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**Twin City Fan & Blower Guide Specification
Ceiling - Mounted Ventilators: T Series, Direct Drive**

**Twin City Fan & Blower T Series** Ceiling Ventilators are designed for commercial applications requiring quiet, continuous, reliable operation.

Model T is AMCA Certified for Air & Sound and is UL/cUL listed.

**Application**

Ceiling Ventilators are designed for commercial applications. Exhausters are constructed with a low profile grille and are easy to duct horizontally or vertically, with many models offering round duct connectors as standard.

Airflow to 1,590 CFM (2,701 m3/hour)

Static pressure to 1.0 inches wg (248Pa)

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 23.06 – CEILING MOUNTED VENTILATORS

1. GENERAL
	* + 1. SUMMARY
				1. Section includes ceiling mounted exhaust fans, direct drive.
			2. REFERENCE STANDARDS
				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 205 - Energy Efficiency Classification for Fans

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

AMCA Publication 211 - Certified Ratings Program - Product Rating Manual for Fan Air Performance

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

AMCA Publication 311 - Certified Ratings Program - Product Rating Manual For Fan Sound Performance

* + - * 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. Underwriters Laboratories, Inc. (UL): [www.ul.com](http://www.ul.com):

UL 507 - Standard for Electric Fans

* + - 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 or seismic 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.

Provide fan units rated according to AMCA Standard 211 (air performance) and AMCA Standard 311 (sound performance).

* + - 1. COORDINATION
				1. Coordinate sizes and locations of supports required for fan units.
				2. Coordinate sizes and locations of equipment supports.
			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 ceiling - mounted ventilators from a single manufacturer.
			2. PERFORMANCE REQUIREMENTS
				1. Fan Performance Ratings: [Project site level- based] [Sea level-based].
				2. AMCA Compliance: Provide units that bear the AMCA-Certified Ratings Seal.
				3. Compliance: Provide units that comply with requirements of UL 507.
				4. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70.
			3. CEILING-MOUNTED VENTILATORS
				1. Bath Fans

Basis of Design Product: **Twin City Fan & Blower, Model T050 - T080**.

Specifier: In the following paragraph, select 3 inch duct for model T050, and 4 inch duct for model T080.

Configuration: Ceiling bottom inlet grille and side outlet connection for [3 inch (76 mm)] [4 inch (102 mm)] duct, as indicated on Drawings.

Housing: Galvanized steel.

Blower Wheel: Single wheel, centrifugal, impact resistant polymeric construction.

Inlet Grille: White polymeric.

Integral polymeric gravity backdraft damper.

Specifier: Select mounting orientation in the following paragraph. If more than one orientation are required, show orientation on Drawing fan schedule and delete the following paragraph.

Suitable for [ceiling] [wall] mounting.

Provide mounting brackets with punched keyhole fastener openings.

* + - * 1. Round Outlet Duct Type

Basis of Design Product: **Twin City Fan & Blower, Model T100 - T300**.

Specifier: In following paragraph, select 6 inch duct for T100 and T150 fans. Select 8 inch duct for T200 - T300 fans.

Configuration: Ceiling bottom inlet grille and side outlet connection for [6 inch (152 mm)] [8 inch (203 mm)] diameter duct, as indicated on Drawings.

Housing: 20 Ga, 0.0396 inch (1.0 mm) galvanized steel.

Blower Wheel: Single wheel, impact resistant polymeric construction.

Specifier: In the following paragraph, polymeric grille is standard. Select metal grille, when required.

Inlet Grille: [White polymeric] [White painted steel].

Integral gravity backdraft damper.

1/2 inch (13 mm) acoustic insulation lining.

Specifier: Select mounting orientation in the following paragraph. If more than one orientation are required, show orientation on Drawing fan schedule and delete the following paragraph.

Suitable for [ceiling] [wall] mounting.

Provide eight-position mounting brackets.

When installed above bathtubs and showers, provide ceiling mounted unit that is UL listed when connected to circuit with Ground Fault Circuit Interrupter (GFCI) protection.

* + - * 1. Rectangular Outlet Duct Type

Basis of Design Product: **Twin City Fan & Blower, Model T400 - T700**.

Configuration: Ceiling bottom inlet grille and side outlet connection for 4.5 X 18.5 inch (114 X 470 mm) duct, as indicated on Drawings.

Housing: 20 Ga, 0.0396 inch (1.0 mm) galvanized steel.

Blower Wheel: Double wheel, impact resistant polymeric construction.

Inlet Grille: White steel, painted.

Integral gravity backdraft damper.

1/2 inch (13 mm) acoustic insulation lining.

Specifier: Select mounting orientation in the following paragraph. If more than one orientation are required, show orientation on Drawing fan schedule and delete the following paragraph.

Suitable for [ceiling] [wall] mounting.

Provide eight-position mounting brackets.

When installed above bathtubs and showers, provide ceiling mounted unit that is UL listed when connected to circuit with Ground Fault Circuit Interrupter (GFCI) protection.

* + - * 1. Rectangular Outlet Duct Type

Basis of Design Product: **Twin City Fan & Blower, Model T900 - T1500**.

Configuration: Ceiling bottom inlet grille and side outlet connection for 8 X 12 inch (203 X 305 mm) duct, as indicated on Drawings.

Housing: 20 Ga, 0.0396 inch (1.0 mm) galvanized steel.

Blower Wheel: Single wheel, centrifugal, impact resistant polymeric construction.

Inlet Grille: White steel, painted.

Integral gravity backdraft damper.

1/2 inch (13 mm) acoustic insulation lining.

Specifier: Select mounting orientation in the following paragraph. If more than one orientation are required, show orientation on Drawing fan schedule and delete the following paragraph.

Suitable for [ceiling] [wall] mounting.

Provide eight-position mounting brackets.

* + - * 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.

Electrical Data:

Voltage: 115 V; 1 phase; 60 Hz.

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

Specifier: Select motor enclosure type in first following subparagraph.

Enclosure Type: Open, Drip Proof (ODP).

* + - * 1. Accessories:

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

Roof Caps:

Round Inlet Duct: Provide [black, epoxy coated steel] [mill finish aluminum] weatherproof outlet, suitable for [flat] [pitched] roof, with integral backdraft damper and bird screen.

Wall Caps:

Round Inlet Duct: Provide [galvanized steel with aluminum louvers] [mill finish aluminum] weatherproof outlet, suitable for wall mount, with integral backdraft damper and [with] [without] integral bird screen.

Controls:

Specifier: In the following paragraph, select speed control options as follows:

- 3A: Fan sizes 50 to 900

- 6A: Fan size 1500 only

Remote Mounted Speed Control: Manual dial speed control suitable for mounting in single gang box. Rated [3 A at 115 V] [6 A at 115 V].

Specifier: The speed controller in the following paragraph is suitable for fan sizes 100 to 900 only

Speed Control: Manual dial speed control suitable for mounting inside fan enclosure, with adjustment through inlet grille. Rated 3 A at 115 V.

Timer Control: Manual dial time control for up to [15] [60] minutes run time. Provide timer suitable for mounting in single gang box. Rated [6 A at 115 V].

On-Off Switch: Manual switch suitable for mounting in single gang box. Rated 15 A at 115 V.

Combination Switch and Timer: Provide timer suitable for mounting in single gang box. Rated 4 A at 115 V fan circuit and 4 A at 115 V light circuit. Requires hot and neutral wires in switch box.

Fan and light operate together when switch is indexed to UP position.

When switch is indexed to center position, fan and light immediately de‑energize.

When switch is indexed to down position, lights go off and fan runs for user adjustable period between 5 and 60 minutes.

Rectangular to Round Transition:

Fan Size 400 to 700: Provide galvanized steel transition from 4.5 by 18.5 inches (114 by 470 mm) to 10 inch (254 mm) diameter round.

Fan Size 900 to 1500: Provide galvanized steel transition from 8 by 12 inches (203 by 305 mm) to 12 inch (305 mm) diameter round.

Inline Adaptor: Provide adaptor in place of inlet grille to transition from inlet duct to fan housing.

Radiation Damper: Provide galvanized steel parallel blade radiation damper with fusible link. Configure damper such that when fusible link melts, radiation damper closes.

Vibration Isolation: Provide resilient vibration hangers.

* + - * 1. Fan Capacities and Characteristics: Refer to Drawing schedule.
			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 Standard 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 and seismic 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.

Verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation.

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