

architecture engineering planning

ADDENDUM NO. 5

Date: March 10, 2025

Project: New Headquarters Building Inland Fisheries and Wildlife Augusta, Maine

This addendum is issued prior to receipt of the bids and does hereby become a part of the contract documents, and in case of conflict, it shall supersede original project manual and drawings.

Each bidder shall be responsible for issuing information contained herein to sub-contractors and suppliers to ensure that their proposal covers all work required by the contract documents including this addendum.

GENERAL

NOTICE

The bid submission date for the project is being extended as follows

Bid Submission Date: March 26, 2025, no later than 2:00:00 p.m

The deadline for submission of questions has expired.

ADMINISTRATIVE

- 1. Q: Please explain what type of background screening is required?
 - A. Background checks will be required for all workers on site and will be conducted by the owner. If approved, the owner will issue identification cards that must be worn at all times while on site. See attached background check form.
- 2. Q: Who is responsible to remove and dispose of owner's furniture that is left in the building?
 - A. General Contractor.
- 3. Q: Since this project involves renovations/additions to existing property and a new storage barn, please confirm who is to provide the builder's risk for all components of the new Work?
 - A. The General Contractor is responsible for Builder's Risk insurance for all construction, which includes building additions, renovations, and the new barn (see revised paragraph 9.3.4 in specification section 00 72 13 General Conditions).

- 4. Q: If the Owner will provide the Builder's Risk please confirm that Contractor and all Subcontractors will be included as insureds and specify who is responsible for the payment of deductibles and amount of the deductibles.
 - A. The General Contractor is responsible for Builder's Risk insurance for all construction, which includes building additions, renovations, and the new barn (see revised paragraph 9.3.4 in specification section 00 72 13 General Conditions).
- 5. Q: Please confirm who should be named as the oblige on Contractor's bid bond?
 - A. State of Maine, Bureau of General Services.
- 6. Q: The insurance requirements state the Owner and BGS shall be named as additional insureds. Please confirm the Owner is the Maine Department of Inland Fisheries & Wildlife and BGS is State of Maine Bureau of General Services?

A. The Owner is the State of Maine, Bureau of General Services.

7. Q: Please confirm the Owner will maintain property insurance on all existing structures during the construction.

A. No. The General Contractor is responsible for all insurance pertaining to the project.

8. Q: Please confirm if subcontractor bid bonds are required with our bid submission per this spec section.

A. Subcontractor bid bonds are not required.

9. Q: Please confirm if all subcontractors on the project are required to hold a performance and payment bond per this spec section.

A. Subcontractor performance and payment bonds are not required.

- 10. Q: Reference 1.12. What is the duration of the required post-construction warranty?
 - A. Varies (see individual specification sections), but generally one year after substantial completion.
- 11. Q: Masons and Tenders are not listed on the wage determination sheet provided. Can you please provide wage determination for Masons and Tenders?

A. See "Brickmasons and Blockmasons"

- 12. Q: Are there any set-aside or minority hiring or workforce requirements?
 - A. No.
- 13. Q: With the current status and impact of tariffs uncertain and suppliers therefore generally unwilling or unable to lock in pricing at the time of bid, please confirm whether: (1) the Owner will allow for adjustment of impacted material prices after the bid/award date to account for tariffs, provided the impact is properly documented or (2) there will be no adjustments for tariffs post-bid and bidders must account for possible impacts in their bid prices. Bidder believes the former approach may be to Owner's advantage as it avoids contingencies that may turn out to be unnecessary and allows the parties flexibility in dealing with tariffs that, if they go into effect, will be unavoidable and will impact pricing and schedule of domestic products such as steel, in addition to impacting imported steel prices.
 - A. There will be no adjustments for tariffs post-bid and bidders must account for possible impacts in their bid prices.

14. Q: Is there record of ledge from previous utility installation to the south or east of the proposed additions?

A. Unknown.

STRUCTURAL

- 1. Q: There are several details that indicate 4" rigid insulation from the edge of slab-on-grade to 2'-0" inside the conditioned area, however there are several other details that indicate 4" rigid insulation to 3'-0" inside the conditioned area. Please advise which is correct.
 - A. Extend the 4" rigid insulation 3'-0" inside the conditioned area.
- 2. Q: Please confirm that the costs of special inspections and testing will be paid by the Owner.
 - A. Owner will engage for special inspections and testing. The general contractor is responsible for scheduling and coordinating site visits with the overall schedule.
- 3. Q: Please provide an existing wall connection detail between the structural steel and the masonry exterior wall. Please confirm how the existing slabs connect to the existing masonry wall. During the walkthrough, we tried to view the condition at the basement level looking up to the first floor slab and attached a photo. The floor doesn't appear pocketed, but there does seem to be steel (perhaps channel) within the exterior wall which will need to remain. What removals are expected of the demo contractor at this location? Cut flush with existing face?
 - A. Based on limited information, it is assumed the existing slabs do not extend into the masonry walls. Cut the existing steel framing flush with the face of the existing brick wall. Grout voids solid at the existing brick wall.
- 4. Q: Are the steel beam and plates welded to the micropiles and embedded in the pile caps coated or bare steel?
 - A. The steel beams and plates welded to the micropiles and embedded in the pile caps will be bare steel.
- 5. Q: Structural round timbers. Can the top and bottom chords be broken due to log availability and engineering requirements?
 - A. The specification is a delegated design, connection is to be determined by the truss manufacturer.
- 6. Q: Is the barn to have solid sawn roof decking or glue laminated roof decking?
 - A. The barn has solid sawn roof decking.
- 7. Q: SD101: Keynote #3 calls for removal of collar ties, but points to the hip rafters. Please confirm if this is correct, or if collar ties are to be removed within the roof framing, and if so, please confirm the extent. Also, drawing SF105 appears to show the existing hip rafters as remaining.
 - A. Removal keynote 3 (hexagon shape) on sheet SD101 calls out for the removal of three collar ties at the location of the roof deck and roof framing removals. The remaining existing collar ties are to remain. The hip rafters are called out with existing keynote 3 (diamond shape) on both sheets SD101 and SF105 and are existing to remain.

- 8. Q: SD101: Keynote #2 is tagged at both the north and south end of the building (both sides of the shorter dimensions of the building). Is the intent to remove all existing 2x10 joists up to the hip rafters from both the north and south components of the roof? SF-105 keynote #2 call for these existing joists to be sistered.
 - A. Keynote 2 that is tagged at both the north and south ends of the building is existing keynote 2 (diamond shape), not removal keynote 2 (hexagon shape). The existing framing will remain existing and not be removed. On sheet SF105, keynote 2 (square shape) references the reinforcing of the existing framing.
- 9. Q: SB102: Refer to keynote #1 on column line N-A. This keynote tags the foundation dimension as 3'x1', but the foundation is drawn at 3'-6" wide. Please confirm which is correct.
 - A. 3'-0" wide is the correct footing width.
- 10. Q: SB104: What is the footing designation at column line S-3/S-B?
 - A. Footing at column line S-3/S-B is "FTG L".
- 11. Q: AE506/SB501: The details on SB501 call for the 4" insulation to extend from edge of slab inside 2', and then 2" insulation the remainder of the slab, but the details on AE506 call for the 4" to extend 36" in from edge of slab, which is correct?
 - A. AE506 is correct. Extend the 4" insulation 36" in from the edge of slab. Details on sheet SB501 will be updated.
- 12. Q: 003126: Were the structural steel beams tested for lead paint?
 - A. The structural beams were not tested for lead paint. Assume paint on the steel is lead containing paint.
- 13. Q: SB104: Keynote 6 is indicated on 1/SB104 x4 times. For the tag between tags S-a/S-b and S-2/S-3 it rightly points out need for bolted angle and metal decking. The other keynote 6 locations appear to be at slab on grade location on the interior of the foundation wall. Please confirm that these other locations do not require bolt/angle/decking as the slab is at grade.
 - A. Two of the remaining keynote 6 locations on sheet SB104 are at a slab-on-ground location and do not require the bolt/angle/decking. The keynote 6 location between S-H/S-J and S-1/S-2 is at a stair that extends to the basement and will require coordination with the stair delegated design.
- 14. Q: SB101: Keynote 4 indicates that the area is to be slab on ground, details in this section (1/SB503 and 2/SB503) show a slab on deck detail. Please confirm which is required.
 - A. Keynote 4 on sheet SB101 indicates the slab-on-ground is at elevation 161.00'. The top of slab elevation at the slab-on-deck is 170.00'. Keynote 4 indicates the slab-on-ground located below the slab-on-deck. The framing plan for the elevated slab-on-deck is located on sheet SF101.

ARCHITECTURAL

- 1. Q. Existing Hazardous Material Information. This section states that this document is not part of the Contract Documents. Does this mean that the contractor is not responsible for removal of any hazardous materials?
 - A. Permitting, removal and disposal of the Hazardous Materials and Universal Waste tested and reported in 00 31 26 is to be carried by the general contractor as part of the base bid.

- 2. Q. Both specs reference a FM Global approved installer, there is only one independent firestop contractor in the state which has the appropriate certifications, this will not keep the bids for this section competitive, can the FM approved installer qualification be removed and replaced with a contractor trained by the Manufacturer of the firestop product?
 - A. Provide the FM Global approved installer as indicated in the specifications.
- 3. Q. Please confirm if the building permit fee is to be included in our bid.
 - A. The building permit fee for the City of Augusta will be paid directly by the owner.
- 4. Q. Please confirm if the State of Maine Fire Marshal permit fees (construction fee, building permit surcharge fees, and barrier-free permit application fees) are to be included in our bid.
 - A. The permit fees for the State of Maine Fire Marshal construction and barrier free permits along with building code surcharge will be paid by the owner.
- 5. Q. Please confirm if an NPDES permit is required, and if so, is the permit fee to be included in our bid.
 - A. Required environmental permits have been received and included in the project manual and addendum No. 1.
- 6. Q. Please explain what portions of the property is to be occupied?
 - A. The existing CETA building is currently unoccupied. The full area included in the site of this project will be unoccupied during the duration of construction. Adjacent parking lots outside of the construction area will be occupied and used by State employees and visitors as well as adjacent office buildings.
- 7. Q. Are there any Build America, Buy America (BABA) requirements for this project?
 - A. No.
- 8. Q. Please confirm if the lump sum bid should include LEED registration fees, and if so, please identify an allowance for all bidders to carry.
 - A. The LEED Submission Fees will be paid for by the owner. Submission of LEED documents indicated in the construction documents is to be carried by the contractor.
- 9. Q. Reference 1.12. What is the duration of the required post-construction warranty?
 - A. 12 Months from final completion.
- 10. Q. Is whole building air-tightness testing required to be included in our scope?
 - A. A whole building air-tightness test will be conducted during the commissioning process. The test will be conducted by the commissioning agent hired by the owner. The General Contractor will need to provide support for this work including 1 day of time for each of the following trades:
- 11. Q. Are there any set-aside or minority hiring or workforce requirements?
 - A. No
- 12. Q. The Pedestrian Bridge is referenced multiple times on AE403 as being "manufactured" and being "by manufacturer". Please provide the Basis of Design Manufacturer and specifications for the Pedestrian Bridge.
 - A. See specification section 055520 included in this addendum.

- 13. Q. For the pedestrian bridge, please confirm a timber substructure/abutments with concrete deck is an approved alternative.
 - A. Provide a steel prefabricated pedestrian bridge as indicated in Specification Section 055520 included in this addendum.
- 14. Q. Multiple wall types state the ½" resilient channels are to be vertical. The details look to show the channels as horizontal. Please advise.
 - A. The resilient channels are to be installed horizontal.
- 15. Q. Reference AE120/AE503. On the roof plan (AE120) there appears to be an apron illustrated at the eves of the center shingled building. The eave details on AE503, details 5,6,7 do not indicate an apron and only shingles going to the edge. Please clarify.
 - A. There is not to be an apron, shingles will go to the edge. See revised AE120.
- 16. Demountable Partition Details on Drawing AE630 indicates a "front loaded" glass system. Is a center mounted glass system acceptable. Per the specifications list, several of the acceptable manufacturers have standard center mounted glass.
 - A. A center mounted glass system does not work with the basis of design product, but could be accepted if a different approved product was chosen.
- 17. Is the intent to have both high-performance coatings and interior painting on interior steel substrates and interior galvanized-metal substrates?
 - A. No, high performance coatings only.
- 18. In looking at the schedule, type E is not doable in Essential Single Hung with a split checkrail height as shown. Will a 50/50 split work? It can be done in Marvin's Infinity series fiberglass window in the 50/50 split. Please confirm if this is acceptable.
 - A. Yes. 50/50 split would be accepted.
- 19. Type H is not available in any fiberglass window and the divider is not available in GBG as drawn. Will that type be acceptable as a Clad Wood with SDL?

A. Yes.

- 20. Spec 072100 references 061600 for foam over sheathing, no reference is found in the sheathing spec please advise.
 - A. Remove reference to 061600, see revised specifications.
- 21. There are several details that indicate 4" rigid insulation from the edge of slab-on-grade to 2'-0" inside the conditioned area, however there are several other details that indicate 4" rigid insulation to 3'-0" inside the conditioned area. Please advise which is correct.
 - A. The below slab insulation should be, 4" rigid insulation (R-20 min) for 36" from edge, then 2" rigid insulation (R-10 min) for full slab.
- 22. Tag "DE-1" is used in multiple locations but there is no corresponding description. Please clarify.
 - A. Tag DE-1 should be replaced with F-1. See revised sheets AE202 and AE203.
- 23. On drawing AE101, note 23 refers to an ADA Under Counter Refrigerator. Do we need to include it in our proposal? If yes, could you provide the spec section for it?
 - A. Refrigerators are NIC.

- 24. Adding Architectural Film in Addendum 1 will likely void any IGU warranty for the fiberglass windows. Please note that any glazing warranty will be excluded if film is added per manufacturer. Please advise.
 - A. The bird friendly glass is acid etched glass, not a film. Refer to specification section 088000, 2.4.D.1 "Basis-of-Design Product: Subject to compliance with requirements, provide "AviProtek-E Low-e coated Bird Friendly Glass, Walker Glass Company Ltd." Pattern to be "Dots & Squares, 217, 2"x2"-5mm Dots.". It has been confirmed with the Basis of design manufacturer that the bird glass can be used with the selected windows.
- 25. Window schedule refers to both aluminum and wood windows, but the window basis of design is Marvin Essential, which is fiberglass. Are window types A through H all Marvin Essential?
 - A. All will be Marvin Ultimate. See revised window schedule on AE620.
- 26. Please confirm the only lab casework rooms are 001 Wildlife Necropsy, and rooms 161, 167, 168, 169 & 170. Also, rooms 001 & 167 are the only rooms, with gray epoxy counters. The other rooms listed above are Chem-Surf plastic laminate counters.
 - A. Lab casework to be in rooms 001 Wildlife Necropsy (Barn building), and rooms 161, 167, 168 & 170 (not 169). Counters correct as listed above.
- 27. The demountable partitions in rooms 155, 157, 321 and 323 have two different hatchings. Are these different types of window film? Please clarify.
 - A. Doors should have same privacy window film. See revised sheets AE741 and AE743.
- 28. Could you please clarify the discrepancy from the Color Key/Manufacturer's Guide to the finish schedule. EP-1 Room 166 is not on the finish schedule but on the Color Key
 - A. 166 to be conc floor finish. See revised Color Key on AE41.
- 29. Could you please clarify the discrepancy from the Color Key/Manufacturer's Guide to the finish schedule. EP-2 Rooms 101,106,107,108 are not listed to receive epoxy on the finish schedule, Room 207 is on the finish schedule but not listed on the color key and room 302 is on the color key, but not on the finish schedule
 - A. Rooms 101, 106, 107 and 108 to be PT-2 floor finish as listed in Room Finish Schedule and Floor Finish plan. Room 207 to be EP-2 floor finish as listed in Room Finish Schedule and Floor Finish plan. Room 302 to be conc floor finish as listed in Room Finish Schedule and Floor Finish plan.
- 30. Please clarify the discrepancy between the finish schedule and the drawings. Room 105 Storage on drawing AE801 shows CONC, but the schedule shows LVT-1.
 - A. 105 Storage to be conc floor finish. See revised room finish schedule.
- 31. Please clarify the discrepancy between the finish schedule and the drawings. Room 221 Waiting Area on drawing AE802 shows CPTT-6, but the schedule shows CPTT-2.
 - A. 221 Waiting Area to be CPTT-6 floor finish. See revised room finish schedule.
- 32. Please clarify the discrepancy between the finish schedule and the drawings. Room 231 Open Conf on drawing AE802 shows CPTT-1,6, but the schedule shows CPTT-1.
 - A. 231 Open Conf to be CPTT-1,6 floor finish. See revised room finish schedule.
- 33. Please clarify the discrepancy between the finish schedule and the drawings. Room 163 Toilet on drawing AE701 shows GYP, but the schedule shows CLT.
 - A. 163 Toilet ceiling finish to be GYP. See revised room finish schedule.

- 34. Please clarify the discrepancy between the finish schedule and the drawings. Room 245 Hotel Offices on drawing AE702 shows GYP, but the schedule shows OPEN/ACT-1.
 - A. 245 Hotel Offices, part of the room is ACT-1 finish, and part of the room is open to above, with a GYP finish.
- 35. Question on page AE801 sections, 101, 107, and 108. The drawings state that the spec is PT-2, however the finished schedule states EP-2. Can you please clarify what the correct spec is?
 - A. Floor finish in rooms 101, 107 and 108 should be PT-2.
- 36. Rooms 307, 309, 317, 313, 312, 328, and 325 are showing access panels, but they don't have labels. Please clarify.
 - A. Access panels to be tagged with keynote 24. See revised AE103.
- 37. The demountable partitions in rooms155, 157, 321 and 323 have two different hatchings. Are these different types of window film? Please clarify.
 - A. Revised to be all privacy film hatch. See revised sheets AE741 and AE743.
- 38. On plan sheet D-101, Demolition Keynote #3 states "Remove portion of exterior wall. See D-201 for dimensions.". Note #3 is indicated in several locations on plan sheets D-101 & D-102. Details 2 & 4 on D-201 show a 10' wide dimension, but do not clearly state what this dimension represents. Please clarify.
 - A. 10'-0" dimension is referred to keynote 3. See revised D-201.
- 39. Regarding the Headquarters Building: Please advise if the sills at the Headquarters building are solid surface per the finish schedule AE641 and various details and that the side and head jambs are drywall.
 - A. Yes, sills to be solid surface, side and head jambs are drywall.
- 40. Assemblies XA, XB, and XC on AE001 indicate "Dense Pack Cellulose Insulation (R-20)," however there is no specification for dense pack cellulose. Please provide a specification.
 - A. Dense Pack Cellulose is being revised to Mineral Wool. This has been added to the Thermal Insulation Specification Section 072100.
- 41. Exterior wall assemblies on sheets AE510 and AE511 indicate "4-1/2" Rigid Insulation." Please advise on the corresponding spec section for this application. There are several spec sections that pertain to "rigid insulation." None of the related spec sections in 1.1, B. Related Requirements provide additional information as suggested.
 - A. Specification section 072100-Thermal Insulation has been updated to identify material for various locations. Please refer to 2.3.A for masonry walls and 2.4.A for non-masonry walls.
- 42. Mineral wool insulation is indicated in wall assembly 1G, however there is no corresponding specification section. Please provide specification.
 - A. This has been added to the Thermal Insulation Specification Section 072100.
- 43. Some details (4/AE511) show a single layer of 4.5" rigid insulation while others (1/AE511) show one layer of 2.5" insulation and a second layer of 2" insulation. Is the intent to use one or two layers of rigid insulation?
 - A. The intent is to use two layers of insulation with staggered joints.

ELECTRICAL

- 1. Q: Per Sheet ET101 Note 1, & ET501, ET502 Detail 3, please confirm the Electrical Sub to provide all Telecommunications backboxes, Raceways, Pull Strings, Cable Trays.
 - A: Confirmed
- 2. Q: Please confirm Telecommunications Horizontal Cabling, Backbone Cabling, Devices, Terminations, Labeling and Certifications are by Owner.
 - A: Confirmed.
- 3. Q: Please confirm the Electrical Sub to provide all backboxes, Raceways, and cabling for Audio Visual systems. (No Specs Provided) Please provide specifications for the system equipment and rack info shown on sheet ET101.
 - A: The electrical subcontractor will provide backboxes and raceways for the AV system. The AV system will be part of the FFE package and has not been fully designed yet.
- 4. Q: Per Detail 5 & 6 Sheet ET502, please confirm the Electrical Sub to provide all backboxes, Raceways for the Access Control System Hardware
 - A: Confirmed.
- 5. Q: Per Detail 1 Sheet ET502 & Drawing Note 1, Please confirm all Access Control System Hardware devices, cabling, and hardware for a complete operating system by Owner.
 - A: The electrical sub must provide the access control system and coordinate with Honeywell for programming and installation as this system must be an extension of the existing system. Refer to general note 14 on drawing E-001.
- 6. Q: Per Detail 2 Sheet ET502, please confirm Electrical Sub to provide all Surveillance System backboxes and raceways.
 - A: Confirmed.
- 7. Q: Per Detail 2 Sheet ET502 & Drawing Note 1, please confirm all Surveillance System devices, cabling, and hardware for a complete operating system is by Owner.
 - A: The electrical sub must provide the CCTV system (Cat6 cabling provided by others) and coordinate with Honeywell for programming and installation as this system must be an extension of the existing system. Refer to general note 14 on drawing E-001.
- 8. Q: Please confirm the Electrical Sub is to provide Fire Alarm backboxes, raceways, cabling, & devices for a complete operating system.
 - A: Confirmed. Coordinate with Honeywell as this system must integrate with existing state fire alarm system.
- 9. Q: Please confirm the Electrical Sub is to provide Two Way Communications System backboxes, raceways, cabling, & devices for a complete operating system.
 - A: Confirmed
- 10. Q: Is there a preferred fire alarm vendor for the site?
 - A: Yes, Honeywell. Please see specification section 284622.11 2.2.

- Q: Keynotes on the technology plans indicate the project scope to provide pathways and boxes for communications and electronic security systems. Spec sections were provided for Division 27 and 28. Please confirm the project bid is not to include any scope besides pathways and boxes for telecommunications, data, and security wiring.
 - A: Contractor must provide boxes, conduit and pathways, for division 27 equipment. Contractor must provide the complete system for division 28 equipment.
- 12. Q: Can aluminum conductors be used for all panel feeders?
 - A: The project has been designed and specified with copper conductors.

CIVIL

 Available ledge information is contained in the boring log indicated on drawings B-101 through B-103 and the geotechnical report in section 312000 of the project specifications. Ledge information from previous underground utility installation is not available.

SPECIFICATIONS

- 1. Section 00 72 13 GENERAL CONDITIONS" **Revise** Paragraph 9.3.4 as follows:
 - For the portion of a project which is new construction, t "The Contractor shall procure and maintain Builder's Risk insurance naming the Owner, Contractor, and any Subcontractor as insureds as their interest may appear. Covered causes of loss form shall be all Risks of Direct Physical Loss, endorsed to include flood, earthquake, transit and sprinkler leakage where sprinkler coverage is applicable. Unless specifically authorized in writing by the Owner, the limit of insurance shall not be less than the initial contract amount, for the portion of the project which is new construction, and coverage shall apply during the entire contract period and until the work is accepted by the Owner."
- 2. Section 033000 CAST-IN-PLACE CONCRETE:
 - a. Paragraph 3.8: **ADD** "A. Coordinate finish of floors and slabs with each flooring type requirements.", and re-letter remaining paragraphs.
 - b. Paragraph 3.8.B.3 Float Finish: **DELETE** last word "and".
- 3. **ADD** new Section 055520 PRE-ENGINEERED STEEL PEDESTRIAN BRIDGE (attached).
- 4. **ADD** new Section 057300.10 EXTERIOR ALUMINUM MESH PANEL (attached).
- 5. **DELETE** Section 072100 THERMAL INSULATION and **REPLACE** with updated Section 072100 THERMAL INSULATION (**attached**).
- 6. **ADD** new Section 084433 FIRE-RATED GLAZED STEEL CURTAIN WALL (attached).
- 7. **DELETE** Section 085413 FIBERGLASS WINDOWS and **REPLACE** with Section 085113 ALUMINUM WINDOWS and Section 085200 WOOD WINDOWS (**attached**).
- 8. **DELETE** Section 088813 FIRE RATED GLAZING and **REPLACE** with updated Section 088813 FIRE-RESISTANT GLAZING (attached).
- 9. Geothermal piping and appurtenances are specified in Division 33 for installation outside of the foundation wall. Geothermal piping and appurtenances specified in Division 23 are for installation through the foundation wall and inside the building.

DRAWINGS (all referenced revised drawings below are included/attached)

DEMO

- 1. Sheet D-101
 - a. **ADD** general note 9.
- 2. Sheet D-201
 - a. ADD keynote 3 at 10-0" dimension.
 - b. **ADD** general note 9.

STRUCTURAL

- 1. Sheet S-001
 - a. STRUCTURAL STEEL NOTES: **ADD** note 12: "12. STONE VENEER LINTELS PER LINTEL SCHEDULE ON SHEET S-002. COORDINATE LOCATIONS AND SPANS WITH ARCHITECTURAL PLANS.".
- 2. Sheet S-002
 - a. ADD "STONE VENEER LINTEL SCHEDULE".
- 3. Sheet SB103
 - a. KEYNOTES: ADD keynote 12 "REINFORCED CONCRETE FOUNDATION WALL INFILL AT EXISTING WINDOW OPENINGS. MATCH PROFILE OF EXISTING ADJACENT FOUNDATION WALL. SEE DETAIL 7/SB503.".
 - b. 1/SB103: **ADD** concrete infill at existing windows tagged with keynote 12 at locations around the perimeter of the existing building.
 - c. 1/SB103: ADD dimensions at concrete stoops at west side of existing building.

4. Sheet SB104

- a. 1/SB104: ADD "FTG L" tag to footing at column S-3/S-B.
- 5. Sheet SB501
 - a. 1/SB501: CHANGE note "4" RIGID INSUL (R-20 MIN) FOR 2'-0", R-10 FULL SLAB (TYP)" to "4" RIGID INSUL (R-20 MIN) FOR 3'-0", R-10 FULL SLAB (TYP)".
 - b. 1/SB501: CHANGE 2'-0" dimension at under slab insulation to 3'-0".
 - c. 2/SB501: **CHANGE** note "4" RIGID INSUL (R-20 MIN) FOR 2'-0", R-10 FULL SLAB (TYP)" to "4" RIGID INSUL (R-20 MIN) FOR 3'-0", R-10 FULL SLAB (TYP)".
 - d. 2/SB501: CHANGE 2'-0" dimension at under slab insulation to 3'-0".
 - e. 3/SB501: **CHANGE** note "4" RIGID INSUL (R-20 MIN) FOR 2'-0", R-10 FULL SLAB (TYP)" to "4" RIGID INSUL (R-20 MIN) FOR 3'-0", R-10 FULL SLAB (TYP)".
 - f. 3/SB501: CHANGE 2'-0" dimension at under slab insulation to 3'-0".
 - g. 4/SB501: **CHANGE** note "4" RIGID INSUL (R-20 MIN) FOR 2'-0", R-10 FULL SLAB (TYP)" to "4" RIGID INSUL (R-20 MIN) FOR 3'-0", R-10 FULL SLAB (TYP)".
 - h. 4/SB501: CHANGE 2'-0" dimension at under slab insulation to 3'-0".
- 6. <u>Sheet SB503</u>
 - a. 1/SB503: **CHANGE** note "4" RIGID INSUL (R-20 MIN) FOR 2'-0", R-10 FULL SLAB (TYP)" to "4" RIGID INSUL (R-20 MIN) FOR 3'-0", R-10 FULL SLAB (TYP)".
 - b. 1/SB503: CHANGE 2'-0" dimension at under slab insulation to 3'-0".
 - c. 3/SB503: **CHANGE** note "4" RIGID INSUL (R-20 MIN) FOR 2'-0", R-10 FULL SLAB (TYP)" to "4" RIGID INSUL (R-20 MIN) FOR 3'-0", R-10 FULL SLAB (TYP)".
 - d. 5/SB503: **CHANGE** note "4" RIGID INSUL (R-20 MIN) FOR 2'-0", R-10 FULL SLAB (TYP)" to "4" RIGID INSUL (R-20 MIN) FOR 3'-0", R-10 FULL SLAB (TYP)".
 - e. 5/SB503: CHANGE 2'-0" dimension at under slab insulation to 3'-0".
 - f. 7/SB503: ADD detail "TYP EXIST FND WALL INFILL DETAIL".

ARCHITECTURAL

- 1. Sheet AE103
 - a. ADD general note 9.
 - b. ADD keynote 24 at access panels.

2. Sheet AE104

- a. ADD general note 9.
- b. ADD keynote 1.

3. Sheet AE120

a. **REVISE** edge of roof at CETA.

4. Sheet AE202

- a. REVISE roof fascia tags F-1
- b. **REVISE** control joint locations.
- c. **ADD** general note 4.
- d. ADD detail reference at stone accent bands.

5. Sheet AE203

- a. **REVISE** roof fascia tags F-1
- b. REVISE control joint locations
- c. **ADD** general note 4.

6. Sheet AE422

- a. **REMOVE** keynote D details 2/AE422, 6/AE422 and 16/AE422.
- 7. Sheet AE503
 - a. **REVISE** dimensions at Detail at chimney at CETA building 8/AE503.
 - b. **REVISE** gutter at details 5/AE503, 6/AE503, 7/AE503.

8. Sheet AE511

- a. ADD stone accent band detail 8/AE511.
- b. **ADD** cast stone accent band detail 9/AE511.

9. Sheet AE620

- a. **REVISE** window schedule.
- b. **REVISE** general notes 1. Basis of design: Window systems: Marvin Ultimate.
- c. REVISE callouts at window types F, G and H.

10. Sheet AE640

a. **REVISE** room finish schedule.

11. Sheet AE641

- a. **REVISE** color key/manufacturer guide.
- 12. Sheet AE741
 - a. **REVISE** privacy film hatch elevation 2/AE741.
 - b. **ADD** note storage racks NIC elevations 17/AE741, 18/AE741, 19/AE741, 20/AE741.

13. Sheet AE743

a. **REVISE** privacy film hatch elevation 2/AE743.

STORAGE BARN

- 1. Sheet AE202
 - a. **REVISE** sectional doors 001A, 002A, 004A.
 - b. **ADD** bird friendly glass hatch to windows.
- 2. Sheet AE620
 - a. REVISE window schedule notes, Basis of design, Marvin Ultimate.
 - b. **ADD** bird friendly glass hatch to windows.

MECHANICAL

- 1. Sheet M-601
 - a. **REVISE** Air Handling Unit Schedule chilled water coil and electrical parameters.
 - b. **REVISE** Geothermal Heat Pump Schedule to describe operating conditions. The capacity remains the same.
 - c. **REVISE** Pump Schedule to reduce the size of the chilled water pumps.
 - d. **REVISE** Air Conditioning Unit Schedule to add required accessories.
- 2. Sheet M-602
 - a. **REVISE** Water Cooled Condensing Unit Schedule performance and electrical parameters.
 - b. REVISE Split System Heat Pump fan Coil Schedule airflows and electrical parameters.

ELECTRICAL

- 1. **REPLACE** Drawing EP101.
- 2. **REPLACE** Drawing EP102.
- 3. **REPLACE** Drawing EP103.
- 4. **REPLACE** Drawing EP104.
- 5. **REPLACE** Drawing EP501.
- 6. **REPLACE** Drawing EP502.
- 7. **REPLACE** Drawing EP601.
- 8. **REPLACE** Drawing EP602.
- 9. **REPLACE** Drawing EP603.
- 10. **REPLACE** Drawing EP604.
- 11. **REPLACE** Drawing EP101- Barn.

CIVIL

- 1. Sheet CS102
 - a. **REVISE** Keynote pointing to the sign at Arsenal Street to be Keynote 35 (stop sign).
- 2. <u>Sheet CU101</u>
 - a. Keynote 41 requires a 3" thick concrete slab in lieu of sand bedding over the top of communications service lines. 36" min cover and concrete encasement is only required where these lines pass under roadways.
 - b. Keynote 52 denotes the existing geothermal well that is being reused.

3. Sheet C-503

a. **REVISE** vertical curbing depth and thickness on Detail 7.

4. Sheet C-506

b. **REMOVE** the "X" from below the word "sand bedding" on Detail 2.

5. <u>Sheet C-508</u>

c. **REVISE** the modular box storage chamber model on Detail 1.

END OF ADDENDUM NO. 5

CONFIDENTIAL

Background Check Authorization

A photo must accompany the request for a background check.

A "full face" photo is one in which the applicant is facing the camera directly Photo background will be a solid color Head coverings and hats are only acceptable due to religious beliefs

Print Name:				
	(First)	(Middle)	(Last)	Date of Birth
Former Name(s	and Dates Used	:		
Current Address	s Since:			
	(Mo/Y	r) (Street)	(City)	(Zip/State)
Previous Addres	ss From:			
	(Mo/Yr) (Street)	(City)	(Zip/State)
Previous Addres	ss From:			
	(Mo/Yr) (Street)	(City)	(Zip/State)
Drivers License	Number/State:		Telephone Number:	

The information contained in this application is correct to the best of my knowledge.

I hereby authorize the State of Maine, Building Control Center and its designated agents and representatives to conduct a comprehensive review of my background. I understand that the scope of the report may include, but is not limited to the following areas: verification of social security number; current and previous residences; civil and criminal history records from any criminal justice agency in any or all federal, state, county jurisdictions; driving records, birth records, and any other public records.

I further authorize written notification on a PASS / FAIL pertaining to me, to be released to the requesting Department / Agency / Bureau or agent making such requests. Written notification may include justification for a failure. All information received from this authorization will be kept in a confidential manner in order to protect the applicants personal information, including, but not limited to, addresses, social security numbers, and dates of birth.

Possible Reasons for Failure;

History of Burglary / Theft Domestic Violence Felony Conviction

Signature: _____

Date:

BCC Background 11052024

SECTION 055520 - PRE-ENGINEERED STEEL PEDESTRIAN BRIDGE

PART 1 - GENERAL

1.1 RELATED SECTIONS

- A. Section 033000 "Cast-In-Place Concrete."
- B. Section 051200 "Structural Steel Framing"

1.2 SUMMARY

- A. Section Includes:
 - 1. Exterior, pre-fabricated pedestrian bridges.

1.3 PERFORMANCE STANDARDS

- A. Governing Codes and Standards: Bridges shall be designed in accordance with the AASHTO Guide Specification for the Design of Pedestrian Bridges, latest edition, where applicable and unless otherwise stated in the document.
- B. Reference Codes and Standards:
 - 1. AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridges, 2009
 - 2. AASHTO LRFD Bridge Design Specifications, 9th edition, 2020
 - 3. AASHTO Guide Specifications for LRFD Seismic Bridge Design, latest edition
 - 4. AASHTO M 133 Standard Specification for Preservatives and Pressure Treatment Processes for Timber, latest edition
 - 5. Steel Deck Institute (SDI), C-2017 Standard for Composite Steel Floor Deck-Slabs
 - 6. AISC Part 16.1-2010 Specification for Structural Steel Buildings
 - 7. AWS D1.1 Structural Welding Code Steel, latest edition
 - 8. National Design Specification for Wood Construction, ANSI NDS, latest edition
 - 9. American Wood Preservers Association Standards, latest edition

1.4 ACTION SUBMITTALS

- A. Submittals shall comply with the requirements of Section 013300 "Submittal Procedures" and the individual sections specifying the work.
- B. Submittal Drawings: Schematic drawings and diagrams shall be submitted to the Owner for their review after receipt of order. Submittal drawings shall be unique drawings, prepared to illustrate the specific portion of the bridge(s) being fabricated.
 - 1. All relative design information such as member size, material specification, bridge reactions, dimensions, general notes, and required critical welds shall be clearly shown on the drawings.
 - 2. Drawings shall have cross referenced details and sheet numbers.

PRE-ENGINEERED STEEL PEDESTRIAN BRIDGE

- 3. All drawings shall be signed and sealed by a Professional Engineer licensed in the State of Maine
- 4. A stamped electronic soft copy shall be provided.
- 5. At minimum the following criteria must be included for approval:
 - a. All Relevant Bridge Dimensions
 - b. Bridge Cross sections
 - c. Detailing of All Connections
 - d. Member Cross sections
 - e. General Notes indicating material specifications
 - f. Weld Details
 - g. Detail of Bolted Splices (if applicable)
 - h. Signature and Seal of PE licensed in accordance with this specification
 - i. Camber Details
 - j. Anchorage to supporting reinforced concrete piers.
- C. Delegated Design Structural Calculations: Structural Calculations for the bridge superstructure shall be submitted by the bridge manufacturer. All calculations shall be signed and sealed by a Professional Engineer licensed in the State of Maine. The calculations shall include all design information necessary to determine the structural adequacy of the bridge. A stamped electronic soft copy shall be provided.
 - 1. At minimum the following criteria must be included for approval:
 - a. Applied loads and conditions for all load combinations
 - b. All resistance checks for axial, bending, and shear in each member
 - c. Structural analysis results including all input data, member design forces, member code checks and deflections.
 - d. Bolted Splice Connections (if applicable)
 - e. Bearing Plate Analysis
 - f. Critical weld connection check for each member type
 - g. Welded Tubular Connections
 - h. Anchor rod design for anchorage supporting reinforced concrete piers.
 - i. Bridge Reactions
 - j. Expansion and Contraction Requirements and/or Induced Loads

1.5 INFORMATIONAL SUBMITTALS

- A. Submittals shall comply with the requirements of Section 013300 "Submittal Procedures" and the individual sections specifying the work.
- B. Qualification data for testing agency.

1.6 QUALITY ASSURANCE

A. Welding: Welding and weld procedure qualification tests shall conform to the provisions of ANSI/AWS D1.1 "Structural Welding Code", latest edition. Filler metal shall comply with the applicable AWS Filler Metal Specification (i.e. AWS A 5.28 for the GMAW Process). For exposed, bare, unpainted applications of corrosion resistant steels (i.e. ASTM A588 and A847), the filler metal shall comply with AWS D1.1, Section 3.7.3.

- B. Welders: Each welder shall be a properly accredited operator, and shall:
 - 1. submit certification of satisfactorily passing AWS standard qualification tests for all positions with unlimited thickness of base metal.
 - 2. have a minimum of six (6) months experience in welding tubular structures and
 - 3. have demonstrated the ability to make uniform sound welds of the type required.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect and store steel pedestrian bridges from corrosion, moisture, deformation, and other damage during delivery, storage and handling during installation.

PART 2 - PRODUCTS

2.1 PRE-ENGINEERED STEEL PEDESTRIAN BRIDGES, GENERAL

- A. Materials:
 - 1. Painted Steel: Bridges which are to be painted shall be fabricated from ASTM A36, A572, or A992 and tubular sections from ASTM A500 GR B or C.
 - 2. Bolts: Field splices shall be fully bolted with ASTM A325 high strength bolts in accordance with the AASHTO Specifications for Structural Joints. Type 3 hardware shall be used for weathering steel bridge. Type 1 hardware shall be used for painted or galvanized finishes.
 - 3. Deck: Decking shall meet the following criteria:
 - Concrete decks shall be designed for concentrated load as specified in Section 2.3. The wheel loads used for deck design shall be distributed per AASHTO LRFD Bridge Design Specifications and using Steel Deck Institute C-2017 Standard for Composite Steel Floor Deck-Slabs.

2.2 BASIS-OF-DESIGN PRODUCT

- A. Basis-of-Design Product: Subject to compliance with requirements, provide "Pratt Truss, Pre-Engineered Bridge" by Bridge Brothers, Inc., 1-866-806-6564, or comparable product meeting the performance requirements.
- B. Pedestrian Bridge:
 - 1. Span: The bridge span shall be as indicated on the Drawings. The span shall be a straight line dimension measured from each end of the bridge structure.
 - 2. Width: The bridge width shall be as indicated. The width shall be the clear width to structural members or accoutrements to the structure as measured at deck level.
 - 3. Truss Style: The bridge shall be designed as a half-through Pratt truss with one (1) diagonal per panel and square ended vertical members. All vertical members, unless specified otherwise, shall be plumb or perpendicular as determined during design.

- a. Bridges may be designed utilizing an H-Section configuration where the floor beams are placed up inside the trusses or utilizing a U-Section configuration where the floor beam is welded to the bottom of the bottom chord.
- b. The distance from the top of the deck to the top and bottom truss members shall be determined by the bridge fabricator based upon structural and/or shipping requirements. When the bridge is in the floodplain, the overall height of the truss and distance from the deck to the bottom chord shall be minimized as much as possible.
- c. The top of the top chord shall not be less than forty-two inches (42") above the deck (measured from the high point of the walking surfaces).
- 4. Member Components: All members of the vertical trusses (top and bottom chords, verticals, and diagonals) shall be fabricated from square and/or rectangular structural steel tubing. Other structural members and bracing shall be fabricated from structural steel shapes or square and rectangular structural steel tubing.
- 5. Deck: Concrete decking shall be as required for structural performance, in accordance with section 2.1 of this document.
- 6. Attachments:
 - a. Horizontal Cable Rail System, stainless steel cable rails shall be placed on the structure up to a minimum height of forty-two inches (42") above the deck surfaces. Cable rails shall be placed so as to prevent a four-inch (4") sphere from passing through the truss. Cable rails shall be attached to the inside of the structure with adjustable tensioning hardware. Cable rails shall have their ends sealed and ground smooth so as to produce no sharp edges if safety rails are placed on the inside of the structure.
- 7. Camber The bridge shall have a vertical camber dimension at midspan equal to one hundred percent (100%) of the full dead load deflection.
- 8. Elevation Difference: The bridge abutments shall be constructed at the elevations indicated by the contract documents. Bridge shall have plumb verticals and flat base plates in all scenarios.
- 9. Provide manufacturer's standard integrated handrail lighting system.

2.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Structural design of the bridge shall be performed by or under the direct supervision of a license professional engineer in the State of Maine, and in accordance with recognized engineering practices and principles.
- B. Design Loads: In considering design and fabrication issues, this structure shall be assumed to be statically loaded.
 - 1. Dead Loads: The bridge structure shall be designed considering its own dead load (superstructure and original decking) only. No additional dead loading shall be considered.
 - 2. Pedestrian Live Load
 - a. Main supporting members, including girders, trusses and arches shall be designed for a pedestrian live load of ninety pounds (100lbs) per square foot of bridge walkway area. The pedestrian live load shall be applied to those areas of the

walkway so as to produce maximum stress in the member being designed. Pedestrian live loads shall NOT be reduced.

- b. Secondary members such as bridge decks and supporting floor systems, including secondary stringers, floor beams, and their connections to main supporting members shall be designed for a live load of ninety pounds (100lbs) per square foot, with no reduction allowed.
- 3. Vehicle Load: The bridge superstructure, floor system, and decking shall be designed for the following point load conditions:
 - a. An occasional twelve hundred pound (1,500lbs) four wheeled vehicle with a wheelbase and tire print area as shown in the following diagram:



All the concentrated or wheel loads shall be placed so as to produce the maximum stress in each member being analyzed. Critical stresses shall be calculated assuming there is only one (1) vehicle on the bridge at any given time. Assumptions that vehicles only travel down the center of the bridge or that the vehicle load is a uniform line load shall not be allowed.

A vehicle impact allowance shall not be required.

All the concentrated or wheel loads shall be placed so as to produce the maximum stress in each member being analyzed. Critical stresses shall be calculated assuming there is only one (1) vehicle on the bridge at any given time. Assumptions that vehicles only travel down the center of the bridge or that the vehicle load is a uniform line load shall not be allowed.

A vehicle impact allowance shall not be required.

- 4. Wind Load:
 - a. Horizontal Forces: The bridge shall be designed for a wind load as specified by AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridges, latest edition for the velocity, risk category and exposure indicated. The wind load shall be applied horizontally at right angles to the longitudinal axis of the structure.

The wind load shall be considered both in the design of the lateral load bracing system and in the design of the truss vertical members, floor beams, and their connections.

b. Overturning Forces: The effect of forces tending to overturn structures shall be calculated assuming that the wind direction is at right angles to the longitudinal axis of the structure. In addition, an upward force shall be applied at the windward

quarter point of the transverse superstructure width. This force shall be twenty pounds (20lbs) per square foot of deck.

- 5. Seismic Forces:
 - a. Design for seismic forces calculated in accordance with the AASHTO LRFD Specifications for the Design of Pedestrian Bridges for the acceleration, seismic site class, and risk category indicated.
 - b. Forces must be applied in each principle direction of the bridge.
- 6. Top Chord Railing Loads: The top chord, truss verticals, and floor beams shall be designed for lateral wind loads, per Engineering Horizontal Forces, herein and for any loads required to provide top chord stability as outlined in Engineering Top Chord Stability herein. In no case shall the load be less than fifty pounds (50lbs) per lineal foot and a two hundred pound (200lb) point load, acting concurrently, applied in any direction at any point along the top chord, or at the top of the safety system (42" or 54" above the deck level) if higher than the top chord.
- 7. Safety Rails: The safety rail system shall be designed for loading of a two hundred pound (200 lbs) point load and fifty pounds per lineal foot (50plf) acting currently applied horizontally at right angles.
- 8. Picket Railing: Picket railing shall be designed for infill loads of 50 pounds per square foot (50psf), applied horizontally at right angles.
- C. Design Limitations:
 - 1. Deflection:
 - a. Vertical Deflection: The vertical deflection of the main trusses due to service pedestrian Live Load shall not exceed one six-hundredth (1/600) of the span.

The vertical deflection of cantilever spans of the structure due to service pedestrian Live Load shall not exceed one six-hundredth (1/600) of the cantilever arm length.

The deflection of the floor beams due to service pedestrian Live Load shall not exceed one six-hundredth (1/600) of its span.

The deflection of the deck and stringers due to service pedestrian Live Load or Vehicle Load shall not exceed one three-sixtieth (1/360) of their respective spans.

The service pedestrian Live Load shall NOT be reduced for deflection checks.

- b. Horizontal Deflection: The horizontal deflection of the structure due to lateral wind loads shall not exceed one three-sixtieth (1/360) of the span.
- 2. Vibration: The fundamental frequency of the unloaded pedestrian bridge shall be no less than 3.0 Hz to avoid the first harmonic.
- 3. Minimum Thickness of Metal: The minimum thickness of all main structural steel members shall be one-quarter of an inch (1/4") nominal and be in accordance with the AISC Manual of Steel Constructions "Standard Mill Practice Guidelines". For ASTM A500 and ASTM A847 tubing, the section properties used for design shall be per the

Steel Tube Institute of North America, Hollow Structural Sections, "Dimensions and Section Properties".

- D. Analysis:
 - 1. Frequency: Frequency analysis shall be completed to determine that the bridge frame is sufficient to avoid resonance due to frequencies under normal use for the following load combinations and in accordance with section 6 of AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridges.
 - a. Service I
 - b. DL Only
 - 2. Top Chord Stability: The top chord of a half-through truss shall be considered as a column with elastic lateral supports at the panel points. Contributions of the connection stiffness between the floor beam and vertical member shall be considered in accordance with section 7.1.2 of AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridges.
 - 3. Welded Tubular Connections: All welded tubular connections shall be checked, when within applicable limits, for the limiting failure modes outlined in the ANSI/AWS D1.1 Structural Welding Code.
 - a. When outside the "validity range" defined in these design guidelines, the following limit states or failure modes shall be checked:
 - 1) Chord Wall Plastification
 - 2) Shear Yielding (Punching)
 - 3) Local Yielding of Chord Sidewalls
 - 4) Local Crippling of Chord Sidewalls
 - 5) Local Yielding of Branch Due to Uneven Load Distribution
 - b. All tubular joints shall be plain unstiffened joints and fabricated without the use of reinforcing plates, except as follows:
 - c. Floor beams hung beneath the lower chord of the structure may be constructed with or without stiffener (or gusset) plates, as required by design.
 - d. Floor beams which frame directly into the truss verticals (H-Section bridges) may be designed with or without end stiffening plates as required by design.
 - e. Where chords, end floor beams and in high profiles the top end struts weld to the end verticals, the end verticals (or connections) may require stiffening to transfer the forces from these members into the end vertical. Truss vertical to chord connections.
 - 4. Bolted Splices: Bolted splice design shall be in accordance with Section 6.13 of the "AASHTO LRFD Bridge Design Specifications" and in accordance with section 1.4 of this document. Bolted field splices shall be provided if required for shipping. Splices across the width of the bridge (in floor beams and wind braces) may be used.

2.4 FABRICATION

A. General Requirements:

- 1. Drain Holes: Provide drain holes in tubular sections at the lowest point.
- 2. Bolt Holes: Unless otherwise specified, standard holes shall be used in high-strength bolted connections. Oversize holes may be used in any or all plies of slip-critical connections. They shall not be used in bearing-type connections. Cut, drill, mechanically thermal cut, or punch bolt holes perpendicular to metal surfaces. Do not enlarge bolt holes by burning.
- 3. Bearing Holes/Slots: Cut, drill, mechanically thermal cut, or punch bearing holes/slots perpendicular to steel surfaces.

2.5 FINISHING

- A. Blast Cleaning:
 - 1. All Blast Cleaning shall use Best Management Practices in accordance with all applicable local, state and federal regulations.
 - 2. Exposed surfaces of steel shall be defined as those surfaces seen from the deck and from outside of the structures. Stringers, floor beams, lower brace diagonals and the inside face of the truss below deck and bottom face of the bottom chord shall not be blasted.
 - 3. All finishing shall be completed in manufacturer's shop prior to shipping.
- B. Painting: All exterior surfaces of steel shall be painted utilizing a 2-coat system. All exterior surfaces of steel shall be abrasively blast cleaned in accordance with SSPC-SP6 prior to application of the primer.
 - 1. Epoxy Midcoat
 - 2. Polyurethane Topcoat
 - 3. Bridges shall be provided with paint for touch up after erection.

2.6 BEARING DEVICES

- A. Bridge bearings shall consist of a setting or slide plate placed on the abutment or grout pad. The bridge bearing plate which is welded to the bridge structure shall bear on this setting plate. One end of the bridge will be fixed by fully tightening the nuts on the anchor bolts at that end. The opposite end will have finger tight only nuts to allow movement under thermal expansion or contraction.
- B. Bridges with dead load reactions of 15,000 pounds or more (at each bearing location) shall have Teflon coated steel setting plates.

2.7 ANCHORS

- A. The bridge manufacturer shall determine the number, diameter, minimum grade and finish of all anchor bolts. The anchor bolts shall be designed to resist all horizontal and uplift forces to be transferred by the superstructure to the supporting foundations.
- B. Information as to bridge support reactions and anchor bolt locations will be furnished by the

bridge manufacturer after receipt of order and after the bridge design is complete.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting the performance of the work.
 - 1. For the record, prepare written report, endorsed by the Installer, listing conditions detrimental to performance of the Work.
 - 2. Verify that foundations are within tolerances specified.
- B. Before installation, verify placement of embedded elements, including bearing plates and anchor bolts.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Delivery and Erection:
 - 1. Bridges will be delivered by truck to a location nearest to the site accessible by roads. Hauling permits and freight charges are the responsibility of the manufacturer.
 - 2. The manufacturer will notify the customer in advance of the expected arrival. Information regarding delays after the trucks depart the plant such as weather, delays in permits, re-routing by public agencies or other circumstances will be passed on to the customer as soon as possible but the expensess of such unavoidable delays will not be accepted by the manufacturer.
 - 3. The manufacturer will advise the customer of the actual lifting weights, attachment points and all necessary information to install the bridge. Lifting procedure submittals shall be the responsibility of the bridge erector. Unloading, splicing, bolting, and proper lifting equipment is the responsibility of others.
 - 4. The bridge manufacturer shall provide written inspection and maintenance procedures to be followed by the bridge owner.

END OF SECTION

SECTION 057300.10 – EXTERIOR ALUMINUM MESH PANEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Aluminum decorative railings.
- B. Related Requirements:
 - 1. Section 057300 "Decorative Metal Railings" for interior decorative railing systems.

1.3 DEFINITIONS

A. Railings: Guards, handrails, and similar devices used for protection of occupants at open-sided floor areas and for pedestrian guidance and support, visual separation, or wall protection.

1.4 COORDINATION AND SCHEDULING

- A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver items to Project site in time for installation.
- B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not meet structural performance requirements.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Submittals shall comply with the requirements of Section 013300 "Submittal Procedures" and the individual sections specifying the work.

- B. Product Data: For the following:
 - 1. Manufacturer's product lines of railings assembled from standard components.
 - 2. Grout, anchoring cement, and paint products.
- C. Shop Drawings: Include plans, elevations, sections, and attachment details.
- D. Samples for Initial Selection: For products involving selection of color, texture, or design, including mechanical finishes.
- E. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

- A. Submittals shall comply with the requirements of Section 013300 "Submittal Procedures" and the individual sections specifying the work.
- B. Qualification Data: For professional engineer.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.
- D. Evaluation Reports: For post-installed anchors, from ICC-ES.

1.8 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Build mockups as shown on Drawings.
 - 2. Build mockups for each form and finish of railing consisting of two posts, top rail, infill area, and anchorage system components that are full height and are not less than 24 inches in length.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Aluminum Decorative Railings:
 - 1. <u>Basis-of-Design Product:</u> Subject to compliance with requirements, provide "Railing Systems-Perforated Patterns," Ameteo Manufacturing Corporation, or comparable product by one of the following:
 - a. <u>Architectural Metal Works</u>.
 - b. Architectural Railings & Grilles, Inc.
 - c. Braun, J. G., Company; The Wagner Companies.
 - d. Laurence, C. R. Co., Inc.
 - e. <u>Livers Bronze Co</u>.
 - f. Hollaender Architectural Railing Systems.
 - g. Superior Aluminum Products, Inc.
 - h. <u>Wagner, R & B, Inc</u>.
- B. Source Limitations: Obtain each type of railing from single source from single manufacturer.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods, including structural analysis, preconstruction testing, field testing, and in-service performance.
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of railings and are based on the specific system indicated. See Section 016000 "Product Requirements."
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design railings, including attachment to building construction.
- B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:

- 1. Aluminum: The lesser of minimum yield strength divided by 1.65 or minimum ultimate tensile strength divided by 1.95.
- C. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
 - b. Infill load and other loads need not be assumed to act concurrently.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior railings by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.3 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.
 - 1. Provide cast-metal brackets with flange tapped for concealed anchorage to threaded hanger bolt.
 - 2. Provide either formed- or cast-metal brackets with predrilled hole for exposed bolt anchorage.
 - 3. Provide extruded-aluminum brackets with interlocking pieces that conceal anchorage. Locate set screws on bottom of bracket.

2.4 ALUMINUM

- A. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below.
- B. Extruded Bars and Shapes: ASTM B 221, Alloy 6063-T5/T52.
- C. Extruded Structural Pipe and Round Tubing: ASTM B 429/B 429M, Alloy 6063-T6.

- 1. Provide Standard Weight (Schedule 40) pipe unless otherwise indicated.
- D. Drawn Seamless Tubing: ASTM B 210, Alloy 6063-T832.
- E. Plate and Sheet: ASTM B 209, Alloy 5005-H32.
- F. Die and Hand Forgings: ASTM B 247, Alloy 6061-T6.
- G. Castings: ASTM B 26/B 26M, Alloy A356.0-T6.
- H. Perforated Metal: Aluminum sheet, ASTM B 209, Alloy 6061-T6, 0.125 inch thick, with 1-inch holes 1-1/4 inch o.c. in staggered rows.
 - 1. Basis-of-Design Product: Provide product with perforations matching "Round-Perforations Staggered Centers," Ameteo Manufacturing Corporation.

2.5 FASTENERS

- A. Fastener Materials: Unless otherwise indicated, provide the following:
 - 1. Aluminum Components: Type 304 stainless-steel fasteners.
 - 2. Dissimilar Metals: Type 304 stainless-steel fasteners.
- B. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work unless exposed fasteners are unavoidable.
 - 1. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.
- D. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193.
 - 1. Material for Exterior Locations: Alloy Group 1 (A1) stainless steel bolts, ASTM F 593/ F 539M and nuts ASTM F 594/F 594 M.

2.6 MISCELLANEOUS MATERIALS

- A. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

- C. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
 - 1. Water-Resistant Product: Where indicated provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.7 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with nonwelded connections unless otherwise indicated.
- H. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
 - 1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.
- I. Form changes in direction as follows:
 - 1. By inserting prefabricated elbow fittings.
- J. Close exposed ends of hollow railing members with prefabricated end fittings.
- K. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns, unless clearance between end of rail and wall is 1/4 inch or less.
- L. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

- 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crushresistant fillers, or other means to transfer loads through wall finishes to structural supports and to prevent bracket or fitting rotation and crushing of substrate.
- M. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- N. For railing posts set in concrete, provide stainless-steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with metal plate forming bottom closure.
- O. Perforated-Metal Infill Panels: Fabricate infill panels from perforated metal made from aluminum.
 - 1. Edge panels with U-shaped channels made from metal sheet, of same metal as perforated metal and not less than 0.043 inch thick.
 - 2. Orient perforated metal with pattern as indicated on Drawings.
- P. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

2.8 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.9 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Baked-Enamel of Powder-Coated Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacture's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - 1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 - 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
 - 1. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

- A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.
- B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

3.4 ANCHORING POSTS

- A. Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- C. Cover anchorage joint with flange of same metal as post, attached to post with set screws.
- D. Anchor posts to metal surfaces with flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
 - 1. For aluminum railings, attach posts as indicated using fittings designed and engineered for this purpose.

3.5 ATTACHING RAILINGS

- A. Anchor railing ends to concrete and masonry with brackets on underside of rails connected to railing ends and anchored to wall construction with anchors and bolts.
- B. Attach handrails to walls with wall brackets except where end flanges are used. Provide brackets with 1-1/2-inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
 - 1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
 - 2. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- C. Secure wall brackets and railing end flanges to building construction as follows:
 - 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 - 2. For hollow masonry anchorage, use toggle bolts.

3.6 CLEANING

A. Clean aluminum and stainless steel by washing thoroughly with clean water and soap, rinsing with clean water, and wiping dry.

3.7 **PROTECTION**

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Extruded polystyrene foam-plastic board insulation.
 - 2. Molded (expanded) polystyrene foam-plastic board insulation.
 - 3. Polyisocyanurate foam-plastic board insulation.
 - 4. Wood-fiber blanket insulation.
 - 5. Composite polyisocyanurate foam-plastic board insulation (nail board).
- B. Related Requirements:
 - 1. Section 072119 "Foamed-in-Place Insulation" for spray-applied polyurethane foam insulation.
 - 2. Section 075323 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing" for insulation specified as part of roofing construction.

1.2 ACTION SUBMITTALS

- A. Submittals shall comply with the requirements of Section 013300 "Submittal Procedures" and the individual sections specifying the work.
- B. Product Data: For each type of product.
- C. Sustainable Design Submittals:
 - 1. Product Data: For recycled content, indicating percentage of postconsumer and preconsumer recycled content and cost.
 - 2. Environmental Product Declaration: For each product.
 - 3. Health Product Declaration: For each product.
 - 4. Environmental Product Declaration: For each product.
 - 5. Environmental Product Declaration: For each product.
 - 6. Health Product Declaration (HPD): Provide documentation indicating that manufacturer has screened and publicly provided ingredient disclosure to 1000 ppm, and has developed an action plan to mitigate known hazards.
 - 7. Product Data: For adhesives, indicating VOC content.
 - 8. Laboratory Test Reports: For insulation, indicating compliance with the VOC emissions evaluation.
 - 9. Laboratory Test Reports: For insulation, indicating compliance with requirements for low-emitting materials.

1.3 INFORMATIONAL SUBMITTALS

- A. Submittals shall comply with the requirements of Section 013300 "Submittal Procedures" and the individual sections specifying the work.
- B. Installer's Certification: Listing type, manufacturer, and R-value of insulation installed in each element of the building thermal envelope.
 - 1. For blown-in or sprayed fiberglass and cellulosic-fiber loose-fill insulation, indicate initial installed thickness, settled thickness, settled R-value, installed density, coverage area, and number of bags installed.
 - 2. Sign, date, and post the certification in a conspicuous location on Project site.
- C. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- D. Research Reports: For foam-plastic insulation, from ICC-ES.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect foam-plastic board insulation as follows:
 - 1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
 - 2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
 - 3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes less than Class A, 25 and 450 when tested in accordance with ASTM E84.
- B. Fire-Resistance Ratings: Comply with ASTM E119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from listings of another qualified testing agency.
- C. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
- D. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.
- E. Thermal-Resistance Value (R-Value): R-value as indicated on Drawings in accordance with ASTM C518.
- F. Verify insulation complies with requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- G. Verify insulation complies with requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Verify formaldehyde emissions do not exceed 16.5 mcg/cu. m or 13.5 ppb, whichever is less, except for insulation manufactured without formaldehyde.
- H. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 15 percent.
 - 1. Verify adhesives have a VOC content of 70 g/L or less.
 - 2. Verify adhesive complies with testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION (XPS)

- A. Extruded Polystyrene Board Insulation, Type VII (Foundation/Below Slab Insulation): ASTM C578, Type VII, 25 psi minimum compressive strength.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. DiversiFoam Products
 - b. DuPont de Nemours, Inc.
 - c. Kingspan Insulation LLC
 - d. Owens Corning
 - e. The Dow Chemical Company

2.3 MOLDED (EXPANDED) POLYSTYRENE FOAM-PLASTIC BOARD INSULATION (EPS)

- A. Extruded Polystyrene Board, Type IV (Masonry Cavity Wall Insulation): ASTM C 578, Type IV, 25-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. DiversiFoam Products.
- b. Dow Chemical Company (The).
- c. Owens Corning.
- 2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.4 POLYISOCYANURATE FOAM-PLASTIC BOARD INSULATION

- A. Polyisocyanurate Board Insulation, Glass-Fiber-Mat Faced (Wall Insulation, Non-Masonry): ASTM C1289, glass-fiber-mat faced, Type II, Class 2.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Atlas Polyiso Roof and Wall Insulation
 - b. Carlisle Coatings & Waterproofing Inc
 - c. Elevate; Holcim Building Envelope
 - d. Johns Manville; a Berkshire Hathaway company
 - e. Rmax, A Business Unit of Sika Corporation
 - 2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.5 COMPOSITE POLYISOCYANURATE FOAM-PLASTIC BOARD

- A. Polyisocyanurate Board, Glass-Fiber-Mat Faced with Bonded 5/8-inch Fire Retardant Treated Plywood (FRTP) on One Face (Wall Insulation): ASTM C 1289, Type 5.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Atlas Roofing Corporation.
 - b. Carlisle Coatings & Waterproofing Inc.
 - c. Hunter Panels.
 - d. Rmax, Inc.
 - 2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.6 MINERAL-WOOL BLANKETS

A. Mineral-Wool Blanket, Unfaced: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Industrial Insulation Group, LLC (IIG-LLC).
 - b. ROCKWOOL (ROXUL Inc.).
 - c. Thermafiber, Inc.; an Owens Corning company.

2.7 INSULATION FASTENERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.
 - 1. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - 2. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation.
- B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.
- C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanizedsteel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.
- D. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.
- E. Insulation Fastener Accessories: Provide double-pointed weld pins, lagging pins, quilting pins, duct liner pins, insulation hangers, specialty washers, special caps, j-hooks, capacitor discharge annular weld pins, capacitor discharge acoustical lagging pins, and other accessory materials that are recommended in writing by insulation fastener manufacturer to produce complete insulation supports.

2.8 ACCESSORIES

- A. Insulation for Miscellaneous Voids:
 - 1. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.
- B. Miscellaneous Application Accessories:
 - 1. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.
 - 2. Crack Sealer: Closed-cell insulating foam in aerosol dispenser recommended in writing by insulation manufacturer for filling gaps in board insulation.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or those that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products, applications and applicable codes.
- B. Install insulation that is undamaged, dry, and unsolled and that has not been left exposed to ice, rain, or snow at any time.
- C. Install insulation with manufacturer's R-value label exposed after insulation is installed.
- D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF SLAB INSULATION

- A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive in accordance with manufacturer's written instructions.
- B. On horizontal surfaces, loosely lay insulation units in accordance with manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

3.4 INSTALLATION OF FOUNDATION WALL INSULATION

- A. Butt panels together for tight fit.
- B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:
 - 1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive in accordance with anchor manufacturer's written instructions.
 - 2. Space anchors in accordance with insulation manufacturer's written instructions for insulation type, thickness, and application.

C. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing in accordance with manufacturer's written instructions.

3.5 INSTALLATION OF CAVITY-WALL INSULATION

- A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches o.c. both ways on inside face and as recommended in writing by manufacturer.
 - 1. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 042000 "Unit Masonry."

3.6 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members in accordance with the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
 - 1. Detailing Foam Insulation for Voids: Apply in accordance with manufacturer's written instructions.

3.7 INSTALLATION OF BOARD INSULATION

- A. Install board insulation in accordance with manufacturer's written instructions per project applications and conditions.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
 - 1. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.8 INSTALLATION OF COMPOSITE NAIL BASE ROOF INSULATION

- A. Installation Over Cross-Laminated Timber Decking:
 - 1. Install base layer of polyisocyanurate foam-plastic insulation with end joints staggered not less than 12 inches in adjacent rows.

- a. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
- b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
- c. Make joints between adjacent insulation boards not more than 1/4 inch in width.
- d. Fill gaps exceeding 1/4 inch with insulation.
- e. Cut and fit insulation within 1/4 inch, projections, and penetrations.
- f. Mechanically attach base layer of insulation using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.
 - 1) Fasten insulation to resist indicated roof loads.
- 2. Install upper layer of composite nail base insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.
 - a. Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch in width.
 - d. Trim insulation so that water flow is unrestricted.
 - e. Fill gaps exceeding 1/4 inch with insulation.
 - f. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
 - g. Mechanically attach composite nail base roof insulation using mechanical fasteners specifically designed for fastening composite nail base roof insulation to metal decks.
 - 1) Fasten insulation to indicated roof loads.

3.9 **PROTECTION**

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.
- B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

SECTION 084433 - FIRE-RATED GLAZED STEEL CURTAIN WALL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fire-rated curtain wall systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of curtain wall framing.
- B. Related Sections include the following:
 - 1. Section 078400 "Firestopping" for perimeter fire-containment systems (safing insulation) field installed with steel fire-rated glazed curtain-wall systems.
 - 2. Section 079200 "Joint Sealants" for installation of joint sealants installed with steel firerated glazed curtain-wall systems and for sealants to the extent not specified in this Section.
 - 3. Section 084113 "Aluminum-Framed Entrances and Storefronts," 084413 "Glazed Aluminum Curtain Walls," 089119 "Fixed Louvers," and 107050 "Architectural Sunshades" for coordinating finish among aluminum fenestration units.
 - 4. Section 087100 "Door Hardware" for door hardware not provided by this Section.
 - 5. Section 088813 "Fire-Resistant Glazing."

1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 501.1-2005: Standard Test Method for Water Penetration of Windows, Curtain Walls, and Doors Using Dynamic Pressure
 - 2. AAMA 501.2-2003: Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems
 - 3. AAMA 501.4-2000 (Revised 2001): Recommended Static Test Method for Evaluating Curtain Wall and Storefront Systems Subjected to Seismic and Wind Induced Interstory Drifts
 - 4. AAMA 501.5-2005: Test Method for Thermal Cycling of Exterior Walls
 - 5. AAMA 506-2000 (Revised 2003): Voluntary Specifications for Hurricane Impact and Cycle Testing of Fenestration Products
 - 6. AAMA 1503-1998: Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections
 - 7. AAMA 2603-2002 Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
 - 8. AAMA 2604-2005 Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.

- 9. AAMA 2605-2005 Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- B. American Society for Testing and Materials (ASTM):
 - 1. Fire safety related:
 - a. ASTM E119: Methods for Fire Tests of Building Construction and Materials.
 - 2. Material related:
 - a. ASTM A 1008/A 1008M Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2007.
 - b. ASTM A 1011/A 1011M Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2006b.
 - 3. Exterior related:
 - a. ASTM E 283-04: Test Method for Determining the Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences across the Specimen
 - b. ASTM E 330-02: Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference Procedure A
 - c. ASTM E 331-04: Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
 - d. ASTM E 783-02: Test Method for Field Measurement of Air Leakage through Installed Exterior Windows and Doors
 - e. ASTM E 1105-00: 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
- C. American Welding Society (AWS):
 - 1. AWS D1.3 Structural Welding Code Sheet Steel; 2007.
- D. Builders Hardware Manufacturers Association, Inc.:
 - 1. BHMA A156 American National Standards for door hardware; 2006 (ANSI/BHMA A156).
- E. National Fire Protection Association (NFPA):
 - 1. NFPA 80: Fire Doors and Windows.
 - 2. NFPA 251: Fire Tests of Building Construction & Materials
 - 3. NFPA 252: Fire Tests of Door Assemblies
 - 4. NFPA 257: Fire Test of Window Assemblies

- F. Underwriters Laboratories, Inc. (UL):
 - 1. UL 9: Fire Tests of Window Assemblies
 - 2. UL 10 B: Fire Tests of Door Assemblies
 - 3. UL 10 C: Positive Pressure Fire Tests of Window & Door Assemblies
 - 4. UL 263: Fire tests of Building Construction and Materials
 - 5. UL-752: Ratings of Bullet-Resistant Materials
- G. American National Standards Institute (ANSI):
 - 1. ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings
- H. Consumer Product Safety Commission (CPSC):
 - 1. CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials
- I. American Society of Civil Engineers (ASCE)
 - 1. ASCE 7 Minimum Design Loads for Buildings and Other Structures; 2005

1.3 DEFINITIONS

A. Manufacturer: A firm that produces primary glass, fabricated glass or framing as defined in referenced glazing publications.

1.4 ACTION SUBMITTALS

- A. Submittals shall comply with the requirements of Section 013300 "Submittal Procedures" and the individual sections specifying the work.
- B. Product Data:
 - 1. Technical Information: Submit latest edition of manufacturer's product data providing product descriptions, technical data, Underwriters Laboratories, Inc. listings and installation instructions.
- C. Shop Drawings:
 - 1. Include plans, elevations and details of product showing component dimensions; framed opening requirements, dimensions, tolerances, and attachment to structure
- D. Structural Calculations:
 - 1. Provide structural calculations sealed by a licensed professional engineer in the State in which the project is located; prepared in compliance with referenced documents and these specifications.
- E. Samples. For following products:
 - 1. Glass sample-as provided by manufacturer

FIRE-RATED GLAZED STEEL CURTAIN WALL

- 2. Sample of frame
- 3. Verification of sample of selected finish
- F. Glazing Schedule: Use same designations indicated on drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.
- G. Warranties: Submit manufacturer's warranty.
- H. Certificates of compliance from glass and glazing materials manufacturers attesting that glass and glazing materials furnished for project comply with requirements.
 - 1. Separate certification will not be required for glazing materials bearing manufacturer's permanent label designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authority having jurisdiction.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualifications according to
 - 1. International Accreditation Service for a Type A Third-Party Inspection Body (Field Services ICC-ES Third-Party Inspections Standard Operating Procedures, 00-BL-S0400 and S0401)
 - 2. International Accreditation Service for Testing Body-Building Materials and Systems
 - a. Fire Testing
 - 1) ASTM Standards E 119
 - 2) CPSC Standards 16 CFR 1201
 - 3) NFPA Standards 251, 252, 257
 - 4) UL Standards 9, 10B, 10C, 1784, UL Subject 63
 - 5) BS 476; Part 22: 1987
 - 6) EN 1634-1
 - 7) CAN Standards S 101, S 104, S 106
- B. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).
- C. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

- E. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are classified and labeled by UL, for fire ratings indicated, based on testing according to NFPA 257 and UL 9.
- F. Fire-Rated Wall Assemblies: Assemblies complying with ASTM E119 that are classified and labeled by UL, for fire ratings indicated, based on testing in accordance with UL 263, ASTM E119.
- G. Listing and Labels Fire-Rated Assemblies: Under current follow-up service by Underwriters Laboratories® maintaining a current listing or certification. Label assemblies accordance with limits of manufacturer's listing.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle under provisions specified by manufacturer.

1.7 PROJECT CONDITIONS

- A. Obtain field measurements prior to fabrication of frame units. If field measurements will not be available in a timely manner, coordinate planned measurements with the work of other sections.
 - 1. Note whether field or planned dimensions were used in the creation of the shop drawings
- B. Coordinate the work of this sections with others effected including but not limited to: other interior and /or exterior envelope components and door hardware beyond that provided by this section.

1.8 WARRANTY

- A. Special Assembly Warranty: Manufacturer and Installer agrees to repair or replace components of fire-rated glazed steel curtain wall that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration created by wind and thermal and structural movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Water penetration through fixed glazing and framing areas.
 - e. Failure of operating components.
 - 2. Warranty Period: Five years from date of Substantial Completion.
- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

- 1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
- 2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Products: Subject to compliance with requirements, provide "Pilkington Pyrostop" fire rated glazing and "Fireframes Curtain Wall Series;" Technical Glass Products or a comparable product.

2.2 PERFORMANCE REQUIREMENTS

- A. System Description:
 - 1. Steel fire-rated glazed curtain wall system, outside glazed pressure plate, cover cap format.
 - 2. Face Widths: 2-3/8 inch wide.
 - 3. Water Drainage:
 - a. System is vertically weeped. No joint plugs or weep holes at horizontal mullions. Horizontal gaskets are notched and received by vertical gaskets.
- B. Structural Performance:
 - 1. Design and size the system to withstand structural forces placed upon it without damage or permanent set when tested in accordance with ASTM E330 using load 1.5 times the design wind loads and of 10 seconds in duration.
 - 2. Positive wind load: As indicated on the drawings.
 - 3. Negative wind Load: As indicated on the drawings.
 - 4. Member deflection: Limit deflection of the edge of the glass normal to the plane of the glass to 1/175 of the glass edge length or 3/4 inch, whichever is less of any framing member
 - 5. Accommodate movement between storefront and adjoining systems
- C. Air Infiltration: ASTM E 283; Air infiltration rate shall not exceed 0.06 cfm/ft² at a static air pressure differential of 6.24 psf.
- D. Water Resistance, (static): ASTM E 331; No leakage at a static air pressure differential of 15 psf as defined in AAMA 501.

- E. Water Resistance, (dynamic): AAMA 501.1; No leakage at an air pressure differential of 15 psf as defined in AAMA 501.
- F. Thermal Movements: Provide steel fire-rated glazed curtain-wall systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.3 MATERIALS - GLASS

- A. Low-E Coated Bird Collision glass for use in insulated exterior units See Section 088000 "Glazing."
- B. Fire Rated Glazing: For use in insulated exterior units. See Section 088813 "Fire-Resistant Glazing."
- C. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).
- D. Exterior Grade: PVB inner layer installed toward exterior.
- E. Logo: Each piece of fire-rated glazing shall be labeled with a permanent logo including name of product, manufacturer, testing laboratory (UL), fire rating period, safety glazing standards, and date of manufacture.
- F. Glazing Accessories: Manufacturer's standard compression gaskets, spacers, setting blocks and other accessories necessary for a complete installation.

2.4 MATERIALS – STEEL FRAMING

- A. Steel Curtainwall Framing System 60 min.
 - 1. Frame: Steel: Profiled steel tubing permanently joined with steel bolts.
 - 2. Insulation: Insulate framing system against effects of fire, smoke, and heat transfer from either side. Firmly pack perimeter of framing system to rough opening with mineral wool fire stop insulation or appropriately rated intumescent sealant
 - 3. Fasteners: Type recommended by manufacturer
 - 4. Glazing Gaskets, Compounds and tapes: Glaze Pilkington Pyrostop glass with approved EPDM glazing gaskets and closed cell PVC tape, or pure silicone sealant.
 - 5. Steel Pressure Plates: Formed stainless steel pressure plate with dimensions recommended by manufacturer to securely hold glazing material in place.
 - 6. Cover Caps: Formed extruded aluminum.
- B. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 1. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221.

- C. Steel Reinforcement: With manufacturer's standard corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
 - 1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 - 2. Cold-Rolled Sheet and Strip: ASTM A 611.
 - 3. Hot-Rolled Sheet and Strip: ASTM A 570/A 570M.
- D. Brackets and Reinforcements: Manufacturer's standard high-strength materials with nonstaining, nonferrous shims for aligning system components.
- E. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - 1. Where fasteners are subject to loosening or turn out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
 - 2. Reinforce members as required to receive fastener threads.
- F. Anchors: Three-way adjustable anchors that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
 - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- G. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

2.5 ACCESSORIES

- A. Exposed Fasteners: Use fasteners fabricated from Type 304 or Type 316 stainless steel.
- B. Glazing Gaskets:
 - 1. Glazing gaskets for interior or exterior applications: ASTM C 864 (extruded EPDM rubber that provides for silicone adhesion) or ASTM C1115 Standard Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories (extruded silicone).
- C. Intumescent Tape: As supplied by frame manufacturer.
- D. Setting Blocks: 1/4 inch Calcium silicate.
- E. Perimeter Anchors: Steel or 316 Stainless steel when exposed.
- F. Flashings: As recommended by manufacturer; same material and finish as cover caps.
- G. Silicone Sealant: One-Part Low Modulus, neutral cure High Movement-Capable Sealant: Type S; Grade NS; Class 25 with additional movement capability of 100 percent in extension and 50

percent in compression (total 150 percent); Use (Exposure) NT; Uses (Substrates) M, G, A, and O as applicable. (Use-O joint substrates include: Metal factory-coated with a high-performance coating; galvanized steel; ceramic tile.)

- 1. Available Products:
 - a. Dow Corning 790, 795 Dow Corning Corp.
 - b. Momentive
 - c. Tremco
- H. Intumescent Caulk: Single component, latex-based, intumescent caulk designed to stop passage of fire, smoke, and fumes through fire-rated separations; permanently flexible after cure; will not support mold growth; flame spread/smoke developed 10/10.
 - 1. Available Products:
 - a. 3M CP-25 WP+.

2.6 SLAG-WOOL-FIBER/ROCK-WOOL-FIBER INSULATION

- A. Available Manufacturers:
 - 1. Fibrex Insulations Inc.
 - 2. Owens Corning.
 - 3. Thermafiber.
 - 4. Rockwool.
- B. Unfaced, Slag-Wool-Fiber/Rock-Wool-Fiber Board Insulation: ASTM C 612, maximum flame-spread and smoke-developed indexes of 15 and 0, respectively; passing ASTM E 136 for combustion characteristics; and of the following nominal density and thermal resistivity:
 - 1. Nominal density of 4 lb/cu. ft. (64 kg/cu. m), Types IA and IB, thermal resistivity of 4 deg F x h x sq. ft./Btu x in. at 75 deg F (27.7 K x m/W at 24 deg C).
 - 2. Fiber Color: Regular color, unless otherwise indicated.

2.7 FABRICATION

- A. General:
 - 1. Fabricate components per manufacturer's installation instructions and with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
 - 2. Accurately fit and secure joints and corners. Make joints flush and weatherproof.
 - 3. Prepare components to receive anchor devices.
 - 4. Provide physical and thermal isolation of glazing from framing members.
 - 5. Provide internal guttering to drain water from joints and condensation occurring within glazing pocket.
 - 6. Fabricate anchors.

7. Arrange fasteners and attachments to be concealed from view.

2.8 POWDER COAT FINISHES

- A. Finish after fabrication.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable. Noticeable variations in the same piece are not acceptable.
- C. Interior and Exterior Steel Finishes.
 - 1. Powder-Coat Finish: Polyester Super Durable powder coating which meets AAMA 2604 for chalking and fading. Apply manufacturer's standard powder coating finish system applied to factory-assembled frames before shipping, complying with manufacturer's recommended instructions for surface preparation including pretreatment, application, and minimum dry film thickness.
 - 2. Color and Gloss: Custom color match to sample provided by Architect.
 - 3. Coordinate final color selection with color selection in Section 084413 "Glazed Aluminum Curtain Walls."

2.9 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. High-Performance Organic Finish (2-Coat Fluoropolymer): AA-C12C40R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: conversion coating; Organic Coating: manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2604 and with coating and resin manufacturers' written instructions.
 - 1. Coordinate finish color selection with color selections in Section 084113 "Aluminum-Framed Entrances and Storefronts," Section 084413 "Glazed Curtain Walls," Section 085113 "Aluminum Windows," and Section 089119 "Fixed Louvers."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions. Verify openings are sized to receive curtain wall system and sill plate is level in accordance with manufacturer's acceptable tolerances.

- B. Notify Architect of any conditions which jeopardize the integrity of the proposed fire wall / door system.
- C. Do not proceed until such conditions are corrected.

3.2 INSTALLATION

A. Install curtain wall system and glazing in accordance with the manufacturer's written instructions.

3.3 PROTECTION AND CLEANING

- A. Protect glass from damage immediately after installation by attaching crossed streamers to framing held away from the glass. Do not apply markers to the glass surface. Remove nonpermanent labels, and clean surfaces.
 - 1. Do not clean with astringent cleaners. Use a clean "grit free" cloth and a small amount of mild soap and water or mild detergent.
 - 2. Do not use any of the following:
 - a. Steam jets
 - b. Abrasives
 - c. Strong acidic or alkaline detergents, or surface-reactive agents
 - d. Detergents not recommended in writing by the manufacturer
 - e. Do not use any detergent above 77 degrees F
 - f. Organic solvents including but not limited to those containing ester, ketones, alcohols, aromatic compounds, glycol ether, or halogenated hydrocarbons.
 - g. Metal or hard parts of cleaning equipment must not touch the glass surface
- B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
- C. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

END OF SECTION

SECTION 085113 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes aluminum windows for exterior locations.
- B. Related Requirements:
 - 1. Section 084113 "Aluminum-Framed Entrances and Storefronts" and Section 084413 "Glazed Aluminum Curtain Walls" for coordinating finish among aluminum fenestration units.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review and discuss the finishing of aluminum windows that is required to be coordinated with the finishing of other aluminum work for color and finish matching.
 - 3. Review, discuss, and coordinate the interrelationship of aluminum windows with other exterior wall components. Include provisions for anchoring, flashing, weeping, sealing perimeters, and protecting finishes.
 - 4. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
 - 5. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

1.4 ACTION SUBMITTALS

- A. Submittals shall comply with the requirements of Section 013300 "Submittal Procedures" and the individual sections specifying the work.
- B. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for aluminum windows.

- C. Shop Drawings: For aluminum windows.
 - 1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
- D. Samples for Initial Selection: For units with factory-applied finishes.
 - 1. Include Samples of hardware and accessories involving color selection.
- E. Samples for Verification: For aluminum windows and components required, showing full range of color variations for finishes, and prepared on Samples of size indicated below:
 - 1. Exposed Finishes: 2 by 4 inches.
 - 2. Exposed Hardware: Full-size units.
- F. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

- A. Submittals shall comply with the requirements of Section 013300 "Submittal Procedures" and the individual sections specifying the work.
- B. Qualification Data: For manufacturer and Installer.
- C. Product Test Reports: For each type of aluminum window, for tests performed by a qualified testing agency.
- D. Field quality-control reports.
- E. Sample Warranties: For manufacturer's warranties.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.
- B. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.

1.7 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.

- b. Structural failures including excessive deflection, water leakage, condensation, and air infiltration.
- c. Faulty operation of movable sash and hardware.
- d. Deterioration of materials and finishes beyond normal weathering.
- e. Failure of insulating glass.
- 2. Warranty Period:
 - a. Window: 10 years from date of Substantial Completion.
 - b. Glazing Units: 10 years from date of Substantial Completion.
 - c. Aluminum Finish: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain aluminum windows from single source from single manufacturer.

2.2 WINDOW PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
 - 1. Window Certification: AAMA certified with label attached to each window.
- B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
 - 1. Minimum Performance Class: AW.
 - 2. Minimum Performance Grade: 50 (single-hung) and 65 (projected awning).
- C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.44 Btu/sq. ft. x h x deg F for operable windows.
- D. Solar-Heat Gain Coefficient (SHGC): NFRC 200 maximum whole window SGHC of 0.46.
- E. Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a CRF of no less than 51.
- F. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change: 120 deg F ambient; 180 deg F material surfaces.

2.3 ALUMINUM WINDOWS

- A. <u>Basis-of-Design Manufacturer:</u> Subject to compliance with requirements, provide "Ultimate Collection" Marvin Windows and Doors, or comparable product by one of the following:
 - 1. EFCO Corporation.
 - 2. <u>Kawneer North America; an Aloa company</u>.
 - 3. <u>OldCastle BuildingEnvelope</u>.
- B. Types: Provide the following types in locations indicated on Drawings:
 - 1. Projected Awning
 - 2. Single-hung
 - 3. Fixed
- C. Frames and Sashes: Aluminum extrusions complying with AAMA/WDMA/ CSA 101/I.S.2/A440.
 - 1. Thermally Improved Construction: Fabricate frames, sashes, and muntins with an integral, concealed, low-conductance thermal barrier located between exterior materials and window members exposed on interior side in a manner that eliminates direct metal-to-metal contact.
 - 2. Frame shall include window anchor clip in widths indicated on Drawings.
- D. Insulating-Glass Units: ASTM E2190. See Section 088000 "Glazing" for insulated glazing performance characteristics.
- E. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.
- F. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.
 - 1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.
- G. Projected Window Hardware:
 - 1. Gear-Type Rotary Operators: Complying with AAMA when tested according to ASTM E405, Method A. Provide operators that function without requiring the removal of screens or using screen wickets.
 - a. Type and Style: As selected by Architect from manufacturer's full range of types and styles.
 - 2. Hinges: Non-friction type, not less than two per sash.
 - 3. Lock: Lift-type throw, cam-action lock with keeper.

- H. Hung Window Hardware:
 - 1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
 - 2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.
 - 3. Tilt Lach: Releasing latch allows sash to pivot about horizontal axis to facilitate cleaning.
- I. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.
- J. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.
 - 1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.4 ACCESSORIES

- A. Subsills: Thermally broken, extruded-aluminum subsills in configurations indicated on Drawings.
- B. Column Covers: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
- C. Interior Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
- D. Panning Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
- E. Receptor System: Two-piece, snap-together, thermally broken, extruded-aluminum receptor system.
- F. Clip Anchor: Two-Piece, snap-together, extruded-aluminum clip system that anchors window in place.

2.5 INSECT SCREENS

- A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.
 - 1. Type and Location: Full, inside for projected awning and half, outside for single-hung.
- B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.
 - 1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.
- C. Aluminum Wire Fabric: 18-by-16 mesh of 0.011-inch-diameter, coated aluminum wire.

1. Wire-Fabric Finish: Charcoal gray or black.

2.6 FABRICATION

- A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.
- B. Glaze aluminum windows in the factory.
- C. Weather strip each operable sash to provide weathertight installation.
- D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- E. Provide water-shed members above side-hinged sashes and similar lines of natural water penetration.
- F. Mullions: Provide mullions and cover plates, matching window, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window unites due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.
- G. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

2.7 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.8 ALUMINUM FINISHES

- A. High-Performance Organic Finish (Two-Coat Fluoropolymer): AA-C12C40R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: conversion coating; Organic Coating: manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2605 and with coating and resin manufacturers' written instructions.
 - 1. Color and Gloss: As selected by Architect from full range of industry colors and color densities.

2. Coordinate finish selection with finish selections of Sections 084113 "Aluminum Framed Entrances and Storefronts" and Section 084413 "Glazed Aluminum Curtain Walls."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.
- C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.
- C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
 - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing Services: Testing and inspecting of installed windows shall take place as follows:
 - 1. Testing Methodology: Testing of windows for air infiltration and water resistance shall be performed according to AAMA 502.
 - 2. Air-Infiltration Testing:

- a. Test Pressure: That required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance class indicated.
- b. Allowable Air-Leakage Rate: 1.5 times the applicable AAMA/WDMA/CSA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.
- 3. Water-Resistance Testing:
 - a. Test Pressure: Two-thirds times test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.
 - b. Allowable Water Infiltration: No water penetration.
- 4. Testing Extent: Three windows of each type as selected by Architect and a qualified independent testing and inspecting agency. Windows shall be tested after perimeter sealants have cured.
- 5. Test Reports: Prepared according to AAMA 502.
- C. Windows will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.4 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
- B. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
 - 1. Keep protective films and coverings in place until final cleaning.
- C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION

SECTION 085200 - WOOD WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fiberglass-clad wood windows.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review, discuss, and coordinate the interrelationship of wood windows with other exterior wall components. Include provisions for anchoring, flashing, weeping, sealing perimeters, and protecting finishes.
 - 3. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
 - 4. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

1.3 ACTION SUBMITTALS

- A. Submittals shall comply with the requirements of Section 013300 "Submittal Procedures" and the individual sections specifying the work.
- B. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for wood windows.
- C. Sustainable Design Submittals:
 - 1. <u>Chain-of-Custody Certificates</u>: For certified wood products. Include statement of costs.
 - 2. <u>Chain-of-Custody Qualification Data</u>: For manufacturer and vendor.
- D. Shop Drawings: For wood windows.
 - 1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
- E. Samples for Initial Selection: For units with factory-applied finishes.

- 1. Include Samples of hardware and accessories involving color selection.
- F. Samples for Verification: For wood windows and components required, prepared on Samples of size indicated below:
 - 1. Exposed Finishes: 2 by 4 inches.
 - 2. Exposed Hardware: Full-size units.
- G. Product Schedule: For wood windows. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Submittals shall comply with the requirements of Section 013300 "Submittal Procedures" and the individual sections specifying the work.
- B. Qualification Data: For Installer.
- C. Product Test Reports: For each type of wood window, for tests performed by a qualified testing agency.
- D. Field quality-control reports.
- E. Sample Warranties: For manufacturer's warranties.

1.5 QUALITY ASSURANCE

- A. <u>Certified Wood</u>: Provide an invoice including vendor's chain-of-custody number, product cost, and entity being invoiced.
- B. <u>Vendor Qualifications</u>: A vendor that is certified for chain of custody by an FSC-accredited certification body.
- C. Installer Qualifications: An installer acceptable to wood window manufacturer for installation of units required for this Project.
- D. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace wood windows that fail in materials or workmanship within specified warranty period.

- 1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.
 - b. Structural failures including excessive deflection, water leakage, and air infiltration.
 - c. Faulty operation of movable sash and hardware.
 - d. Deterioration of materials and finishes beyond normal weathering.
 - e. Failure of insulating glass.
- 2. Warranty Period:
 - a. Window: 10 years from date of Substantial Completion.
 - b. Glazing Units: 10 years from date of Substantial Completion.
 - c. Fiberglass Cladding: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain wood windows from single source from single manufacturer.

2.2 WINDOW PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
 - 1. Window Certification: WDMA certified with label attached to each window.
- B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
 - 1. Minimum Performance Class: LC.
 - 2. Minimum Performance Grade: 35.
- C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.30 Btu/sq. ft. x h x deg F.
- D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.40.
- E. Sound Transmission Class (STC): Rated for not less than 26 STC when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E413.
- F. Outside-Inside Transmission Class (OITC): Rated for not less than 22 OITC when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E1332.

2.3 WOOD WINDOWS

A. Fiberglass-Clad Wood Windows:

- B. <u>Basis-of-Design Manufacturer:</u> Subject to compliance with requirements, provide "Ultimate Collection" Marvin Windows and Doors, or comparable product by one of the following:
 - a. Andersen Windows, Inc.; Andersen Corporation.
 - b. Kolbe Windows & Doors.
- C. Operating Types: Provide the following operating types in locations indicated on Drawings:
 - 1. Single hung.
 - 2. Fixed.
- D. <u>Certified Wood</u>: Certify wood products as "FSC Pure" or "FSC Mixed Credit" in accordance with FSC STD-01-001 and FSC STD-40-004.
- E. Frames and Sashes: Fine-grained wood lumber complying with AAMA/WDMA/CSA 101/I.S.2/A440; kiln dried to a moisture content of not more than 12 percent at time of fabrication; free of visible finger joints, blue stain, knots, pitch pockets, and surface checks larger than 1/32 inch deep by 2 inches wide; water-repellent preservative treated.
 - 1. Exterior Finish: Fiberglass-clad wood.
 - a. Color: As selected by Architect from manufacturer's full range.
 - 2. Interior Finish: Manufacturer's standard stain-and-varnish finish.
 - a. Exposed Unfinished Wood Surfaces: Manufacturer's standard species.
 - b. Color: As selected by Architect from manufacturer's full range.
- F. Insulating-Glass Units: ASTM E2190.
 - 1. Glass: ASTM C1036, Type 1, Class 1, q3.
 - a. Tint: As selected by Architect from manufacturer's full range.
 - b. Kind: Fully tempered where indicated on Drawings.
 - 2. Lites: Two.
 - 3. Filling: Fill space between glass lites with argon.
 - 4. Low-E Coating: Manufacturer's standard for northern climate.
- G. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.
- H. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.
 - 1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.
- I. Hung Window Hardware:

- 1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
- 2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.[**Provide custodial locks.**]
- 3. Tilt Hardware: Releasing tilt latch allows sash to pivot about horizontal axis to facilitate cleaning exterior surfaces from the interior.
- J. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.
- K. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.
 - 1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.4 ACCESSORIES

- A. Dividers (False Muntins): Provide divider grilles in designs indicated for each sash lite.
 - 1. Quantity and Type: One permanently located between insulating-glass lites.
 - 2. Material: Manufacturer's standard.
 - 3. Pattern: As indicated on Drawings.
 - 4. Profile: As selected by Architect from manufacturer's full range.
 - 5. Color: As selected by Architect from manufacturer's full range.

2.5 INSECT SCREENS

- A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.
 - 1. Type and Location: Full, outside for double-hung sashes.
- B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.
 - 1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.
 - 2. Finish for Interior Screens: Baked-on organic coating in color selected by Architect from manufacturer's full range.
 - 3. Finish for Exterior Screens: Baked-on organic coating in color selected by Architect from manufacturer's full range.
- C. Glass-Fiber Mesh Fabric: 18-by-16 mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration. Comply with ASTM D3656/D3656M.
 - 1. Mesh Color: Manufacturer's standard.

2.6 FABRICATION

- A. Fabricate wood windows in sizes indicated. Include a complete system for installing and anchoring windows.
- B. Glaze wood windows in the factory.
- C. Weather strip each operable sash to provide weathertight installation.
- D. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.
- E. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.
- C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.
- B. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

- 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing Services: Testing and inspecting of installed windows shall take place as follows:
 - 1. Testing Methodology: Testing of windows for air infiltration and water resistance shall be performed according to AAMA 502.
 - 2. Air-Infiltration Testing:
 - a. Test Pressure: That required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance class indicated.
 - b. Allowable Air-Leakage Rate: 1.5 times the applicable AAMA/WDMA/CSA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.
 - 3. Water-Resistance Testing:
 - a. Test Pressure: Two-thirds times test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.
 - b. Allowable Water Infiltration: No water penetration.
 - 4. Testing Extent: Three windows of each type as selected by Architect and a qualified independent testing and inspecting agency. Windows shall be tested after perimeter sealants have cured.
 - 5. Test Reports: Prepared according to AAMA 502.
- C. Windows will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.4 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
- B. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances.
 - 1. Keep protective films and coverings in place until final cleaning.
- C. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.
- D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION

SECTION 088813 - FIRE-RESISTANT GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fire-resistance-rated glazing.
- B. Related Sections include the following:
 - 1. Section 084433 "Fire-Rated Glazed Steel Curtain Wall" for steel framing system for fire-resistant glazing.

1.2 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

1.3 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.4 ACTION SUBMITTALS

- A. Submittals shall comply with the requirements of Section 013300 "Submittal Procedures" and the individual sections specifying the work.
- B. Product Data: For each type of product.
- C. Glass Samples: For each type of glass product; 12 inches square.
- D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. Submittals shall comply with the requirements of Section 013300 "Submittal Procedures" and the individual sections specifying the work.

- B. Qualification Data: For installers.
- C. Product Certificates: For each type of glass and glazing product, from manufacturer.
- D. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install fire-resistant glazing until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature conditions at occupancy levels during the remainder of the construction period.

1.9 WARRANTY

- A. Manufacturer's Special Warranty on Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty on Double Glazing Units with Clear Gel Fill: Manufacturer agrees to replace units that deteriorate within specified warranty period. Deterioration of double glazing units with clear gel fill is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning glass contrary to manufacturer's written instructions. Evidence of failure is the leakage of gel fill from units, air bubbles within units, or obstruction of vision by contamination or deterioration of gel.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
- B. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; deterioration of glazing materials; or other defects in construction.

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organization below unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
- B. Safety Glazing Labeling: Permanently mark glazing with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction or the manufacturer. Label shall indicate manufacturer's name, type of glass, glass thickness, and safety glazing standard with which glass complies.

2.4 GLASS PRODUCTS

- A. Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class I (clear) unless otherwise indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- B. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
 - 1. Construction: Laminate glass with polyvinyl butyral interlayer unless fire-protection or fire-resistance rating is based on another product.
 - 2. Interlayer Thickness: Provide thickness as needed to comply with requirements.
 - 3. Interlayer Color: Clear unless otherwise indicated.

2.5 FIRE-RESISTANCE-RATED GLAZING

- A. Fire-Resistance-Rated Glazing: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-resistance ratings indicated, based on testing according to ASTM E 119 or UL 263.
- B. Fire-Resistance-Rated Glazing Labeling: Permanently mark fire-resistance-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, that the glazing is approved for use in walls, and the fire-resistance rating in minutes.
- C. Laminated Glass with Intumescent Interlayers: Laminated glass made from multiple plies of uncoated, ultraclear float glass; with intumescent interlayers; and complying with 16 CFR 1201, Category II.
 - 1. <u>Basis-of-Design Product:</u> Subject to compliance with requirements, provide "Pyrostop;" Technical Glass Products or comparable product by one of the following:
 - a. <u>AGC Glass Company North America, Inc</u>.
 - b. <u>Pilkington North America</u>.
 - c. <u>SAFTI FIRST Fire Rated Glazing Solutions</u>.
 - d. <u>Technical Glass Products</u>.
 - e. <u>Vetrotech Saint-Gobain</u>.

2.6 GLAZING ACCESSORIES

- A. Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which products are used for applications and fire-protection ratings indicated.
- B. Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.
 - 1. <u>Products:</u> Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
 - a. <u>Dow Corning Corporation</u>; 795.
 - b. <u>GE Construction Sealants; Momentive Performance Materials Inc</u>.; SilGlaze II SCS2800.
 - c. <u>Tremco Incorporated</u>; Spectrem 2.
 - 2. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- C. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer
rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

- 1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
- 2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- D. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
 - 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
 - 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.7 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- C. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.8 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with manufacturing and installation tolerances, including those for size, squareness, and offsets at corners, and for compliance with minimum required face and edge clearances.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

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3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate fire side and protected side. Label or mark units as needed so that fire side and protected side are readily identifiable. Do not use materials that leave visible marks in the completed work.

3.3 GLAZING, GENERAL

- A. Use methods approved by testing agencies that listed and labeled fire-resistant glazing products.
- B. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- I. Set glass lites with proper orientation so that coatings face fire side or protected side as specified.

- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant, where indicated.
- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop, so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- D. Install gaskets so they protrude past face of glazing stops.

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3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial washaway from glass.

3.7 CLEANING AND PROTECTION

- A. Immediately after installation, remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 FIRE-PROTECTION-RATED GLAZING SCHEDULE

A. Glass Type: 45-minute fire-protection-rated glazing; film-faced ceramic glazing.

3.9 FIRE-RESISTANCE-RATED GLAZING SCHEDULE

- A. Glass Type: 120-minute fire-resistance-rated glazing with 450 deg F temperature-rise limitation; laminated glass with intumescent interlayers.
 - 1. Overall Unit Thickness: 2-3/8 inch.
 - 2. Thickness of Outdoor Lite: 6 mm.
 - 3. Outdoor Lite: Clear, fully tempered float glass.
 - 4. Interspace Content: Argon.
 - 5. Indoor Lite: Clear, fire-rated, 120 minute, laminated glass with intumescent interlayers.
 - 6. Low-E Coating: Pyrolytic on second surface with fire protection ceramic frit.
 - 7. Visible Light Transmittance: 74 percent minimum.
 - 8. Winter Nighttime U-Factor: 0.35 maximum.

NEW HEADQUARTERS BUILDING INLAND FISHERIES AND WILDLIFE – EAST CAMPUS AUGUSTA, MAINE

9. Summer Daytime U-Factor: 0.35 maximum.

END OF SECTION