

SECTION 07 42 43
COMPOSITE METAL PANELS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Self-supporting metal-faced composite panels including interior column covers (MP-1), attachment system components, miscellaneous metal framing and secondary supports, matching flashing and trim with accessories. Match existing at New Polytrauma.
- B. The metal panels for this project are all interior applications. The performance requirements are not applicable except where they may affect the appearance of the panel assembly. Wind performance, air infiltration, and water infiltration are not issues for the interior applications. However if any of the performance issues affect the appearance, the metal panel installation must be made to appear exactly the same as the exterior panels.

1.2 RELATED WORK

- A. Installation of anchors in Concrete: Section 03 30 00.
- B. Installation of anchors in Unit Masonry: Section 04 20 00.
- C. Silicone Joint Sealants: Section 07 92 00.
- D. Field-formed flashings, and other sheet metal work not part of metal-faced composite wall panel assemblies: Section 07 60 00, Flashing and Sheet Metal.

1.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Metal-faced composite wall panel assemblies shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 - 1. Refer to paragraph 1.1, B above.
- B. Delegated Design: Design metal-faced composite wall panel assembly, including comprehensive engineering analysis by a licensed professional engineer from the State of Texas, using performance requirements and design criteria indicated.
 - 1. Provide panel jointing and weather-seal using reveal joints and gaskets but no sealant. Same in appearance to existing at exterior of New Polytrauma.
 - 2. Anchor panels to supporting framing without exposed fasteners.
- C. Wind Performance: Panels shall be designed to withstand the Inward and Outward Design Wind Load Pressure based upon the local building code and as indicated on the Structural Drawings, but in no case less than 30 pounds

per square foot (psf) including parapet and corner panels. Wind-load testing shall be conducted in accordance with ASTM E330 without permanent deformation or failures of structural members to obtain the following results.

1. Normal to the plane of the wall between supports, deflection of the secured perimeter-framing members shall not exceed $L/175$ or $3/4$ -inch, whichever is less.
 2. Normal to the plane of the wall, the maximum panel deflection shall not exceed $L/60$ of the full span.
 3. Maximum anchor deflection shall not exceed $1/16$ -inch. At $1-1/2$ times design pressure, permanent deflections of framing members shall not exceed $1/100$ of span length and components shall not experience failure or gross permanent distortion. At connection points of framing members to anchors, permanent set shall not exceed $1/16$ ".
- D. Thermal Movement: Provide for free and noiseless vertical and horizontal thermal movement due to expansion and contraction under material temperature range of minus 20 degrees F to 180 degrees F without buckling, opening of joints, undue stress on fasteners, or other detrimental effects; allow for ambient temperature at time of fabrication, assembly, and erection procedures.
- E. Fire Performance: Tested in accordance with, and complying with the acceptance criteria of NFPA 285; testing must be performed specifically for this project.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, Shop Drawings, Product Data and Samples
- B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal-faced composite wall panel and accessory.
- C. Shop Drawings: Show fabrication and installation layouts of metal-faced composite wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish among factory, shop, and field-assembled work.
 1. Accessories: Include details of the following items, at a scale of not less than $1-1/2$ inches per foot:

- a. Flashing.
 - b. Anchorage systems.
 - D. Color Chart for Initial Selection: For each type of metal-faced composite panel indicated with factory-applied color finishes.
 - E. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
 - 1. Metal-Faced Composite Panels: Minimum 12 x 12 inches. Include fasteners, closures, and other metal-faced composite wall panel accessories.
 - a. Include four-way joint.
 - 2. Closures: 12 inches long. Include fasteners and other exposed accessories.
 - 3. Accessories: 12-inch long Samples for each type of accessory.
 - F. Delegated-Design Submittal: For metal-faced composite wall panel assembly indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the licensed Professional Engineer from the State of Texas responsible for their preparation.
 - G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.
 - H. Field quality-control reports.
 - I. Maintenance Data: For metal-faced composite panels to include in maintenance manuals.
 - J. Warranties: Samples of special warranties.
- 1.5 QUALITY ASSURANCE**
- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
 - B. Source Limitations: Obtain each type of metal-faced composite panel from single source from single manufacturer and their approved fabricator.
 - C. Pre-construction Compatibility and Adhesion Testing: Submit samples of materials that will contact joint sealants to joint-sealant manufacturers for testing indicated in Section 07 92 00.
 - D. Mockups: Build a mockup as indicated on the Contract Drawings using approved submitted materials and details in the presence of a factory-authorized representative.
 - E. Composite panel manufacturer shall have a minimum of 15 years' architectural experience in the manufacture of this product and be located within the continental USA.

- F. Fabricator shall be acceptable to composite panel manufacturer.
- G. Fabricator and installer shall have a minimum 5 years' experience in architectural metal panel work similar in scope and size to this project.
- H. Shop Drawings shall show joint details providing a watertight and structurally-sound panel system that allows no uncontrolled water penetration, on the inside face of the panel system as determined by ASTM E331.
- I. Maximum deviation from vertical and horizontal alignment of erected panels: 1/4-inch in 20 feet non-accumulative.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, sheets, metal-faced composite panels, and other manufactured items so as not to be damaged or deformed. Package metal-faced composite panels for protection during transportation and handling.
- B. Unload, store, and erect metal-faced composite panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Store metal-faced composite wall panels vertically, covered with suitable weather-tight and ventilated covering. Store metal-faced composite panels to ensure dryness, with positive slope for drainage of water. Do not store metal-faced composite wall panels in contact with other materials that might cause staining, denting, or other surface damage. Do not allow storage space to exceed 120 deg F.
- D. Retain strippable protective covering on metal-faced composite panels for period of panel installation.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before metal-faced composite panel fabrication and indicate measurements on Shop Drawings.

1.8 COORDINATION

- A. Coordinate metal-faced composite panel assemblies with rain drainage work, flashing, trim, and construction of studs, soffits, and other adjoining work.

1.9 WARRANTY

- A. Metal composite panels are subject to the terms of the Article "Warranty of Construction," FAR clause 52.246-21, except extend the warranty period to two (2) years.
 - 1. Failures include, but are not limited to, the following:

- a. Structural failures, including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
2. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
3. Finish Warranty Period: Extend to twenty (20) years

1.10 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
 - B209-07.....Aluminum and Aluminum-Alloy Sheet and Plate.
 - B221-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wires, Profiles and Tubes.
 - C754-08.....Installation of Steel Framing Members to Receive Screw Attached Gypsum Panel Products.
 - C920-08.....Elastomeric Joint Sealants.
 - D1781-98(04).....Climbing Drum Peel Test for Adhesive Materials.
 - D1929-96(2001)e1...Determining Ignition Temperature of Plastics
 - D2244-07.....Calculation of Color Tolerances and Color Differences.
 - D4214-07.....Evaluating the Degree of Chalking of Exterior Paints.
 - E84-09.....Surface Burning Characteristics of Building Materials
 - E283-04.....Air Performance of Exterior Windows, Curtain Walls and Doors.
 - E329-08.....Agencies engaged in Construction Inspection and/or Testing.
 - E330-02.....Structural Performance of Exterior Windows, Curtain Walls and Doors under the Influence of Wind Loads.
 - E331-00.....Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls.

E1105-00.....Field Determination of Water Penetration of Installed
Exterior Windows, Skylights, Doors and Curtain Wall.

C. American Architectural Manufacturers Association (AAMA):

501.2.....Methods of Test for Exterior Walls.

2603-02(2008)....Specification for Dense Thermoplastic Elastomers Used for
Compression Seals, Gaskets, Setting Blocks, Spacers and
Accessories

2605-05Performance Requirements and Test Procedures for Superior
Performing Organic Coatings on Aluminum Extrusions and
Panels

D. Sheet Metal and Air Conditioning Contractors National Association (SMACCA).

E. National Association of Architectural Metal Manufacturers (NAAMM).

F. National Fire Protection Association (NFPA):

285.06.....Fire Propagation Characteristics of Exterior Non-Load
Bearing Wall Assemblies Containing Combustible
Components

PART 2 - PRODUCTS

2.1 PANEL MATERIALS

A. Aluminum Sheet: Coil-coated sheet, ASTM B209, alloy as standard with
manufacturer, with temper as required to suit forming operations and
structural performance required.

1. Surface: Smooth, flat finish.

2. Exposed Coil-Coated Finishes:

a. Organic: Provide spray-applied, medium gloss, metallic color finish
for exposed exterior aluminum surfaces in accordance with AAMA
2605, equal to PPG Industries, Inc. "Duramar XL" - a three-coat,
factory-applied fluoropolymer coating system based on Elf Atochem
North America, Inc. "Kynar 500" or Ausimont USA, Inc. "Hylar 5000"
polyvinylidene fluoride (PVF2) resin, with a minimum dry film
thickness of 1.6 mils.

b. Provide spray-applied medium gloss finish for exposed interior alu-
minum surfaces in accordance with AAMA 2603, equal to PPG Indus-
tries, Inc. "Duracron" or "Polycron III" - a factory-applied ther-
mosetting acrylic enamel coating system with a dry film thickness
of 1.0 mil.

c. Employ an applicator licensed by coating system manufacturer to ap-
ply the finish in accordance with manufacturer's specifications for
application and quality control.

d. **"Basis of Design"** Color: PPG Industries, Inc. "Pewter Classic -
UC51713XL", to match the Architect's control sample.

3. Concealed Finish (including both sides of MP-2): Apply pre-treatment
and manufacturer's standard white or light-colored acrylic or

polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

B. Panel Sealants:

1. Joint Sealant: ASTM C920, silicone sealant, of type, grade, class, and use classifications required to seal joints in metal-faced composite panels and remain weather-tight; and as recommended in writing by the panel manufacturer.

2.2 MISCELLANEOUS MATERIALS

- A. Aluminum Extrusions: ASTM B221, alloy and temper recommended by manufacturer for type of use and finish indicated.
- B. Concealed-Non Corrosive Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads.
- C. Butyl Tape: 100 percent solid polyisobutylene-cross linked butyl, preformed sealant or extruded tape as manufactured by Tremco, or as approved.

2.3 METAL-FACED COMPOSITE PANELS (MP-1)

- A. General: Provide factory-formed and assembled, metal-faced composite wall panels fabricated from two metal facings bonded, using no glues or adhesives, to solid, extruded thermoplastic core; formed into profile for installation method indicated. Include attachment system components and accessories as required for installation.
 1. **"Basis of Design"** manufacturer: Alcoa Inc. "Reynobond ACM".
 2. Subject to compliance with requirements, comparable products from only one of the following may be acceptable:
 - a. Alcan Composites USA Inc. "Alucabond".
 - b. Alpollic Materials USA "ACM".
 - c. CENTRIA Architectural Systems.
 - d. Copper Sales, Inc.; UNA-FAB.
- B. Aluminum-Faced Composite Panels: Formed with 0.020-inch-thick, coil-coated aluminum sheet facings.
 1. Panel Thickness: 1-inch deep composite panels. Thicker or reinforced at lower portions of exterior column covers as shown on the Architectural Drawings.
 2. Core: Manufacturers standard.
 3. Flammability: Self-ignition temperature of 650 degrees F or greater, when tested in accordance with ASTM D1929.

4. Surface Burning Characteristics: Flame spread index of 25 maximum, smoke developed index of 450 maximum, when tested in accordance with ASTM E84.
5. Bond Integrity: When tested for bond integrity, in accordance with ASTM D1781 (simulating resistance to panel delamination), there shall not be an adhesive failure of the bond a) between the core and the skin or b) cohesive failure of the core itself below the following values:
6. Peel Strength:
 - a. 40 in lb./inch as manufactured.
 - b. 40 in lb./inch after 21 days soaking in water at 70°F.
- C. Attachment System Components: Formed from extruded aluminum.
 1. Include manufacturer's standard perimeter extrusions with integral weather stripping, panel stiffeners, panel clips and anchor channels.

2.4 ACCESSORIES

- A. Wall Panel Accessories: Provide components required for a complete metal-faced composite panel assembly including fasciae, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal-faced composite panels unless otherwise indicated.
- B. Flashing: Formed from 0.040-inch minimum thickness, aluminum-zinc alloy-coated steel sheet factory painted with coil coating. Provide flashing as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, drips, jambs, framed openings, rakes, fasciae, reveals, and fillers. Finish flashing with same finish system as adjacent metal-faced composite panels.

2.5 FABRICATION

- A. General: Fabricate and finish metal-faced composite panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Fabricate metal-faced composite panels in a manner that eliminates condensation on interior side of panel and with joints between panels designed to form weather-tight seals.
- C. Metal-Faced Composite Wall Panels: Factory form panels in a continuous process with a chemical bond between the core and skins, using no glues or

adhesives between dissimilar materials. The core shall be free of voids and-or air spaces and not contain foamed insulation materials.

1. Form panel lines, breaks, and angles to be sharp and true, with surfaces free from warp and buckle.
 2. Keep panel surfaces free of scratches or marks caused during fabrication.
 3. Fabricate panels with sharply cut edges, with no displacement of face sheets or protrusion of core material.
 4. Fabricate panels with panel stiffeners, as required to comply with deflection limits, attached to back of panels with structural silicone sealant or bond tape.
 5. For "dry" jointing, secure extrusions to returned pan edges with stainless steel rivets. Provide means of concealed drainage with baffles and weeps for water that might accumulate in members of the system.
 6. Dimensional Tolerances:
 - a. Panel Bow: 0.8 percent maximum of panel length or width.
 - b. Squareness: 0.25 inch maximum.
- D. Sheet Metal Accessories: Fabricate flashing to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 2. Seams for Aluminum: Fabricate non-moving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet concealed joints for additional strength.
 3. Sealed Joints: Form non-expansion but movable joints in metal to accommodate silicone sealant to comply with SMACNA standards.
 4. Conceal non-corrosive aluminum or stainless steel fasteners and expansion provisions where possible.
 - a. Exposed fasteners are not allowed on faces or accessories exposed to view.
 5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, non-corrosive metal recommended by metal-faced composite panel manufacturer.

- a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal-faced composite panel manufacturer for application, but not less than thickness of metal being secured.

2.6 GENERAL FINISH REQUIREMENTS

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

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal-faced composite wall panel supports, and other conditions affecting performance of the Work.
 - 1. Examine framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal-faced composite panel manufacturer.
- B. Examine roughing-in for components and systems penetrating metal-faced composite panels to verify actual locations of penetrations relative to seam locations of panels before panel installation.
- C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Framing: Install sub-girts, base (sill) angles, furring, and other miscellaneous panel support members and anchorage according to ASTM C 754 and metal-faced composite panel manufacturer's written instructions.

3.3 METAL-FACED COMPOSITE WALL PANEL INSTALLATION

- A. General: Install metal-faced composite panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts and sub-girts unless otherwise indicated. Anchor panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Shim or otherwise plumb substrates receiving metal-faced composite panels.
 - 2. Flash and seal metal-faced composite panels at perimeter of all openings. Do not begin installation until weather barrier and flashings that will be concealed by panels are installed.
 - 3. Install flashing as metal-faced composite panel work proceeds.
 - 4. Apply silicone sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action as recommended by metal-faced composite panel manufacturer.
- C. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weather-tight performance of metal-faced composite panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by panel manufacturer.
 - 1. Prepare joints and apply sealants to comply with requirements in Section 07 92 00, "Joint Sealants."
- D. Attachment System Installation, General: Install attachment system required to support metal-faced composite panels and to provide a complete weather-tight wall system, including sub-girts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.
 - 1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.
 - 2. Do not begin installation until air barrier and flashings that will be concealed by composite panels are installed.
 - 3. Install butyl tape at all locations where inserts will penetrate the air barrier membrane where already installed.
- E. Concealed Track-Support Installation: Provide manufacturer's standard horizontal and vertical tracks that provide support and complete secondary drainage system, draining to the exterior at horizontal joints. Install support system at locations, spacings, and with fasteners recommended by

manufacturer. Attach panels to wall by interlocking tracks with perimeter extrusions attached to wall panels. Fully engage integral gaskets and leave horizontal and vertical joints with open reveal.

1. Attach routed-and-turned flanges of panels to perimeter extrusions with manufacturer's standard fasteners.
2. Attach flush panels to perimeter extrusions by engaging panel edges and by attaching with manufacturer's standard structural silicone adhesive.
3. Install panels to allow individual panels to "free float" and be installed and removed without disturbing adjacent panels.
4. Do not apply sealants to joints unless otherwise indicated on Contract Drawings or approved Shop Drawings.

3.4 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weather-tight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
 1. Install components required for a complete metal-faced composite panel assembly including flashings, sealants, gaskets, fillers, closure strips, and similar items.
- B. Flashing: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
 1. Install exposed flashing that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.5 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal-faced composite panel units within installed tolerance of 1/4 inch in 20 feet, non-accumulative, on level, plumb, and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust completed metal-faced composite wall panel installation, including accessories.
- C. Metal-faced composite panels will be considered defective if they do not pass tests and inspections.
- D. Additional tests and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- E. Prepare test and inspection reports and transmit to Owner and Architect.

3.7 CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as metal-faced composite panels are installed, unless otherwise indicated in manufacturers written installation instructions. On completion of metal-faced composite wall panel installation, clean finished surfaces as recommended by panel manufacturer. Maintain in a clean condition during construction.
- B. After metal-faced composite panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal-faced composite wall panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

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