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**Twin City Fan & Blower Guide Specification
Centrifugal, Louvered Roof Ventilators: Model BCLP, Belt Driven**

Twin City Fan & Blower Model BCLP Series, Centrifugal Louvered Roof Ventilators, provide cost effective, general purpose ventilation solutions for commercial and light industrial applications.

Louvered penthouse model BCLP (belt driven) is suitable for exhaust service in general, clean air applications. These models feature a tiered aluminum louvered penthouse enclosure with a removable aluminum top cover and a galvanized steel mesh bird screen positioned vertically behind the louvers.

Model BCLP is UL/cUL 705 listed.

Application

Models BCLP utilizes an aluminum louvered penthouse enclosure. The louvers are made from extruded aluminum and corners are precision miter cut and welded. The tiered louver design not only gives these models structural rigidity, but also makes them aesthetically pleasing.

Weather Resistance: The extruded aluminum louvers have double weather and snow baffles for added weather protection. In addition, the curb base features a vertical baffle to guard against storm driven rain and snow.

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

Sizes (wheel diameters): 10 to 54 inches (254 mm to 1,372 mm)

Airflow: Up to 42,200 CFM (71,697 m3/hour)

Static Pressure: Up to 3.25 inches wg (810 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 louvered penthouse centrifugal roof ventilators, 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. 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. Office of Statewide Health Planning and Development (OSHPD): https://www.oshpd.ca.gov/

OSHPD Special Seismic Certification Preapproval OSP-0395-10

ICC-ES AC 156 – Acceptance Criteria for Seismic Certification by Shake-Table Testing of Nonstructural Components

* + - * 1. Underwriters Laboratories, Inc. / Underwriters Laboratories of Canada (UL/cUL): [www.ul.com](http://www.ul.com):

UL/cUL 705 - Standard for Power Ventilators

* + - 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. Compliance: Listed in accordance with UL/cUL 705.
				3. 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 roof mounted exhaust of relatively clean air for general ventilation applications.

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

* + - * 1. Fan Capacities, Characteristics, and Configuration: Refer to Drawing schedule.
				2. Housing: Provide louvered enclosures with removable aluminum top cover for access to internal components.

Fabricate units with deep formed inlet venturi to prevent snow and rain entry into building.

Fabricate units from extruded aluminum louvers with precision mitered and welded corners.

Provide galvanized steel wire bird screens on inner face of louvers.

* + - * 1. Motor Mount Assemblies: Provide motor mount assemblies fabricated of heavy gage steel.
				2. Wheel: Centrifugal, backward inclined type, containing matching inlet venturi.

Statically and dynamically balance wheel.

* + - * 1. Fan Shaft: Turned, ground, and polished steel shaft, with shaft keyed to wheel hub, sized for first critical speed minimum 1.25 times maximum speed for each fan class.
				2. Bearings: Manufacturer's standard, heavy duty, field-lubricated pillow block ball type, based on fan size and mounting orientation.

Minimum L-50 Bearing Life: 500,000 hours at maximum operating speed, in accordance with ABMA 9.

* + - * 1. Belt Drive:

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 belt-driven sheave mounted on separate assembly with belt tension adjustment mechanism. Resiliently mount to housing.

Motor and Drive Assembly: Resiliently mounted on rubber isolators.

* + - * 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."

Specifier: If optional electronically commutated motor is required, retain the following paragraph.

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.

Motor Speed: [3,600] [1,800] [1,200] [900] rpm.

Provide unfused disconnect switch, wired and factory mounted to fan housing.

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] [575] V; [1] [3] phase; 60 Hz.

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

Specifier: Select motor enclosure type in first following subparagraph.

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

Provide motors that comply with the Energy Independence and Security Act of 2007 (EISA).

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

When controlled with a Variable Frequency Drive (VFD), provide premium efficiency motors suitable for inverter duty use.

Specifier: Factory disconnect switch is standard. Select NEMA enclosure rating in following paragraph, and select one subparagraph below to specify factory or field mounting. NEMA 7/9 disconnects ae shipped loose for field mounting and wiring.

Provide unfused disconnect switch, NEMA [1] [3R] [4] [4X] [7/9], selected in accordance with Division 26 section "Enclosed Switches."

Factory mount and wire disconnect switch.

Ship disconnect switch loose for field mounting and wiring.

* + - * 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. 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 Curbs: [Galvanized steel] [Aluminum]; mitered and welded corners; [1-1/2-inch- (40-mm-) thick, rigid, fiberglass insulation adhered to inside walls;] and 1-1/2-inch (40-mm) wood nailer. Size as required to suit roof opening and fan base. Provide 3/16 inch- (4.76 mm-) thick polystyrene gasket.

Configuration: [Self-flashing without a cant strip, with mounting flange] [Built-in cant and mounting flange] [Built-in raised cant and mounting flange].

Coordinate curb height with roof deck construction and insulation thickness; other heights are available. 16-inch (400-mm) height in first subparagraph below is for sound curb. Provide minimum 12 inch curb height for fans with motorized backdraft dampers.

Overall Height: [8 inches (200 mm)] [12 inches (300 mm)] [18 inches (450 mm)].

Subparagraphs below are optional features.

Sound Curb: Curb with sound-absorbing insulation.

Pitch Mounting: Manufacture curb for roof slope.

Metal Liner: Galvanized steel.

Burglar Bars: [1/2-inch- (13-mm-)] [5/8-inch- (16-mm-)] [3/4-inch- (19-mm-)] thick steel bars welded in place to form 6-inch (150-mm) squares.

Curb Hinge: Piano-type hinge for curb base mounted on standard canted curb, for access to exhaust fan, backdraft damper, and duct [, with retaining chain] [and security hasp].

Auto Belt Tensioner: Provide mechanism to keep constant tension on drive belt. Available with single-groove drives only.

Backdraft Damper, [Automatic] [Motorized], parallel-blade type. Adjust backdraft damper to close when fan is not running.

Fabricate frame from 20 ga. (0.80 mm) galvanized steel.

Fabricate blades from 26 ga. (0.40 mm) aluminum, mill finish, with vinyl edge seals.

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

Backdraft damper actuator suitable for [24] [115] [208] [230] [460] [575] VAC, single phase. [Provide transformer for [575] V actuator.]

Aluminum wire insect screen.

Two-Speed Switch: Provide for two-speed control of two-speed single-phase motors, 1 horsepower and smaller.

Firestat: To de-energize motor when high temperature is sensed. Manual reset type, field adjustable from 100 - 170 deg F (38 - 77 deg C).

Specifier: Retain the following paragraph when OSHPD Seismic Certification is required for the project

Available accessories when OSHPD Seismic Certification is required are limited to the following:

• Extended Lube Lines • Curb Hinge

• Retaining Chain • Security Hasp

• 2-Speed Switch • Firestat

• Aluminum Insect Screen • Motor and Drive Assembly

• Rubber Isolators • Stainless Steel Shaft

• Automatic Belt Tensioner • Stainless Steel Hardware

• Tie Down Brackets • Aluminum Nameplate

• Stainless Steel Nameplate • 2-Groove Drive

• Backdraft Damper: Motorized or Automatic

• Disconnect Switch: NEMA 1, NEMA 3R, NEMA 4, NEMA 7/9

• Birdscreen: Aluminum, Galvanized Steel

• Roof Curb: 8”, 12”, 18” tall; Self-flashing or Straight Sided; Galvanized or Aluminum

OSHPD Seismic Certification: Provide unit construction compliant with California’s Office of Statewide Health Planning and Development seismic certification of equipment and components.

The Design will be in Accordance with ASCE 7-10 Chapter 13.

Fan will be mounted to a roof curb secured using lag bolts.

* + - 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.

Specifier: Retain option in following paragraph for belt driven units. Otherwise, delete option.

[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