

CSI SECTION 08 65 00 Specification for Light Shelves

SECTION 08 65 00 – Light Shelves

PART 1 - GENERAL

1.1 Description:

- A. Provide Light Shelves as shown on the drawings, as specified, and as needed for a complete and proper installation.
- B. The drawings show the extent of the work, the dimensioned profile and depth of the light shelf to be provided.
- C. Related work specified elsewhere:
 - 1. 08 81 00 - Glass & Glazing
 - 2. 08 32 13 - Aluminum Framed Entrances & Storefronts
 - 3. 08 44 13 - Glazed Aluminum Curtain Walls
 - 4. 08 44 33 – Sloped Glazing Assemblies
 - 5. 08 51 13 – Aluminum Windows
 - 6. List specification sections that affect clip attachment to structure such as glass & glazing, cold formed metal framing, masonry etc.
 - 7. List specification sections that may affect timing of installation of light shelves such as any interior finish, painting, ceiling installation, HVAC, Electrical, or Fire Sprinklers.

1.2 Industry Standard:

- A. Reference:
 - 1. National Association of Architectural Metal Manufacturers (NAAMM)
 - 2. American Architectural Manufacturers Association (AAMA)

1.3 Qualifications:

- A. Manufacturers:
 - 1. Standard: Basis of design type and quality for the work under this section. BrightShelf® is the only known source for horizontal projected light shelves that meet the Design & Performance Requirements in section (1.4).
 - a. BrightShelf® light shelf as manufactured by:
H&H Enterprises, Inc.
12520 Grant Drive #100
Thornton, CO 80241
www.h-hmetals.com

BrightShelf® is sold by: H&H Enterprises, Inc.
Technical Questions: Chad Huff chuff@h-hmetals.com
Request for Quotes: Jim Huff jhuff@h-hmetals.com
www.h-hmetals.com
 - 2. Other manufacturers will not be considered as this light shelf design & construction is proprietary under U.S. Patent 8,027,092B1

1.4 Design & Performance Requirements:

- A. The BrightShelf® daylighting system is an optical light shelf daylighting system that is affixed on the inside of the daylight glazing. The BrightShelf® intercepts and redirects incident daylight in an efficient and uniform pattern toward the ceiling of the daylit space.
- B. The optical pattern shall consist of a patent pending ogee (cyma-reversa) curved shape to direct incident sunlight at constantly changing angles, casting light that hits the concave portion of the light far at predominately low angles and light that hits the concave portion backwards toward the perimeter of the daylit space at increasing angles.
- C. The light shelf shall have the following minimum optical properties:

- a. Reflective Surfaces:
 - 1) Total Reflectance (Nominal) – 98%
 - 2) Direct Image Reflectance, Specularity (Nominal) – 96%
- D. The light shelf units shall securely attach to the window frame so that seismic forces shall not dislodge the unit and cause it to fall from the brackets.
- E. The light shelf shall have provisions for tool free operation to rotate the shelf downward for periodic cleaning.
- F. The light shelf shall have means to keep the shelf section from inadvertently dislodging from mounting brackets during operation.

1.4 Submittals:

- A. Product Data: Submit specifications, technical and descriptive data, and installation instructions from the manufacturer of the light shelf.
- B. Shop Drawings:
 - 1. Submit shop drawings for the system for architects and engineers approval prior to commencement of any work or fabrication.
 - 2. Show anchorage, details and connections for all the component parts, including connection of mounting clip to structure and adjacent construction.
 - 3. Drawings shall include plans, sections, and specific details for each unit.
 - 4. Drawings shall detail appropriate materials, alloys, and finishes of all parts including installation hardware.
- C. Warranty: Provide written warranty to the owner that all light shelf products will be free of defective materials or workmanship for a period of one (1) year from date of installation.

1.5 Quality Assurance:

- A. Manufacturer must show evidence of having wholly owned manufacturing facilities. Outsourcing to a subcontracted manufacturer for shop or field assembly is not acceptable.
- B. Manufacturer must operate, design, assemble, and finish their product in the United States of America as a “Made in America” product. All materials must be procured from sources inside the United States of America.

PART 2 - PRODUCTS

2.1 Materials:

- A. Aluminum Extrusion Blades: ASTM B211, Alloy 6063-T5.
- B. Aluminum Plate ASTM B211, Alloy 5052.
- C. Fasteners: Fasteners shall be stainless steel. Provide types, gauges and lengths to suit unit installation conditions.
- D. Anchors and Inserts: Use non-Ferrous metal or hot dip galvanized anchors and inserts for installation and elsewhere as required for corrosion resistance. Use stainless steel or zinc galvanized expansion bolt devices for drill-in place anchors. Furnish inserts, as required, to be set into concrete or masonry work.
- E. Sustainable Design:
- F. The materials in this section are intended to have applicable credits toward LEED® certification. Provide documentation in accordance with USGBC’s LEED® for New Construction and Major Renovations™ *version 3 (2009)*, verifying that the components, processes or assemblies specified herein conform to the following requirements.
 - 1. EA Credit 1: Optimizing Energy Performance
 - a. Provide BrightShelf® model for incorporation into the overall project energy and lighting models.
 - 2. MR Credit 4: Recycled Content
 - a. Provide light shelf with an average total recycled content by weight of approximately 36%
 - b. Submit documentation outlining recycled content percentages using the formula: post consumer + ½ pre-consumer = Total Recycled content weight
 - 3. IEQ Credit 3.1: Construction IAQ Management Plan.

- a. Ensure that light shelf sections are shipped in prefabricated assembled sections, directly to the jobsite. No on-site fabrication shall be performed.
- 4. IEQ Credit 4.2: Low-Emitting Materials (adhesives, sealants / paints and coatings)
 - a. Verify that the shipped product does not require any on site application of adhesives, sealants, paints or coatings other than perimeter or installation sealants.
 - b. All interior “on site” applied primers, structural glazing adhesives, metal to metal sealants and cosmetic seals must meet applicable South Coast Air Quality Management District (SCAQMD) Rule #1168 VOC limits.
- 5. IEQ Credit 6.1: Controllability of Systems - Lighting
 - a. Provide lighting system with automatically controlled daylight sensors that will dim and/or turn off electric lights when adequate daylight is present.
- 6. IEQ Credit 7.1: Thermal Comfort Design
 - a. Utilize highly reflective (specular) lighting sheet that does not absorb heat to the extent of more matte finishes.
 - b. Utilize a minimum amount of daylighting window to reduce necessary window square footage and thusly reducing HVAC system load.
- 7. IEQ Credit 8.1: Daylight and Views – Daylight
 - a. Ensure that natural daylight is even and diffuse, decreasing areas that are over saturated with light.
- 8. IEQ Credit 8.2: Daylight and Views - Views
 - a. Ensure that light shelf system is installed at at a minimum 7'-6" A.F.F. giving occupants a clear connection to the outdoors.

2.2 Fabrication, General:

- A. Provide light shelves and accessories of design, material, sizes, depth, arrangement, and thickness as indicated or as required for optimal performance with respect to strength; durability; and uniform appearance, and optical performance.
- B. Include brackets, anchorage, and accessories required for complete assembly, including all attachment clips and necessary hardware for attachment to structure.
- C. Manufacturer shall allow +/- 1/16" thermal expansion room at each light shelf to compensate for dissimilar movement between building structure and light shelf structure. This design shall be incorporated as to not induce self-destructing loads onto either the light shelf or building substrate.

2.3 Light Shelf Construction:

- A. Components:
 - 1. Bullnose and back support members shall be 6063-T5 aluminum-extruded members.
 - a. Extrusions shall be designed with integral screw boss that is hidden from view after installation. Size and spacing is to be as shown on the architectural details.
 - 2. Outrigger components shall be fabricated from 3/16" 5052-H32 aluminum plate.
 - a. Outriggers shall be machined to an optical ogee curve, screwed to aluminum extrusion blades via countersunk fastener holes. Connections of aluminum extrusions to outriggers should be flush with no protruding fasteners visible after installation. Outriggers are pre-drilled for mounting to the structural light shelf bracket via stainless steel slip connection to compensate for thermal expansion.
 - 3. Underside Sheet material shall be .032" aluminum ASTM B209, Aluminum Association specification sheet 3003-H14/3105-H14 for painted finish
 - 4. Top Reflective Sheet material shall be .032" aluminum ASTM B209, Aluminum Association specification sheet 1085-H18
 - 5. Clip brackets shall be of 12 gauge carbon steel.
 - a. Connection of light shelf to building shall be by means of toolless insertion of light shelf into bracket.
 - b. Brackets shall be furnished with an integral set of cut out tracks to enable the installation of the light shelf, the rotation downward for cleaning and the rotation back up to level for a positive lock in the horizontal position.

6. Clip caps manufactured from UV resistant ABS manufactured by the injection mold process.
- B. Assembly: Components to be shop assembled in sections to allow for immediate installation. Sections indicated on shop drawings to be assembled and shipped as units with brackets and fasteners shipped loose. Under no circumstance shall the light shelf be field assembled.

2.4 Aluminum Finish For Light Shelf End Caps & Extrusions:

Painted Finishes: (Extrusions or Outriggers)

- A. General: Comply with NAAMM "Metal Finishes Manual" Chapter 1 NAMM-2604-05 for finish designations and application recommendations, except as otherwise indicated. Apply finishes in factory prior to product assembly. Remove scratches and blemishes from exposed surfaces, which will be visible after completing finishing process.
- B. Type: Factory applied super durable powder coating. Finish shall have enhanced resistance to fading, chalking, gloss retention that meets or exceeds AAMA 2604.
- C. Pretreatment:
 1. Manufacturer to pre-sand, sandblast, or timesave all surfaces to be painted in a linear direction.
 2. Applicator to pretreat the aluminum with solutions to remove organic and inorganic surface soils, remove residual oxides, followed by an optional chrome phosphosphate conversion coating – at minimum 30mg/ft² – to ensure adhesion of paint to the aluminum (AAMA 6.0).
- D. Application: One primer coat, one color coat, for a minimum of 1.2 mills of dry film thickness.
- E. Color: Provide color as indicated or, if not otherwise indicated, as selected by architect from standard colors.
 - a. Colors as chosen by architect from:
 - 1) Tiger Drylac: Series 38
 - i. Standard Bone White
 - ii. Standard Anodized Silver
 - iii. Any other color desired (may be subject to minimums)
 - 2) Or approved equal
- F. Finish Warranty: Furnish manufacturer's twenty (20) year limited warranty against adhesion loss, and standard ten (10) year limited warranty for gloss retention.

2.5 Coil Coated Panel Finishes: (Underside Sheet)

- A. Coating shall be a fluoropolymer coating utilizing 70% Kynar 500 resins.
- B. Color as selected by owner/consultant from manufacturer's standard colors.
- C. Coating shall be factory applied on a continuous process paint line. Coating shall consist of a 0.2 mil prime coat, a 0.75 mil barrier coat, a 0.75 mil metallic/color coat containing 70% Kynar resins, and a 0.5 mil clear coat containing 70% Kynar resins (Note mil thickness is approximate.)

2.6 Lighting Sheet Finish: (Top Reflective Sheet)

- A. Coating shall be a clear anodized bright finish, anodized by electro polishing to a film thickness of 0.060
- B. Total Reflectance (TR) = 98%
- C. Image Clarity (DI) = 97%
- D. Iridescence rating = 1 Flat field/ low color

2.7 Steel Clip Finish:

- A. General: Comply with NAAMM "Metal Finishes Manual" Chapter 4 for finish designations and application recommendations, except as otherwise indicated. Apply finishes in factory after product assembly. Remove scratches and blemishes from exposed surfaces, which will be visible after completing finishing process.
- B. Type: Factory applied super durable powder coating. Finish shall have enhanced resistance to fading, chalking, and loss of gloss that meets or exceeds AAMA 2604.
- C. Pretreatment:

1. Manufacturer to degrease parts to remove any dirt, oils, or other debris.
2. Applicator to pretreat with a chrome phosphahate conversion coating – at minimum 30mg/ft² – to ensure proper adhesion to metal surface (AAMA 6.0).
- D. Application: One coat epoxy zinc rich primer, one color coat, for a minimum 1.2 mills of dry film thickness.
- E. Color: Provide color as indicated.
 1. Black
 2. Bone White
 3. Anodized Silver
- F. Finish Warranty: Furnish manufacturer's twenty (20) year limited warranty against adhesion loss, and standard ten (10) year limited warranty for gloss retention.

2.8 Plastic Clip Cap Finish:

- A. Finish shall be black pre-mixed polymers colored prior to the molding process, so color is present throughout part. Caps to be painted to match clip color if Bone White or Anodized Silver is chosen.
- B. Exterior surface of cap to be slightly embossed matte finish.

PART 3 - EXECUTION

3.1 Material Inspection:

- A. Examine crates and reconcile to a shipping manifest or packing slip. Verify all required components are present.

3.2 Field Dimensions / Site Inspection:

- A. Prior to Clip Installation:
 1. Verify conditions: Examine areas where work is to be performed and identify any conditions that could be detrimental to proper or timely completion.
- B. Prior to light shelf Installation:
 1. Contractor shall field confirm opening widths and elevations as shown on shop drawings prior to fabrication of light shelf sections. Field dimensions of clip locations shall be verified prior to fabrication of sections.
- C. Installation of sections should not proceed until all conditions are satisfactory.

3.2 Installation / Erection:

- A. Comply with manufacturer's instructions and recommendations for installation of the work.
- B. Verify dimensions of supporting structure at the site by accurate field measurements so that the work will be accurately designed, fabricated, and fitted to the structure.
- C. Anchor light shelf to building substructure as indicated on the light shelf shop drawings.
- D. Erection Tolerances:
 1. Clips or Mounting Brackets:
 - a. Elevation clip Variation from level: 1/8" maximum in any column to column space or 20'-0" runs, non-cumulative.
 - b. Clip Plumbness: 1/32" in clip height.
 - c. Clip projection level: 1/32" in clip projection. Shim back of clip as necessary.
 2. Light Shelf Sections:
 - a. Projection Level: 1/8" in 5'-0"
 - b. Horizontal Level: 1/8" max in any column to column space or in 20'-0" runs, non-cumulative.
 - c. Section to section variation 1/16" at adjoining sections.
- E. Peel protective film coating from bottom and top surfaces immediately after installation. Do not let protective film sit in sunlight, as this can affect the sheet surface finish and light shelf performance.
- F. Do not erect warped, bowed, deformed or otherwise damaged or defaced members. Remove and replace any members damaged in the erection process as directed.
- G. Set units level, plumb and true to line, with uniform joints.

- H. Erect light shelf sections after all adjacent painting, glazing, ceiling grid installation, electrical, mechanical, fire protection, and other similar work is completed above and below the light shelf sections.

3.3 Cleaning:

- A. Clean light shelf surfaces to prevent buildup of dust and debris. Clean light shelves as outlined in BrightShelf® Maintenance & Care Guide available for download, or upon request from the manufacturer.

3.4 Protection:

- A. Protect light shelf materials after installation to prevent damage by other trades. Special attention shall be taken to ensure no equipment or tools are placed on top of the light shelf system. Schedule should dictate that light shelves are one of the last erected items to help mitigate damage to the system.

END OF SECTION 08 65 00