400.

1. General Purpose Horizontal Grade: 0.05 inches thick.
2. General Purpose Vertical Grade: 0.028 inches thick.
3. Backing Sheet Grade: 0.02 inches thick.
4. Post-Forming Grade: 0.042 inches thick.
5. Cabinet Liner: 0.02 inches thick.
6. Fill and seal plastic laminate joints with Seamfil by KAMPEL ENTERPRISES, INC. or FormFill by FORMFILL PRODUCTS (UNIKA USA). Colors specifically mixed by manufacturer to match plastic laminate.

F. Pressure Fused Laminate/Interior Surfacing

1. Melamine resin impregnated, 100 gram PSM minimum, surface laminated to core under pressure.
3. White pressure fused laminate for cabinet interiors behind door and drawers, interiors of all open cabinets unless otherwise specified, and underside of wall cabinet unless otherwise specified.
4. Shall be balanced at all concealed surfaces with phenolic backer. Unsurfaced coreboard not allowed.

G. Hardware Items: All exposed hardware to be satin stainless steel finish.

1. Drawer Slides: Self-closing, side mounting type with nylon tire, steel ball-bearing rollers. Manufactured by BLUM, GRASS, AMEROCK, KNAPE & VOGT; ACCURIDE. Load capacity as follows:
   a. 75 pounds: Drawers up to 3-1/2 inches deep: Similar to ACCURIDE Series 2132.
   b. 100 pounds: Drawers up to 8 inches deep: Similar to ACCURIDE Series 2832.
   c. 150 pounds: Drawers over 8 inches deep, all file drawers: Similar to ACCURIDE Series 4034.
2. Drawer and Door locks: 5-pin tumbler removable core, dead bolt. BEST; NATIONAL LOCK; CORBIN. Key and masterkey locks as directed by Architect.
   Provide 2 keys per cylinder and 5 masterkeys per master set.
3. Concealed Hinges: European style, self-closing, type as required for construction. Metallamet by HAFELE; similar by GRASS; PRAMETE; BLUM.
5. Drawer and Door Pulls: EPCO Edge Pull DP47.
6. Adjustable Cabinet Shelf Supports: Provide metal pilaster type or hardwood drilled type, manufacturer's standard.
   a. Metal Type: KNAPE & VOGT (KV) steel nickel plated.
      1) Standards: KV #255 NP for dado installation.
2) Clips: KV #256 NP.
   b. Wood Type: Provide hardwood verticals with adjustment holes located 1/2" on center. Provide shelf clips of type that locks shelf in place.
7. Catches: Magnetic, STANLEY #45 or equal by NATIONAL LOCK or EPCO.

H. Glue: Waterproof adhesive (phenol, resorcinol or melamine) base meeting requirements of CS 253 for "Wet Use" unless otherwise specified in specific sections.

I. Plywood: Birch hardwood plywood conforming to AWI Section 200 for veneer core material, AWI "custom" grade, provide with waterproof glue.

2.02 FABRICATION - CASEWORK

A. General: Except as specified hereinafter, fabricate all work in accordance with AWI quality standards as specified. Work not specified with a level of quality shall be not less than "Custom" quality per AWI.

1. "Flush Overlay" frameless design as shown in AWI Architectural Casework Details.
2. Provide complete factory-fabricated and finished components which, when assembled on site, will provide an integral system of storage and work surfaces.
3. Provide locks where indicated.
4. Make cut-outs and other provisions for the work of other trades and as indicated or required for installation.
5. Assemble cabinets with accurate router grooves 1/8" deep with glue and nails and screws.
6. Apply plastic laminate to exposed ends after assembly to conceal screws in end cabinet.
7. All particle board panels to be balanced construction.

B. Subbases: Provide continuous plywood closed bases capable of being leveled to meet site conditions; subbase to be unfinished to receive resilient base. See Section 09 65 13.

C. Base Cabinets

1. Sides and Bottoms: Construct of 3/4" thick particle board with interior of cabinet finished with cabinet liner or polyester laminate. Provide balanced constructed panels with neutral colored backer sheet at concealed conditions and finish laminate at exposed conditions.
2. Backs: Standard 1/4" prefinished hardboard. Install in housed joints in surrounding panels. All backs exposed to view to be neutral colored except where indicated to match vertical color surfaces. Rear, unexposed side of backs to receive continuous hot melt glue at joint between back and sides/top/bottom for sealing against moisture and vermin, and to further contribute to cabinet stability.
3. Frame: Provide frame construction of 3/4" thick particle board or lumber
dadoed into sides at the following:
   a. As sub-top.
   b. At all locked drawers and doors.
4. Runners: Provide runners or frame construction between all drawers.
5. Shelves: Provide fixed and adjustable shelves with particle board core where indicated on drawings. Provide shelves adjustable on 1/2" centers. Except for exposed shelving conditions, finish shelves with neutral colored polyester laminate or liner grade laminate. Finish front and rear edges with PVC "T" edge.
   a. Shelves under 36" wide: 3/4" thick, except all open shelves to be 1" thick.
   b. Shelves 36" to 42" wide: 1" thick.
   c. Shelves over 42" wide: Construct in accordance with AWI Section 400 to support minimum 30 lbs./running foot of shelf with deflection limited to 1/4" or provide intermediate supports to limit the span to ranges specified above.
6. Finish
   a. Casework Edges: Except where cabinet design requires matching laminate edges and/or "T" edge, finish front edges of sides, frames, and bottom with PVC sheet, black, gray or neutral colored as approved by Architect.
   b. Exposed Exterior of Casework: Finish exposed portion of cabinet with vertical grade plastic laminate in solid color finish as selected by Architect.
   c. Interior of Casework
      1) Semi-Concealed (behind doors): Neutral colored polyester or cabinet liner laminate.
      2) Exposed: Vertical grade laminate to match exposed casework.
   d. Shelves: Same as specified for interior of casework. "T" edge typical except where cabinet design requires matching laminate self edge.

D. Drawers
1. Body: Construct of fiberboard with polyester laminate finish on faces and PVC on exposed top edges. Subfronts, sides and back fabricated with shouldered lock joint or dado construction and routed to receive bottom.
   a. Sides and Back: 1/2" thick.
   b. Subfront: 5/8" thick.
2. Bottom: 1/4" thick prefinished hardboard, housed and glued, into front, sides and back. Underside of drawer to receive continuous hot melt glue at joint between bottom and back/sides/front for sealing and rigidity. Reinforce drawer bottoms as required with intermediate spreaders.
3. Front: 3/4" thick particle board front finished with vertical grade plastic laminate on exposed face and cabinet liner laminate on interior side; total thickness 13/16" thick. Except where cabinet design requires self edge matching laminate edges (see cabinet design), edges to be finished with PVC "T" edging, black, gray or neutral color as selected by Architect; corners rounded.
   a. Where adjacent door sizes require core thickness in excess of 3/4",
provide drawer fronts to match door thickness. Verify conditions with Architect.

4. Install on proper sized slides specified herein.

E. Doors: Construct and finish same as drawer fronts except core construction to vary as follows:

1. Doors over 30" x 48": Construct from 1" to 1-1/4" thick particle board core.
2. Doors over 36" x 60": Construct as 1-3/8" thick hollow core units in accordance with AWI Section 1300.

F. Wall Cabinets: Construct and finish same as base cabinets except provide suitable hang rail of 3/4" plywood secured to cabinet frame.

1. Where wall cabinets close to soffit or ceiling, provide fascia scribed to conditions and leveled on bottom to permit level installation of cabinets. Finish of fascia to match cabinet.

G. Design

1. Configuration of casework is indicated on drawings.
2. The detailing and design required to provide rigid, solid and structurally adequate casework is the responsibility of the fabricator; within parameters of AWI specifications and as approved by Architect.
3. The following conditions require special attention:
   a. Casework exceeding 42" in width between supports.
   b. Sink and/or equipment cutouts and supports.
   c. Countertops exceeding 24" unsupported.
   d. Wall and Ceiling Mounted Casework: Provide integral framing in casework of size, strength, and in locations which allow unit to be screw attached to proper substrate and remain rigidly in place.

PART 3 EXECUTION

3.01 CASEWORK INSTALLATION

A. General

1. Install plumb, level, true and straight with no distortions so that doors and drawers will fit openings properly and be accurately aligned.
2. Shim as required using concealed shims.
3. Where casework abuts other finished work, scribe and apply filler strips for accurate fit with concealed fasteners.
4. Where possible, assemble units into one integral unit with joints flush, tight and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16".
5. Anchor cabinet units securely in place with concealed (when doors and drawers are closed) fasteners, anchored into structural support members of wall construction. Comply with manufacturer’s instructions and
recommendations for support of unit.
6. Adjust casework and hardware so that doors and drawers are centered in openings and operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

B. Base Cabinets

1. Fasten each individual cabinet to floor at toe space, with fasteners spaced at 24” on center.
2. Bolt continuous cabinets together.
3. Secure individual cabinets with not less than 2 fasteners into floor, where they do not adjoin other cabinets.

C. Wall Cabinets

1. Verify that wood blocking has been installed at required locations.
2. Bolt continuous cabinets together.
3. Secure individual cabinets with not less than 2 fasteners into wall (wood blocking), where they do not adjoin other cabinets.

3.02 CLEANING AND PROTECTION

A. Repair or remove and replace defective work as directed upon completion of installation.

1. Patch surfaces damaged by installation to prior condition as approved or replace damaged units as directed.

B. Clean shop-finished surfaces, touch-up as required, and remove or refinish damaged or soiled areas, as acceptable to Architect.

1. Dust cabinet interiors. Clean exterior surfaces to original condition.

C. Advise Contractor of procedures and precautions for protection of materials and installed casework from damage by work of other trades.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Movable and permanently anchored exterior site furnishings.

B. Miscellaneous Materials: Thermoplastic paint, non-shrink grout.

1.2 SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Provide plans and elevations, indicating overall dimensions.

C. Samples: Submit manufacturer's samples of materials, finishes, and colors for Landscape Architect's selection from manufacturer's full line of color and finishes.
   1. Metal Finishes: Provide samples on metal substrate. Color chart not acceptable.
   2. Wood Finish: Submit sample of wood with factory finish.
      a) Size: Not less than 4 inch length of wood slat used on benches.

D. Samples: For each exposed product and for each color and texture specified.

E. Maintenance data.

1.3 QUALITY ASSURANCE

A. Installer and Fabricator Qualifications: Workmanship shall be best standard practice of trades and shall be performed by mechanics skilled in type of Work required.

B. Regulatory Requirements: Meet requirements of applicable laws, codes, and regulations required by authorities having jurisdiction over Work.

1.4 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage: Store materials in clean, dry area in accordance with manufacturer's instructions. Keep materials in manufacturer's original, unopened containers and packaging until installation.

C. Handling: Protect materials and finish during handling and installation to prevent damage.

1.5 WARRANTY

A. Products will be free from defects in material and/or workmanship for a period of three years from the date of invoice.
   1. Warranty does not apply to damage resulting from accident, alteration, misuse, tampering, negligence, or abuse.
      a. Scratches, nicks, and dents are to be considered normal wear and tear, and are not covered by the warranty.
   2. Manufacturer shall, at its option, repair, replace, or refund the purchase price of any items found defective upon inspection by the manufacturer's authorized service representative.
PART 2 - PRODUCTS

2.1 SEE LANDSCAPE PLANS FOR INFORMATION.

2.2 MISCELLANEOUS MATERIALS

A. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.


C. Others: As required for a complete installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Site Conditions: Examine site and verify that conditions are suitable to receive Work and that no defects or errors are present which would cause defective installation of products or cause latent defects in workmanship and function.

3.2 PREPARATION

A. Protect existing conditions to remain such as structures, utilities, irrigation systems, plant materials and paving on or adjacent to the site of the Work.

B. Prevent excessive compaction of planting area soil and soil mixes.

C. Provide barricades, fences or other barriers to protect existing conditions to remain from damage during construction.

D. Submit written notification of conditions damaged during construction to the Owner’s Representative immediately.

E. Embedded Items: Supply metal items required to be cast into concrete or embedded in masonry with setting templates to appropriate trades.

3.3 INSTALLATION

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.

B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.

C. Install site furnishings level, plumb, true, and securely anchored at locations indicated on Drawings.

D. Meet requirements of accepted Shop Drawings.

E. Brace and carefully handle shop fabricated items subject to damage to prevent distortions or other damage.

3.4 ERECTION TOLERANCES

A. Maximum Variation from Plumb: 1/8-inch.

3.5 CLEANING

A. Remove soil and foreign matter from finished surfaces and keep clean until the Owner accepts maintenance.

3.6 PROTECTION

A. Apply protective coverings to prevent damage until date of Final Completion.

END OF SECTION
This page intentionally blank
SECTION 14 21 23

ELECTRIC TRACTION PASSENGER ELEVATORS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide all labor, materials, equipment and services necessary to furnish and install all traction machine roomless passenger elevators. The elevator system as described shall be installed with all needed accessories as required to provide a complete installation.

1.02 RELATED SECTIONS

A. Related Sections: The following Sections contain requirements that relate to this Section.

1. Section 05 50 00 - Metal Fabrications; pit ladder, divider beams, lintels for door support.
2. Division 23 - Heating, Ventilating, and Air Conditioning; ventilation and temperature control of elevator equipment room.
3. Division 26 - Electrical; electrical service to main disconnect in elevator machine room (shunt trip type) including electrical power for elevator installation and testing; electrical service for machine room, machine room and pit GFIC convenience outlets; non-GFIC outlet dedicated for sump pump, lighting in elevator pit; telephone service to machine room. If electrical requirements differ from those indicated on the Electrical Drawings, the Elevator Supplier must pay the Electrical Contractor for costs to accommodate this change. Power changes should be brought to the Architect's attention during bidding for inclusion in an Addendum.
4. Division 26 - Fire Alarm Systems; fire and smoke detectors and interconnecting devices; fire alarm signal lines to contacts in the machine room.
5. Division 26 - Telephone System to machine room.
   a. Provide cellular communication.
6. Division 27 and 28 – Access control and position switches.

1.03 QUALITY ASSURANCE

A. Manufacturer

1. Regularly engaged in designing, engineering, manufacturing, installing and servicing elevators of the type and character specified.
2. Have a history, during the last ten (10) years, of not less than 50 successful installations and satisfied Owners where continuous maintenance service was performed. Such history to be fully documented, upon request, listing project name, date of installation, address, architect, owner, name and phone number of owner's facilities manager or maintenance superintendent.
3. Provide evidence that a service office with qualified service personnel is located within 50 miles of the installation and warehouse parts is maintained within 50 miles. Where service facilities are further than the specified distances, manufacturer to provide response time of not more than 1-1/2 hours to request of service.

B. Installer: Manufacturer or an authorized agent of the manufacturer with not less than 5 years of successful experience installing similar elevators.


D. Codes and Standards: Perform all work in accordance with the American National Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks (ASME A17.1), the National Electrical Code and the OBC.

E Regulatory Requirements
1. ASME A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.
2. OBBC.

F. Fire-rated entrance assemblies: Opening protective assemblies including frames, hardware and operation shall comply with ASTM E152, UL 10B and NFPA Standard 80. Provide entrance assembly units bearing UL Class B labels.

G. Obtain and pay for all required permits, inspections and fees. Arrange for and make required inspections and tests. Obtain certificates and operating permits and turn over to University upon acceptance of work.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's product specifications and installation instructions for each principal component or product and include certified test reports on required testing. List and describe features of the control system, performances and operating characteristics.

B. Shop Drawings: Submit plans, elevations and details of car enclosures and hoistway entrances. Include:
1. A comparison of maximum loads imposed on the building structures at points of support and all similar considerations of the elevator work.
2. Access control and position switch coordination.

C. Maintenance Manuals: Submit bound maintenance manual for each elevator or type of elevator with operating and maintenance instructions, parts listing,
recommended parts inventory listing, purchase source listing, emergency instructions and similar information.

D. Samples: Submit samples of exposed finishes of car enclosures, hoistway entrances, and signal equipment; 8” squares of materials and 12” lengths of running materials.

E. Inspection certificates and operating permits required by governing authorities to allow normal, unrestricted use of elevator.

F. Deliver permit to operate elevator to Architect.

1.05 DELIVERY, STORAGE AND HANDLING

A. Do not deliver materials to the site until areas in which they are to be installed are ready to receive them in place for final installation.

B. Wrap, carton and crate factory finished materials in a manner to protect finishes.

C. Store, protect and handle materials in accordance with manufacturer's recommendations to prevent damage, soiling or deterioration.

D. Fully protect movable and operating equipment from weather damage.

1.06 PROJECT CONDITIONS

A. Painting
   1. Paint all equipment that is not factory finished.
   2. Provide all ferrous metals installed in the hoistway shop primed with a rust inhibitive primer.

B. Temporary Use
   1. Provide all necessary protection to prevent damage to each elevator used for construction purposes before Contract Completion.
   2. Provide temporary enclosures, coverings, guards, barriers and other devices required to protect the elevator car enclosures, hoistway entrances, signal fixtures and related materials, components and finishes from damage. Protective materials, methods and procedures shall be approved by the elevator manufacturer and paid for by the user.
   3. Maintenance during use, including cleaning, lubricating and adjusting equipment and components for proper elevator operation shall be performed only by the elevator manufacturer. Cost for maintenance shall be paid by the user.
   4. Elevators shall be free of damage or deterioration at time of Contract Completion. Cost to repair damaged materials and finishes and replace worn or defective components to restore elevators to their original condition shall be paid by the user.

1.07 MAINTENANCE
A. Provide full preventative maintenance for a period of one year beginning on the date of final acceptance of work.
   1. Frequency: Regular and systematic inspections not less than once per month.
   2. Duration: One hour per visit.
   3. Personnel: Competent and trained employees of the elevator manufacturer.
   4. Maintenance: Includes necessary adjustments, greasing, oiling, cleaning, supplies and parts to keep equipment in proper operation, except such parts made necessary by misuse, accidents or negligence not caused by the manufacturer.
   5. Work Period: Perform all work during regular working hours of the manufacturer’s maintenance personnel.

B. Maintenance Service: To be performed solely by the successful elevator manufacturer and not assigned or transferred to any agent or subcontractor.

C. Provide twenty-four emergency callback service as part of the maintenance service. Respond to all calls within 45 minutes after notification, including evenings and weekends. Trapped passengers require immediate response and are to be treated at the highest emergency level. Failure to respond promptly or to provide competent service will be cause to hire another contractor to perform the work at the expense of the installing contractor.

D. Contractor to have a service office and full-time service personnel within a 50 mile radius of project site. Service office shall have been functioning with full-time personnel for a minimum period of 5 years before the bid date.

E. Extended Maintenance Proposals: Maintenance service beginning after base bid one year period consisting of regular examinations, adjustments and lubrications as specified herein. Provide separate proposal for period of:
   1. 5 years.
   2. 10 years.

1.08 WARRANTY

A. Provide special project guaranty, signed by the Contractor, Installer and Manufacturer, agreeing to replace/repair/restore defective materials and workmanship of the elevator work for a period of one year after date of Contract completion.

B. "Defective" is hereby defined to include, but not be limited to, operation or control system failures, performances below required minimums, excessive wear, unusual deterioration or aging of materials or finishes, unsafe conditions, the need for excessive maintenance, abnormal noise or vibration, and similar unusual, unexpected and unsatisfactory conditions.

C. Repairs to be made at no additional cost to the Owner.
PART 2 PRODUCTS

2.01 GENERAL DESCRIPTION

A. Manufacturer
   1. Basis of Design:
      a. Elevator - 2500 lbs. This specification is based on elevator EcoSpace by KONE.
      b. Service Elevator - 3500 lbs. This specification is based on elevator EcoSpace by KONE.
   2. Similar products/models by THYSSEN KRUPP, OTIS are acceptable providing they meet the requirements specified herein and include in their scope all changes to building physical dimensions or electric service beyond what is indicated on the drawings.

B. Elevator: Performance Requirements for elevators are defined as follows:
   1. Speed: 150 fpm (All). Variation above or below the referenced speed is permitted depending upon load.
   2. Hoistway Entrances:
      a. 2500 lbs Elevators: 3’-6” x 7’-0”
      b. 3500 lbs Elevators: 3’-6” x 7’-0”
   3. Power Supply: As indicated.
   4. Platform Size (inside clear):
      a. 2500 lbs Elevators: 6’-8” wide by 4’-3 ½” deep
      b. 3500 lbs Elevators: 6’-8” wide by 5’-6 ½” deep
   5. Landings and Openings: 2
   6. Cab Height: 8’-0”.
   7. Power: 480 volt, three phase, 60 hertz.

2.02 MATERIALS, GENERAL

A. Colors, patterns, and finishes: As selected by the Architect from manufacturer's full range of standard colors, patterns, and finishes.

B. Steel
   1. Shapes and Bars: ASTM A 36.
   2. Sheet: ASTM A 366, cold-rolled steel sheet, commercial quality, Class 1, matte finish, stretcher leveled.
   3. Finish: Shop primed.

C. Stainless Steel
   1. Shapes and Bars: ASTM A 276, Type 304 (18-8).
   2. Tubing: ASTM A 269, Type 304 (18-8).
   3. Sheet: ASTM A167, Type 304 (18-8).
   4. Finish: NAAMM No. 4 satin finish.
D. **Plastic Laminate:** Decorative high-pressure type, complying with NEMA LD3, Type GP-50 General Purpose Grade, nominal 0.050” thickness.
   1. **Color/Pattern:** As selected by Architect.

E. **Aluminum:** Extrusions per ASTM B221; sheet and plate per ASTM B209.

F. **Fire Retardant Treated Particleboard Panels:** Minimum 3/4" thick backup for plastic laminate veneered panels, provided with suitable anti-warp backing; to meet ASTM E84 Class "A" rating with flame-spread rating of 25 or less.

### 2.03 EQUIPMENT/COMPONENTS

A. **Mechanical Equipment.**
   1. **General:** Incorporate all necessary standard components required for such application all in accordance with applicable code(s).
   2. **Hoisting Machine:** Include an AC drive motor, direct current electro-mechanical brake and integral traction drive sheave, mounted to the back of the car guiderail at the top landing.
      a. Provide equipped with an electric drive motor especially designed for elevator service, developing high starting torque with low starting current.
      b. **Motor Horsepower:** In accordance with the duty specified.
   3. **Machine Brake:** Electrically released and spring applied. The drive sheave shall be accurately turned and grooved for the quantity and size of Hoist Ropes applicable to this service.
   4. **Traction steel hoist device:** Size and number appropriate to insure proper wearing qualities, shall be provided. As a minimum, the number and size of ropes shall comply with the factor of safety requirements of the ASME/ANSI A17.1 Safety Code for Elevators.
   5. **Elevator System** shall include a car frame, car safety, overspeed governor and pit buffers for both car and counterweight; all integrated into this system in accordance with application criteria.
   6. **Hoisting Machine**
      a. Located within the hoistway and mounted on the car guiderail furnished by the elevator contractor.
      b. **Mounting of Hoisting Machine:** Incorporate isolation to minimize the transmission of noise and/or vibration to the building structure.
   7. **Counterweight:** Provide elevator suitably counterbalanced with adequate weights contained in a structural steel frame. This Counterweight shall be equal to the weight of the complete elevator car plus a percentage of the capacity load.
   8. **Counterweight Guard:** Manufacturer’s appropriate design and size; provided in place at the bottom of the hoistway.

B. **Additional Equipment**
   1. **Guide Rails:** Provide elevator car and counterweight guide rails erected plumb, and securely fastened to the hoistway framing. Design and provision of hoistway framing shall be of adequate strength and properly positioned to withstand loads applied in conjunction with data provided by the elevator contractor.
2. Roller Guides: Provide mounted to the top and bottom of both the car and counterweight frame. Each roller guides assembly shall be arranged to maintain constant contact on the rail surfaces.

C. Power and Operational Controls

1. Power Control: Digital, solid state based control system. Provide smooth, accurate speed regulation and efficient operation. Interface with the microcomputer elevator logic providing closed loop position control.
   a. Design power control system to vary the alternating current power supply to the AC hoist motor providing smooth acceleration and deceleration regardless of elevator load and shall use I.G.B.T. technology in the power stage in order to deliver power to the motor in a quiet mode, minimizing the need for external power filters for quiet operation.
   b. Solid state load/torque balancing circuitry shall be incorporated to automatically monitor car load prior to start and adjust the hoist motor torque to assure smooth car start-up.
   c. Power control shall be fully factory pre-set, minimizing the need for field adjustment. Computer inputs shall tailor the power control to the specific elevator design parameters. Provision shall be made for minor field adjustment. Such adjustments shall generally be non-interacting.

2. Elevator Operation - Selective Collective Control: Pressure upon one or more car buttons shall send the car to the designated landings in the order in which the landings are reached by the car, irrespective of the sequence in which the buttons are pressed, provided the hoistway door interlock and car door switch circuits are completed. During this operation, the car shall also answer calls from the landings which are in the prevailing direction of travel. Each landing call shall be canceled when answered.
   a. Pressure upon a hall button at a floor above the car location shall cause the car to start up and answer any up calls as they are reached by the car irrespective of the sequence the buttons have been pressed. The car shall not stop at floors where down buttons only had been pressed. If no further car or up hall calls are registered, the car shall reverse its direction preference to response to car calls or down hall calls.
   b. The car shall start down to answer calls below the car and shall not stop where only up calls are registered. When traveling up, the car shall reverse at the highest call and proceed to answer calls below it. When traveling down, the car shall reverse at the lowest call and answer calls above it.
   c. Should both an up and a down call be registered at an intermediate landing, only the call responding to the direction in which the car is traveling shall be canceled upon the stopping of the car at the landing. Terminal limit switches shall be provided in the hoistway designed to automatically stop the car at or near the closest terminal landing.

3. Up-Fall Protection: Provide a system which monitors for unintended upward movement of the elevator system. In the event unintended
upward movement occurs the system shall engage a braking system to stop a car with up to 125% of rated capacity. The main car brake, rope brakes and sheave wedges are not acceptable alternatives.

4. Passenger Rescue Feature: Provide a device in the machine room to move the elevator car to a floor landing in the event of controller or power failure. This device must be speed controlled to prevent an overspeed condition. A line of sight must also be provided between the Passenger Rescue Feature and the elevator car.

5. Auxiliary Operations and Controls include the following:
   a. Independent Service
   b. Fireman’s Control Phase I and Phase II
   c. Home Landing
   d. Zoned Access at bottom floor
   e. Sequence starting (under emergency power)

6. Access Control: Coordinate and integrate key reader operation system with Division 28.

2.04 HOISTWAY ENTRANCES

A. Doors and Frames: Provide complete hollow metal type hoistway entrances at each hoistway opening.
   1. Manufacturer’s standard entrance design, bearing Underwriters’ Laboratories "B" labels, and consisting of 14 gauge frames with 2 inch profile, 16 gauge doors, hangers, hanger supports, hanger covers, fascia plates, sight guards, and necessary hardware.
   2. Elevator wall interface with hoistway entrance assembly shall comply with elevator manufacturer’s requirements.
      a. Stainless steel: ASTM A 167, Type 304 stainless steel panels, No. 4 satin finish.
      a. Stainless steel: ASTM A 167, Type 304 formed stainless steel sheet, No. 4 satin finish.

B. Interlocks: Equip each hoistway entrance with an Underwriters' Laboratories "B" label approved type interlock tested as required by code. Design interlock to prevent operation of the car away from the landing until the doors are locked in the closed position as defined by code and prevent opening the doors at any landing from the corridor side unless the car is at rest at that landing or is in the leveling zone and stopping at that landing.

C. Door Hanger and Tracks: Provide sheave type two point suspension hangers and tracks for each hoistway sliding door.
   1. Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.
   2. Hangers: Provide an adjustable slide to accommodate the up-thrust of the doors.
   3. Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.
D. Hoistway Sills: Extruded, with grooved surface, 1/4 inch (6.4 mm) thickness.  
   1. Aluminum: ASTM B 221 aluminum, mill finish.

2.05 CAR ENCLOSURE

A. Car Enclosure
   1. Walls: Reinforced 16 gauge cold-rolled steel with two coats factory applied 
      baked enamel finish, with applied vertical wood core panels covered on all 
      six sides with high pressure plastic laminate. 
      a. Colors: As selected. Provide manufacturers premium laminate 
         selections.
   2. Canopy: Reinforced 14 gauge cold-rolled steel with hinged exit. Finish: 
      Two coats factory applied reflective baked enamel.
   3. Ceiling: Downlight type, 16 gauge metal pans with LED downlights 
      suspended and dimmer switch 7'-4" above the finished floor. Number of 
      downlights shall be dependent on platform size with a minimum of six. 
      a. Metal pans: Stainless steel, No. 4 satin finish.
   5. Doors: Horizontal sliding car doors reinforced with steel for panel rigidity. 
      Hang doors on sheave type hangers with polyurethane tires that roll on a 
      polished steel track and are guided at the bottom by non-metallic shoes 
      sliding in a smooth threshold groove. 
      a. Door Finish: Stainless steel, No.4 satin finish. 
      b. Cab Sills: Extruded, with grooved surface, 1/4 inch (6.4 mm) 
         thickness. Aluminum: ASTM B 221 aluminum, mill finish.
   6. Handrail: Segmented type metal bar handrail with ends curved to the wall, 
      nominal 1/4" x 2", stainless steel satin finish, lacquered. Provide at rear 
      and side walls.
   7. Ventilation: Two speed exhaust fan mounted on the car top.
   8. Pad Buttons: Provide pad buttons on cab front(s) and walls. 
      a. Provide one set of vinyl protection pads for the project.
  10. Protection: Provide one set of wall protection cloth pads
  11. Finished Floor: TBD.

2.06 DOOR OPERATION

A. Door Operation: Provide a direct current motor driven heavy duty operator 
   designed to operate the car and hoistway doors simultaneously. Door movements 
   shall be electrically cushioned at both limits of travel and the door operating 
   mechanism shall be arranged for manual operation in event of power failure. Doors 
   shall automatically open when the car arrives at the landing and automatically 
   close after an adjustable time interval or when the car is dispatched to another 
   landing. Direct drive geared operators, AC controlled units with oil checks, or other 
   deviations are not acceptable.
   1. No Un-Necessary Door Operation: Car door shall open only if the car is 
      stopping for a car or hall call, answering a car or hall call at the present 
      position or selected as the next car up.
2. Door Open Time Saver: If a car is stopping in response to a car call assignment only (no coincident hall call), the current door hold open time is changed to a shorter field programmable time when the electronic door protection device is activated.

3. Limited Door Reversal: If the doors are closing and an infra-red beam is interrupted, the doors will reverse and reopen partially. After the obstruction is cleared, the doors will begin to close.

B. Electronic Passenger Sensing Device with Nudging: Provide at each entrance a solid state electronic detector and an electro-mechanical reversal edge as follows:

1. After a stop is made, doors shall remain open for an adjustable time interval. Closing may be initiated instantaneously by registration of a car call, operation of load weighing device or signal from the service demand integrator.

2. Doors will remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door movement is obstructed for a predetermined time, a buzzer will sound and doors will close at a reduced speed. If the reversal edge contacts a person or object while closing, doors will immediately stop and resume closing after the obstruction has been removed.

3. Arrange circuitry to inactivate the electronic detector should it fail to operate. However, the electro-mechanical reversing edge will not be deactivated by failure of the electronic detector or its removal from the circuitry by means of a manual switch.

4. Electronic Passenger Sensing Device (Light Ray Device)
   a. Provide infra-red light ray device in elevator car entrance. Provide complete, operational system.
      1) Light Curtain: Minimum 40 beam, evenly spaced from floor to 6'-0" above floor.
      2) Control Module: Top of car mounting.
      3) Transmitter: Mounted in housing on left or right door jamb.
      4) Receiver: Mounted in housing on door jamb opposite transmitter.
      5) Housing: Gage as recommended by manufacturer.
      6) Electrical: 110 VAC 6VA.

5. Ensure that "nudging mode" is either turned off or set to the longest delay setting available.

2.07 CAR OPERATING STATION

A. Vandal Resistant Car Operating Panel: Flush mounted stainless steel panels, containing call button for each landing served, and containing other buttons, switches and controls required for specified car operation and control. These include, but are not limited to, emergency lighting and alarm bell, key operated stop switch, key operated lights and key operated single-speed fan switch, key operated car top inspection switch, key operated independent service key switch, and all necessary safety functions.

2. Provide operating device symbols as required by code. Mark other buttons
and switches with manufacturer’s standard identification, including Braille next to buttons, for required use or function.

3. Mount controls at height complying with ANSI A117.1 requirements for handicapped.

4. Provide illuminated buttons, which light up when activated and remain illuminated until call or other function has been fulfilled. Provide non-illuminated buttons with brushed stainless steel finish.

5. Fire Service Instructions for Phase II are to be permanently engraved in the car operating panel.

6. Provide a GFIC duplex outlet at the bottom of the car operating panel.

7. Position Indicator: An electronic dot matrix position indicator mounted in a module matching the control panel. As the car travels, its position in the hoistway shall be indicated by the illumination of the alpha/numeric character corresponding to the landing which the elevator is stopped or passing.

8. Emergency Light: An emergency light and capacity plate shall be integrated into a module. Emergency light shall illuminate automatically upon loss of the building’s normal power supply.

B. In-Car Travel Direction Lanterns: Mounted in car entrance jamb visible from corridor. Illuminates to indicate direction of car travel. Provide with chime which sounds once for “UP” direction and twice for “DOWN” direction as doors are opening.

2.08 CAR OPERATION SYSTEM

A. Simplex Collective Operation: Using a microprocessor-based controller, operation shall be automatic by means of the car and hall buttons. If all calls in the system have been answered, the car shall park at the last landing served.

B. Emergency Power: In the event of a normal power supply failure, the elevator system shall be arranged to lower from an emergency power supply. The elevator contractor shall provide circuitry so after normal power failure and establishment of emergency power, each elevator shall be operable.

2.09 HALL STATIONS

A. Hall Stations, General: Illuminated buttons indicating a call has been registered at that floor for the indicated direction. Faceplates shall be No. 4 satin finish stainless steel.

1. Each terminal station shall contain one illuminating pushbutton.

2. Each intermediate station shall consist of two illuminating pushbuttons, one for the up direction and one for the down position.

3. Phase 1 firefighters service keyswitch, with instructions, shall be permanently engraved into the hall station at the designated level.

B. Floor Identification Pads: Provide metal door jamb pads at each floor. Jamb pads shall comply with Americans with Disabilities Act (ADA) requirements.
PART 3  EXECUTION

3.01  PREPARATION

A. Take field dimensions and examine conditions of substrates, supports, and other conditions under which this work is to be performed.

1. Do not proceed with work until unsatisfactory conditions are corrected.

3.02  INSTALLATION

A. Install elevators as specified in accordance with all governing codes, manufacturer's written direction and ASME A17.1.

B. Lubricate all equipment in accordance with manufacturer's written instructions.

3.03  CLEAN-UP

A. Remove all unused materials and leave cab and all related areas clean.

3.04  DEMONSTRATION

A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.

B. Make a final check of each elevator operation, with Owners personnel present, immediately before date of substantial completion. Determine that control systems and operating devices are functioning properly.

END OF SECTION