SECTION 233713 – GRILLES, REGISTERS, DIFFUSERS

1. GENERAL

TO STANDARD PART 1, ADD THE FOLLOWING:

1.X DELIVERY, STORAGE AND HANDLING

1. Deliver ceiling components to project site in original, unopened packages and store them in fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.
2. Handle carefully to avoid damaging components in any way.

PART 2 - PRODUCTS

2.1 LAMINAR FLOW DIFFUSERS

1. Diffuser shall be ASHRAE Group E, non-aspirating laminar flow type in accordance with ASHRAE Standard 170 for Operating Rooms.
2. Provide aluminum laminar flow diffuser modules (LFD) to supply non-aspirating air where shown on the contract documents.
3. Laminar diffusers shall utilize a two-chamber plenum design to deliver air to the space with zero aspiration at the face of the perforated plate. Air shall enter the initial plenum through an inlet collar and inverse conical balancing mechanism. The balancing mechanism shall be adjustable through the plenum via an adjustable screw from the room side.
4. Manufacturer’s published performance data for 24” x 48“ nom. size with 10” inlet shall not exceed 0.09” w.g. at design point of 30 CFM/sq. ft.
5. A solid aluminum plate with two rectangular cutouts located directly above a V-shaped diffusion basket shall separate 48“nom. the top and bottom chambers. The lower chamber shall have a V-shaped, perforated diffusion basket mounted within a rectangular, perforated diffusion basket to evenly distribute air over the entire face of the diffuser
6. Plenum frame shall be constructed of 0.063-in. extruded aluminum with mitered, continuously back-welded corners and aluminum top plate. No cracks or gaps in the sides of diffuser plenum will be allowed. Provide four (4) aluminum hanging tabs on plenum for independent support from above (if required).
7. Perforated distribution faceplate shall be constructed of 0.050-in. aluminum. Perforations to be 16% open area for 40 or less CFM per square ft. of module, 23% open area for 45-65 CFM per square ft. of module, or 33% open area for higher velocities. Plate shall to be retained to the module frame through the use of quarter-turn fasteners. Provide safety retainers of vinyl-coated stainless steel cable to prevent accidental dropping of plate during cleaning. The distribution plate shall be installed in aluminum mounting frame with mitered back welded corners. No diffusion component may be affixed to the back side of the faceplate frame. The back side of faceplate shall be easily accessible for ease of cleaning.
8. All exposed surfaces, including border trim, shall be provided with manufacturer’s standard white baked enamel finish (*OPTIONAL FINISH:* 204-R1 clear anodized aluminum), suitable for withstanding typical cleaning solutions and scrubbing implements typically employed in operating room environment.
9. Diffusers located in rooms with gypsum board ceilings shall be furnished complete with plaster frames or framing sections by diffuser manufacturer to support diffusers located adjacent to one another as shown on plans. Verify exact locations of diffusers with architectural reflected ceiling plans where shown.
	* + 1. The heavy-duty plaster frames or framing sections shall be 1-1/2" wide x 1-7/16" high and angles shall be ¾” wide x 1-7/16” high. Minimum wall thickness of the tees and angles shall be 1/8”.
			2. The suspension system shall be factory-welded in sub-assemblies. Where framing sub-assemblies butt together, the adjoining surfaces shall be gasketed and mechanically-fastened with self-tapping wafer head screws. If MRI Rooms, ALUMINUM self-tapping wafer head screws shall be utilized.
			3. All tees and angles shall be pre-punched on 6" centers for independent suspension from above spaced at 2’ max.
			4. Manufacturer shall furnish 1/8" thick closed-cell polyethylene gasket tape to be field installed on the frame assembly to provide seal between diffuser and frame. Gasketing be field installed on the top side of all horizontal frame surfaces as per manufacturer’s installation instructions after surfaces have been wiped clean, free from any construction dust
10. Acceptable model and manufacturer: Lami-Vent by Precision Air. No exceptions or alternates will be accepted without prior pre-submittal approval by engineer.  Contractors offering manufacturers other than basis of specification, whether listed as acceptable equal or not, shall submit a line item comparison stating specific deviations from specification at time of bid. Contractor shall be responsible for any cost difference to meet above specification even if alternates are approved by engineer.

***OPTIONAL REMOVABLE PLUG BUTTON FOR THRU-FACE ACCESS TO INTERNAL VOLUME ADJUSTMENT VALVE ($), ADD TO 2.1 G.:***

Manufacturer shall provide removable plug button for room-side access to volume adjustment valve without need to drop faceplate. Plug button shall match finish color.

***OPTIONAL FACTORY-APPLIED INSULATION ($), ADD TO 2.1 F.:***

Manufacturer shall insulate the laminar flow diffuser with 1-1/2" duct wrap FSK-backed insulation of 0.75lb/cu. ft. density to prevent heat gain and condensation.

***optional WRAP-AROUND STYLE alum. faceplate ($), replace 2.1. G. with the following:***

G. Perforated faceplate shall be .050" aluminum and shall extend over and wrap around plate frame on all four sides to assure continuous perforated surface appearance between ceiling tee frames. Perforations to be 16% open area for 40 or less CFM per square ft. of module, 23% open area for 45-65 CFM per square ft. of module, or 33% open area for higher velocities. Manufacturer shall provide vinyl-coated stainless steel cable safety retainers on two opposite sides to prevent accidental dropping of faceplate. No diffusion component may be affixed to the back side of the faceplate frame. The back side of faceplate shall be easily accessible for ease of cleaning.

***optional stainless steel faceplate, replace 2.1. G. with the following:***

G. Perforated faceplate shall be 22 ga. 304 stainless steel with No. 4 polished finish and shall extend over and wrap around plate frame on all four sides to assure continuous perforated surface appearance between ceiling tee frames. Perforations to be 16% open area for 40 or less CFM per square ft. of module, 23% open area for 45-65 CFM per square ft. of module, or 33% open area for higher velocities. Manufacturer shall provide vinyl-coated stainless steel cable safety retainers on two opposite sides to prevent accidental dropping of faceplate. No diffusion component may be affixed to the back side of the faceplate frame. The back side of faceplate shall be easily accessible for ease of cleaning.

***OPTIONAL SIDE (or end) oval inlet diffusers ($), replace paragraph 2.1, C. with the following:***

C. Diffuser shall utilize a two-chamber plenum design. Laminar diffusers shall utilize a two-chamber plenum design to deliver air to the space with zero aspiration at the face of the perforated plate. Air shall be admitted through an oval inlet collar located on side (or end) of the upper plenum. An inverse conical balancing mechanism shall be included, room-side adjustable by means of internal screw.

*DESIGNER CAUTION:* Elongated oval inlets result in decreased inlet areas. Manufacturer’s oval inlet sizes are sized to accept flex duct circumferences. Contact a Precision Air Application Engineer for assistance with sizing oval-shaped inlets and flexible duct sizes for project-specific air volumes to avoid high neck velocities which may result in unacceptable NC levels. 800-404-0931.

***OPTIONAL NON-FERROUS UNITS FOR MRI ROOMS ($), INSERT PARAGRAPH BELOW 2.1 D.:***

E. Diffusers for MRI Room(s) only shall be entirely NON-FERROUS, assembled with aluminum or non-ferrous hardware including but not limited to aluminum captive screws, plastic safety cables, aluminum nuts and adjustment screw.

***To specify all stainless steel lami-Vent, contact Precision air for SST guide spec.***

EXECUTION

#### Inspection/Examination

1. Verify balancing dampers are installed on all duct take-off to diffusers, despite whether dampers are specified as part of the diffuser assembly.

END