

(Aluminum Sun Control Devices) CSUB Math & Computer Science

SECTION 10 71 13

EXTERIOR SUN CONTROL DEVICES

PART 1 – General

1.1 AERO SERIES : M089

- A. Provide design and engineering of Custom Sunshades as per drawings, as specified, and as required for a complete and proper performance.
- B. Section Includes (but is not limited to): Horizontal, Vertical, Fixed, Extruded aluminum Exterior Sun Control Devices, Awnings and Canopies.
- C. Related Sections :
 - 1. Section 05120 – Structural Steel framing, main frame knife blade attachments points, brackets any components in Steel within the curtain wall to which cantilevered units beyond the curtain wall may be affixed.
 - 2. Section 05090 – Metal anchors, fasteners: devices for attachments to building substrates beyond the curtain wall or main frame. Includes stainless steel fasteners, “L” bars, Rods and Clevis’s other components.
 - 3. Section 07900- Joint Sealers : Joint Sealants installed in perimeter joints between frame sun control devices penetrations into fabric of building or adjoining construction

1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 611, "Voluntary Specifications for Anodized Architectural Aluminum (Revised)."
 - 2. AAMA 2605, "Voluntary Specification, Performance Requirements, and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels."
- B. American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE):
 - 1. ASHRAE/IESNA 90.1, "Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings" (co-sponsored by IESNA).

C. American Welding Society (AWS):

1. AWS D1.2, "Structural Welding Code - Aluminum" (copyrighted by AWS, ANSI approved).

D. ASTM (ASTM):

1. ASTM B 26/B 26M, "Standard Specification for Aluminum-Alloy Sand Castings."
2. ASTM B 209/B 209M, "Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate."
3. ASTM B 221/B 221M, "Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes."
4. ASTM D 1187, "Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal."

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

1. NAAMM MFM, "Metal Finishes Manual."

1.3 SUBMITTALS

A. Product Data: Submit specifications, and Manufacturer's data sheet for each product to be used (to include : necessary preparations, storage and handling instructions, and installation instructions, if applicable)

B. Shop Drawings: Submit shop drawings for each product required.

1. Include plans, elevations, sections and details showing profiles, angles, and spacing of blades, frames and supports.
2. Include sectional details showing adjacent construction, including flashing, wall finish and sealants.
3. Indicate materials, thicknesses, types, connection details and methods, reinforcements and anchoring methods.
4. Shop drawings shall be prepared and sealed, as well as signed by Civil or Structural Engineer, as required.
5. On all submissions show Anchors and Inserts : List type, size, and material required for type of loading and required torque for installation as indicated.

6. When specified in Contract, prepare and submit CAD drawings for approval following which Civil Engineered calculations showing compliance with all local codes.

C. Samples:

1. Submit samples for initial color selection. Submit samples of each specified finish. Submit samples in form of manufacturer's color charts showing full range of colors and finishes available. Where finishes involve normal color variations, include samples showing the full, range of variations expected.
2. Submit samples for verification purposes. Submit 2 inch (51 mm) by 3 inch (76 mm) minimum size sample of selected color coating. Additional samples may be required to show design, fabrication techniques, and workmanship.

D. Quality Control Submittals:

1. Design Data: To comply with design loadings include structural analysis data signed and sealed by the professional engineer.

E. LEED Submittals: Submittals that are required to comply with requirements for LEED certification include, but shall not be limited to, the following:

1. Recycled Content Materials: Provide product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
2. Regional Materials: Provide product data for regional materials indicating location and distance from the Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Distance shall be within 500 miles (805 Km) of the Project Site. Include statement indicating cost for each regional material and, if applicable, the fraction by weight that is considered regional.
3. Low-Emitting Materials: Submit certification by the manufacturer confirming that products (i.e., adhesives, sealants, paints, coatings, etc.) meet or exceed the volatile organic compound (VOC) limits set by specific agencies or other requirements as outlined in the LEED Green Building Rating System. VOC limits shall be clearly stated in the submittal.

4. Daylighting 75 Percent of Spaces: Submit certification by the manufacturer confirming that products provide the building occupants a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas of the building.
5. Optimize Energy Performance: Submit certification by the manufacturer confirming that products contribute to increasing levels of energy performance above the baseline in the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

1.4 System Performance

- A. Structural Design of Sun Control Devices : General Contractor shall provide all engineering services and where necessary re-deferred approval by Authority Having Jurisdiction (AHJ) and obtain all the relevant permits and authorization.
 1. Components shall have all exterior profiles and dimensions indicated on the CAD Shop Drawings.
 2. Extrusion wall thicknesses, internal reinforcements, jointing and installation provisions shall all be illustrated. (As an optional extra, be designed by a professional Civil Engineer registered to practice in the State of California ; made available for out of State applications for local State licensed Civil or Structural Engineer to check and approve as meeting local conditions and ratify as satisfactory). Analysis of blade deflection shall be limited to $L/120$, $\frac{3}{4}$ " or as required by Authority Having Jurisdiction (AHJ). Include wind loads as applicable to local conditions.
- B. Design and Experience : Sun Control Devices shall be designed, integrated, engineered, produced, and assembled by a single manufacturer with proven 20yrs experience and being the principle provider on at least one Aluminum project exceeding 500,000 US Dollars.
- C. Quality Control
 1. For quality and delivery control, units shall be manufactured, assembled with mechanical fasteners and finished by on manufacturer with who is also a fully licensed Duranar/Kynar approved applicator.
 2. Engineer Qualifications: The engineer shall be a professional engineer legally authorized to practice in the jurisdiction where the Project is located and experienced in providing engineering services of the kind indicated that have resulted in the installation of products similar to this Project in material, design, and extent, and that have a record of successful in-service performance.

3. Welding will only be acceptable when provided by certified welders or when specifically essential to the design of the product. Otherwise blades shall be removable for repair and replacement. Welder Qualifications: Qualify welding processes and welding operators in accordance with AWS standard qualification procedures. Operators shall carry proof of qualification on their persons.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the Project site in supplier's or manufacturer's original wrappings and containers.
- B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Take field measurements prior to fabrication of the work and preparation of shop drawings, to ensure proper fitting of the work. Show recorded measurements on final shop drawings. Notify the Owner and the Architect, in writing, of any dimensions found which are not within specified dimensions and tolerances in the Contract Documents, prior to proceeding with the fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the work.
 1. Established Dimensions: Where field measurements can not be made without delaying the work, guarantee dimensions and proceed with fabricating of exterior sun control assemblies without field measurements. Coordinate construction to ensure that exterior sun control assemblies correspond to established dimensions.

1.7 WARRANTY

- A. Warranty: Provide written warranty to the owner that all screen products will be free of defective materials or workmanship for a period of one year from date of installation

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Products are manufactured by B&C Awnings Inc; 3082 E. Miraloma Ave., Anaheim, CA 92806; Phone: 800-962-9949; Fax: 708-388-9392; Web Site: www.bcawnings.com.
- B. Acceptable Manufacturers : Equivalent products of other manufacturers will be acceptable in accordance with the “or equal” provision specified in Section 01600 – Product Requirements. Slight manufacturing variances will be considered if general appearance, materials, finishes, and weathering provisions are equivalent to those of specified product.

2.2 MATERIALS

1. Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer to produce required finish.
2. Aluminum Extrusions : ASTM B221, Alloy 6063 –T5 or 6061 –T6
3. Perforated Metal Panels should be Aluminum and not steel (due to perforation being applied after galvanizing and subject to rust)
4. Internal and External Metal Fasteners : Stainless Steel Nuts, Bolts, Metal Screws, Rods and Clevises as applicable and as shown on drawings and as shown on drawings. Neoprene washers to be used to separate dissimilar materials. Do not use metals which are corrosive or incompatible with materials joined.
 - a. Use types, gages, and lengths to suit unit installation conditions.
 - b. Use flat-head machine screws for exposed fasteners, unless otherwise indicated.
5. On all submissions show Anchors and Inserts : List type, size, and material required for type of loading and required torque for installation as indicated.
 - a. Use nonferrous metal or hot – dipped galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance.
 - b. Use toothed steel or expansion bolt devices for drilled – in – place anchors and in masonry structures.
6. Bituminous Coating. Tnemec 46-450 Heavy Tnemecol, high-build mineral – filled coal tar pitch coating, or a cold applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers.

2.3 ALUMINUM EXTERIOR SUN CONTROLS

- A. General: Provide extruded aluminum exterior sun control assemblies complying with the following:
 - 1. Infill: 6" x 3/32" thk. Aluminum Airfoil Blades 6063-T5 ([click for more options](#))
 - 2. Outrigger : 1/4" Outrigger 1050- H14 or 5052 –H32 (click for more options)
 - 3. Fascia: 5" x 3" x 1/8" thk. Quarter-Barrel Fascia 6063 –T5 ([click for more options](#))

2.4 FABRICATION

- A. Assemble exterior sun control assemblies in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitation. Clearly mark units for reassembly and coordinated installation.
- B. Exterior sun control assemblies shall be assembled in accordance with manufacturer recommendations.
- C. Maintain equal blade spacing, including, but not limited to, separation between blades and frames to produce a uniform appearance. Blades shall be fixed.
- D. Make provisions to secure components in field using concealed fasteners.
- E. Include supports, anchorage, and accessories required for complete assembly.

2.5 ALUMINUM FINISHES - KYNAR

- A. Comply with NAAMM MFM for architectural metal products for recommendations for pretreatment, application of finishes. Finish exterior sun control devices after assembly if welded.
 - 1. Aluminum Finishes: Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
- B. Specified Manufacturer : Coatings & Resins Division, PPG Industries, Inc. (Duramar, Kynar) Springdale, PA (412/274-7900 or 800/258-6398) to be applied by PPG licensed applicator.

- C. Acceptable Manufacturers :
1. Akzo Nobel Coatings, Inc. (Trinar brand), Columbus, OH (614/294-3361 or 800/294-3361)
 2. The Valspar Corporation (Fluorpon brand), Garland, TX (972/485-7173 or 866/351-6900)
 3. BASF Corporation (Fluorceram brand), Southfield, MI (248/948-2442)
- D. Acceptable Resin Manufacturers : Provide coating based on PVDF resin produced by one of the following :
1. Duranar
 2. Kynar 500, by Arkema Inc. Philadelphia, PA (800/225-7788)
 3. Hylar 5000, by Solvay Solexis, Inc. Thorofare, NJ (856/853-8119)
- E. PVDF Resin-Based Coating System : PPG Duranar series thermoplastic organic coating system containing minimum 70 percent Kynar 500 or Hylar 5000 polyvinylidene fluoride (PVDF) resin combined with proprietary ceramic/ inorganic pigments for factory application to aluminum extrusions. Coating system shall comply with the following :
1. American Architectural Manufacturers Association (AAMA) standard AAMA 2605 – Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
 2. Architectural Spray Coaters Association (ASCA) standard ASCA 96 – Voluntary Specification for Superior Performance of Organic Coatings.
- F. Touch – Up Paint : For minor field repairs to finish, air drying coating as produced and recommended by finish coating manufacturer's specifications.
- G. Factory Application : Prepare Aluminum Extrusions and factory apply aluminum pretreatment according to finish coating manufacturer's specifications.
1. High Performance Organic Coating:
 - i. Pretreatment : AAMA 606-98
 - a. High Temperature Alkaline Wash
 - b. Ambient Rinse
 - c. Deoxidizer
 - d. Chromium Chromate Coat
 - e. Ambient Rinse and Dry Off
 - ii. Standard Two-Coat Fluoropolymer Finish Coating: Manufacturer's standard thermocured system, complying with AAMA 2604 standards, inhibitive primer and fluoropolymer color topcoat.

- H. Pretreatment , Primers, PVDF coating and topcoats in compliance with coating manufacturer's instructions and recommendations and in compliance with applicable provisions of referenced standards.
 - 1. Primer : According to coating manufacturer's specifications as integral components of overall finish system.
 - 2. Finish Coat : PVDF resin based coating according to finish coating manufacturer's specifications, thermoset after application.
 - 3. Coating Thicknesses :
 - a. Primer : Minimum 0.3 mil (+/- 0.1 mil) dry film thickness
 - b. Color coat : 1.0 mil (+/- 0.1 mil) dry film thickness
- I. Visual Performance Criteria: Coating finish shall be uniform in thickness and color, smooth and free from blemishes which might impair the serviceability or which are visible when viewed from a distance of 10 feet under normal daylight conditions at the project site.

2.6 ALUMINUM FINISHES - POWDERCOAT

- A. Comply with NAAMM MFM for architectural metal products for recommendations for pretreatment, application of finishes. Finish exterior sun control devices after assembly if welded.
 - 1. Aluminum Finishes: Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
- B. Specified Manufacturer : TIGER Drylac U.S.A., Inc. Ontario, CA 91761 (909/930-9100)
- C. Touch – Up Paint : For minor field repairs to finish, air drying coating as produced and recommended by finish coating manufacturer's specifications.
- D. Factory Application : Prepare Aluminum Extrusions and factory apply aluminum pretreatment according to finish coating manufacturer's specifications.
 - 1. TGIC Polyester Powder Coating System:
 - i. Pretreatment : AAMA 606-98
 - a. High Temperature Alkaline Wash
 - b. Ambient Rinse
 - c. Deoxidizer
 - d. Chromium Chromate Coat
 - e. Ambient Rinse and Dry Off

ii. TGIC Polyester Powder Coating System: Manufacturer's standard thermocured system, complying with AAMA 2604 standards .

a. Pretreatment , Primers, TGIC Powdercoating and topcoats in compliance with coating manufacturer's instructions and recommendations and in compliance with applicable provisions of referenced standards.

i. Primer : According to finish coating manufacturer's specifications as integral components of overall finish system.

ii. Finish Coat : TGIC Polyester Powder Coating to manufacturer's specifications, thermoset after application.

b. Visual Performance Criteria: Coating finish shall be uniform in thickness and color, smooth and free from blemishes which might impair the serviceability or which are visible when viewed from a distance of 10 feet under normal daylight conditions at the project site.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which the work is to be installed, and notify the Contractor in writing, with a copy to the Owner and the Architect, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

1. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the Installer.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to the Project Site.

3.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the Project site in supplier's or manufacturer's original wrappings and containers.
- B. Store materials in their original, undamaged packages and containers, inside a well ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

3.4 INSTALLATION

- A. Install exterior sun control devices in accordance with reviewed product data, final shop drawings, and engineering calculations.
- B. Install assemblies plumb, level, and in proper alignment with adjacent Work
- C. To assist in handling and shipping assemble units with slip fit interconnections and mechanical fasteners.
- D. Isolate aluminum from steel and incompatible materials with field applied bituminous coating, insulators, vinyl or plastic gaskets.
- E. Use countersunk, concealed anchorages or intersection material and make hairline joints as inconspicuous as possible.
- F. Provide neoprene washers fitted to screws in order to protect metal surfaces and to make a point of compression a weather resistant connection.
- G. Anchor to substrate using fasteners as recommended by sunshade manufacturer, as indicated on reviewed shop drawings and in accordance with general anchoring requirements specified in Section 05090 – Anchors
- H. Form closely fitted joints with exposed connections accurately located and secured.
- I. Corrosion Protection : Protect galvanized and nonferrous metal surfaces which will be in contact with concrete, masonry, or dissimilar materials.
- J. On wall penetration, following the pilot hole drilling procedure, Installer is to apply a small quantity of sealant into hole or on thread or anchor bolt to provide water resistant bond.
- K. Following any Installation, the General Contractor, buyer or owner must secure the services of a professional sealing company with at least (5) years of experience. Sealants of a type related to the local climatic conditions and suitable for the purpose for which they are intended together with any preferred flashing is to be applied by a professional in such a manner to provide a water tight seal against weather penetration at all points of anchor curtain wall, substrate, backing, decking or roofing as necessary.

- L. Where possible design units with minimum welding to avoid heat applications which will change the tensile strength of the material.
- M. Build in expansion capacity to minimize distortion and oil canning of surfaces.

3.5 ADJUSTING AND PROTECTION

- A. Protection : Protect louvered sun control devices from damage during construction period including use of temporary protecting coverings where needed and approved by sun control device manufacturer. Remove Protective Covering at time of Completion Review
- B. Restoration : If necessary, restore louvered sun control devices damaged during installation and construction period, so that no evidence remains of corrective work.
 - i. Clean and touch up minor abrasions in finishes with air dried coating that matches color and gloss of, as well as compatible with, factory applied finish coating.
 - ii. If results of restoration are unsuccessful, as determined by City's Representative remove damaged units and replace with new units.

3.6 CLEANING

- A. Progress Cleaning : Periodically clean exposed surfaces of sunshade (without the use of ladders) which are not protected by temporary covering, to remove dust and soiling during construction period ; do not let dust or soiling accumulate until final cleaning
- B. Final Cleaning : Before Completion Review, clean exposed surfaces with water and with a mild soap or detergent not harmful to finishes. Rinse thoroughly and dry surface.
- C. Units not to be walked upon or bare loads during or after installation.

3.7 WARRANTY

Provide standard 20 year warranty on applicable finishes and other pertinent Warranties on Materials and labor as per published standard.

END OF SECTION