

SECTION 23 37 00 – AIR OUTLETS AND INLETS

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
- B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.
- C. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:
 - 1. AMCA 500 - Test Method for Louvers, Dampers and Shutters.
 - 2. ANSI/NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
 - 3. ARI 890 – Rating of Air Diffusers and Air Diffuser Assemblies.
 - 4. ASHRAE 70 - Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.
 - 5. SMACNA 1035 - HVAC Duct Construction Standards - Metal and Flexible.

1.2 QUALITY ASSURANCE

- A. Test and rate performance of air outlets and inlets in accordance with ASHRAE 70.
- B. Test and rate performance of louvers in accordance with AMCA 500.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Submit product data and Shop Drawings, indicating type, size, location, application, noise level, finish, and type of mounting.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.
- B. Grilles, registers and diffusers shall be as scheduled on the Drawings and shall be provided with sponge rubber or soft felt gaskets. If a manufacturer other than the one scheduled is used, the sizes shown on the Drawings shall be checked for performance, noise level, face velocity, throw, pressure drop, etc., before the submittal is made. Selections shall meet the manufacturer's own published data for the above performance criteria. The throw shall be such that the velocity at the end of the throw in the five (5) foot occupancy zone will not exceed 50 fpm nor be less than 25 fpm except where indicated otherwise. Noise levels shall not exceed those published in ASHRAE for the type of space being served (NC level). In the vicinity of lab hoods, terminal velocity at face of hood shall exceed 20 fpm.
- C. Perforated face diffusers shall be prohibited. Sidewall supply diffusers shall be of the double deflection design. Sidewall return or exhaust grilles shall be of the fixed blade design.

- D. All diffusers and registers shall be without volume control dampers. Volume control shall be via dampers provided in the ductwork at the take off from main or branch ducts.
- E. Locations of air distribution devices on Drawings are approximate and shall be coordinated with other trades to make symmetrical patterns and shall be influenced by the established general pattern of the lighting fixtures or architectural reflected ceiling plan, but primarily located to maintain proper air distribution. Where called for on Drawings, grilles, registers and diffusers shall be provided with deflecting devices and manual dampers. These grilles, registers, and diffusers shall be the standard product of the manufacturer, and subject to review by the AE.
- F. Provide a frame compatible with the type of ceiling or wall in which the devices are installed. Refer to Architectural Drawings for exact type of ceiling specified.
- G. Coordinate color and finish of the devices with the AE.

2.2 MANUFACTURERS

A. Grilles, Registers, and Diffusers:

1. Titus Products.
2. Price Industries.
3. Nailor Industries.

B. Louvers:

1. Ruskin.
2. Greenheck.
3. Arrow.

C. Roof Hoods:

1. Greenheck.
2. Cook.
3. Acme.

2.3 ROUND CEILING DIFFUSERS

- A. Round, adjustable pattern, stamped or spun, multicore type diffuser to discharge air in 360-degree pattern, with sector baffles where indicated.
- B. Project diffuser collar above ceiling face and connect to duct with duct ring. In plaster ceilings, provide plaster ring.
- C. Fabricate of aluminum, unless otherwise noted, with factory baked enamel, off-white finish.
- D. Provide multi-louvered equalizing grid where noted on the drawings or schedules.

2.4 RECTANGULAR CEILING DIFFUSERS

- A. Rectangular, full louvered face, directional, removable multi-core type diffuser to discharge air in 360-degree pattern. Neck size shall be as scheduled on the Drawings. Provide filler panels, where required, for directional throw diffusers.
- B. Fabricate frame and blades of extruded aluminum with factory baked enamel, off-white finish.

- C. Provide multi-louvered equalizing grid.
- D. Provide round neck connection as scheduled on Drawings.

2.5 SQUARE PANEL FACE SUPPLY AND RETURN AIR CEILING DIFFUSER

- A. Architectural diffuser with a square panel centered within a square housing similar to the Titus OMNI model. Drawings that depict two-way and three-way throw options are achieved with the use of filler panel (where required) for directional throw diffusers.
- B. Although the manufacturers show this model being used only as a supply air device, this same diffuser can also be used as a return air device. The neck connection shall be the largest available neck size provided by the manufacturer.
- C. Provide round neck connection as scheduled on Drawings.

2.6 CEILING EXHAUST AND RETURN REGISTERS/GRILLES

- A. Streamlined blades, depth of which exceeds 3/4-inch spacing, with spring or other device to set blades, vertical face.
- B. Fabricate 1-inch margin frame with concealed mounting.
- C. Fabricate of steel with minimum 20 gage frames and minimum 22 gage blades, steel and aluminum with minimum 20 gage frame, or aluminum extrusions, with factory baked enamel finish.

2.7 CEILING LINEAR SLOT DIFFUSERS

- A. Continuous linear flow bar slot with adjustable vanes for left, right, or vertical discharge, with volume control. Provide slot width, length and number of slots as scheduled on the Drawings.
- B. Fabricate of aluminum extrusions with factory baked enamel finish.
- C. Provide support clips and gasket as required for ceiling system.
- D. Provide alignment strips for hairline joints and end caps where the slot terminates. Provide mitered corners.
- E. Provide black matte finish for all interior exposed-to-view components.
- F. Provide externally insulated supply air plenum by diffuser manufacturer.
- G. Provide return slot diffuser same as supply, except without the adjustable vane control. Provide return air plenum for ducted return where indicated on Drawings.

2.8 PLENUM SLOT SUPPLY AND RETURN DIFFUSERS

- A. Supply or return plenum slot, 3/4-inch single extruded aluminum curved deflector blade to create a tight horizontal airflow pattern across the ceiling. Provide slot width, length, and number of slots as scheduled on the Drawings.
- B. Diffusers shall discharge air horizontally through two outside sections and vertically through a center down-blow section.
- C. Standard nominal lengths shall be 2, 3, 4, or 5 feet. Units shall be constructed of 24 gage steel. Maximum height of the unit's plenum shall be 9-inches. Inlets shall have a minimum of 1-1/2-inch depth for duct connection. The standard finish shall be black on the face of the diffuser and pattern deflectors.

- D. Diffuser shall be similar to Titus N-1-R diffuser.

2.9 CEILING LINEAR EXHAUST AND RETURN GRILLES

- A. Streamlined blades with 90-degree one-way deflection, 1/8-inch x 3/4-inch on 1/4-inch centers.
- B. Fabricate 1-inch margin frame with countersunk screw mounting.
- C. Fabricate of steel with 22 gage minimum frames and 22 gage minimum blades, steel and aluminum with 20 gage minimum frame, or aluminum extrusions, with factory baked enamel finish.
- D. Where not individually connected to exhaust fans, provide integral, gang-operated opposed blade dampers with removable key operator, operable from face.

2.10 WALL SUPPLY REGISTERS/GRILLES

- A. Streamlined and individually adjustable curved blades to discharge air along face of grille with two-way deflection.
- B. Fabricate 1-inch margin frame with countersunk screw, concealed mounting and gasket.
- C. Fabricate of aluminum extrusions with factory clear anodized finish.
- D. Provide multi-louvered equalizing grid.

2.11 WALL EXHAUST AND RETURN REGISTERS/GRILLES

- A. Streamlined blades, depth of which exceeds 3/4-inch spacing, with spring or other device to set blades, vertical or horizontal face as scheduled.
- B. Fabricate one-inch margin frame with concealed mounting.
- C. Fabricate of aluminum with 20 gage minimum frame, or aluminum extrusions, with factory baked enamel finish.

2.12 LINEAR BAR WALL DIFFUSERS

- A. Streamlined blades with 0 to 15 degree deflection, as scheduled, 1/8-inch x 3/4-inch or 1/4-inch centers.
- B. Fabricate of aluminum extrusions, with factory clear anodized finish.
- C. Fabricate 1/2-inch margin frame with concealed mounting and gasket.
- D. Provide concealed fastening, straightening grids and alignment bars.
- E. Provide externally insulated plenums by diffuser manufacturer.
- F. Provide return bar diffusers same as supply with return air plenum.
- G. Silhouette finish.

2.13 LINEAR FLOOR SUPPLY REGISTERS/GRILLES

- A. Streamlined blades with zero degree deflection, 7/32-inch x 3/4-inch on 1/2-inch centers.
- B. Fabricate of high-grade aluminum extrusions with factory clear anodized finish.
- C. Fabricate 3/16-inch margin heavy margin frame with concealed mounting and gasket and mounting frame. Frameless flange for floor installation. Silhouette finish.

- D. Provide concealed fastening, straightening grids and alignment bars.

2.14 LABORATORY RADIAL AIR SUPPLY DIFFUSERS

- A. High-volume, low velocity performance.
- B. Diffuser shall provide non-aspirating radial air pattern and shall be configured with air supply plenums with inlet collars to assure uniform velocity over the diffuser face.
- C. Furnish stainless steel back pan and stainless steel faced diffusers for animal holding rooms.
- D. Furnish aluminum back pan and aluminum-faced diffusers for laboratories.
- E. Performance face drops below ceiling, single-pane back pan and single piece lower chamber. Sectioned diffuser is not acceptable.

2.15 LOUVERS AND SCREENS

- A. Relief, exhaust, or intake air openings shall be provided with storm-proof louvers. Louvers shall be of extruded aluminum construction.
- B. Louvers shall be 0.080 inch minimum blade and frame thickness. Blade angle shall be 45 degrees. Minimum depth of louver section shall be 4 inches.
- C. Matching finish bird screen shall be a minimum 0.063 gage. Below-grade intake louvers shall have removable bird screen install on outside of louvers. Louvers installed on the sides of buildings shall have removable matching color bird screen installed on the outside of louver. *[Note to AE: Special requests for louvers with the screen installed on the inside of the louvers for architectural concerns must receive prior permission from the Owner.]*
- D. Insect screen and drainable blade louvers are prohibited.
- E. Intake openings shall be sized for an actual velocity of not to exceed 500 FPM through the available net free area, including bird screen. This limit is imposed in order to reduce air noise and the tendency to pull snow and debris into the ductwork.
- F. Intake chambers shall be equipped with watertight and welded stainless steel drain pans (minimum of 16 gage) with drainpipe to open-site drains.
- G. Intake ductwork shall be pitched to drain towards the louver. Ductwork shall be water tight and attached to the top side of the bottom blade of louver to allow complete drainage to the outside.

2.16 LOUVERED PENTHOUSES AND GRAVITY INTAKES

- A. Throat velocities shall not exceed 600 FPM for Louvered Penthouses and 300 FPM for gravity intakes. Louvered Penthouses shall be a minimum of 0.080 inch aluminum construction with 1 ½" x 1 ½" x 1/8" aluminum frame. Gravity intakes shall be a minimum of 18 gauge aluminum construction. Both units shall have aluminum bird screen and have insulated tops. A welded stainless steel pan with capped drain shall be provided at bottom of ductwork risers or beneath bottom of duct opening. All units shall be installed on curbs that have a minimum height of 18 inches and that are securely mounted to roof deck.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

- B. All installation shall be in accordance with manufacturer's published recommendations.
- C. Check location of air outlets and inlets and make necessary adjustments in position to conform to architectural features, reflected ceiling plans, symmetry, and lighting arrangement.
- D. Install air outlets and inlets to ductwork with airtight connection.
- E. Provide balancing dampers on duct take-off to diffusers, grilles and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.
- F. Provide all specialties and frames for air distribution devices as required for proper installation in ceiling type as indicated on Architectural Drawings. Provide all cutting and patching of T-bars, gypsum board, and other ceiling systems as required for installation of air devices.

END OF SECTION **23** 37 00

This section of the *U of I Facilities Standards* establishes minimum requirements only.
It should not be used as a complete specification.