SECTION 08 90 00

LOUVERS, GRILLES AND VENTS

1. GENERAL
   1. SECTION INCLUDES
      1. Fixed-Blade Extruded-Aluminum Louvers:
         1. Horizontal louver.
         2. Horizontal drainable-blade louver.
         3. Vertical sight proof fixed-blade louver.
         4. Storm Class horizontal blade louver.
         5. Storm Class vertical blade louver.
         6. Narrow louver.
      2. Stationary Hurricane Louvers, Miami-Dade County Approved.
      3. Stationary Hurricane Louvers, Florida State Building Code Approved.
      4. Louver Screens.
      5. Blank-Off Panels for Louvers.
   2. RELATED SECTIONS
      1. Section 05 50 00 - Metal Fabrications.
      2. Section 07 91 26 - Joint Fillers.
      3. Section 09 91 00 - Painting.
   3. REFERENCES
      1. Air Movement and Control Association International (AMCA):
         1. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating.
         2. AMCA 501 - Application Manual for Air Louvers.
         3. AMCA 511 - Certified Ratings Program - Product Rating Manual for Air Control Devices.
         4. AMCA 512 - AMCA Listing Label Program. Water and Air Certification.
         5. AMCA 512 - AMCA Listing Label Program. Water, Air, Wind-Driven Rain Certification.
         6. AMCA 512 - AMCA Listing Label Program. Air Certification.
         7. AMCA 540 - Test Method for Louvers Impacted by Windborne Debris.
            1. D-HV-6 - AMCA 540 Basic Lev D.
            2. - AMCA 540 Basic Lev D or Enhanced Level E.
            3. - AMCA 540 Basic Lev D or Enhanced Level E.
            4. - AMCA 540 Enhanced Level E.
            5. - AMCA 540 Enhanced Level E.
            6. - AMCA 540 Enhanced Level E.
            7. - AMCA 540 Enhanced Level E.
            8. - AMCA 540 Enhanced Level E.
         8. AMCA 550 - Test Method for High Velocity Wind Driven Rain Resistant Louvers.
            1. D-HV-6 - AMCA 550.
            2. - AMCA 550.
            3. - AMCA 550.
            4. - AMCA 550.
            5. - AMCA 550.
            6. - AMCA 550.
            7. - AMCA 550.
      2. ASTM International (ASTM):
         1. ASTM A 653 - Standard 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 788 - Standard Specification for Steel Forgings, General Requirements.
         4. ASTM B 26 - Standard Specification for Aluminum Alloy Sand Castings.
         5. ASTM B 209 - Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.
         6. ASTM B 221 - Standard Specification for Aluminum and Aluminum Alloy Rolled or Cold Finished Bar, Rod, and Wire.
         7. ASTM C 578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
         8. ASTM C 612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
         9. ASTM D822 - Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
         10. ASTM D 1187 - Standard Specification for Asphalt Base Emulsions for Use as Protective Coatings for Metal.
         11. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.
         12. ASTM D2244 - Standard Test Method for Calculation of Color Differences From Instrumentally Measured Color Coordinates.
         13. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
         14. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
         15. ASTM E 413 - Classification for Rating Sound Insulation.
      3. American Architectural Manufacturer's Association (AAMA).
         1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
         2. AAMA 2603 - Voluntary Specification. Performance Requirements and Test Procedures For. Pigmented Organic Coatings on Aluminum Extrusions.
         3. AAMA 2604 - High Performance Organic Coatings on Architectural Extrusions and Panels.
         4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum.
      4. National Association of Architectural Metal Manufacturers (NAAMM): Metal Finishes Manual for Architectural and Metal Products.
      5. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA): Architectural Sheet Metal Manual.
      6. National Electrical Manufacturers Association (NEMA).
      7. Underwriters Laboratories, Inc. (UL).
   4. DEFINITIONS
      1. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section, unless otherwise defined in this Section or in referenced standards.
      2. Standard Free Area: Free area of a louver 48 inches (1220 mm) wide by 48 inches (1220 mm) high, identical to that provided.
      3. Maximum Standard Airflow: Airflow at point of beginning water penetration through a louver 48 inches (1220 mm) wide by 48 inches (1220 mm) high, identical to that provided.
      4. Drainable-Blade Louver: Louver designed to collect and drain water to exterior at sill by means of gutters in front edges of blades and channels in jambs and mullions.
      5. Minimum Weather Louver Effectiveness: Weather louver effectiveness rating shall be based on tests conducted in accordance with:
         1. AMCA Standard 500-L.
   5. SUBMITTALS
      1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
      2. Product Data: Manufacturer's data sheets for each product and assembly specified.
         1. Preparation instructions and recommendations.
         2. Storage and handling requirements and recommendations.
         3. Cleaning methods.
      3. Engineering Review: Submit theoretical calculations prepared by a professional engineer specializing in the application of welding technology demonstrating that each fillet weld joining blade and frame members will withstand a minimum of 526 pounds of force in shear.
      4. Shop Drawings: For units and accessories. Include plans; elevations; sections; and details showing profiles, angles, and spacing of elements. Show unit dimensions related to wall openings and adjacent construction; free area for each size indicated for louvers; profiles of frames at jambs, heads, and sills; and anchorage details and locations.
         1. Verify openings by field measurements before fabrication and indicate measurements on Shop Drawings.
         2. For installed products indicated to comply with design loadings, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
         3. Wiring Diagrams: Detail power, signal, and control systems for motorized adjustable louvers and differentiate between manufacturer-installed and field-installed wiring.
      5. Product Certificates:
         1. Air Performance: Certificates signed by Air Movement and Control Association International Inc (AMCA) certifying that the manufacturer's stock units are tested in accordance with AMCA Standard 500 and are licensed to bear the AMCA Certified Ratings Seal in accordance with AMCA Standard 511.
         2. Water Penetration: Certificates signed by Air Movement and Control Association International Inc (AMCA) certifying that the manufacturer's stock units are tested in accordance with AMCA Standard 500 and are licensed to bear the AMCA Certified Ratings Seal in accordance with AMCA Standard 511.
         3. Weather Louver Effectiveness: Certificates signed by Air Movement and Control Association International Inc (AMCA) certifying that the manufacturer's stock units are tested in accordance with AMCA Standard 500-L99, Section 8.3.2 - Wind Driven Rain Water Penetration Test, and are licensed to bear the AMCA Certified Ratings Seal in accordance with AMCA Standard 511.
         4. Provide AMCA Certification - Water, Air for louvers as scheduled.
         5. Provide AMCA Certification - Water, Air, Wind-Driven Rain for louvers as scheduled.
         6. Provide AMCA Certification - Air for louvers as scheduled.
      6. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
      7. Selection Samples: Two complete color charts showing the full range of colors available for units with factory-applied color finishes.
      8. Samples for Verification: For each finish specified, two samples representing actual finishes specified; prepared on Samples of same thickness and material indicated for final Work. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.
   6. QUALITY ASSURANCE
      1. Manufacturer Qualifications: Minimum 5 years manufacturing similar products. The manufacturer shall have implemented a program for the management of quality objectives, continual improvement, and monitoring of customer satisfaction to assure that customer needs and expectations are met.
      2. Installer Qualifications: Minimum 2 years experience installing similar louvers.
      3. Professional Engineer Qualifications: A professional engineer legally qualified to practice in jurisdiction where Project is located and experienced in providing engineering services of kind indicated. Engineering services are defined as those performed for installations of products that are similar to those indicated for this Project in material, design, and extent.
      4. Source Limitations: Obtain products through one source from a single manufacturer where alike in one or more respects regarding type, design, or factory-applied color finish.
      5. Welding Standards: As follows:
         1. Comply with AWS D1.2, "Structural Welding Code - Aluminum."
         2. Comply with AWS D1.3, "Structural Welding Code - Sheet Steel."
      6. AMCA Standard 500-L: Air performance, water penetration and air leakage ratings shall be determined in accordance with Air Movement and Control Association International Inc (AMCA) Standard 500, "Laboratory Methods of Testing Louvers for Rating."
      7. AMCA Standard 511: Air performance, water penetration and air leakage ratings shall be licensed in accordance with Air Movement and Control Association International Inc. (AMCA) Standard 511, "Certified Ratings Program for Air Control Devices," latest edition.
      8. AMCA Standard 512: Ratings shall be determined in accordance with Air Movement and Control Association International Inc (AMCA) Standard 512, "AMCA Listing Label Program," latest edition.
      9. SMACNA Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" recommendations for fabrication, construction details, and installation procedures.
      10. UL and NEMA Compliance: Provide motors and related components for motor-operated adjustable louvers that are listed and labeled by UL and comply with applicable NEMA standards.
   7. DELIVERY, STORAGE, AND HANDLING
      1. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations and industry standards.
      2. Store products indoors in manufacturer's or fabricator's original containers and packaging, with labels clearly identifying product name and manufacturer. Protect from damage.
      3. Handling: Protect materials and finishes during handling and installation to prevent damage.
   8. SEQUENCING AND SCHEDULING
      1. Field Measurements: Verify openings and adjacent construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
         1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating products without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to established dimensions.
         2. 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 Project site.
   9. PROJECT CONDITIONS
      1. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
   10. WARRANTY
       1. Manufacturer's Warranty: Provide manufacturer's standard limited warranty for louver systems for a period of 1 year from date of installation, no more than 18 months after shipment from manufacturing plant. When notified in writing from the Owner of a manufacturing defect, manufacturer shall promptly correct deficiencies without cost to the Owner.
       2. Manufacturer's Finish Warranty: Provide manufacturer’s limited warranty for 70 percent fluoropolymer-based finish on aluminum substrates.
          1. Warranty Period: 10 years.
          2. Warranty Period: 20 years.
          3. Finish coating shall not peel, blister, chip, crack or check.
          4. Chalking, fading or erosion of finish when measured by the following tests:
             1. Finish coating shall not chalk in excess of 8 numerical ratings when measured in accordance with ASTM D4214.
             2. Finish coating shall not change color or fade in excess of 5 NBS units as determined by ASTM D2244 and ASTM D822.
             3. Finish coating shall not erode at a rate in excess of .01 mils/year confirmed by Florida test samples.
       3. Manufacturer shall provide 5 year limited warranty for Class I anodized finish.
       4. Manufacturer shall provide 1 year limited warranty for Class II anodized finish.
2. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: Air Performance LLC.; 159 Genco Drive; Hartford, AL 36344. Phone: 334-588-0070. Fax: 334-588-0171. Email: info@airperformancellc.com. Web Site: www.airperformancellc.com
      2. Substitutions: Not permitted.
      3. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
   2. LOUVERS, GRILLES AND VENTS - GENERAL.
      1. Louvers shall be mechanically fastened construction and furnished with bird screen, insect screen, sill pans, supports, installation hardware and finishes as specified or required for a complete installation.
      2. Louver shall be of welded construction and furnished with bird screen, insect screen, sill pans, supports, installation hardware and finishes as specified or required for a complete installation.
      3. The supporting structure shall be designed to accommodate the point loads transferred by the louvers when subject to the design wind loads.
      4. Performance Requirements:
         1. Structural Performance: Provide products capable of withstanding the effects of loads and stresses from wind and normal thermal movement without evidencing permanent deformation of components including blades, frames, and supports; noise or metal fatigue caused by component rattle or flutter; or permanent damage to fasteners and anchors.
            1. Wind Load: Uniform pressure (velocity pressure) of 25 lbf per sq ft (1200 Pa), acting inward or outward.
            2. Thermal Movements: Provide products that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, and other detrimental effects:
            3. Temperature Change (Range): 120 degrees F (67 degrees C), ambient; 180 degrees F (100 degrees C), material surfaces.
         2. Air-Performance, Water-Penetration, and Air-Leakage Ratings: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacturer's stock units 48 inches (1220 mm) wide by 48 inches (1220 mm) high. Test units according to AMCA 500.
            1. Perform testing on unpainted, cleaned, degreased units.
            2. Perform water-penetration testing on louvers without screens.
         3. Weather Louver Effectiveness: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacturers stock units in accordance with AMCA Standard 500-L, Section 8.3.2 - Wind Driven Rain Water Penetration Test.
      5. Materials:
         1. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy 6063-T5 or T-52.
         2. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy 3003 or 5052 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
         3. Aluminum Castings: ASTM B 26/B 26M, alloy 319.
         4. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 (Z275) zinc coating, mill phosphatized.
         5. Stainless-Steel Sheet: ASTM A 666, Type 304 or 316 with a No. 2 polish.
         6. Fasteners: Of same basic metal and alloy as fastened metal or 300 series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.
            1. Use types and sizes to suit unit installation conditions.
         7. Anchors and Inserts: Of type, size, and material required for loading and installation indicated. Use nonferrous metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as needed for corrosion resistance. Use toothed steel or expansion bolt devices for drilled-in-place anchors.
         8. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12 but containing no asbestos fibers, or cold-applied asphalt emulsion complying with ASTM D 1187.
      6. Fabrication:
         1. Assemble units in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
            1. Continuous Vertical Assemblies: Where height of units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates and without interrupting blade-spacing, or grille or screen pattern.
         2. Maintain equal louver blade spacing to produce uniform appearance.
         3. Fabricate frames, including integral sills for louvers, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining materials' tolerances, and perimeter sealant joints.
         4. Include supports, anchorages, and accessories required for complete assembly.
         5. Louvers shall be of welded construction.
         6. Louvers shall be of mechanically fastened construction.
   3. FIXED-BLADE EXTRUDED-ALUMINUM LOUVERS
      1. AMCA Seal: Mark units with AMCA Certified Ratings Seal.
      2. Fixed-Blade Extruded-Aluminum Louvers: Horizontal Louvers as manufactured by Air Performance LLC.

Fixed-Blade Extruded-Aluminum Louvers: Storm Class Horizontal Blade Louvers as manufactured by Air Performance Model: APXS2

* + - 1. Weather Louver Effectiveness Rating: Minimum rating determined under AMCA Standard 500-L and certified under AMCA Standard 511.
         1. Wind Velocity (mph/m per sec): \_\_\_\_\_\_\_\_.
         2. Rainfall Rate (inches/mm): \_\_\_\_\_\_\_\_ per hour.
         3. Intake Air Volume (cfm/cu m per min): \_\_\_\_\_\_\_\_.
         4. Effectiveness Rating: \_\_\_\_\_\_\_\_.
         5. Depth: inches ( mm) nominal louver depth.
         6. Mullion Type: Visible.
         7. Mullion Type: Concealed.
         8. Percent Free Area: percent.
         9. Beginning Point of Water Penetration: fpm ( m per sec).
         10. Air Volume Flow Rate at Beginning Point of Water Penetration: cfm ( cu m per sec).
         11. Pressure Drop at Beginning Point of Water Penetration: inches WC ( kPa).
         12. Wind-Driven Rain Water Penetration Test:

Exterior Wind Velocity: mph ( m per sec).

LOUVER SCREENS

* + 1. General: Provide louvers with screens as manufactured by Air Performance LLC. at locations indicated on Drawings.
    2. General: Provide exterior louvers with louver screens.
       1. Screen Location for Fixed Louvers: Interior face.
       2. Screen Location for Adjustable Louvers: Interior face, unless otherwise indicated.
       3. Screen Location for Adjustable Louvers: Exterior face, unless otherwise indicated.
       4. Screening Type: Bird screening, unless otherwise indicated.
       5. Screening Type: Insect screening where indicated.
    3. Attachment: Secure screens to louver frames with stainless-steel machine screws, spaced 18 inches (458 mm) o.c.
    4. Louver Screen Frames: As manufactured by Air Performance LLC; to sizes indicated on Drawings.
       1. Fabrication: Mitered corners.
       2. Metal: Roll formed aluminum.
       3. Finish: Same finish as louver frames to which louver screens are attached.
       4. Finish: Mill finish, unless otherwise indicated.
       5. Type: Rewirable frames with a driven spline or insert for securing screen mesh.
       6. Type: Non-rewirable, U-shaped frames for permanently securing screen mesh.
    5. Louver Screening for Aluminum Louvers: As manufactured by The.
       1. Bird Screening: Flattened, expanded aluminum, 3/4 by 0.050 inch (19 by 1.27 mm) thick.
       2. Bird Screening: Flattened, expanded aluminum, 3/4 inch by 0.125 inch (19 by 3.18 mm) thick.
       3. Bird Screening: Aluminum, 1/2 inch (12.7 mm) square mesh, 0.063 inch (1.6 mm) wire.
       4. Bird Screening: Aluminum, 1/4 inch (6.35 mm) square mesh, 0.047 inch (1.19 mm) wire.
       5. Bird Screening: Aluminum, 1 inch (25.4 mm) square mesh, 0.120 inch (3.05 mm) wire.
       6. Bird Screening: Stainless steel, 1/2 inch (12.7 mm) square mesh, 0.047 inch (1.19 mm) wire.
       7. Bird Screening: Stainless steel, 1 inch (25.4 mm) square mesh, 0.063 inch (1.60 mm) wire.
       8. Insect Screening: Aluminum, 18-by-16 (1.4-by-1.6 mm) mesh, 0.012 inch (0.30 mm) wire.
       9. Insect Screening: Stainless steel, 18-by-18 (1.4-by-1.4 mm) mesh, 0.009 inch (0.23 mm) wire.
    6. Louver Screening for Galvanized Steel Louvers: As manufactured by The
       1. Bird Screening: Galvanized steel, 1/2 inch (12.7 mm) wire cloth, 0.041 inch (1.04 mm) wire.
       2. Bird Screening: Stainless steel, 1/2 inch (12.7 mm) square mesh, 0.047 inch (1.19 mm) wire.
       3. Insect Screening: Stainless steel, 18-by-18 (1.4-by-1.4 mm) mesh, 0.009 inch (0.23 mm) wire.
    7. Louver Screening for Stainless-Steel Louvers: As manufactured by The.
       1. Bird Screening: Stainless steel, 1/2 inch (12.7 mm) square mesh, 0.047 inch (1.19 mm) wire.
       2. Insect Screening: Stainless steel, 18-by-18 (1.4-by-1.4 mm) mesh, 0.009 inch (0.23 mm) wire.
  1. BLANK-OFF PANELS
     1. General: Provide blank-off panels as manufactured by at locations indicated on Drawings.
        1. Attachment: Blank-off panels are not sealed, but fastened to the interior face of the louver.
        2. Attachment: Blank-off panels are silicone wet sealed and fastened to the interior face of the louver.
     2. Non-Insulating, Blank-off Panels: Metal sheet as manufactured by.
        1. Aluminum Sheet for Aluminum Louvers:
           1. 0.050 inch (1.2 mm) thickness, precoat black.
           2. 0.063 inch (1.6 mm) thickness, finished to match exterior and/or interior.
           3. 0.125 inch (3.2 mm) thickness, finished to match exterior and/or interior.
        2. Galvanized Steel Sheet for Galvanized Steel Louvers:
           1. Thickness: 0.052 inch (1.3 mm), unless otherwise indicated.
           2. Thickness: 0.040 inch (1.0 mm), unless otherwise indicated.
        3. Stainless-Steel Sheet for Stainless-Steel Louvers:
           1. Thickness: 0.0500 inch (1.3 mm), unless otherwise indicated.
           2. Thickness: 0.0375 inch (0.95 mm), unless otherwise indicated.
        4. Blank-off panel construction: Fabrication method is single sheet. Gasket materials, edge treatments, and sealed edges are not by.
     3. Insulating Blank-off Panels: Metal-faced panels consisting of insulating core as manufactured by The.
        1. Metal Facing Sheets: Aluminum sheet, 0.032 inch (0.8 mm) thick, precoat black.
        2. Metal Facing Sheets: Aluminum sheet, 0.063 inch (1.6 mm) thick, finished to match finished to match exterior and/or interior.
        3. Metal Facing Sheets: Aluminum sheet, 0.125 inch (3.2 mm) thick, finished to match finished to match exterior and/or interior
        4. Thickness: 1 inch (25 mm).
        5. Thickness: 2 inch (50 mm).
        6. Insulating Core: Mineral Wool.
           1. Semi-rigid, non-combustible, mineral wool thermal insulation board; will comply with ASTM C612, Minimum R-value of 4.2 per 1 inch of thickness @75 degree F mean temperature, Minimum Density of 4.4 lbs./cu.ft.
           2. MEA Approval - New York City (331-97-M) and Los Angeles (RR 25444) approved for compliance and performance.
        7. Insulating Core: Extruded Polystyrene.
           1. Rigid cellular thermal insulation will comply with ASTM C578, Minimum R-value of 5.0 per 1 inch of thickness @75 degree F mean temperature, Minimum Density of 1.5 lbs./cu.ft.
        8. Blank-off Panel Construction: Fabrication method shall be pan-in-pan. Gasket materials, edge treatments, and sealed edges are not by The.
        9. Seal perimeter joints between panel faces and louver frames.
  2. FlNlSHES, GENERAL
     1. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
     2. Finish units after assembly.

ALUMINUM FlNlSHES

* + 1. Compliance: Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
    2. Class I, Clear Anodic Finish: AA-M12C22A41 complying with AAMA 611.
       1. Mechanical Finish: Nonspecular as fabricated.
       2. Chemical Finish: Etched, medium matte.
       3. Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker.
    3. Class I, Color Anodic Finish: AA-M12C22A42/A44 complying with AAMA 611.
       1. Mechanical Finish: Nonspecular as fabricated.
       2. Chemical Finish: Etched, medium matte.
       3. Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker. Color to fall in standard range for color variation in anodic finishes.
       4. Color: Champagne bronze.
       5. Color: Light bronze.
       6. Color: Medium bronze.
       7. Color: Dark bronze.
       8. Color: Extra Dark bronze.
       9. Color: Black.
    4. High-Performance Organic Coating Finish: AA-C12C42R1x.
       1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
       2. Chemical Finishes: Cleaned with inhibited chemicals and acid-chromate-fluoride-phosphate conversion coating.
       3. Fluoropolymer Two-Coat Coating System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.
          1. Color: As indicated by manufacturer's color designations.
          2. Color: Match Architect's sample.
          3. Color: As selected by Architect from manufacturer's full range of colors.
       4. Fluoropolymer Three-Coat Coating System: Manufacturer's standard three-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.
          1. Color: As indicated by manufacturer's color designations.
          2. Color: Match Architect's sample.
          3. Color: As selected by Architect from manufacturer's full range of colors.

1. EXECUTION
   1. EXAMINATION AND PREPARATION
      1. Prepare substrates and openings using methods recommended by manufacturer for achieving best result for substrates under project conditions.
      2. Do not proceed with installation until substrates and nailers have been prepared using the methods recommended by the manufacturer and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.
      3. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.
   2. INSTALLATION
      1. Install in accordance with manufacturer's instructions.
         1. Locate and place units level, plumb, and at indicated alignment with adjacent work.
         2. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
         3. Form closely fitted joints with exposed connections accurately located and secured.
         4. Provide perimeter reveals and openings of uniform width for sealants and joint fillers as indicated on Drawings.
         5. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.
         6. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.
      2. Install concealed gaskets, flashings, joint fillers, and insulation, as installation progresses, where weathertight joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during installation.
   3. ADJUSTING, CLEANING AND PROTECTION
      1. Test operation of adjustable louvers and adjust as needed to produce fully functioning units that comply with requirements.
      2. Protect products from damage until completion of project. Use temporary protective coverings where needed and approved by manufacturer. Remove protective covering at the time of Substantial Completion.
      3. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION