



**PROPOSED ACADEMY OF AEROSPAVE ENGINEERING  
JOHN WALLACE MIDDLE SCHOOL  
Newington, Connecticut**

**Addendum #03  
02-09-2015**

**This addendum includes clarifications to:**

**Abatement, Demolition and Reconstruction Project, #094-0104 CV  
&  
Alterations Project, #094-0102 A**

**GENERAL / CLARIFICATIONS**

1. Drawing HM1.4 references soil excavation and hauling to another area of the school. Please confirm this work is by the Abatement/Demolition Contractor.

**Yes, work is the responsibility of the Abatement/Demolition Contractor, project #094-0104 CV. Same contractor is responsible for spreading soil level.**

2. Who is responsible for supplying and spreading new soil to replace soil removed during abatement/demolition?

**Soil replacement and spreading in abatement area is the responsibility of the Abatement/Demolition Contractor, project #094-0104 CV.**

3. The Environmental consultant, Enviomed Services, Inc. performed an additional test boring at the perimeter slab.

**Refer to attached SKA-02, Exterior Wall Section, for results of boring test.**

**ADDENDUM #3 - continued**

4. Enviomed Services, Inc. has issued a revised wall section regarding the PCB abatement.

Substitute the Exterior Wall Section – Wing 7, attachment, for the Wall Section – Wing 7 shown on drawing HM1.2 & HM1.3. (This is a 1-page attachment titled, Exterior Wall Section – Wing7)

5. Is there any lead or asbestos abatement in the project scope?

No, only PCB's.

6. Refer to the attached Specification sections listed below.

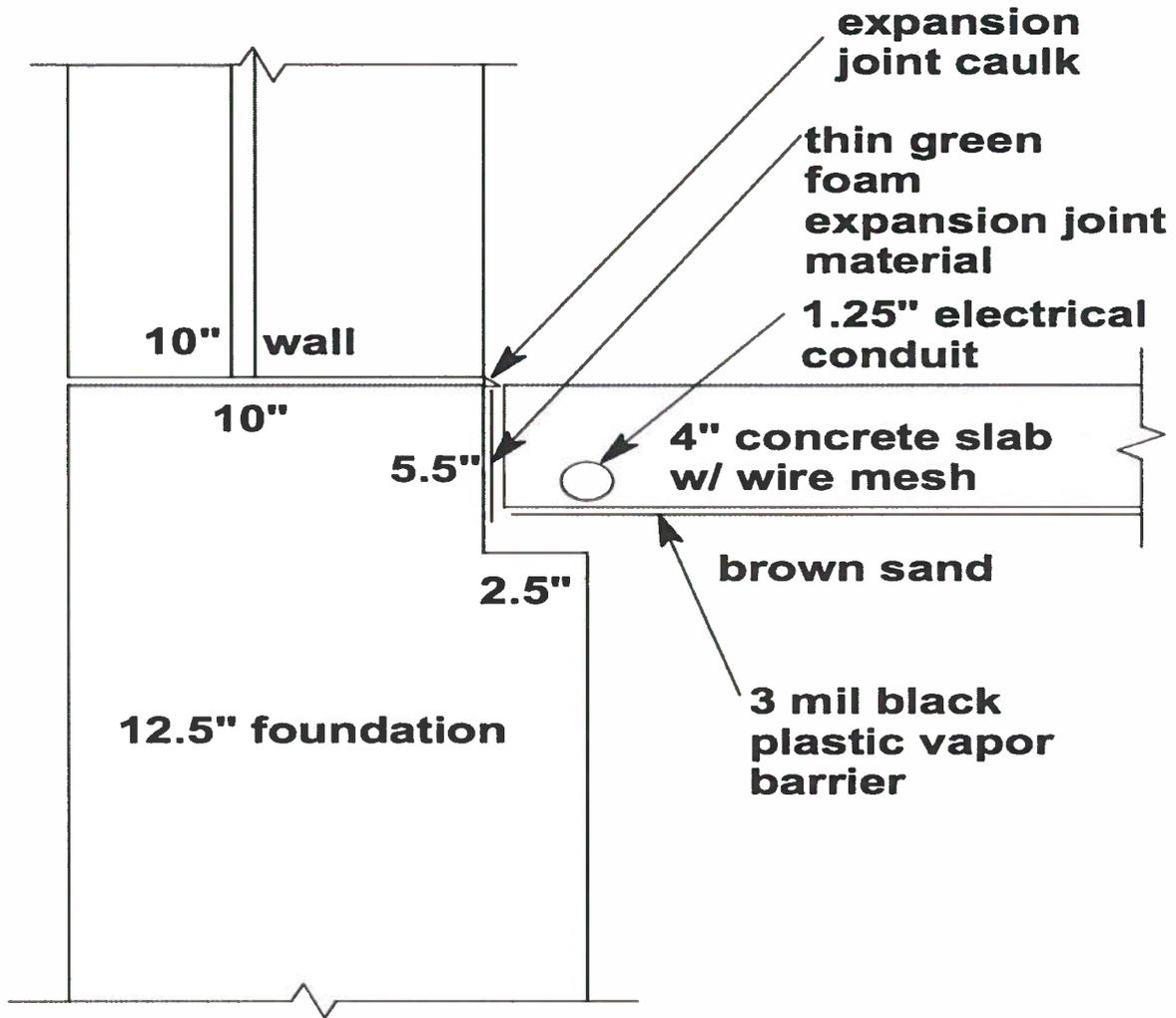
Section 074213 – METAL WALL PANELS (11-pages)

Section 085113 – ALUMINUM WINDOWS (9-pages)

Section 107113 – SUN CONTROL DEVICES (2-pages)

Section 03542 – HYDRAULIC CEMENT UNDERLAYMENT (4-pages)

END OF ADDENDUM #3 (Refer to attachments)



## EXTERIOR WALL SECTION

### Exterior Wall Section

Scale: NTS

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Academy of Aerospace Engineering Wing No.7

**John Wallace  
Middle School**

71 Halleran Drive, Newington, CT

Issue Date:

02-09-2015

Sheet #:

**SKA-02**

Addendum #3

Project #:

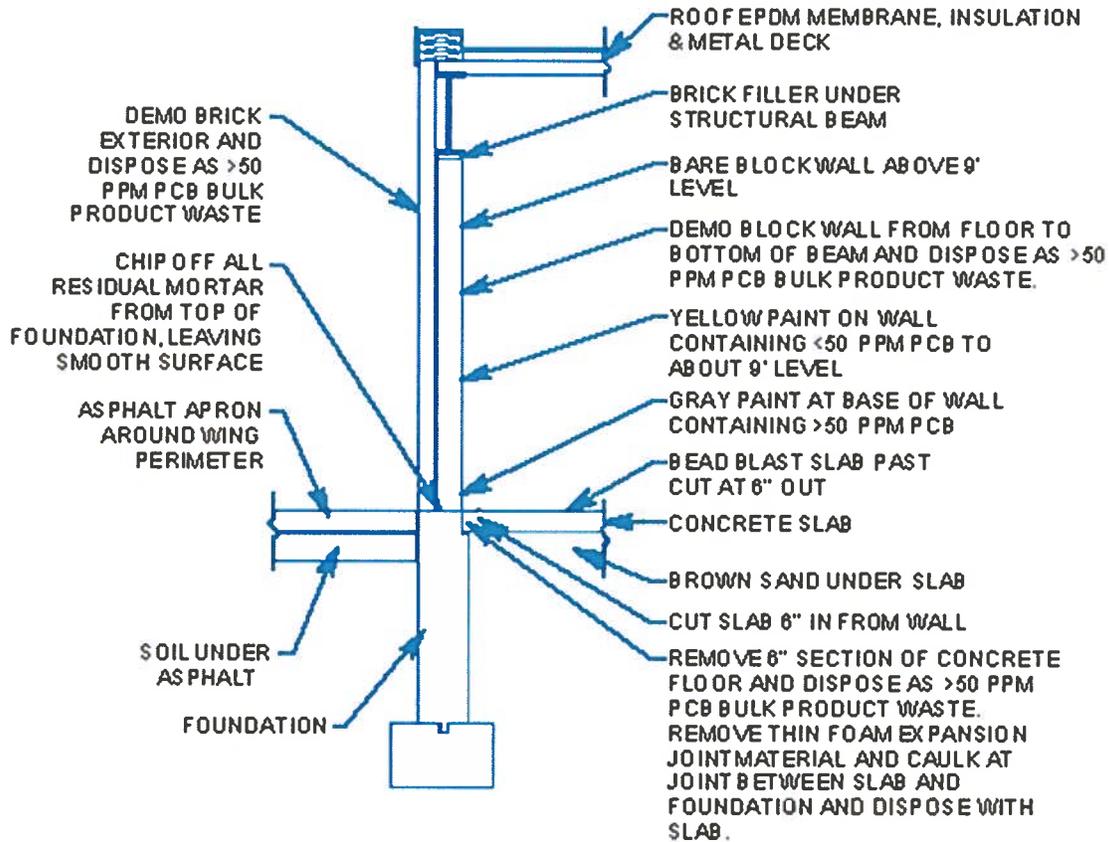
1319

Drawn By:

JL

Addendum #3 Items - EnviroMed Services

1. Substitute the Exterior Wall Section – Wing 7 shown below for the Exterior Wall Section – Wing 7 shown on Drawings HM1.2 and HM1.3.



## Exterior Wall Section - Wing 7 Scale 3/16" = 1'-0"

2. Add the following General Note 4 to Drawing HM1.2.
  4. Following the completion of wall demolition, wet wipe the roof trusses and support columns free of dust, dirt, and debris. Dispose of dust, dirt, and debris as >50 ppm PCB bulk product waste.

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SECTION 074213 – METAL PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Laminated aluminum, insulated metal wall panels
- B. Accessories including fasteners and perimeter trim

1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA)
  - 1. AAMA 501.1: Standard Test Method for Metal Curtain Walls for water penetration using Dynamic Pressure
  - 2. AAMA 501.2: Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls and Sloped Glazing Systems
  - 3. AAMA 508: Voluntary Test Method and Specification for Pressure-Equalized Rain-Screen Wall Cladding System
  - 4. AAMA 620: Voluntary Specification for High Performance Organic Coatings on Coil Coated Architectural Aluminum Substrates
  - 5. AAMA 621: Voluntary Specification for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) and Zinc-Aluminum Coated Steel Substrates
  - 6. AAMA 809.2: Voluntary Specification for Non-Drying Sealants
- B. American Society of Civil Engineers (ASCE)
  - 1. ASCE 7: Minimum Design Loads for Buildings and Other Structures
- C. ASTM International
  - 1. ASTM A653: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  - 2. ASTM A755: Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products
  - 3. ASTM A792: Standard Specification for Steel Sheet, 55 percent Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
  - 4. ASTM A924: Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
  - 5. ASTM B117: Standard Practice for Operating Salt Spray (Fog) Apparatus
  - 6. ASTM B209: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
  - 7. ASTM C209: Standard Test Methods for Cellulosic Fiber Insulating Board
  - 8. ASTM C591: Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
  - 9. ASTM C920: Standard Specification for Elastomeric Joint Sealants
  - 10. ASTM C1363: Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
  - 11. ASTM D522: Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings

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12. ASTM D523: Standard Test Method for Specular Gloss
13. ASTM D714: Standard Test Method for Evaluating Degree of Blistering of Paints
14. ASTM D968: Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
15. ASTM D1308: Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes
16. ASTM D1929: Standard Test Method for Determining Ignition Temperature of Plastics
17. ASTM D2244: Standard practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
18. ASTM D2247: Standard Practice for Testing Water Resistance of Coatings in 100 percent Relative Humidity
19. ASTM D2794: Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
20. ASTM D3273: Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
21. ASTM D3359: Standard Test Methods for Measuring Adhesion by Tape Test
22. ASTM D3363: Standard Test Method for Film Hardness by Pencil Test
23. ASTM D4145: Standard Test Method for Coating Flexibility of Prepainted Sheet
24. ASTM D4214: Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films
25. ASTM D5894: Standard Practice for Cyclic Salt Fog/UV Exposure of Painted Metal, (Alternating Exposures in a Fog/Dry Cabinet and a UV Condensation Cabinet)
26. ASTM E72: Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
27. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials
28. ASTM E283: Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
29. ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, Curtain Walls by Uniform Static Air pressure Difference
30. ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
31. ASTM E1105: Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference
32. ASTM E1233: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Cyclic Air Pressure Differential
33. ASTM F1642: Standard Test Method for Glazing Systems Subject to Airblast Loadings
34. ASTM G153: Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials
35. ASTM G154: Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

D. FM Global

1. FM 4880: Class 1 Fire Rating of Insulated Wall or Wall and Roof/Ceiling Panels, Interior Finish Materials or Coatings, and Exterior Wall Systems

E. International Building Code (IBC): current edition

F. National Fire Protection Association (NFPA)

1. NFPA 259: Standard Test Method for Potential Heat of Building Materials
2. NFPA 268: Standard Test Method for Determining Ignitibility of Exterior Wall Assemblies Using a Radiant Heat Energy Source

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3. NFPA 285: Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-bearing Wall Assemblies Containing Combustible Components

G. Underwriters Laboratories (UL)

1. ANSI/UL 263: Fire Resistance Ratings, Certifications Directory.
2. UL Canada (ULC) Approval:
  - a. CAN/ULC-S101: Standard Methods of Fire Endurance Tests of Building Construction and Materials
  - b. CAN/ULC-S102: Surface Burning Characteristics of Building Materials and Assemblies
  - c. CAN/ULC-S127: Standard Corner Wall Method of Test for Flammability Characteristics of Non-Melting Building Materials

H. International Organization for Standardization (ISO)

1. ISO 14025: Environmental Labels and Declarations

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation meeting: Conduct a pre-installation meeting at the job site attended by Owner, Architect, Manufacturer's Technical Representative, Panel Installer, and Contractors of related trades. Coordinate structural support requirements in relation to insulated wall panel system, installation of any separate air/water barriers, treatment of fenestration, and other requirements specific to the project.

1.4 SUBMITTALS

- A. Refer to Section 01 33 00 FOR Submittal Procedures.
- B. Product Data: Submit manufacturer current technical literature for each type of product.
- C. Shop Drawings: Submit detailed drawings showing:
  1. Profile
  2. Gauge of both exterior and interior sheet
  3. Location, layout and dimensions of panels
  4. Location and type of fasteners
  5. Shape and method of attachment of all trim
  6. Locations and type of sealants
  7. Installation sequence
  8. Coordination Drawings: Provide elevation drawings and building sections which show panels in relationship to required locations for structural support. Include panel details and details showing attachment to structural support.
  9. Other details as may be required for a weather tight installation
- D. Panel Analysis: Provide panel calculations to verify panels will withstand the design wind loads indicated without detrimental effects or deflection exceeding the specified limit. Include effects of thermal differential between the exterior and interior panel facings and resistance to fastener pullout.
- E. Samples: Provide nominal 3 x 5 inch of each color indicated. Provide panel width by 10 inches long minimum.

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F. Miscellaneous Certifications:

1. Submit documentation certifying that products comply with provisions of the "Buy American Act" Title 41 of the US Code Sub-sections 10a through 10d.
2. Submit documentation that products have been certified in accordance with ISO 14025.

G. Quality Assurance Submittals

1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with requirements.
  - a. Provide test report from nationally recognized testing agency to demonstrate compliance with IBC Section 1403.2.
2. Manufacturer Erection Instructions: Provide manufacturer's written installation instructions including proper material storage, material handling, and maintenance instructions.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Manufacturer shall have a minimum of five (5) years' experience in the production of insulated metal wall panels. Manufacturer shall demonstrate past experience with examples of projects of similar type and exposure.
2. Manufacturer to be registered with a Program Operator with a Certified Environmental Product Declaration, in conformance with ISO 14025, for Insulated Metal Panels.

B. Installer Qualifications:

1. Installer shall be authorized by the manufacturer and the work shall be supervised by a person having successfully completed a manufacturer training seminar regarding proper installation of the specified product.

1.6 DELIVERY, STORAGE AND HANDLING

A. Refer to Section 01 60 00 Product Requirements.

B. Deliver panel materials and components in manufacturer's original, unopened, undamaged packaging with identification labels intact.

C. Store wall panel materials on dry, level, firm, and clean surface. Stack no more than two bundles high. Elevate one end of bundle to allow moisture run-off, cover and ventilate to allow air to circulate and moisture to escape.

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1.7 WARRANTY

- A. Limited Warranty: Standard form in which manufacturer agrees to repair or replace items that fail in materials or workmanship within specified warranty period. The items covered by the warranty include structural performance including bond integrity, deflection and buckling.
  - 1. Warranty Period: TEN (10) years from date of Substantial Completion.
- B. Finish Warranty: Standard form in which manufacturer agrees to repair or replace metal panels that evidence deterioration of fluoropolymer finish, including flaking or peeling from approved primed metal substrate, chalk in excess of 8 when tested in accordance with ASTM D4214, Method A, and/or color fading in excess of 5  $\Delta E$  Hunter units on panels when tested in accordance with ASTM D2244.
  - 1. Warranty Period: Twenty (20) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Kingspan Benchmark; a division of Kingspan Insulated Panels, Inc., Or approved equal
- B. Basis of Design: Designwall 2000 Flat Panel.
- C. Substitution Limitations:
  - 1. Submit written request for approval of substitutions to the Architect Include the following information:
    - a. Name of the materials and description of the proposed substitute.
    - b. Drawings, cut sheets, performance and test data.
    - c. List of projects of similar scope and photographs of existing installations.
    - d. Test reports indicating compliance with the performance criteria.
    - e. Other information necessary for evaluation.
    - f. A letter stating the proposed substitution is a laminated panel. Foamed-in-place panels will not be accepted.
  - 2. After evaluation by Architect, approval will be issued via addendum. No verbal approval will be given.
  - 3. Substitutions following award of contract are not allowed except as stipulated in Division 01 – General Requirements.

2.2 EXTERIOR WALL PANELS

- A. Design Criteria:
  - 1. Wind Loads: Provide metal wall panel assemblies capable of withstanding the effects of the following loads and stresses, based on testing according to ASTM E 1592. Wind loads are to be based on a minimum design uniform pressure of 30 lbf/sf. Ft, acting inward or outward.
  - 2. Deflection criteria – The panel should be able to withstand wind load with horizontal deflection no greater than L/180 of the span.

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**B. Performance Criteria:**

1. **Structural Test:** Structural performance shall be verifiable by witnessed structural testing for simulated wind loads in accordance with ASTM E72 or ASTM E330.
2. **Fatigue Test:** There shall be no evidence of metal/insulation interface delamination when the panel is tested by simulated wind loads of 30 psf (positive and negative loads), when applied for two million alternate cycles.
3. **Bond Strength:** No metal primer interface corrosion and/or delamination shall occur after 1000 hours at 135 degree F and 100 percent relative humidity. No delamination shall occur after 2-1/2 hours in a 2 psi 217 degree F autoclave.
4. **Pressure Equalization:** The typical horizontal and vertical joint system shall exhibit rapid pressure equalization when subjected to cyclic external pressure fluctuations applied in accordance with ASTM E1233. Panels shall be successfully tested using procedure similar to AAMA 508; modified as appropriate for insulated foam core panels with an integral vapor barrier. The liner sheet of the panel shall be considered as the imperfect air barrier during the test procedure.
5. **Water Penetration:**
  - a. **Dynamic:** There shall be no uncontrolled water leakage when tested in accordance with AAMA 501.1 at a pressure differential of 15 psf. Test shall be conducted with the liner side seal broken.
  - b. **Static:** No uncontrolled water leakage, when tested in accordance with ASTM E331 at a 20 psf pressure differential.
  - c. **Static – 2 hour duration:** Panel system shall demonstrate no water penetration when tested in accordance with ASTM E331 at 6.24 psf pressure differential for a two (2) hour duration to satisfy International Building Code, Section 1403.2.
6. **Air Infiltration:** Air infiltration through the panel shall not exceed 0.01 cfm/sf at 20 psf air pressure differential when tested in accordance with ASTM E283.
7. **Water Absorption:** There shall be no more than 0.127 percent water absorption by volume when a 12 x 12 inch laminated insulated metal wall panel sample is subjected to a 24-hour full water submersion in accordance with ASTM C209.
8. **Thermal Performance:** Polyisocyanurate (ISO) core panels shall provide the following R-Values as tested in accordance with ASTM C1363:
  - a. 2 inch thick Flat: R-14
  - b. 3 inch thick Flat: R-21
9. **Seismic Performance:** Comply with ASCE 7, Section 13, "Seismic Design Requirements for Non-Structural Components". Panels shall be hard-fastened to structure along one edge only such that lateral slippage between panels can occur in the event of seismic activity.
10. **Fire Test Response Characteristics:** Steel-faced panels with polyisocyanurate (ISO) core shall fully comply with Chapter 26 of International Building Code regarding the use of Foam Plastic. The following tests shall be available upon request for submission to the Authority Having Jurisdiction:
  - a. **FM 4880:** Class I rated per FM Global, panels are approved for use without a thermal barrier and do not create a requirement for automatic sprinkler protection.
  - b. **ASTM E84 Surface Burning Characteristics;** Finished panel shall have a Flame Spread equal to 0, and Smoke Developed equal to 35.
  - c. **NFPA 285 Intermediate Scale Multi-story Fire Evaluation;** successfully passed acceptance criteria.
  - d. **UL 263 Fire Resistive Rating;** classified as a component of a fire-rated wall assembly for 1-hour and 2-hour rating Design No. U053 (rated assemblies include appropriate layers of fire-rated Type X Gypsum board).
  - e. **ASTM D1929 Minimum Flash and Self Ignition;** established for foam core.

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- f. NFPA 259 Potential Heat Content; established for foam core.
  - g. NFPA 268 Exposure to a Radiant Heat Energy Source; successfully passed acceptance criteria.
  - h. S101, S102, S127 UL Canada fire test standards; successfully passed.
11. Regional and International Approvals: Steel-faced panels with polyisocyanurate (ISO) foam core shall have the following specific approvals in-place:
- a. Miami-Dade County, Florida N.O.A. No. 09-0713.01 High Velocity Hurricane Zone Rated (expires May 20, 2014).
  - b. Florida Product Approval: Report No. FL-4656.2, Florida Building Code for Non-Hurricane Zones.
  - c. UL Canada Approval: File R22398, evaluation for compliance with the requirements of the Canadian National Building Code.
12. Insulating Core: Polyisocyanurate (ISO) core, ASTM C591 Type IV, CFC and HCFC free, compliant with Montreal Protocol and Clean Air Act, with the following minimum physical properties:
- a. Density Nominal: 2.1 pcf
  - b. Shear Strength: 27 psi
  - c. Compressive Strength: 26 psi
  - d. Tensile Strength: 33 psi
  - e. Closed Cell Content: 95 percent minimum
  - f. FM Global approvals: Class 1 per FM 4880
  - g. Surface burning characteristics of unfaced foam core when tested in accordance with ASTM E84:
    - 1) Flame Spread: less than 25
    - 2) Smoke Developed: less than 195
  - h. Ignition characteristics when tested in accordance with ASTM D1929:
    - 1) Self-Ignition: 896 degrees F, minimum
    - 2) Flash Ignition: 833 degrees F, minimum
  - i. Potential Heat Content per NFPA 259: 11,281 BTU/lb.
- C. Exterior Paint Finish Characteristics for Panels meeting the requirements of AZ50 Galvalume® and AAMA 620 for coil-coated aluminum:
- 1. Gloss:  $15 \pm 5$  measured at 60 degree angle tested in accordance with ASTM D523.
  - 2. Pencil Hardness: HB-H minimum tested in accordance with ASTM D3363.
  - 3. Flexibility, T-Bend: 1-2T bend with no adhesion loss when tested in accordance with ASTM D4145.
  - 4. Flexibility, Mandrel: No cracking when bent 180 degrees around a 1/8 mandrel as tested in accordance with ASTM D522.
  - 5. Adhesion: No adhesion loss tested in accordance with ASTM D3359.
  - 6. Reverse Impact: No cracking or adhesion loss when impacted 3000 x inches of metal thickness (lb-in), tested in accordance with ASTM D2794.
  - 7. Abrasion Resistance: Nominal 65 liters of falling sand to expose 5/32 inch diameter of metal substrate when tested in accordance with ASTM D968.
  - 8. Graffiti Resistance: Minimal effect.

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9. Acid Pollutant Resistance: No effect when subjected to 30 percent sulfuric acid for 18 hours, or 10 percent muriatic acid for 15 minutes when tested in accordance with ASTM D1308.
10. Salt Fog Resistance: Passes 1000 hours, when tested in accordance with ASTM B117 (5 percent salt fog at 95 degrees F).
11. Cyclic Salt Fog and UV Exposure: Passes 2016 hours when tested in accordance with ASTM D5894.
12. Humidity Resistance: Passes 1500 hours at 100 percent relative humidity and 95 degrees F, with a test rating of 10 when tested in accordance with ASTM D2247 and D714.
13. Color Retention: Passes 5000 hours when tested in accordance with ASTM G153 and G154.
14. Chalk Resistance: Maximum chalk is a rating of 8 when tested in accordance with ASTM D4214, Method A.
15. Color Tolerances: Maximum of 5 $\Delta$ E Hunter units on panels when tested in accordance with ASTM D2244.

D. Exterior Aggregate Finish Characteristics:

1. Moisture Resistance: 14 days exposure with no deleterious effects when tested in accordance with ASTM D2247.
2. Salt Spray: 1000 hours, no deleterious effects when tested in accordance with ASTM B117.
3. Abrasion Resistance: 500 liters of sand, no deleterious effects when tested in accordance with ASTM D968.
4. Freeze/Thaw (60 cycles): No checking, cracking or splitting.
5. Mold Resistance: No growth of mold when tested per ASTM D3273.
6. Flame Spread: Less than 25, Class 1 rating when tested in accordance with ASTM E84.

E. Panel Assembly:

1. Panel thickness: 3 inches thick.
2. Panel width Flat Panels: As indicated on drawings.
3. Panel joint shall consist of fasteners and attachment clip completely concealed within the joint. Panel joint shall have two distinct lines of defense against water infiltration using continuous finned rubber gasket seal on both face and liner sheet. Horizontal panels shall have a nominal gutter height of 2 7/8 inches.
4. Exterior Face of Panel:
  - a. Material:
    - 1) Coil material shall be in accordance with ASTM A755.
    - 2) Gauge: 0.040 (aluminum)
  - b. Profile: Flat
    - 1) Flat profile to have no flutes, planking, or mild profiling of any type. Reveal width shall be as indicated on the Drawings.
  - c. Texture: Smooth
  - d. Exterior Paint Finish Color:
    - 1) Selected from current Kingspan Insulated Panels color chart.
    - 2) Finish System:
      - a) 2.4 mil. Fluoropolymer (PVDF) Three Coat system: 0.8 mil primer with 0.8 mil Kynar 500 (70 percent) SOLID color coat and 0.8 mil clear coat.

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- e. Exterior Aggregate Finish:
  - 1) Baked epoxy primer with factory applied 12 mil dry film thickness finish coat of acrylic bonder and silica aggregate.
    - a) Silica Aggregate Color: Selected from current Kingspan Insulated Panels GRANITSTONE color chart.
    - b) Quartz Aggregate Color: Selected from current Kingspan Insulated Panels GRANITSTONE QUARTZ color chart.
  
- 5. Interior Face of Panel:
  - a. Material:
    - 1) Coil material shall be ASTM B209, 3003-H14 aluminum.
    - 2) Gauge: 0.040 inch (aluminum)
  - b. Profile: Standard flat, non-profiled
  - c. Texture: Smooth
  - d. Interior Finish: Modified polyester finish with a total minimum dry film thickness of 0.9 to 1.1 mil including primer.
    - 1) Color: Custom color as selected by Architect.
  
- 6. Insulating Core: Precured, profiled, sanded flat, and fully inspected prior to lamination. Core material shall be polyisocyanurate (ISO).
- 7. Structural Adhesive: Type II Class 2 Structural Urethane Adhesive, 100 percent solids and 100 percent solvent free, evaluated and listed for sandwich panel construction by ICC Evaluation Service or other recognized agency.

### 2.3 ACCESSORIES

- A. Fasteners: Fasteners as recommended by manufacturer.
- B. Clips: Shall be zinc-plated C1050 annealed spring steel, heat-treated to nominal 150 ksi yield strength.
- C. Perimeter Trim:
  - 1. Fabricated perimeter trim and metal flashing: Shall be same gauge, material and coating color as exterior face of insulated metal wall panel.
  - 2. Extruded perimeter trim: Shall be extruded aluminum 6063-T5 alloy with spray applied PVF coating in same color as exterior face of insulated metal wall panel.
- D. Butyl Weather Barrier Sealant: Non-skinning butyl tube sealant per panel manufacturer's recommendations compliant with AAMA 809.2.
- E. Vertical joint gasket (for horizontal panel applications):
  - 1. Material: Extruded Santoprene® rubber gasket shall have a finned profile. Vertical joint gasket shall give the appearance of a recessed and tooled caulk joint and be capable of accommodating joint with variations from 3/8 to 3/4 inch due to normal construction tolerances.
  - 2. Color: Custom color, non-metallic, to match panel color

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- F. Sealants at exposed joints: Elastomeric polyurethane sealant compliant with ASTM C920.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Provide field measurements to manufacturer as required to achieve proper fit of the preformed wall panel envelope. Measurements shall be provided in a timely manner so that there is no impact to construction or manufacturing schedule.
- B. Supporting Steel: All structural supports required for installation of panels shall be by others. Support members shall be installed within the following tolerances:
1. Plus or minus 1/8 inch in 5 feet in any direction along plane of framing.
  2. Plus or minus 1/4 inch cumulative in 20 feet in any direction along plane of framing.
  3. Plus or minus 1/2 inch from framing plane on any elevation.
  4. Plumb or level within 1/8 inch at all changes of transverse for performed corner panel applications.
  5. Verify that bearing support has been provided behind vertical joints of horizontal panel systems and horizontal joints of vertical panel systems. Width of support shall be as recommended by manufacturer.
- C. Examine individual panels upon removing from the bundle; notify manufacturer of panel defects. Do not install defective panels.

#### 3.2 PANEL INSTALLATION

- A. Installation shall be in accordance with manufacturer's installation guidelines and recommendations.
- B. Install panels plumb, level, and true-to-line to dimensions and layout indicated on approved shop drawings.
- C. Cut panels prior to installing, where indicated on shop drawings, using a power circular saw with fine tooth carbide tip blade per manufacturer's instructions. Ventilate area where polyurethane dust is generated. Personnel should wear respiratory and eye protection devices.
- D. Butyl Weather Barrier Sealant:
1. Apply non-skinning butyl sealant as shown on shop drawings and manufacturer's installation instructions as necessary to establish the vapor barrier for the panels.
  2. Use non-skinning butyl tube sealant only for tight metal-to-metal contact.
  3. Do not use non-skinning butyl tube sealant to bridge gaps.
- E. Place panel fasteners through pre-punched holes in attachment clips, concealed within the joint of the panel. Secure units to the structural supports. Space clips as recommended by manufacturer or otherwise indicated on the approved shop drawings.

#### 3.3 TRIM INSTALLATION

- A. Place trim and trim fasteners only as indicated per details on the approved shop drawings.

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- B. Field drill weep holes where appropriate in horizontal trim; minimum 1/4 inch diameter at 24 inches on center.
- C. Place a continuous strip of butyl tape or butyl tube sealant on closure trims for the length of the panel to be covered by trim.

3.4 SEALANT INSTALLATION FOR EXPOSED JOINTS

- A. Clean and prime surfaces to receive exterior exposed sealants in accordance with sealant manufacturer's recommendations.
- B. Follow sealant manufacturer's recommendations for joint width-to-depth ratio, application temperature range, size and type of backer rod, and compatibility of materials for adhesion.
- C. Direct contact between butyl and silicone sealants shall not be permitted.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: General Contractor shall engage an independent testing and inspection agency acceptable to the architect to perform field tests and inspections and to prepare reports of findings.
- B. Field Water Test: After completing portion of metal wall panel assembly including accessories and trim, test a 2-bay area selected by the architect for water penetration in accordance with AAMA 501.2 or ASTM E1105.

3.6 CLEANING AND PROTECTION

- A. Remove protective film immediately after installation.
- B. Touch-up, repair or replace metal panels and trim that have been damaged.
- C. After metal wall panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

END OF SECTION

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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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes fixed and operable aluminum-framed windows for exterior locations.
- B. Related Sections include the following:
  - 1. Division 8 Section "Glazed Aluminum Curtain Walls" for incorporating aluminum windows into glazed curtain walls and for coordinating finish among aluminum fenestration units.

1.3 DEFINITIONS

- A. Performance class designations according to AAMA/WDMA 101/I.S.2/NAFS:
  - 1. AW: Architectural.
  - 2. HC: Heavy Commercial.
- B. Performance grade number according to AAMA/WDMA 101/I.S.2/NAFS:
  - 1. Design pressure number in pounds force per square foot used to determine the structural test pressure and water test pressure.
- C. Structural Test Pressure: For uniform load structural test, is equivalent to 150 percent of the design pressure.
- D. Minimum Test Size: Smallest size permitted for performance class (gateway test size). Products must be tested at minimum test size or at a size larger than minimum test size to comply with requirements for performance class.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified, and that are of minimum test size indicated below:
  - 1. Size required by AAMA/WDMA 101/I.S.2/NAFS for gateway performance for both gateway performance and optional performance grade.
  - 2. Size indicated on Drawings.

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- B. Structural Performance: Provide aluminum windows capable of withstanding the effects of the following loads, based on testing units representative of those indicated for Project that pass AAMA/WDMA 101/I.S.2/NAFS, Uniform Load Structural Test:
1. Design Wind Loads: Determine design wind loads applicable to Project from basic wind speed indicated in miles per hour at 33 feet above grade, according to ASCE 7, Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.
    - a. Basic Wind Speed (IBC 1609.3): 100 mph.
    - b. Importance Factor (IBC 1604.5): III
    - c. Exposure Category (IBC 1609.4): B
  2. Deflection: Design glass framing system to limit lateral deflections of glass edges to less than 1/175 of glass-edge length or 3/4 inch, whichever is less, at design pressure based on testing performed according to AAMA/WDMA 101/I.S.2/NAFS, Uniform Load Deflection Test or structural computations.
- C. Windborne-Debris Resistance: Provide glazed windows capable of resisting impact from windborne debris, based on the pass/fail criteria as determined from testing glazed windows identical to those specified, according to ASTM E 1886 and testing information in ASTM E 1996 and requirements of authorities having jurisdiction.
- D. 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 (Range): 120 deg F, ambient; 180 deg F material surfaces.

1.5 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of aluminum window indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other work, operational clearances, installation details, and the following:
1. Mullion details, including reinforcement and stiffeners.
  2. Joinery details.
  3. Expansion provisions.
  4. Flashing and drainage details.
  5. Weather-stripping details.
  6. Thermal-break details.
  7. Glazing details.
  8. Window cleaning provisions.
  9. For installed products indicated to comply with design loads, include structural analysis data prepared by or under the supervision of a qualified professional engineer detailing fabrication and assembly of aluminum windows and used to determine the following:
    - a. Structural test pressures and design pressures from wind loads indicated.

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- b. Deflection limitations of glass framing systems.
  - C. Samples for Initial Selection: For units with factory-applied color finishes.
    - 1. Include similar Samples of hardware and accessories involving color selection.
  - D. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.
  - E. Qualification Data: For Installer, manufacturer and testing agency.
  - F. Field quality-control test reports.
  - G. Product Test Reports: Based on evaluation of comprehensive tests performed within the last four years by a qualified testing agency for each type, class, grade, and size of aluminum window. Test results based on use of downsized test units will not be accepted.
  - H. Maintenance Data: For operable window sash, operating hardware, weather stripping and finishes to include in maintenance manuals.
  - I. Warranty: Special warranty specified in this Section.
- 1.6 QUALITY ASSURANCE
- A. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.
    - 1. Installer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
    - 2. Engineering Responsibility: Preparation of data for aluminum windows, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
  - B. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.
  - C. Source Limitations: Obtain aluminum windows through one source from a single manufacturer.
  - D. Product Options: Information on Drawings and in Specifications establishes requirements for aluminum windows' 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 preconstruction testing, field testing, and in-service performance.
  - E. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum windows and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements." Do not modify size and dimensional 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.

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- F. Fenestration Standard: Comply with AAMA/WDMA 101/I.S.2/NAFS, "North American Fenestration Standard Voluntary Performance Specification for Windows, Skylights and Glass Doors," for definitions and minimum standards of performance, materials, components, accessories, and fabrication. Comply with more stringent requirements if indicated.
  - 1. Provide AAMA-certified aluminum windows with an attached label.
- G. Glazing Publications: Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.

**1.7 PROJECT CONDITIONS**

- A. Field Measurements: Verify aluminum window openings by field measurements before fabrication and indicate measurements on Shop Drawings.
  - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating aluminum windows without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

**1.8 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which 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, air infiltration, or condensation.
    - c. Faulty operation of movable sash and hardware.
    - d. Deterioration of metals, other materials, and metal finishes beyond normal weathering.
    - e. Failure of insulating glass.
  - 2. Warranty Period:
    - a. Window: Ten years from date of Substantial Completion.
    - b. Glazing: 10 years from date of Substantial Completion.
    - c. Metal Finish: 20 years from date of Substantial Completion.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. EFCO Corporation. - Basis of design Series 450X
  - 2. Kawneer; an Alcoa Company.

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3. Wausau Window and Wall Systems.

2.2 WINDOW

- A. Window Type: As indicated on Drawings.
- B. AAMA/WDMA Performance Requirements: Provide aluminum windows of performance indicated that comply with AAMA/WDMA 101/I.S.2/NAFS unless more stringent performance requirements are indicated.
  - 1. Performance Class and Grade: Not less than HC 70
- C. Air Infiltration: Maximum rate not more than indicated when tested according to AAMA/WDMA 101/I.S.2/NAFS, Air Infiltration Test.
  - 1. Maximum Rate: 0.3 cfm/sq. ft. of area at an inward test pressure of 1.57 lbf/sq. ft.
- D. Water Resistance: No water leakage as defined in AAMA/WDMA referenced test methods at a water test pressure equaling that indicated, when tested according to AAMA/WDMA 101/I.S.2/NAFS, Water Resistance Test.
  - 1. Test Pressure: 15 percent of positive design pressure, but not less than 2.86 lbf/sq. ft. or more than 15 lbf/sq. ft.
  - 2. Test Pressure: 20 percent of positive design pressure, but not more than 15 lbf/sq. ft.
- E. Forced-Entry Resistance: Comply with Performance Grade 20 requirements when tested according to ASTM F 588.
- F. Life-Cycle Testing: Test according to AAMA 910 and comply with AAMA/WDMA 101/I.S.2/NAFS.
- G. Operating Force and Auxiliary (Durability) Tests: Comply with AAMA/WDMA 101/I.S.2/NAFS for operating window types indicated.

2.3 GLAZING

- A. Glass and Glazing Materials: Refer to Division 8 Section "Glazing" for glass units and glazing requirements applicable to glazed aluminum window units.

2.4 HARDWARE

- A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely lock aluminum windows, and sized to accommodate sash or ventilator weight and dimensions. Do not use aluminum in frictional contact with other metals. Where exposed, provide nonmagnetic stainless steel.

2.5 INSECT SCREENS

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- A. General: Design windows and hardware to accommodate screens in a tight-fitting, removable arrangement, with a minimum of exposed fasteners and latches. Fabricate insect screens to fully integrate with window frame. Locate screens on outside of window and provide for each operable exterior sash or ventilator.
  - 1. Comply with SMA 1004, "Specifications for Aluminum Tubular Frame Screens for Windows," for minimum standards of appearance, fabrication, attachment of screen fabric, hardware, and accessories unless more stringent requirements are indicated.
- B. Aluminum Insect Screen Frames: Manufacturer's standard aluminum alloy complying with SMA 1004. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners and removable PVC spline/anchor concealing edge of frame.
  - 1. Aluminum Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet with minimum wall thickness as required for class indicated.
  - 2. Finish: Baked-on organic coating in manufacturer's standard color.

2.6 FABRICATION

- A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.
- B. Fabricate aluminum windows that are reglazable without dismantling sash or ventilator framing.
- C. Thermally Improved Construction: Fabricate aluminum windows 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.
  - 1. Provide thermal-break construction that has been in use for not less than three years and has been tested to demonstrate resistance to thermal conductance and condensation and to show adequate strength and security of glass retention.
  - 2. Provide thermal barriers tested according to AAMA 505; determine the allowable design shear flow per the appendix in AAMA 505.
  - 3. Provide hardware with low conductivity or nonmetallic material for hardware bridging thermal breaks at frame or vent sash.
- D. Weather Stripping: Provide full-perimeter weather stripping for each operable sash and ventilator.
  - 1. Horizontal-Sliding Windows: Provide operable sash with a double row of sliding weather stripping in horizontal rails and single- or double-row weather stripping in meeting or jamb stiles, as required to meet specified performance requirements. Provide compression-type weather stripping at perimeter of each movable panel where sliding-type weather stripping is not appropriate.
  - 2. Vertically Pivoted Windows: Provide double-row weather stripping.
- E. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- F. Provide water-shed members above side-hinged ventilators and similar lines of natural water penetration.
- G. Mullions: Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for

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movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of window units.

- H. Subframes: Provide subframes with anchors for window units as shown, of profile and dimensions indicated but not less than 0.062-inch thick extruded aluminum. Miter or cope corners, and weld and dress smooth with concealed mechanical joint fasteners. Finish to match window units. Provide subframes capable of withstanding design loads of window units.
- I. Factory-Glazed Fabrication: Glaze aluminum windows in the factory where practical and possible for applications indicated. Comply with requirements in Division 8 Section "Glazing" and with AAMA/WDMA 101/I.S.2/NAFS.
- J. Glazing Stops: Provide snap-on glazing stops coordinated with Division 8 Section "Glazing" and glazing system indicated. Provide glazing stops to match sash and ventilator frames.

## 2.7 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" 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: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. 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.

## 2.8 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.
- C. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
  - 1. Organic Coating: Thermosetting, modified-acrylic or polyester enamel primer/topcoat system complying with AAMA 2603, except with a minimum dry film thickness of 1.5 mils medium gloss.
  - 2. Color: As selected by Architect from manufacturer's full range.
- D. 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).

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Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2604 and with coating and resin manufacturers' written instructions.

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

### 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 work. Verify rough opening dimensions, levelness of sill plate, and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight window installation.
  1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
  2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches (76 mm) of opening.
  3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
  4. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.
- 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.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.
- D. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- E. 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 and prepare test reports.
  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:

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1. Testing Methodology: Testing of windows for air infiltration and water resistance shall be performed according to AAMA 502, Test Method A or B, by applying same test pressures required to determine compliance with AAMA/WDMA 101/I.S.2/NAFS in Part 1 "Performance Requirements" Article.
  2. Testing Extent: Three windows as selected by Architect and a qualified independent testing and inspecting agency. Windows shall be tested immediately after installation.
  3. Test Reports: Shall be prepared according to AAMA 502.
- C. Remove and replace noncomplying aluminum window and retest as specified above.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- 3.4 ADJUSTING, CLEANING, AND PROTECTION
- A. Adjust operating sashes and ventilators, screens, hardware, operators, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.
  - B. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
  - C. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.
- 3.5 DEMONSTRATION
- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain window operating system. Refer to Division 1 Section "Demonstration and Training."

END OF SECTION 08520

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SECTION 107113 – SUN CONTROL DEVICES

**PART 1 – GENERAL**

**1.1 RELATED DOCUMENTS**

- A. The drawings and provisions of the General Conditions, and the sections included under Division 1 specification sections , apply to this section

**1.2 SUMMARY**

- A. This section includes horizontal and/or vertical aluminum sun control assemblies

**1.3 PERFORMANCE REQUIREMENTS**

- A. Structural performance: provide exterior sun control device assemblies capable of withstanding the effects of load and stresses from wind loads, dead loads, snow loads and normal and expected thermal movement without evidence of permanent defects of the assemblies. System design for a mechanically fastened assembly to substructure.
  - 1. Wind Load as required by applicable building code
  - 2. Dead Load as required by applicable building code
  - 3. Snow Load as required by applicable building code
  - 4. Snow Drift Load as required by applicable building code
- B. Design sun control device to eliminate vibration harmonics; wind whistles; and noises cause by thermal movement.

**1.4 SUBMITTALS**

- A. Product Data: Manufacturer’s company literature
- B. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish.
- C. Structural Calculations: submit complete engineering calculations to support design.
- D. Finish Samples: submit color samples for final approval

**1.5 QUALITY ASSURANCE**

- A. Engineering Qualifications: Provide Engineering calculations for the sunshade system and mounting brackets, prepared by an engineer registered in the state the project is located
- B. Manufacturer Qualifications: Minimum of Five years experience in manufacturing of exterior sun control devices
- C. Installer Qualifications: Acceptable to manufacturer

**1.6 DELIVERY, STORAGE AND HANDLING**

- A. Delivery: deliver sun control devices in manufacturer’s crates packaged for long haul transit
- B. Storage: store materials in a dry and safe area
- C. Handling: handle materials to avoid any damage to materials and finishes

**1.7 WARRANTY**

- A. The contractor must warrant the materials to be free of defects in accordance with the general conditions. Finish warranty shall be extended by paint manufacturer’s standard warranty.

**PART 2 – PRODUCTS**

**2.1 MANUFACTURER**

- a. AmeriClad Exterior Sunshade devices or approved equal

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**2.2 MATERIALS**

- A. Aluminum Sheet: ASTM B209, Alloy 6061-T6, 5005-H34 or 3003-H14
- B. Aluminum Extrusions: ASTM B221, Alloy 6063-T6 and/or 6061-T6

**2.3 FABRICATION**

- A. Factory assembled sun control devices for a turnkey installation
- B. Blades will be mechanically fastened with stainless steel screws to the outriggers. Spot welds only to be used where mechanical fastening of parts is prohibitive.
- C. Maintain blade spacing per approved shop drawings

**2.4 HORIZONTAL/VERTICAL SUN CONTROL DEVICES**

- A. Outrigger: See construction documents
- B. Blade: See construction documents
- C. Facia: See construction documents

**2.5 SUN CONTROL DESIGN**

- A. Choose AmeriClad Design
  - a. Series AC-100 (Airfoil)

**2.6 FINISHES**

- A. High Performance Coating: Organic coating: Clean and prime exposed aluminum surfaces and apply a Kynar 500 finish conforming to AAMA 2605, color to be determined by the architect

**PART 3 – EXECUTION**

**3.1 PREPARATION**

- A. Coordinate drawings, diagrams, fixtures, instructions and instructions for installation of anchors to structure.

**3.2 INSTALLATION**

- A. Attach anchorage to structure per shop drawing
- B. Install sun control device units level and plumb

**3.3 CLEANING AND PROTECTING**

- A. Clean exposed surfaces after installation per manufacturers recommendations
- B. Touch up minor abrasions in finish with touch up paint supplied by finish applicator.

**END OF SECTION**

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SECTION 03542 - HYDRAULIC CEMENT UNDERLAYMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 1 Section "Summary", Paragraph 1.1A, entitled "Related Documents."

1.2 SUMMARY

A. Section includes hydraulic-cement-based, polymer-modified, self-leveling underlayment for application below interior floor coverings.

B. Related Sections include the following:

1. Division 9 Section "Resilient Tile Flooring" for patching and leveling compounds applied with floor coverings.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Plans indicating substrates, locations, and average depths of underlayment based on survey of substrate conditions.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer Certificates: Signed by manufacturers of both underlayment and floor covering system certifying that products are compatible.

B. Qualification Data: For Installer.

C. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.

B. Product Compatibility: Manufacturers of both underlayment and floor covering system certify in writing that products are compatible.

C. Mockups: Apply hydraulic-cement-based underlayment mockups to demonstrate surface finish, bonding,

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1. Apply mockups approximately 100 sq. ft. in area in location indicated or, if not indicated, as directed by Architect.

2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

#### 1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.

#### 1.7 PROJECT CONDITIONS

A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature and humidity, ventilation, and other conditions affecting underlayment performance.

1. Place hydraulic-cement-based underlayments only when ambient temperature and temperature of substrates are between 50 and 80 deg F.

#### 1.8 COORDINATION

A. Coordinate application of underlayment with requirements of floor covering products, including adhesives, specified in Division 09 Sections, to ensure compatibility of products.

### PART 2 - PRODUCTS

#### 2.1 HYDRAULIC-CEMENT-BASED UNDERLAYMENTS

A. Underlayment: Hydraulic-cement-based, polymer-modified, self-leveling product that can be applied in minimum uniform thicknesses of 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Ardex; K-15 Self-Leveling Underlayment Concrete.
- b. Laticrete International, Inc.; Laticrete 88 Latilevel.
- c. Teck Specialties; Teck 2800.
- d. Thoro Underlayment.

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2. Cement Binder: ASTM C 150, portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C 219.
3. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.
4. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer formulated for
  - B. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch; or coarse sand as recommended by underlayment manufacturer.
  1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.
- C. Water: Potable and at a temperature of not more than 70 deg F.
- D. Reinforcement: For underlayment applied to wood substrates, provide galvanized metal lath or other corrosion-resistant reinforcement recommended in writing by underlayment manufacturer.
- E. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.
  1. Primer shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for conditions affecting performance.
  1. Proceed with application only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. General: Prepare and clean substrate according to manufacturer's written instructions.
  1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
  2. Fill substrate voids to prevent underlayment from leaking.
- B. Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other

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contaminants that might impair underlayment bond.

1. Moisture Testing: Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates do not exceed a maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.

C. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions..

### 3.3 APPLICATION

A. General: Mix and apply underlayment components according to manufacturer's written instructions.

1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.

2. Coordinate application of components to provide optimum underlayment-to-substrate and intercoat adhesion.

3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.

B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Apply underlayment to produce uniform, level surface.

1. Apply a final layer without aggregate to produce surface.

2. Feather edges to match adjacent floor elevations.

D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.

E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.

F. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

### 3.4 PROTECTION

A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION 03542

**ADDENDUM #3 - continued**

**END OF ADDENDUM #3 ATTACHMENTS**