SECTION 15855 – REGISTERS, GRILLES AND DIFFUSERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK INCLUDED

A. Furnish and install all registers, grilles and diffusers including opposed blade dampers, frames and other accessories to make a complete system of air distribution.

B. All materials shall be new and manufactured for the specific purpose of distributing and controlling air flow.

1.3 RELATED SECTIONS

A. Examine all drawings and criteria sheets and all other Sections of the Specifications for requirements which affect work under this Section whether or not such work is specifically mentioned in this Section.

1.4 REFERENCES

A. Applicable provisions of the following Codes and Trade Standard Publications shall apply to the work of this Section, and are hereby incorporated into, and made a part of the Contract Documents.

B. Material standards shall be as specified or detailed hereinafter and as following:

1. ADC 1062: GRD – Test Code for Grilles, Registers and Diffusers; 1984.
2. AMCA 500 – Test Method for Louvers, Dampers and Shutters; 1989.
3. ASHRAE 70 – Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.
4. NFPA 90A – Installation of Air Conditioning and Ventilating Systems; 1993.
5. SMACNA (DCS) – HVAC Duct Construction Standard – metal and Flexible; 1995.

1.5 SUBMITTALS

A. See Section 15050 and General Conditions for Additional Requirements.

B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application and noise level.

C. Project Record Documents: Record actual locations of air outlets and inlets.

D. Submit air terminal performance data including static pressure, throw, velocity, airflow and acoustical performance. Data must indicate compliance with referenced Codes and Standards specified herein.

E. Manufacturer shall review requirements of outlets as to size, finish and type of mounting before submitting shop drawings and schedule of outlets.

F. Manufacturer shall check location of outlets and make necessary adjustments in position to conform with architectural features, symmetry and lighting arrangement before submitting shop drawings.

1.6 QUALITY ASSURANCE

A. Manufacturer shall certify cataloged performance and ensure correct application of air outlet types.

B. Manufacturer shall be responsible for examining application of each outlet and shall guarantee that each will provide comfortable space conditions without drafts at noted capacity.

PART 2 - PRODUCTS

2.1 GENERAL

A. Acceptable manufacturers contingent on compliance with specifications.

1. Anemostat
2. Krueger
3. Tuttle & Bailey
4. MetalAire
5. Price
6. Nailor
7. Titus
8. Precision Air

B. All air distribution devices shall be of steel or aluminum construction unless otherwise specified herein or scheduled on the drawings.

C. Distribution devices, except where such devices are specified or scheduled to be steel extruded aluminum, shall be factory primed and finish painted by the manufacturer in a color as approved by the Architect during shop drawing review, unless otherwise noted.

D. **All diffusers, grilles and registers must be compatible with the designed ceiling/wall type. Refer to architectural drawings for exact details of ceiling/wall construction.**

2.2 DIFFUSERS, REGISTERS AND GRILLES SHALL BE OF TYPE AS HEREIN SPECIFIED

Designation	Service	Air Pattern
A	Supply	1-way
B	Supply	2-way (90°)
C	Supply	2-way (180°)
D	Supply	3-way
E	Supply	4-way
F	Return/Exhaust	45° Deflection
G	Sidewall Supply (Adjustable)	45° Deflection (Double Deflection)
H	Low Wall Return/Exhaust	Louvered
I	Linear Supply/Return	1 or 2 way
J	O.R. Laminar Supply	Perforated
K	Ceiling Return	Linear Slot
N1, 2, 3	Radial Pattern Supply	Perforated/Louvered

A. Types A, B, C, D and E (Ceiling Supply)

1. Ceiling or sidewall supply air diffusers of the above types shall be of the restricted multi-orifice jet induction and air mixing type, consisting of louvered sections with built-in diffusing vanes, similar to Tuttle & Bailey Type RCTC.
2. The vanes shall be arranged to discharge air from adjacent channels at a 45° angle in opposite directions to the plane of discharge to ensure rapid mixing of primary and room air. Each individual diffusing vane shall be welded in (2) places to the adjacent louver sections to make a rigid integral unit. The vanes shall extend to the discharge edges of the louvers.
3. Where louver sections abut core frame, the louver ends shall be welded to core frame. The louver ends shall be rounded and hemmed before welding to core frames.
4. Diffusers shall be square or rectangular, as shown on the drawings. Diffusers shall be assembled in patterns which provide 1-way, 2-way, 3-way or 4-way air discharge with each side delivering a quantity of air proportional to the area served.
   Diffusers shall be fabricated of steel welded or aluminum construction. The diffusers shall be provided with a removable core permitting easy access to the neck connection.
5. The diffusers shall be constructed with an integral collar extending at least 1" above the core to accommodate an internal duct connection. Collar corners shall have welded angles on the outside to prevent leakage and ensure that internal duct connection can be made secure.

B. Type F (Return and Exhaust)

1. General return/exhaust registers shall be similar to Tuttle & Bailey Model T70D and shall be made of steel or aluminum with (1) set of fixed blades, 35° deflection. Provide with countersunk holes and suitable frame to match ceiling or wall construction.
2. All return and exhaust registers installed in all toilet rooms, laundry rooms, showers and other areas subject to moisture shall be similar to above except constructed of all aluminum, equal to Tuttle & Bailey Model A70D.

C. Type G (Sidewall Adjustable Supply)

1. Sidewall supply registers shall be similar to Tuttle & Bailey Model A547 and shall be made of steel or aluminum, with mitered corners, double adjustable deflection core, and horizontal front louvers. Frames shall be suitable for construction adjacent to where registers are to be installed. Registers shall have countersunk screw holes.

D. Type H (Low Wall Return/Exhaust)

1. Low wall return/exhaust registers shall be similar to above except frame and blade shall be manufactured of heavy gauge extruded aluminum (minimum thickness 12 gauge) for rugged use similar to Tuttle & Bailey Model A110DG.

E. Type I (Linear Supply and Return)

1. Stripline supply and return diffusers shall be similar to Tuttle & Bailey Model EH or MetalAire Model 2000D.
2. Linear diffusers shall be of the multi-orifice, quick diffusing type. Diffusers shall be so designed that the air will be discharged at a uniform velocity through all orifices. Airstreams shall be discharged at counter angles to create turbulence within the primary airstream and thus 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 1'-0" from the point of discharge. Slotted elements of the grilled type lacking diffusing elements and mixing characteristics will not be acceptable.
3. Stripline borders and frames shall be of extruded aluminum. Diffusing vane sections shall be of drawn and stamped aluminum shapes.
4. Diffuser shall be equipped with matching extruded frame to suit the adjacent construction where applicable. Means shall be provided for attaching diffuser to plaster frame with safety spring locks. No screwholes shall be visible on plaster frames or stripline.
5. Finish shall be electro-plated off-white enamel or as indicated on the drawings.

F. Type J (O.R. Laminar Supply)

1. O.R. laminar supply diffusers shall be equal to Tuttle & Bailey Model CRD rectangular or square perforated face supply air diffusers of the sizes indicated on plans. The diffuser inlet shall properly distribute air over the entire diffuser face and

be complete with a steel butterfly damper, adjustments of the damper for air volume control shall be possible without removal of diffuser face. The diffuser shall produce a well-distributed, non-aspirating vertical air pattern. The perforated face shall be removable for thorough cleaning of the entire diffuser. Diffusers shall be complete with safety chain for retention of face. The diffuser construction shall be: aluminum face and plenum with extruded aluminum margins. Diffuser margins to be compatible with ceiling construction. The entire assembly is to have a white enamel finish to comply with appearance, color and maintenance requirements.

G. Type K (Slot Diffusers)

1. Extruded aluminum linear slot diffusers shall be equal to Tuttle & Bailey Imperialine 7000 or Metalaire 7000 Series. Diffusers shall be provided with adjustable pattern deflectors capable of providing a 180° pattern adjustment. Pattern deflectors must be positive positioning when providing a horizontal airpath. Constant static pressure shall be maintained at a fixed volume under all positions of pattern adjustment.
2. Diffuser margins shall be as furnished to overlap or recess the opening as required to fit the wall or ceiling finish. Mounting frames shall be furnished with positive holding concealed fasteners. When used to form plaster openings, frames shall be furnished with rigid bracing to maintain the opening size. Diffusers with mounting frames shall be furnished in one piece up to 6'-0" in length. Continuous diffuser sections shall butt with hairline joints and be provided with interlocking splines. Diffuser margins shall be mechanically fastened to provide a neat hairline corner appearance.
3. Volume dampers shall be furnished behind all active supply sections in each slot opening. Mitered corner sections shall be furnished with blankoff baffles. Inactive sections shall be blanked with integral volume dampers. Maximum damper length shall be 24". Diffuser slot opening widths shall be as indicated on drawings. Aluminum slot diffusers shall be furnished with etched and satin anodized finish.
4. Performance ratings of pressure, sound, throw and room velocity shall be tested in accordance with ADC Test Code standards. Diffuser sizes shall be selected to provide the required throw and room velocity at NC 35 level.

H. Type N1, N2 & N3 (Radial Pattern Supply)

1. Radial pattern diffusers shall be equivalent to Tuttle & Bailey Model VECTOR®. Installed units shall provide a flush line with ceiling system, non-flush face diffusers are not acceptable. The unit shall consist of a diffuser face assembly and a diffuser back assembly. The diffuser face assembly must be assembled into the diffuser back assembly and be delivered ready to install. The diffuser face assembly shall feature a combination of engineered longitudinal louvers and perforated sheet metal, oriented and proportioned in a manner to provide either a 90 degree or 180 degree radial, non-aspirating air flow pattern. The perforated sheet metal shall consist of 5/32" diameter holes on 1/4" centers on 2' lengths or 3/16" diameter holes on 1/4" centers on 4' lengths. The diffuser face assembly shall be removable with common tools. It must be hinged on one side and secured in place with quarter-turn fasteners on the opposing side. The diffuser back assembly shall be fabricated as a fully assembled single unit, consisting of the back frame, an integral diffusion baffle specifically designed for each

size and air pattern, and a 2" high collar complete with locking bead for positive duct connection.

2. The manufacturer shall provide published Engineering data based upon tests conducted in accordance with ASHRAE Standard 70-1991, Method of Testing for Rating the Performance of Air Outlets and Inlets at non-isothermal conditions. Published Noise Criteria (NC) data shall be determined based upon a 10dB room attenuation across all octave bands.

I. Air Screens/Wire Mesh

1. Mesh shall be 3/4" square pattern, 1/16" galvanized wire, interwoven, welded or secured to frame.
2. Frames shall be 1" by 1" by 1/8" galvanized steel angles for duct sizes through 24"; 1 1/2" x 3/16" for duct sizes between 25" and 48"; and, 2" by 2" by 3/16" for ducts larger than 48", continuous around perimeter of screen.

PART 3 - INSTALLATION

3.1 INSTALLATION

A. Install in accordance with manufacturer’s instruction.

B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry and lighting arrangement.

C. Install diffusers to ductwork with air tight connections.

D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

E. Paint ductwork visible behind air outlets and inlets matte black.

END OF SECTION