**SECTION 23 34 00**

**HVAC Fans**

**PART 1 GENERAL**

**1.1 SUMMARY**

1. Section Includes
2. The ceiling-mounted circulation fan is the model scheduled with the capacities indicated. The fan shall be furnished with standard mounting hardware and variable speed control to provide cooling and destratification.
3. Summary of Work
4. Installation of the fan, miscellaneous or structural metal work (if required), field electrical wiring, cable, conduit, fuses and disconnect switches, other than those addressed in the installation scope of work, shall be provided by others. F­actory installation services are available through Big Ass Fans. Consult the appropriate installation scope of work for information on the available factory installation options, overview of customer and installer responsibilities, and details on installation site requirements.

**1.2 RELATED SECTIONS**

1. 21 00 00 Fire Suppression
2. 23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)
3. 26 00 00 Electrical

**1.3 REFERENCES**

1. National Fire Protection Association (NFPA)
2. Underwriters Laboratories (UL)
3. Canadian Standards Association (CSA)
4. National Electrical Code (NEC)
5. International Organization for Standardization (ISO)
6. Air Movement and Control Association Inc. (AMCA)
7. AMCA Publication 211-13 - Certified Ratings Program - Product Rating Manual for Fan Air Performance
8. AMCA 230-15 - Standard Laboratory Methods of Testing Air Circulating Fans for Rating and Certification
9. American National Standards Institute (ANSI)
10. Nationally Recognized Testing Laboratory (NRTL)
11. European Community (CE)
12. UK Conformity Assessed (UKCA)

**1.4 SUBMITTALS**

1. Shop Drawings: Drawings detailing product dimensions, weight, and attachment methods
2. Product Data: Specification sheets on the ceiling-mounted fan, specifying electrical and installation requirements, features and benefits, and controller information
3. Revit Files: Files provided for architectural design
4. IES Files (fans with optional light kit)
5. Installation Guide: The manufacturer shall furnish a copy of all operating and maintenance instructions for the fan. All information is subject to change without notice.
6. Schedule
7. Provide manufacturer's certification that high volume, low speed fans are licensed to bear the Air Movement and Control Association (AMCA) Certified Rating Seal for Circulating Fan Performance.

**1.5 QUALITY ASSURANCE**

1. Certifications
2. The fan assembly, as a system (without light kit), shall be Nationally Recognized Testing Laboratory (NRTL)-certified and built pursuant to the guidelines set forth by UL standard 507 and CSA standards 22.2 No. 60335-1 and 22.2 No. 113.
3. The fan assembly, as a system (without light kit), shall be CE- and UKCA-compliant.
4. The fan (without light kit) shall be compliant with NFPA 13—Standard for the Installation of Sprinkler Systems, NFPA 72—National Fire Alarm and Signaling Code, and NFPA 70—NEC.
5. Controllers shall comply with NEC and UL standards and shall be labeled where required by code.
6. The optional LED light kit shall be compliant with UL standard 1598 and CSA standard 22.2 No. 250.
7. Performance ratings (airflow and power) shall conform to AMCA standard 211. Fans must be tested in accordance with ANSI/AMCA Standard 230-15 in an AMCA accredited laboratory. Fans shall be certified to bear the AMCA Seal for Circulating Fan Performance.
8. Manufacturer Qualifications
9. The fan and any accessories shall be supplied by Big Ass Fans that has a minimum of twenty (20) years of product experience.
10. ISO 9001 compliant

**1.6 DELIVERY, STORAGE, AND HANDLING**

1. Deliver product in original, undamaged packaging with identification labels intact. The fan shall be new, free from defects, and factory tested.
2. The fan and its components shall be stored in a safe, dry location until installation.

**1.7 WARRANTY**

1. The manufacturer shall replace any products or components defective in material or workmanship for the customer free of charge (including transportation charges within the USA, FOB Lexington, KY), pursuant to the complete terms and conditions of the Big Ass Fans Warranty in accordance to the following schedule:

Mechanical† 10 years

Electrical†† 5 years (no factory install†††); 10 years (factory install††††)

Labor 1 year

† "Mechanical" is defined as mechanical components of the fan, including, the gearbox, fan hub, motor frame, mounting, airfoils, and winglets.

†† "Electrical" is defined as electrical and electronic components of the fan, including the motor, motor drive, variable frequency drive, and any standard controller or accessories.

††† The No Factory Install Warranty Period defined above for "Electrical" applies to proper installations by any other state-qualified or licensed electrical contractor.

†††† The Factory Install Warranty Period defined above for "Electrical" requires installation to be purchased from Big Ass Fans and performed by a factory-approved, Big Ass Fans Certified Installer.

††††† All reasonable costs of repair or replacement will be paid or reimbursed provided customer obtains pre-approval.

†††††† The Warranty Period for light kits is limited to 1 year (parts).

††††††† The Warranty period for any manufacturer defects or flaws to surface finishes is limited to 1 year.

†††††††† All products are considered for indoor use only unless specifically specified on the product label.

††††††††† See the complete warranty for more details.

**PART 2 PRODUCT**

**2.1 MANUFACTURER**

1. Delta T LLC, dba Big Ass Fans, PO Box 11307, Lexington, Kentucky 40575.   
   Phone (877) 244-3267. Fax (859) 233-0139. Website: www.bigassfans.com.

**2.2 HIGH VOLUME, LOW SPEED FANS – BIG ASS FANS ESSENCE**

1. Complete Unit
2. Regulatory Requirements: The entire fan assembly (without light kit) shall be NRTL-certified and built pursuant to the construction guidelines set forth by UL standard 507 and CSA standards 22.2 No. 60335-1 and 22.2 No. 113.
3. Sustainability Characteristics: The fan shall be designed to move an effective amount of air for cooling and destratification of conditioned commercial applications over an extended life. The fan components shall be designed specifically for high volume, low speed fans to ensure lower operational noise. Sound levels from the fan operating at maximum speed measured in a laboratory setting shall not exceed 40 dBA. Actual results of sound measurements in the field may vary due to sound reflective surfaces and environmental conditions.
4. Good workmanship shall be evident in all aspects of construction. Field balancing of the airfoils shall not be necessary.
5. High volume, low speed (HVLS) fans shall be licensed to bear the AMCA Certified Rating Seal for Circulating Fan Performance to ensure performance as cataloged in the field. Unlicensed HVLS fans shall not be accepted.
6. Controls
7. The fan controller shall be incorporated into the fan assembly and housed in an enclosure independent of the motor to prevent overheating or electrical interference. The fan controller shall be factory programmed to minimize starting and braking torques and shall be equipped with a simple diagnostic program and an LED light to identify and relay faults in the system.
8. Airfoil System
9. The fan shall be equipped with eight (8) high volume, low speed airfoils of precision extruded, anodized aluminum alloy. Each airfoil shall be of the high-performance Mini-Elipto design. The airfoils shall be connected to the hub and interlocked with eight (8) stainless steel retainers and two (2) sets of stainless steel bolts and lock washers per airfoil.
10. The fan shall be equipped with eight (8) upswept winglets designed to redirect outward airflow downward, thereby enhancing efficiency. The winglets shall be molded of high strength polymer and shall be attached at the tip of each airfoil with a stainless steel screw. The standard color of the winglets shall be silver or black.
11. As an option, the fan shall be equipped with eight (8) plug-style airfoil tips, molded of high strength polymer, in place of the eight (8) upswept winglets. The airfoil tips shall be attached at the tip of each airfoil with a stainless steel screw. The standard color of the airfoil tips shall be black.
12. Motor
13. The motor shall be a permanent magnet brushless motor rated for continuous operation at maximum speed with the capability of modulating the fan speed from 0–100% without the use of a gearbox or other mechanical means of control.
14. The motor shall operate from any voltage ranging from 100–120 VAC or 200–240 VAC, single phase, and 50/60Hz, without requiring adapters or customer selection. The motor shall be a non-ventilated, heat sink design with the capability of continuous operation in -4°F to 131°F (-20°C to 55°C) ambient condition.
15. The motor shall be rated IP43.
16. The standard color of the motor unit shall be white with silver trim or silver with black trim.
17. LED Light Kit (Optional)
18. The fan shall be equipped with a hollow shaft in which electrical wiring can be routed to below the fan.
19. The LED light kit shall operate independently from the fan at an operating voltage of 120–277 VAC,  
    50–60 Hz.
20. The standard color of the LED light kit components shall be white or silver.
21. As an option, Big Ass Fans can provide a controller to operate the LED light.
22. The LED light kit shall have a standard LED color temperature and lumen option of one of the following:
    1. 3,000 CCT (4,800 lumens)
    2. 4,000 CCT (5,000 lumens)
23. Essence with UV-C Technology (Optional)
24. The fan shall be equipped with a UV-C light, as specified by the architect or owner.
25. The UV-C light shall be installed on top of the fan motor hub and shall emit UV-C light while the fan is spinning.
26. For safety, the UV-C light shall only be able to be turned on while the fan is spinning.
27. The UV-C light kit shall include a UV-C LED light module that shall secure to the fan extension tube with two screws and two set screws. The kit shall also include a driver box that shall be installed near the ceiling for electrical connections.
28. Mounting System
29. The fan mounting system shall be designed for quick and secure installation from a variety of structural supports. All components in the mounting system shall be of formed metal design using low-carbon steel no less than 3/16” (0.5 cm) thick and containing no critical welds. The mounting system shall be powder coated for appearance and resistance to corrosion. All mounting bolts shall be metric stainless steel or equivalent. No mounting hardware substitutions, including cast aluminum, are acceptable.
30. The fan extension tube shall be a round, extruded aluminum tube. The extension tube shall include a chrome plate with forward and reverse controls and a fan status indicator light that is visible from the floor.
31. Hub
32. The fan hub shall be constructed of zinc plated steel for high strength and durability. The hub shall be precision machined to achieve a well-balanced and solid rotating assembly.
33. Safety Cable
34. The fan shall be equipped with a safety cable that provides an additional means of securing the fan assembly to the building structure. The safety cable shall be Ø3/16” (0.5 cm) diameter and fabricated out of 7 x 19 stranded galvanized steel, pre-loaded and tested to 3,200 lbf (13,345 N).
35. Field construction of safety cables is not permitted.
36. Wall Control
37. Wired (standard). The fan shall be equipped with a low-voltage wired remote wall control providing control of all fan functions. The wall control shall be capable of mounting to a standard electrical box. The wall control shall include a rotary-style dial for controlling the fan’s power and speed and an LED light to identify and relay faults in the system. Communication with the fan drive and controller shall be by a standard, commercially available CAT5 (or higher) Ethernet cable that is field installed and provided by the installer.
38. Wireless (optional). As an option, the fan shall be equipped with a battery-operated radio frequency (RF) remote wall control in place of the wired wall control. The wall control shall include buttons for wirelessly controlling the fan’s power and speed and for programming a preferred preset speed. The wall control shall be capable of functioning as a handheld remote control or can be mounted to a wall or other surface. Communication with the fan drive and controller shall be wireless.
39. Fire Control Panel Integration
40. Includes a 10–30 VDC pilot relay for seamless fire control panel integration. The pilot relay can be wired Normally Open or Normally Closed in the field.
41. Guy Wires
42. Guy wires shall be included for installations with extension tubes 4 ft (1.2 m) or longer to limit the potential for lateral movement.

**PART 3 EXECUTION**

**3.1 PREPARATION**

1. Fan location shall have a typical bar joist or existing I-beam structure from which to mount the fan. Additional mounting options may be available.
2. Mounting structure shall be able to support weight and operational torque of fan. Consult structural engineer if necessary.
3. Fan location shall be free from obstacles such as lights, cables, or other building components.
4. Check fan location for proper electrical requirements. Consult Installation Guide for appropriate circuit requirements.
5. Each fan requires dedicated branch circuit protection.

**3.2 INSTALLATION**

1. The fan shall be installed by a factory-certified installer according to the manufacturer’s Installation Guide, which includes acceptable structural dimensions and proper sizing and placement of angle irons for bar joist applications. Big Ass Fans recommends consulting a structural engineer for installation methods outside the manufacturer’s recommendation and a certification, in the form of a stamped print or letter, submitted prior to installation.
2. Minimum Distances
3. Airfoils shall be at least 10 ft (3.05 m) above the floor.
4. Installation area shall be free of obstructions such as lights, cables, sprinklers, or other building structures with the airfoils at least 2 ft (0.61 m) clear of all obstructions.
5. The structure the fan is attached to shall be capable of supporting a torque load of up to 40 ft·lb (54 N·m) of torque.
6. The fan shall not be located where it shall be continuously subjected to wind gusts or in close proximity to the outputs of HVAC systems or radiant heaters. Additional details are in the Big Ass Fans Installation Manual.
7. The fan is suitable for use in wet locations when installed on a GFCI protected branch circuit.
8. The optional LED light kit shall be installed on a separate circuit from the fan and shall be connected to the lighting grid control, not the fan control.
9. In buildings equipped with sprinklers, including ESFR sprinklers, fan installation shall comply with all of the following:
10. The maximum fan diameter shall be 24 ft (7.3 m).
11. The HVLS fan shall be centered approximately between four adjacent sprinklers.
12. The vertical clearance from the HVLS fan to the sprinkler deflector shall be a minimum of 3 ft (0.9 m).
13. All HVLS fans shall be interlocked to shut down immediately upon receiving a waterflow signal from the alarm system in accordance with the requirements of NFPA 72—National Fire Alarm and Signaling Code.

END OF SECTION