



INDUSTRIAL PROCESS AND  
COMMERCIAL VENTILATION SYSTEMS

# BELT DRIVEN CENTRIFUGAL ROOFTOP FILTERED SUPPLY FAN

Model BCRFS



# FILTERED SUPPLY VENTILATORS



## Overview

### BCRFS



Twin City Fan & Blower's belt driven filtered supply fan, model BCRFS, is designed specifically for roof mounted applications, supplying clean, untempered make-up air. These fans offer high efficiency and quiet operation in a compact design.

BCRFS units feature double width forward curved centrifugal impellers, which produce high air volumes at low speeds. Units are manufactured under strict quality assurance standards to ensure catalogued performance and years of trouble-free operation.

#### Typical Applications Include

Data Center Exhaust, General HVAC, Generator Room Ventilation, Swimming Pool Exhaust, Kitchen Exhaust, Dishwasher Exhaust, Elevator Shaft Exhaust/Pressurization, Emergency Smoke Exhaust, Stairwell Pressurization

#### Configurations

Available in Belt Driven Configuration

#### Impeller Type

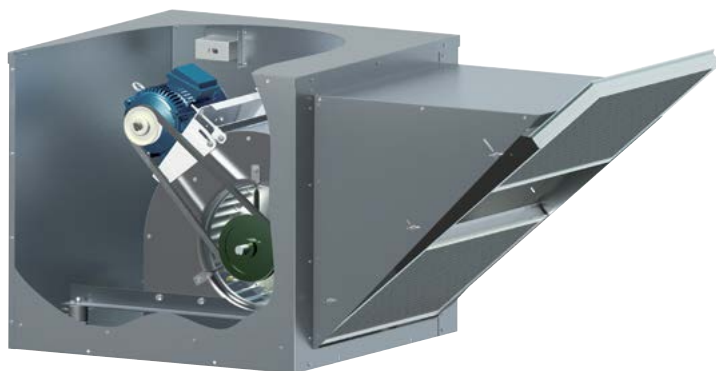
Forward Curved

#### Optional Construction

Spark Resistant, Aluminum Construction, UL 705, Special Coatings

#### Certifications

AMCA Sound/Air and FEI, UL 705 Listed for Electrical



Model BCRFS units are cULus 705 listed for electrical, File No. E158680.



Twin City Fan & Blower certifies that the Model BCRFS Belt Driven Centrifugal Rooftop Filtered Supply fans shown herein are licensed to bear the AMCA Seal. Certified performance data may be found in Twin City Fan & Blower's Fan Selector software.



Scan the QR code to search Twin City Fan & Blower's AMCA-certified products.



For complete product performance, drawings and available accessories, download our Fan Selector software at [tcf.com](http://tcf.com).

## Overview

### BCRFS

#### Features

- Housing assembly features heavy-gauge galvanized steel construction. Fan housing sides and scroll are spot welded on sizes 090-180. Sizes 200 and 220 have lock seam housing.
- Removable top panel provides easy access for service and maintenance.
- One-inch thick aluminum mesh washable filter.
- Forward curved, galvanized steel impellers are statically and dynamically balanced to assure long life and quiet operation.
- Heavy-duty cast iron adjustable pulleys to permit speed variation.
- Sizes 090-180 are furnished with permanently lubricated and sealed deep groove, self-aligning ball bearings. Sizes 200 and 220 are provided with heavy-duty, re-greasable pillow block ball bearings.

#### Sizes

Model BCRFS fans are available in seven sizes, ranging from 9" through 22" impeller diameters.

#### Performance

Airflow to 17,000 CFM  
Static pressure to 4" w.g.



General HVAC Installation

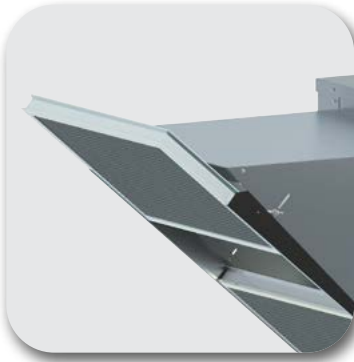


## Energy Regulations

Twin City Fan & Blower supports energy efficiency regulations enacted by the U.S. Department of Energy (DOE) and specific states. The selection and application of fan products is a significant part of these regulations. Engineers and specifiers must understand how to apply TCF products to their specific applications to meet applicable DOE and state regulatory requirements. Twin City Fan & Blower has made significant investments in product testing and development to provide efficient products. Developments in Twin City Fan & Blower's Fan Selector software are in place to aid your decision in product selection to assist with meeting the efficiency requirements as stipulated in the applicable regulations.



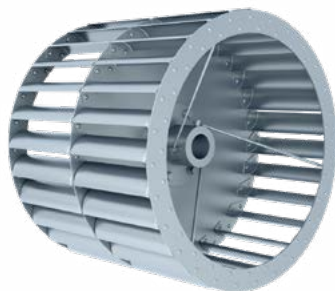
Drive Frame  
& Drive Assembly



Washable  
Filters



Self-Aligning  
Ball Bearings



Forward Curved Impeller

## Housing

Fan housing constructed of heavy-gauge galvanized steel.

## Bearings

Sizes 090-180 are furnished with permanently lubricated and sealed deep groove, self-aligning ball bearings. Sizes 200 and 220 are provided with heavy-duty, re-greasable pillow block ball bearings.

## Filters

One-inch thick aluminum mesh washable filters. Filter rail pivots to allow for easy removal of filter for cleaning.

## Scroll Fan

Housing assembly features heavy-gauge galvanized steel construction. Fan housing sides and scroll are spot welded on sizes 090-180. Sizes 200 and 220 have lock seam housing.

## Forward Curved Impeller

Double width, double inlet forward curved centrifugal fan impellers are constructed of galvanized steel with FC blades tab locked into the end rings and a heavy-duty steel hub is bolted to the impeller.

## Removable Top Cover

Top cover of fan is completely removable to allow access to fan for inspection and maintenance.

## Drive Assembly

Adjustable pitch V-belt drives with cast iron sheaves and heat resistant belts are selected at 150% of the driven motor horsepower.

## Drive Frame

Motor, drive assembly and blower are completely isolated from the fan supports by rubber isolators to reduce transmission of noise and vibration.

## Curb Cap

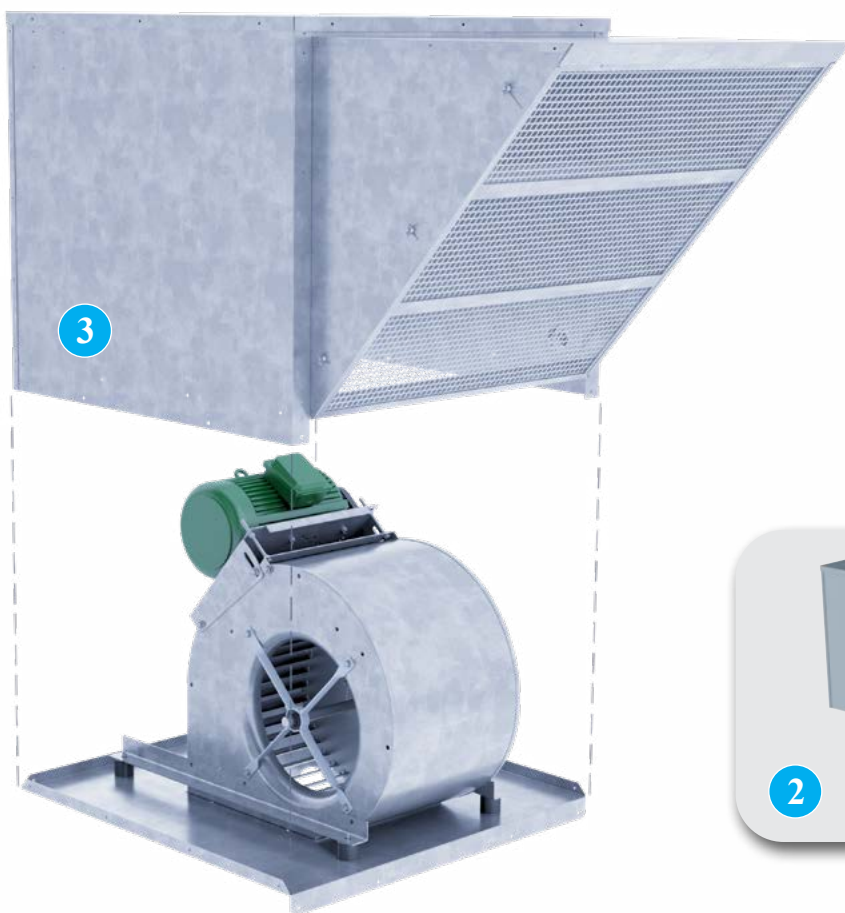
Fan curb cap has prepunched mounting holes to provide easy and accurate attachment to the roof curb.

## Disconnect Switch

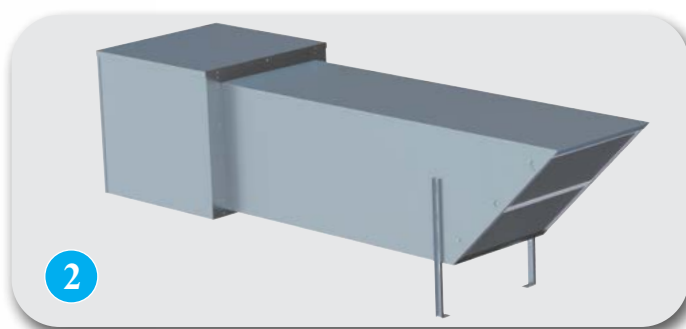
Standard on all units. Fans are provided with a NEMA 1 type disconnect switch mounted inside the fan housing.







Backdraft Dampers



Inlet Extension & Equipment Supports

**1 Duct Adapter** (Not Shown.) The duct adapter allows for an easy installation of the ductwork to the roof curb and unit.

**2 Inlet Extension and Equipment Supports** To separate the inlet from nearby exhaust, the inlet extension accessory can be used. Equipment supports are available to support the inlet extension ducting.

**3 Aluminum Construction** Units are available in aluminum exterior construction.

**4 Backdraft Damper** Backdraft dampers, with automatic or motorized operation, feature felt-edged damper blades for quiet operation. Damper frames are constructed of 20-gauge galvanized steel and blades are constructed of 26-gauge aluminum. Dampers are channel frame and ship loose for field mounting in the inlet extension.

Motorized dampers are recommended for low CFM applications to assure unrestricted airflow. Motorized dampers are available with 24, 115, 208, 230, 460 or 575 volt service; 575 volt service requires a step-down transformer.

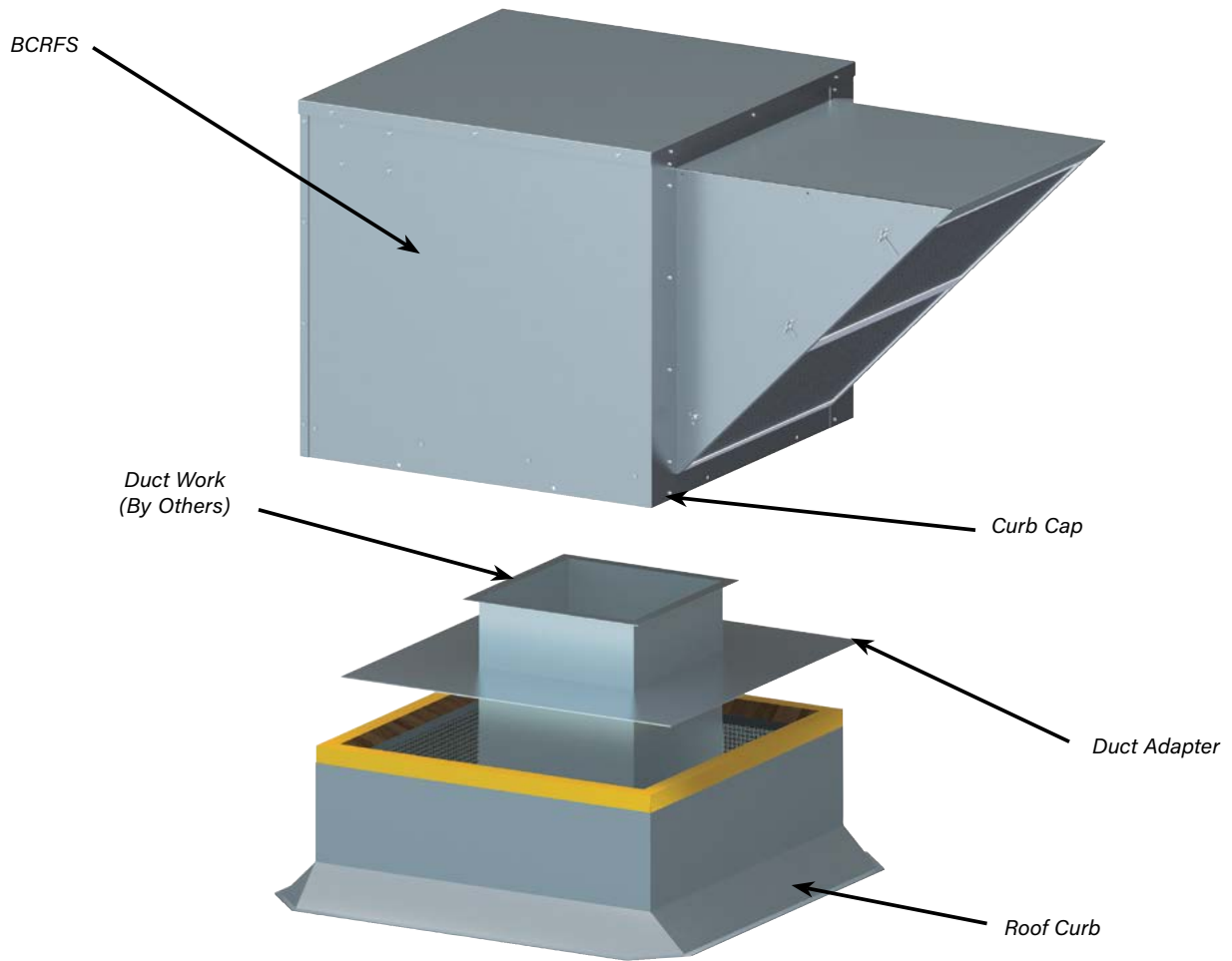
**5 Weatherproof Disconnect Switches** (Not Shown.) NEMA 3R and NEMA 4 disconnect switches are available for applications where an external visible shutoff is required for the unit's primary power supply. Weatherproof disconnect switches are available as either factory or field installed.

**6 Prefabricated Roof Curbs** See page 7 for more information. Prefabricated roof curbs are available in heavy-duty galvanized steel or aluminum construction, in heights of 8", 12" or 18". The standard curb (canted) is provided with a factory installed wood nailer, while the optional self flashing design is provided with a 3/16" polystyrene gasket. Both the standard curb and the self flashing design are provided with 1.5" of insulation as standard and feature continuously welded seams for added rigidity and moisture protection. Prefabricated curbs are also available in raised cant, pitched and peak models. Refer to Catalog 4910 for complete details on roof curb options. Minimum 12" high curbs are recommended for use with motorized damper.

### Optional Construction:

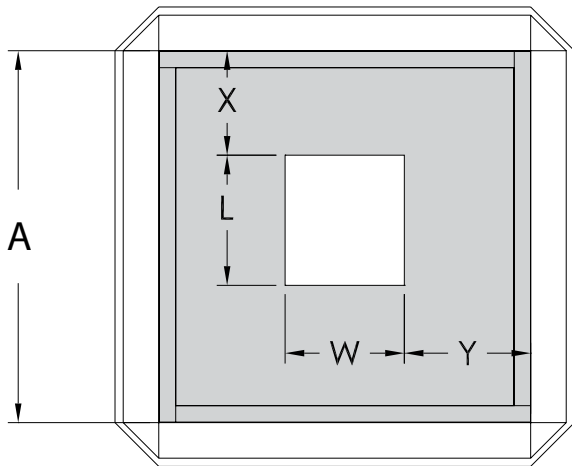
- Special Coatings
- UL 705 Listing
- Aluminum Construction

# TYPICAL INSTALLATION



## Duct Adapter Dimensions

Top View of Roof Curb With Duct Adapter



FAN SIZE	A	L	W	X	Y
090	23.75	11.19	10.00	4.78	6.88
100	29.75	12.25	11.31	7.25	9.22
120	33.75	14.31	13.00	8.22	10.38
150	33.75	16.75	15.56	7.00	9.09
180	39.75	19.69	17.81	8.53	10.97
200	45.75	25.63	20.63	8.56	12.56
220	53.75	28.25	21.09	11.25	16.33

## Canted Roof Curbs

- Constructed of 18-gauge galvanized steel with continuously-welded seams
- Large 3" built-in 45° cant to accommodate roofing material to top of curb. Cant is beveled at corners for better support of roofing material
- Wood nailer (1 1/2") secured to top ledge
- Lined with 1 1/2" fiberglass fire-resistant, sound-absorbing insulation
- Damper shelf standard
- Options: Aluminum (16-gauge) construction, burglar security bars, metal liner (galvanized or aluminum), special heights up to 24", single- or double-pitched curbs for sloping roofs



## Self-Flashing & Straight-Sided Roof Curbs

- Constructed of 18-gauge galvanized steel with continuously-welded seams
- Wide base plate (flashing) to ensure watertight seal to roof
- Top ledge covered with 3/16" polystyrene gasket (self-flashing) for weather seal and to reduce metal-to-metal conducted noise
- Wood nailer secured to top ledge (straight-sided)
- Lined with 1 1/2" fiberglass fire-resistant, sound-absorbing insulation
- Damper shelf standard
- Straight-sided roof curbs are constructed with the same features as the self-flashing curbs, but are one dimensional to allow for field supplied cants and roofing material to be brought up to the top of the curb
- Options: Aluminum (16-gauge) construction, burglar security bars, metal liner (galvanized or aluminum), special heights up to 24", single- or double-pitched curbs for sloping roofs



## Curb Adapters

- Constructed of heavy-gauge galvanized steel with continuously-welded seams
- Top ledge covered with 3/16" polystyrene gasket to reduce metal-to-metal conducted noise and act as a weather seal
- Available in enlarger or reducer (shown) models





NEMA 1 Disconnect Switch

Disconnect switches provide positive electrical shutoff during fan cleaning or maintenance.

### **NEMA 1 Disconnect Switch (Standard)**

A NEMA 1 disconnect switch is available shipped loose for field mounting and wiring or factory mounted and wired with ODP or TEFC motors.



NEMA 3R Disconnect Switch

### **NEMA 3R Disconnect Switch**

A NEMA 3R, rain proof, disconnect is available shipped loose for field mounting and wiring or factory mounted and wired externally.



NEMA 4 Disconnect Switch

### **NEMA 4 Disconnect Switch**

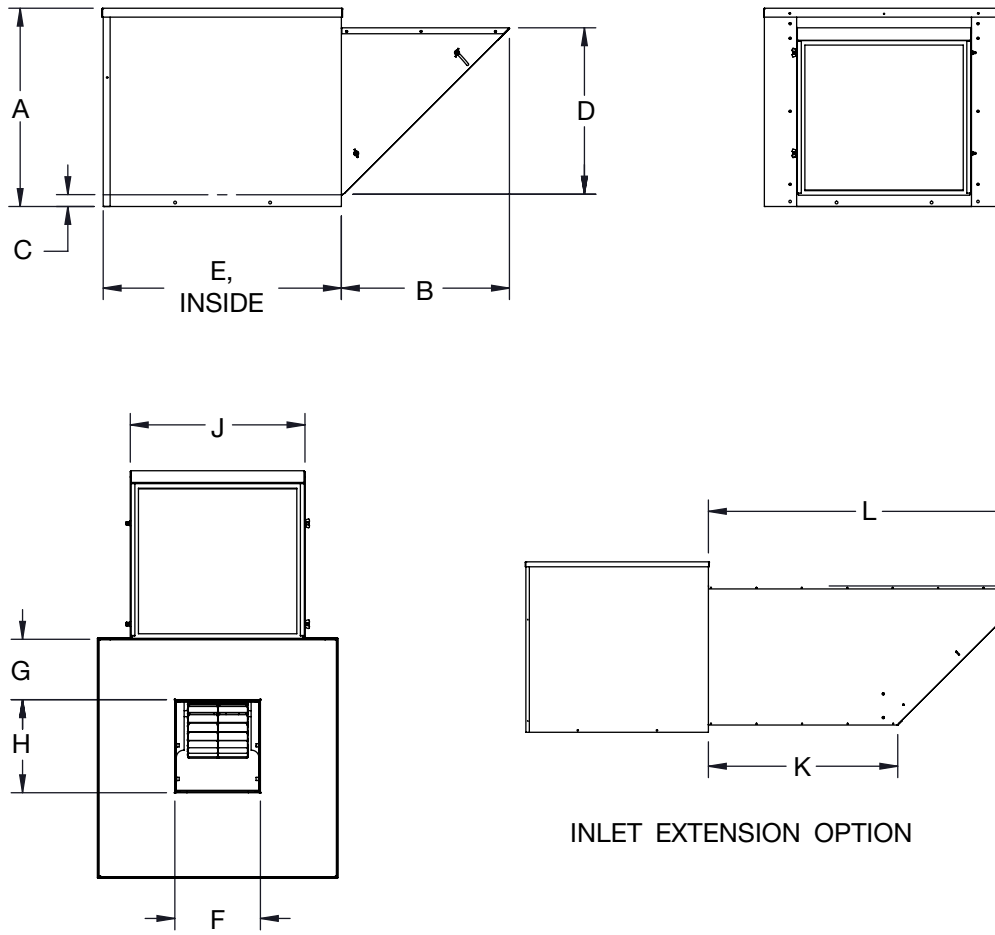
A NEMA 4, water and dust tight, disconnect is available shipped loose for field mounting and wiring or factory mounted and wired externally.

### **NEMA 7/9 Disconnect Switch**

A NEMA 7/9 disconnect switch is recommended on fans with explosion proof motors. The NEMA 7/9 switch is designed for use with fans operating in hazardous environments. Available shipped loose for field mounting and wiring. (Not shown.)





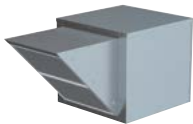


FAN SIZE	A	B	C	D	ESQ.	F	G	H	J	K	L
090	20.04	17.00	1.50	16.86	24.00	9.51	5.09	10.69	18.06	81.39	98.08
100	25.04	20.37	1.50	21.86	30.00	10.81	7.56	11.76	22.06	74.85	95.79
120	28.04	23.06	1.50	24.85	34.00	12.55	8.53	13.81	26.06	70.67	94.43
150	32.04	30.31	2.00	28.31	34.00	15.06	7.29	16.29	30.06	63.02	89.52
180	36.05	28.64	2.00	32.31	40.00	17.31	8.82	19.20	36.09	49.65	78.98
200	48.05	35.58	2.00	44.31	46.00	20.14	8.85	25.14	42.09	47.87	82.77
220	47.30	47.96	2.00	43.55	54.00	20.62	11.55	27.74	48.09	39.44	78.58

D-4310

Dimensions are not to be used for construction.





## Model BCRFS

Filtered Supply Fans shall be of the belt driven centrifugal type, Model BCRFS, as manufactured by Twin City Fan & Blower, Minneapolis, Minnesota.

**PERFORMANCE** — Performance ratings shall conform to AMCA Standard 211 (air performance) and 311 (sound performance). Fans shall be tested in accordance with ANSI/AMCA Standard 210 (air performance) and 300 (sound performance) in an AMCA accredited laboratory. Fans shall be licensed to bear the AMCA certified ratings seal for both sound and air.

Model BCRFS shall be cULus 705 listed. Fans shall bear a permanently attached nameplate displaying model and serial number of the unit for future identification.

**CONSTRUCTION** — Unit exterior shall be constructed of heavy-gauge galvanized steel for durability and appearance. One inch thick aluminum washable filters shall be provided as standard. Top cover of fan is completely removable to allow access to fan for inspection and maintenance. Fan curb cap has prepunched mounting holes to provide easy and accurate attachment to the roof curb.

**DRIVE FRAME** — Motor, drive assembly and blower are completely isolated from the fan supports by rubber isolators to reduce transmission of noise and vibration.

**IMPELLER** — Double width, double inlet fan impellers are constructed of galvanized steel, forward curved blades, tab locked into the end rings. A galvanized structural steel plate mounted in the center of the impeller supports the shaft and stabilizes the blades. Impellers shall be statically and dynamically balanced.

**SHAFT** — Shafts shall be AISI 1040 or 1045 hot rolled steel, accurately turned, ground, polished and ring-gauged for accuracy. Shafts shall be sized for the first critical speed of at least 1.43 times the maximum speed.

**BEARINGS** — Bearings shall be selected for a minimum average bearing life (AFBMA L-50) in excess of 200,000 hours at the maximum fan RPM. Fan sizes 090-180 shall have permanently lubricated and sealed deep groove, self-aligning ball bearings. Sizes 200 and 220 shall have deep groove, self-aligning re-greaseable pillow block ball bearings mounted in a single piece housing.

**DRIVE** — Drive assembly shall be constructed of heavy-gauge galvanized steel and contain no welding. Drives shall be sized for a minimum of 150% of driven horsepower. Machined, cast iron motor sheaves shall be adjustable for final system balancing.

**MOTOR** — Motors shall be of the heavy-duty ball bearing type, closely matched to the fan load. All motors shall be listed by UL and/or CSA. A disconnect switch shall be factory installed and wired to the fan motor and mounted in a junction box within the motor compartment. Electrical knockouts shall be provided in various locations for the unit supply wires for ease of electrical installation.



# INDUSTRIAL PROCESS AND COMMERCIAL VENTILATION SYSTEMS

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