PRODUCT SPECIFICATION GUIDE
LOUVERS AND BRICK VENTS
FACILITY CONSTRUCTION SUBGROUP: DIVISION 8 OPENINGS (PREVIOUSLY DIVISION 10)

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Fixed, extruded-aluminum louvers.
   2. Fixed, formed-metal louvers.
   3. Adjustable louvers.
   4. Insulated adjustable louvers.
   5. Acoustical louvers.
   6. Blank-off panels for louvers.
   7. Wall vents (brick vents).

B. Related Sections include the following:
   1. Division 7 Section "Joint Sealants" for sealants installed in perimeter joints between louver frames and adjoining construction.
   2. Division 8 Section "Steel Doors and Frames" for louvers in hollow-metal doors and frames.
   3. Division 8 Section "Custom Steel Doors and Frames" for louvers in hollow-metal doors and frames.
   4. Division 8 Section "Flush Wood Doors" for louvers in wood doors.
   5. Division 9 Section "Painting" for field painting louvers.
   6. Division 15 Section "Compressed-Air Piping" for connecting pneumatic-operated adjustable metal louvers.
   7. Division 15 Section "Control Systems Equipment" for electric, electronic, and pneumatic control of adjustable metal louvers.
   8 Division 15 Sections for louvers that are a part of mechanical equipment.
   9. Division 16 Sections for electrical power connections for motor-operated adjustable metal louvers.

1.3 DEFINITIONS

A. 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.
B. Standard Free Area: Free area of a louver 48 inches (1220 mm) wide by 48 inches (1220 mm) high, identical to that provided.
C. 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.
D. 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.

E. Minimum Weather Louver Effectiveness: Weather louver effectiveness rating shall be based on tests conducted in accordance with:
   1. AMCA Standard 500-L-99.

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide exterior metal louvers capable of withstanding the effects of loads and stresses from wind and normal thermal movement without evidencing permanent deformation of louver components including blades, frames, and supports; noise or metal fatigue caused by louver blade rattle or flutter; or permanent damage to fasteners and anchors.
   1. Wind Load: Uniform pressure (velocity pressure) of 20 lbf/sq. ft. (960 Pa), acting inward or outward.
   2. Wind Load: Uniform pressure (velocity pressure) of 30 lbf/sq. ft. (1440 Pa), acting inward or outward.
   3. Wind Load: Uniform pressures (velocity pressures) indicated on Drawings, acting inward or outward.
   4. Thermal Movements: Provide louvers 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:
      a. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

B. 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.

C. Airborne Sound Transmission Loss: Provide acoustical louvers complying with airborne sound transmission loss ratings indicated, as demonstrated by testing manufacturer's stock units according to ASTM E 90.

D. Weather Louver Effectiveness: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacturers stock units for a 60 minute test in accordance with AMCA Standard 500-L-99, Section 8.3.2 - Wind Driven Rain Water Penetration Test.

1.5 SUBMITTALS

A. Product Data: For each type of product specified.

B. Shop Drawings: For louver units and accessories. Include plans; elevations; sections; and details showing profiles, angles, and spacing of louver blades. Show unit dimensions related to wall openings and construction; free area for each size indicated; profiles of frames at jambs, heads, and sills; and anchorage details and locations.
   1. For installed louvers and vents indicated to comply with design loadings, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
   2. Wiring Diagrams: Detail power, signal, and control systems for motorized adjustable louvers and differentiate between manufacturer-installed and field-installed wiring.

C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for units with factory-applied color finishes.

D. amples for Verification: Of each type of metal finish required, 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.

E. Product Certificates:

1. Air Performance: Certificates signed by Air Movement and Control Association International Inc (AMCA) certifying that the manufacturer' 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' 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' 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.

F. Product TestReports:
1. Air Performance and Water Penetration: Submit AMCA laboratory test reports demonstrating compliance of products with requirements based on comprehensive testing of current products.
2. Weather Louver Effectiveness: Submit AMCA laboratory test reports demonstrating compliance of products with requirements based on comprehensive testing of current products.

G. 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.

1.6 QUALITY ASSURANCE

A. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of kind indicated. Engineering services are defined as those performed for installations of louvers that are similar to those indicated for this Project in material, design, and extent.

B. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where alike in one or more respects regarding type, design, or factory-applied color finish.

C. 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."
3. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

D. AMCA Standard 500-L-99: 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."

E. 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.

F. SMACNA Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" recommendations for fabrication, construction details, and installation procedures.

F. 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.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify louver openings 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 louvers without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to established dimensions.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. The AIROLITE Company, LLC, Marietta, OH; Phone 740 373 7676; Fax 740 373 6666; email info@airolite.com; and, web http://www.airolite.com
C. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated in the Louver Schedule at the end of Part 3.
D. Products: Subject to compliance with requirements, provide one of the products indicated for each designation in the Louver Schedule at the end of Part 3.

2.2 MATERIALS

A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy 6063-T5 or T-52.
B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
C. Aluminum Castings: ASTM B 26/B 26M, alloy 319.
D. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 (Z275) zinc coating, mill phosphatized.
E. Stainless-Steel Sheet: ASTM A 666, Type 302 or 304.
F. 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.
   2. Use Phillips flat-head screws for exposed fasteners, unless otherwise indicated.
G. 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.
H. 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.

2.3 FABRICATION, GENERAL

A. Assemble louvers 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 louver 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 pattern.

B. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.
C. Maintain equal louver blade spacing to produce uniform appearance.
D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining materials' tolerances, and perimeter sealant joints.
   1. Frame Type: Channel type, unless otherwise indicated.
   2. Frame Type: Exterior flange, unless otherwise indicated.
   3. Frame Type: Interior flange, unless otherwise indicated.
E. Include supports, anchorages, and accessories required for complete assembly.
F. Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 72 inches (1830 mm) o.c., whichever is less. At horizontal joints between louver units, provide horizontal mullions, unless continuous vertical assemblies are indicated.
G. Provide sill extensions and loose sills made of same material as louvers where indicated or required for drainage to exterior and to prevent water penetrating to interior.
H. Join frame members to one another and to fixed louver blades with fillet welds concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.4 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Louver Construction: Provide fixed-blade louvers with extruded-aluminum frames and blades.
B. Horizontal Louvers: Either drainable- or nondrainable-blade type complying with the following:
   1. Louver Depth: 4 inches (100 mm), unless otherwise indicated.
   2. Louver Depth: 6 inches (150 mm), unless otherwise indicated.
   3. Louver Depth: As indicated.
   4. Frame Thickness: 0.081 inch (2.06 mm).
   5. Frame Thickness: 0.125 inch (3.18 mm).
   6. Blade Thickness: 0.081 inch (2.06 mm).
   7. Blade Thickness: 0.125 inch (3.18 mm).
   8. Performance Requirements: Maximum standard airflow not less than 8500 cfm (4010 L/s) with not more than 0.20- inch wg (50-Pa) static-pressure loss.
   9. Performance Requirements: Maximum standard airflow not less than 7500 cfm (3540 L/s) with not more than 0.18- inch wg (45-Pa) static-pressure loss.
   10. Performance Requirements: Maximum standard airflow not less than 5800 cfm (2740 L/s) with not more than 0.12- inch wg (30-Pa) static-pressure loss.
   11. AMCA Seal: Mark units with AMCA Certified Ratings Seal.
C. Horizontal, Drainable-Blade Louvers: As follows:
   1. Louver Depth: 4 inches (100 mm), unless otherwise indicated.
   2. Louver Depth: 6 inches (150 mm), unless otherwise indicated.
   3. Louver Depth: As indicated.
   4. Frame Thickness: 0.081 inch (2.06 mm).
   5. Frame Thickness: 0.125 inch (3.18 mm).
   6. Blade Thickness: 0.081 inch (2.06 mm).
   7. Blade Thickness: 0.125 inch (3.18 mm).
   8. Blade Angle and Spacing: 35 degrees and 3-1/2 inches (89 mm) o.c. for 4-inch (100-mm) deep louvers.
   9. Blade Angle and Spacing: 45 degrees and 4 inches (100 mm) o.c. for 4-inch (100-mm) deep louvers.
   10. Blade Angle and Spacing: 37 degrees and 5 inches (125 mm) o.c. for 6-inch (150-mm) deep louvers.

11. Blade Angle and Spacing: 45 degrees and 6 inches (150 mm) o.c. for 6-inch (150-mm) deep louvers.

D. Horizontal, Sightproof, Drainable-Blade Louvers: As follows:
   1. Louver Depth: 5 inches (125 mm).
   2. Frame Thickness: 0.081 inch (2.06 mm).
   3. Blade Thickness: 0.081 inch (2.06 mm).
   4 Performance Requirements: Maximum standard airflow not less than 7000 cfm (3300 L/s) with not more than 0.20- inch wg (50-Pa) static-pressure loss.
   5. Blade Profile: Blade with center baffle.
   6. Blade Spacing: 2 inches (50 mm) o.c.

E. StormClass, Horizontal, Sightproof, Drainable-Blade Louvers: As follows:
   1. Louver Type: SCH5 or SCH8
   2. Louver Depth: 5 inches (125 mm) or 8 inches (203 mm).
   3. Frame Thickness: 0.081 inch (2.06 mm).
   4. Blade Thickness: 0.063 inch (1.60 mm).
   5. Select subparagraph above or two below. See Editing Instruction No. 4 in the Evaluations.
   6. Blade Profile: Double or Triple Bank StormClass Type.
   7. Blade Spacing: 2 inches (50 mm) o.c.
   8. Minimum Free Area determined in accordance with AMCA Standard 500 and licensed under AMCA Standard 511: 4' x 4' Unit - 5.67 sq. ft. (0.53 sq m) or 7.93 sq. ft. (0.74 sq m)
   9. Performance Requirements: Maximum standard airflow determined in accordance with AMCA Standard 500 and certified under AMCA Standard 511 shall not less than 7,088 cfm (3,343 L/s) at not more than than 0.240-inch wg (28-Pa) static-pressure loss or 9,912 cfm (4,673 L/s) with not more than 0.430-inch wg (50-Pa) static-pressure loss.
   10. Weather Louver Effectiveness Rating: Minimum rating determined under AMCA Standard 500-L-99 and certified under AMCA Standard 511 shall be specify effectiveness rating in % effective at an exterior wind velocity of specify wind velocity in mph (m/s), specify rainfall rate in inches per hour inches (mm) per hour rainfall rate and specify intake air volume in cfm cfm intake air volume.

F. Horizontal, Nondrainable-Blade Louvers: As follows:
   1. Drainable Heads: Designed to divert water that washes down wall from above louver away from face of louver by means of gutter in head and channels in jambs and mullions.
   2. Louver Depth: 2 inches (50 mm), unless otherwise indicated.
   3. Louver Depth: 4 inches (100 mm), unless otherwise indicated.
   4. Louver Depth: 6 inches (150 mm), unless otherwise indicated.
   5. Louver Depth: As indicated.
   6. Frame Thickness: 0.081 inch (2.06 mm).
   7. Frame Thickness: 0.125 inch (3.18 mm).
   8. Blade Thickness: 0.081 inch (2.06 mm).
   9 Blade Thickness: 0.125 inch (3.18 mm).
   10. Blade Profile: Plain blade with no center baffle.
   11. Blade Profile: Blade with center baffle.
   12. Blade Angle and Spacing: 45 degrees and 3 inches (75 mm) o.c. for 2-inch (50-mm) deep louvers.
   13. Blade Angle and Spacing: 30 degrees and 3 inches (75 mm) o.c. for 4-inch (100-mm) deep louvers.
   14. Blade Angle and Spacing: 45 degrees and 5 inches (125 mm) o.c. for 4-inch (100-mm) deep louvers.
   15. Blade Angle and Spacing: 37 degrees and 5 inches (125 mm) o.c. for 6-inch (150-mm) deep louvers.
   16. Blade Angle and Spacing: 45 degrees and 6 inches (150 mm) o.c. for 6-inch (150-mm) deep louvers.

G. Continuous, Horizontal, Drainable-Blade Louvers: Fabricated with close-fitting, field-made splice joints in blades designed to permit expansion and contraction without deforming blades or framework and with mullions recessed from front edges of blades so blades have continuous appearance.
H. Continuous, Horizontal, Nondrainable-Blade Louvers: Fabricated with close-fitting, field-made splice joints in blades designed to permit expansion and contraction without deforming blades or framework. Supporting framework is concealed from view by placing braces, mullions, and brackets on inside face of louver.
   1. Louver Depth: 4 inches (100 mm), unless otherwise indicated.
   2. Louver Depth: 6 inches (150 mm), unless otherwise indicated.
   3. Louver Depth: As indicated.
   4. Frame Thickness: 0.081 inch (2.06 mm).
   5. Frame Thickness: 0.125 inch (3.18 mm).
   6. Blade Thickness: 0.081 inch (2.06 mm).
   7. Blade Thickness: 0.125 inch (3.18 mm).
   8. Blade Profile: Drainable blade.
   9. Blade Profile: Plain blade with no center baffle.
   10. Blade Profile: Blade with center baffle.
   11. Blade Angle and Spacing: 30 degrees and 3 inches (75 mm) o.c. for 4-inch (100-mm) deep louvers.
   12. Blade Angle and Spacing: 37 degrees and 4 inches (100 mm) o.c. for 4-inch (100-mm) deep louvers.
   13. Blade Angle and Spacing: 45 degrees and 5 inches (125 mm) o.c. for 4-inch (100-mm) deep louvers.
   14. Blade Angle and Spacing: 37 degrees and 5 inches (125 mm) o.c. for 6-inch (150-mm) deep louvers.
   15. Blade Angle and Spacing: 45 degrees and 6 inches (150 mm) o.c. for 6-inch (150-mm) deep louvers.
   16. Exterior Corners: Prefabricated corner units with mitered and welded blades aligned with straight sections, with concealed bracing.
I. Vertical, Sightproof, Fixed-Blade Louvers: As follows:
   1. Louver Depth: 4 inches (100 mm).
   2. Louver Depth: As indicated.
   3. Frame and Blade Thickness: 0.081 inch (2.06 mm).
   4. Blade Profile: Chevron-shaped blade.
   5. Blade Profile: Y-shaped blade.
   6. Blade Profile: Labyrinth-shaped blade.
   7. Blade Spacing: 2 inches (50 mm) o.c.
   8. Blade Spacing: 4 inches (100 mm) o.c.

2.5 FIXED, FORMED-METAL LOUVERS

A. Louver Construction: Provide fixed-blade louvers with frames and blades formed from metal sheet of metal indicated.
B. Horizontal Louvers: Either drainable- or nondrainable-blade type complying with the following:
   1. Louver Depth: 4 inches (100 mm), unless otherwise indicated.
   2. Louver Depth: 6 inches (150 mm), unless otherwise indicated.
   3. Louver Depth: As indicated.
   4. Frame and Blade Material: Galvanized steel sheet, 0.052 inch (1.3 mm) for frames and 0.040 inch (1.0 mm) for blades.
   5. Frame and Blade Material: Galvanized steel sheet, 0.052 inch (1.3 mm).
   6. Frame and Blade Material: Galvanized steel sheet, 0.064 inch (1.6 mm).
   7. Frame and Blade Material: Stainless-steel sheet, 0.0500 inch (1.3 mm).
   8. Frame and Blade Material: Stainless-steel sheet, 0.0625 inch (1.6 mm).

9. Performance Requirements: Maximum standard airflow not less than 7300 cfm (3440 L/s) with not more than 0.12- inch wg (30-Pa) static-pressure loss.
10. Performance Requirements: Maximum standard airflow not less than 5000 cfm (2360 L/s) with not more than 0.10- inch wg (25-Pa) static-pressure loss.
11. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

C. Horizontal, Drainable, Fixed-Blade Louvers: As follows:
1. Louver Depth: 4 inches (100 mm), unless otherwise indicated.
2. Louver Depth: 6 inches (150 mm), unless otherwise indicated.
3. Louver Depth: As indicated.
4. Frame and Blade Material: Galvanized steel sheet, 0.052 inch (1.3 mm) for frames and 0.040 inch (1.0 mm) for blades.
5. Frame and Blade Material: Galvanized steel sheet, 0.052 inch (1.3 mm).
6. Frame and Blade Material: Galvanized steel sheet, 0.064 inch (1.6 mm).
7. Frame and Blade Material: Stainless-steel sheet, 0.0500 inch (1.3 mm).
8. Frame and Blade Material: Stainless-steel sheet, 0.0625 inch (1.6 mm).
9. Blade Angle and Spacing: 35 degrees and 3-1/2 inches (89 mm) o.c. for 4-inch (100-mm) deep louvers.
10. Blade Angle and Spacing: 45 degrees and 4 inches (100 mm) o.c. for 4-inch (100-mm) deep louvers.
11. Blade Angle and Spacing: 37 degrees and 5 inches (125 mm) o.c. for 6-inch (150-mm) deep louvers.
12. Blade Angle and Spacing: 45 degrees and 6 inches (150 mm) o.c. for 6-inch (150-mm) deep louvers.

D. Horizontal, Nondrainable, Fixed-Blade Louvers: As follows:
1. Drainable Heads: Designed to divert water that washes down wall from above louver away from face of louver by means of gutter in head and channels in jambs and mullions.
2. Louver Depth: 4 inches (100 mm), unless otherwise indicated.
3. Louver Depth: 6 inches (150 mm), unless otherwise indicated.
4. Louver Depth: As indicated.
5. Frame and Blade Material: Galvanized steel sheet, 0.052 inch (1.3 mm) for frames and 0.040 inch (1.0 mm) for blades.
6. Frame and Blade Material: Galvanized steel sheet, 0.052 inch (1.3 mm).
7. Frame and Blade Material: Galvanized steel sheet, 0.064 inch (1.6 mm).
8. Frame and Blade Material: Stainless-steel sheet, 0.0500 inch (1.3 mm).
9. Frame and Blade Material: Stainless-steel sheet, 0.0625 inch (1.6 mm).
10. Blade Profile: Plain blade with no center baffle.
11. Blade Profile: Blade with center baffle.
12. Blade Angle and Spacing: 30 degrees and 3 inches (75 mm) o.c. for 4-inch (100-mm) deep louvers.
13. Blade Angle and Spacing: 45 degrees and 5 inches (125 mm) o.c. for 4-inch (100-mm) deep louvers.
14. Blade Angle and Spacing: 45 degrees and 6 inches (150 mm) o.c. for 6-inch (150-mm) deep louvers.

2.6 ADJUSTABLE, EXTRUDED-ALUMINUM LOUVERS

A. Louver Construction and Operation: Provide adjustable louvers with extruded-aluminum frames and blades, and with operating mechanisms to suit louver sizes.
1. Hand operation with push bars.
2. Hand operation with spring, chain, wall bracket, and 160 deg F (71 deg C) fusible link.
3. Crank operation with removable-crank operator in sill or jamb.
4. Chain operation with tension spring, wall clip, pull chain, and 160 deg F (71 deg C) fusible link.

5. Motor operation, with two-position, spring-return application (with power on, motor opens louver; with power off, spring closes louver); 110-V, 60-Hz motor; and limit switch wired for grounding; equipped as follows:
6. Motor operation, with two-direction, 110-V, 60-Hz motor; and limit switches wired for grounding; equipped as follows:
    a. Toggle switch mounted on louver frame, ready for wiring.
    b. Loose toggle switch and indicator light, ready for installation.
    c. Terminals for controlling devices.
7. Pneumatic piston operation for use with 80- to 100-psi (550- to 690-kPa) compressed air.
    a. Operation: Two position; power open, power close.
    b. Operation: Two position; power open, power close with spring-return fail-safe.
    c. Operation: Modulating; power open, power close.
    d. Operation: Modulating; power open, power close with spring-return fail-safe.

B. Dual-Blade, Drainable, Adjustable Louvers: Fixed drainable blades and adjustable blades combined in single frame.
1. Louver Depth: 4 inches (100 mm).
2. Louver Depth: 6 inches (150 mm).
3. Frame Thickness: 0.081 inch (2.06 mm).
4. Frame Thickness: 0.125 inch (3.18 mm).
5. Fixed-Blade Thickness: 0.081 inch (2.06 mm).
6. Fixed-Blade Thickness: 0.125 inch (3.18 mm).
7. Adjustable-Blade Thickness: 0.081 inch (2.06 mm).
8. Adjustable-Blade Thickness: 0.125 inch (3.18 mm).
9. Blade Angle: 35 degrees.
10. Blade Angle: 37 degrees.
11. Blade Angle: 45 degrees.
12. Performance Requirements: As follows:
    a. Maximum Standard Airflow: Not less than 6850 cfm (3230 L/s) with not more than 0.15-inch wg (37-Pa) static-pressure loss.
    b. Air Leakage: Not more than 1.5 cfm per sq. ft. (7.6 L/s per sq. m) of louver gross area at a differential static pressure of 0.15-inch wg (37 Pa) with adjustable louver blades closed.
13. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

C. Single-Blade, Adjustable Louvers: As follows:
1. Louver Depth: 4 inches (100 mm).
2. Louver Depth: 6 inches (150 mm).
3. Frame Thickness: 0.081 inch (2.06 mm).
4. Frame Thickness: 0.125 inch (3.18 mm).
5. Blade Thickness: 0.081 inch (2.06 mm).
6. Blade Thickness: 0.125 inch (3.18 mm).
7. Blade Type: Drainable blade.
8. Blade Type: Plain blade with no center baffle.
9. Blade Type: Blade with center baffle.
10. Blade Angle: 30 degrees.
11. Blade Angle: 35 degrees.
12. Blade Angle: 45 degrees.
13. Accessories: Equip louvers as follows:
    a. Snap-on, blade-edge gaskets for each louver blade to reduce air leakage at blade edges.
    b. Stainless-steel jamb seals between adjustable-blade ends and jambs to restrict air leakage.
14. Performance Requirements: As follows:
    a. Maximum Standard Airflow: Not less than 7050 cfm (3330 L/s) with not more than 0.15-inch wg (37-Pa) static-pressure loss.

b. Air Leakage: Not more than 3.5 cfm per sq. ft. (17.8 L/s per sq. m) of louver gross area at a differential static pressure of 0.15-inch wg (37 Pa) with adjustable louver blades closed.

15. Performance Requirements: As follows:
    a. Maximum Standard Airflow: Not less than 4450 cfm (2100 L/s) with not more than 0.10-inch wg (25-Pa) static-pressure loss.
    b. Air Leakage: Not more than 3.5 cfm per sq. ft. (17.8 L/s per sq. m) of louver gross area at a differential static pressure of 0.15-inch wg (37 Pa) with adjustable louver blades closed.
16. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

D. Insulated, Adjustable Louvers: Single-blade, adjustable louvers with gasketed, insulated blades. Frames and blade frames are 0.081-inch (2.06-mm) extruded aluminum with urethane thermal break. Blade facings are 0.032-inch (0.8- mm) aluminum sheet.
1. Louver Depth: 6 inches (150 mm).
2. Insulation Thickness: 2 inches (50 mm).
3. Standard Free Area: Not less than 8 sq. ft. (0.74 sq. m).

2.7 FIXED, ACOUSTICAL LOUVERS

A. Mixed, Formed-Metal Louvers: Extruded- or formed-metal frames and formed-metal blades filled on interior with mineral-fiber, rigid-board, acoustical insulation retained by perforated metal sheet.
1. Louver Depth: 6 inches (150 mm), unless otherwise indicated.
2. Louver Depth: 8 inches (200 mm), unless otherwise indicated.
3. Louver Depth: 12 inches (300 mm), unless otherwise indicated.
4. Louver Depth: As indicated.
5. Frame Material: Aluminum, 0.080 inch (2.0 mm).
6. Frame Material: Aluminum, 0.125 inch (3.18 mm).
7. Frame Material: Galvanized steel sheet, 0.052 inch (1.3 mm).
8. Frame Material: Galvanized steel sheet, 0.064 inch (1.6 mm).
9. Blade Material: Aluminum sheet, 0.063 inch (1.6 mm).
10. Blade Material: Aluminum sheet, 0.080 inch (2.0 mm).
11. Blade Material: Galvanized steel sheet, 0.034 inch (0.85 mm).
12. Blade Material: Galvanized steel sheet, 0.040 inch (1.0 mm).
13. Blade Material: Galvanized steel sheet, 0.052 inch (1.3 mm).
14. Blade Angle: 45 degrees, unless otherwise indicated.
15. Blade Spacing: 6 inches (150 mm) o.c. for 6-inch (150-mm) deep louvers.
16. Blade Spacing: 6 inches (150 mm) o.c. for 8-inch (200-mm) deep louvers.
17. ade Spacing: 8 inches (200 mm) o.c. for 8-inch (200-mm-) deep louvers.
18. Blade Spacing: 9 inches (225 mm) o.c. for 12-inch (300-mm) deep louvers.
19. Blade Spacing: 12 inches (300 mm) o.c. for 12-inch (300-mm) deep louvers.
20. Standard Free Area: Not less than 4 sq. ft. (0.37 sq. m).
21. Airborne Sound Transmission Loss: STC 10 per ASTM E 413, determined by testing per ASTM E 90.

2.8 LOUVER SCREENS

A. General: Provide louvers with screens at locations indicated.

B. General: Provide each exterior louver with louver screens complying with the following requirements:
0. Screen Location for Fixed Louvers: Interior face.
1. Screen Location for Adjustable Louvers: Interior face, unless otherwise indicated.
2. Screen Location for Adjustable Louvers: Exterior face, unless otherwise indicated.
3. Screening Type: Bird screening, unless otherwise indicated.
4. Screening Type: Insect screening where indicated.

C. Secure screens to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches (150 mm) from each corner and at 12 inches (300 mm) o.c.
D. Louver Screen Frames: Fabricate screen frames with mitered corners to louver sizes indicated and to comply with the following requirements:
    1. Metal: Same kind and form of metal as indicated for louver to which screens are attached.
        a. Reinforce extruded-aluminum screen frames at corners with clips.
    2. Finish: Same finish as louver frames to which louver screens are attached.
    3. Finish: Mill finish, unless otherwise indicated.
    4. Type: Rewirable frames with a driven spline or insert for securing screen mesh.
    5. Type: Non-rewirable, U-shaped frames for permanently securing screen mesh.
E. Louver Screening for Aluminum Louvers: As follows:
    1. Bird Screening: Aluminum, 1/2-inch (12.7-mm) square mesh, 0.063-inch (1.6-mm) wire.
    2. Bird Screening: Stainless steel, 1/2-inch (12.7-mm) square mesh, 0.047-inch (1.19-mm) wire.
    3. Bird Screening: Flattened, expanded aluminum, 3/4 by 0.050 inch (19 by 1.27 mm) thick.
    4. Insect Screening: Aluminum, 18-by-16 (1.4-by-1.6-mm) mesh, 0.012-inch (0.30-mm) wire.
    5. Insect Screening: Stainless steel, 18-by-18 (1.4-by-1.4-mm) mesh, 0.009-inch (0.23-mm) wire.
F. Louver Screening for Galvanized Steel Louvers: As follows:
    1. Bird Screening: Galvanized steel, 1/2-inch (12.7-mm) square mesh, 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: Galvanized steel, 18-by-14 (1.4-by-1.8-mm) mesh, 0.011-inch (0.28-mm) wire.
    4. Insect Screening: Stainless steel, 18-by-18 (1.4-by-1.4-mm) mesh, 0.009-inch (0.23-mm) wire.
G. Louver Screening for Stainless-Steel Louvers: As follows:
    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.

2.9 BLANK-OFF PANELS

A. General: Fabricate blank-off panels from materials and to sizes indicated and comply with the following requirements:
    1. Finish: Same as finish applied to louvers.
    2. Finish: Same as finish applied to louvers, but black color.
    3. Attach blank-off panels to back of louver frames with clips.
    4. Attach blank-off panels to back of louver frames with stainless-steel sheet-metal screws.
B. Uninsulated, Blank-off Panels: Metal sheet complying with the following requirements:
    1. Aluminum sheet for aluminum louvers, as follows:
        a. Thickness: 0.050 inch (1.2 mm), unless otherwise indicated.
    2. Galvanized steel sheet for galvanized steel louvers, as follows:
        a. Thickness: 0.052 inch (1.3 mm), unless otherwise indicated.
        b. Thickness: 0.040 inch (1.0 mm), unless otherwise indicated.
    3. Stainless-steel sheet for stainless-steel louvers, as follows:
        a. Thickness: 0.0500 inch (1.3 mm), unless otherwise indicated.
        b. Thickness: 0.0375 inch (0.95 mm), unless otherwise indicated.
C. Insulated, Blank-off Panels: Laminated metal-faced panels consisting of insulating core surfaced on back and front with metal sheets, complying with the following requirements:

1. Thickness: 1 inch (25 mm).
2. Thickness: 2 inches (50 mm).
3. Metal Facing Sheets: Aluminum sheet, 0.032 inch (0.8 mm) thick.
4. Insulating Core: Unfaced, rigid, glass-fiberboard insulation complying with ASTM C 612, Class 1 and 2.
5. Insulating Core: Extruded-polystyrene insulation board complying with ASTM C 578, Type VII.
6. Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturer's standard extruded-aluminum-channel frames 0.081 inch (2.06 mm) thick, with corners mitered and with same finish as panels.
7. Seal perimeter joints between panel faces and louver frames with 1/8-by-l-inch (3.2-by-25-mm) PVC compression gaskets.

2.10 VENTS (BRICK VENTS)

A. Extruded-Aluminum Wall Vents: Extruded-aluminum louvers and frames not less than 0.125 inch (3.18 mm) thick and assembled by welding; with 18-by-14 (1.4-by-1.8-mm) mesh aluminum insect screening on inside face; incorporating weep holes, continuous drip at sill, and integral waterstop on inside edge of sill; of load-bearing design and construction.
B. Cast-Aluminum Wall Vents: One-piece, cast-aluminum louvers and frames; with 18-by-14 (1.4-by-1.8-mm) mesh aluminum insect screening on inside face; incorporating integral waterstop on inside edge of sill; of load-bearing design and construction.
   1. Dampers: Aluminum blades and frames mounted on inside of wall vents; operated from exterior with Allen wrench in socket-head cap screw. Fabricate operating mechanism from Type 302 or 304 stainless-steel components.

2.11 FINISHES, GENERAL

A. Apply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
B. Finish louvers after assembly.

2.12 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
B. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 607.1.
C. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 607.1.
D. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 606.1 or AAMA 608.1.
   1. Color: Light bronze.
   2. Color: Medium bronze.
   3. Color: Dark bronze.
   4. Color: Black.
   5. Color: Match Architect's sample.
   6. Color: As selected by Architect from the full range of industry colors and color densities.
E. Conversion-Coated Finish: AA-C12C42 (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating).

F. Conversion-Coated and Factory-Primed Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below).
   1. Organic Coating: Air-dried primer of not less than 2.0- mil (0.05-mm) dry film thickness.
G. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's specifications for cleaning, conversion coating, and painting.
   1. Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 603.8, except with a minimum dry film thickness of 1.5 mils (0.04 mm), medium gloss.
   2. Color: As indicated by manufacturer's color designations.
   3. Color: Match Architect's sample.
   4. Color: As selected by Architect from manufacturer's full range of colors.
H. High-Performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   1. 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 605.2.
   2. 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 605.2.
      a. Color and Gloss: As indicated by manufacturer's color and gloss designations.
      b. Color and Gloss: Match Architect's sample.
      c. Color and Gloss: As selected by Architect from manufacturer's full range of colors and glosses.

2.13. GALVANIZED STEEL SHEET FINISHES

A. Surface Preparation: Clean surfaces of dirt, grease, and other contaminants. Clean welds, mechanical connections, and abraded areas and repair galvanizing according to ASTM A 780. Apply a conversion coating of type suited to organic coating applied over it.
B. Factory Priming for Field-Painted Finish: Where field painting after installation is indicated, apply an air-dried primer immediately after cleaning and pretreating.
C. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat, with not less than 1.0-mil (0.025-mm) dry film thickness for topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2.0 mils (0.05 mm).
   1. Color and Gloss: As indicated by manufacturer's color and gloss designations.
   2. Color and Gloss: Match Architect's sample.
   4. Color and Gloss: As selected by Architect from manufacturer's full range of choices for color and gloss.

2.14 STAINLESS-STEEL SHEET FINISHES

A. Grind and polish surfaces to remove irregularities, weld spatter, scratches, and forming marks, leaving a surface matching a No. 4 finish.
B. Passivate and rinse surfaces, remove embedded foreign matter, and leave surfaces chemically clean.

PART 3 – EXECUTION

3.1 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 Project site.

3.2 INSTALLATION

A. Locate and place louver units level, plumb, and at indicated alignment with adjacent work.
B. 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.
C. Form closely fitted joints with exposed connections accurately located and secured.
D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
E. 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.
F. 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.
G. Install concealed gaskets, flashings, joint fillers, and insulation, as louver installation progresses, where weathertight louver joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during louver installation.

3.3 ADJUSTING, CLEANING, AND PROTECTING

A. Test operation of adjustable louvers and adjust as needed to produce fully functioning units that comply with requirements.
B. Periodically clean exposed surfaces of louvers and vents that are not protected by temporary covering to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.
C. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
D. Protect louvers and vents from damage during construction. Use temporary protective coverings where needed and approved by louver manufacturer. Remove protective covering at the time of Substantial Completion.
E. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
    1. Clean and touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

3.4 LOUVER SCHEDULE

A. Louver Type L-[#]:
    1. Products: [Provide one of the following products:] [Available products include the following:] <CORRELATE WITH PARA RETAINED IN PART 2 "MANUFACTURERS" ARTICLE>
        a. <MODEL NUMBER; MFR'S NAME.>
        b. <MODEL NUMBER; MFR'S NAME.>

2. Louver Type: [Fixed louver.] [Dual-blade, combination adjustable and fixed louver.] [Single-blade, adjustable louver.] [Acoustical louver.] <RETAIN APPLICABLE TYPE OR INSERT ANOTHER>
3. Louver Depth: <INSERT LOUVER DEPTH>
4. Louver Construction: [Extruded-aluminum frames and blades.] [Formed-sheet metal frames and blades.] [Extruded-aluminum frames and formed-sheet metal blades.] <RETAIN APPLICABLE CONSTRUCTION>
5. Blade Metal and Thickness: <INSERT METAL AND THICKNESS>
6. Frame Metal and Thickness: <INSERT METAL AND THICKNESS>
7. Metal Finish: <INSERT REQUIRED FINISH>
8. Blade Type: [Drainable blade.] [Nondrainable blade without center baffle.] [Nondrainable blade with center baffle.] [Horizontal sightproof blade.] [Vertical sightproof blade.] [Sightproof drainable blade.] <RETAIN APPLICABLE BLADE TYPE IF DESCRIPTIVE RATHER THAN PERFORMANCE SPECIFICATION IS USED. ADD ADDITIONAL DESCRIPTIVE INFORMATION IF REQUIRED.>
9. Blade Angle and Spacing: <INSERT BLADE ANGLE AND SPACING IF DESCRIPTIVE SPECIFICATION IS USED. DELETE IF PERFORMANCE SPECIFICATION IS USED.>
10. Performance Requirements: As follows: <DELETE IF DESCRIPTIVE RATHER THAN PERFORMANCE SPECIFICATION IS USED>
    a. Maximum Standard Airflow: Not less than <INSERT VALUE> with not more than <INSERT VALUE> static-pressure loss.
    b. Air Leakage: Not more than <INSERT VALUE> of louver gross area at a differential static pressure of <INSERT VALUE> with adjustable louver blades closed. <RETAIN THIS SUBPARA ONLY FOR ADJUSTABLE LOUVERS>
11. AMCA Seal: Mark units with AMCA Certified Ratings Seal. <DELETE IF NOT REQUIRED OR AVAILABLE. SEE EDITING INSTRUCTION NO. 2 IN THE EVALUATIONS.>
12. STC Rating: <INSERT VALUE> <RETAIN ONLY FOR ACOUSTICAL LOUVERS>
13. Screen Type: <INSERT DESCRIPTION OF SCREEN TYPE REQUIRED>
14. Accessories Required: <INSERT REQUIRED ACCESSORIES OR DELETE IF NONE>