**Product Specification Guide**

**Belt Driven Single Width Centrifugal Fume Exhaust with Integral Stack, Model FJ-M**

**Facility Services Subgroup: Division 23 SECTIONS 23 34 23**

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**Specifier Notes**: This product specification guide is written in accordance to the Construction Specifications Institute (CSI) Format - 2004 Edition.

This section must be carefully reviewed and edited by the Engineer to meet the requirements of the project and local building code. Coordinate with other specification sections and the drawings.

Delete all unnecessary “**Specifier Notes**” when editing this section.

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**GENERAL**

* 1. **SUMMARY**
1. Section Includes: Single Width Centrifugal Fume Exhaust with Integral Stack, Model FJ-M
	* 1. Related Sections:

All sections, drawing plans, specifications, and contract documents.

* 1. **REFERENCES**
		1. Air Movement and Control Association Inc. (AMCA):
			1. 99 - Standards Handbook.
			2. ANSI Z9.2-2012 Local Exhaust Ventilation Systems
			3. 211-05 - Publication, Certified Ratings Program – Product Rating Manual for Fan Air Performance.
			4. 300-96 - Standard Reverberant Room Method for Sound Testing of Fans.
			5. 311-05 - Publication Certified Ratings Program – Product Rating Manual for Fan Sound Performance.
			6. 99-0401-86 - Classification for Spark Resistant Construction.
			7. 99-2408-69 - Operating Limits for Centrifugal Fans.
		2. Air Movement and Control Association Inc. (AMCA), American National Standards Institute (ANSI):
			1. 204-05 - Standard Balance Quality and Vibration Levels for Fans.
			2. 210-99 - Standard Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.
		3. American National Standards Institute (ANSI):
			1. 11-r1999 - Method of Evaluating Load Ratings of Bearings.
		4. Occupational Safety and Health Administration (OSHA):
			1. 1910.212 - General requirements for Machine Guarding.
			2. 1910.219 - General requirements for guarding safe use of mechanical power transmission apparatus.
			3. 1926.300 - General requirements for safe operation and maintenance of hand and power tools.
	2. **SUBMITTALS**
		1. General: Submit in accordance with Section 01 33 00 Submittal Procedures
		2. Provide dimensional drawings and product data on each fan.
		3. Provide fan curves for each fan at the specified operation point, with the flow, static pressure and horsepower clearly plotted.
		4. Provide outlet velocity and fan's inlet sound power readings for the eight octave bands, sound power and decibels.
		5. Strictly adhere to QUALITY ASSURANCE requirements as stated in section 1.4 of this specification.
		6. Provide manufacturer's certification that exhaust fans are licensed to bear Air Movement and Control Association (AMCA), Certified Rating Seal for sound and air performance.
		7. Installation, Operation, and Maintenance Manual (IOM): Provide manufacturer's installation, operations, and maintenance manual, including instructions on installation, operations, maintenance, pulley adjustment, receiving, handling, storage, safety, and cleaning information. A troubleshooting guide, parts list, warranty, and electrical wiring diagrams shall be provided.
	3. **QUALITY ASSURANCE**
		1. Performance ratings: Conform to AMCA standard 211 and 311. Fans must be tested in accordance with ANSI/AMCA Standard 210-99 and AMCA Standard 300-96 in an AMCA accredited laboratory. Fans shall be certified to bear the AMCA label for air and sound performance seal.
		2. Certification Standard: Product shall have QMS - ISO 9001, EMS – ISO 14001 and OHSAS 18001.
		3. Each fan shall be given a balancing analysis which is applied to wheels at the outside radius. The maximum allowable static and dynamic imbalance is 0.05 ounces (Balance grade of G6.3).
		4. Comply with International Electrotechnical Commission (IEC), standards for motors and electrical accessories.
	4. **DELIVERY, STORAGE, AND HANDLING**
		1. Delivery: Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly indicating manufacturer, material, products included, and location of installation.
		2. Storage: Store materials in a dry area indoor, protected from damage, and in accordance with manufacturer’s instructions. For long term storage follow manufacturer's Installation, Operations, and Maintenance Manual.
		3. Handling: Handle and lift fans in accordance with the manufacturer’s instructions. Protect materials and finishes during handling and installation to prevent damage. Follow all safety warnings posted by the manufacturer.
	5. **WARRANTY**
		1. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
			1. The warranty of this equipment is to be free from defects in material and workmanship for a period of 12 months from the date of commissioning or 18 months from the date of delivery, whichever ends earlier. Any units or parts which prove defective during the warranty period will be replaced at the Manufacturers option when returned to Manufacturer, transportation prepaid.
			2. Motor Warranty is warranted by the motor manufacturer for a period of 12 months from the date of commissioning or 18 months from the date of delivery, whichever ends earlier. Should motors furnished by us prove defective during this period, the nearest Representative Agent or Greenheck Office should be contacted to remedy.
	6. **MAINTENANCE**
		1. Refer to Manufacturer's Installation, Operation and Maintenance Manual (IOM), to find maintenance procedures
1. **PRODUCTS**
	1. **MANUFACTURER**
		1. Greenheck, Plot # 241, Sector-3, HSIIDC Growth Centre, Bawal, Distt. Rewari (HR) – 123501, India

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* 1. **BELT DRIVEN SINGLE WIDTH CENTRIFUGAL FANS - GREENHECK MODEL CSB**
		1. General Description:
			1. Base fan performance at standard conditions (density 0.075 Lb./ft3; 1.2 kg/m3).
			2. Performance capabilities up to 17000 cubic feet per minute (8024 l/s) and static pressure to 5.8 inches of water gauge (1440 Pa).
			3. Fans are available in 8 sizes with nominal wheel diameters ranging from 315 mm through 710 mm (Aluminum wheel).
			4. Normal operating temperature up to 150 C.
			5. Applications include kitchen grease exhaust and general fume exhaust.
			6. Each fan shall bear a permanently affixed manufacturer's engraved metal nameplate containing the model number and individual serial number.
			7. Wiring Connection: Motor leads are wired into the terminal block which is easily accessible for Power supply hook-up.
		2. Wheel:
			1. Non-overloading, backward inclined centrifugal wheel.
			2. Constructed of coated steel, with an optional aluminum offering to reduce weight and corrosion.
			3. Statically and dynamically balanced in accordance to AMCA Standard 204-05.
			4. The wheel cone and fan inlet will be matched and shall have precise running tolerances for maximum performance and operating efficiency.
			5. Single thickness blades are securely welded to a heavy gauge back plate and wheel cone.
			6. Fan and wheel available with optional Spark B spark resistant construction per AMCA publication 99-16 for sizes 315 to 710.
		3. Motors:
1. Motor enclosures: Totally enclosed fan cooled (TEFC) - no opening in the frame or brackets. Equipped with an external fan to blow air over the motor.

2. Motors are permanently lubricated, heavy duty ball bearing type to match with the fan load and pre-wired to the specific voltage and phase.

* + 1. Shafts and Bearings:
			1. Fan shaft shall be ground and polished solid steel with an anti-corrosive coating.
			2. Permanently sealed bearings or pillow block ball bearings.
			3. Bearing shall be selected for a minimum L10 life in excess of 40,000 hours (equivalent to L50 average life of 200,000 hours), at maximum cataloged operating speed.
			4. Fan Shaft first critical speed is at least 25 percent over maximum operating speed.
		2. Housing and Integral Stack
			1. Fan housing is to be aerodynamically designed with high-efficiency inlet, engineered to reduce incoming air turbulence.
			2. Fan shall be of airtight PermaLockTM construction with the scroll panel material formed and embedded into the side panels.
			3. Housing and bearing supports shall be constructed of heavy gauge galvanized steel, bolted to prevent vibration and to rigidly support the shaft and bearing assembly.
			4. Felt shaft seal to be included for grease or spark proof construction.
			5. Housing orientation available as UB (Up-Blast) discharge.
			6. Drain port shall be located at the lowest part of the scroll housing to prevent moisture build up.
			7. Housing shall include discharge stack/fixed nozzle of same material as fan housing to increase the overall discharge height of the unit. Minimum overall unit height with stack to be 7 feet (2.1m) [10 feet (3 m)] from the roof deck.
			8. Stack shall match outlet dimensions of the fan to avoid static pressure drop.
			9. No discharge rain caps are permitted as to interfere with the exhaust airflow.
		3. Housing Supports and Drive Frame:
			1. Housing supports are constructed of galvanized steel with formed flanges.
			2. Drive frame is made of galvanized steel which supports the shaft, bearings and reinforces the housing.
			3. Pivoting motor plate with adjusting screws to make belt tensioning operations
		4. Drive Assembly:
			1. Belts, pulleys, and keys oversized for a minimum of 150 percent of driven horsepower
			2. Belts: Static free and oil resistant
			3. Pulleys: Cast type, keyed, and securely attached to wheel and motor shafts
			4. Readily accessible for maintenance
		5. Duct Collars:
			1. Square outlet design to provide a large discharge area
			2. Inlet and discharge collars provide easy duct connection
		6. Access Panel:
			1. Two side access panels on the drive frame, permit easy access to drive components
		7. Options/Accessories:

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**Specifier Notes**: To provide additional specifications not found in the general specifications above.

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* + - 1. Bearing Cover:
				1. Fabricated of galvanized steel
				2. Covers bearings and driven sheave for safety and smooth drive operation
				3. Included with Standard Drive Frame construction
			2. Belt Guard:
				1. Three-sided fabricated galvanized steel
				2. Covers drive belt for safety and smooth drive operation
				3. Included with Standard Drive Frame construction
			3. Belt Type:
				1. Type: [Standard]

* + - 1. Isolation:
				1. Type: [Neoprene Base] [Spring Base]
				2. Sized to match the weight of each fan

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**Specifier Notes**: Edit the following types of Isolation to meet project requirements:

1. Neoprene/Base: (6 & 8 mm deflection rate), Steel top plate, base plate embedded in oil resistant neoprene, threaded stud in the center.

2. Neoprene Hanging: (6 mm deflection rate), Neoprene housed in Square bracket

3. Spring Base: (25 mm deflection rate), Unhoused laterally stable steel springs.

4. Spring Hanging: (25 mm deflection): laterally stable, free standing springs assembled into steel housing

5. Mounting Brackets: universal to mount in any orientation

Consult manufacturer for additional information

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1. **EXECUTION**
	1. **MANUFACTURER'S INSTRUCTIONS**
		1. Compliance: Comply with manufacturer's product data, including technical bulletins, product catalog, and installation instructions
	2. **EXAMINATION**
		1. Examine areas to receive fans. Notify the Engineer of conditions that would adversely affect installation or subsequent utilization and maintenance of fans. Do not proceed with installation until unsatisfactory conditions are corrected
	3. **PREPARATION**
		1. Ensure roof openings are square, accurately aligned, correctly located, and in tolerance
		2. Ensure duct is plumb, sized correctly, and to proper elevation above roof deck. Install duct as specified in Air Distribution (Division 23)
	4. **INSTALLATION**
		1. Install fans system as indicated on the Installation, Operation and Maintenance Manual (IOM) and contract drawings
		2. Install fans in accordance with manufacturer's instructions
	5. **SYSTEM STARTUP**
		1. Refer to Installation, Operation, and Maintenance Manual (IOM)
	6. **ADJUSTING**
		1. Adjust exhaust fans to function properly
		2. Adjust Belt Tension
		3. Lubricate bearings
		4. Adjust drive for final system balancing
		5. Check wheel overlap
	7. **CLEANING**
		1. Clean as recommended by manufacturer. Do not use material or methods which may damage finish surface or surrounding construction
	8. **PROTECTION**
		1. Protect installed product and finished surfaces from damage during construction
		2. Protect installed exhaust fans to ensure that, except for normal weathering, fans will be without damage or deterioration at time of substantial completion

## END OF SECTION 23 34 23