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SECTION 07 42 13
METAL WALL PANELS

Kingspan BENCHMARK
Kingspan Designwall 2000 Series Laminated Wall Panel System
QuadCore®-B insulation core

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Laminated [steel], 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 501.4: Recommended Static Test Method for Evaluating Window Wall, Curtain Wall, and Storefront Systems Subjected to Seismic and Wind-Induced Inter-Story Drift
- 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 C272: Standard Test Method for Water Absorption of Core Materials for Sandwich Constructions
 6. ASTM C273: Standard Test Method for Shear Properties of Sandwich Core Materials
 7. ASTM C591: Standard Specification for Unfaced Preformed Rigid
 8. ASTM D1621: Standard Test Method for Compressive Properties of Rigid Cellular Plastics
 9. ASTM D1622: Standard test Method for Apparent Density of Rigid Cellular Plastics
 10. ASTM D1623: Standard Test Method for Tensile and Tensile Adhesion of Rigid Cellular Plastics
 11. ASTM D1929: Standard Test Method for Determining Ignition Temperature of Plastics
 12. ASTM D6226: Standard Test Method for Open Cell Content of Rigid Cellular Plastics
 13. ASTM E72: Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
 14. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials
 15. 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
 16. ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, Curtain Walls by Uniform Static Air pressure Difference
 17. ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
 18. 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
- D. FM Global (FM)
1. Approval Standard 4880; Class 1 Fire Rating of Insulated Wall or Wall and Roof/Ceiling Panels, Interior Finish Materials or Coatings, and Exterior Wall Systems. Approval Standard
 2. 4881; Class 1 Exterior Wall Systems. Approval Standard
- E. International Building Code (IBC): current edition
- F. Underwriters Laboratories (UL)
1. UL 1715: Fire Test of Interior Finish Material
- G. 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

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

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 Submittal Procedures] [insert section number and title].
- 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 weathertight 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] [Insert size].

F. LEED Submittals:

1. Energy and Atmosphere
 - a. Energy Analysis: Demonstrating percentage of performance improvement compared with the baseline building performance rating.
2. Materials and resources
 - a. Building Life-Cycle Impact Reduction
3. Building product disclosure and optimization
 - a. Environmental Product Declaration (EPD) conforming to ISO 14025, 14040, 14044, EN 15804 or ISO 21930 with a Cradle to Grave
 - b. Sourcing of Raw Materials: publically released reports that comply with LEED requirements for raw material source and extraction reporting
4. Indoor Environmental Quality
 - a. Low Emitting Materials: Compliance sheets indicating adhesives and gasket are within the published VOC emissions thresholds
5. Innovation in Design
 - a. [Documentation for Credit: [Include specific requirements related to documenting credit.]

G. 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.

H. Quality Assurance Submittals

1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with requirements.
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] [insert section number and title].
- 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.

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. Coverage under this warranty includes panel performance, bond integrity, deflection and delamination.
 1. Warranty Period: Two (2) years from date of Substantial Completion, or 2 years and 6 months from the date of shipment from manufacturer's plant, whichever occurs first.
- B. (Specifier Note: Finish warranty periods are limited by the coil coater and the coating manufacturer and the finish.) Special Panel Finish Warranty: Submit Manufacturer's limited warranty on the exterior paint finish for adhesion to the metal substrate and limited warranty on the exterior paint finish for chalk and fade.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Kingspan BENCHMARK; a division of Kingspan Insulated Panels, Inc. (www.kingspanpanels.us)
 - 1. East: 720 Marion Road, Columbus, Ohio 43207; 1-877-638-3266 (Toll Free) or 614-444-0110
 - 2. West: 2000 Morgan Road, Modesto, California 95358; 1-800-377-5110 (Toll Free) or 209-531-9091
- B. Basis of Design: [Designwall 2000 Flat Panel] [Designwall 2000S Striated Panel]
- C. Substitution Limitations:
 - 1. Submit written request for approval of substitutions to the Architect [a minimum of [14] days prior to the date for receipt of bids] [Insert time period]. 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.
 - 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: [As indicated on Drawings] [Insert positive and negative loads (psf) for Components and Cladding Zones 4 and 5].
 - 2. Deflection criteria shall be [L/180] [insert project specific deflection criteria].
- B. Performance Criteria:
 - 1. Structural Test:
 - a. Structural performance shall be verifiable by witnessed structural testing for simulated wind loads in accordance with ASTM E72 or ASTM E330. Deflection

criteria shall be [L/180] [insert project specific deflection criteria].

- b. The panels shall be FM Approved as a Class 1 Exterior Wall System. Provide metal wall panel assembly follows requirements listed in FM Approvals' "Approval Guide."

2. 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.
- b. Static: No uncontrolled water penetration when tested in accordance with ASTM E331 at a [6.24 psf, 2hrs] [20 psf, 15min] pressure differential.

- 3. Air Infiltration: Air infiltration through the panel shall not exceed 0.01 cfm/sf at [6.24 psf] [20 psf] air pressure differential when tested in accordance with ASTM E283.
- 4. Water Absorption: There shall be no more than 0.72 pcf water absorption by volume when foam core sample is subjected to a 24-hour full water submersion in accordance with ASTM C272.
- 5. Thermal Performance: QuadCore®-B panels shall provide the following R-Values as tested in accordance with ASTM C518 at 75 degree F mean temperature or as determined from thermal modeling using Therm 5.2 software developed by Lawrence Berkley Laboratories:

- | | |
|-------------------------|--------|
| | DW2000 |
| a. 2 inch thick Flat: | R-12.8 |
| b. 2.5 inch thick Flat: | R-16.0 |
| c. 3 inch thick Flat: | R-19.2 |
| d. 4 inch thick Flat: | R-25.6 |

- 6. Seismic Performance: Tested per AAMA 501.4. After 1.5" seismic racking, there shall be no water penetration at 15 psf pressure differential and no structural failure at 60 psf simulated wind pressure. 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.
- 7. Fire Test Response Characteristics: Steel-faced panels with QuadCore B 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. Surface burning characteristics of unfaced foam core when tested in accordance with ASTM E84:
 - 1) Flame Spread: less than 25 or less
 - 2) Smoke Developed: less than 450 or less
- c. NFPA 285 Intermediate Scale Multi-story Fire Evaluation; successfully passed acceptance criteria when installed per listed details.
- d. NFPA 268 Exposure to a Radiant Heat Energy Source;

- successfully passed acceptance criteria.
 - e. ASTM D1929 Minimum Flash and Self Ignition; established for foam core.
 - f. NFPA 259 Potential Heat Content; established for foam core.
 - g. UL 1715 Fire Test of Interior Finish Material. Successfully passed acceptance criteria.
 - h. FM 4880: Class I rated per FM Global, provided the panel assembly meets the requirements listed in FM Approvals' "Approval Guide."
- 8. Windborne Debris rating for Wall Panel
 - a. Meet requirements for high velocity hurricane zone with large missile impact when following Miami Dade NOA assembly requirements.
- 9. Insulating Core: QuadCore®-B, 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 per ASTM D1622: 2.1-2.6 pcf
 - b. Shear Strength per ASTM C273: 15 psi
 - c. Compressive Strength per ASTM D1621: 24 psi
 - d. Tensile Strength: 24 psi
 - e. Closed Cell Content per ASTM D6226: 95 percent minimum

C. Panel Assembly:

- 1. Panel thickness: [2 inches] [2 ½ inches] [3 inches] [4 inches] thick.
- 2. Panel width (Flat Panels and Striated Panels): [12 inches] [18 inches] [20 inches] [24 inches] [30 inches] [36 inches] [40 inches] [42 inches] [Custom] [As indicated on drawings]
- 3. Panel length: [As indicated on Drawings]
- 4. Panel joints 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 rubber gasket seals on both face and liner sheet.
- 5. Exterior Face of Panel:
 - a. Material:
 - 1) Coil material shall be in accordance with ASTM A755: [Grade 33, G90 galvanized steel in accordance with ASTM A653 and A924] [AZ50 Galvalume® / Zinalume® in accordance with ASTM A792] (contact Kingspan for project specific availability)
 - 2) Gauge: [22 (steel)] [20 (steel)]
 - b. Profile: [Flat] [Striated]

- 1) Flat profile to have no flutes, planking, or mild profiling of any type. [Reveal width shall be as indicated on the Drawings].
- 2) Striated profile to have linear striations nominal 0.035 inches deep, (2 at 5/8 inch equal to 1 1/4 inch o.c.) across the entire face width.

c. Exterior Texture: [Smooth] [Non-directional embossed]

d. Exterior Paint Finish Color:

- 1) [Selected from current Kingspan Insulated Panels color chart] [Custom color as selected by Architect] [Color indicated].

2) Finish System:

- a) [1.0 mil. Fluoropolymer (PVDF) Two Coat system: 0.2 mil primer with 0.8 mil Kynar 500 (70 percent) SOLID color coat.]
- b) [1.0 mil. Fluoropolymer (PVDF) Two Coat system: 0.2 mil primer with 0.8 mil Kynar 500 (70 percent) MICA color coat.]
- c) [1.5 mil. Fluoropolymer (PVDF) Three Coat system: 0.2 mil primer with 0.8 mil Kynar 500 (70 percent) METALLIC color coat and .5 mil clear coat.]
- d) [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.]

e. Exterior Aggregate Finish:

- 1) Baked epoxy primer with factory applied [12 mil dry film thickness] [36 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] [Custom color as selected by Architect] [Color indicated].
 - b) Quartz Aggregate Color: [Selected from current Kingspan Insulated Panels GRANITSTONE QUARTZ color chart] [Color indicated].

6. Interior Face of Panel:

a. Material:

- 1) Coil material shall be [Grade 33, G90 galvanized steel in accordance with ASTM A653 and A924] [AZ50

Galvalume® / Zincolume® in accordance with ASTM A792 (contact Kingspan for project specific availability)].

2) Gauge: [24 (steel)] [22 (steel)] [20 (steel)]

- 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: [Standard USDA Imperial White] [Selected from the current Kingspan Insulated Panels stock color chart] [same as exterior finish] [Custom color as selected by Architect] [Color indicated].

- 7. Insulating Core: Precured, profiled, sanded flat, and fully inspected prior to lamination. Core material shall be QuadCore®-B.
- 8. 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 minimum 14 gauge half-hard type 301 stainless steel with PVC or neoprene foam sealing pad adhered to underside of clip, designed to prevent water infiltration around fastener penetrations. Supplied by the manufacturer.
- 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.
- E. Sealants at exposed joints: [Elastomeric polyurethane] [Neutral cure silicone] as recommended by manufacturer.

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.
- 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

DISCLAIMER:

Kingspan Insulated Panels Guide Specifications have been written as an aid to the professionally qualified Specifier and Design Professional. The use of this Guideline Specification requires the sole professional judgment and expertise of the qualified Specifier and Design Professional to adapt the information to the specific needs for the Building Owner and the Project, to coordinate with their Construction Document Process, and to meet all the applicable building codes, regulations and laws. KINGSPAN INSULATED PANELS EXPRESSLY DISCLAIMS ANY WARRANTY, EXPRESSED OR IMPLIED, INCLUDING THE WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE OF THIS PRODUCT FOR THE PROJECT.