

SECTION 23 37 13 - DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Rectangular and square ceiling diffusers.
- 2. Linear bar diffusers.
- 3. Adjustable bar registers and grilles.
- 4. Fixed face registers and grilles.
- 5. Linear bar grilles.
- 6. Operating Room Diffusors
- 7. Operating Room Ceiling Grid

- B. Related Sections:

- 1. Division 08 Section "Louvers and Vents" for fixed and adjustable louvers and wall vents, whether or not they are connected to ducts.
- 2. Division 23 Section "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated, include the following:

- 1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
- 2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

- B. Samples for Initial Selection: For diffusers, registers, and grilles with factory-applied color finishes.

- C. Samples for Verification: For diffusers, registers, and grilles, in manufacturer's standard sizes to verify color selected.

- D. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:
1. Ceiling suspension assembly members.
 2. Method of attaching hangers to building structure.
 3. Size and location of initial access modules for acoustical tile.
 4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 5. Duct access panels.
- E. Source quality-control reports.

PART 2 - PRODUCTS

2.1 CEILING DIFFUSERS

A. Rectangular and Square Ceiling Diffusers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Tuttle & Bailey-Agitair Type RC.
 - b. Titus Type TDX.
 - c. Anemostat Type D.
 - d. Price SMX.
2. Devices shall be specifically designed for variable-air-volume flows with internal directional induction vanes.
3. Material: Steel.
4. Finish: Baked enamel, white.
5. Face Size: 24 by 24 inches.
6. Mounting: T-bar and plaster.
7. Pattern: Refer to drawings.
8. Accessories:
 - a. Minimum 3"high plenum (not including duct collar) square to round adapter installed at the factory. Adapter to fit on inside of diffuser neck to minimize leakage.

2.2 LINEAR SLOT OUTLETS

A. Linear Diffuser:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Tuttle & Bailey
 - b. Anemostat Products; a Mestek company.
 - c. Titus.

d. Price.

2. Devices shall be specifically designed for variable-air-volume flows.
3. Material: Extruded aluminum.
4. Finish: Baked enamel, white.
5. The diffuser shall be designed so that the air will be discharged at a uniform velocity across the entire length of the unit. The air streams shall be discharged at counter angles parallel to the diffuser mounting surface by extruded aluminum fixed louvers providing one or two way discharge patterns to create induction of room air within the primary air stream to achieve rapid mixing of primary and room air. The diffuser efficiency must be such that the initial temperature differential shall be reduced by 50% at a distance one foot from the point of discharge. Slotted outlets of the grille type lacking diffusion vanes and mixing characteristics shall not be accepted.
6. Diffusers shall be equipped with matching extruded aluminum plaster frames or to match ceiling types. Frames shall be equipped with slots to accept the coil mounting springs mounted on the diffuser for positive mounting within the frame. Visible fasteners shall not be accepted.
7. Mounting: Concealed, Spring clip.
8. Accessories: Plaster frame, Directional vanes, Alignment pins, Core clips and Blank-off strips where indicated.
9. Diffusers in curved walls shall be constructed of lengths that respect the curved surface (maximum 3'-0") so the diffuser does not need to be curved. Refer to drawings.

B. Ceiling-Integral Continuous Diffuser:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Anemostat Products; a Mestek company.
 - b. Titus.
 - c. Price.
 - d. Tuttle and Bailey
2. Slot Width: shall be as schedule.
3. Section Length: shall be as indicted on the drawing.
4. Straight and curved sections as required to accommodate layout.
5. Mitered tees and corners.
6. Pattern Controllers: 24 inches o.c.
7. Material: Aluminum, extruded, heavy wall.
8. Finishes:
 - a. Exterior: Standard white baked enamel.
 - b. Interior: Standard black.
9. Mounting: Ceiling and Sidewall.
10. Plenum: all Insulated and vapor proof.
11. Other Features:
 - a. Painted interior.
 - b. Blank-offs.

2.3 REGISTERS AND GRILLES

A. Adjustable Bar Register:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Anemostat Products; a Mestek company.
 - b. Titus.
 - c. Tuttle & Bailey
 - d. Price.
 - e. Krueger.
2. Material: Steel.
3. Finish: Baked enamel, white.
4. Face Blade Arrangement: Horizontal.
5. Core Construction: Integral.
6. Rear-Blade Arrangement: Vertical.
7. Frame: 1 inch wide.
8. Mounting: Concealed.

B. Adjustable Bar Grille:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Anemostat Products; a Mestek company.
 - b. Titus.
 - c. Tuttle & Bailey.
 - d. Price.
 - e. Krueger.
2. Material: Steel.
3. Finish: Baked enamel, white.
4. Face Blade Arrangement: Horizontal.
5. Core Construction: Integral.
6. Rear-Blade Arrangement: Vertical.
7. Frame: 1 inch (25 mm) wide.
8. Mounting: Concealed.

2.4 Operating Room Diffuser:

A. Operating Room Diffuser:

1. Supply and install air systems in each operating room of the sizes and capacities as indicated on the drawings or diffuser schedule. Equivalent manufactures shall include:
 - a. Tuttle and Bailey
 - b. Titus

- c. Krueger
 - d. Price
2. Each operating room air system shall consist of modular slot diffusers which shall provide a protective air curtain around the operating area and laminar flow diffusers which shall provide a supply of sterile air over the operating table area
 3. The slot diffuser and laminar flow diffuser shall be of aluminum construction
 4. The slot diffusers shall consist of a .064" (2) aluminum plenum with continuous welded joints and radiused corners to facilitate cleaning, extruded aluminum frames, formed aluminum diffuser face with two slots and fixed pattern deflectors. Plenums shall have formed aluminum inlet collars complete with dampers, removable from plenum face. The removable dampers shall be opposed blade type of stainless steel construction. Damper shall be adjusted without removing face of HORD. The diffuser face shall be attached by 90° quick-release fasteners and safety cable for easy removal and replacement. Entire plenum and diffusers shall have a B11 Sterile White - Thermal Setting finish which meets special requirements for hospital use and will be subjected to regular cleaning with high concentration cleaning solutions and agents for sterilization purposes
 5. The laminar flow diffusers shall have components of aluminum and plated steel to inhibit corrosion. The perforated face plate, perforated damper deflector using interior baffles and diffuser back pan plenum assembly shall be of 0.040 (1) aluminum. The volume control damper shall be a steel construction full flow type damper. The perforated face plate shall open easily with ¼ turn fasteners and safety cable for damper adjustment and cleaning. Diffusers shall have a B11 Sterile White - Thermal Setting finish which will withstand cleaning with high concentration cleaning solutions and agents

B. Return Grille

1. The hospital operating room return grilles shall be of stainless steel construction. The core of the return grille will consist of 45° louvres, 0.75" (19) on centre. The grille border shall have a #4 finish. The grille shall use 90° quick-release fasteners to mount to a separate stainless steel wall mounting frame, provided with the unit, thereby allowing easy removal for cleaning.

2.5 Operating Room Ceilings

- A. The operating room air diffuser manufacturer shall furnish extruded aluminum tee and angle frame ceiling suspension system to support air diffusers, fill-in panels and light fixtures. Tees should have a 1.5" face width and 1.563" overall height. Minimum wall thickness of tees shall be 0.125" with a minimum weight of 0.45 lbs. per linear ft (full tee). All tee and angle frame extrusions should include channels along the top of the stack to support hold-down clips for fill-in panels. Extrusions shall be fabricated using 100% pre-consumer recycled aluminum material. The manufacturer shall coordinate with the medical equipment supplier and other trades to insure fit and finish. The manufacturer shall provide detailed CAD drawings for approval prior to fabrication.

- B. The ceiling suspension system shall be factory heliarc welded in sub-assemblies not larger than 5' x 10', where framing sub-assemblies butt together for field assembly. The butting angles shall be half tees mechanically-fastened together with heavy duty bolts.
- C. All tees and angles shall be pre-punched on 4.85" centers for attachment to minimum 12 gauge pre-stressed suspending hanger wires on minimum 48" centers. Systems shall be designed to support 15 lbs/sq.ft when installed as per ASTM C636. Hangers are by others.
- D. Manufacturer shall furnish 0.125" thick closed-cell polyethylene gasket tape to be (factory) installed on the frame assembly to provide an airtight seal between the tees and diffusers, fill-in panels and/or light fixtures. Gasket shall also be field applied between framing sub-assemblies prior to field assembly. Infill panels shall be (Equal to Price SC Series lay-in type, 0.040" unperforated aluminum, or equal to Price SPB Series perforated panel with border consisting of 0.040" perforated aluminum faceplate with 0.040" solid aluminum backing with B11 finish
 - 1. Fill-in panels should be held down using factory supplied spring clips on all sides of the panel to seal against the closed-cell gasket. Manufacturer shall provide filler panels and access as required (provide a minimum of four access panels at corners of grid). Manufacturer shall coordinate tee and panel layout with medical equipment manufacturer
- E. The ceiling suspension system shall have a baked-on powder coat finish to match the laminar flow diffusers and fill-in panels. Paint finish must demonstrate no deterioration when tested in accordance with ASTM D1308 (covered spot & immersion) and ASTM D4752 (MEK double rub) paint durability tests.

2.6 SOURCE QUALITY CONTROL

- A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install diffusers, registers, and grilles level and plumb.

- 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 practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.
- D. Noise level at noted capacities shall not exceed criteria specified in Section NOISE CONTROL. Diffusers shall be suitable for operation at 5 percent excess and 25 percent less than noted capacity. Provide blanking for proper coverage and blow without producing objectionable noise or air motion at occupied level. Finish shall match color sample as approved:
- E. Linear diffusers: Frame types shall mate with ceilings. Provide means to neatly butt and align units to give continuous appearance without butting flanges. No screw holes or welded corners visible on diffusers or frames will be permitted. Air volume shall be adjustable through air supply face without requiring removal of face panel. Provide blanked sections for inactive lengths. Provide plaster frames and opposed blade volume dampers with remote cable operators where noted. Refer to Architectural Drawings for mounting details and overall lengths. Finish shall match color sample as approved:
- F. Install all fire rated diffusers in compliance with NFPA and UL listed installation instructions.

3.3 ADJUSTING

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

3.4 Operating Room Ceiling Installation

- A. Install all components in accordance with the manufactures' instructions in accordance to ASTM C 636.
- B. Main grid members are to be suspended on pre-stressed hanger wire at 4' (1200 mm) centers. Minimum gauge for the hanger wire shall be 12 gauge.
- C. Maximum allowable deflection shall not exceed L/360.
- D. Install ceilings to heights indicated on eh plans and specifications to a tolerance of 1/8" in 12'-0" (3.2mm in 3660 mm).

END OF SECTION