



Guide Specifications Section 23 34 39 Destratification Fans

SECTION 23 34 39 AIR DESTRATIFICATION FANS

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PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Destratification fans for thermal equalization of buildings.

1.2 RELATED SECTIONS

- A. Section 26 00 00, "Common Work Results for Electrical".

1.3 REFERENCES

- A. UL 507: Underwriters Laboratory Standard for Electric Fans
- B. CAN/CSA-C22.2 No. 1113: Safety of household and similar electrical appliances.
- C. UL 94 5VA: Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.
- D. ISO3744 Engineering Grade Acoustical Testing
- E. NEC: National Electric Code.
- F. ETL: Listed for US and Canada in Intertek Directory of Listed Products.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 33 00, "Administrative Requirements".
- B. Product Data: Manufacturer's data sheets for each product, including:
 - 1. Power requirements and mounting recommendations.
 - 2. Fan velocity profile showing isothermal feet per minute (FPM) delivery at various distances from fan.
- C. Shop Drawings:
 - 1. Placement Drawings: Include manufacturer's placement recommendation diagram.
 - 2. Wiring Diagrams.
 - 3. Mounting details, including safety restraint where required.
- D. Revit Files
- E. Manufacturer's Instructions: Provide manufacturer's "Installation, Operation, and Maintenance Manual"
- F. Schedule

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum of twenty years of product experience. Providing sole source for fans, accessories, and controls.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products and materials to project site in manufacturer's unopened packaging.
- B. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

- A. Maintain temperature, humidity, and ventilation within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

- A. Warranty: Refer to warranty information contained in the "Installation, Operation & Maintenance Manual".

~~B. Factory Refurbish Program: Users can purchase a motor replacement or a new discounted system upon failure outside the warranty period. Contact manufacturer for details.~~

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Airius, LLC, which is located at: 811 S. Sherman St., Longmont, CO 80501 Toll Free Tel: 888-247-7327; Tel: 303-772-2633; Email: info@airiusfans.com; Web: www.airiusfans.com

2.2 AIRIUS AIR PEAR DESTRAITIFICATION FANS

- A. Performance: Coordinated design of housing, stator and motor shall provide columnar laminar airflow to produce a minimum of 100 fpm at center of column at grade level when installed within 2'-0" of ceiling. Refer to manufacturer's airflow velocity profiles for jet pattern and throw data.
- B. Housing: The fan housing shall be made of ~~PC~~/ABS resin, rated 5VA for flame resistance.
 - 1. Housing color(pick one):
 - a. PMS Cool Gray 2C (off white)
 - b. Black
 - c. As scheduled

~~C. Hardware: Stainless steel for increased corrosion resistance.~~

~~C.D. Safety Cable: Supplied with 6'-0" steel cable fastened to seismic restraint point integrated into the fan housing. Safety restraint attached to primary mounting handle will not be accepted.~~

~~D.E. Motor Mounting: Enclosed in housing, above stator.~~

~~E.F. Stator: The fan shall be equipped with a ~~patented~~ curved multiple-vane stator coordinated with fan design for maximizing columnar laminar flow.~~

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F.G. Certification: UL Standard 507 for Safety Electric Fans, CAN/CSA-C22.2 No. 1113 and UL 94 5VA as certified by nationally recognized testing laboratory. Acceptable laboratories include ETL, UL or other nationally recognized testing laboratories.

G.H. Identification: Permanently affixed manufacturer's nameplate including the following: Model Number, Serial Number, Motor Power Specifications, Country of Manufacture and Safety Marks: ETL (US & CA) & CE (EU).

H.I. Power Cord: 6 foot, 300-volt AC, UL rated. Motors within the voltage range of 100-130VAC are provided with a standard 3-prong plug. Motors within the voltage range of 200-277VAC are not provided with a plug.

I.J. Destratification Fan **[DF-1]** shall be an Air Pear Model 15.

1. Size and Weight:
 - a. Standard: 22 inch height to bail; 16 inch height to rim; 13 inch diameter; 9 lb (4.1 kg).
 - b. Short: 16 inch height to bail; 12 inch height to rim; 13 inch diameter; 7 lb (3.2 kg).
2. Motor (SP): Shaded pole motor, 228mm in diameter. Blades molded in one piece with hub. Ball bearings shall be permanently lubricated and shielded. Up to 266 cfm, 1057 rpm, 47.3 dBA. Thermally protected motor with an operating range of -4° F (-20° C) to 158° F (70° C).
 - a. Recommended ceiling height up to 18 feet (5.5 m) and area coverage up to 800 sq. ft (75 sq. m); 16 feet (4.88 m) from the fan's center in all directions.
 - b. Electrical Requirements:
 - 1) 120V AC, single phase, 60 Hz.; 0.18 Amps; 18 watts
 - c. Controls shall be coordinated with motor electrical requirements.
 - 1) Provide with an inline, wall mounted, TRIAC controller for variable speed and on/off.
 - 2) Provide with Airius 10A transformer for BAS integration. Installed on fan power circuit, accepts 0-10VDC signal to adjust fan speed over 8 steps.
 - 3) Provide with an Airius Delta T Controller with automatic temperature-based control. Utilizes two manufacturer supplied temperature sensors for mounting at ceiling and floor to vary fan speed based on temperature delta.
 - 4) None
3. Motor (EC): Electronically commutated motor, up to 92% efficient, 230mm in diameter. Plastic blades and hub. Ball bearings shall be permanently lubricated and shielded. Up to 266 cfm, 1170 rpm, 62 dBA. Thermally protected motor with an operating range of -22° F (-30° C) to 122° F (50° C).
 - a. Recommended ceiling height up to 18 feet (5.5 m) and area coverage up to 800 sq. ft (75 sq. m); 16 feet (4.88 m) from the fan's center in all directions.
 - b. Electrical Requirements:
 - 1) 100-130V AC, single phase, 60 Hz.; 0.15 Amps; 18 watts
 - 2) 200-250V AC, single phase, 60 Hz.; 0.08 Amps; 11 watts
 - c. Controls
 - 1) Shall be controlled directly by 0-10VDC control signal from BAS. Uses low voltage control circuit separate from mains power. See wiring diagram.
 - 2) Provide with wall mounted potentiometer. Uses low voltage control circuit for single or multiple fan control. See wiring diagram.
 - 3) Provide with PearLink WiFi control. Requires 2.4GHz WiFi network for communication with PearLink mobile application. Mobile application (iOS and Android) to include scheduling, temperature/humidity based

- automation capability, fan status monitoring and error alerts. See cut sheet for further details.
- 4) Provide with an Airius Delta T Controller with automatic temperature-based control. Utilizes two manufacturer supplied temperature sensors for mounting at ceiling and floor to vary fan speed based on temperature delta.
- 5) Provide with BACnet MS/TP card for individual fan control and status integration with BAS.
- 6) None

J.K. Destratification Fan **[DF-3]** shall be an Air Pear Model 25.

1. Size and Weight:
 - a. Standard: 22 inch height to bail; 16 inch height to rim; 13 inch diameter; 9 lb (4.1 kg).
 - b. Short: 16 inch height to bail; 12 inch height to rim; 13 inch diameter; 7 lb (3.2 kg).
2. Motor (SP): Shaded pole motor, 228mm in diameter. Blades molded in one piece with hub. Ball bearings shall be permanently lubricated and shielded. Up to 412 cfm, 1670 rpm, 60 dBA. Thermally protected motor with an operating range of -4° F (-20° C) to 158° F (70° C).
 - a. Recommended ceiling height up to 25 feet (7.6 m) and area coverage up to 1200 sq. ft (112 sq. m); 20 feet (6 m) from the fan's center in all directions.
 - b. Electrical Requirements:
 - 1) 120V AC, single phase, 60 Hz.; 0.31 Amps; 37 watts
 - 2) 277V AC, single phase, 60 Hz.; 0.17 Amps; 45 watts
 - c. Controls shall be coordinated with motor electrical requirements.
 - 1) Provide with an inline, wall mounted, TRIAC controller for variable speed and on/off.
 - 2) Provide with Airius 10A transformer for BAS integration. Installed on fan power circuit, accepts 0-10VDC signal to adjust fan speed over 8 steps.
 - 3) Provide with an Airius Delta T Controller with automatic temperature-based control. Utilizes two manufacturer supplied temperature sensors for mounting at ceiling and floor to vary fan speed based on temperature delta.
 - 4) None
3. Motor (EC): Electronically commutated motor, up to 92% efficient, 230mm in diameter. Plastic blades and hub. Ball bearings shall be permanently lubricated and shielded. Up to 421 cfm, 1700 rpm, 69 dBA. Thermally protected motor with an operating range of -22° F (-30° C) to 122° F (50° C).
 - a. Recommended ceiling height up to 25 feet (7.6 m) and area coverage up to 1200 sq. ft (112 sq. m); 20 feet (6 m) from the fan's center in all directions.
 - b. Electrical Requirements:
 - 1) 100-130V AC, single phase, 60 Hz.; 0.46 Amps; 31 watts
 - 2) 200-250V AC, single phase, 60 Hz.; 0.26 Amps; 30 watts
 - c. Controls:
 - 1) Shall be controlled directly by 0-10VDC control signal from BAS. Uses low voltage control circuit separate from mains power. See wiring diagram.
 - 2) Provide with wall mounted potentiometer. Uses low voltage control circuit for single or multiple fan control. See wiring diagram.
 - 3) Provide with PearLink WiFi control. Requires 2.4GHz WiFi network for communication with PearLink mobile application. Mobile application (iOS and Android) to include scheduling, temperature/humidity based automation capability, fan status monitoring and error alerts. See cut sheet for further details.
 - 4) Provide with an Airius Delta T Controller with automatic temperature-based control. Utilizes two manufacturer supplied temperature sensors for

- mounting at ceiling and floor to vary fan speed based on temperature delta.
- 5) Provide with BACnet MS/TP card for individual fan control and status integration with BAS.
- 6) None

K.L. Destratification Fan [DF-4] shall be an Air Pear Model 45.

1. Size and Weight: 24 inch height to bail, 18 inch height to rim, 15 inch diameter, 14 lb (6.4 kg).
2. ~~Motor (P2): Permanent split capacitor, 2-pole motor, 250mm in diameter. Steel blades welded to steel hub. Ball bearings shall be permanently lubricated and shielded. Up to 908 cfm, 2412 rpm, 81.8 dBA. Thermally protected motor with an operating range of -13° F (-25° C) to 158° F (70° C).~~
 - a. ~~Recommended ceiling height up to 45 feet (13.7 m) and area coverage up to 1500 sq. ft (140 sq. m); 22 feet (6.75 m) from the fan's center in all directions.~~
 - b. ~~Electrical Requirements:~~
 - 1) ~~120V AC, single phase, 60 Hz.; 1.6 Amps; 192 watts~~
 - c. ~~Controls shall be coordinated with motor electrical requirements.~~
 - 1) ~~Provide with an inline, wall mounted, TRIAC controller for variable speed and on/off.~~
 - 2) ~~Provide with Airius 10A transformer for BAS integration. Installed on fan power circuit, accepts 0-10VDC signal to adjust fan speed over 8 steps.~~
 - 3) ~~Provide with an Airius Delta T Controller with automatic temperature-based control. Utilizes two manufacturer supplied temperature sensors for mounting at ceiling and floor to vary fan speed based on temperature delta.~~
 - 4) ~~None~~

- 3.2. Motor (P4): Permanent split capacitor, 4-pole motor, 250mm in diameter. Steel blades welded to steel hub. Ball bearings shall be permanently lubricated and shielded. Up to 555 cfm, 1550 rpm, 69.3 dBA. Thermally protected motor with an operating range of -13° F (-25° C) to 158° F (70° C).
 - a. Recommended ceiling height up to 38 feet (11.6 m) and area coverage up to 1200 sq. ft. (112 sq. m); 20 feet (6 m) from the fan's center in all directions.
 - b. Electrical Requirements:
 - 1) 120V AC, single phase, 60 Hz.; 0.45 Amps; 54 watts
 - 2) 277V AC, single phase, 60 Hz.; 0.2 Amps; 45 watts
 - c. Controls shall be coordinated with motor electrical requirements.
 - 1) Provide with an inline, wall mounted, TRIAC controller for variable speed and on/off.
 - 2) Provide with Airius 10A transformer for BAS integration. Installed on fan power circuit, accepts 0-10VDC signal to adjust fan speed over 8 steps.
 - 3) Provide with an Airius Delta T Controller with automatic temperature-based control. Utilizes two manufacturer supplied temperature sensors for mounting at ceiling and floor to vary fan speed based on temperature delta.
 - 4) None

- 4.3. Motor (EC): Electronically commutated motor, up to 92% efficient, 250mm in diameter. Steel blades welded to steel hub. Ball bearings shall be permanently lubricated and shielded. Up to 951 cfm, 2789 rpm, 85.7 dBA. Thermally protected motor with an operating range of -13° F (-25° C) to 140° F (60° C).
 - a. Recommended ceiling height up to 45 feet (13.7 m) and area coverage up to 1500 sq. ft (140 sq. m); 22 feet (6.75 m) from the fan's center in all directions.
 - b. Electrical Requirements:
 - 1) 100-130V AC, single phase, 60 Hz.; 1.9 Amps; 154 watts
 - 2) 200-277V AC, single phase, 60 Hz.; 1.4 Amps; 175 watts
 - c. Controls shall be coordinated with motor selection (EC).

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- 1) Shall be controlled directly by 0-10VDC control signal from BAS. Uses low voltage control circuit separate from mains power. See wiring diagram.
- 2) Provide with wall mounted potentiometer. Uses low voltage control circuit for single or multiple fan control. See wiring diagram.
- 3) Provide with PearLink WiFi control. Requires 2.4GHz WiFi network for communication with PearLink mobile application. Mobile application (iOS and Android) to include scheduling, temperature/humidity based automation capability, fan status monitoring and error alerts. See cut sheet for further details.
- 4) Provide with an Airius Delta T Controller with automatic temperature-based control. Utilizes two manufacturer supplied temperature sensors for mounting at ceiling and floor to vary fan speed based on temperature delta.
- 5) Provide with BACnet MS/TP card for individual fan control and status integration with BAS.
- 6) None

L.M. Destratification Fan **[DF-5]** shall be an Air Pear Model 60.

1. Size and Weight: Standard 32 inch height to bail; 24 inch height to rim. 20 inch diameter, 22lb (10kg)
2. Motor (P4): Permanent split capacitor, 4-pole motor, 330mm in diameter. Steel blades welded to steel hub. Ball bearings shall be permanently lubricated and shielded. Up to 1333 cfm, 1489 rpm, 75.2 dBA. Thermally protected motor with an operating range of -13° F (-25° C) to 167° F (75° C).
 - a. Recommended ceiling height up to 60 feet (18.3 m) and area coverage up to 2000 sq. ft. (186 sq. m); 25 feet (7.6 m) from the fan's center in all directions.
 - b. Electrical Requirements:
 - 1) 120V AC, single phase, 60 Hz.; 1.35 Amps; 162 watts
 - 2) 277V AC, single phase, 60 Hz.; 0.68 Amps; 170 watts
 - c. Controls shall be coordinated with motor electrical requirements.
 - 1) Provide with an inline, wall mounted, TRIAC controller for variable speed and on/off.
 - 2) Provide with Airius 10A transformer for BAS integration. Installed on fan power circuit, accepts 0-10VDC signal to adjust fan speed over 8 steps.
 - 3) Provide with an Airius Delta T Controller with automatic temperature-based control. Utilizes two manufacturer supplied temperature sensors for mounting at ceiling and floor to vary fan speed based on temperature delta.
 - 4) None
3. Motor (EC): Electronically commutated motor, up to 92% efficient, 330mm in diameter. Steel blades welded to steel hub. Ball bearings shall be permanently lubricated and shielded. Up to 1342 cfm, 1605 rpm, 78.2 dBA. Thermally protected motor with an operating range of -13° F (-25° C) to 140° F (60° C).
 - a. Recommended ceiling height up to 60 feet (18.3 m) and area coverage up to 2000 sq. ft. (186 sq. m); 25 feet (7.6 m) from the fan's center in all directions.
 - b. Electrical Requirements:
 - 1) 100-130V AC, single phase, 60 Hz.; 1.8 Amps; 143 watts
 - 2) ~~200-277V AC, single phase, 60 Hz.; 1.3 Amps; 170 watts.~~
 - c. Controls shall be coordinated with motor selection.
 - 1) Shall be controlled directly by 0-10VDC control signal from BAS. Uses low voltage control circuit separate from mains power. See wiring diagram.
 - 2) Provide with wall mounted potentiometer. Uses low voltage control circuit for single or multiple fan control. See wiring diagram.
 - 3) Provide with PearLink WiFi control. Requires 2.4GHz WiFi network for communication with PearLink mobile application. Mobile application (iOS

- and Android) to include scheduling, temperature/humidity based automation capability, fan status monitoring and error alerts. See cut sheet for further details.
- 4) Provide with an Airius Delta T Controller with automatic temperature-based control. Utilizes two manufacturer supplied temperature sensors for mounting at ceiling and floor to vary fan speed based on temperature delta.
- 5) Provide with BACnet MS/TP card for individual fan control and status integration with BAS.
- 6) None

M.N. Destratification Fan [DF-6] shall be an Air Pear Model 100.

1. Size and Weight: 33.25 inch height to rim; 19.5 inch diameter. 45lb (20.5 kg).
2. Motor (EC): Electronically commutated motor, up to 92% efficient, 400mm in diameter. Steel blades welded to steel hub. Ball bearings shall be permanently lubricated and shielded. Up to 1722 cfm, 1517 rpm, 80.9 dBA. Thermally protected motor with an operating range of -13° F (-25° C) to 140° F (60° C).
 - a. Recommended ceiling height up to 100 feet (30.5 m) and area coverage up to 2500 sq. ft. (232 sq. m); 28 feet (8.5 m) from the fan's center in all directions.
 - b. Electrical Requirements:
 - 1) 100-130V AC, single phase, 60 Hz.; 3.34 Amps; 294 watts
 - 2) 200-277V AC, single phase, 60 Hz.; 2.5 Amps; 390 watts
 - c. EC motor shall be controlled by 0-10VDC analog control signal. Daisy chained low voltage control wires link to:
 - 1) Shall be controlled directly by 0-10VDC control signal from BAS. Uses low voltage control circuit separate from mains power. See wiring diagram.
 - 2) Provide with wall mounted potentiometer. Uses low voltage control circuit for single or multiple fan control. See wiring diagram.
 - 3) Provide with PearLink WiFi control. Requires 2.4GHz WiFi network for communication with PearLink mobile application. Mobile application (iOS and Android) to include scheduling, temperature/humidity based automation capability, fan status monitoring and error alerts. See cut sheet for further details.
 - 4) Provide with an Airius Delta T Controller with automatic temperature-based control. Utilizes two manufacturer supplied temperature sensors for mounting at ceiling and floor to vary fan speed based on temperature delta.
 - 5) Provide with BACnet MS/TP card for individual fan control and status integration with BAS.
 - 6) None

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until supporting structure and interior work have been properly completed.
- B. Check location and availability of utility services to ensure proper voltage and installation preparation.
- C. Installation of miscellaneous support, if required, electrical wire and wiring, conduit, fuses, and disconnect switches other than those provided by fan manufacturer are specified in other sections.

- D. Examine the substrate and conditions under which the Fan is to be installed. Notify the Architect in writing of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install destratification fan according to manufacturer's written recommendations.
- B. Fan to be mounted at a maximum of 2'-0" from ceiling deck to ensure thermal/humidity equalization from ceiling to floor.
- C. Adjust unit as required for proper operation in accordance with manufacturer's installation instructions.

3.3 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

3.4 DESTRATIFICATION FAN SCHEDULE (Sample)

Tag	Location	Manufacturer	Model	Weight (lb)	Height (in.)	Max Air-flow (CFM)	RPM	Watts	Volts	Phase	Remarks
DF-1	Office 305	Airius	A-25-EC	9	22	421	1700	35	120	1	1, 2, 3
DF-2	Main Gym	Airius	A-60-EC	22	32	1342	1660	170	100-130	1	1, 2

- 1: Mount within 2'-0" of ceiling deck
- 2: Daisy chain low voltage control wire and link to wall mounted potentiometer.
- 3: Include grille guard

END OF SECTION