**SECTION 10 71 14**

 **METAL SUN SHADES**

**\*\*\*\*\* Ametco® Manufacturing Corporation manufacturers several types of ornamental metal fencing and many basic construction materials such as perforated metal and plastic panels, expanded metal panels, wire cloth, steel and aluminum bar gratings, safety gratings, stair treads, and ladder rungs.**

**This guide specification can be used to specify sun shades manufactured by Ametco® Manufacturing Corporation. These are fabricated from either galvanized steel or aluminum and are designed to mount with outriggers on exterior building surfaces or window framing. Three styles of shading - bar grilles, louvers, and perforated panels - available for Ametco® sun shades. In addition to standard designs, custom fabricated sun shades are provided to meet specific and unique project requirements.**

**The specifier will need to edit this guide specification for a specific project to reflect the options and applications being used. The guide specification has been written so that most editing can be accomplished by deleting unnecessary requirements. Options are indicated by [ ]. Notes to assist the specifier in selecting options and editing the guide specification are printed in bold and indicated with \*\*\*\*\*. For final editing, all brackets and notes will need to be deleted from the guide.**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**PART 1 - GENERAL**

**1.1 SUMMARY**

 A. Section includes: Modular, shop-fabricated, metal sun shades to mount on exterior [window framing] [building walls] [\_\_\_\_\_].

 B. Related sections:

**\*\*\*\*\* List other specification sections dealing with work directly related to this section such as the following. \*\*\*\*\***

 1. [Section 03 40 00 - Precast Concrete] [Section 04 20 00 - Unit Masonry] [Section 07 42 13 - Metal Wall Panels]: Exterior wall surfaces to receive sun shades.

 2. [Section 08 41 00 - Entrances and Storefronts] [Section 08 44 00 - Curtain Wall and Glazed Assemblies]: Metal window framing to receive sun shades.

**1.2 REFERENCES**

**\*\*\*\* List by number and full title reference standards referred to in remainder of specification section. Delete non-applicable references. \*\*\*\*\***

 A. ASTM International (ASTM):

 1. ASTM A36 – Carbon Structural Steel.

 2. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

 3. ASTM A526 - Sheet Steel, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.

 4. ASTM A792 - Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

 5. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.

 6. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.

 7. ASTM B221 – Aluminum and Aluminum‑Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

 8. ASTM D822 - Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

 9. ASTM D2794 – Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

 10. ASTM D3363 - Film Hardness by Pencil Test.

**1.3 SUBMITTALS**

 A. Provide in accordance with Section 01 33 00 - Submittal Procedures:

 1. Product data for sun shade components and finish.

 2. Shop drawings showing layout, dimensions, spacing of components, and anchorage and installation details.

 3. Calculations for support system.

 4. Sample: [10 by 10 inches] [254 by 254 mm] minimum size sample of sun shade panel illustrating design, fabrication workmanship, and selected color coating.

 5. Copy of warranty specified in Paragraph 1.5 for review by Architect.

**1.4 QUALITY ASSURANCE**

 A. Design structural support framing components for sun shades under direct supervision of professional structural engineer.

 B. Installer qualifications: Approved by manufacturer for installation of sun shade system.

**1.5 WARRANTY**

 A. Provide in accordance with Section 01 77 00 - Closeout Procedures:

 1. 20-year warranty for factory finish against cracking, peeling, and blistering under normal use.

**PART 2 - PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

 A. Ametco Manufacturing Corporation, 4326 Hamann Parkway, P.O. Box 1210, Willoughby, Ohio 44096; 800-362-1360.

 B. Requests to use equivalent products of other manufacturers shall be submitted in accordance with Section 01 25 13 - Product Substitution Procedures.

**2.2 MATERIALS**

**\*\*\*\*\* Edit this article to indicate if sun shade is fabricated from galvanized steel or aluminum. \*\*\*\*\***

 A. Steel bar stock: ASTM A36.

 B. Steel tubing: ASTM A500, Grade B.

 C. Steel sheet: ASTM A526 galvanized or ASTM A792 Galvalume.

 D. Extruded aluminum: ASTM B221, Alloy 6063, Temper T-6.

 E. Sheet aluminum: ASTM B209, Alloy 6063, Temper T-6.

**2.3 SUN SHADE SYSTEM**

**\*\*\*\*\* Ametco® Manufacturing Corporation provides three types of sun shades: bar grill, louver, and perforated. Typically sun shades are mounted with outriggers. Edit the following paragraph to indicate material and type of sun shade being specified. \*\*\*\*\***

 A. Type: [Aluminum] [Galvanized steel] sun shades consisting of modular framed panels with [bar grill] [louver] [perforated sheet] infill and outriggers for mounting on [window framing] [exterior wall surfaces]; Sun Shades as manufactured by Ametco Manufacturing Corporation.

 B. Sun shade panel: Modular panel with perimeter frame.

**\*\*\*\*\* Various panel sizes can be fabricated. Size is determined by structural and wind loads, seismic conditions, and degree of shading required. Maximum panel length for bar grill sun shades is 10 feet (3048 mm) and for louver sun shades is 6 feet (1829 mm). Contact Ametco® Manufacturing Corporation for assisting in determining layout and size of sun shade panels and designing structural connections. \*\*\*\*\***

 1. Panel size: [[\_\_\_\_\_] by [\_\_\_\_\_] [inches] [mm].] [As indicated on Drawings and approved shop drawings.]

**\*\*\*\*\* Ametco® provides four standard styles of bar grill type sun shades each providing 60 degrees incident angle of sun shade.**

 **Style 101: 2 by 3/16 inches (51 by 5 mm) bars on 1-3/16 inches (30 mm) centers.**

 **Style 102-45: 2 by 1/2 inches (51 by 12 mm) tubes on 2-5/16 inches (57 mm) centers.**

 **Style 102-90: 2 by 1/2 inches (51 by 12 mm) tubes on 2-5/16 inches (57 mm) centers.**

 **Style 104-45: 4 by1/2 inches (102 by 12 mm)tubes on 4-7/16 inches(112 mm) centers.**

 **Style 104-90: 4 by1/2 inches (102 by 12mm)tubes on 2-1/2 inches (63 mm) centers**

**Include the following paragraph if bar grill type sun shade is required and indicate style and corresponding dimensions. \*\*\*\*\***

 2. Panel infill: Bar grill type consisting of flat, vertical bars connected with cross bars; Style [101] [102] [103] [104] as manufactured by Ametco Manufacturing Corporation.

 a. Incident angle of sun shade: 60 degrees.

 b. Main bars: [\_\_\_\_\_] by [\_\_\_\_\_] [inch] [mm] bars on [\_\_\_\_\_] [inch] [mm] centers.

**\*\*\*\*\* Ametco® provides two standard styles of louver sun shades.**

 **Style 201: Providing 80 percent direct visual screening.**

 **Style 202: Providing 100 percent direct visual screening.**

**Include the following paragraph if louver type sun shade is required and indicate style and corresponding visual screening. \*\*\*\*\***

 3. Panel infill: Inclined, flanged louvers welded to cross bars; Style [201] [202] as manufactured by Ametco Manufacturing Corporation.

 a. Direct visual screening: [80] [100] percent.

 b. Main bars: [\_\_\_\_\_] by [\_\_\_\_\_] [inch] [mm] bars on [\_\_\_\_\_] [inch] [mm] centers.

**\*\*\*\*\* Ametco® Manufacturing Corporation has an extensive variety of perforated metal sheets which can be used for perforated sun shades. Refer to Ametco® product literature for style numbers and illustrations of available perforation patterns. Thickness of perforated panels is 1/8 inch (3 mm). Include the following paragraph if perforated sun shades are required and indicate selected style number. \*\*\*\*\***

 4. Panel infill: Flat perforated panel; Style [\_\_\_\_\_] as manufactured by Ametco Manufacturing Corporation.

 a. Thickness: [1/8 inch] [3 mm].

 b. Perforation pattern:

**\*\*\*\*\* Numerous round, square, slotted, and hexagonal perforation patterns are available. Complete and edit the appropriate paragraph for the type of pattern selected. Delete other types. \*\*\*\*\***

 1) Round: [\_\_\_\_\_] [inch] [mm] diameter holes [spaced at [\_\_\_\_\_] [inch] [mm] centers] in [straight line] [[60] [45] degrees staggered] pattern and providing [\_\_\_\_\_] percent open area with [\_\_\_\_\_] holes per [square inch] [square mm].

 2) Square: [\_\_\_\_\_] [inch] [mm] square perforations placed in [straight line] [staggered] pattern and providing [\_\_\_\_\_] percent open area.

 3) Slotted: [\_\_\_\_\_] by [\_\_\_\_\_] [inch] [mm] slots with [round] [square] ends in [straight line] [end staggered] [side staggered] pattern with [\_\_\_\_\_] [inch] [mm] wide side bar and [\_\_\_\_\_] [inch] [mm] wide end bar and providing [\_\_\_\_\_] percent open area.

 4) Hexagonal: [\_\_\_\_\_] [inch] [mm] wide hexagons separated by [\_\_\_\_\_] [inch] [mm] thick bars and spaced at [\_\_\_\_\_] [inch] [mm] centers providing [\_\_\_\_\_] percent open area.

 C. Support system: Provide outriggers or other means for support of sun shade panel fabricated from same material as panel. System shall be designed to resist applicable dead, live, wind, and seismic loads.

 1. Type: Straight projecting outriggers.

 2. Construction: Welded fabrication consisting of attachment plate, double support angles, and tapered plate extension as detailed and dimensioned on Drawings and approved shop drawings.

 3. Size: As required to provide sufficient structural support of panels.

 D. Fasteners: Stainless steel bolts, studs, and other types of size and spacing as recommended by manufacturer for specific condition and detailed on approved shop drawings.

**2.4 FACTORY FINISH**

 A. Sun shade panels, outriggers, and other components shall receive electrostatically applied colored polyester powder coating heat cured to chemically bond finish to metal substrate.

 1. Minimum hardness measured in accordance with ASTM D3363: 2H.

 2. Direct impact resistance tested in accordance with ASTM D2794: Withstand 160 inch-pounds.

 3. Salt spray resistance tested in accordance with ASTM B117: No undercutting, rusting, or blistering after 500 hours in 5 percent salt spray at 95 degrees F and 95 percent relative humidity and after 1000 hours less than [3/16 inch] [5 mm] undercutting.

 4. Weatherability tested in accordance with ASTM D822: No film failure and 88 percent gloss retention after 1 year exposure in South Florida with test panels tilted at 45 degrees.

**\*\*\*\*\* Ametco® Manufacturing Company provides 15 standard colors. Custom colors are available for minimum size orders. Contact Ametco® Manufacturing Company for information on custom colors. \*\*\*\*\***

 B. Color: [[Red Baron] [Black Velvet] [Blue Streak] [Bronze Mat] [Cal Gray] [Charlie Brown] [Cream] [Light Blue] [Light Ivory] [Moss Green] [Pale Green] [Safety Orange] [Safety Yellow] [Silver with weather-resistant clear coating] [White] as manufactured by Ametco Manufacturing Company.] [Selected by Architect from manufacturer's standard range.] [Custom color as selected by Architect.]

**PART 3 - EXECUTION**

**3.1 PREPARATION**

 A. Prior to fabrication, field verify required dimensions.

 B. Coordinate sun shade installation with provision of [exterior wall system] [window framing system] [curtain wall system] to ensure proper structural support is provided, attachment of sun shades is compatible with substrate, and weathertightness of exterior envelop is maintained.

**3.2 INSTALLATION**

 A. Install sun shades in accordance with manufacturer's installation instructions and approved shop drawings.

 B. Insulate dissimilar metals to prevent electrolysis with bituminous paint or non-absorptive gasket to prevent contact.

 C. Allow for thermal expansion and contraction of metal components.

 D. Install shade panels plumb, level, free from distortion, and aligned with building elements and adjacent shade panels.

 E. Do not install bent, bowed, or otherwise damaged panels. Remove damaged components from site and replace.

 F. Attach shade panels to outriggers with appropriate fasteners for secure, permanent installation.

 G. After installation, touch-up damaged finish with paint supplied by manufacturer and matching original coating.

 **END OF SECTION**