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**SECTION 07 42 13
METAL WALL PANELS**

Kingspan Insulated Panels
Kingspan KS42 MF Series Insulated Wall Panel System

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Steel faced, mineral wool core fire resistive insulated wall panels for [exterior walls] [interior partitions] [interior fire rated partitions] [and] [ceilings]
- B. Accessories including fasteners and perimeter trim

1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA)
 - 1. AAMA 501: Test Method for Exterior Walls
- B. 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% 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 C165: Standard Test Method for Measuring Compressive Properties of Thermal Insulations
 - 7. ASTM C303: Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation
 - 8. ASTM C518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
 - 9. ASTM C612: Standard Specification for Mineral Fiber Block and Board Thermal Insulation
 - 10. ASTM D522: Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings
 - 11. ASTM D523: Standard Test Method for Specular Gloss

12. ASTM D714: Standard Test Method for Evaluating Degree of Blistering of Paints
13. ASTM D968: Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
14. ASTM D1308: Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes
15. ASTM D2244: Standard practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
16. ASTM D2244: Standard practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
17. ASTM D2247: Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
18. ASTM D2794: Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
19. ASTM D3359: Standard Test Methods for Measuring Adhesion by Tape Test
20. ASTM D3363: Standard Test Method for Film Hardness by Pencil Test
21. ASTM D4145: Standard Test Method for Coating Flexibility of Prepainted Sheet
22. ASTM D4214: Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films
23. ASTM E72: Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
24. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials
25. ASTM E119: Standard Test Methods for Fire Tests of Building Construction and Materials
26. ASTM E136: Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750° C
27. 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
28. ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
29. ASTM E814: Standard Test Method for Fire Tests of Penetration Firestop Systems
30. ASTM G153: Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials
31. ASTM G154: Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

C. Underwriters Laboratories (UL)

1. UL 1479: Fire Tests of Through-Penetration Fire Stops
2. UL Canada (ULC) Approval:
 - a. CAN/ULC-S101: Standard Methods of Fire Endurance Tests of Building Construction and Materials
 - b. CAN/ULC-S114: Standard Method of Test for Determination of Non-Combustibility in Building Materials
 - c. CAN/ULC-S115: Standard Method of Fire Tests of Firestop Systems

1.3 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 indicate compliance with maximum deflection of L/180 for the indicated wall design loads. The design load / deflection criteria and fastening pattern shall be verified from witnessed / audited tests using the "Chamber Method" in accordance with ASTM E72. Include effects of thermal differential between the exterior and interior panel facings.
- 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 (EA)
 - a. Energy Analysis for Credit EA 1: Demonstrating percentage of performance improvement compared with the baseline building performance rating.
2. Material and Resources (MR)
 - a. Product Certificates for Credit **[MR 4] [MR 4.1[and Credit MR 4.2]]**: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
 - b. Product Certificates for Credit **[MR 5] [MR 5.1[and Credit MR 5.2]]**: For products and materials required to comply with requirements for regionally manufactured materials. Include statement indicating cost, location of manufacturer, and distance to Project for each regionally manufactured material.
3. Indoor Environmental Quality (IEQ)
 - a. Product Data for Credit **[IEQ 4.1] [EQ 4.1]**: For sealants, including printed statement of VOC content
 - b. Product Data for Credit **[IEQ 4.2] [EQ 4.2]**: For paints and coatings, including printed statement of VOC content
4. Innovation in Design (ID)
 - a. **[Documentation for Credit [ID 1] [ID 1.1]: [Include specific requirements related to documenting credit.]**

G. 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, installation sequence, panel location(s), and attachment methods, details and required trim and accessories.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer shall have a minimum of five (5) years experience in the production of fire resistive insulated metal wall panels. Manufacturer shall demonstrate past experience with examples of projects of similar type and exposure.

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.

1.5 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.
- D. Mineral fiber core shall be protected from moist air, rain and UV during construction. Stored panels must be wrapped in plastic or tarpaulins. Protect exposed mineral fiber from rain or water with plastic sheet during installation.

1.6 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: Two (2) years from date of Substantial Completion, or 2 years and 3 months from the date of shipment from manufacturer's plant, whichever occurs first.
- 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 ΔE Hunter units on panels when tested in accordance with ASTM D2244.
 1. Warranty Period: Twenty (20) years from date of Substantial Completion, or 20 years and 3 months from the date of shipment from manufacturer's plant, whichever occurs first.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Kingspan Insulated Panels Ltd. 12557 Coleraine Drive, Caledon, ON L7E 3B5 (866-442-3594); 5202-272nd Street, Langley, B.C. V4W 1S3 (866-442-3594) (www.kingspanpanels.ca); Kingspan Insulated Panels, Inc., 726 Summerhill Drive, Deland, FL 32724 (888-882-5862); 2000 Morgan Road, Modesto, CA 95358 (800-377-5110) (www.kingspanpanels.us)
- B. Basis of Design: Kingspan KS42 MF
- 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 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 WALL PANELS

- A. Performance Criteria:
 - 1. Structural Test: Structural performance shall be verifiable by witnessed structural testing for simulated wind loads in accordance with ASTM E72. Deflection criteria shall be [L/240] [insert project specific deflection criteria].
 - 2. Thermal Properties: The panel shall provide an R-value of 3.6 per inch thickness when tested in accordance with ASTM C518.
 - 3. Adhesion Test: Tensile strength in accordance with ASTM D1623.
 - 4. Penetration and Firestop Test: The finished panel with 4 inches and 6 inches thick mineral wool core and steel skins with through penetration firestop systems meet requirements of 1 hour and 2 hour fire resistance performance in accordance with ASTM E814 and UL 1479.

5. Water Penetration: There shall be no uncontrolled water penetration through the panel joints at a pressure differential of 20 psf, when tested in accordance with ASTM E331.
6. Air Infiltration: Air infiltration through the panel shall not exceed 0.001 cfm/sf at 20 psf air pressure differential when tested in accordance with ASTM E283.
7. Insulating Core:
 - a. Density: 8.5 lb. /cu. ft. +/- 10% or minimum 7.65 lb. /cu. ft., maximum 9.4 lb. / cu. ft.; in accordance with ASTM C303.
 - b. Combustibility: Non-combustible at 1382° F in accordance with ASTM E136.
 - c. Combustibility: Non-combustible when tested in accordance with ULC-S114, Flame Spread = 0, Smoke Developed = 0.
 - d. Apparent thermal conductivity: Maximum "k" factor at 75° F. mean temp. - 0.24 Btu in/h ft² °F (R=3.6 ft² °F h / Btu inch thickness) in accordance with ASTM C518.
 - e. Compressive Strength: Force applied parallel to fiber orientation (cut lamella pieces) Maximum 5% deformation at 9.2 KN of force in accordance with ASTM C165.
 - f. Dimensional stability: Linear shrinkage 2% max. at 1200° F in accordance with ASTM C612.
 - g. Moisture resistance: Water vapor absorption - 5% max. by weight in accordance with ASTM C612.
 - h. Odor emission: No objectionable odor in accordance with ASTM C612.
 - i. Surface burning characteristics when tested in accordance with ASTM E84:
 - 1) Flame Spread: 0
 - 2) Smoke Developed: 0
8. Fire Test Response Characteristics: Steel-faced panels with mineral wool core shall comply with appropriate sections of Chapter 7 of the International Building Code regarding fire-resistance-rated construction. The following approval listings/test reports shall be available upon request for submission to the Authority Having Jurisdiction:
 - a. ASTM E119: Panels shall have successfully passed the requirements of this standard.
 - b. CAN/ULC-S101: Panels shall have successfully passed the requirements of this standard.
 - c. CAN/ULC-S115: Panel penetrations shall have successfully passed the requirements of this standard.

B. Exterior Paint Finish Characteristics:

1. Gloss: 15 +/- 5 measured at 60° 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° 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.
9. Acid Pollutant Resistance: No effect when subjected to 30% sulfuric acid for 18 hours, or 10% 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% salt fog @ 95° 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% relative humidity and 95°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 5ΔE Hunter units on panels when tested in accordance with ASTM D2244.

C. Exterior Aggregate Finish Characteristics:

1. Moisture Resistance: 14 days exposure with no deleterious effects when tested in accordance with ASTM D2274.
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. Mildew Resistance: (MIL STD 801B): No growth of mildew.
6. Flame Spread: <25, Class 1 rating when tested in accordance with ASTM E84.

D. Panel Description:

1. Panel thickness: [4 inches] [6 inches] [8 inches] thick.
2. Panel width: 42 inches.
3. Fire Rating: [1 hour] [2 hour] [3 hour].
4. Panel joint: Tongue and groove interlock joint.
5. Reveal: 1/8 inch
6. Exterior Face of Panel:
 - a. Material:
 - 1) Steel coil material shall be in accordance with ASTM A755 [Grade 33, G90 galvanized steel in accordance with ASTM A653 and A924] [AZ50 Galvalume®/ Zinalume® (55% aluminum, 45% zinc) in accordance with ASTM A792].
 - b. Profile: [Shadowline].
 - 1) Profile description: Linear striations nominal 0.0625 inch deep by 3/4 inches wide at 3 inches on center.
 - c. Texture: [Non-directional stucco embossed] [Smooth].
 - d. Gauge: [26] [24] [22].
 - e. Profile: [Micro-Rib].
 - 1) Profile description: Micro-Rib profile has linear 0.0625 inch deep fluted striations at 3/4 inches on center.
 - f. Texture: [Non-directional stucco embossed] [Smooth].
 - g. Gauge: [24] [22].
 - h. Profile: [Azteco].
 - 1) Profile description: Azteco profile is flat.
 - i. Texture: Heavy (deeply) embossed.
 - j. Gauge: [24] [22].
 - k. 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. Silicone Modified Polyester finish.]
 - b) [1.0 mil. Fluoropolymer (PVDF) Two Coat system: 0.2 mil primer with 0.8 mil Kynar 500 (70%) SOLID color coat.]
 - c) [1.0 mil. Fluoropolymer (PVDF) Two Coat system: 0.2 mil primer with 0.8 mil Kynar 500 (70%) MICA color coat.]
 - d) [1.5 mil. Fluoropolymer (PVDF) Three Coat system: 0.2 mil primer with 0.8 mil Kynar 500 (70%) METALLIC color coat and .5 mil clear coat.]
 - e) [2.4 mil. Fluoropolymer (PVDF) Three Coat system: 0.8 mil primer with 0.8 mil Kynar 500 (70%) SOLID color coat and 0.8 mil clear coat.]

I. 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].

7. Interior Face of Panel:

a. Material:

- 1) Steel coil material shall be [Grade 33, G90 galvanized steel in accordance with ASTM A653 and A924] [AZ50 Galvalume®/ Zinalume® (55% aluminum, 45% zinc) in accordance with ASTM A792].

b. Profile: Shadowline.

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

d. Gauge: [26] [24].

e. Interior Finish: [modified polyester, dry film thickness of 1.0 mil including primer.] [PVDF finish, dry film thickness of 1.0 mil including primer] [Vinyl Plastisol, 4.0 mil including primer].

- 1) Color: [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].

8. Insulating Core: Rigid mineral wool insulation board, bonded with a thermal setting resin in accordance with ASTM C612.

2.3 ACCESSORIES

A. Fasteners:

1. [Exposed through-fasteners applied from the exterior side of the panel connecting both metal faces to supporting steel structure.]
2. [Hidden fasteners with clips applied from the exterior and concealed in the panel side joint connecting both metal faces to supporting steel structure.]
3. Material: Hex-head type with steel and neoprene washer and 12 gauge stainless steel clip supplied by the manufacturer.
4. Size: As recommended by manufacturer.

- B. Perimeter Trim: Required trim and metal flashing shall be steel with same coating, color, and gauge as the exterior face of the insulated metal wall panel.
- C. Sealants: [Butyl, non-skinning/curing] [Silicone, mildew resistant] type per panels manufacturer's recommendations

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 a cumulative of 1/4 inch in 20 feet in any direction along plane of framing.
 - 3. Plus or minus 1/2 inch from framing plane on any elevation.
 - 4. 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.
- D. Beginning of installation means acceptance of structure and supports for the installation of the insulated metal wall 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. Personnel should wear respiratory and eye protection devices.

- D. Apply [non-skinning butyl sealant] [silicone sealant] as shown on shop drawings and manufacturer's installation instructions so as to complete the necessary vapor barrier.
- E. Place panel fasteners through pre-punched holes in attachment clips, concealed within the joint of the panel. Space clips as recommended by manufacturer or otherwise indicated on the approved shop drawings.
 - 1. Secure units to the steel supports with manufacturer's recommended fastener. Adjacent panels shall be mechanically interlocked at their longitudinal edges with the roll-formed tongue and groove profile.
 - 2. Install horizontal panels from bottom to top. Place female side of bottom panel in base channel, clip and fasten to structural supports.
 - 3. Install vertical panels from one end of the wall to the other end. Place the female panel end in base, fasten to structural supports.

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 where indicated on shop drawings.
- C. Place a continuous strip of butyl tape or butyl sealant on closure trims for the length of the panel to be covered as indicated on shop drawings.

3.4 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.