Specifiers: Click on the ¶ icon in the WORD toolbar to reveal detailed instructions

SECTION 07 42 13
METAL WALL PANELS
Benchmark by Kingspan
Kingspan Designwall 2000 Series Laminated Wall Panel System

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Laminated [steel][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
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
2. FM 4881: Approval Standard for Class 1 Exterior Wall Systems

E. Governmental Agencies

1. General Services Administration (GSA): GSA-TS01 - US General Services Administration Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings
2. Department of Defense (DoD): UFC 4-010-01 - Unified Facilities Criteria (UFC) DoD Minimum Antiterrorism Standards for Buildings.
3. Department of Veterans Affairs (VA): Physical Security Design Manual for VA Facilities (Life-Safety Protected).

F. International Building Code (IBC): current edition

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. Florida Building Code – current edition

1. Testing Application Standard (TAS) 201: Impact Test Procedures
2. Testing Application Standard (TAS) 202: Criteria for Testing Impact and Non-Impact Resistant Building Envelope Components using Uniform Static Air Pressure
3. Test Application Standard (TAS) 203: Criteria for Testing Products subject to Cyclic Wind Pressure Loading

I. 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
    d. CAN/ULC-S134: Standard Method of Fire Test of Exterior Wall Assemblies
    e. CAN/ULC-S138: Standard Method of Test for Fire Growth of Insulated Building Panels in a Full-Scale Room Configuration

J. 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. Submit N.O.A. documentation that manufacturer has been accepted and insulated metal panels are rated for use in High Velocity Hurricane Zone by Miami-Dade County, Florida.

G. Anti-Terrorism/Force Protection: Submit documentation that panel system installed on metal studs will comply with [DoD UFC 4-010-01 Low level of protection for Conventional Construction stand-off distance with a "No Hazard" rating as established by ASTM F1642] [GSA Level C and Performance Condition "2" rating] [Veterans Administration criteria for Life-Safety Protected Facilities and a pressure impulse not exceeding GP1].

H. LEED 2009 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: 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: 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: For sealants, including printed statement of VOC content

b. Product Data for Credit IEQ 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.]

5. Pilot Credit 61: Material Disclosure and Assessment

a. Environmental Product Declaration

I. LEED V4 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

c. Material Ingredients: Publically produced, complete Health Product Declaration with full disclosure of know hazards in compliance with the Health Product Declaration open Standards

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.]

J. 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.

K. 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] [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. 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. Benchmark by Kingspan; 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] [Designwall 2000R Ribbed 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. Static: Structural performance shall be verifiable by witnessed structural testing for simulated wind loads in accordance with ASTM E72 or ASTM E330.
   b. Cyclic: Tested constructions meet the approval criteria of FM 4881 when installed as specified in the listing.

2. Large Missile Impact with Cyclic Pressure: Panels shall successfully pass test standards TAS 201/203 Large Missile Impact with Cyclic inward and outward pressures to demonstrate suitability for High Velocity Hurricane Zone applications with windborne debris.
3. Blast Loads: Panels installed on metal stud system shall be tested to withstand a minimum shock load of 6 psi peak pressure and 42 psi-msec impulse pressure when tested in

accordance with ASTM F1642 or GSA-TS01. After testing there shall be no debris, fragments, or components found in the witness chamber.

4. Fatigue Test: There shall be no evidence of metal/insulation interface delamination when the panel is tested by simulated wind loads of 20 psf (positive and negative loads), when applied for two million alternate cycles.
5. 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.
6. 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.
7. 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 leakage, when tested in accordance with ASTM E331 at a [6.24 psf] [20 psf] [70 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.

8. 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.
9. 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.
10. Thermal Performance: Polyisocyanurate (ISO) core panels shall provide the following R-Values as tested in accordance with ASTM C1363 or as determined from thermal modeling using Therm 5.2 software developed by Lawrence Berkley Laboratories:

    a. 2 inch thick Flat: R-14
    b. 2.5 inch thick Flat: R-17
    c. 3 inch thick Flat: R-21
    d. 4 inch thick Flat: R-28
    e. 2.5 inch thick Ribbed: R-11

f. 3 inch thick Ribbed: R-14
g. 4 inch thick Ribbed: R-22

11. 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.
12. 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, 2-hour, or 3-hour rating with fire applied to either side, 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.
    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. S102, S127, S134, S138 UL Canada fire test standards; successfully passed.

13. 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. 14-0317.05 High Velocity Hurricane Zone Rated (expires May 20, 2019).
    b. Florida Product Approval: Report No. FL-15462.1, 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.

14. 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: 2.0 pcf
b. Shear Strength: 21 psi
c. Compressive Strength: 25 psi
d. Tensile Strength: 36 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 250

h. Ignition characteristics when tested in accordance with ASTM D1929:

    1) Self-Ignition: 915 degrees F, minimum
    2) Flash Ignition: 839 degrees F, minimum

i. Potential Heat Content per NFPA 259: 12,448 BTU/lb.

C. Exterior Paint Finish Characteristics for Panels meeting the requirements of [AAMA 621 for G90 galvanized steel or AZ50 Galvalume®] [AAMA 620 for coil-coated aluminum]:

1. Gloss: 15 ± 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.
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 5ΔE 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: [2 inches] [2 ½ inches] [3 inches] [4 inches] thick.
2. [Panel width (Flat Panels and Striated Panels): [24 inches] [30 inches] [36 inches] [Custom] [As indicated on drawings].]
3. [Panel width (Ribbed Panels): [12 inches] [16 inches] [20 inch] [24 inch].]
4. 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 3 1/4 inches.
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] [ASTM B209, 3003-H14 aluminum] [AZ50 Galvalume® / Zincalume® in accordance with ASTM A792 (contact Kingspan for project specific availability)].
        2) Gauge: [22 (steel)] [20 (steel)] [0.040 (aluminum)]

b. Profile: [Flat][Striated][Ribbed]

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.
3) Ribbed profile to have 7/8 inch deep ribs at 4 inches o.c. spacing. Thermal insulation retained in low cell of the ribbed profile to be minimum [1 5/8 inches thick for 2 ½ inch panel] [2 1/8 inches thick for 3 inch panel] [3 1/8 inches thick for 4 inch panel].

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. Fluropolymer (PVDF) Two Coat system: 0.2 mil primer with 0.8 mil Kynar 500 (70 percent) SOLID color coat.]
b) [1.0 mil. Fluropolymer (PVDF) Two Coat system: 0.2 mil primer with 0.8 mil Kynar 500 (70 percent) MICA color coat.]
c) [1.5 mil. Fluropolymer (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. Fluropolymer (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] [ASTM B209, 3003-H14 aluminum] [AZ50 Galvalume® / Zincalume® in accordance with ASTM A792 (contact Kingspan for project specific availability)].
2) Gauge: [24 (steel)] [22 (steel)] [20 (steel)] [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: [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 polyisocyanurate (ISO).
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.

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 (for horizontal panel applications):

1. Material: [Extruded TPE 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 width variations from 3/8 to 3/4 inch due to normal construction tolerances] [Insulated block spline with polyisocyanurate foam core and metal facings designed to be flush with horizontal reveal in matching finish color] [2-piece vertical joint extrusion with 2 1/2 inch wide face cap]
2. Color: [Standard Black gasket] [Standard Light Gray gasket] [Custom color gasket, non-metallic, to match panel color]

F. Sealants at exposed joints: [Elastomeric polyurethane] [Neutral cure silicone] 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.

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