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**Twin City Fan & Blower Guide Specification
Propeller Fans: Model TCPE, Direct Drive**

Twin City Fan & Blower Model TCPE Series Propeller Wall Fans are direct drive panel fans designed for low static pressures. They can be mounted in a wall vertically or in a ceiling horizontally. All units come standard with a spun galvanized panel, zinc plated motor mount/guard, custom engineered motor and an aluminum blade that is statically and dynamically balanced. Units are designed for exhaust and supply of relatively clean air. They are manufactured under strict ISO 9001 quality standards and performance is certified by AMCA.

**Application**

Sizes (propeller diameters): 8 to 24 inches (203 mm to 610 mm)

Airflow: 131 to 7,615 CFM (12,900 m3/hour)

Static pressure to 0.625 inches wg (156 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 23.08 – PROPELLER FANS

1. GENERAL
	* + 1. SUMMARY
				1. Section includes propeller wall 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)

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 ANSI/AMCA Standard 210 (air performance) and ANSI/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).

Provide fan units rated according to AMCA Standard 205 (fan efficiency grade).

* + - 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 propeller wall fans from a single manufacturer.
			2. PERFORMANCE REQUIREMENTS
				1. Fan Performance Ratings: [Project site elevation- based] [Sea level elevation-based].
				2. AMCA Compliance: Provide units that bear the AMCA-Certified Ratings Seal.
				3. Compliance: Classified under AMCA Standard 205
				4. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70.
			3. PROPELLER WALL FANS
				1. Description: Direct-Driven, Propeller Wall Fans: Axial fan units, configured for horizontal flow of relatively clean air for Heating, Ventilating, and Air-Conditioning (HVAC) applications.

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

* + - * 1. Propeller: Fixed pitch design, constructed with fabricated aluminum blades fastened to steel hub. Balance propeller assembly statically and dynamically in accordance with AMCA 204, to Fan Application Category BV-3, Balance Quality Grade G6.3.

Specifier: Retain the following subparagraph for spark-resistant aluminum fan wheel impeller only.

Maximum Operating Temperature: 104 deg. F (40 deg. C).

* + - * 1. Panel: Construct from 16 Ga (0.0635 inch) (1.6 mm), G90 galvanized steel, mill finish.

Fabricate with deep spun inlet venturi and prepunched holes

* + - * 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."

[Single] [Variable] -speed.

Specifier: Select motor type option in the following paragraph. If more than one motor type is required for project fans, delete the following paragraph and show motor type on fan schedule on drawings.

Provide [electronically commutated] [permanent split capacitor, single phase] motor with permanently lubricated ball bearings.

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: If factory disconnect is required, retain the following paragraph.

Furnish unfused disconnect switch, NEMA 1, selected in accordance with Division 26 section "Enclosed Switches."

Ship disconnect switch loose for field mounting and wiring.

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] [277] [460] [\_\_\_\_\_] V; [1] phase; 60 Hz.

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

Specifier: Select motor enclosure type in following subparagraph.

Enclosure Type: Open, Drip Proof (ODP).

* + - * 1. Motor Mount/Guard Assembly:

Provide guard to protect propeller blades on air intake with guard that is compliant to OSHA Standard 1910.212

Fabricate guard from zinc plated wire and hardware.

Secure to fan panel with captive nut inserts for easy servicing without removal of full panel.

* + - * 1. Accessories:

Specifier: If variable speed control is required, select one of the three following paragraphs. Delete all three if this is a single speed fan.

Electronically Commutated Motor Integral Speed Controller: Motor mounted speed control to reduce speed from 100 to 17 percent of synchronous speed.

Specifier: The following paragraph is a standard feature of electronically commutated motors. Retain if this motor type was selected above.

Electronically Commutated Motor Analog Speed Control Signal: Provide 36 inch (900 mm) wire to receive 0 - 10 V DC speed control signal from Building Automation System.

Specifier: The following paragraph is an optional feature of electronically commutated motors. Retain if this motor type was selected above and this feature is required..

Electronically Commutated Motor Remote-Mounted Control: Provide remote mounted 0 - 10V speed control dial, suitable for switchbox mounting. Provide 120V to 24V ac control power transformer in NEMA 1 enclosure.

Wall Collar: Provide wall collar to mount propeller wall fan and accessories into wall opening.

Furnish wall collar [fully assembled] [as kit, for field assembly].

Wall Box: Provide wall box enclosure for fan and accessories. Include weather hood and bird screen.

Furnish wall box [fully assembled] [as kit, for field assembly].

Specifier: Retain the first following paragraph for gravity backdraft damper. Retain second following paragraph for motorized backdraft damper. Retain option in paragraph if end switch is required.

Backdraft Damper, Automatic: Gravity, parallel-blade type mounted at fan outlet. [Include SPDT end switch.]

Backdraft Damper, Motorized: Motorized, parallel-blade type mounted at fan outlet with actuator. [Include SPDT end switch.]

Actuator Power: [115] [230] [460] [575] V.

Provide transformer for [460] [575] V actuator.

Specifier: For 115 V, single phase, permanent split capacitor motors, Twin City Fans offers a manually adjustable speed controller for mounting up to 10 feet (3.0 m) from the fan.

Variable Speed Controller: Provide manual speed controller suitable for mounting in a 2 by 4 inch (51 by 102 mm) wiring box. Furnish loose for field mounting and wiring.

Weather Hood – Galvanized: Includes galvanized birdscreen (standard flange mounts to wall collar, extended flange mounts to exterior wall).

Damper Guard, Galvanized

Conduit Box Kit: For use with 48 Frame PSC type motors to allow for wire connections to be enclosed when fan motor is wired. Ships loose for field mounting and installation.

* + - * 1. Finish: Galvanized mill finish internal parts, and uncoated external [aluminum] and [galvanized steel] parts exposed to weather.

Specifier: The first paragraph below is manufacturer's standard finish. Those that follow are optional finishes. Select finish that is required.

If fans specified for the project have different finishes, include the finish for each fan on the Drawings and delete here.

[None]

[Enamel, Gray]

[Enamel, Color Matched]

[Epoxy, Black]

[Phenolic Heresite, Gray]

[Carbocoat 30, Black]

[Transcoat 161, Black].

* + - * 1. Fan Capacities, Characteristics, and Configuration: 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 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. Retain option if fan is in ducted configuration

* + - * 1. Tests and Inspections:

Specifier: Retain paragraphs below that apply to the project. Delete those that do not apply.

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 propeller 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