

## **SECTION 07 42 16 - METAL PLATE WALL PANELS**

### **PART 1 - GENERAL**

#### **1.1 CONTROLLING DOCUMENTS**

- A. This specification is controlled by Division 08, Section 08 40 00 "Exterior Enclosure Systems". In addition to the requirements of this document, all requirements of Controlling Documents must also be met. The more onerous conditions of this document or the Controlling Document must be met.

#### **1.2 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. This Section includes but is not limited to metal plate wall and soffit panels **MTP-01**.
- C. Related Work:
  - 1. Division 05, Section 05 40 00 "Cold-Formed Metal Framing" for cold-formed metal framing supporting sheathing and metal plate panels.
  - 2. Division 05, Section 05 50 00 "Miscellaneous Metal Fabrications" for secondary framing support of ceiling suspension attached to steel beams that support interior metal soffit systems.
  - 3. Division 05, Section 05 58 13 "Column Covers " for interior column covers and interior metal panels.
  - 4. Division 06, Section 06 16 00 "Sheathing" for sheathing support.
  - 5. Division 07, Section 07 27 26 "Fluid-Applied Air and Water Barriers" for continuous air barrier systems.
  - 6. Division 07, Section 07 21 00 "Thermal Insulation" for building insulation.
  - 7. Division 07, Section 07 62 00 "Sheet Metal Flashing and Trim" for high temperature sheet waterproofing under plate metal roofing panels, field-formed flashings, and other sheet metal work not part of metal wall panel assemblies.
  - 8. Division 07, Section 07 92 00 "Joint Sealants" for installation of joint sealants between metal panel system and adjacent exterior wall systems.
  - 9. Division 08, Section 08 40 00 "Exterior Enclosure Systems Requirements" for coordinating with requirements for exterior wall mockups.
  - 10. Division 08, Section 08 41 13 "Aluminum-Framed Entrances and Storefront" for coordinating metal finishes.
  - 11. Division 08, Section 08 44 13 "Glazed Aluminum Curtain Walls" for coordinating metal finishes.
  - 12. Division 08, Section 08 91 19 "Fixed Louvers" for louvers.

#### **1.3 DEFINITION**

- A. Metal Plate Panel Assembly: Metal plate panels, attachment system components, miscellaneous metal framing, and accessories necessary for a complete rainscreen system.

#### **1.4 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site, in compliance with Division 08, Section 08 40 00 "Exterior Enclosure Systems Requirements".

1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of doors, and louvers.
2. Agenda: Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - a. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
  - b. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
  - c. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal panels.
  - d. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
  - e. Review temporary protection requirements for metal panel assembly during and after installation.
  - f. Review procedures for repair of metal panels damaged after installation.
  - g. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.
  - h. Coordinate the work of this Section with the work of other Trades.

## 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Actionable LEED Submittal:
  1. Building Product Disclosure and Optimization – Sourcing of Raw Materials:
    - a. Leadership Extraction Practices
      - 1) Extended Producer Responsibility (EPR): Submit documentation indicating that manufacturers have a take back or recycling program for the product purchased.
      - 2) Recycled Content: For products having recycled content, indicate percentages by weight of post-consumer and pre-consumer recycled content.
        - a) Include statement indicating costs for each product having recycled content.
    - b. Sourcing of Raw Materials: For products that are required to comply with requirements for regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material.
      - 1) Include statement indicating distance to Project, cost for each regional material and the fraction by weight that is considered regional.
  2. Indoor Environmental Quality, Low Emitting Materials: Building Products must be tested and compliant with the California Department of Public-Health (CDPH) Standard Method V1.1-2010, using the applicable exposure scenario.
    - a. For paints, and coatings, wet applied, include printed statement of VOC content, showing compliance with the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure for Architectural Coatings or the South Coast Air Quality Management District (SCAQMD) Rule 113-2011.

- b. Alternative tests for VOC include ASTM D2369-10, ISO 11890, ASTM D6886-03; or ISO 11890-2.
  - c. Methylene Chloride and perchloroethylene may not be added to paints, coating, adhesive or sealants
- C. Shop Drawings:
  - 1. Include fabrication and installation layouts of metal panels; interfaces with other systems and components, details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories; and special details.
    - a. Distinguish among factory-, shop, and field assembled work.
  - 2. Accessories: Include details of the flashing, trim, and anchorage, at a scale of not less than 1-1/2 inches per 12 inches.
- D. Samples for Initial Selection: For each type of metal panel indicated with factory-applied color finishes.
  - 1. Include similar Samples of trim and accessories involving color selection.
- E. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below. Where finishes involve normal color and texture variations, include sample sets showing full range of variations expected.
  - 1. Metal Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal panel accessories.
  - 2. Trim and Closures: 12 inches long. Include fasteners and other exposed accessories.
  - 3. Accessories: 12-inch-long Samples for each type of accessory.
  - 4. Aluminum Extrusions: Minimum 4 feet length.
  - 5. Aluminum Sheet: Minimum 5 feet length x 1 feet wide.
  - 6. Submit metal finish samples as the same time as metal finish samples submitted for:
    - a. Section 08 41 13 "Aluminum-Framed Entrances and Storefronts".
    - b. Section 08 44 13 "Glazed Aluminum Curtain Walls".
  - 7. Coil and extrusion material finished by different manufacturers shall match curtain wall framing color and gloss to the satisfaction of the Architect.
- F. Fabrication Engineering and Design Data Submittal: Submit for metal plate wall panels to verify compliance with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Exterior elevations, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Metal plate panels and attachments.
  - 2. Girts, Stud framing.
  - 3. Wall-mounted items including but not limited to doors, louvers, and lighting fixtures.
  - 4. Penetrations of by pipes and utilities.
  - 5. Details of gutter, flashing, roofing, air/water barrier systems.
  - 6. Interface with other systems and components.
- B. Qualification Data: For Installer.
- C. LEED Informational Submittals:

1. Building Product Disclosure and Optimization - Sourcing of Raw Materials:
    - a. Raw Material Sources and Extraction Reporting: Submit Raw materials supplier corporate Sustainability Reports (CSRs); documenting responsible extraction; including extraction locations, long term ecologically responsible land use, commitment to reducing environmental harms from extraction and manufacturing processes, and a commitment to meeting applicable standards or programs that address responsible sourcing criteria
      - 1) Submit manufacturers' self-declared reports
      - 2) Submit third party verified corporate sustainability reports (CSR) using one of the following frameworks"
        - a) Global Reporting Initiative (GRI) Sustainability Report
        - b) Organization for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises
        - c) UN Global Compact
        - d) ISO 26000
        - e) USGBC approved program.
  2. Building Product Disclosure and Optimization - Material Ingredients
    - a. Material Ingredient Optimization: Submit manufacturer's Environmental Product Declaration (EPD) and at least one of the following:
      - 1) GreenScreen V1.2 Benchmark: Third party report prepared by a licensed GreenScreen List Translator, or a full GreenScreen Assessment.
      - 2) Cradle to Cradle: Manufacturer's published literature for the product bearing the Cradle-to-Cradle logo.
      - 3) International Alternative Compliance Path - REACH Optimization
      - 4) Declare: Manufacturer's completed Product Declaration Form
      - 5) Other programs approved by USGBC
    - b. Product Manufacturer Supply Chain Optimization: Submit documentation from manufacturers for products that go beyond material ingredient optimization as follows:
      - 1) No GreenScreen Benchmark 1 materials
      - 2) Cradle to cradle gold or platinum certification
      - 3) REACH
      - 4) Other programs approved by USGBC
- D. Fabrication Engineering and Design: Submit comprehensive engineering analysis and Shop Drawings signed and sealed by a qualified Structural Engineer licensed to practice in the project jurisdiction, responsible for their preparation, indicating compliance with performance requirements specified. Submission shall include:
1. Analysis for applicable loads on framing members including backup cold formed metal wall.
  2. Analysis for applicable loads on anchors and support system for the project.
  3. Structural calculations and details of anchoring system, including type, size, and spacing of fasteners.
- E. Product Test Reports: For each product, based on evaluation of compressive tests performed by a qualified testing agency.
1. Provide lab test data (performed within 4 years prior to the date of submission) on structural air and water penetration tests per AAMA 509, evidencing compliance with requirements for exterior metal panel rainscreen systems to control water flow within the exterior envelope.

- F. Certification for High Performance Organic Finishes: Manufacturer's and fabricator's certification indicating that PVDF coating complies with the Contract Documents and AAMA 2605.
- G. Field quality-control reports.
- H. Sample Warranties: For special warranties.

## **1.7 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For metal panels to include in maintenance manuals.

## **1.8 QUALITY ASSURANCE**

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for installation of specified metal plate wall panels, column covers and metal soffit and canopy systems.
- B. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.
- C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for design and installation of metal wall panel assemblies that are similar to those indicated for this Project in material, design, and extent
- D. Mockups: Prior to installing exterior wall systems, build mockups as part of composite mockup indicated on Mockup Elevation Drawing Sheets. Incorporate exterior wall construction and finish to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Coordinate with Exterior wall sections listed in Summary Paragraph of Section 08 40 00 "Exterior Enclosure Systems". Provide materials in this section to create the composite testing mockup indicated.
  - 2. Build mockup of typical metal panel assembly as shown on Drawings, including corner, soffits, supports, attachments, and accessories.
    - a. Include four-way joint for metal panels, with finish for Architect's selection.
    - b. Include exterior metal panel soffit.
    - c. Column cover, including base/bumper and finish.
  - 3. Water-Spray Test: Conduct water-spray test of metal panel assembly mockup, testing for water penetration according to AAMA 501.2.
  - 4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
- E. Repair procedure: Provide a sample panel of minimum 36 inches by 36 inches in size. Demonstrate repair procedure for scratches, dents and discoloration. Review with Architect and make determination which repair procedures will be acceptable on the project. Repairs will be viewed in natural light, 8 feet from panel and viewed at 60-degree angle.

## **1.9 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal panels during installation.

## **1.10 FIELD CONDITIONS**

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements: Verify locations of structural members and opening dimensions by field measurements before metal plate panel fabrication and indicate measurements on Shop Drawings.

## **1.11 COORDINATION**

- A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

## **1.12 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
  - 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.
    - c. Damage to panel surface that cannot be repaired in the field successfully.
  - 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Finish Warranty, Factory-Applied Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace metal that shows evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
    - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.

- c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
- 2. Warranty Period: Minimum 10 years from date of Substantial Completion.

## **PART 2 - PRODUCTS**

### **2.1 PERFORMANCE REQUIREMENTS**

- A. General Performance: Metal plate panel assemblies shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Fabrication Engineering and Design: Engineer metal plate panel assembly, including cold formed steel framing supports, as well as sheathing, air/water barrier and insulation to comply with performance requirements specified. Provide a comprehensive engineering analysis by a qualified professional engineer licensed to practice in the State of Texas and responsible for preparation of the design, using performance requirements and criteria indicated.
- C. Structural Performance: Provide metal panel systems, column covers, soffits and canopies capable of withstanding the effects of the following loads, based on testing according to ASTM E330:
  - 1. Structural Loads: Except as modified by requirements specified in this Section, metal plate panels shall be engineered, fabricated and installed to withstand design wind loads, seismic loads, sidesway, live and dead loads, structural movement, deflections, and tested performance requirements specified in Division 08, Section 08 40 00 "Exterior Enclosure System Requirements".
  - 2. In addition to withstanding wind and structural loads, column covers shall be engineered to withstand impact loads of 10 lb. applied at midspan with a maximum deflection of 1/4 inch with no permanent deflection
  - 3. Deflection Limits: Withstand test pressures with deflection no greater than 1/240 of the span and no evidence of material failure, structural distress, or permanent deformation exceeding 0.2 percent of the clear span.
    - a. Test Pressures: 150 percent of inward and outward wind-load design pressures.
  - 4. Metal canopy, soffit and fascia shall comply with positive and negative wind uplift pressures as well as structural loads specified above.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- E. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
- F. Thermal Performance: Provide metal panel exterior Rainscreen assemblies (including Insulation, air space, and air barriers within cavity) with total Composite U factor of 0.048

Btu/sq. ft x h x deg F, and a minimum insulation R value of 21 or as shown on specific wall sections types whichever is greater, when tested according to ASTM C1363 or ASTM C518.

- G. Single Source Responsibility: Use one manufacturer for each type of metal panel system used on the project, so that there is single source responsibility.

## 2.2 PANEL MATERIALS

- A. Recycled Content:
1. Aluminum: Provide aluminum products with an average recycled content such that so post-consumer recycled content plus one-half of pre-consumer recycled content is not less than 12 percent.
  2. Steel: Provide steel products with an average recycled content such that so post-consumer recycled content plus one-half of pre-consumer recycled content is not less than 50 percent.
- B. Regional Materials: Provide a minimum of 20 percent of building materials (by cost) that are regionally extracted, processed and manufactured materials within a radius of 100 miles.
- C. Aluminum Plate: ASTM B209. Alloy and temper as recommended by manufacturer for application.
- D. Aluminum Extrusions: ASTM B221, alloy and temper recommended by manufacturer for type of use and finish indicated.

## 2.3 METAL PLATE WALL AND SOFFIT PANELS

- A. Metal Plate Wall Panels: Provide factory-formed, metal plate wall panels fabricated from single sheets of metal formed into profile for installation method indicated. Include attachment assembly components, panel stiffeners, and accessories and air barriers specified in Section 07 27 26 "Fluid-Applied Air and Water Barriers" as required for weathertight system.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Sobotec; SI-2000P or a comparable product by one of the following:
    - a. Alply Insulated Panels LLC.
    - b. Bemo USA Corporation.
    - c. Dri-Design.
    - d. LINEL; Custom keyslot system.
    - e. Metalwerks Div Armstrong; Ameriplate.
    - f. Pohl USA; Europlate.
- B. Aluminum Plate: Tension-leveled, smooth aluminum plate, ASTM B209, 1/8 inch thick.
1. Panel Depth: As indicated on Drawings.
  2. Exterior Finish: Fluoropolymer.
- C. Metal Panel Types: **MTP-01**: 1/8-inch-thick metal plate wall and soffit panels.
- D. Attachment System Components: Formed from extruded aluminum.



1. Provide internal drainage system that allows individual panels to be installed and removed without disturbing adjacent panels.
  2. Include aluminum subgirts, perimeter extrusions, tracks, and drainage channels, panel stiffeners, panel clips, and anchor channels.
  3. Alignment Pins: Stainless steel.
- E. Fabricate metal plate wall panel system to profiles and dimensions shown, using metal plate wall panels specified in a dry-open joint plate system installation as shown on drawings.
- F. Provide weeps in panel profile locations where cavity water could potentially collect.

## 2.4 MISCELLANEOUS MATERIALS

- A. Non-Metallic Thermal Isolation Clips and Spacers: Fiberglass reinforced polyamide thermal isolator clip with stainless steel structural screws (or equivalent) and extruded aluminum anchor clip used to support girt system of exterior wall cladding materials and maintain continuous insulation (CI) requirements for the wall:
1. Fiberglass reinforced polyamide spacer block (ISO 66396-PA 66, GF40, E2C2, S14-080.
  2. Stainless steel: Elco Bi-Flex or SFS Bi-Metal self-drilling structural screws
  3. Extruded aluminum hat channel
  4. Basis of Design: SmartCI "GREENgirt Clips, and GREENgirts"  
<http://smartcisystems.com>; Composite sub-girt framing members, consisting of polyester and vinyl ester bioresin matrix (FRP) with recycled materials, ultra-violet inhibitor, fire retardant adhesives and integral continuous stainless steel inserts the length of the profile, reinforced with glass strand rovings for longitudinal and continuous strand glass mats for stitched reinforcements used for transverse strength.
  5. Alternates:
    - a. Technoform, "Thermal Isolator Clip (TIC)"; <https://www.technoform.com/en/clip>.
    - b. Cascadia Windows Inc., "Cascadia Clip", [www.cascadiaclip.com](http://www.cascadiaclip.com); 100% Pultruded glass fiber and thermoset polyester resin insulation clip, min. 3/16-inch-thick for top base and web, of depth required for exterior wall installation detailed.
  6. Surface Burning Characteristics:
    - a. Flame Spread Index (FSI): 25 or less, when tested in accordance with ASTM E84.
    - b. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  7. Spacer thermal clips, spacers, sub-girts and fasteners as recommended by the manufacturer for application shown and performance requirements specified. Provide stainless steel fasteners of depth and diameter necessary to fully engage members and transfer stresses from cladding to structural supports.
  8. Assembly to have an NFPA 285 assembly test with all components of exterior wall assembly. Engineering Judgement, if required to be based on equal system and be sign & sealed by a Fire Protection Engineer licensed in the State of Texas. Clip to accommodate varying angles of substrate wall and exterior panel facing as indicated on drawings.
- B. Miscellaneous Metal Subframing and Furring: ASTM C645, cold-formed, metallic-coated steel sheet, ASTM A653/A653M, G90 coating designation or ASTM A792/A792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

- C. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
  - 1. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- D. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, end walls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
  - 1. At perimeter transitions of new inserted construction to existing metal panels, provide break formed metal trim as shown on drawings and rivet to existing metal panel profiles. trim finish to match finish of adjacent metal panels.
- E. Panel Fasteners: Self-tapping series 300 stainless steel screws with bimetallic heads equal to Bi-Flex "300 series Stainless Steel Self Drilling Fasteners" bolts and nuts; self-locking rivets and bolts, end welded studs or other suitable series 300 stainless steel fasteners designed to withstand design loads. Do not used exposed fasteners. Provide EPDM or PVC sealing washers for exposed fasteners.
- F. Panel Sealants: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer. Provide sealant types that are compatible with panel materials, are nonstaining, and do not damage panel finish.

## 2.5 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory to the 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 panel joints with factory-installed captive gaskets or separator strips in a way that eliminates condensation on interior side of panels and between joint between panels and that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
  - 1. Fabricate panels with panel stiffeners as required to comply with deflection limits, attached to panel backs with stud welds and silicone sealant or silicone bond tape. Weld and grind panel corners smooth.
  - 2. Tolerances: Fabricate panels to the following dimensional tolerances:
    - a. Length and Width: Plus, or minus 0.032 inch up to 48 inches; 0.064 inch more than 48 inches.
    - b. Diagonal: Plus, or minus 0.1875 inch.
    - c. Panel Bow: Not more than 0.2 percent of panel width or length up to 0.1875 inch maximum.
    - d. Thickness: Plus, or minus 0.008 inch.
    - e. Squareness: 0.1875-inch difference between diagonal measurements.
    - f. Camber: 0.032 inch.

- C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and 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 nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
  3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
  4. Sealed Joints: Form non expansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
  5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
  6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
    - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

## 2.6 FINISHES

- 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: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
1. Physical damage to panels including dents and scratches are not acceptable.
- D. Finishes Application: Apply high performance organic coatings to exposed exterior surfaces of exterior enclosure system components. Apply thermosetting acrylic enamel coatings to exposed and concealed interior surfaces of exterior enclosure system components.
1. During production, maintain large size color range samples for use in comparing against production material.
  2. Adhesion and Compatibility Testing: Test samples of high-performance coatings on aluminum shall be provided for compatibility and adhesion testing of joint sealants proposed for use on exterior enclosure system components prior to installations. Refer to Division 07, Section 07 92 00"Joint Sealants."
- E. Aluminum Panels and Accessories: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- F. High-Performance Finish:

1. Two-coat fluoropolymer finish system consisting of corrosion inhibitive primer and fluoropolymer color coat complying with AAMA 2604, with suspended mica flakes for mica colors, containing not less than 50 percent PVDF resin by weight in color coat in not less than 1.2 mils dry thickness. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
2. Color and Gloss: Custom color as selected by Architect to match Section 08 44 13 "Glazed Aluminum Curtain Walls".

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
  1. Examine wall 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 wall panel manufacturer.
  2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
    - a. Maximum substrate and framing deviations from flat plane acceptable:
      - 1) 1/4-inch in 20 feet (6 mm in 6 m) vertically or horizontally.
      - 2) 1/2-inch (12 mm) across building elevation.
      - 3) 1/8-inch in 5 feet (3 mm in 1.6 m).
    - b. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Examine panels to verify that panel surfaces are unmarred, smooth, and free from discoloration and scratches. Do not install panels that have been damaged.
- D. Examine for out-of-tolerance work and other deficient conditions prior to starting installation of metal panels.
- E. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.2 PREPARATION**

- A. Attachment Assembly: Install attachment assembly required to support metal wall panels, including subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal panel manufacturer's written recommendations.

1. Soffit Framing: clip and fasten furring channels to supports, as required to comply with requirements for assemblies indicated.

### 3.3 INSTALLATION

- A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
1. Commence metal plate panel installation and install minimum of 300 sq. ft. in presence of factory-authorized representative.
  2. Shim or otherwise plumb substrates receiving metal panels.
  3. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
  4. Install screw fasteners in predrilled holes.
  5. Locate and space fastenings in uniform vertical and horizontal alignment.
  6. Install flashing and trim as metal panel work proceeds.
  7. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
  8. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
  9. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
1. Aluminum Panels: Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.
  2. Stainless-Steel Panels: Use stainless-steel fasteners.
- C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- D. For panels with metallic finish, orient panels so that metallic flake lays in the same direction so that panels do not appear as a patchwork quilt. Any panels installed that do not orient correctly will be subject to removal and replacement.
- E. Attach thermal clips and spacers against air barrier with sealant compatible with water resistive air barrier. Shim as required to maintain tolerances for exterior wall system. Position thermal clips and spacers and install specified stainless-steel fasteners through clips and spacers, securing to cold formed metal channels in horizontal and vertical spacing grid in accordance with clip and spacer manufacturer's written recommendations and specifications.
1. For clips, install no less than 1 clip per 4 sq. ft. of area. Use no less than two screws per block in accordance with manufacturer's standard details or as required by engineering analysis. Install clips plumb, level, in alignment across elevation and at locations required to support girts that will provide securement for attachment assembly
  2. For thermal spacer channels, install wall panel support system in accordance with manufacturer's installation instructions. shim and align units with installed tolerances of 1/4 inch in 20 ft. non-cumulative on level, plumb and location lines. Secure angle and channel spacers to cold formed metal framing with stainless steel fasteners.
  3. Fit insulation tightly around clips and spacers in accordance with manufacturer's instructions and requirements specified in Division 07, Section 07 21 00 "Thermal

Insulation". Do not compress insulation, install continuously without voids. Place insulation in clip recess to maintain continuity of insulation.

- F. Attachment Assembly, General: Install attachment assembly required to support metal plate wall panels and to provide a complete weathertight wall system, including subgirts, 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 metal panels are installed and tested.
- G. Rainscreen-Principle Installation: Install using manufacturer's standard assembly with vertical channel that provides support and secondary drainage assembly, draining at base of wall. Notch vertical channel to receive support pins. Install vertical channels supported by channel brackets or adjuster angles and at locations, spacings, and with fasteners recommended by manufacturer. Attach metal plate wall panels by inserting horizontal support pins into notches in vertical channels and into flanges of panels. Leave horizontal and vertical joints with open reveal.
  - 1. Install metal plate wall panels to allow individual panels to be installed and removed without disturbing adjacent panels.
  - 2. Do not apply sealants to joints unless otherwise indicated.
- H. Joint Sealers: Install gaskets, and joint fillers where indicated and where required for weathertight performance of metal plate panel assemblies. Provide types of gaskets, and fillers indicated or, if not indicated, types recommended by panel manufacturer.
  - 1. Coordinate with adjacent exterior wall systems to prepare joints and apply sealants where shown, to comply with requirements in Division 07, Section 07 92 00 "Joint Sealants."

### 3.4 ACCESSORY INSTALLATION

- A. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
  - 1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal panel manufacturer; or, if not indicated, provide types recommended in writing by metal panel manufacturer.
- B. Flashing and Trim: 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 are permanently watertight.
  - 1. Install exposed flashing and trim that is without 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 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 waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
3. Where lapped expansion provisions cannot be used or would not be sufficiently 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 plate wall 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.
- B. Align joints vertically and horizontally across entire elevation. Do not vary by more than 1/8 inch in 20 ft. noncumulative, in level, plumb, or offset greater than 1/8 in in adjoining panel surfaces.

### **3.6 FIELD QUALITY CONTROL**

- A. Testing Agency: Engage a qualified independent testing agency (IIA) to perform field tests and inspections, in accordance with local building code inspection requirements. Coordinate with Division 08, Section 08 40 00 "Exterior Enclosure Systems Requirements" for other required testing. Contractor shall be responsible to perform the following field testing:
- B. Water-Spray Test: After installation, test area of assembly as directed by Architect for water penetration according to AAMA 501.2.
- C. Remove and replace metal wall panels where tests and inspections indicate that they do not comply with specified requirements. Remove and replace metal panels where field applied repairs are not acceptable.
  1. Scratches longer than 2" and located in the center of the panel are not acceptable for field repairs.
- D. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- E. Prepare test and inspection reports.

### **3.7 CLEANING AND PROTECTION**

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

### **END OF SECTION**