SECTION 00 92 11
ADDENDUM NUMBER 2

PARTICULARS

DATE: APRIL 14, 2022

PROJECT: BSD KALAPUYA ALTERNATE HIGH SCHOOL CLASSROOM BUILDING ADDITION

OWNER'S PROJECT NUMBER: 21036

OWNER: LAKE OSWEGO SCHOOL DISTRICT

ARCHITECT: SODERSTROM ARCHITECTS

TO: PROSPECTIVE BIDDERS:

THIS ADDENDUM FORMS A PART OF THE CONTRACT DOCUMENTS AND MODIFIES THE ORIGINAL PROCUREMENT DOCUMENTS DATED MARCH 25, 2022, WITH AMENDMENTS AND ADDITIONS NOTED BELOW.

ACKNOWLEDGE RECEIPT OF THIS ADDENDUM IN THE SPACE PROVIDED IN THE BID FORM. FAILURE TO DO SO MAY DISQUALIFY THE BIDDER.

QUESTIONS:

Q. We have been informed by our surety, Liberty Mutual, that they cannot provide bond coverage for any extended Installer's Workmanship Warranties which exceed two years. On the Kalapuya High School-Classroom Building Addition project, there are eight warranties that exceed two-years and could be interpreted as Installer's Workmanship Warranties:

Per the specification language:

03 30 00 1.08.B. Moisture Vapor Reducing Admixture Life of Concrete ***(warranty item deleted from specification, see modified specification)***

07 19 00 1.09.B. Water Repellents 5 year ***(see modified specification)***

07 42 00 1.10.B Phenolic Wall Panels 5 year ***(see modified specification)***

07 42 13 1.07.B. Metal Wall Panels 20 year ***(see modified specification)***

07 42 13 1.07.D. Metal Wall Panels 10 year ***(see modified specification)***

07 72 00 1.06.B. Roof Accessories 5 year ***(see modified specification)***

07 92 00 1.06.B. Sealant 5 year *(see modified specification)*

08 43 13 1.10.B. Storefronts 5 year ***(see modified specification)***

A. See notes above in bold italic and modified specification sections to address Manufacturer's and Installer's Workmanship Warranties.

Q. Exposed interior wood deck is noted as stain finish. Is there a specification for this stain? Are exposed beams to be treated similar?

A. Specification provided with this addendum. Yes, exposed interior wood deck and beams to be stained. Exterior exposed wood deck, beams and wood soffits to be stained.

CHANGES TO THE PROJECT MANUAL - SPECIFICATIONS:

SECTION 00 01 10 - TABLE OF CONTENTS

ADD new section 00 92 11 - ADDENDUM NUMBER 2

ADD new section 09 93 00 - STAINING AND TRANSPARENT FINISHING

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

REMOVE Paragraph 1.08 Warranty; B, Slabs with MVRA warranty requirement.

REMOVE Paragraph 2.05 Admixtures; A, 10, MVRA product information.

PROVIDING revised specification in its entirety.

SECTION 00 52 01 - AIA A101 - 2017 AGREEMENT BETWEEN OWNER AND CONTRACTOR

REVISE Parapgraph 5.1.7 Retainage; item 5.1.7.1 as follows: ~~Fifteen precent (15%)~~***Five (5%)*** of each payment.

Fianl contract form will reflect the 5% retainage.

SECTION 07 19 00 - WATER REPELLANTS

REMOVE Paragraph 1.09 Warranty; item B.

ADD Paragraph 1.09 Warranty; item C to read as follows: ***"Provide contractor's warranty for (2) two year period after Date of Substantial Completion."***

ADD Paragraph 1.09 Warranty; item D to read as follows: ***"Provide manufacturer's standard warranty for product to be free from defect."***

PROVIDING revised specification in its entirety.

SECTION 07 42 00 - PHENOLIC PANELS

REMOVE Paragraph 1.10 Warranty; item B.

ADD Paragraph 1.10 Warranty; item C to read as follows: ***"Provide contractor's warranty for (2) two year period after Date of Substantial Completion."***

PROVIDING revised specification in its entirety.

SECTION 07 42 13 - METAL WALL PANELS

REMOVE Paragraph 1.07 Warranty; item B.

ADD paragraph 1.07 Warranty; item C to read as follows: ***"Manufacturer's Warranty: Provide standard 25-year performance warranty after Date of Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather."***

REVISE Paragraph 1.07; item D to read as follows: "~~Special~~ ***Contractor's*** Warranty: Provide 2-year warranty covering water tightness and integrity of seals of metal wall panels. Complete forms in Owner's name and register with warrantor.

REMOVE Paragraph 1.07 Warranty; item E.

PROVIDING revised specificaiton in its entirety.

SECTION 07 72 00 - ROO ACCESSORIES

REMOVE Paragraph 1.06 Warranty; item B.

ADD paragraph 1.06 Warranty; item C to read as follows: ***"Manufacturer's Warranty: Provide manufacturer's standard warranty from date of purchase. Materials shall be free of defects in material and workmanship. Should a part fail to function in normal use withing this period, manufacturer shall furnish a new part at no charge."***

ADD Paragraph 1.06 Warranty; item D to read as follows: ***"Provide contractor's warranty for (2) two year period after Date of Substantial Completion."***

PROVIDING revised specification in its entirety.

SECTION 07 92 00 - JOINT SEALANT

REMOVE Paragraph 1.06 Warranty; item B.

REVISE paragraph 1.06 Warranty; item C to read as follows: "***Manufacturer's*** Warranty: ***Provide manufacturer's standard warranty to correct defective work within a (5) five year period after Date of Substantial Completion.*** Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.'

ADD Paragraph 1.06 Warranty; item D to read as follows: ***"Provide contractor's warranty for (2) two year period after Date of Substantial Completion."***

PROVIDING revised specification in its entirety.

SECTION 08 43 13 - ALUMINUM FRAMED STOREFRONTS

REVISED Paragraph 1.06 Warranty; item B to read as follows: ***Manufacturer's Warranty: Provide manufacturer's standard warranty to*** correct defective Work within a five year period after Date of Substantial Completion.

ADD Paragraph 1.06 Warranty; item D to read as follows: ***"Provide contractor's warranty for (2) two year period after Date of Substantial Completion."***

PROVIDING revised specification in its entirety.

SECTION 09 93 00 - STAINING AND TRANSPARENT FINISHING

ADD new section 09 93 00 - STAINING AND TRANSPARENT FINISHING in its entirety

CHANGES TO DRAWINGS:

NONE

SUBSTITUTION REQUEST

APPROVAL OF ADDITIONAL PRODUCTS/SYSTEMS:

ALL CONTRACT DOCUMENT SPECIFICATION REQUIREMENT APPLY IN TOTAL TO ALL ADDITIONAL MANUFACTURERS AND PRODUCTS LISTED BELOW.

A. 07 21 00 - THERMAL INSULATION; Paragraph 2.01. 1-9.
   1. R-Tech VXI, 40PSI - APPROVED.

B. 07 41 13 METAL ROOF PANELS; Paragraph 2.01.
   1. MS-200 22ga by Taylor Metal - APPROVED
   2. VM2.0 22 ga Mechanical Seam Panels by Vantage Metal Works - APPROVED

C. 07 42 13 METAL WALL PANELS; Paragraph 2.01.
   1. Smoothwall (R-2) 12" 22ga. by Taylor Metal - APPROVED

END OF SECTION

SECTION 00 01 10
TABLE OF CONTENTS

B. 21 05 00 - Fire Protection Basic Materials and Methods
C. 21 13 00 - Fire Suppression Sprinklers

2.13 DIVISION 22 -- PLUMBING

A. 22 00 00 - Basic Plumbing Requirements
B. 22 05 13 - Common Motor Requirements for Plumbing Equipment
C. 22 05 19 - Meters and Gauges for Plumbing Piping
D. 22 05 29 - Hangers and Supports for Plumbing Piping and Equipment
E. 22 05 49 - Plumbing Seismic Restraint
F. 22 05 53 - Identification for Plumbing Piping and Equipment
G. 22 07 19 - Plumbing Piping Insulation
H. 22 08 00 - Commissioning of Plumbing
I. 22 10 05 - Plumbing Piping
J. 22 10 06 - Plumbing Piping Specialties
K. 22 30 00 - Plumbing Equipment
L. 22 40 00 - Plumbing Fixtures

2.14 DIVISION 23 -- HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

A. 23 00 00 - Basic HVAC Requirements
B. 23 05 13 - Common Motor Requirements for HVAC Equipment
C. 23 05 19 - Meters and Gauges for HVAC Piping
D. 23 05 48 - Vibration Isolation and Sound and Seismic Controls for HVAC Piping and Equipment
E. 23 05 49 - HVAC Seismic Restraint
F. 23 05 53 - Identification for HVAC Piping and Equipment
G. 23 05 93 - Testing, Adjusting, and Balancing for HVAC
H. 23 07 13 - Duct Insulation
I. 23 07 19 - HVAC Piping Insulation
J. 23 08 00 - Commissioning of HVAC
K. 23 09 13 - Instrumentation and Control Devices for HVAC
L. 23 09 23 - Direct-Digital Control System for HVAC
M. 23 09 93 - Sequence of Operations for HVAC Controls
N. 23 10 05 - Fuel Piping
O. 23 23 00 - Refrigerant Piping System
P. 23 31 00 - HVAC Ducts and Casings
Q. 23 33 00 - Air Duct Accessories
R. 23 34 23 - HVAC Power Ventilators
S. 23 37 00 - Air Outlets and Inlets
T. 23 54 00 - Furnaces
U. 23 72 23 - Packaged Air-to-Air Energy Recovery Units
V. 23 82 16 - Air Coils

2.15 DIVISION 26 -- ELECTRICAL

A. 26 00 00 - Basic Electrical Materials and Methods
B. 26 05 01 - Minor Electrical Demolition

C. 26 05 19 - Low-Voltage Electrical Power Conductors and Cables
D. 26 05 26 - Grounding and Bonding for Electrical Systems
E. 26 05 29 - Hangers and Supports for Electrical Systems
F. 26 05 34 - Conduit
G. 26 05 35 - Surface Raceways
H. 26 05 37 - Boxes
I. 26 05 53 - Electrical Identification
J. 26 08 00 - Electrical Commissioning Requirements
K. 26 09 18 - Lighting Control System
L. 26 24 13 - Switchboards
M. 26 24 16 - Panelboards
N. 26 27 26 - Wiring Devices
O. 26 28 13 - Fuses
P. 26 28 17 - Enclosed Circuit Breakers
Q. 26 28 18 - Enclosed Switches
R. 26 33 05 - Lighting Emergency Power Supply
S. 26 51 00 - Lighting

2.16 DIVISION 27 -- COMMUNICATIONS

A. 27 05 28 - Pathways for Communications Systems
B. 27 13 43 - Structured Cabling for Voice and Data

2.17 DIVISION 28 -- ELECTRONIC SAFETY AND SECURITY

A. 28 31 00 - Fire Alarm System

2.18 DIVISION 31 -- EARTHWORK

A. 31 10 00 - Site Clearing
B. 31 20 00 - Earth Moving

2.19 DIVISION 32 -- EXTERIOR IMPROVEMENTS

A. 32 01 90 - Planting
B. 32 12 16 - Asphalt Paving
C. 32 13 13 - Concrete Paving
D. 32 17 23 - Pavement Markings
E. 32 31 16 - Welded Wire Fences and Gates
F. 32 84 23 - Irrigation
G. 32 92 00 - Seeding

2.20 DIVISION 33 -- UTILITIES

A. 33 10 00 - Site Water Utility
B. 33 30 00 - Site Sanitary Sewers
C. 33 42 00 - Stormwater Conveyance

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete formwork and form accessories.
B. Slabs on grade.
C. Underslab waterproofing and vapor retarder.
D. Foundation walls, and footings.
E. Concrete reinforcement.
F. Joint devices associated with concrete work.
G. Mixture Design.
H. Placement procedures.
I. Miscellaneous concrete elements, including equipment pads, and light pole bases.
J. Concrete curing.

1.02 RELATED SECTIONS

A. Section 03 35 43 - Poilshed Concrete Finishing: Polished concrete floors.
B. Section 31 20 00 - Earth Moving: Drainage fill under slabs-on-grade.
C. Section 32 13 00 - Rigid Pavement: Sidewalks, pavement, curbs and gutters.

1.03 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Sustainable Design Submittals:
   1. For liquid floor treatments and sealing compounds, submit documentation including printed statement of VOC content.
C. Design Mixtures: For each concrete mixture, a minimum of 15 days prior to the start of Work. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
   1. Identify all materials and admixtures and the proportion of each.
   2. Identify all materials and admixtures and the proportion of each; indicate mix design for use at areas of Polished Concrete work per Section 03 35 43.
   3. Water-cement ratio, slump, and aggregate grading.
   4. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
   5. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing. Include substantiating substantial test data to show compliance with ACI 318 Chapter 5.
   6. Indicate materials sources for principal constituents.
   7. For exact mix, including all constituents, for use at areas of Polished Concrete work per Section 03 35 43, provide test data demonstrating compliance with shrinkage or initial crack limitation requirements of Section 2.10.
   8. Indicate whether mix is appropriate for pumping.
   9. Indicate amounts of mixing water to be withheld for later addition at Project site.
D. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop

spacing, and supports for concrete reinforcement. The steel reinforcement detailers shall generate all shop drawing bending and installation details from the structural and architectural drawings and specifications. The use of reproductions or photocopies of the contract drawings shall not be permitted.

1. Provide details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement."
2. Shop drawing re-submittals shall clearly identify all revisions to previous submittals.
   a. Heavy ink clouded outlines (revision clouds) shall be drawn around revised areas of individual sheets.
   b. Architect/Engineer will not review information outside of revision clouds on resubmitted drawings.

E. Construction and Contraction Joint Layout: Submit plan showing joint layout.
1. Location of construction joints is subject to approval of the Architect.

F. Material Certificates: For each of the following, signed by manufacturers:
1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Evaporation retarder.
6. Floor and slab treatments.
7. Bonding agents.
8. Adhesives.
9. Vapor barriers.
10. Semi-rigid joint filler.
11. Joint-filler strips.
12. Repair materials.

G. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.

H. Minutes of pre-installation conference.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM 94/C94M requirements for production facilities and equipment.
1. Manufacturer certified according to NRMCA’s “Certification of Ready Mixed Concrete Production Facilities.

C. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

D. Welding: Qualify procedures and personnel according to AWS D1.4, Structural Welding Code--Reinforcing Steel.

E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
1. ACI 301, Specification for Structural Concrete, Sections 1 through 5.
2. ACI 117, Specifications for Tolerances for Concrete Construction and Materials.
3. ACI 347.3R-13, Guide to Formed Concrete Surfaces.

CSC1	CONCRETE SURFACES IN AREAS WITH LOW VISIBILITY OR OF LIMITED IMPORTANCE WITH REGARD TO FORMED CONCRETE SURFACE REQUIREMENTS, USED OR COVERED WITH SUBSEQUENT FINISH MATERIALS. NO MOCKUP.	T1	SVR1	CU1	SI1	CJ1	FC1
CSC2	CONCRETE SURFACES WHERE VISUAL APPEARANCE IS OF MODERATE IMPORTANCE. MOCKUP OPTIONAL.	T2	SVR2	CU1	SI2	CJ2	FC1
CSC3	CONCRETE SURFACES THAT ARE IN PUBLIC VIEW OR WHERE APPEARANCE IS IMPORTANT, SUCH AS EXTERIOR OR INTERIOR EXPOSED BUILDING ELEMENTS. MOCKUP REQUIRED.	T3	SVR3	CU2	SI3	CJ3	FC2
CSC4	CONCRETE SURFACES WHERE THE EXPOSED CONCRETE IS PROMINENT FEATURE OF THE COMPLETED STRUCTURE OR VISUAL APPEARANCE IS IMPORTANT. MOCKUP REQUIRED.	T4	SVR4	CU2	SI4	CJ4	FC3

F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1. Coordinate with the Concrete Polishing conference identified in Section 03 35 43 - Poilshed Concrete Finishing.

G. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1.
   1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
      a. Contractor’s superintendent.
      b. Independent testing agency responsible for concrete design mixes.
      c. Ready mix concrete manufacturer.
      d. Concrete subcontractor.
      e. Applicator of Polished Concrete finish per Section 03 3511.
   2. Review special inspection and testing and inspecting agency procedures for field quality control; concrete finishes and finishing; cold- and hot-weather concreting procedures; curing procedures; construction contraction and isolation joints, and joint-filler strips; semi-rigid joint fillers; forms and form removal limitations; vapor-retarder installation; anchor rod and anchorage device installation tolerances; steel reinforcement installation; floor and slab flatness and levelness measurement.
   3. Review special inspection and testing and inspecting agency procedures for field quality control; concrete finishes and finishing; cold- and hot-weather concreting procedures;

curing procedures; construction contraction and isolation joints, and joint-filler strips; semi-rigid joint fillers; forms and form removal limitations; vapor-retarder installation; anchor rod and anchorage device installation tolerances; steel reinforcement installation; floor and slab flatness and levelness measurement; coordination with Section 03 35 43 for work of this Section to receive Polished Concrete finish; concrete repair procedures; and, concrete protection.

1.06 MOCK-UP

A. Construct and erect mock-up panel for architectural concrete surfaces indicated to receive special treatment or finish. Consult with Architect on location.
   1. Requirements associated with mock-ups of work to receive Polished Concrete finish are indicated in Section 03 35 43.
   2. Mock-up may not remain as part of the Work.
   3. Mock-up may not remain as part of the Work, except as noted in Section 03 35 43.

1.07 DELIVERY, STORAGE, AND HANDLING

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

1.08 WARRANTY

A. See Division 01 Section “Closeout Submittals” for additional warranty requirements.

B. ~~Slabs with Moisture Vapor Reducing Admixture (MVRA): Provide warranty to cover the cost of flooring failures due to moisture migration from slabs for life of the concrete.~~
   1. ~~Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.~~
   2. ~~Provide warranty by manufacturer of MVRA matching terms of flooring adhesive or primer manufacturer’s material defect warranty.~~

1.09 SYSTEM DESCRIPTION

A. Redesign or Departures from Requirements of the Contract Documents Initiated by Contractor:
   1. Obtain written acceptance from the Architect and Architect’s consultants.
   2. Bear costs for Contractor-initiated or construction error due to changes in type, form, system, or details of construction from those indicated by the contract documents.
   3. Costs of review of such changes by Architect and Architect’s consultants will be deducted from the Contract Sum by Change Order.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
   2. Products: Subject to compliance with requirements, provide one of the products specified.
   3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to manufacturers specified.
   4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.02 FORM-FACING MATERIALS

A. 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. Medium-density overlay, Class 1, or better, mill-release agent treated and edge sealed.
      b. Structural 1, B-B, or better, mill oiled and edge sealed.

c. B-B (Concrete Form), Class 1 or better, mill oiled and edge sealed.

B. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.

C. 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.
1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

D. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes not larger than 1 inch (25 mm) in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive damp-proofing or waterproofing.

2.03 REINFORCEMENT

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

B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 90 percent.

C. Reinforcing Steel: As indicated on the Drawings within the General Structural Notes.
1. Type: Deformed billet-steel bars.
2. Finish: Unfinished, unless otherwise indicated.

D. Low-Alloy-Steel Reinforcing Bars: As indicated on the Drawings within the General Structural Notes.

E. Reinforcement Accessories:
1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.
2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
3. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

2.04 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M Type I, II, or I/II - Normal Portland type.

B. Fine and Coarse Aggregates: ASTM C 33.
1. Acquire all aggregates for entire project from same source.
2. Maximum Coarse-Aggregate Size: 1 inch (25mm).
3. Combined Aggregate Gradation: Well graded from coarsest to finest with not more than 18 percent and not less than 8 percent retained on an individual sieve, except that less than 8 percent may be retained on coarsest sieve and on No. 50 (0.3-mm) sieve, and less than 8 percent may be retained on sieves finer than No. 50 (0.3 mm).

C. Fly Ash: ASTM C618, Class C or F.

D. Calcined Pozzolan: ASTM C618, Class N.

E. Silica Fume: ASTM C1240, amorphous silica, proportioned in accordance with ACI 211.1.

F. Water: Clean and not detrimental to concrete.

G. Color Additives: Mix in accordance with manufacturer's instructions. Mix until color additives are uniformly dispersed throughout mixture and disintegrating bags, if used, have disintegrated.
1. Manufacturer:
a. Davis Colors; www.daviscolors.com.- Basis of Design
b. Substitutions: See Section 01 6000 - Product Requirements
2. Type:

a. Concentrated pigments specially processed for mixing into concrete and complying with ASTM C979.
b. Color additives containing carbon black are not acceptable.

3. Color Additive Delivery:
   a. Automated Dispensing: Meter and dispense colors using computer-controlled automated color weighing and dispensing system. Use Davis Colors Chameleon liquid metering system and Hydrotint liquid color additives.
   b. Manual Dispensing: Use Davis Colors Mix-Ready powdered color additives in pre-measured disintegrating bags.
4. Concrete Colors:
   a. PC-1: Silversmoke 8084.

2.05 ADMIXTURES

A. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures that will not contribute water-soluble chloride ions in excess of 0.1 percent by weight of cement. Do not use calcium chloride or admixtures containing calcium chloride.
   1. Air Entrainment Admixture: ASTM C260/C260M
   2. Water Reducing Admixture: ASTM C494/C494M, Type A.
   3. Retarding Admixture: ASTM C494/C494M, Type B.
   4. Water Reducing and Retarding Admixture: ASTM C494/C494M, Type D.
   5. High Range Water Reducing Admixture: ASTM C494/C494M, Type F.
   6. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M, Type G.
   7. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.
   8. Shrinkage Reducing Admixture: ASTM C494/C494M, Type S.
   9. Crack Reducing Admixture: ASTM C494/C494M, Type S.
   10. ~~Moisture Vapor Reduction Admixture (MVRA): Liquid, inorganic admixture free of volatile organic compounds (VOCs) and formulated to close capillary systems formed during curing to reduce moisture vapor emission and transmission, with no adverse effect on concrete properties.~~
       a. ~~Provide admixture in slabs to receive adhesively applied flooring.~~
       b. ~~Products:~~
          1) ~~Barrier One, Inc; Barrier One Moisture Vapor Reduction Admixture.~~
          2) ~~Hycrete, Inc; V1000.~~
          3) ~~Substitutions: See Division 01 Section "Product Requirements".~~

2.06 ACCESSORY MATERIALS

A. Underslab Vapor Retarder: Sheet material complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.
   1. Installation: Comply with ASTM E1643.
   2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
   3. Manufacturers:
      a. Inteplast Group; Barrier-Bac VB-350.
      b. ISI Building Products; Viper VaporCheck II 15-mil (Class A).
      c. W. R. Meadows, Inc; PERMINATOR Class A - 15 mils.
      d. Substitutions: See Section 01 6000 - Product Requirements.

B. Concrete Surface Protection: one time spray-applied, penetrating, colloidal silica concrete treatments and substrate protection, applied after finishing that penetrates, providing permanent waterproofing and protection.
   1. Products: Spray-Lock Concrete Protection SCP 327.
      a. No substitutions on this product.
      b. Install to manufacturers written instructions for site conditions.
      c. Provide manufactures warranty.

d. Install at all interior slab locations that receive finish floor coverings. Not on polished concrete.

2.07 BONDING AND JOINTING PRODUCTS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber ASTM D1752, cork or self-expanding cork.

B. Semi-rigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D2240.

C. Bonding Agent: ASTM C1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy-Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class, suitable for application temperature and grade to suit requirements, and as follows:
1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.08 CURING MATERIALS

A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss; intended for application immediately after concrete placement.
1. Products:
a. Dayton Superior Corporation; AquaFilm Concentrate J74: www.daytonsuperior.com.
b. Kaufman Products Inc.; VaporAid: www.kaufmanproducts.net.
c. Sika Corporations, Inc; SikaFilm:
d. SpecChem, LLC; SpecFilm Concentrate or SpecFilm RTU: www.specchemllc.com.
e. W.R. Meadows, Inc; Evapre or Evapre-RTU: www.wrmeadows.com.
f. Vexcon Chemicals, Inc; Certi-Vex Envio Assist: www.vexcon.com.
g. Substitutions: See Section 01 6000 - PRODUCT REQUIREMENTS.
2. Absorptive Cover: AASHTO M182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
3. Moisture-Retaining Sheet: ASTM C171.
a. Curing paper, regular or white.
b. Polyethylene film, white opaque, minimum nominal thickness of 0.0040 inch.
c. White-burlap-polyethylene sheet, weighing not less than 10 ounces per linear yard, 40 inches wide.
4. Water: Potable, not detrimental to concrete.

2.09 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.
1. Cement Binder: ASTM C150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C109/C109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6.4 mm) and that can be feathered at edges to match adjacent floor elevations.
1. Cement Binder: ASTM C150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C219.

2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi (34.5MPa) at 28 days when tested according to ASTM C109/C109M.

2.10 CONCRETE MIXTURES

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301 and in accordance with the following:
   1. Proportion constituents in accordance with ACI 211.1 recommendations and as recommended by admixture manufacturers.
   2. Compressive Strength: Refer to Drawings within General Structural Notes.
   3. Maximum Water-Cementitious Materials Ratio: Refer to Drawings within General Structural Notes, except as noted below for Work to receive Polished Concrete finish per Section 03 3511.
   4. Air Content: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having the air content specified in the General Structural Notes.
   5. Slabs-on-grade to receive Polished Concrete finish Work of Section 03 3511: Use only one mix design. Inclusion of admixtures, plasticizers, slab, fly ash, or other products replacing portions of the Portland cement in this mix shall comply with the limitations recommended by the Concrete Polishing Council (CPC), a specialty council of the American Society of Concrete Contractors. Concrete used in this application shall exhibit a maximum shrinkage of 0.035% at 28 days when tested in accordance with ASTM C157. Alternatively, in lieu of the maximum shrinkage limitation, concrete used in this application shall exhibit a maximum initial crack width of 0.010 inch when tested in accordance with ASTM C1581. Shrinkage and/or initial crack width testing shall be completed by a qualified laboratory.

B. Cementitious Materials: Unless otherwise indicated, limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:
   1. Fly Ash: 20 percent.
   2. Combined Fly Ash and Pozzolan: 20 percent.
   3. Ground Granulated Blast-Furnace Slag: 50 percent.
   4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 20 percent.
   5. Silica Fume: 10 percent.
   6. Combined Fly Ash, Pozzolans, and Silica Fume: 30 percent with fly ash or pozzolans not exceeding 20 percent and silica fume not exceeding 10 percent.
   7. Combined Fly Ash or Pozzolans, Ground Granulated Blast-Furnace Slag, and Silica Fume: 50 percent portland cement minimum, with fly ash or pozzolans not exceeding 20 percent and silica fume not exceeding 10 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.
   1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizers) in concrete, as required, for placement and workability.
   2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
   3. Use shrinkage reducing admixture for floors indicated to receive polished concrete finish.

2.11 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C94/C94M and ASTM C1116/C1116M,, and furnish batch ticket information

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 FORMWORK

A. Design, erect, brace, and maintain formwork, according to ACI 301, to support lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 and ACI 347R.3-13.

	FC1	FC2	FC3
Holes, greater than 3/16 in.	Plug or disk covers are acceptable	Acceptable if patched, sanded, or sealed or ground to match adjacent form surface	Visible filling is unacceptable
Holes, 3/16 in. or less	Acceptable	Acceptable without patching, provided form surface is not damaged or torn around hole(s)	Acceptable if patched, sanded, or and sealed or grounded to match adjacent surface
Vibrator burns	Acceptable	Unacceptable	Unacceptable
Scratches/dents	Acceptable	Acceptable if patched, sanded, or and sealed or ground to match adjacent form surface	Unacceptable unless otherwise approved
Concrete remnants	Acceptable	Unacceptable	Unacceptable
Cement residue	Acceptable	Acceptable	Should not affect finished concrete surface
Swelling of facing at fastener or tie holes	Acceptable	Unacceptable	Unacceptable
Patching	Acceptable	Acceptable	Should not affect finished concrete surface

C. Limit concrete surface irregularities based on selected formed concrete surface categories, in accordance with ACI 117 and ACI 347R.3-13.
   1. Surface Irregularities:
      a. SI4 (Class A), 1/8 inch (3 mm) for smooth-formed finished surfaces.
      b. SI2 (Class C), 1/2 inch (13 mm) for rough-formed finished surfaces.

D. Align joints and make watertight. Keep form joints to a minimum.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
   1. Install keyways, reglets, recesses, and the like, for easy removal.
   2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.
   1. Chamfer Size: As indicated on Drawings. When size is not identified, request clarification from Architect prior to constructing formwork and placing concrete.

I. Form openings, chases, offsets, linkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Application of Form Release Agent:
   1. Apply form release agent on formwork in accordance with manufacturer's recommendations.
   2. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items
   3. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.02 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.03 REMOVING AND REUSING FORMS

A. General: Formwork, for sides of walls and similar parts of the Work, that does not support weight of concrete may be removed after cumulatively curing at not less than 50F (10C) for 24 hours after placing concrete if concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.04 UNDERSLAB VAPOR RETARDERS

A. Installation: Place, protect, and repair vapor retarders according to ASTM E1643 and manufacturer's written instructions..
   1. Lap joints 6 inches (150 mm) and seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
   2. Vapor Retarder Over Granular Fill: Install compactible granular fill before placing vapor retarder as shown on the drawings. Do not use sand.

3.05 STEEL REINFORCEMENT

A. General: Comply with CRSI's Manual of Standard Practice for placing reinforcement.
   1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
   1. Weld reinforcing bars according to AWS D1.4, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.06 JOINTS

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

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
   1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated.
   2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
   3. Anchor joint fillers and devices to prevent movement during concrete placement.
   4. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
   5. Use a bonding agent or roughen interface to 1/4 inch (6 mm) amplitude at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Tool or saw weakened-plane contraction joints, sectioning concrete into areas.
   1. Locate contraction joints as indicated on the Drawings, but no more than 15 feet maximum spacing. Confirm final layout of joints with Architect prior to installation of the slab.
   2. Sawed Joints: Within 4 to 12 hours after concrete placement, form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades with a triangular arbor configuration. Cut joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column blockouts, foundation walls, and other locations, as indicated.
   1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
   2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.07 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement, unless approved by Architect.
   1. Do not add water to concrete after adding high-range water-reducing admixtures to mix.

C. Adjust mix as required to maintain specified air content at the point of discharge.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
   1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
   2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
   3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete

that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
   1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
   2. Maintain reinforcement in position on chairs during concrete placement.
   3. Screed slab surfaces with a straightedge and strike off to correct elevations.
   4. Slope surfaces uniformly to drains where required.
   5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

F. Cold-Weather Placement: Comply with ACI 306R and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
   2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mixture designs.

G. Hot-Weather Placement: Comply with ACI 301 and as follows:
   1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
   2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.08 FINISHING FORMED SURFACES

A. As-Cast Finishes: Coordinate finishes of all as-cast concrete finishes with construction of formwork in accordance with ACI 117 and ACI 347R.3-13. Produce as-cast form finishes in accordance with the following requirements:
   1. Rough-Formed Finish, CSC2: Repair and patch tie holes and defects. Chip or rub off fins exceeding 1/2 inch in height. Leave surfaces with texture imparted by the forms.
      a. Apply to concrete surfaces not exposed to public view.
   2. Smooth-Formed Finish, CSC3: Form-facing materials arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins exceeding 1/8 inch in height. Leave surfaces with the texture imparted by the forms.
      a. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete.

B. Unspecified Finishes: When a specific finish is not specified in the Contract Documents for a concrete surface, apply the following finishes:
   1. Rough-formed finish, CSC2, on concrete surfaces not exposed to public view.
   2. Smooth-formed finish, CSC3, on concrete surfaces exposed to public view.
   3. 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 FLOORS AND SLABS

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

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of ¼ inch (6mm) in one direction.
   1. Apply scratch finish to surfaces indicated and to surfaces to receive concrete floor topping or mortar setting beds for bonded cementitious floor finishes.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Re-straighten, cut down high spots, and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.
   1. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to be covered with fluid-applied or sheet waterproofing.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and re-straighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
   1. Apply a 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.
   2. Finish surfaces to the following tolerances, according to ASTM E1155/E1155M for a randomly trafficked floor surface:
      a. Specified overall values of flatness, F(F) 35; and levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and levelness, F(L) 17; for slabs-on-grade.

E. Trowel and Fine-Broom Finish: Apply a first trowel finish, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
   1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
   1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

G. Polished Finish: See Section 03 3511 - Concrete Floor Finishes
   1. Finish surfaces to the following tolerances, according to ASTM E1155/E1155M:
      a. Specified overall values of flatness, F(F) 50; and levelness, F(L) 30; with minimum local values of flatness, F(F) 35; and levelness, F(L) 20; for slabs-on-grade to receive Polished Concrete finish.

3.10 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases: As indicated on the Drawings.
   1. Refer to Mechanical drawings for locations.
   2. Pad size to extend 6 inches (150mm) beyond edge of equipment on all sides.
   3. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.11 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306R for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308R by one or a combination of the following methods:
   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.

3.12 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
   1. Defer joint filling until concrete has aged at least six months. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semi-rigid epoxy joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.13 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas only when and as specifically approved by the Architect in writing. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18 mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
   1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension in solid concrete but not less than 1 inch (25 mm) in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
   2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than

surrounding surface.

3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas only when and as specifically approved by the Architect in writing. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, pop-outs, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch (19 mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.14 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Inspections: As indicated in the As indicated in the Special Inspection Requirements sheet of the Structural Drawings .

D. Concrete Tests: As indicated in the Special Inspection Requirements sheet of the Structural Drawings.

E. Moisture Testing: Cooperate with manufacturer of specified moisture vapor reduction admixture (MVRA) to allow access for sampling and testing concrete for compliance with warranty requirements.

F. Floor flatness and levelness shall be tested within 48 hours after completion of the final toweling operation according to ASTM E1155/E1155M by an independent testing agency experienced with the testing procedure and possessing the necessary equipment.

1. Out of tolerance work shall be corrected.

END OF SECTION

SECTION 07 19 00
WATER REPELLENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Water repellents applied to exterior, unit masonry and concrete surfaces.

B. Pressure washing.

1.02 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 04 20 00 - Unit Masonry.

1.03 REFERENCE STANDARDS

A. ASTM C140/C140M - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units 2017a.

B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings 2005 (Reapproved 2013).

C. ASTM D5095 - Standard Test Method for Determination of the Nonvolatile Content in Silanes, Siloxanes, and Silane-Siloxane Blends Used in Masonry Water Repellent Treatments 1991 (Reapproved 2013).

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a meeting at least one week prior to starting work; require attendance of affected installers; invite Architect and Owner.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide product description, details of tests performed, limitations, and chemical composition.

C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention; cautionary procedures required during application.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience

1.07 MOCK-UP

A. Prepare representative surface 36 by 36 inches (0.91 by 0.91 m) in size using specified materials and preparation and application methods on surfaces identical to those to be coated; approved mock-up constitutes standard for workmanship.

B. Mock-up may remain as part of the Work.

1.08 FIELD CONDITIONS

A. Protect liquid materials from freezing.

B. Do not apply water repellent when ambient temperature is lower than 50 degrees F (10 degrees C) or higher than 100 degrees F (38 degrees C).

C. Do not apply water repellents when wind velocity is higher than 20 mph (32 kph).

1.09 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. ~~Correct defective Work within a five year period after Date of Substantial Completion.~~

C. ***Provide contractor's warranty for (2) two year period after Date of Substantial Completion.***

D. ***Provide manufacturer's standard warranty for product to be free from defect.***

1.10 PART 2 PRODUCTS

1.11 MATERIALS

A. Water Repellent: Non-glossy, colorless, penetrating, water-vapor-permeable, non-yellowing sealer, that dries invisibly leaving appearance of substrate unchanged.
   1. Applications: All new and existing concrete and masonry vertical surfaces and non-traffic horizontal surfaces.
   2. Number of Coats: Two.
   3. VOC Content: Less than 600 g/L, when tested in accordance with ASTM D3960 or ASTM D5095.
   4. Moisture Absorption When Applied to Masonry: Five percent, maximum, when tested in accordance with ASTM C140/C140M using masonry sample completely coated with water repellent.
   5. Maintains dry appearance when wetted.
   6. Silane, siloxane, silane-siloxane blend, or siliconate that reacts chemically with concrete and masonry; minimum 90 percent nonvolatile content.
      a. Manufacturers:
         1) PROSOCO, Inc.; Blok-Guard & Graffiti Control 15.
         2) PROFESSIONAL PRODUCTS OF KANSAS, Inc.; Water Sealant & Anti Graffitiant PWS-15 Super
         3) Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

2.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify joint sealants are installed and cured.

C. Verify surfaces to be coated are dry, clean, and free of efflorescence, oil, or other matter detrimental to application of water repellent.

2.02 PREPARATION

A. Protection of Adjacent Work:
   1. Protect adjacent landscaping, property, and vehicles from drips and overspray.
   2. Protect adjacent surfaces not intended to receive water repellent.

B. Prepare surfaces to be coated as recommended by water repellent manufacturer for best results.

C. Do not start work until masonry mortar substrate is cured a minimum of 30 days.

D. Pressure wash surfaces to be coated.
   1. Concrete: High pressure wash at 1,500 to 4,000 psi (10 to 30 MPa), at 6 to 12 inches (150 to 300 mm) from surface.
   2. Firm Masonry (Concrete Masonry Units, Brick, and Dense Stone): High pressure wash at 1,500 to 4,000 psi (10 to 30 MPa), at 6 to 12 inches (150 to 300 mm) from surface.

E. Allow surfaces to dry completely to degree recommended by water repellent manufacturer before starting coating work.

2.03 APPLICATION

A. Apply water repellent in accordance with manufacturer's instructions, using procedures and application methods recommended as producing the best results.

B. Apply at rate recommended by manufacturer, continuously over entire surface.

C. Apply two coats, minimum.

D. Remove water repellent from unintended surfaces immediately by a method instructed by water repellent manufacturer.

END OF SECTION

SECTION 07 42 00
PHENOLIC WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Exterior solid phenolic cladding panel system and accessories as required for a complete drained and back-ventilated rainscreen system.
   1. Wall Panels

1.02 RELATED REQUIREMENTS

A. Section 01 40 00 - Quality Requirements: Procedures for testing, inspection, mock-ups, reports, certificates; use of reference standards.

B. Section 01 70 00 - Contract Closeout: Project record documents, operation and maintenance (O&M) data, warranties and bonds.

C. 07 25 00 - Weather Barriers

D. 08 11 13 - Hollow Metal Doors and Frames

E. 08 43 13 - Aluminum Framed Storefront and Doors.

F. 09 21 16 - Gypsum Board Assemblies

1.03 REFERENCE STANDARDS

A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus 2018.

B. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position 2018.

C. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics 2016.

D. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates 2016.

E. ASTM D2247 - Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity 2015.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2018.

G. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2016a.

H. ASTM D638 - Standard Test Method for Tensile Properties of Plastics 2014.

I. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials 2016.

J. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014.

K. NEMA LD 3 - High-Pressure Decorative Laminates 2005.

L. NFPA 268 - Standard Test Method for Determining Ignitibility of Exterior Wall Assemblies Using a Radiant Heat Energy Source 2012.

M. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components 2012.

N. ISO 105 A02-93 - Tests for Color Fastness -- Part A02: Grey scale for assessing change in color.

O. ISO 178 – Determination of Flexural Properties.

P. ISO 527-3 – Determination of Tensile Properties.

Q. ISO 846 – Evaluation of the Action of Organisms.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

B. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide Manufacturer's printed product literature and specifications including fabrication and assembly..

C. Shop Drawings: Indicate Submit drawings necessary to describe and convey the layout, profiles and product components, including edge conditions, panel joints, fixture location, anchorage, accessories, finish colors, patterns and textures..

D. Samples: Submit two Manufacturer's standard, 12" by 12" inch (____by____ mm) in size, illustrating colors and texture.

E. Certificate: Certify that products of this section meet or exceed specified requirements.

F. Installation Instructions

G. Engineering Calculations: Submit engineering calculations as required by the local building code, showing that the installed panels and attachments system meets the wind load requirements for the project.

H. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than ten years of documented experience.

B. Installer Qualifications:
   1. Proven professional cladding system installer with a minimum of 5 years of documented experience.
   2. Approved by the manufacturer.

1.07 MOCK-UP

A. Provide in-place mock-up, size as directed on the drawings, illustrating the product and application workmanship.

B. See Section 01 40 00 - Quality Requirements for additional requirements.

C. Mock-up may remain as part of the Work.

D. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.

E. Pre-installation Meetings: Conduct pre-installation conference to verify project requirements, substrate conditions, manufacturer’s installation instructions and manufacturer’s warranty requirements.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original unopened containers/packages, with labels clearly identifying product name, manufacturer, color/texture, and weight.

B. Storage:
   1. Store materials in clean, dry area in accordance with manufacturer's instructions.
   2. Keep package sealed until ready for use.

C. Handling:
   1. Handle materials in accordance with manufacturer's instructions.
   2. Protect materials during handling to prevent damage.

1.09 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Field Measurements: Verify actual measurements/openings by field measurements performed by the installer prior to release for fabrication. Recorded measurements to be indicated on shop drawings based on field measurements provided by the installer. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

C. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.10 WARRANTY

A. Warranty: At project closeout, provide manufacturer’s limited ten year warranty covering defects in materials. Warranty only available when material installed by an installation contractor trained and approved by the manufacturer’s representative.

B. ~~Correct defective Work within a five year period after Date of Substantial Completion.~~

C. ***Provide contractor's warranty for (2) two year period after Date of Substantial Completion.***

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Phenolic Laminate Panels:
   1. Stonewood Architectural Panels.
   2. Trespa International.
   3. Substitutions: See Section 01 60 00 - Product Requirements

2.02 MATERIALS

A. Solid phenolic laminate panel with UV protection
   1. Color: Per 3.07 Schedules.
   2. Finish: Per 3.07 Schedules.
   3. Thickness: 8 mm
   4. Size: As shown on the drawings.
   5. Panel Core: Standard brown or black core.
   6. Physical Properties:
      a. Modulus of Elasticity: 1,300,000 psi (9000 N/mm2) minimum, ISO 178.
      b. Tensile Strength: 10,100 psi (70 N/mm2) minimum, ISO 527-2.
      c. Flexural Strength: 14,500psi (120 N/mm2) minimum, ISO 178.
      d. Thermal Conductivity: 2.1 BTU/inch/ft2.hr.°F, EN 12524.
      e. Structural Performance (ASTM E330):
         1) Panels shall be designed to withstand the Design Wind Load based upon the local building code, but in no case less than 15 pounds per square foot (psf). Wind load testing shall be done in accordance with this standard to obtain the following results:
         2) Normal to the plane of the wall, the maximum panel deflection shall not exceed L/175
         3) Normal to the plane of the wall between supports, deflection of the aluminum sub-framing members shall not exceed L/175 or 3/4 inch, whichever is less.
            (a) At 1-1/2 times design pressure, permanent deflection of framing members shall not exceed L/100 of span length and components shall not experience failure or gross permanent distortion.
         4) If system tests are not available, mock ups shall be constructed and tests performed under the direction of an independent third party laboratory which show compliance to the minimum standards listed above.

7. Fire Resistance
    a. Flame Spread: Class B, ASTM E84
8. Products:
    a. Trespa - Meteon Wall Panels - Exposed Fastener.
    b. Stonewood - Exterior Panels - Exposed Fastener.
    c. Substitutions: See Section 01 60 00 - Product Requirements

2.03 ACCESSORIES (FASTENERS)

A. Manufactured by approved supplier.

B. Provide exterior wall cladding and sub-framing system designed to withstand the effects of dead load, live load, and accommodate hygrothermal expansion/contraction of the panel.
1. Vertical Furring Members: Z-channels
    a. Material: 18-guage G-90 Galvanized coated steel.
    b. Dimensions: 1-1/4 inch flange width; 2 inch height.
    c. Color: Paint black at all panel reveals.
2. Horizontal Furring Members: Vented hat channels.
    a. Material: 18-gauge G-90 Galvanized coated steel
    b. Color: Paint black at all panel reveals.
    c. Dimensions: 2-1/2 inches top width; 1-1/2 inches flange width; 2 inches height
    d. Venting: 3.5 square inches open area per linear foot.

2.04 ACCESSORIES

A. Flashing: Drip Flashing.
1. Color: Black.
2. Width of each panel.

B. Wall Panel System:
1. Vent Screen:
    a. Color: Black
2. Joint Closure:
    a. Color: Black
3. System Closure:
    a. Color: Black

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify correct panels received, including dimension, tolerance, color/texture.

B. Verify correct attachment system received for the specific project/job.

C. Verify all the documents, including shop drawings and installation guidelines.

D. Verify installation conditions are satisfactory to receive work of this Section before the commencement.

3.02 PREPARATION

A. Field Measurements: Verify prior to fabrication and installation of the cladding panel.

B. Lay out work before beginning installation as necessary for true, plumb, and aligned panel installations.

C. Verify locations of joints and panel lengths

D. Clean surfaces thoroughly prior to installation.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions and provisions of shop drawings.

B. Conform to fastener’s instructions for installation of fasteners.

C. Install to allow hygrothermal expansion/contraction.

D. Use appropriate techniques/tools to work with the panel.

E. Use appropriate techniques/tools to work with the panel.

F. Make cutting and fitting neat, square, and true. Where required, cut, de-burr edges, and clean filings from adjacent surfaces

G. Do not install damaged or questionable panels.

H. Install corner profiles and trim with fasteners appropriate for use with adjoining construction as indicated on the Contract Drawings and as recommended by manufacturer.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Provide manufacturer's field representative to ensure product installation is in accordance with manufacturer’s/fabricator’s/supplier’s instructions and installation manuals, shop drawings, etc..

3.05 ADJUSTING

A. Correct identified defects and irregularities

B. Replace damaged, soiled, and discolored work.

3.06 CLEANING

A. Clean finished surfaces as recommended by panel manufacturer. After installation cleaning, cleaning during construction shall become the responsibility of the General Contractor.

3.07 SCHEDULES

A. Phenolic Panel: Wood Grain.
   1. Trespa - Harmony Oak.
   2. Stonewood - Shadwell Oak.

END OF SECTION

SECTION 07 72 00
ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof curbs.

B. Roof penetrations mounting curbs.

C. Roof hatches, [_____].

D. Roof hatch safety rails.

1.02 RELATED REQUIREMENTS

A. Section 07 41 13 - Metal Roof Panels.

B. Section 07 52 00 - Modified Bituminous Membrane Roofing.

C. Section 07 62 00 - Sheet Metal Flashing and Trim: Roof accessory items fabricated from sheet metal.

1.03 REFERENCE STANDARDS

A. 29 CFR 1910.23 - Ladders current edition.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2017.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used.
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Maintenance requirements.

C. Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.

D. Warranty Documentation:
   1. Submit manufacturer warranty.
   2. Ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store products under cover and elevated above grade.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. ~~Correct defective Work within a five year period after Date of Substantial Completion.~~

C. ***Manufacturer's Warranty: Provide manufacturer's standard warranty from date of purchase. Materials shall be free of defects in material and workmanship. Should a part fail to function in normal use withing this period, manufacturer shall furnish a new part at no charge.***

D. ***Provide contractor's warranty for (2) two year period after Date of Substantial Completion.***

PART 2 PRODUCTS

2.01 ROOF CURBS

A. Roof Curbs Manufacturers:

1. LMCurbs; Roof Curbs:
2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Roof Curbs Mounting Assemblies: Custom factory fabricated hollow sheet metal construction, internally reinforced, insulated, and capable of supporting superimposed live and dead loads and designated equipment load with fully mitered and sealed corner joints welded or mechanically fastened, and integral counterflashing with top and edges formed to shed water.
   1. Roof Curb Mounting Substrate: Curb substrate consists of horizontal standing seam metal roof panel system over plywood decking.
   2. Sheet Metal Material:
      a. Galvanized Steel: Hot-dip zinc coated steel sheet complying with ASTM A653/A653M, SS Grade 33 (230); G60 (Z180) coating designation; 18 gauge, 0.048 inch (1.21 mm) thick.
         1) Finish: Baked enamel.
         2) Color: As selected by Architect from manufacturer's standard line of colors.
   3. Roofing Cants: Provide integral sheet metal roofing cants dimensioned to begin slope at top of roofing system at 1:1 slope; minimum cant height 4 inches (102 mm).
   4. Fabricate curb bottom and mounting flanges for installation directly on metal roof panel system to match slope and configuration of system.
      a. Curbs shall be constructed to match slope of roof and provide a level top surface for
      b. mounting of equipment.
      c. Extend side flange to next adjacent roof panel seam and comply with seam configurations and seal connection, providing at least 6 inch (152 mm) clearance between curb and metal roof panel flange allowing water to properly flow past curb.
      d. Where side of curb aligns with metal roof panel flange, attach fasteners on upper slope of flange to curb connection allowing water to flow past below fasteners, and seal connection.
      e. Maintain at least 12 inch (305 mm) clearance from curb, and lap upper curb flange on underside of down sloping metal roof panel, and seal connection.
      f. Lap lower curb flange overtop of down sloping metal roof panel and seal connection.
      g. mounting of equipment.
   5. Provide layouts and configurations indicated on drawings.

2.02 ROOF HATCHES AND VENTS

A. Roof Hatch Manufacturers:
   1. Bilco Company; Type NB-50TB - 30x54.
   2. Precision Ladders, LLC; Model PH-A - 30x54.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Frames and Curbs: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.
   1. Insulation: Manufacturer's standard; 1 inch (25 mm) rigid glass fiber, located on outside face of curb.
   2. Curb Height: 12 inches (305 mm) from finished surface of roof, minimum.

C. Safety Railing System: Roof hatch safety rail system mounted directly to curb without penetration of roofing system.
   1. Railing Size: 30 by 54 inches (762 by 1,372 mm).
   2. Railing: Comply with 29 CFR 1910.23 for ladder safety, with a safety factor of two.
   3. Posts and Rails: Aluminum tube.
   4. Gate: Same material as railing; automatic closing with latch.
   5. Finish: Manufacturer's standard, factory applied finish.
   6. Products:
      a. BILCO Company; Bil-Guard 2.0: RL2-NB.
      b. Percision Ladders, Roof Hatch Guard-Rail System.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

D. Hardware: Steel, zinc coated and chromate sealed, unless otherwise indicated or required by manufacturer.
   1. Lifting Mechanisms: Compression or torsion spring operator with shock absorbers that automatically opens upon release of latch; capable of lifting covers despite 10 psf (475 kPa) load.
   2. Hinges: Heavy duty pintle type.
   3. Hold open arm with vinyl-coated handle for manual release.
   4. Latch: Upon closing, engage latch automatically and reset manual release.
   5. Manual Release: Pull handle on interior.
   6. Locking: Padlock hasp on interior.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

3.04 CLEANING

A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.

B. Clean installed work to like-new condition.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 07 92 00
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Self-leveling pourable joint sealants.

C. Joint backings and accessories.

D. Owner-provided field quality control.

1.02 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.

B. Section 07 25 00 - Weather Barriers: Sealants required in conjunction with water-resistive barriers.

C. Section 07 26 00 - Vapor Retarders: Sealants required in conjunction with vapor retarders.

D. Section 07 84 00 - Firestopping: Firestopping sealants.

E. Section 08 80 00 - Glazing: Glazing sealants and accessories.

F. Section 09 21 16 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.

1.03 REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer 2015.

B. ASTM C834 - Standard Specification for Latex Sealants 2017.

C. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications 2012 (Reapproved 2017).

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.

E. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.

F. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants 2008 (Reapproved 2012).

G. ASTM C1311 - Standard Specification for Solvent Release Sealants 2014.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
   1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
   2. List of backing materials approved for use with the specific product.
   3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
   4. Substrates the product should not be used on.
   5. Substrates for which use of primer is required.

C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. ~~Correct defective work within a five year period after Date of Substantial Completion.~~

C. ***Manufacturer's*** Warranty: ***Provide manufacturer's standard warranty to correct defective work within a (5) five year period after Date of Substantial Completion.*** Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

D. ***Provide contractor's warranty for (2) two year period after Date of Substantial Completion.***

PART 2 PRODUCTS

2.01 JOINT SEALANT APPLICATIONS

A. Scope:
   1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
      a. Wall expansion and control joints.
      b. Joints between door, window, and other frames and adjacent construction.
      c. Joints between different exposed materials.
      d. Openings below ledge angles in masonry.
      e. Other joints indicated below.
   2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
      a. Joints between door, window, and other frames and adjacent construction.
      b. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
         1) Exception: Through-penetrations in sound-rated assemblies that are also fire-rated assemblies.
      c. Other joints indicated below.
   3. Do not seal the following types of joints.
      a. Intentional weepholes in masonry.
      b. Joints for vented rainscreen cladding.
      c. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
      d. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
      e. Joints where installation of sealant is specified in another section.
      f. Joints between suspended panel ceilings/grid and walls.

B. Fully Concealed Interior and Exterior Joints: Use Type [JS-5] - Non-Curing Butyl Sealant, unless otherwise indicted

C. Exterior Joints:
   1. Use nonsag non-staining silicone sealant, Type [JS-1], unless otherwise indicated.
   2. Metal-to Metal joints in storefront and metal framed glazing systems: Type [JS-1 or JS-2].
   3. Lap Joints in Sheet Metal Fabrications: Butyl rubber, non-curing; Type [JS-5].
   4. Thresholds and concealed sealants in storefront installations: Type [JS-5].

5. Control and Expansion Joints in Concrete Paving: Self-leveling polyurethane "traffic-grade" sealant; Type [JS-8].

D. Interior Joints:
1. Use nonsag Acrylic emulsion latex sealant, Type (JS-6), unless otherwise indicated.
2. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white; Type [JS-2].
3. Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant; Type [JS-6].
4. Wall and Ceiling Joints in Wet Areas: Nonsag polyurethane sealant for installations not expected to withstand continuous liquid immersion; Type [JS-4].
5. Joints between Fixtures and Casework (including tops) in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white; Type [JS-3].
6. In Sound-Rated Assemblies: Acrylic emulsion latex sealant; Type [JS-6].
7. Narrow Control Joints in Interior Concrete Slabs: Self-leveling polyurethane sealant; Type [JS-7].

E. Interior Wet Areas: Bathrooms, restrooms, kitchens, and food service areas; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, and other similar items.

F. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".

2.02 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products with acceptable levels of volatile organic compound (VOC) content; see Section 01 61 16.

2.03 NONSAG JOINT SEALANTS

A. Type JS-1 - Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 50 percent,, minimum.
2. Non-Staining to Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.

B. Type JS-2 - Silicone Sealant: ASTM C920, Uses S and T; single-component, explicitly approved by manufacturer for traffic exposure when recessed below traffic surface; not expected to withstand continuous water immersion.
1. Movement Capability: Plus 500 percent, minimum.
2. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
3. Color: To be selected by Architect from manufacturer's standard range.
4. Cure Type: Single-component, neutral moisture curing.

C. Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 25 percent, minimum.
2. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
3. Color: To be selected by Architect from manufacturer's standard range.
4. Cure Type: Single-component, neutral moisture curing

D. Type JS-3 - Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
1. Color: White.

E. Type JS-4 - Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 50 percent, minimum.
2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
3. Color: To be selected by Architect from manufacturer's standard range.

F. Type JS-5 - Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging, (paintable); not intended for exterior use.
   1. Color: To be selected by Architect from manufacturer's standard range.

G. Type JS-6 - Non-Curing Butyl Sealant: Solvent-based; ASTM C1311; single component, non-sag, non-skinning, non-hardening, non-bleeding; vapor-impermeable; intended for fully concealed applications.

H. Type JS-7 - Flexible Polyurethane Foam: Single-component, gun grade, and low-expanding.
   1. Density: ASTM D3574: 94 to 1.56 lb/ft³
   2. Service Temperature Range: -40 to 194 °F
   3. Air Leakage: ASTM E283: 6.26 psf (300 Pa) infiltration, -0.002 cfm/ft²
   4. Tack Free Time: FEICA 1014: 10 min at 73 °F (23 °C) and 50% RH
   5. Cutting Time: FEICA 1005: 45 min at 73 °F (23 °C) and 50% RH (1” (25 mm) width)
   6. Water Absorption: ASTM D28: 2 0.003
   7. Water Absorption2: AAMA 812: Tested in Accordance
   8. Theoretical Yield: FEICA 1003: 31.28 L
   9. Thermal Resistance per Inch (R/in): ASTM C518: 3.64
   10. Color: White.

2.04 SELF-LEVELING SEALANTS

A. Type JS-8 - Self-Leveling Silicone Sealant: ASTM C920, Grade P, Uses M and A; single or multicomponent, explicitly approved by manufacturer for traffic exposure when recessed below traffic surface; not expected to withstand continuous water immersion.
   1. Movement Capability: Plus and minus 25 percent, minimum.
   2. Color: To be selected by Architect from manufacturer's standard range.

B. Type JS-9 - Self-Leveling Polyurethane Sealant for Continuous Water Immersion: Polyurethane; ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure and continuous water immersion.
   1. Movement Capability: Plus and minus 25 percent, minimum.
   2. Color: To be selected by Architect from manufacturer's standard range.

2.05 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.

E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

F. Broadcast Sand: Broadcast sand on sealant at masonry wall conditions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Perform acoustical sealant application work in accordance with ASTM C919.

D. Install bond breaker backing tape where backer rod cannot be used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.04 FIELD QUALITY CONTROL

A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.

B. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

END OF SECTION

SECTION 08 43 13
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Infill panels of glass.

C. Aluminum doors and frames.

D. Weatherstripping.

E. Door hardware.

1.02 RELATED REQUIREMENTS

A. Section 05 50 00 - Metal Fabrications: Steel attachment devices.

B. Section 07 25 00 - Weather Barriers: Sealing framing to water-resistive barrier installed on adjacent construction.

C. Section 07 92 00 - Joint Sealants: Sealing joints between frames and adjacent construction.

D. Section 08 71 00 - Door Hardware: Hardware items other than specified in this section.

E. Section 08 80 00 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site 2015.

B. AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls and Sloped Glazing Systems 2014.

C. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document) 2015.

D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.

E. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2013.

F. ASTM E283/E283M - Standard Test Method for Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal) 2010 (Reapproved 2019).

G. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014.

H. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference 2015.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.

1. Include design engineer's stamp or seal on shop drawings for attachments and anchors.

2. Include structural calculations.
3. Professional engineer licensed in Oregon.

D. Samples: Submit two samples 12 by 12 inches (304 by 304 mm) in size illustrating finished aluminum surface, glass, infill panels, glazing materials.

E. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.

F. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.

G. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.

H. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.

I. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 DESIGN CRITERIA

A. Wind load requirements:
1. As listed in Section 08 80 00 - Glazing

B. Deflection head requirements:
1. Assume vertical deflection of 1/2" at head unless noted otherwise.

C. Energy Code Compliance for Exterior Doors:
1. Doors in metal frames:
a. Opaque Doors (less than 50% glass): U<=0.70 unless noted otherwise.
b. Glazed Doors (more than 50% glass): U<=0.46 unless noted otherwise.
1) SHGC: <=0.40.
c. Main Entry Doors: U<=0.80 unless noted otherwise.
1) SHGC: <=0.40
d. Maximum Air Infiltration Rate:
1) Swinging Doors: 1.00 CFM/ft2.
2) Revolving Doors: 1.00 CFM/ft2.
2. Storefront, including operable windows: U<=0.45.
a. SHGC: <=0.40.
b. Maximum Air Infiltration Rate: 0.06 CFM/ft2.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.09 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F (5 degrees C). Maintain this minimum temperature during and 48 hours after installation.

1.10 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. ***Manufacturer's Warranty: Provide manufacturer's standard warranty to*** correct defective Work within a five year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

D. Provide ten year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

E. ***Provide contractor's warranty for (2) two year period after Date of Substantial Completion.***

PART 2 PRODUCTS

2.01 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING

A. **[SF SYS-01]:** Center-Set Style, Thermally-Broken:
   1. Basis of Design: [Kawneer 451T].
      a. All applications, unless noted otherwise.

B. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed below:
   1. C.R. Laurence Company, Inc; U.S. Aluminum.
   2. EFCO, a Pella Company.

C. Substitutions: See Section 01 60 00 - Product Requirements.
   1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

2.02 BASIS OF DESIGN -- SWINGING DOORS

A. Medium Stile, Insulating Glazing, Thermally-Broken:
   1. Basis of Design: Kawneer 350T Insulpour Thermal Entrance Doors.

B. Wide Stile, Insulating Glazing, Thermally-Broken:
   1. Basis of Design: Kawneer 500T Insulpor Thermal Entrance Doors.

C. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed below:
   1. C.R. Laurence Company, Inc; U.S. Aluminum.
   2. EFCO, a Pella Company.

D. Substitutions: See Section 01 60 00 - Product Requirements.
   1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

2.03 ALUMINUM-FRAMED STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Glazing Rabbet: For 1 inch (25 mm) insulating glazing, exterior application.
   2. Finish: Class II natural anodized.
      a. Factory finish all surfaces that will be exposed in completed assemblies.
   3. Finish Color: Dark bronze.
   4. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   5. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   6. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   7. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F (95 degrees C) over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.

8. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
9. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

B. Performance Requirements
1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
a. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
2. Air Leakage: 0.06 cfm/sq ft (0.3 L/sec sq m) maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf (75 Pa) pressure difference.

2.04 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, drainage holes and internal weep drainage system.
1. **[SYSTEM-01]:** 2" high x 4-1/2" deep typical; (4" high x 4-1/2" sill at grade)
a. Glazing Stops: Flush.
b. Aluminum Sill Pan: Thermally broken HP Flashing.
c. Head Receptor: As required by system or where indicated on drawings.

B. Glazing: See Section 08 80 00.

C. Exterior Swing Doors: Glazed aluminum.
1. Medium Style: Located per Door Schedule.
a. Basis of Design: Kawneer, 350T Insulpour Thermal Entrance Doors.
1) Thickness: 2 inches (50 mm).
2) Top Rail: 3-1/2 inches (89 mm) wide.
3) Vertical Stiles: 3-1/2 inches (89 mm) wide.
4) Bottom Rail: 10 inches (254 mm) wide.
5) Glazing Stops: Square.
6) Finish: Same as storefront.
b. Substitutions: See Section 01 60 00 - Product Requirements.
2. Wide Style: Located per Door Schedule and as required for panic hardware.
a. Basis of Design: Kawneer, 500T Insulpour Thermal Entrance Doors.
1) Thickness: 2 inches (50 mm).
2) Top Rail: 6 inches (152 mm) wide.
3) Vertical Stiles: 6 inches (152 mm) wide.
4) Bottom Rail: 10 inches (254 mm) wide.
5) Glazing Stops: Square.
6) Finish: Same as storefront.
b. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Fasteners: Stainless steel.

C. Exposed Flashings: Aluminum sheet, 20 gauge, 0.032 inch (0.81 mm) minimum thickness; finish to match framing members.

D. Concealed Flashings: Stainless steel, 26 gauge, 0.0187 inch (0.48 mm) minimum thickness.

E. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, compatible with flashing material.

F. Sealant for Setting Thresholds: Non-curing butyl type.

G. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

2.06 HARDWARE

A. For each door, include weatherstripping, sill sweep strip, and threshold.

B. Other Door Hardware: See Section 08 71 00.

C. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.

D. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

E. Threshold: Extruded aluminum, one piece per door opening, ribbed surface; provide on all doors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

3.02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

I. Set thresholds in bed of sealant and secure.

J. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inch per 3 feet (1.5 mm per m) non-cumulative or 0.06 inch per 10 feet (1.5 mm per 3 m), whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch (0.8 mm).

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for general testing and inspection requirements.

B. Provide field testing of installed storefront system by independent laboratory in accordance with AAMA 503 during construction process and before installation of interior finishes.
   1. Perform a minimum of two tests in each designated area as indicated on drawings.
   2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
   3. Field test for water penetration in accordance with ASTM E1105 with uniform static air pressure difference (Procedure B) not less than 4.18 psf (200 Pa).
      a. Maximum allowable rate of water penetration in 15-minute test is 0.5 ounce (14 gram) that is not contained in an area with provisions to drain to exterior, or collected on surface of interior horizontal framing member.

C. Repair or replace storefront components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.05 ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

3.06 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.

C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

3.07 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 09 93 00
STAINING AND TRANSPARENT FINISHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of stains and transparent finishes.

C. Internal wood stabilizer

1.02 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 09 91 13 - Exterior Painting: Stains and transparent finishes for wood substrates.

C. Section 09 91 23 - Interior Painting: Stains and transparent finishes for wood substrates.

1.03 DEFINITIONS

A. Comply with ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS

A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications 2016.

B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:

1. Manufacturer's name, product name and/or catalog number, and general product category.

C. Samples: Submit two samples, illustrating selected colors and sheens for each system with specified coats cascaded. Submit on actual wood substrate to be finished, 6 by 6 inch (152 by 152 mm) in size.

D. Certification: By manufacturer that stains and transparent finishes comply with VOC limits specified.

E. Manufacturer's Instructions: Indicate special surface preparation procedures.

F. Maintenance Data: Submit data including product technical data sheets, safety data sheets (SDS), care and cleaning instructions, and touch-up procedures.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years experience and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of stain or transparent finish, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Stain and Transparent Finish Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.08 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by manufacturer of stains and transparent finishes.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide finishes from the same manufacturer to the greatest extent possible.
   1. In the event that a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.

2.02 STAINS AND TRANSPARENT FINISHES - GENERAL

A. Finishes:
   1. Provide finishes capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. Supply each finish material in quantity required to complete entire project's work from a single production run.
   4. Do not reduce, thin, or dilute finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content: Comply with Section 01 61 16.

C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

D. Colors: To be selected from manufacturer's full range of available colors.
   1. Selection to be made by Architect after award of contract.

2.03 EXTERIOR STAIN AND TRANSPARENT FINISH SYSTEMS

A. Finish on Wood:
   1. Stain: Natural Oil Waterborne Wood Stain: Penetrating wood stain; oil based, breathable, formulated with fungicide/algaecide and UV protectors.
      a. 2 coats stain, 1 coat clear UV protectant.
         1) Fungicide/Algaecide: 1 percent solution; manufactured by Troy Chemicals.
      b. Products:
         1) Timber Pro Coatings; Log & Siding Formula Smooth Transparent Series.
         2) Substitutions: Section 01 60 00 - Product Requirements.
      c. UV Protection: Clear, UV reflectors, absorbers, and micro transoxide absorbent pigment.
         1) Products:
            (a) Timber Pro Coatings; Clear UV.
            (b) Substitutions: Section 01 6000 - Product Requirements.
   2. Internal Wood Stabilizer:
      a. 2 coats stabilizer, discoloration as required, 1 coat clear UV protectant.
      b. Products:
         1) Timber Pro CUV Internal wood stabilizer (IWS)
         2) Substitutions: Section 01 60 00 - Product Requirements.
      c. Discoloration remover:
         1) Timber Pro UV Clean & Brite.
         2) Substitutions: Section 01 60 00 - Product Requirements.

d. UV Protection: Clear, UV reflectors, absorbers, and micro transoxide absorbent pigment.
   1) Products:
      (a) Timber Pro Coatings; Clear UV.
      (b) Substitutions: Section 01 60 00 - Product Requirements.

2.04 INTERIOR STAIN AND TRANSPARENT FINISH SYSTEMS

A. Finish on Wood:

B. Stain: Natural Oil Waterborne Wood Stain: Penetrating wood stain; oil based, breathable, formulated with fungicide/algaecide and UV protectors.
   1. 2 coats stain, 1 coat clear UV protectant.
      a. Fungicide/Algaecide: 1 percent solution; manufactured by Troy Chemicals.
   2. Products:
      a. Timber Pro Coatings; Log & Siding Formula Smooth Transparent Series.
      b. Substitutions: Section 01 60 00 - Product Requirements.

C. UV Protection: Clear, UV reflectors, absorbers, and micro transoxide absorbent pigment.
   1. Products:
      a. Timber Pro Coatings; Clear UV.
      b. Substitutions: Section 01 60 00 - Product Requirements.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of finished surfaces.

B. Patching Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

E. Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

C. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

D. Reinstall items removed prior to finishing.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

A. Protect finishes until completion of project.

3.07 SCHEDULE

A. Solid Wood Window Sills: Color: TBD Finish: Matte Clear Coat.

B. Interior Wood Deck: Color: TBD Finish: Matte Clear Coat.

C. Glulam Beams: Color: TBD Finish: Matte Clear Coat.

D. Exterior Plywood Soffits: Color: TBD Finish: Matte Clear Coat.

END OF SECTION