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UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated July 2023
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SECTION 23 37 13.00 40

DIFFUSERS, REGISTERS, AND GRILLES
08/22

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NOTE: This guide specification covers the requirements for air-diffusion devices that are connected to ductwork or mounted in equipment], except as otherwise provided.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).
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PART 1 GENERAL

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NOTE: Identify air-diffusion devices on the drawings with symbols provided. Where deviations from standards occur, devise a new symbol within the format used herein.

Natural aluminum diffusers are unprotected unless specified to be furnished with clear acrylic or anodizing finishes. Normally, aluminum diffusers specified without further qualification are supplied with factory baked enamel finish. Steel diffusers and grilles should be specified with a factory baked enamel finish.

Show type of DLB frame, bar spacing if other than specified, bar deflection, blanking if any, and type of damper on drawings.

Show frame style, width, and screw or clip fastening on drawings.

Show linear slot width and number of slots, if other than specified on drawings.

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1.1 REFERENCES

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NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 113	(2022) Method of Testing for Room Air Diffusion
ASHRAE EQUIP IP HDBK	(2012) Handbook, HVAC Systems and Equipment (IP Edition)
ASHRAE EQUIP SI HDBK	(2012) Handbook, HVAC Systems and Equipment (SI Edition)
ASHRAE FUN IP	(2021) Fundamentals Handbook, I-P Edition
ASHRAE FUN SI	(2021) Fundamentals Handbook, SI Edition

1.2 ADMINISTRATIVE REQUIREMENTS

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NOTE: If Section 23 30 00 HVAC AIR DISTRIBUTION is not included in the project specification,

applicable requirements therefrom should be inserted and the following paragraph deleted.
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Section 23 30 00 HVAC AIR DISTRIBUTION applies to work specified in this section.

1.3 SUBMITTALS

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NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a “G” to an item, if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.
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Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are [for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Material, Equipment, and Fixture Lists[; G[, [____]]]

Records of Existing Conditions[; G[, [____]]]

SD-02 Shop Drawings

Fabrication Drawings[; G[, [____]]]

Installation Drawings[; G[, [____]]]

SD-03 Product Data

Equipment and Performance Data[; G[, [____]]]

SD-04 Samples

Manufacturer's Standard Color Chart[; G[, [____]]]

SD-10 Operation and Maintenance Data

Type TS Supply Troffer[; G[, [____]]]

Type TSR Combination Supply and Return Troffer[; G[, [____]]]

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

Certify air diffusion devices having been tested and rated in accordance with Chapter 19-ASHRAE EQUIP SI HDBK, Chapter 16-ASHRAE FUN SI Chapter 19-ASHRAE EQUIP IP HDBK, Chapter 16-ASHRAE FUN IP, and ASHRAE 113, where such certification is required.

Submit equipment and performance data for air-diffusion devices consisting of [sound data in terms of Noise Criteria (NC) index for the capacity range of the device.][sound data in terms of sound-power level in octave bands second through eighth and Noise Criteria (NC) index for the capacity range of the device. Where room attenuation is not specified or indicated, assume 18 decibels. Where space or sound data are not specified or indicated, assume NC40.]

2.2 COMPONENTS

2.2.1 Air Diffusion Device Construction

Preclude flutter, rattle, or vibration on air-diffusion device construction and mounting. Refer to Section 23 05 48.00 40 VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT for vibration isolation considerations. Modify devices and provide accessories necessary for mounting in indicated surface construction.

[Select color from manufacturer's standard color chart which indicates the manufacturer's standard color selections and finishes for air-diffusion devices.

][Match color with architectural background.

][Provide color as indicated on drawings.

] Provide supply diffusers with combination damper and equalizing grid. Ensure dampers are extracting-splitter type, except as otherwise indicated. Equalizing grids shall consist of individually adjustable vanes designed for equalizing airflow into diffuser neck and providing

directional control of airflow.

Ensure air-diffusion device volume and pattern adjustments can be made from the face of the device. Make volume adjustments by [removable key] [tamper-deterring device].

Provide gaskets for supply-terminal air devices mounted in finished surfaces.

Include within the material, equipment, and fixture lists the manufacturer's style or catalog numbers, specification and drawing reference numbers, warranty information, and fabrication site information.

Submit records of existing conditions consisting of the results of Contractor's survey of work area conditions and features of existing structures and facilities within and adjacent to the jobsite. Commencement of work constitutes acceptance of existing conditions.

Submit fabrication drawings for air-diffusion devices consisting of fabrication and assembly details to be performed in the factory.

2.2.2 Types of Air Diffusion Devices

2.2.2.1 Type DRA

Provide type DRA supply diffuser, round with five or more expanding cones with beaded edges to provide hemispherically diffused discharge air. Arrange cones to provide a minimum of [four] [_____] air paths which simultaneously diffuse air at 6 to 15 meter per minute 20 to 50 feet per minute (fpm) and aspirate room air at 25 to 35 percent of discharge volume.

Provide aluminum diffuser with baked enamel finish.

Provide antismudge rings and extended cones.

2.2.2.2 Type DRB

Provide type DRB supply diffuser, round with [four] [_____] more expanding cones to provide hemispherically diffused discharge air. Arrange cones to provide a minimum of [three] [_____] air paths which simultaneously diffuse air at 6 to 15 meter per minute 20 to 50 fpm. Provide a pattern adjustment range from horizontal to downward projection, and any intermediate point, when mounted on exposed ductwork.

Provide aluminum diffuser with baked enamel finish.

Provide [Integral][Separate] antismudge rings and extended cones.

2.2.2.3 Type DRC

Provide type DRC combination supply and return diffuser, round with four expanding cones. Arrange cones to provide one return air path and two supply air paths. Provide a butterfly supply-air damper and an annular return-air damper. [Provide a baked enamel finish][Provide aluminum construction.]

[Provide antismudge rings.

]2.2.2.4 Type DRE

Provide type DRE supply diffuser, round with [three] [_____] expanding cones to provide discharge air paths, minimally, two-position adjustable for horizontal or vertical discharge. [Provide a baked enamel finish.]

[Provide antismudge rings.

]2.2.2.5 Type DRH

Provide type DRH supply diffuser, half-round with [four][_____] semiconical expanding members to discharge diffused air in a 180-degree pattern. Arrange cones to provide a minimum of [three] [_____] air paths which simultaneously diffuse air at 6 to 15 meter per minute 20 to 50 fpm. Provide opposed-blade volume control.

[Provide a baked enamel finish.

][Provide antismudge rings.

]2.2.2.6 Type DP Series

Provide type DP series supply diffuser with a [square] [rectangular], perforated, face plate with [opposed blade] [splitter-damper] volume control, white baked enamel exterior finish, and black matte finish on exposed-to-view interior surface. Provide hinges and latches for removal of perforated face plates to allow for cleaning and adjustment of baffle or damper.

[Provide one-way deflection.

][Provide two-way opposed deflection.

][Provide two-way diagonal deflection.

][Provide three-way deflection.

][Provide four-way deflection.

][Provide flush face.

][Provide drop face.

][Provide aluminum construction.

][Provide steel construction.

]2.2.2.7 Type DLB

Provide type DLB supply diffuser, linear bar type, frame mounted, with extruded-aluminum bar and frame.

Ensure bars are [6] [1/4] [_____] millimeter [_____] inch thick by [19] [3/4] [_____] millimeter [_____] inch high, [13] [1/2] [_____] millimeter [_____] inch on center, pencilproof spacing, with zero degree bar deflection angle.

For floor- and sill-mounted diffusers provide heavy-duty reinforced construction to carry loads of not less than [490] [100] [_____] kilogram

per square meter [_____] pounds per square foot.

Provide continuous length diffuser with hairline butt joints.

Provide mitered end caps where diffuser run terminates.

Provide opposed-blade type dampers.

Provide an integral, pivoted, bar-type access door where indicated.

Provide straightening grids where indicated.

2.2.2.8 Type DLS

Provide type DLS supply diffuser, linear slot type, extruded aluminum construction, with fully adjustable integral air pattern and volume control vanes that deflect air pattern from horizontal along ceiling to straight down. Ensure any intermediate setting and a pattern control element that permits complete blanking-off of slot.

Slot width: [19] [3/4] [_____] millimeter [_____] inch.

Provide number of slots per unit run as indicated.

Align butts in continuous runs for hairline joints.

Butt ends of diffuser against walls without mitered end caps. Provide end caps where slot terminates.

Provide exposed-to-view part of frame with anodized aluminum, and all interior exposed-to-view components with a black matte finish.

2.2.2.9 Type DSA

Provide type DSA supply diffuser, square with [four] [_____] expanding flared members to provide radially diffused discharge air. Arrange flared members to provide a minimum of four air paths which simultaneously diffuse air at 6 to 15 meter per minute 20 to 50 fpm. Include pattern adjustments horizontal, vertical projection, and an intermediate position or range.

[Provide a baked enamel finish.

][Provide aluminum construction.

][Provide antismudge rings.

][Provide integral extended surface to fit into module of lay-in ceiling.

]2.2.2.10 Type GS

Provide type GS supply grilles double deflection type with adjustable face bars parallel to short dimension and adjustable rear bars parallel to long dimension.

[Provide a baked enamel finish.

][Provide aluminum construction.

][Provide antismudge rings.

][Provide integral extended surface to fit into module of lay-in ceiling.

]2.2.2.11 Type GSP

Provide type GSP series supply grille with a [square] [rectangular], perforated face plate, white baked enamel exterior finish, black matte finish on exposed-to-view interior surface for lay-in or surface mounting. Perforated face plate to be removeable, hinged or unlatched, for cleaning.

[Provide aluminum construction.

][Provide steel construction.

]2.2.2.12 Type GEP

Provide type GEP series return or general exhaust grille with a[square][rectangular], perforated face plate, white baked enamel exterior finish, black matte finish on exposed-to-view interior surface for lay-in or surface mounting. Perforated face plate to be removeable, hinged or unlatched for cleaning.

[Provide aluminum construction.

][Provide steel construction.

][Provide aluminum filter track.

]2.2.2.13 Type GSE

Provide type GSE series return or general exhaust grille with a[square][rectangular], eggcrate face with a12.7 by 12.7 by 12.7 mm1/2 by 1/2 by 1/2 inch aluminum core, white baked enamel exterior finish, black matte finish on exposed-to-view interior surface for lay-in mounting.

[Provide aluminum border.

][Provide steel border.

][Provide aluminum opposed-blade damper.

][Provide hinged face with 1/4 turn fasteners and aluminum filter track.

]2.2.2.14 Type GR

Provide type GR return grilles, single deflection type with fixed face bars.

Provide grilles installed in vertical surfaces with horizontal face bars set downward at 45 degrees from vertical.

Provide grilles installed in horizontal surfaces with face bars straight and parallel to short dimension.

[Provide a baked enamel finish.

][Provide aluminum construction.

][Provide antismudge rings.

][Provide integral extended surface to fit into module of lay-in ceiling.

]2.2.2.15 Type GCA

Provide type GCA with an individually adjustable, horizontal, curved-blade grilles and a one-way pattern.

[Provide a baked enamel finish.

][Provide aluminum construction.

]2.2.2.16 Type GCB

Provide type GCB with an individually adjustable, vertical, curved-blade grilles and a one-way pattern.

[Provide a baked enamel finish.

][Provide aluminum construction.

]2.2.2.17 Type GCD

Provide type GCD with an individually adjustable, vertical, curved-blade grilles and a two-way pattern.

[Provide a baked enamel finish.

][Provide aluminum construction.

]2.2.2.18 Type GCE

Provide type GCE with an individually adjustable, vertical and horizontal, curved-blade grilles and a three-way pattern.

[Provide a baked enamel finish.

][Provide aluminum construction.

]2.2.2.19 Type GCF

Provide type GCF with an individually adjustable, vertical and horizontal, curved-blade grilles and a four-way pattern.

[Provide a baked enamel finish.

][Provide aluminum construction.

]2.2.2.20 Type RS

Provide type RS supply register, double-deflection type, with adjustable face bars parallel to short dimension and adjustable rear bars parallel to long dimension with opposed-blade type dampers.

[Provide a baked enamel finish.

][Provide aluminum construction.

][Provide integral extended surface to fit into module of lay-in ceiling.

]2.2.2.21 Type RR

Provide type RR return register, single-deflection type with fixed face bars with opposed-blade dampers.

Provide registers installed in vertical surfaces with horizontal face bars set downward at approximately 45 degrees from vertical.

Provide registers installed in horizontal surfaces with face bars set straight and parallel to short dimension.

[Provide a baked enamel finish.

]2.2.2.22 Type RCA

Provide type RCA with an individually adjustable, horizontal, curved-blade register and a one-way pattern with opposed-blade damper.

[Provide a baked enamel finish.

][Provide aluminum construction.

]2.2.2.23 Type RCB

Provide type RCB with individually adjustable, vertical, curved-blade register and a one-way pattern with opposed blade damper.

[Provide a baked enamel finish.

][Provide aluminum construction.

]2.2.2.24 Type RCC

Provide type RCC with an individually adjustable, horizontal, curved-blade register and a two-way pattern with opposed blade damper.

[Provide a baked enamel finish.

][Provide aluminum construction.

]2.2.2.25 Type RCD

Provide type RCD with an individually adjustable, vertical, curved-blade register and a two-way pattern with opposed blade damper.

[Provide a baked enamel finish.

][Provide aluminum construction.

]2.2.2.26 Type RCE

Provide type RCE with an individually adjustable, vertical and horizontal, curved-blade register and a three-way pattern with opposed-blade damper.

[Provide a baked enamel finish.

][Provide aluminum construction.

]2.2.2.27 Type RCF

Provide type RCF with an individually adjustable, vertical and horizontal, curved-blade register and a four-way pattern with opposed-blade damper.

[Provide a baked enamel finish.

][Provide aluminum construction.

]2.2.2.28 Type TS

Provide type TS supply troffer complete assembly as specified in Section 26 51 00 INTERIOR LIGHTING and as indicated. Install air handling section of unit under this section.

2.2.2.29 Type TR

Provide type TR return troffer conforming to requirements for Type TS supply troffer.

2.2.2.30 Type TSR

Provide type TSR combination supply and return troffer assembly as specified in Section 26 51 00 INTERIOR LIGHTING and as indicated. Install air handling section of unit under this section.

PART 3 EXECUTION

3.1 INSTALLATION

Install equipment as indicated and specified and in accordance with manufacturer's recommendations.

[Mount wall-mounted supply registers 150 millimeter 6 inches below ceiling.

][Mount wall-mounted return registers 150 millimeter 6 inches above the finished floor.

] Submit installation drawings for air-diffusion devices. Indicate on drawings overall physical features, dimensions, ratings, service requirements, and equipment weights.

Unless otherwise indicated, size ductwork drop to diffusers or grilles to match unit collar sizes.

Seal connections between ductwork drops to diffusers or grilles airtight.

Support independently diffusers and grilles for T-bar mounting that exceed weight limit of ceiling suspension system in which they are to be installed.

3.1.1 Operations and Maintenance Manuals

Provide operation and maintenance manuals consistent with manufacturer's standard brochures, schematics, printed instructions, general operating procedures and safety precautions.

-- End of Section --