

CENTRIA Formawall™ Dimension Series Insulated Core Metal Wall Panel System

CENTRIA Formawall pressure-equalized insulated core metal wall panel system is designed as a complete wall solution. Formawall provides an air, water, vapor, and thermal barrier with total wall insulation values up to R22 in a single, easy-to-install finished system. Formawall eliminates the need for separate batt or board insulation, gypsum board sheathing, air barriers, vapor retarders, and building wraps, while providing better thermal efficiency and moisture control for exterior metal-clad walls.

Formawall was developed using ATMP® - CENTRIA's Advanced Thermal Moisture Protection building envelope science. This exciting product maximizes a metal wall system's ability to effectively control moisture without sacrificing thermal efficiency. Through extensive research and testing, the energy and cost savings of Formawall have made it a choice for architects across the country. Rainscreen design, streak-free dry seal joinery, exceptional panel flatness standards, and high-performance finishes - everything about Formawall and the CENTRIA network of experienced installers assures the architect of complete satisfaction in the finished project.

Panels are available in Kynar 500® or Hylar 5000® polyvinylidene fluoride (PVDF) finishes, including micas and metallics. Highly UV resistant and durable in the face chemical and air borne pollution, salt spray and wind-driven sand, PVDF coatings are the Gold Standard of the architectural exterior industry. CENTRIA Formawall wall systems are available in over 60 standard colors, and wide array of custom colors. CENTRIA Formawall panels are also available in stainless steel.

A companion guide specification is available from CENTRIA for projects requiring CENTRIA's integrated window, translucent panel, louver, and sun screen units in a Formawall application.

Consult your local CENTRIA architectural representative for design assistance. Contact CENTRIA, Pittsburgh, PA, (800)759-7474, Email: info@centria.com, www.centria.com for a list of offices. CENTRIA is a world leader in the manufacture of metal building products and systems for nonresidential walls and roofs. CENTRIA is also a world-class coil coater, coating a wide range of products for customers in numerous industries.

CENTRIA products appear in the following MasterFormat sections:

- Section 07 41 13 – Metal Roof Panels (SRS2, SRS3)
- Section 07 41 16 – Insulated Core Metal Roof Panels (Versapanel)
- Section 07 42 13 – Metal Wall Panels (Concept Series, IW Series, Exposed Fastener Panels)
- Section 07 42 16 – Insulated-Core Metal Wall Panels (Formawall Dimension Series, Formawall Graphics Series, Versawall, Versapanel)
- Section 07 42 17 – Insulated Composite Backup Panel (MetalWrap)
- Section 07 42 43 – Composite Wall Panels (FormaBond)

Specifier: This document is organized according to CSI MasterFormat™ 2004 and SectionFormat™ 2008. Edit section number and title as appropriate to the Project. Bold items require specifier selection. Convert bold to plain text and delete notes before publishing. This document is compatible with certain MasterSpec® and SpecText® editing tools.

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SECTION 07 42 16

INSULATED CORE METAL WALL PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Foamed-insulation-core horizontal and vertical metal wall panel assembly with integral reveals and profiled panels, with related metal trim and accessories.

Specifier: Include below if secondary metal supports will be installed under this Section.

- B. Secondary metal framing.

1.2 RELATED REQUIREMENTS

Specifier: Edit list below to correspond to Project.

- A. Division 01 Section "Sustainable Design Requirements" for related LEED general requirements.
- B. Division 05 Section "Cold-Formed Metal Framing" for support framing for insulated core metal wall panels.
- C. Division 07 air barrier section for transition and flashing components of air/moisture barrier.
- D. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal copings, flashings, reglets and roof drainage items.
- E. Division 07 Section "Joint Sealants" for field-applied joint sealants.

1.3 DEFINITIONS

Specifier: Retain definition below for Projects incorporating innovative sustainability goals. C2C certification described in paragraph below is a comprehensive sustainability certification that transcends LEED requirements to address life cycle analysis of entire production cycle of building products. CENTRIA and a number of leading product manufacturers have aligned their manufacturing and distribution practices with C2C core principles.

- A. Cradle to Cradle Certification: The Cradle to Cradle Certification process, administered by McDonough Braungart Design Chemistry (MBDC), www.c2ccertified.com, that evaluates materials and product ingredients and the complete formulation for human and environmental health impacts throughout its lifecycle as well as its potential for being truly recycled or safely composted.
- B. Pressure-Equalized Rainscreen Design: As defined by AAMA 508-07.

1.4 REFERENCES

- A. American Architectural Manufacturer's Association (AAMA):

1. AAMA 501.1 - Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure.
 2. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtainwalls and Sloped Glazing Systems.
 3. AAMA 508-07 Voluntary Test Method and Specifications for Pressure Equalized Rain Screen Wall Cladding Systems.
- B. American Society of Civil Engineers (ASCE):
1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- C. ASTM International (ASTM):
1. ASTM A 653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 2. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
 3. ASTM A 755 - Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
 4. ASTM B 117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.
 5. ASTM B 209 - Specification for Aluminum and Aluminum Alloy Sheet and Plate.
 6. ASTM C 209 - Standard Test Methods for Cellulosic Fiber Insulating Board.
 7. ASTM C 645 - Specification for Nonstructural Steel Framing Members.
 8. ASTM C 754 - Specification for Installation of Steel Framing Members to Receive Screw Attached Gypsum Panel Products.
 9. ASTM C 920 - Specification for Elastomeric Joint Sealants.
 10. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus.
 11. ASTM D 968 - Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive.
 12. ASTM D 3359 - Standard Test Methods for Measuring Adhesion by Tape Tests.
 13. ASTM D 4585 - Standard Practice for Testing Water Resistance of Coatings Using Controlled Condensation.
 14. ASTM D 4587 - Standard Practice for Fluorescent UV-Condensation Exposures of Paint and Related Coatings
 15. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
 16. ASTM E 84 - Test Methods for Surface Burning Characteristics of Building Materials.
 17. ASTM E 119 - Test Methods for Fire Tests of Building Construction and Materials.
 18. ASTM E 283 - Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences across the Specimen.
 19. ASTM E 329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.
 20. ASTM E 331 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 21. ASTM E 1886 – Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
 22. ASTM E 1996 - Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
- D. Factory Mutual Global (FMG):

1. ANSI/FMG 4880 Standard for Evaluating Insulated Wall & Roof/Ceiling Assemblies.
- E. National Fire Protection Association (NFPA):
1. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.
 2. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.
- F. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA):
1. Architectural Sheet Metal Manual.
- G. Underwriters Laboratories, Inc. (UL):
1. UL 263 - Fire Tests of Building Construction and Materials.
 2. UL 723 - Test for Surface Burning Characteristics of Building Materials.
 3. UL 1040 – Fire Test of Insulated Wall Construction.
 4. UL 1715 – Fire Test of Interior Finish Material.
 5. Fire Resistance Directory.

1.5 PERFORMANCE REQUIREMENTS

- A. General: Provide metal wall panel system meeting performance requirements as determined by application of specified tests by a qualified testing agency on manufacturer's standard assemblies.
- B. Air Infiltration: Maximum 0.06 cfm/sq. ft. (0.3 L/s per sq. m) per ASTM E 283 at a static-air-pressure difference of 6.24 lbf/sq. ft. (300 Pa), using minimum 10-by-10 foot (3050-by-3050 mm) test panel that includes horizontal and vertical joints.
- C. Water Penetration, Static Pressure: No uncontrolled water penetration per ASTM E 331 at a minimum static differential pressure of 15 lbf/sq. ft. (718 Pa), using minimum 10-by-10 foot (3050-by-3050 mm) test panel that includes horizontal and vertical joints.
- D. Water Penetration, Static Pressure – 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. Panel systems unable to demonstrate compliance with this requirement will require a separate weather-resistant barrier installed behind the wall panel system to comply with International Building Code requirements.
- E. Water Penetration, Dynamic Pressure: No uncontrolled water penetration per AAMA 501.1 at a minimum static differential pressure of 15 lbf/sq. ft. (718 Pa), using minimum 10-by-10 foot (3050-by-3050 mm) test panel that includes horizontal and vertical joints.
- F. System Performance: A 3rd party test report utilizing the standard ASTM E 283, E 331 and AAMA 501 procedures following the test protocol described in AAMA 508-07 must be submitted prior to bid. Test panel must include a horizontal joint, with an imperfect air barrier.
1. Bidders supplying panel systems that have not successfully passed AAMA 508-07 shall provide a backup system that meets the air and water infiltration values as listed above in sections 1.5.C – 1.5.E.

Specifier: For projects requiring inclusion of products that have not been tested under AAMA 508-07, include paragraph below requiring provision of a separate, tested air and water barrier membrane.

- G. **System Performance, Alternate Configuration:** Meet performance requirements in Paragraph above utilizing separate air and water barrier membrane on rigid backup.
- H. **Water Absorption:** Maximum 1.0 percent absorption rate by volume when tested according to ASTM C 209.
- I. **Structural Performance:** Provide metal wall panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated, per ASTM E 72:

Specifier: Consult structural engineer and edit below as required by local codes. Insert structural data below if not indicated on drawings.

- 1. **Wind Loads:** Determine loads based on uniform pressure, importance factor, exposure category, and basic wind speed indicated on drawings.
- 2. **Limits of Deflection:** Composite wall panel system shall withstand scheduled wind pressure with the following allowable deflection:
 - a. Maximum allowable deflection limited to L/175 deflection of panel perimeter normal to plane of wall with no evidence of failure.
- 3. **Secondary Metal Framing:** Design secondary metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions." Provide minimum 3-inch- (76-mm-) wide bearing surface for metal wall panels at the following locations:
 - a. Horizontal Panel System: At vertical joints.
 - b. Vertical Panel System: At horizontal stack joints.

Specifier: Coordinate information for Project wind zone, or delete subparagraph if not applicable. Consult CENTRIA for additional documentation available if required by authorities having jurisdiction, including State of Florida Product Approval and Miami Dade County Notice of Acceptance.

- 4. **Windborne-Debris-Impact-Resistance Performance:** Pass missile-impact and cyclic-pressure tests per ASTM E 1886 and ASTM E 1996 for Wind Zone indicated on Drawings.
 - a. Large-Missile Test: For curtainwall located within 30 feet (9.1 m) of grade.
 - b. Small-Missile Test: For curtainwall located more than 30 feet (9.1 m) above grade.
- 5. **Seismic Performance:** Comply with ASCE 7 Section 9, "Earthquake Loads."
- J. **Thermal Movements:** Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction.
- K. **Thermal Performance:** Thermal-resistance (R) value indicated, per ASTM C 1363, with the following conditions:
 - 1. 15 mph (24.1 km/h) exterior wind speed and still air on interior.

2. Include side joint and standard fastening.
 3. Base R value reported on performance of specified panel, taking into account integral reveals and profiling with resultant reduction in panel insulation thickness.
- L. Fire Performance Characteristics: Provide metal composite wall systems with the following fire-test characteristics determined by indicated test standard as applied by UL or other testing and inspection agency acceptable to authorities having jurisdiction.
1. Surface-Burning Characteristics: Provide metal composite wall system panels with the following characteristics when tested per ASTM E 84.
 - a. Flame spread index: 25 or less.
 - b. Smoke developed index: 450 or less.
 2. Fire Performance of Insulated Wall: Class 1 wall panel per ANSI/FM 4880.
 3. Room Corner Test: NFPA 286 or UL 1715.
 4. Intermediate Scale Multistory Fire Test: Representative mockup tested per NFPA 285.

Specifier: Retain below when metal wall panels are part of a fire-resistance-rated wall assembly.

5. Fire Resistance Ratings: Where indicated by design designations, provide metal wall panels tested per ASTM E 119 or UL Standard 263 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1.6 QUALITY ASSURANCE

- A. Manufacturer/Source: Provide metal wall panel system and panel accessories from a single manufacturer.

Specifier: Retain paragraph below if Owner allows substitutions but requires strict control over qualifying of substitutions. Note that approval of similar panel systems that do not meet AAMA 508 standard may result in requirement for added sheathing and separate air barrier installed behind metal panel system.

- B. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum 10 years experience in manufacture of similar products in successful use in similar applications.
1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
 - a. Product data, including certified independent test data indicating compliance with requirements.
 - b. Samples of each component.
 - c. Sample submittal from similar project.
 - d. Project references: Minimum of 5 installations not less than 5 years old, with Owner and Architect contact information.
 - e. Sample warranty.
 2. Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements.
 3. Approved manufacturers must meet separate requirements of Submittals Article.

- C. Wall Systems Installer Qualifications: Experienced Installer with minimum of 5 years experience with successfully completed projects of a similar nature and scope, and employing workers trained by manufacturer to install products of this Section.
- D. Testing Agency Qualifications: Qualify in accordance with requirements of ASTM E 329.
- E. Adhesion Test: Prior to delivery of composite wall panel system, perform test on adhesives and sealants per ASTM D 3359. Test each adhesive and sealant utilizing specified panel finish.
 - 1. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as specified in Division 07 Section "Joint Sealants."

Specifier: Retain paragraph below if scope of composite wall panel installation warrants a mockup. Edit requirements to suit Project. Consider either a free-standing mockup or a mockup consisting of a portion of the final building cladding to establish standards of appearance and workmanship. Show extent of mockup on Drawings. Consult Project waterproofing or building envelope consultant, if any.

- F. Mockups: Build mockup in size and location indicated. Show details of composite wall panel system. Demonstrate methods and details of installation. Show details of horizontal and vertical joints, penetrations, doors, windows, louvers, pipe openings, inside and outside corners, top and bottom of wall.
 - 1. Approval of mockup does not relieve Contractor of responsibility to comply with all requirements of contract documents.
 - 2. Approved mockup may become part of installation if approved by Architect.

1.7 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct preinstallation meeting at site attended by Owner, Architect, manufacturer's technical representative, and other trade contractors.
 - 1. Coordinate building framing in relation to composite wall panel system.
 - 2. Coordinate installation of building air and water barrier behind composite wall panel system.
 - 3. Coordinate window, door and louver, and other openings and penetrations of composite wall panel system.

1.8 ACTION SUBMITTALS

- A. Product Data: Manufacturer's data sheets for specified products.

Specifier: Retain and edit below to comply with Project requirements for LEED or other sustainable design requirements.

- B. LEED Submittals:
 - 1. Credit MR 4.1/MR 4.2: Product data indicating the following:
 - a. Percentages by weight of post-consumer and pre-consumer recycled content.
 - b. Total weight of products provided.
 - c. Include statement indicating costs for each product having recycled content.

- C. Shop Drawings: Provide shop drawings prepared by manufacturer or manufacturer's authorized dealer. Include full elevations showing openings and penetrations. Include details of each condition of installation and attachment. Provide details at a minimum scale 1-1/2-inch per foot of all required trim and extrusions needed for a complete installation
 - 1. Indicate points of supporting structure that must coordinate with composite wall panel system installation.
- D. Samples for Initial Selection: For each product specified including sealants and gaskets. Provide representative color charts of manufacturer's full range of colors.
- E. Samples for Verification: Provide 24-inch section of wall panel showing finishes, horizontal joinery, vertical joint return, injected core material, panel stiffener and anchoring details. Provide 12-inch long pieces of each extruded aluminum trim and gaskets.

1.9 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Indicating compliance of products with requirements, from a qualified independent testing agency.
- B. Cradle to Cradle Certification: Submit minimum of silver level Cradle to Cradle certification www.c2ccertified.com or a comparable independent sustainability audit acceptable to Owner that evaluates and validates materials, material reutilization/design for environment, energy use, water usage, and social responsibility of the product and manufacturing process.

Specifier: Retain paragraphs below when Project requirements include compliance with Federal Buy American provisions. CENTRIA FormaBond complies with requirement.

- C. Buy American Act Certification: Submit documentation certifying that products comply with provisions of the Buy American Act 41 U.S.C 10a – 10d.

Specifier: Retain below when authorities having jurisdiction require certification of high wind design compliance.

- D. Dade County Approval, Miami-Dade County Notice of Acceptance.
- E. Manufacturer's warranty: Submit sample warranty.

1.10 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.11 DELIVERY, STORAGE, AND HANDLING

- A. Protect products of composite wall panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage.
 - 1. Deliver, unload, store, and erect composite wall panel system and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.

1.12 WARRANTY

Specifier: Warranty terms below are available from CENTRIA. Verify that other allowable manufacturers furnish warranty meeting requirements.

- A. Special Manufacturer's Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace metal wall panel assemblies [and integrated translucent panels, window units, louver units, and sunscreen units] that fail in materials and workmanship within [two] years from date of Substantial Completion.

Specifier: Consult CENTRIA representative to verify available finish warranty.

- B. Special Panel Finish Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace wall panels that evidence deterioration of finish within [20] years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Insulated Core Metal Wall Panel System: Factory-foamed-in-place horizontal and vertical wall panel system consisting of an exterior metal face sheet with interior metal liner panel, bonded to factory foamed-in-place core in thermally-separated profile, utilizing no glues or adhesives, with factory sealed tongue-and-groove and pressure-equalized rainscreen-designed horizontal joint, attached to supports using concealed fasteners.

Specifier: Retain and edit optional text below when system includes secondary framing.

1. System is provided complete with secondary metal framing.

2.2 MANUFACTURERS

- A. Basis of Design: **CENTRIA, Formawall Dimension Series Insulated Core Metal Wall Panels**. Provide basis of design product[, or comparable product approved by Architect prior to bid].

1. CENTRIA Architectural Systems; Moon Township, PA 15108-2944. Tel: (800)759-7474. Tel: (412)299-8000. Fax: (412)299-8317. Email: info@CENTRIA.com. Web: www.CENTRIA.com.

2.3 PANEL MATERIALS

Specifier: Select panel face metal material from 3 optional paragraphs below.

- A. Stainless-Steel Face Sheet: ASTM A 666, Type 304 architectural grade alloy.
1. Face Sheet Thickness: [0.030 inch/22 gage (0.76 mm)].
 2. Surface: [Smooth] [Smooth, striated] [Embossed] [Embossed, striated].
 3. Finish: [Brushed, No. 4].
- B. Metallic-Coated Steel Face Sheet: Coil-coated, ASTM A 755/A 755M.

1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90, structural quality.
2. Face Sheet Thickness: Minimum [0.030 inch/22 gage (0.76 mm)] [0.036 inch/20 gage (0.91 mm)] thick.
3. Face Sheet Thickness: As required to meet performance requirements.
4. Surface: [Smooth] [Smooth, striated] [Smooth, variable striated] [Embossed] [Embossed, striated] [Embossed, variable striated].

C. Aluminum Face Sheet: Smooth surface coil-coated, ASTM B 209, 5052-H32 alloy.

1. Face Sheet Thickness: 0.040 (1.0 mm) thick.
2. Surface: [Smooth, striated] [Embossed].

Specifier: Select metallic-coated steel face sheet or aluminum face sheet finish system from options below. AAMA 620 is aluminum sheet finish standard; AAMA 621 is metallic-coated steel sheet finish standard. Delete all finish options if specifying stainless steel face sheet.

D. Exposed Coil-Coated Finish:

1. Fluoropolymer Two-Coat System: 0.2-mil primer with 0.8-mil 70 percent PVDF fluoropolymer color coat, AAMA [620] [621].
 - a. Basis of Design: **CENTRIA Fluorofinish.**
2. Fluoropolymer Two-Coat System: 0.8 mil primer with 0.8 mil 70 percent PVDF fluoropolymer color coat, AAMA [620] [621].
 - a. Basis of Design: CENTRIA Duraguard.
3. Fluoropolymer Three-Coat System: 0.8 mil primer with 0.8 mil 70 percent PVDF fluoropolymer color coat, and a 0.8 mil 70 percent PVDF fluoropolymer clear coat, AAMA [620] [621].
 - a. Basis of Design: **CENTRIA Duraguard Plus.**
4. Fluoropolymer Two-Coat Mica System: 0.25-mil primer with 0.8-mil 70 percent PVDF fluoropolymer color coat providing a pearlescent appearance, AAMA [620] [621].
 - a. Basis of Design: **CENTRIA Sundance Mica.**
5. Fluoropolymer Three-Coat Metallic System: 0.2 mil primer with 0.8-mil 70 percent PVDF fluoropolymer color coat containing metal flakes, and a 0.5-mil 70 percent PVDF fluoropolymer clear coat, AAMA [620] [621].
 - a. Basis of Design: **CENTRIA Sundance AM.**

Specifier: CENTRIA's Duracast textured coat is available with an extended warranty; see Warranty article in Part 1.

6. Natural Aggregate Texture Coat: 0.2 mil primer with a 0.8 mil low wax polyester and a matching spray applied acrylic and silica aggregate texture coat, displaying continuing film integrity when tested as follows:
 - a. QUV Weatherometer: ASTM G 154, 1000 hours, no visible change.

- b. Humidity: ASTM D 4585: 1000 hours at 120 deg. F and condensing humidity, no effect.
 - c. Freeze/Thaw: ASTM D 4587: 50 cycles of freeze/thaw with humidity, no effect.
 - d. Salt Fog: ASTM B 117: 1000 hours exposure of scribed specimens.
 - e. Abrasion: ASTM D 968: 400 liters of falling sand, passed.
 - f. Basis of Design: **CENTRIA Duracast**
- 7. Fluoropolymer Two-Coat Corrosion and Abrasion Resistant System: 3.0 mil barrier coat primer with 0.8 mil 70 percent PVDF fluoropolymer color coat.
 - a. Basis of Design: **CENTRIA Versacor Ultra PF.**
- 8. Urethane Two-Coat Corrosion and Abrasion Resistant System: 3.0 mil barrier coat primer with 1.5 mil urethane color coat.
 - a. Basis of Design: **CENTRIA Versacor Ultra TF.**
- 9. Urethane Two-Coat Corrosion and Abrasion Resistant System: 3.0 mil barrier coat primer with 3.0 mil urethane color coat.
 - a. Basis of Design: **CENTRIA Versacor Ultra HF.**
- 10. Fluoropolymer Two-Coat Plus Corrosion and Abrasion Resistant System: 3.0 mil primer with 0.8 mil 70 percent PVDF fluoropolymer color coat that includes mica flakes that provides a pearlescent appearance.
 - a. Basis of Design: **CENTRIA Versacor Ultra MX.**
- 11. Fluoropolymer Three Coat System: 0.2 mil primer with a 0.5 mil polyester base coat and a 0.8 mil nominal PVDF fluoropolymer top coat providing an iridescent finish.
 - a. Basis of Design: **CENTRIA KolorShift.**
- 12. Color: [As indicated] [As selected by Architect from manufacturer's standard colors] [Match Architect's custom color].

Specifier: Select liner sheet thickness option in paragraph below; aluminum-faced panel requires 22 gage liner panel. Smooth, Flat faced panels require a 22 gage embossed, flat liner.

- E. Metallic-Coated Steel Liner Sheet: Coil-coated, ASTM A 755/A 755M, [0.019 inch/26 gage (0.48 mm)] [0.024 inch/24 gage (0.60 mm)] [0.030 inch/22 gage (0.76 mm)] [0.036 inch/20 gage (0.91 mm)] thick.
 - 1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90, structural quality.

Specifier: Confirm that selected finish option below is available in desired metal thickness above.

- 2. Surface: [Smooth planked] [Embossed planked] [Embossed flat].
 - 3. Interior Liner Panel Finish: 0.2 mil primer with 0.6 mil acrylic color coat.
- F. Exposed Trim and Fasteners: Match panel finish.

2.4 INSULATION FOR PANEL CORES

- A. Metal Panel Foamed-Insulation-Core: Foamed-in-place urethane or isocyanurate containing no CFC or HCFC compounds.
1. Density: Minimum 2.7 lb/cu. ft. (43.4 kg/cu. m)
 2. Shear Strength: Minimum 31 lb/sq. in.
 3. Compressive Strength: Minimum 32 lb/sq. in.
 4. Tensile Strength: Minimum 29 lb/sq. in.

2.5 FOAMED INSULATION-CORE METAL WALL PANELS

- A. Foamed-Insulation-Core Metal Wall Panels: Factory-foamed-in-place horizontal and vertical wall panel system consisting of an exterior metal face sheet with interior metal liner panel forming a thermally separated profile, bonded to factory foamed-in-place core, with no glues or adhesives, and with factory-sealed tongue-and-groove and rainscreen-designed pressure-equalized horizontal joint, configured with weep-hole-vented chamber to maintain equalized atmospheric pressure reducing potential for moisture drive into wall assembly, attached to supports using concealed fasteners.
1. Exclusions: The following do not meet the requirements of this Section:
 - a. Laminated panels.
 - b. Barrier wall-designed systems.
 - c. Systems relying upon venting only at vertical joints to attain pressure equalization.
 - d. Systems relying upon field-installed gaskets or wet seals to meet performance requirements.
 2. Horizontal Joints: Horizontal joints with positive drip edge, sloped drain shelf and integral venting to the exterior along the panel length to permit moisture drainage and to allow air to enter the pressure equalization chamber. Joint shall have a 2-3/8-inch baffle interlock to provide effective rain screen and pressure equalized performance as demonstrated by testing specified in 1.5.B – 1.5.E.
 3. Vertical Joint: Vertical joints for insulated metal panels shall [include an integrated, insulated metal vertical joint spline. The insulated vertical reveal shall be recessed 1-3/16" deep and be 5/8" wide [up to 1" wide]]. The insulated metal vertical joint should not add exterior sightlines, expose metal edges or exposed wet seals. The joint spline shall include polyisocyanurate foam insulation adhered to a metal face of the same material and gage as the face of the panel.] [be gasketed, exposed wet seals are not permitted. Outer wings of gasket shall compress against the metal return flange (trimless end) of the panel face.] The vertical joint shall be designed to allow moisture to be drained from the panel's horizontal joint. No end dam sealant is to be applied to the ends of the horizontal joint at the vertical joint location. A continuous back-up flash behind the vertical joint is required with two beads of field applied non-curing butyl sealant between the panel and back up flashing for each panel.
 - a. R Value for Insulated Metal Vertical Joint option shall be [R-5 (2" panel)] [R-8 (2.5" panel)] [R-11(3" panel)]
 4. Panel Ends: Factory formed trimless ends, tabbed under panel horizontal shelf.
 5. Panel Width: [24 inch (588 mm)] [30 inch (762 mm)] [36 inch (914 mm)] [Custom widths indicated].

Specifier: Describe panel profile by selecting option in subparagraph below, or delete and show profile in drawing details.

6. Panel Profile: [Flat] [Profile-faced] [Segmented-faced] [Steep-sloped joint] in locations and sizes indicated.

Specifier: Retain applicable descriptions for panel profiles in four subparagraphs below. Retain first option in first paragraphs for Series 2 panels and Series 3-T panels, and second option for Series 3 panels.

- a. Reveals: [1-3/16 inch (30.2 mm) – for 2", 2.5" and 3"-T] [2-3/16 inch (55.6 mm) – for 3"] deep by width indicated.
- b. Profile-faced Panels: As indicated.
- c. Segmented-faced Panels: With intermediate formed joints, as indicated on Drawings.
- d. Panels with Steep Sloped Joint: 45 degree (0.77 rad) sloped joint as indicated.

Specifier: Coordinate panel thickness selected below with corresponding thermal resistance value in following paragraph. Panel thicknesses and R-values correspond to CENTRIA Formawall 2.0, 2.5 and 3.0, and 3.0-T respectively.

7. Panel Thickness: [2.0 inch (51 mm), profiled] [2.0 inch (51 mm), flat] [2.5 inch (64 mm), profiled] [2.5 inch (64 mm), flat] [3.00 inch (76 mm), flat] [3.00 inch - T (76 mm), flat].
8. Thermal-Resistance (R) Value: [2" R-14] [2.5" R-17] [3" R-21] [3"-T R-22].

2.6 METAL WALL PANEL ACCESSORIES

- A. Metal Wall Panel Accessories, General: Provide complete metal wall panel assembly incorporating trim, copings, fasciae, parapet caps, soffits, sills, inside and outside corners, and miscellaneous flashings. Provide manufacturer's factory-formed clips, shims, flashings, gaskets, lap tapes, closure strips, and caps for a complete installation. Fabricate accessories in accordance with SMACNA Manual.
- B. Formed Flashing and Trim: Match material, thickness, and color of metal wall panel face sheets.
- C. Extrusion Trim: Provide manufacturer-provided extruded trim for the following locations and as indicated on Drawings:
 1. Base trim.
 2. Coping.
 3. Panel installation perimeter.
 4. Opening perimeters.

Specifier: Retain paragraph below when specifying CENTRIA Formawall PE system with pressure equalization. Below provides a second line of defense against water intrusion.

- D. Vertical Joint Seal Plate: Extruded aluminum seal plate with combination neoprene gasket and non-curing butyl dual seal forming pressure-equalized vented chamber permitting moisture to drain to exterior. Seal plate capable of transferring panel loads to vertical supports. Resultant vertical panel joint shall meet performance requirements.

1. Performance: Vertical joint design shall effectively demonstrate pressure equalization and be evaluated in accordance with ASTM E 283-04 and ASTM E 331-00. A third party test indicating the successful passing of these tests and noting effective pressure equalization must be submitted prior to bid.
- E. Sealants: Type recommended by metal wall panel system manufacturer for application, meeting requirements of Division 07 Section "Joint Sealants."
- F. Flashing Tape: 4-inch wide self-adhering butyl flashing tape.
- G. Panel Attachment Clips: Concealed G-90 galvanized steel clip configured to prevent overdriving of fastener and crushing of foam core, with panel fasteners engaging both face and liner elements and mechanically attaching to panel supports. Clip configured also to be utilized without removing significant portions of the foam at each clip location.
- H. Fasteners: Self-tapping screws, bolts, nuts, and other acceptable fasteners recommended by panel manufacturer. Where exposed fasteners cannot be avoided, supply corrosion-resistant fasteners with heads matching color of metal wall panels by means factory-applied coating.

2.7 SECONDARY METAL FRAMING

- A. Miscellaneous Framing Components, General: Cold-formed metallic-coated steel sheet, ASTM C 645, Grade 50, with ASTM A 653/A 653M, G90 (Z180) hot-dip galvanized zinc coating.
- B. Subgirts: C- or Z- shaped sections, 0.064-inch (1.63-mm) minimum.
- C. Sill Channels: 0.064-inch (1.63-mm) minimum.
- D. Hat Channels: 0.040 inch (1.02 mm) minimum.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine metal wall panel system substrate with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal wall panels.
- B. Framing: Inspect framing that will support metal wall panels to determine if support components are installed as indicated on approved shop drawings. Confirm presence of acceptable framing members at recommended spacing to match installation requirements of metal wall panels.
 1. Maximum deviations acceptable:
 - a. 1/4-inch in 20 feet vertically or horizontally from face plane of framing.
 - b. 1/2-inch maximum deviation from framing face plane on any building elevation.
 - c. 1/8-inch in 5 feet.
- C. Openings: Verify that window, door, louver and other penetrations match layout on shop drawings.

- D. Correct out-of-tolerance work and other deficient conditions prior to proceeding with metal wall panel system installation.

3.2 PREPARATION

- A. Secondary Metal Framing: Install secondary metal framing components as indicated. Install secondary metal framing and other metal panel supports per ASTM C 754 and metal wall panel manufacturer's recommendations.

3.3 METAL WALL PANEL SYSTEM INSTALLATION

- A. General: Install metal wall panel system in accordance with approved shop drawings and manufacturer's recommendations. Install metal wall panels in orientation, sizes, and locations indicated. Anchor metal wall panels and other components securely in place. Provide for thermal and structural movement

- B. Attach panels to metal framing using recommended clips, screws, fasteners, sealants, and adhesives indicated on approved shop drawings.

1. Fasteners for Steel Wall Panels: Stainless-steel for exterior locations and locations exposed to moisture; carbon steel for interior use only.
2. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated or, if not indicated, as approved by manufacturer.
3. Fasten metal wall panels to supports with concealed clips at each joint at location, spacing, and with fasteners recommended by manufacturer. Install clips to supports with self-tapping fasteners.
4. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.
5. Horizontal Joinery: Working from base of installation to top connect upper panel to lower panel at dry seal joinery.
6. Vertical Joinery: Provide reveal between vertical ends of panels as shown on shop drawings using hardware and gaskets furnished by manufacturer to form a weather tight seal between panels.
7. Dissimilar Materials: Where elements of metal wall panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.

- C. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal wall panel assemblies.

1. Seal panel end utilizing 2 beads of non-curing butyl aligning with factory-applied seal in adjacent panel pocket; apply continuously without gaps to complete panel system air barrier.
2. Seal metal wall panel end laps to supports or back-up flashing sealant, full width of panel. Seal side joints where recommended by metal wall panel manufacturer. Do not install sealant in locations that will interfere with drainage of pressure-equalized panel chambers.
3. Prepare joints and apply sealants per Division 07 Section "Joint Sealants."

3.4 ACCESSORY INSTALLATION

- A. General: Install metal wall panel accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install related flashings and sheet metal trim per requirements of Division 07 Section "Sheet Metal Flashing and Trim."
2. Install components required for a complete metal wall panel assembly, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
3. Comply with performance requirements and manufacturer's written installation instructions.
4. Provide concealed fasteners except where noted on approved shop drawings.
5. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

3.5 FIELD QUALITY CONTROL

Specifier: Retain one or both paragraphs below and edit options when scope and complexity of metal wall panel installation justifies independent inspection and testing provisions.

- A. Testing Agency: [Owner will engage] [Engage] an independent testing and inspecting agency acceptable to Architect to perform field tests and inspections and to prepare test reports.
- B. Water-Spray Test: After completing portion of metal wall panel assembly including accessories and trim, test 2-bay area selected by Architect for water penetration, according to AAMA 501.2.
- C. Manufacturer's Field Service: Engage a service representative authorized by metal wall panel manufacturer to inspect completed installation. Submit written report. Correct deficiencies noted in report.

3.6 CLEANING AND PROTECTION

- A. Remove temporary protective films. Clean finished surfaces as recommended by metal wall panel manufacturer. Clear weep holes and drainage channels of obstructions, dirt, and sealant. Maintain in a clean condition during construction.
- B. Replace damaged panels and accessories that cannot be repaired by finish touch-up or minor repair.

END OF SECTION

Additional Specifier's Notes for CENTRIA Formawall Metal Wall Panels

Substitution Reviews: When reviewing substitution requests for other products for compliance with this specification, CENTRIA recommends particular attention to the following issues:

Rainscreen system engineering: Require submittal of sample shop drawings from a similar project to determine whether the quality of the total proposed package meets CENTRIA's standards. Is the system a pressure-equalized system such as Formawall, or is it a barrier-type system that must rely on sheathing plus a weather barrier? Do edge conditions and opening conditions include extruded trim rather than formed metal, dry gasketing instead of liquid sealants, secondary framing meeting metal thickness and corrosion resistance requirements, and proper mounting hardware?

Quality of high performance finishes: Require submittal of large scale coating samples on the specified substrate to enable comparison of finish quality. Are desired colors and visual effects comparable to CENTRIA's own coating line finishes? Have previous projects with similar coating proven durable?

Examination of similar installations: Panel flatness and substrate flatness are important components of overall installation quality. Does the manufacturer/installer meet the CENTRIA's tolerances specified in this Section?

Coordination with Drawings: CENTRIA recommends you coordinate the following:

Show details of integrated window, wall louver, and sunscreen units. Show interfaces between panels, panel trim, and integrated units.

Show details that allow for moisture penetration into and weeping from the pressure-equalized cavity behind the CENTRIA rainscreen wall panel system. Show unobstructed path for moisture movement to the exterior, along with moisture barrier and flexible flashings specified in other Sections.

Detail edge conditions with extruded trims that protect the panel edges, especially at panel bottom.

Show extruded coping at top of wall condition for both detail and finish coordination.

Show soffits, sills, expansion joints and other components either specified in this Section or referenced from this Section to Related Sections.