

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and Divisions 00 and 01, apply to this Section.
- B. Related Sections:
 - 1. Division 08.
 - 2. Division 23.

1.2 SUMMARY

- A. This Section includes ceiling-, floor-, sill- and wall-mounted diffusers and grilles.

1.3 DEFINITIONS

- A. Diffuser: Circular, square, or rectangular air distribution outlet, generally located in the ceiling and comprised of deflecting members discharging supply air in various directions and planes and arranged to promote mixing of primary air with secondary room air.
- B. Grille: A louvered or perforated covering for an opening in an air passage, which can be located in a sidewall, ceiling, sill, or floor.

1.4 SUBMITTALS

- A. Product Data: For each model indicated, include the following:
 - 1. Data Sheet: For each type of air outlet and inlet, and accessory furnished; indicate construction, finish, and mounting details.
 - 2. Performance Data: Include throw and drop, static-pressure drop, and noise ratings for each type of air outlet and inlet.
 - 3. Schedule of diffusers and grilles indicating drawing designation, room location, quantity, model number, size, and accessories furnished.
 - 4. Assembly Drawing: For each type of air outlet and inlet; indicate materials and methods of assembly of components.

1.5 CODES AND STANDARDS

- A. Codes and Standards shall be the current version adopted by the Authority Having Jurisdiction.

1.6 QUALITY ASSURANCE

- A. NFPA Compliance: Install diffusers and grilles according to NFPA 90A, "Standard for the Installation of Air-Conditioning and Ventilating Systems."

PART 2 – PRODUCTS

2.1 MANUFACTURED UNITS

- A. Diffusers and grilles are scheduled on Drawings.

2.2 SOURCE QUALITY CONTROL

- A. Testing: Test performance according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

2.3 CEILING DIFFUSERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Air Systems Components; Krueger.
 2. Titus.
 3. Price Companies.
 4. Seiho.
 5. Air Concepts.
 6. Or Approved Equal.
- B. Performance: Provide ceiling air diffusers that have, as minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each size device as listed in manufacturer's current data.
- C. Ceiling Compatibility: Provide diffusers with border styles that are compatible with ceiling systems, and that are specifically manufactured to fit into ceiling module with accurate fit and adequate support. Refer to general construction drawings and specifications for types of ceiling systems, which will contain each type of ceiling air diffuser.
- D. Types: Provide ceiling diffusers of type, construction, capacity, and with accessories and finishes as indicated.
1. Ceiling Diffuser – Modular Core (MC)
 - a. Material: 22-gauge steel modular core, back pan shall be one piece stamped 22-gauge steel.
 - b. Diffuser Construction: Fixed louver directional modules, which can be easily repositioned without tools in the field for one, two, three or four-way discharge. Each module shall be removable.
 - c. Finish: White, anodic acrylic paint.
 - d. Accessories: Opposed blade damper, operable from the face of the diffuser (OBD).
 2. Ceiling Diffuser – Perforated Modular Core (PMC)
 - a. Material: 22-gauge steel modular core, back pan shall be one piece stamped 22-gauge steel. 22-gauge steel perforated face with 3/16-inch diameter holes on 1/4-inch staggered centers.
 - b. Diffuser Construction: Fixed louver directional modules, which can be easily repositioned without tools in the field for one, two, three or four-way discharge. Each module shall be removable. Removable perforated flush type face.
 - c. Finish: White, anodic acrylic paint.
 - d. Accessories: Opposed blade damper, accessible through opening perforated face removal of one of the cones (OBD).
 3. Ceiling Diffuser – Square Adjustable Louver (SAL)

- a. Material: Steel, 24 gauge or Aluminum, 0.040 in.
 - b. Diffuser Construction: Round neck; three concentric square cones, two inner cones removable. Cones each one piece die stamped construction. The two inner cones constructed as single piece and assembly include adjustable vanes to change airflow discharge from fully horizontal to fully vertical
 - c. Finish: White, anodic acrylic paint or aluminum colored paint.
 - d. Accessories:
 - 1) Opposed blade damper, operable from the face of the diffuser without removing inner cone assembly (OBD).
 - 2) Equalizing Grid (EG).
 - 3) Earthquake tabs (ET).
 - 4) Blank-off baffles (BOB).
4. Ceiling Diffuser – Square Louver (SL)
- a. Material: Steel, 24 gauge or Aluminum, 0.040 in.
 - b. Diffuser Construction: Round neck; three concentric square cones, two inner cones constructed as an assembly and removable. Cones each one piece die stamped construction.
 - c. Finish: White, anodic acrylic paint or aluminum colored paint.
 - d. Accessories:
 - 1) Opposed blade damper, operable from the face of the diffuser without removing inner cone assembly (OBD).
 - 2) Equalizing Grid (EG).
 - 3) Earthquake tabs (ET).
 - 4) Blank-off baffles (BOB).
5. Ceiling Diffuser – Round Adjustable Louver (RAL)
- a. Material: Steel, 18 gauge or Aluminum, 0.051 in.
 - b. Diffuser Construction: Round neck; four concentric round cones, three inner cones removable. Cones each one piece die stamped construction. The inner cone assembly is adjusted by rotating the center cone to change airflow discharge from horizontal to vertical
 - c. Finish: White, anodic acrylic paint or aluminum colored paint.
 - d. Accessories:
 - 1) Opposed blade damper, operable from the face of the diffuser (OBD).
 - 2) Equalizing Grid (EG).
 - 3) Earthquake tabs (ET).
 - 4) Blank-off baffles (BOB).

2.4 LINEAR DIFFUSERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- 1. Air Systems Components; Krueger.
 - 2. Titus.
 - 3. Price Companies.
 - 4. Seiho.
 - 5. Air Concepts.

6. Or Approved Equal.
 - B. Performance: Provide linear air diffusers that have, as minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each size device as listed in manufacturer's current data.
 - C. Ceiling Compatibility: Provide diffusers with border styles that are compatible with ceiling systems, and that are specifically manufactured to fit into ceiling module with accurate fit and adequate support. Refer to general construction drawings and specifications for types of ceiling systems, which will contain each type of air diffuser.
 - D. Wall Compatibility: Provide diffusers with border styles that are compatible with wall systems, and that are specifically manufactured to fit into wall construction with accurate fit and adequate support. Refer to general construction drawings and specifications for types of wall construction, which will contain each type of wall diffuser.
 - E. Floor Compatibility: Provide diffusers with border styles that are compatible with floor systems, and that are specifically manufactured to fit into floor construction with accurate fit and adequate support. Refer to general construction drawings and specifications for types of floor construction, which will contain each type of floor diffuser.
 - F. Sill Compatibility: Provide diffusers with border styles that are compatible with sill systems, and that are specifically manufactured to fit into sill construction with accurate fit and adequate support. Refer to general construction drawings and specifications for types of sill construction, which will contain each type of sill diffuser.
 - G. Types: Provide linear diffusers of type, construction, capacity, and with accessories and finishes as indicated.
 1. Linear Diffuser – Slot
 - a. Materials: 0.063-inch extruded aluminum frame; aluminum end borders, end caps and support bars. Steel pattern controller.
 - b. Diffuser Construction: One piece lengths up to 6 feet long. Multiple units, placed end to end, shall be joined with alignment pins to for a continuous slot appearance. Pattern controller shall be aerodynamically curved shaped deflector capable of 180-degree pattern adjustment from the face of the diffuser and shall allow dampering if required. Maximum length of each pattern controller is 3 feet. Exposed frame shall be constructed with mitered corners.
 - c. Finish: Border, white anodic acrylic paint or aluminum; pattern controller, black.
 - d. Accessories: Diffuser plenum; galvanized sheet metal construction, lengths and widths to match individual diffusers, 1-inch internal duct liner.
 2. Linear Diffuser – Bar
 - a. Materials: Extruded aluminum bar core locked into 0.081-inch aluminum frame.
 - b. Diffuser Construction: Bars shall be fixed, [1/8][1/4]-thick, [0][15] degrees deflection, spaced on [1/4][1/2]-inch centers, parallel to the long dimension of the diffuser. The core shall have support bars perpendicular to the bars at no more than 9 inch centers. One piece lengths up to 6 feet long. Multiple units, placed end to end, shall be joined with alignment pins to for a continuous appearance. Exposed frame shall be constructed with mitered corners.
 - c. Finish: White anodic acrylic paint or anodized aluminum.

- d. Accessories: Opposed blade damper, operable from the face of the diffuser (OBD).
3. Linear Diffuser – Architectural Type
 - a. General
 - 1) The systems shall be complete in every respect and shall include all required appurtenances. Furnish and install all plenums, hoods, blank-offs, and associated sheet metal components including all duct connections there to.
 - 2) The diffusers shall integrate into the ceiling system. Where curved linear slot diffusers are indicated, they shall be stretched curved to the exact radii required. Rolled or segmented linear slot diffusers will not be accepted.
 - 3) The linear diffusers shall have a single slot unless shown otherwise and shall be capable of being used for supply air, return air, exhaust air, or any combination thereof.
 - 4) The linear diffusers shall be capable of supporting the ceiling system. Linear diffusers supported by screws in the flanges or from air plenums are unacceptable. For lay-in ceiling, provide hanger wire support clips that are integral with the linear diffusers allowing the diffusers to be supported from the building structure with ceiling wire. For hard ceilings, provide clips that are integral with the diffusers allowing the diffusers to be secured directly to the ceiling framing without the requirement for hanger supports. Provide spline clips to secure joints and ceiling tees to the diffusers.
 - 5) Provide ends and corners as required. Ends shall be butt type, field installed, or mitered picture frame type factory installed, as indicated herein or shown on the drawings. Corners shall be mitered one piece unit.
 - b. Materials: Extruded aluminum frame and pattern controllers, minimum wall thickness 0.062 inches. Spring steel retainer clips.
 - c. Diffuser Construction: Modular linear slot diffuser with adjustable pattern controllers to direct air horizontally in either direction or vertical. Pattern controllers shall be maximum 24-inches long and held by spring loaded spacers. Air throw pattern shall be [vertical throw][adjustable horizontal flow][or][as-indicated].
 - d. Finish: Flanges exposed to view shall be painted factory standard white. All other surfaces and blank-off panels shall be painted flat black.
 - e. Accessories: Diffuser plenums, 24-gauge galvanized steel with 1-inch duct lining. Provide blank-offs for any openings in the plenum or diffuser body that is not meant to deliver supply air directly to the space it serves.
 - f. Return Air Slots: Same unit as adjacent supply air diffusers. Provide return hood/light shield constructed of 51% free area perforated metal painted flat black.

2.5 SUPPLY GRILLES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Air Systems Components; Krueger.
 2. Titus.
 3. Price Companies.
 4. Seiho.
 5. Air Concepts.
 6. Or Approved Equal.

- B. Performance: Provide supply grilles that have, as minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each size device and listed in manufacturer's current data.
- C. Wall Compatibility: Provide grilles with border styles that are compatible with wall systems, and that are specifically manufactured to fit into wall construction with accurate fit and adequate support. Refer to general construction drawings and specifications for types of wall construction, which will contain each type of wall grille.
- D. Types: Provide supply grilles of type, construction, capacity, and with accessories and finishes as indicated.
 - 1. Supply Grille – Louvered
 - a. Materials: 20-gauge steel or 0.050 aluminum frame with heavy duty aluminum blades
 - b. Grille Construction: 1-1/4-inch wide border, corners assembled with full penetration resistance welds. Screw holes countersunk. Double deflection solid airfoil blades, front blades parallel to the [short][long] dimension, spaced on 3/4-inch centers. Blades shall extend through the side frame on each side. Blades shall be individually adjustable, held in place with tension wire, adjustable without loosening or rattling.
 - c. Finish: White, anodic acrylic paint.
 - d. Accessories: Opposed blade damper, operable from the face of the grille (OBD).
 - 2. Supply Grille – Drum Louver
 - a. Materials: Heavy gauge extruded aluminum frame with heavy duty aluminum drum and blades.
 - b. Grille Construction: 1-1/4-inch wide border, corners assembled with full penetration resistance welds. Screw holes countersunk. Drum shall rotate 25 degrees up and down from horizontal. Blades shall be in vertical configuration and individually adjustable.
 - c. Finish: White, anodic acrylic paint.
 - d. Accessories: Opposed blade damper, operable from the face of the grille (OBD).

2.6 EXHAUST/RETURN GRILLES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Air Systems Components; Krueger.
 - 2. Titus.
 - 3. Price Companies.
 - 4. Seiho.
 - 5. Air Concepts.
 - 6. Or Approved Equal.
- B. Performance: Provide exhaust and return grilles that have, as minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each size device and listed in manufacturer's current data.
- C. Ceiling Compatibility: Provide grilles with border styles that are compatible with ceiling systems, and that are specifically manufactured to fit into ceiling module with accurate fit and

adequate support. Refer to general construction drawings and specifications for types of ceiling systems, which will contain each type of grille.

- D. **Wall Compatibility:** Provide grilles with border styles that are compatible with wall systems, and that are specifically manufactured to fit into wall construction with accurate fit and adequate support. Refer to general construction drawings and specifications for types of wall construction, which will contain each type of wall grille.
- E. **Types:** Provide exhaust and return grilles of type, construction, capacity, and with accessories and finishes as indicated.

1. Exhaust/Return Grille – Louvered

- a. **Materials:** 22-gauge roll formed steel frame and blades or 0.040 minimum extruded aluminum frame and blades.
- b. **Grille Construction:** 1-1/4-inch wide border, corners assembled with full penetration resistance welds. Screw holes countersunk. Blades at 35-degree deflection at [1/2][3/4]-inch spacing. Blades fixed in place, parallel to the [short][long] dimension of the grille.
- c. **Finish:** White, anodic acrylic paint or aluminum colored paint.
- d. **Accessories:** Opposed blade damper, operable from the face of the grille (OBD).

2. Exhaust/Return Grille – Airfoil Louvered

- a. **Materials:** 20-gauge roll formed steel frame and blades or 0.040 minimum extruded aluminum frame and blades.
- b. **Grille Construction:** 1-1/4-inch wide border, corners assembled with full penetration resistance welds. Screw holes countersunk. Airfoil shape blades at 45-degree deflection at [1/2][3/4]-inch spacing. Blades fixed in place, parallel to the [short][long] dimension of the grille.
- c. **Finish:** White, anodic acrylic paint or aluminum colored paint.
- d. **Accessories:** Opposed blade damper, operable from the face of the grille (OBD).

3. Exhaust/Return Grille – Eggcrate

- a. **Materials:** 22-gauge roll formed steel frame with aluminum grid.
- b. **Grille Construction:** 1-3/4-inch wide border, corners assembled with full penetration resistance welds. Screw holes countersunk. Eggcrate core shall provide a minimum of 90% free area with 1/2 x 1/2 x 1-inch aluminum grid.
- c. **Finish:** White, anodic acrylic paint.

2.7 SPECIALTY DIFFUSERS

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:

1. Air Systems Components; Krueger.
2. Titus.
3. Price Companies.
4. Seiho.
5. Air Concepts.
6. Or Approved Equal.

- B. Performance: Provide diffusers that have, as minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each size device and listed in manufacturer's current data.
- C. Wall Compatibility: Provide diffusers with border styles that are compatible with wall systems, and that are specifically manufactured to fit into wall construction with accurate fit and adequate support. Refer to general construction drawings and specifications for types of wall construction, which will contain each type of wall diffuser.
- D. Ceiling Compatibility: Provide diffusers with border styles that are compatible with ceiling systems, and that are specifically manufactured to fit into ceiling module with accurate fit and adequate support. Refer to general construction drawings and specifications for types of ceiling systems, which will contain each type of ceiling diffuser.
- E. Types: Provide diffusers of type, construction, capacity, and with accessories and finishes as indicated.
 - 1. Spot Diffusers
 - a. Materials: Manufacturer's standard heavy gauge extruded aluminum frame and adjustable blades. Not welded, fastened or riveted.
 - b. Diffuser Construction: Multi-directional capable of directing airstream up to a minimum of 39° from diffuser centerline to any direction. Flange-to-body gasket shall be two tandem felt strips and flange mounting gasket shall be close-cell neoprene or felt. Provide internal damper under stainless steel leaf spring.
 - c. Finishes: Coordinate exact color with Architect.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine areas where diffusers and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install diffusers and grilles level and plumb, according to manufacturer's written instructions, project Coordination Drawings, original design, and referenced standards.
- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practicable. For units installed in lay-in ceiling panels, locate units in the center of the panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Duct-Mounted Supply and Exhaust/Return Grilles: Mount to duct branch with 16-gauge steel angle collar. Mounting screws to match grille frame. Screws shall not protrude more than 1/4-inch past angle collar.
- D. Install diffusers and grilles with airtight connection to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

- E. Install in-line multiple linear diffusers with alignment pins for a straight continuous appearance.

3.3 ADJUSTING

- A. After installation, adjust diffusers and grilles to air patterns indicated, or as directed, before starting air balancing.

3.4 CLEANING

- A. After installation of diffusers and grilles, inspect exposed finish. Clean exposed surfaces to remove burrs, dirt, and smudges. Replace diffusers and grilles that have damaged finishes.

END OF SECTION