**SECTION 107113**

 Exterior Solid Phenolic Sun Control Devices

**Part 1 – GENERAL**

1.0 RELATED DOCUMENTS

 A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications Sections apply to this Section.

* 1. SUMMARY

A. Exterior solid phenolic panels and aluminum supporting substructure that is part of the sun control devices system.

B. Related Sections: Coordinate with Work of other sections including the following:

* 1. Section 05 50 00 – Metal Fabrications
	2. Section 08 44 13 – Glazed Aluminum Curtain Walls

1.2 SYSTEM DESCRIPTION

 A. Exterior Sun Control Devices: Solid phenolic core, fire retardant exterior grade double sided sheets manufactured for vertical or horizontal sun control, aluminum or steel substructure, attachment system components, and all accessories necessary for mounting phenolic core panels for application.

1.3 PERFORMANCE REQUIRMENTS

 A. General Performance: Solid phenolic exterior sun control panels, aluminum substructure, and attachment accessories shall comply with the performance requirements without failure due to defective manufacture, fabrication, installation or other defects of construction.

 B. Delegated Design Engineering: Design solid phenolic exterior sunshade panel system, including comprehensive engineering analysis by a qualified professional engineer using performance requirements and design criteria indicated.

 1. Design shall be inclusive of aluminum support structure system and all attachment accessories.

 2. Design shall be inclusive of solid phenolic exterior panel manufacturing and shall conform to Manufacturer’s recommended installation procedures.

 C. Structural Performance: Provide solid phenolic exterior sunshade system capable of withstanding the effects of the following loads and stresses within limits and conditions indicated based on Manufacturer’s most current test standards:

 1. Wind Loads: Provide exterior sunshade panel system, including aluminum or steel support structure capable of withstanding wind loads calculated according to requirements of authorities having jurisdiction or as determined based on the following minimum design wind pressures, whichever are more stringent:

 a. Uniform pressure as indicated on Drawings.

 b. As determined by the American Society of Civil Engineers’ ASCE 7, “Minimum Design Loads for Buildings and Other Structures,” “Analytical Procedure”.

 D. Deflection Limits: Aluminum support structure and exterior phenolic sunshade panel system shall be designed in accordance with the Manufacturer’s recommended maximum deflection when tested under positive and negative design wind gust loads and shall withstand wind gust loads with horizontal deflections no greater than the Manufacturer’s allowable span.

 E. Thermal Movements: Exterior solid phenolic sunshade system shall allow for thermal movements from ambient air and surface temperature changes by preventing buckling, over- stressing of components, failure of connections and other detrimental effects. Base calculations on surface temperature changes of materials due to both solar heat gain and nighttime sky heat loss.

 1. Panel shall remain stable for temperature Change (Range): -112 deg. F, ambient: 356 deg. F, material surfaces.

 F. Support Structure: Provide aluminum or steel support structure capable of the following:

 1. Design and install support structure to accommodate expected construction tolerances and misalignment, deflection of building structural components, and connection through the building enclosure to carry dead load and wind load requirements back to structural wall framing.

1.4 SUBMITTALS

1. Product Data: For each type of product indicated. Include Manufacturer’s written installation instructions, including recommendations for evaluating, preparing, and treating substrate, sunshade panel technical data, material descriptions, and finishes and tested physical and performance properties.
2. Shop Drawings: (Optional) Show fabrication and installation layouts of solid phenolic exterior sunshade panels, details of aluminum or steel support structure attachment and wall structure conditions, anchorages for support structure, attachment system for panels, allowances for expansion, trim and accessories as required or specified by the architect, and all special job specific details.
3. Samples: For each type of exposed finish required, provide samples of size and type indicated below for approval:
	1. Sunshade panels: Minimum of 4” x 4” or manufacturer standard sample size per color specified, double sided finish.
4. Installer Qualification Data: For installer, provide certification or letter signed by solid phenolic rainscreen panel Manufacturer certifying that the installer complies with requirements to perform the work specified in this Section.
5. Qualification Data: For professional engineer.
6. Engineering Design Certification: From solid phenolic rainscreen panel Manufacturer, provide certification of acceptance of final shop drawings and acceptance of qualifications for installer. Certification must be provided before start of the Work.

1. Closeout Submittals: From solid phenolic rainscreen panel Manufacturer, provide the following:
	1. Operation and Maintenance data: operation, cleaning and maintenance manuals or brochures including methods for maintaining installed products, replacing damaged panels, and precautions against cleaning materials and methods detrimental to finishes and performance.
	2. FSC Chain of Custody Certificate.
	3. Environmental Product Declaration (EPD) Report
	4. Health Product Declaration (HPD)
2. Warranty: Provide Sample of Manufacturer’s standard 10-year limited warranty for solid phenolic exterior panels. Warranty must be inclusive of material and labor for removal and reinstallation.

1.5 QUALITY ASSURANCE

1. Installer Qualifications: A firm experienced in the installation of exterior phenolic rainscreen wall panel systems or sunshade devices who has a minimum of 3 years installing products indicated in this Project, whose work has resulted in applications with a record of successful in-service performance, and who is recognized and approved by the manufacturer as suitable for the execution of the Work.
2. Fabricator Qualifications: A shop that employs skilled workers who custom fabricate solid phenolic or similar exterior rainscreen wall panel systems or sunshade devices to those required for this Project and whose finished products have a record of successful in-service performance and who is approved by the manufacturer. If shop drawings are required for the Project the shop drawings are to be drawn and coordinated by the approved fabrication company.
3. Source Limitations: Obtain solid phenolic sunshade panels and all auxiliary materials from a single source Manufacturer who has a minimum of 25 years of experience in the manufacturing of exterior high-pressure phenolic rainscreen panels or an accessory Manufacturer who is certified by the solid phenolic rainscreen panel Manufacturer. Panels to be manufactured by a Manufacturer with ISO9001 and ISO14001 certification of standards.
4. Pre-Installation Conference: Conduct pre-installation conference at Project site prior to commencing construction specified herein to verify Project requirements.
	1. Review solid phenolic sunshade panel installation requirements including substrate surface preparation, environmental or site limitations, typical details including attachment and trims, Manufacturer’s recommended installation procedures, coordination with adjacent trades, testing and inspection procedures (if any), protection of work and repair procedures.
	2. Ensure all sub-trades interfacing with or affected by the construction of the solid phenolic sunshade wall panels are present, including Architect, General Contractor, solid phenolic rainscreen panel Manufacturers Representative, mockup and commissioning testing agencies, air barrier installation contractor, exterior insulation installer, electrical installer and any other installer whose work interfaces with or affects the solid phenolic rainscreen wall panels.
5. PROJECT CONDITIONS, STORAGE AND HANDLING
	1. Proceed with installation only when existing and forecasted weather conditions permit assembly of the solid phenolic sunshade panels assembly to be performed according to the Manufacturer’s written installation instructions and warranty requirements.
	2. Field Measurements: Verify actual sunshade panel measurements / mounting openings by field measurement before fabrication to accommodate site tolerances and changes in construction.
	3. Comply with Manufacturer’s stated ordering, lead-time and manufacturing requirements to avoid construction delays.
	4. Deliver solid phenolic panel materials, substructure and other manufactured accessory materials in Manufacturer’s original, unopened, and undamaged containers with identification labels intact and visible. Comply with Manufacturers written material handling and storage guidelines. Do not store panels in such a way that might cause damage by other trades, staining, scratching or other surface damage.
	5. Phenolic panel installer shall notify General Contractor or Construction Manager immediately upon discovery of any issues with the substrate, i.e. improper framing, walls out of plumb, windows not properly aligned or other conditions affecting proper on plane installation. These issues shall be appropriately addressed prior to continuation of sunshade panel installation.
	6. Remove damage and waste panel material from site and legally dispose of according to project guidelines or authority having jurisdiction.
6. WARRANTY
7. Submit Manufacturer’s standard 10 year limited warranty covering defects in material or manufacturing quality, including color fastness warranty. Warranty to include labor for removal, replacement reinstallation of defective material.
8. Warranty is only available when solid phenolic sunshade panels are installed and fabricated by an installation contractor that has been approved by the Manufacturer and has followed the recommended guidelines of the Manufacturer, and has been signed and dated by the appropriate parties listed on the warranty registration form.
9. Submittal of Warranty must be made within 6 months of substantial completion of the Project. Contact Manufacturer for warranty submittal procedure.

# PART 2 – PRODUCTS

2.1 MATERIALS

1. The specifications are based on FunderMax Max Compact Exterior F Quality high-pressure phenolic panels manufactured by FunderMax GmbH, FunderMax North America, and represented \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Telephone: (xxx) xxx-xxxx.
2. Basis of Design: FunderMax Max Compact Exterior F Quality phenolic panels
3. Alternate Products:
4. Product Description:
5. Fire-retardant solid phenolic panels with standard brown core comprised of kraft paper harvested from FSC certified forests and thermosetting resins. Dry Formed (DF) or Natural Fiber Core (NFC) products will not be accepted.
6. Acceptable alternate products must be manufactured using a high pressure laminate press process that meet all requirements of the EN 438-4 standard and may not be manufactured as a low pressure lamination to a phenolic core.
7. Panel Decor: select as appropriate (Unicolours) or (Nature) or (Material) or (Metallic)
	1. Color number XXXX , Color number XXXX (List colors or delete and use below)
	2. As selected by Architect from Manufacturer’s standard color range
8. Sunshade Panel Surface: NT
9. Sunshade Panel Core: Brown
10. Sunshade Panel Thickness: (Select) 8mm, 10mm, 13mm, 15mm
11. Sun shade module(s) for finished installation: As indicated on the architectural drawings
12. Substructure: (Exposed Fastener Type) (Concealed Fastener Type) extruded aluminum or steel profiles, clips, closures, fasteners as detailed on the architectural drawings

2.2 SOURCE QUALITY CONTROL:

1. Panels shall be specifically designed for exterior rainscreen wall applications. Fabricated panels shall comply with all current codes and regulations for the Project. Panels shall have uniform thickness (+0.03”) and flatness (maximum difference of 0.03”) for a 10 foot span.
2. Flame Spread: Panels to conform to ASTM E-84 for Class A fire rating with a Flame spread index of less than 10 and Smoke development index of less than 450.
3. NFPA-268 Surface Ignition test, pass.
4. Ignition Temperature: Greater than 650 degrees Fahrenheit above ambient, ASTM D-1929
5. UV stable surface of Acrylic-PUR resin coating of 100 micron thickness or greater with color stability > 4 on Gray Scale.
6. When required by code, the assembly shall meet the performance requirements of NFPA 285. Exposed fastening assemblies listed in ICC ESR #3340 or Concealed fastening assemblies with Engineering Evaluation report(s) from a nationally recognized fire protection consulting firm. Any variations must be approved by the local code official.
7. Performance Requirements:

1. Modulus of Elasticity: 1,300,000-psi minimum.

2. Weight: 8mm 2.4 lbs./SF; 10mm, 3 lbs./SF; 13mm, 3.9 lbs./SF

3. Tensile Strength: 11,000-PSI, minimum.

4. Flexural Strength: 13,000-PSI, minimum.

5. Surface Impact Resistance: < 8 per EN ISO 178

6. Scratch Resistance: > 3 /4 N per EN 438:6

7. Optical Properties: Color Stability Gray Scale > 4 per ISO 4892-2, 4892-3.

8. Panels shall be hail impact resistant with no breakage per Austrian APBIC Standard, Association of Public Building Insurance Companies. Equivalent test standard 70mm ice ball at a velocity of 30 meters/second (approx. 67 mph) without breakage, tearing or discoloration.

9. Panels shall be FSC Certified

10. Panels shall have an Environmental Product Declaration (EPD) Report.

11.Panels shall have a Health Product Declaration (HPD)

1. Panel Tolerance:

1. Thickness: 1/32”, maximum.

2. Length: ¼”, maximum.

3. Width: ¼”, maximum.

4. Non-porous surface and edges which do not require sealing after cutting or drilling.

2.3 AUXILLIARY MATERIALS

1. Aluminum or Steel Support Substructure: Extruded, Cold Formed, finished, and color matched or mill finish for the type of use indicated on the project Drawings.
2. Attachment Accessories: Of type, size, corrosion resistance, holding power and color-matched as required to suit attachment to support substructure. For exposed fastener attachment of panel to mounting structure Type 304 Stainless steel TORX head fasteners as recommended by Manufacturer are to be used by installer.

2.4 FABRICATION

 A. General: Fabricate solid phenolic rainscreen wall panels and accessory materials in accordance with the Manufacturer’s written instructions and approved submittals, and a fabrication facility trained and approved by the Manufacturer. Comply with indicated profiles and within dimensional and structural requirements.

# PART 3 – EXECUTION

3.1 EXAMINATION

1. Examine substrates, areas, and conditions with Installer present, for compliance with the requirements for installation tolerances of structural substrate, support structure, solid phenolic sunshade panel, and other conditions affecting performance.

1. Verify that substrate conditions, wall framing, and other structural support members and anchorages installed under other sections are acceptable for product installation and have been installed within acceptable tolerances in accordance with the Manufacturer’s written instructions.

2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

1. Support Structure: Install clips, L-Shapes, J-Shapes, Z-Shapes, hat channels or J channels, C Channels, and other components in accordance with approved Shop Drawings and Manufacturer’s recommended installation instructions.
2. Install support structure framing level and plumb and within tolerances of the completed system as approved and recommended by the Manufacturer and in accordance with approved Shop Drawings.

3.3 SOLID PHENOLIC SUNSHADE PANEL INSTALLATION

1. Install solid phenolic sunshade panel’s plumb and level and accurately spaced per Manufacturer’s written installation instructions and in accordance with approved Shop Drawings.
2. Fasten solid phenolic sunshade panels to substructure with fasteners approved for use with adjoining construction and in accordance with approved Shop Drawings for color matching and to confirm compliance with wind load and engineering design requirements.
3. Erection Tolerances: Install support structure within the required installation tolerances as recommended by Manufacturer and in accordance with approved Shop Drawings.

3.4 CLEANING

A. Upon completion of solid phenolic sunshade panel installation clean finished surfaces as recommended by panel Manufacturer prior to Owners’ acceptance.

B. Legally dispose of all surplus material off site or in accordance to project manual.

  **End of Section 107113**