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**Twin City Fan & Blower Guide Specification
Fiberglass Centrifugal, Upblast Roof Exhausters: Model WAB, Belt Driven**

**Twin City Fan & Blower Model WAB Series**, **Fiberglass Centrifugal Upblast Roof Exhausters** provide a line of quiet, efficient and economical centrifugal roof exhausters designed to offer value and long-lasting service in a wide variety of commercial and industrial ventilating applications.

The Whirlout® Series WAB fiberglass upblast centrifugal roof exhausters are especially designed for applications requiring the exhaust of chemical fumes or cooking grease where the removal of exhaust away from the roof line is required. The fiberglass housing of this fan is virtually dent, crack, and break proof and is highly resistant to a wide array of chemicals. The motor is completely separated from the airstream.

Model WAB (Belt Driven) features fiberglass construction. These units are all designed for roof mounted exhaust.

**Application**

Model WAB utilizes a roof curb-mounted exhaust fan, with a bird screen at the fan discharge within the fiberglass enclosure.

Accessibility: All fans feature a heavy duty removable, fiberglass top cover. The easily removable top covers provide access to motor, drives and wheel.

Sizes (wheel diameters): 14.5 to 40 inches (370 mm to 1,020 mm)

Airflow: 205 to 21,508 CFM (994 to 49,588 m3/hour)

Static Pressure: Up to 2 inches wg (497 Pa)

Twin City Fan & Blower (TCF) is an industry leading designer and manufacturer of high quality commercial and industrial fans and is a division of Twin City Fan Companies, Ltd. Our extensive product line includes centrifugal fans and blowers, axial fans, and power roof ventilators. For the commercial market, TCF supplies ventilation fans for retail and office buildings, restaurants, schools, hospitals, and government buildings. TCF’s industrial fans are used in a wide variety of process applications for numerous industries including Petrochemical, Nuclear, Cement, Steel, and Air Pollution Control. Special materials, construction, coatings, and accessories are available to fit any application requirements.

TCF has completed thousands of successful installations across the globe and has a proven track record for tackling the most technically complex applications within the fan industry. TCF is also known for its technical design capabilities, comprehensive testing services, and responsive sales team. Due to the company’s extensive expertise and long-standing reputation for proven quality, TCF products continue to be specified around the globe.

TCF occupies over 1,000,000 sq. ft. of manufacturing space across ten facilities in the U.S, with expanded manufacturing and service operations located in South America, Europe, India, China, and Singapore. Headquarters are located in Minneapolis, Minnesota, which houses the management, sales and marketing, accounting, human resources, material management, engineering personnel, as well as a state-of-the-art AMCA accredited testing lab.

We recommend you consult with your Twin City Fan & Blower Sales Representative, who can be contacted through: Twin City Fan & Blower, Minneapolis MN; (763) 551-7600; email: tcf\_sales@tcf.com; [www.tcf.com](http://www.tcf.com).

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SECTION 23 34 23.02 – CENTRIFUGAL ROOF VENTILATORS

1. GENERAL
	* + 1. SUMMARY
				1. Section includes low profile fiberglass centrifugal upblast roof exhausters, belt driven.
			2. REFERENCE STANDARDS
				1. American Bearing Manufacturers Association (ABMA): [www.americanbearings.org](http://www.americanbearings.org):

ABMA 9 – Load Ratings and Fatigue Life for Ball Bearings

* + - * 1. Air Movement and Control Association International, Inc. (AMCA): [www.amca.org](http://www.amca.org):

AMCA Standard 204 - Balance Quality and Vibration Levels for Fans

AMCA Standard 210 -  ASHRAE 51 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating

AMCA Standard 300 - Reverberant Room Method for Sound Testing of Fans

* + - * 1. ASTM International (ASTM): [www.astm.org](http://www.astm.org):

ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials

* + - * 1. National Electrical Manufacturers Association (NEMA): [www.nema.org](http://www.nema.org):

NEMA MG 1 – Motors and Generators

* + - * 1. National Fire Protection Association (NFPA): [www.nfpa.org](http://www.nfpa.org):

NFPA 70 - National Electric Code

* + - 1. ACTION SUBMITTALS
				1. Product Data: Include the following:

Rated capacities and operating characteristics.

Fan Performance Data: Fan performance curves with flow, static pressure and horsepower.

Sound Performance Data: Fan sound power levels in eight octave bands and, A-weighted overall sound power level or sone values.

Motor ratings and electrical characteristics.

Furnished specialty components.

Specified accessories.

Dimensioned standard drawings indicating dimensions, weights, and attachments to other work.

Specifier: If Contractor will be required to provide engineering drawings and calculations for vibration, seismic, or high wind design, insert requirements here.

* + - 1. INFORMATIONAL SUBMITTALS
				1. Source quality-control reports.
				2. Field quality-control reports.
				3. ISO-9001 certificate.
			2. CLOSEOUT SUBMITTALS
				1. Operation and Maintenance Data: Include routine maintenance, adjustment requirements, safety information, and troubleshooting guide.
			3. QUALITY ASSURANCE
				1. Manufacturer Qualifications: Approved ISO 9001-compliant manufacturer listed in this Section with minimum 10 years' experience in manufacture of similar products in successful use in similar applications, and with an ASME NQA-1 compliant Program.

Specifier: Retain paragraph below if Owner allows substitutions but requires strict control over qualifying of substitutions.

Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:

Product data, including certified independent test data indicating compliance with requirements.

Project references: Minimum of 5 installations not less than 5 years old, with Owner contact information.

Sample warranty.

Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements.

Approved manufacturers must meet separate requirements of Submittals Article.

* + - * 1. AMCA Compliance:

Provide fan types tested in accordance with AMCA Standard 210 (air performance) and AMCA Standard 300 (sound performance) in an AMCA-accredited laboratory.

* + - 1. COORDINATION
				1. Coordinate sizes and locations of supports required for fan units.
				2. Coordinate sizes and locations of equipment supports, roof curbs, and roof penetrations.
			2. FIELD CONDITIONS
				1. Handling and Storage: Handle and store fan units in accordance with manufacturer's published instructions. Examine units upon delivery for damage. Store units protected from weather.
			3. WARRANTY

Specifier: Consult TCF for available special Project-specific warranties.

* + - * 1. Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to furnish replacement components for fan units that demonstrate defects in workmanship or materials under normal use within warranty period specified.

Warranty Period: 12 months from startup or 18 months from shipment by manufacturer, whichever first occurs.

1. PRODUCTS
	* + 1. MANUFACTURER
				1. Basis-of-Design Manufacturer: Provide fan units manufactured by **Twin City Fan & Blower**, Minneapolis MN; (763) 551-7600; email: tcf\_sales@tcf.com; website: [www.tcf.com](http://www.tcf.com).
				2. Source Limitations: Obtain centrifugal roof ventilators from a single manufacturer.
			2. PERFORMANCE REQUIREMENTS
				1. Fan Performance Ratings: [Project site elevation- based] [Sea level elevation-based].
				2. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70.
			3. CENTRIFUGAL ROOF VENTILATORS
				1. Belt-Driven, Centrifugal Roof Ventilators: Centrifugal fan units, configured for vertical flow of exhaust air carrying chemical fumes or cooking grease for rooftop discharge.

Basis of Design Product: **Twin City Fan & Blower, Model WAB**.

Permanently attach nameplate displaying serial number and unit information.

* + - * 1. Fan Capacities, Characteristics, and Configuration: Refer to Drawing schedule.
				2. Motor Mount Assemblies: Provide motor mount assemblies fabricated of heavy gauge mild steel with epoxy coating.
				3. Wheel: Centrifugal, backward inclined, flat blade polypropylene on cast aluminum hub. Include matching inlet venturi.

Statically and dynamically balance wheel.

* + - * 1. Fan Shaft: 304 stainless steel, accurately turned, ground, and polished. Select shaft diameter so that first critical speed is minimum 1.25 times maximum speed.
				2. Bearings: Manufacturer's standard pillow blocks with field-lubricated ball or roller bearings, based on blower size, with copper grease lines extended to outside fan housing.

Minimum L-50 Bearing Life: 200,000 hours at maximum operating speed, in accordance with ABMA 9 for ball bearings.

* + - * 1. Housing: Heavy gauge fiberglass construction of shroud, top cover, and motor bands. Include fiberglass additives to limit flame spread rating to 25, when tested in accordance with ASTM E84.

Specifier: Standard bird screen is PVC coated. Stainless steel screen is optional.

Provide 1/2 x 1/2 inch (13 x 13 mm) [PVC coated] [304 stainless steel] wire bird screen at fan outlet.

* + - * 1. Belt Drive:

Isolate motors and drive from the airstream.

Drive Components: V-Belt drive, rated for minimum 150 percent of motor nameplate horsepower, with machined, cast-iron pulleys, and heat resistant, oil resistant, static-free V-belts.

Motor Pulley: Adjustable pitch.

Motor and Drive Assembly: Outside exhaust airstream.

Provide mechanism that allows for precise belt tensioning by one person.

* + - * 1. Motors: Comply with NEMA MG-1 for designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Division 23 section "Common Motor Requirements for HVAC Equipment."

Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

Specifier: Select motor electrical data in following subparagraphs, or show this data on the drawing fan schedule. Do not show the data in both places.

Electrical Data:

Voltage: [115] [208] [230] [460] [575] [\_\_\_\_\_] VAC; [1] [3] phase; 60 Hz.

Full Load Amps: [\_\_\_\_\_] A.

Specifier: Select motor enclosure type in following subparagraph.

Enclosure Type: [Open, Drip Proof (ODP)] [Totally Enclosed Fan Cooled (TEFC)] [Explosion proof].

Specifier: For motors controlled by VFDs, retain following subparagraph.

When required, provide premium efficiency motor, suitable for inverter duty.

Specifier: Select NEMA enclosure rating for disconnect in following paragraph. NEMA 1 is the manufacturer's standard. NEMA 4 and NEMA 7/9 are optional.

Provide unfused disconnect switch, NEMA [1] [4], [7/9] selected in accordance with Division 26 section "Enclosed Switches."

Specifier: Retain the first following paragraph for all except explosion proof components. Retain the second following paragraph for explosion proof components only.

Factory mount and wire disconnect switch.

Ship motor and disconnect loose for field mounting and wiring.

Specifier: When required, retain custom finish option below and describe custom finish required.

Specifier: The standard finish color for FRP parts is beige, grey is optional. Those that follow are optional finishes. Select finish that is required.

* + - * 1. Finish: Fiberglass reinforced plastic parts to be [beige] [grey] in color. All carbon steel components shall be cleaned and chemically treated by a phosphatizing process and shall then be coated with black epoxy.
				2. Accessories:

Specifier: Accessories listed in subparagraphs below are optional TCF features for this unit. Consult TCF representative for recommended options based upon Project requirements.

Specifier: Retain appropriate options in the following paragraph for curb type. For fan specified with a backdraft damper, select minimum 12 inch roof curb height.

Roof Curb: Fiberglass, canted, 12 inches (305 mm) high, unvented, [with] [without] 1-1/2 inch (38 mm) thick insulation.

Specifier: When backdraft dampers are required, select one of the following two paragraphs. If both types of dampers are required on various units, coordinate with fan schedule on drawings to indicate which damper type is associated with each fan.

For the following paragraph, the standard material is PVC. Aluminum is optional.

Backdraft Damper, Gravity Type: [PVC] [Aluminum] construction, parallel-blade type. Adjust backdraft damper to close when fan is not running.

Backdraft Damper, Motorized Type: Aluminum construction, parallel-blade type. Adjust backdraft damper to close when fan is not running.

Specifier: Retain the following paragraph for motorized backdraft dampers, and select required voltage for actuator power.

Backdraft damper actuator suitable for [115] [208] [230] [460] [575] Vac.

Insect Screen: Removable, fabricate of 304 stainless steel.

* + - 1. SOURCE QUALITY CONTROL
				1. Factory Run Test: Test run assembled fan units prior to shipment at specified operating speed or maximum RPM allowed. Statically and dynamically balance each wheel in accordance with AMCA 204 "Balance Quality and Vibration Levels for Fans" to Fan Application Category BV-3, Balance Quality Grade G6.3. Obtain balance readings by electronic equipment in the axial, vertical, and horizontal directions on each set of bearings.

Submit report of factory run test.

1. EXECUTION
	* + 1. EXAMINATION
				1. Examine areas to receive fans. Notify Engineer regarding conditions that may adversely affect installation, operation, or maintenance of fans. Proceed with installation once conditions are in accordance with manufacturer's published instructions.
			2. PROTECTION
				1. Protect adjacent construction and finished surfaces during installation and testing.
				2. Except for operational testing, do not operate fan during construction.
			3. INSTALLATION
				1. Install fans in accordance with Contract documents and manufacturer's published instructions.

Specifier: Insert applicable installation requirements for vibration, seismic, and high wind design if applicable to installation.

* + - * 1. Install fan units with adequate clearances for service and maintenance.

Specifier: Coordinate duct installation and specialty arrangements with schematics on Drawings and with requirements specified in duct systems. If Drawings are explicit enough, these requirements may be reduced or omitted.

* + - * 1. Duct Connections: Drawings indicate general arrangement of ducts and duct accessories. Where indicated on Drawings, [install factory-furnished companion flanges and] make final duct connections with flexible connectors. Flexible connectors are specified in Division 23 section "Air Duct Accessories."

Install connecting ducts with adequate clearances for service and maintenance.

* + - * 1. Electrical Connections: Connect wiring in accordance with NFPA 70 and Division 26 section "Low-Voltage Electrical Power Conductors and Cables."

Ground and bond equipment according to Division 26 section "Grounding and Bonding for Electrical Systems."

* + - * 1. Equipment Identification: Label units according to Division 23 section "Identification for HVAC Piping and Equipment."
			1. FIELD QUALITY CONTROL

Specifier: Select option in paragraph below to define the party responsible for final tests and inspections to be performed.

* + - * 1. [Owner will retain] [Contractor shall retain] qualified testing agency to perform field tests and inspections.

Specifier: Retain first paragraph below to describe tests and inspections to be performed.

* + - * 1. Tests and Inspections:

Verify that unit is secured to supports, and that duct and electrical connections are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.

Verify that cleaning and adjusting are complete.

Disconnect fan belt drive from motor. Verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.

Verify that manual and automatic volume control, and fire and smoke dampers in connected ductwork systems are in fully open position.

Disable automatic temperature-control actuators, energize motor, adjust fan to indicated rpm, and measure and record motor voltage and amperage.

Shut unit down and reconnect automatic temperature-control actuators.

Remove and replace malfunctioning units and retest as specified above.

* + - * 1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
				2. Submit test and inspection reports.
			1. ADJUSTING AND CLEANING
				1. Adjust, clean, and maintain installed fan units in accordance with manufacturer's published instructions.

END OF SECTION