



Moving Your Way

# FUMEX

## Upblast Roof Exhausters

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### BULLETIN FX14



## INTRODUCTION

### Fumex Series of Centrifugal Fans

Fumex centrifugal fans are designed for medium to high pressure applications. They can be either roof or wall mounted. While suitable for general ventilation, Fumex fans are specifically designed to discharge contaminated or grease-laden air or fumes up and away from building surfaces. The optional "Fatrap" (UL762) restaurant grease exhaust configuration (see Fatrap Configuration) makes Fumex fans particularly suited for all food service applications and chemical fume hoods. The optional heat and smoke removal configuration (see Smoke Removal) makes Fumex fans particularly suited for heat and smoke control systems. The optional high wind construction makes Fumex Fans particularly suited for high wind hurricane zones. Fumex fans are available in a range of capacities.

Fumex fans feature a weather-resistant seamless spun aluminum housing which provides ample drainage and works in conjunction with a patented wheel design and deeply spun inlets to provide smooth quiet airflow through the ventilator. The centrifugal wheels are aluminum, non-overloading, backward inclined, robotically welded, and dynamically balanced.

### Fumex Direct Drive Series

#### Model: FX (V/S/R/Q/Q1/Q2)

- Static pressure up to 1.5 in. wg.
- Flow capacity up to 4,489 CFM.
- Fatrap (FT) option available on sizes 13, 16, and 18.
- High Wind Construction (-HW) option available.

### Fumex Standard Duty Belt Drive Series

#### Model: FX (B)

- Static pressure up to 2.5 in. wg.
- Flow capacity up to 21,511 CFM.
- Fatrap (FT) option available.
- Heat & Smoke Removal (-HS) option available.
- High Wind Construction (-HW) option available.

### Fumex High Pressure Belt Drive Series

#### Model: FX (BH)

- Static pressure up to 4 in. wg.
- Flow capacity up to 9,920 CFM.
- Fatrap (FT) option available.
- Heat & Smoke Removal (-HS) option available.
- High Wind Construction (-HW) option available.

### Fumex High Capacity Belt Drive Series

#### Model: FMX (B)

- Static pressure up to 1.5 in. wg.
- Flow capacity up to 25,035 CFM.



Belt Drive Fumex with Fatrap option (left) and Direct Drive Fumex (below).

## CERTIFICATIONS & LISTINGS



### Fumex Direct & Belt Drive Fans

PennBarry certifies that the Fumex direct drive and belt drive models FX, FXB, FXBH, and FXBHFT shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.



### Fumex High Capacity Belt Drive Fans

PennBarry certifies that the Fumex belt drive model FMXB shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and comply with the requirements of the AMCA Certified Ratings Program.



### UL and cUL Certification

Fumex fans carry the UL label, UL 705 (ZACT), File #E28413. Fumex fans with the "Fatrap" option are UL 762 (YZHW) listed under file #MH10684. Fumex fans with the heat and smoke removal option are UL listed under file #MH19473.

## FEATURES & BENEFITS

### Motor Selection

Both direct drive and belt drive models are available with a wide range of voltages and enclosures (see Motor Selection for a complete listing). Standard belt drive Open Drip Proof (ODP) ball bearing motors are selected using a conservative portion of the NEMA service factor. Standard direct drive ODP motors have Class B insulation and internal overload protection. Overload protection is available as an option on belt drive models. Each size is carefully engineered to match the motor to the wheel capacity.

### Internal Wiring

All direct and belt drive models with ODP motors feature a polarized disconnect plug which is factory wired from the motor to the junction box. This provides a positive method of electric shut-off as required by most codes without requiring the traditional disconnect switch. (See Options & Accessories for optional NEMA wiring and disconnect devices.)

### Sound Performance

Fumex units deliver outstanding air performance with minimal noise and have the lowest AMCA licensed sound performance in the industry.

### Curb Caps (Base)

Curb caps for direct drive and standard duty belt drive models are available in galvanized steel (standard) or aluminum (optional). Curb caps for high capacity belt drive models are available only in aluminum. All curb caps have fully welded corners and are pre-punched to ensure a leak-tight and easy installation.

### Forced Motor Cooling

Motors and drive components are located out of the airstream in a separate compartment. A cooling tube between the motor dome and discharge apron enables fresh air to be drawn into the motor housing during fan operation. This positive cooling promotes longer life for motor and drive components.

### Easy Maintenance Access

By removing the fasteners, the motor dome lifts off for complete access to all the drive components.

### Vibration Isolators

Multidirectional, rubber-in-shear vibration isolators mitigate residual vibration transmission from the unit to the building.

### Structural Integrity

Durable housings of spun aluminum have a high strength-to-weight ratio and incorporate a rolled bead for additional strength. There are no welds to break or seams to leak. The heavy-gauge motor mounting platform provides positive rigidity between all components of the power train assembly.

### Internal Bracing

Tri-Strut™ supports transfer the weight of the motor mounting platform directly to the curb mounting surface. The aluminum spun housing, therefore, is not used to support any weight. For grease laden applications, there is less surface for grease build-up during normal operation.

### Solid Steel Shafts

Sized so the first critical speed is a minimum of 130% of maximum catalogued operating speed, shafts are precision ground, and polished.

### Self-Aligning Bearings

Heavy-duty bearings are sized for a minimum L50 life in excess of 200,000 hours of operation. 100% factory tested, they are designed for air handling applications.

### Drives and Belts

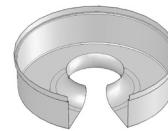
Pulleys are pre-set to the specified RPM. Cast iron variable pitch pulleys are adjustable, allowing for field balancing based on actual field conditions. All pulleys are sized for at least 150% of the driven horsepower.

### Conduit

Both direct and belt drive units include a large 1" nominal conduit chase (not available on heat and smoke removal units; wiring is run via the cooling tubes) for easy installation of wiring from the motor dome to below the curb cap. Fatrap units are factory wired to an external NEMA 3R junction box.

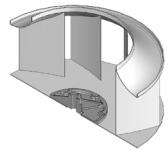
### Reverse Venturi

Reverse venturi reduces turbulence and improves distribution of the air as it enters the wheel inlet and is "captured" by the blades.



### Wheels

Fumex fans offer patented wheel designs. Carefully matched, highly-tooled venturis enhance the performance of these backward inclined and non-overloading centrifugal wheels. Made of advanced aluminum alloys, the various wheel components provide superior strength and durability, as well as spark resistant construction. The heat and smoke removal configuration utilizes steel construction.



### Silent Wheel (Direct Drive)

- Blades' highly curved leading edge provide unsurpassed low sound numbers with excellent air performance.
- Back plate and inlet are stamped for consistency, plus dynamic balancing assure smooth, vibration-free operation.
- Riveted or riveted and welded construction ensure superior dependability over other wheel designs.

### Standard Duty, All Welded Wheel

(Standard Duty & High Pressure Belt Drive)

- Blades are curved for improved air performance while increasing their strength and rigidity.
- Back plate and inlet are stamped for consistency. They include a perimeter rim which enhances strength and improves balancing.
- Wheel assembly is robotically welded to provide extremely durable and consistent performance.
- Wheel is dynamically balanced. Balancing weights are mechanically attached to the inside of the rims of both the back plate and wheel inlet. This allows a precise placement of the weights anywhere within a full 360° range on two separate planes, without the possibility of detachment.

## OPTIONS & ACCESSORIES

### Finishes

Coatings such as Polyester Powder Coat, Epoxy Powder Coat, Phenolic Epoxy Powder Coat, and others are available. See the coatings brochure for details.

### Mounting Pedestal

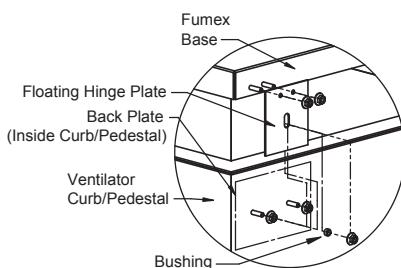
The 12" high mounting pedestal, available in aluminum or galvanized steel, incorporates a removable access panel for easy inspection and service of motor operated back draft dampers. It provides solid ventilator support and a weather resistant seal that does not injure or disturb flashing. This item should not be used with Fatrap units.

### Hinged Sub-Base

Hinged sub-bases provide access to the curb well for damper service or clean out for grease applications. Constructed with a rust proof hinge arrangement and low height (3 1/2") the assembly is easily manipulated and reduces the impact on overall installation height. This accessory is available for use with most all models for either factory built or existing roof curbs.

### Floating Hinge Kit

A floating hinge kit is also available for field installation. This assembly connects the exhauster directly to the roof curb and provides the same level of access as the hinged sub-base.



### Aluminum Bird & Insect Screen

Bird screens are available for all direct and belt drive models. An aluminum insect screen with a smaller mesh than the standard bird screen is also available. However, please note that NFPA 96 installations do not allow the use of bird or insect screens. The requirements of local codes must be reviewed to determine if there are any conflicts.

### Internal Wiring

NEMA 3R wiring is available for both direct and belt drive models.

### Backdraft Dampers

Back draft dampers are available for either gravity or motorized operation (motor kit optional). Dampers feature square galvanized steel frame, multi-leaf, roll formed aluminum blades with nylon bearings. Back draft dampers should not be used when venting kitchen hoods. NFPA 96 installations do not allow the use of dampers. The requirements of local codes must be reviewed to determine if there are any conflicts.

### Safety Disconnect Switch

Safety disconnect switches are available to allow positive electrical shut-off and safety. Switches are factory mounted when factory wiring is requested. Wiring is only run from the motor to the junction box. (Factory wiring of explosion proof applications is not available.) A wide range of NEMA rated enclosures with disconnect switches are available for indoor, outdoor, and explosion proof installations. Disconnects are to be field wired by a licensed electrician.



### Firestat Switch

Firestat switch automatically disconnects the unit when the temperature of the air being exhausted exceeds a preset rating.



### Time-Delay Switch

(Selected direct drive models only) The Airminder Model AM12 switch is a UL recognized and CSA certified time-delay relay that operates both the fan and room light to ventilate an area even after the occupants depart. In the "On" position, the Airminder turns the light and fan on immediately. In the "Off" position, the light goes off immediately and the fan is in operation for a period of time as preset from 1 to 60 minutes. Suitable only for 1/3 HP maximum at 120/1/60.



### Speed Controllers

The Lek-Trol™ controller allows adjustment in speed to a maximum of 50% reduction, which results in a very cost effective means for system balancing. The device can be located under the fan dome to prevent unauthorized tampering or on the wall for ease of operation by the building occupants. (Available on direct drive units with ODP motors and some select TE motors. See reference table under Motor Availability)



### Automatic Belt Tensioner

The factory mounted Automatic Belt Tensioner accessory eliminates the need for re-tensioning the belt after start-up. It is constructed from 10 gage galvanized steel and incorporates five torsion springs to automatically position the motor and maintain proper belt tension. Additional benefits include reduced belt and pulley wear and simplified belt replacement without tools. The Automatic Belt Tensioner is available for Fumex models FX08B, FX10B, FX12BH, FX13B, FX13BHFT and FX14B with 1/4, 1/2, 3/4, and 1 HP ODP motors. It can also be used with 1.5 HP, 3-phase ODP motors.

### Spark Resistant Construction

AMCA 'B' construction is available as standard construction on direct drive units and as an option on belt drive units (not available on heat and smoke removal units). If required, an explosion proof motor and disconnect may be selected as options.

### Wall Mounting

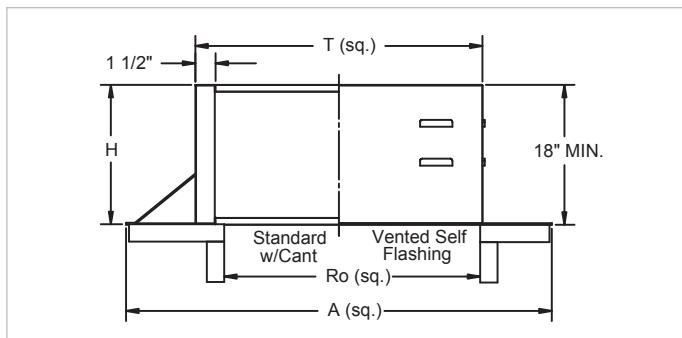
This option is provided as a separate product line, whose models include a "W" prefix. Product line includes models up to size 24, motors up to 2HP, and round bases (not available on heat and smoke removal units).

### Prefabricated Curb

A variety of sizes of prefabricated roof curbs are available. Galvanized steel unibeam curbs are the most popular. For a complete listing of all curb types and sizes available, see the latest PennBarry Ventilation Curb brochure. Please note that NFPA 96 installations require a specific curb height. See Fatrap configuration on the next page.

## OPTIONS & ACCESSORIES

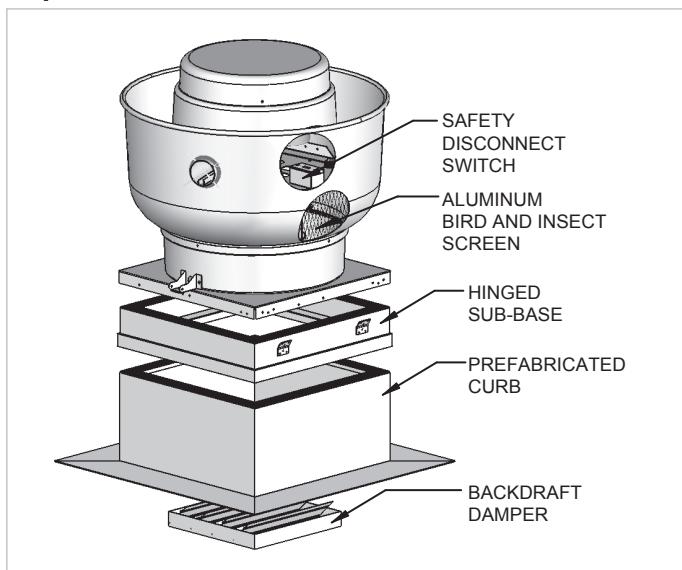
### Fumex Curb



Model	E <sup>(4)</sup> SQ	T <sup>(2)</sup> SQ	A SQ	Ro <sup>(3)</sup> SQ	Damper Size SQ	Galv. Steel Gauge
FX08S/R	18.5	17	25	9	8.75	18
FX10S/R	18.5	17	25	11.5	11.25	18
FX11V/S/R/Q	18.5	17	25	11.5	11.25	18
FX13V/S/R/Q	18.5	17	25	11.5	11.25	18
FX16V/S/R/Q1/Q2	20.5	19	27	16	15.75	18
FX18V	28.5	27	35	20	19.75	18
FX08B to FX14B	24.75	23.25	31.25	16	15.75	18
FX12BH	24.75	23.25	31.25	16	15.75	18
FX13BHFT	24.75	23.25	31.25	16	15.75	18
FX16B and FX18B	28.5	27	35	20	19.75	18
FX18BH	28.5	27	35	20	19.75	18
FX24B	33.5	32	40	25	24.75	18
FX24BH	33.5	32	40	25	24.75	18
FX27B and FX30B	36.5	35	43	28	27.75	18
FX36B	44.5	43	51	36	35.5	18
FMX50B	59	57.5	65.5	50	49.5	18

Standard heights "H" are 8", 12", and 18" including wood nailing. "T" dimension of curb is 1 1/2" less than the dimension of inside base of fan ("E"). "Ro" refers to Roof Opening. "E" dimension is inside base of fan. For FT (Fatrap) units, curbs are cantless, 18" high and optionally vented.

### Exploded View



### Fatrap Configuration

Fatrap configured fans are ideal for use in commercial kitchens over grilles, charcoal broilers, deep fat fryers, steam tables, ranges, dishwashers, and other appliances. Fumex fans are specially configured for food service applications with the addition of a group of accessories that either meets a requirement or eases installation requirements according to NFPA 96. NFPA 96 "Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations" is the generally recognized authority nationwide for restaurant installation requirements. However, local codes may vary.

Included in the units are the following.

- UL 762 Listing:** Fatrap configured Fumex fans are listed at 400°F — 100°F higher than UL requirements. The high temperature rating is the result of the fan's highly efficient forced motor cooling capability. Three direct drive (sizes 13 – 18) and all belt drive models are listed.
- Pre-wired Junction Box:** A weather-proof junction box is factory wired and mounted to the housing exterior. An appropriately sized disconnect switch is commonly selected as an additional option. These items meet the code requirements for positive electric shut-off.
- Grease Collector/Separator Box:** Designed for easy installation, the grease is routed from a single swiveling collection spout to an amply sized durable galvanized steel box, trapping grease and residue, and avoiding discharge onto the roof surface. Additionally, these boxes separate the water from the grease, prolonging the time required between periodic maintenance.

### Additional Fatrap Accessories

**Ventilated Curbs and Pedestals:** For buildings two stories or higher NFPA 96 requires the use of ventilated mounting curbs or pedestals to provide an approved arrangement for connecting a range hood and duct work to the roof fan. PennBarry's ventilated mounting curbs and pedestals, 18" high, comply with that standard when properly installed. Ventilated curbs have a flat mounting flange for fastening directly to the roof deck. This flange should be securely fastened and flashed to ensure weather tightness. Ventilated pedestals are designed to fit on an existing curb. They provide cap flashing when so installed.

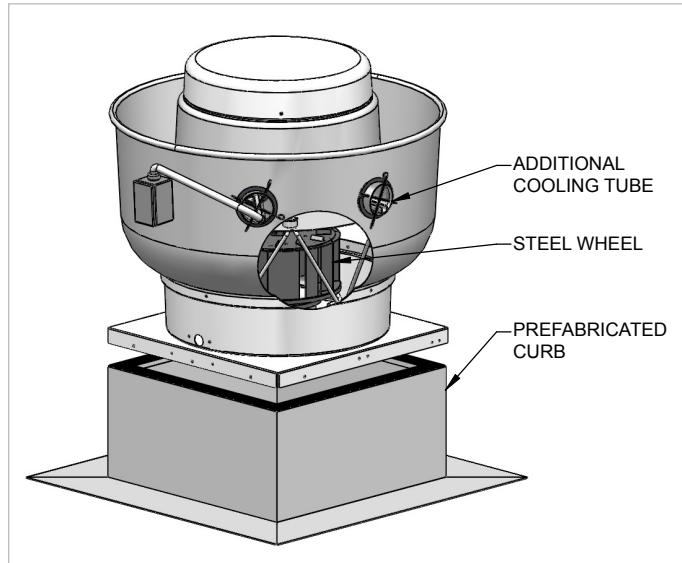
**Make-Up Air Units (Suplex):** Fumex fans with the Fatrap configuration can be combined with a PennBarry FS Muffan fan to create an integrated unit called the Suplex. The Fumex handles the required air flow to be exhausted while the Muffan provides an appropriate amount of supply make-up air. The modular design of the Suplex means that just one roof opening is needed for both the exhaust and supply ducts. An insulated shield divides the base to separate the exhaust and make-up air compartments, and prevents heat transfer between hot exhaust air and fresh filtered air. This results in a complete air-tight seal between the hood and exhaust fan.

## OPTIONS & ACCESSORIES

### Heat & Smoke Removal Configuration

While Fumex fans are commonly used for general ventilation, they are also designed to discharge contaminated or grease-laden air or fumes up and away from building surfaces with the Fatrap option and when equipped with the Heat and Smoke Removal option, this series of fans incorporates features exclusively designed to exhaust heat and smoke in the event of fire. During these emergencies, the fans are designed to operate at the temperature and time limits stated below. To maintain power to these fans during emergencies, special consideration must be made for field power supply. In the event of an emergency, if power is maintained, the units will operate for the times and temperatures indicated, after which they will continue to operate until they are destroyed by the extreme temperature generated during an actual fire, or their roof structure collapses.

For smoke control systems, Heat and Smoke Removal configured fans are listed per UL for emergency smoke removal, referencing UL705, UL793, Industrial Risk Insurers (IRI), and Southern Building Code Congress International (SBCCI).



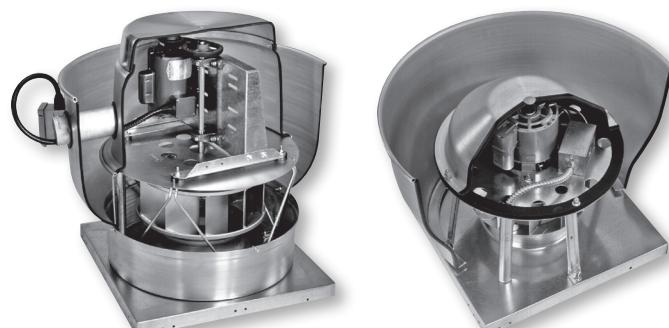
The UL standard requires the fan to run at 500°F for 4 hours (IRI) and 1000°F for 15 minutes (SBCCI). PennBarry Heat and Smoke Removal configured Fumex units are listed at 500°F for 4 hours and 1000°F for 1 hour. The additional 45 minutes at 1000°F will buy precious time in the event of a fire.

**Steel Wheel:** The wheel is a standard duty, all welded wheel (standard duty and high pressure belt drive). The blades are curved for improved air performance while increasing their strength and rigidity. The wheel assembly is fully welded to provide extremely durable and consistent performance. The wheel is dynamically balanced. Balancing weights are mechanically attached to the inside of the rims of both the back plate and wheel inlet. This allows a precise placement of the weights anywhere within a full 360° range on two separate planes, without the possibility of detachment.

**Forced Motor Cooling:** Motors and drive components are located out of the airstream in a separate compartment. Two cooling tubes are located between the motor dome and discharge apron which enables fresh air to be drawn into the motor compartment during fan operation. This allows the cooler outside air to wash over the motor and bearings. This positive cooling promotes longer life for the motor and drive components.

### High Wind Construction

High wind construction Fumex fans are specifically designed for high wind hurricane zones (HWHZ). The Fumex models are designed to withstand 150 MPH winds in accordance with Miami-Dade and Florida Building Code standards. The units are 3rd party tested and certified through a 3rd party Professional Engineer (P.E.) to meet these strict standards. Installation details are provided and since there are no tie downs or external braces required for attaching the unit to the roof or curb this makes installation simple and easy. A wide range is offered to meet all of your ventilation needs which includes all belt and direct drive sizes 36 and under.



### Product Certifications:

- Miami-Dade NOA # 14-0311.03
- Florida Product Approval #12339
- Texas Department of Insurance # RV-48

Belt Drive  
Fumex Cutaway

Direct Drive  
Fumex Cutaway

## MOTOR AVAILABILITY



### Green Plus Electronically Commutated Motor

The Green Plus (GP) option utilizes EC motors to provide significantly greater efficiency, flexibility, and controllability over standard direct drive permanent split capacitor (PSC) motors. Using the included potentiometer, the Green Plus motors can be turned down to as low as 80% the max operating speed while maintaining 90% efficiency through the operating range. Additionally, the Green Plus can accept 0-10V input to tie to building management systems, allowing for savings in not only direct fan energy consumption but reducing the exhaust of conditioned air during off peak hours as well. All Green Plus motors come in open enclosure for usage with 115-208/230V, single phase, 60 Hz applications.

Model	Size	Tap	ECM HP
WFX/FX	08	S	0.33
	08	R	0.33
	10	S	0.33
	10	R	0.33
	11	V	0.33
	11	S	0.33
	11	R	0.33
	11	Q	0.33
	13	V	0.33
	13	S	0.33
	13	R	0.33
	13	Q	0.33
	16	V	0.33
	16	S	0.50
	16	R	0.50
	16	Q1	0.50
	16	Q2	0.75
	18	V	0.75

### NEMA Motor

This chart summarizes the largest allowable NEMA frame sizes for motors used on belt drive models.

### Largest Available NEMA Frame Size per Model

Model	Max. Frame Size	Model	Max. Frame Size
FX08B	56	FX18B	145T
FX10B	56	FX18BH	145T
FX12BH	56	FX24B	184T
FX13B	56	FX24BH	184T
FX13BHFT	56	FX27B/FX30B	184T
FX14B	56	FX36B	213T
FX16B	145T	FMX50B	215T

**At PennBarry's option, large frame motors may be removed after testing and shipped separately.** Contact the factory for special application motor availability.

### Variable Speed Motor Control

PennBarry offers Lek-Trol™ solid state controllers to alter the high speed of most direct drive motors by as much as 50%. If variable speed is required, check the Lek-Trol™ availability table below to verify that controllers exist for the fan model selected. Remember, Lek-Trol™ controllers are currently only available for direct drive motors including all standard Open Drip Proof (ODP) 60 Hz motors. Not all totally enclosed motors are currently available with variable speed control. Inverter rated motors suitable for use with variable frequency drives can be supplied for belt drive models. Contact your local PennBarry representative for availability.

### Available Lek-Trol™ Speed Controls

Model	60 Hz					50 Hz		
	ODP	Totally Enclosed				Totally Enclosed		
		115V	115V	200V	208V	230V	110V	220V
FX08S	-	-	-	-	-	-	-	-
FX08R	LT25	-	-	-	-	-	-	-
FX10S	-	-	-	-	-	-	-	-
FX10R	LT30	LT30	LT35	LT35	LT35	LT30	LT35	LT35
FX11V	-	-	-	-	-	-	-	-
FX11S	-	-	-	-	-	-	-	-
FX11R	LT30	-	-	-	-	-	-	-
FX11Q	LT50	-	-	-	-	-	-	-
FX13V	-	-	-	-	-	-	-	-
FX13S	-	-	-	-	-	-	-	-
FX13R	LT30	LT30	LT35	LT35	LT35	LT50	LT35	LT35
FX13Q	LT45	LT50	LT35	LT35	LT35	LT50	LT35	LT35
FX16V	-	-	-	-	-	-	-	-
FX16S	-	-	-	-	-	-	-	-
FX16R	LT50	-	-	-	-	-	-	-
FX16Q1	LT40	-	-	-	-	-	-	-
FX16Q2	LT75	-	-	-	-	-	-	-
FX18V	LT60	-	-	-	-	-	-	-

*Lek-Trols™ indicated for multi-speed models (eg., FX16V/S/R) are applicable only for the high speed. Do not use on low or medium speed for multi-speed models. Items noted with (-) are not applicable.*

## MOTOR AVAILABILITY

### Direct Drive Motor Availability

The following chart lists the various motor options available for each of the direct drive fan models. Once a fan model is selected, this chart can be used to determine if a suitable motor is available. (If not, another selection may have to be made from the fan performance charts). Look under the nominal RPM heading to determine which fans have 2-speed and 3-speed motors.

Model	Nominal RPM				1 Phase							
	1050 V	1300 S	1550 R	1725 Q	115 Volts			200 - 240 Volts				
					Open Drip Proof	Totally Enclosed	Explosion Proof	Open Drip Proof	Totally Enclosed	50 hz	50 C Ambient	Explosion Proof (4)
FX08S/R	-	x	x	-	yes	yes (1)	-	Use TE Motors	yes (1)	yes (1)	yes (1)	-
FX10S/R	-	x	x	-	yes	yes (1)	-		yes (1)	yes (1)	yes (1)	-
FX11V/S/R	x	x	x	-	yes	yes (1)	-		yes (1)	yes (1)	yes (1)	-
FX11Q	-	-	-	x	yes	yes	yes		yes	yes	yes	yes (5)
FX13V/S/R	x	x	x	-	yes	yes (1)	-		yes (1)	yes (1)	yes (1)	-
FX13Q	-	-	-	x	yes	yes	yes		yes	yes	yes	yes (5)
FX16V/S/R	x	x	x	-	yes	yes (1)	-		yes (1)	yes (1)	yes (1)	-
FX16Q1	-	-	-	x (3)	yes	-	-		-	-	-	-
FX16Q2	-	-	-	x	yes	yes	yes		yes	yes	yes	yes (5)
FX18V	x	-	-	-	yes	-	-		-	-	-	-

Model	Nominal RPM				3 Phase				
	1050 V	1300 S	1550 R	1725 Q	200 - 460 Volts (2)				
					Open Drip Proof	Totally Enclosed	50 hz	50 C Ambient	Explosion Proof (4)
FX08S/R	-	x	x	-	Use TE Motors	-	-	-	-
FX10S/R	-	x	x	-		-	-	-	-
FX11V/S/R	x	x	x	-		-	-	-	-
FX11Q	-	-	-	x		-	-	-	yes (6)
FX13V/S/R	x	x	x	-		-	-	-	-
FX13Q	-	-	-	x		yes	yes	yes	yes (6)
FX16V/S/R	x	x	x	-		-	-	-	-
FX16Q1	-	-	-	x (3)		-	-	-	-
FX16Q2	-	-	-	x		-	-	-	yes (6)
FX18V	x	-	-	-		-	-	-	-

(1) High speed only.; (2) 200 - 240, 380, 415, 460 V; (3) Nominal 1650 RPM; (4) Cls.I, Grp.D, Div. I / Cls. II, Grp.F & G, Div.I., Not available with 50 Hz.; (5) 230 V only. Not available in 200 or 208 V; (6) 230 V and 460 V only.

## FX08 - FX13 | DIRECT DRIVE

### Performance Data Overview

Fumex direct drive models are available with single and multi-speed motors. Multi-speed motors (eg., FX16V/S/R) are designated: V (1050 RPM), S (1300 RPM), and R (1550 RPM). FX18V is an exception, being a single speed motor. Q, Q2 (1725 RPM) and Q1 (1650 RPM) are single speed motors. A single Fumex fan may be suitable for several requirements by a simple wiring change. This feature provides flexibility for a variety of

reasons, including energy savings, off hours requirements, future expansion, or unexpected field variations.

Fumex direct drive models are available in six sizes (8, 10, 11, 13, 16, and 18). Capacities up to 4500 CFM, with static pressures to 1 1/2".

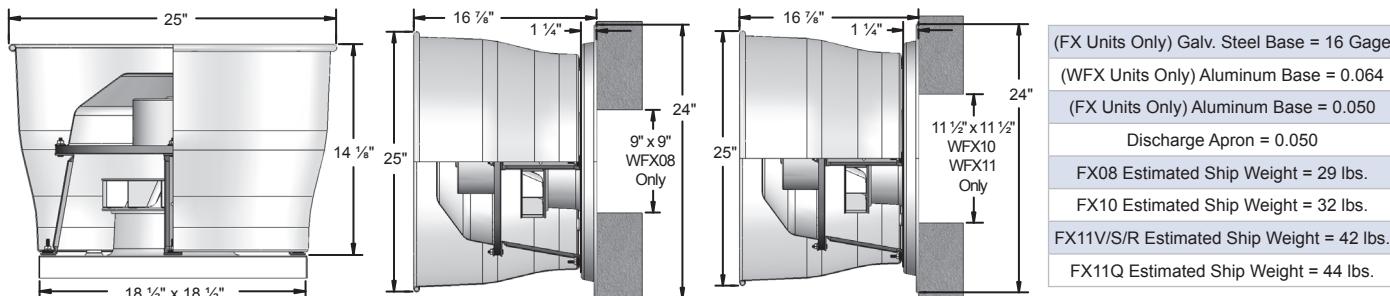
By using Lek-Trol™ variable speed controllers, the high speed flow rate of most models can be reduced by as much

as 50%. Do not use Lek-Trol™ on medium or low speed for multi-speed models.

When compared to belt drive models, direct drive fans require less maintenance, have a simpler construction, cost less, and are lighter in weight.

Performances in 50 Hz applications will be less than shown below; consult your local PennBarry representative.

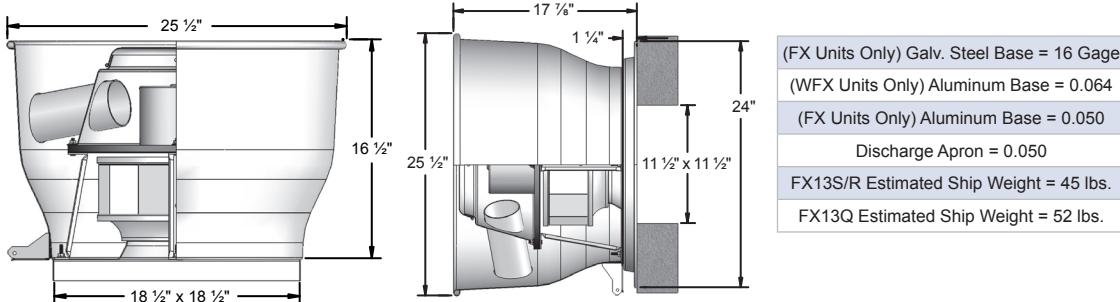
### FX08 - FX11



Model	Nominal			Tip Speed FPM	0.000" SP		0.125" SP		0.250" SP		0.375" SP		0.500" SP		0.625" SP		0.750" SP		1.000" SP	
	HP	Max Watts	RPM		CFM	Sones														
FX08S	1/50	44	1300	3361	247	1.3	150	2.0	94	3.2	54	4.3	-	-	-	-	-	-	-	-
FX08R	1/30	55	1550	4007	288	2.4	205	2.9	154	3.5	112	4.4	72	5.2	-	-	-	-	-	-
FX10S	1/25	85	1300	3361	400	3.5	309	3.8	246	4.1	194	4.6	152	5.0	109	5.5	57	6.1	-	-
FX10R	1/12 <sup>(1)</sup>	122	1550	4007	570	6.2	500	6.6	440	6.8	385	6.8	325	6.8	251	6.9	170	7.1	-	-
FX11V	1/25	103	1050	3058	406	1.9	225	2.2	151	3.6	119	4.2	87	4.8	57	5.5	-	-	-	-
FX11S	1/11	142	1300	3786	534	3.9	414	4.2	337	5.1	273	5.9	223	6.2	177	6.5	129	6.9	-	-
FX11R	1/6 <sup>(2)</sup>	199	1550	4514	760	7.6	667	7.4	586	7.6	512	7.9	434	8.9	359	9.6	283	9.6	118	9.7
FX11Q	1/5	255	1725	5024	1034	10.7	959	10.5	883	10.5	804	10.5	722	10.6	631	10.9	538	10.7	313	9.7

(1) TE motor is 1/6 Hp. (2) TE motor is 1/7 Hp. See additional notes on page 11.

### FX13

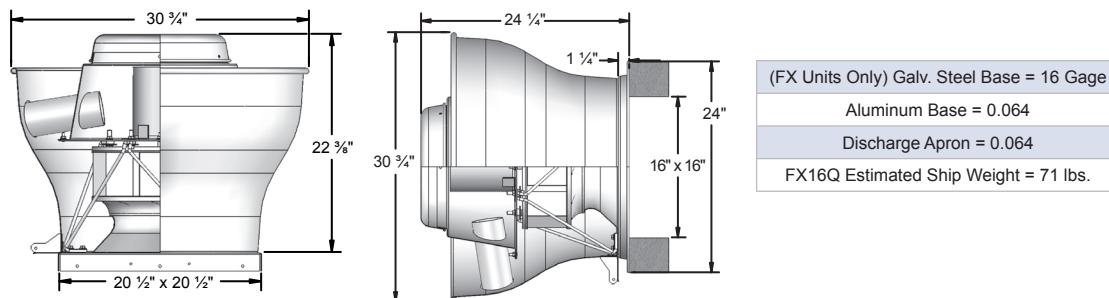


Model	Nominal			Tip Speed FPM	0.000" SP		0.125" SP		0.250" SP		0.375" SP		0.500" SP		0.625" SP		0.750" SP		1.000" SP		1.250" SP	
	HP	Max Watts	RPM		CFM	Sones																
FX13V	1/20	113	1050	3221	640	4.2	469	2.8	317	2.4	250	3.1	197	3.8	149	4.5	106	5.2	-	-	-	-
FX13S	1/12	148	1300	3988	845	7.4	735	6.4	612	5.2	492	5.0	404	5.3	334	5.7	270	6.1	136	7.0	-	-
FX13R	1/6	188	1550	4755	1057	10.5	980	10.1	908	9.6	825	8.6	733	8.1	646	8.1	561	8.2	376	8.2	144	8.5
FX13Q	1/4	343	1725	5292	1261	13.6	1198	13.0	1143	12.6	1093	12.1	1033	11.7	973	11.2	909	10.8	757	10.1	515	9.6

See notes on page 11.

## FX16 - FX18 | DIRECT DRIVE

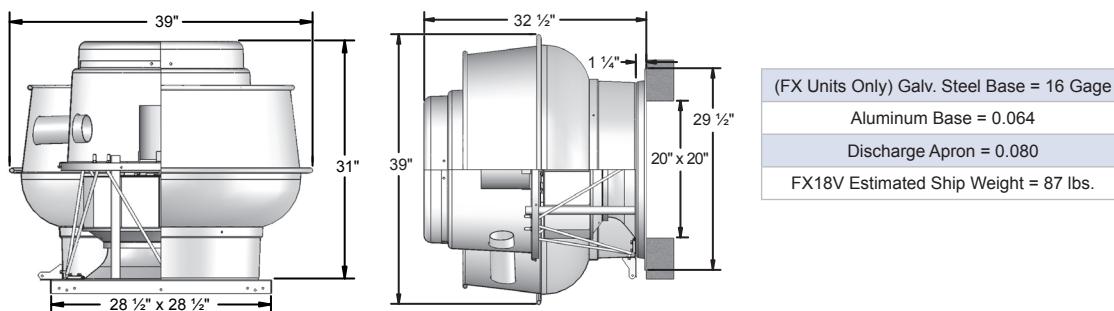
## FX16



Model	Nominal			Tip Speed FPM	0.000" SP		0.125" SP		0.250" SP		0.375" SP		0.500" SP		0.625" SP		0.750" SP		1.000" SP		1.250" SP		1.500" SP	
	HP	Max Watts	RPM		CFM	Sones																		
FX16V	1/6	485	1050	3788	1604	7.9	1358	6.5	1128	5.5	951	5.8	801	6.3	705	6.9	644	7.7	522	9.2	384	9.3	230	9.7
FX16S	1/3	527	1300	4690	1874	10.7	1693	9.5	1514	8.6	1326	8.0	1158	7.6	1023	7.7	913	8.2	735	9.6	572	9.7	379	9.9
FX16R	1/3 <sup>(1)</sup>	590	1550	5592	2140	12.8	1994	11.9	1849	11.0	1709	10.2	1561	9.9	1410	9.6	1269	9.4	1033	9.7	812	11.1	583	10.8
FX16Q1	1/2	715	1650	5953	2531	15.2	2432	14.7	2332	14.2	2232	13.7	2114	13.1	1992	12.5	1868	11.9	1582	11.0	1320	11.5	1001	12.1
FX16Q2	3/4	890	1725	6223	2822	17.1	2753	16.8	2684	16.5	2594	16.1	2501	15.7	2418	15.4	2331	15.1	2119	14.2	1872	14.1	1566	14.2

(1) TE motor is 1/2 Hp. See additional notes at bottom of page.

## FX18



Model	Nominal			Tip Speed FPM	0.000" SP		0.125" SP		0.250" SP		0.375" SP		0.500" SP		0.625" SP		0.750" SP		1.000" SP		1.250" SP		1.500" SP	
	HP	Max Watts	RPM		CFM	Sones																		
FX18V	3/4	969	1075	6029	4489	21.0	4333	21.0	4177	20.0	4011	19.1	3831	18.1	3652	17.6	3455	17.2	3023	16.5	2431	17.5	1447	20.0

Performance shown is for installation Type A: Free Inlet, Free Outlet. Speed (RPM) shown is nominal. Performance is based on actual speed of test. The sound ratings shown are for loudness values in fan sones at 5'0" (1.5m) in a hemispherical free field per AMCA Standard 301. Values shown are for Installation Type A: free inlet hemispherical sone levels. Performance ratings do not include the effects of appurtenances in the air stream.

Fumex fans are only one component of a total system. As such, fan performance is directly affected by the system. It is critical that system designers determine the actual system loss to ensure that the actual flow is specified in the system design.

## DIRECT DRIVE PERFORMANCE DATA

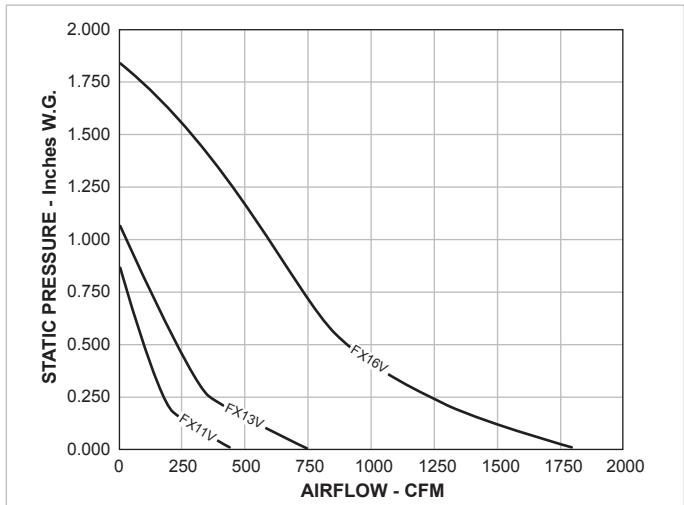
### Fan Curves

The fan curves illustrated here show the range of capacities available for direct drive units. Each graph shows the performance of several models at one particular nominal speed. Fan curves provide a quick method for selecting a fan unit based on design point requirements.

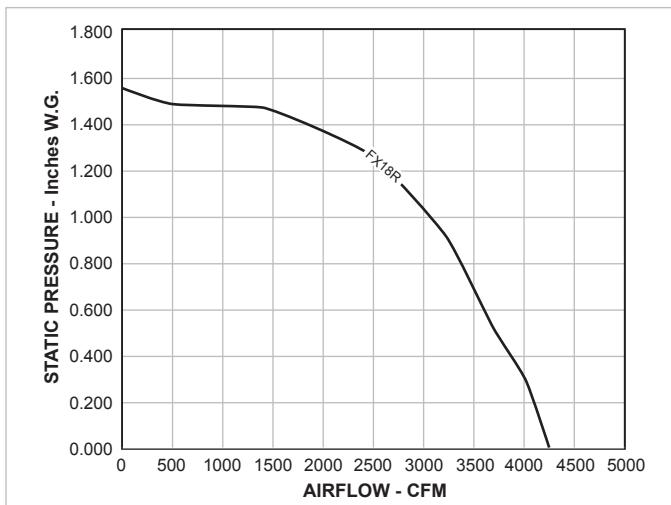
The direct drive performance charts on the previous pages provides the tabular data (CFM and static pressure) used to plot the fan curves. In addition, the horsepower tip speed and sones are tabulated. Since sound is normally an important factor in the selection of a fan, an engineer will usually want to select the "slowest" unit which meets CFM and SP requirements.

Please refer to the Motor Availability section to make sure the motor you select meets your electrical requirements.

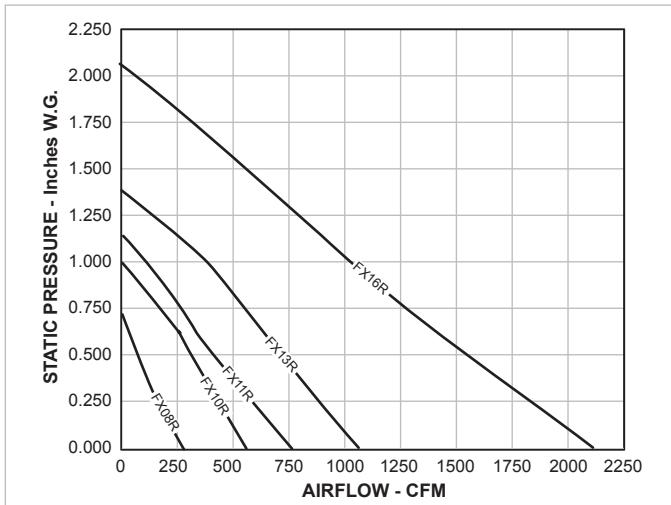
### Nominal 1050 RPM



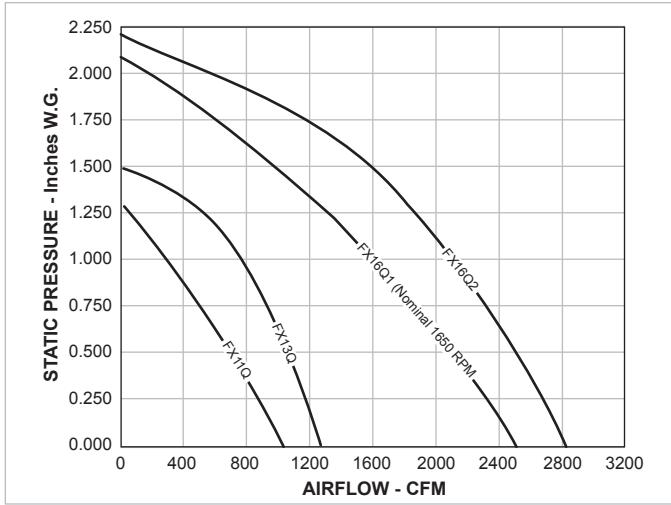
### Nominal 1075 RPM



### Nominal 1300 RPM



### Nominal 1550 RPM



Fumex fans are only one component of a total system. As such, fan performance is directly affected by the system. It is critical that system designers determine the actual system loss to ensure that the actual flow is specified in the system design. Performance shown is for installation Type A: Free Inlet, Free Outlet. Speed (RPM) shown is nominal. Performance is based on actual speed of test. Performance ratings do not include the effects of appurtenances in the air stream.

## BELT DRIVE PERFORMANCE DATA

### Performance Data

The belt drive models shown on the following pages have sizes and capacities ranging from below 250 CFM to above 30,000 CFM, with static pressures from 0" to 4". All models are available with a wide range of horsepower sizes and RPM's. Two-speed motors are commonly used to enhance this flexibility.

The data provided for each belt drive model includes:

- Elevation Drawing Showing Overall Dimensions
- Fan Curve Graph
- Performance Chart

Each curve graphically displays the range of capacities available for each model, in most cases beyond the specifics shown in the tabular data. The maximum performance afforded by each horsepower is indicated by dashed lines and the RPM is indicated by solid lines.

Some models have graphs that show both shaded and unshaded areas. Selection should be made from the unshaded area only. Shaded areas reflect unstable performance ("surge"), a characteristic typical of backward inclined wheels, and should be avoided. These unstable regions are not shown in the tabular data.

The highest RPM shown for a specific horsepower in the tabular data is the maximum speed that for any point along the performance curve, the BHP will not exceed the available horsepower.

It is important to note that while it is common industry-wide practice to exceed a "nominal" horsepower by using a motor's service factor, PennBarry uses a conservative portion of the service factor, allowing half to remain a true "safety" factor.

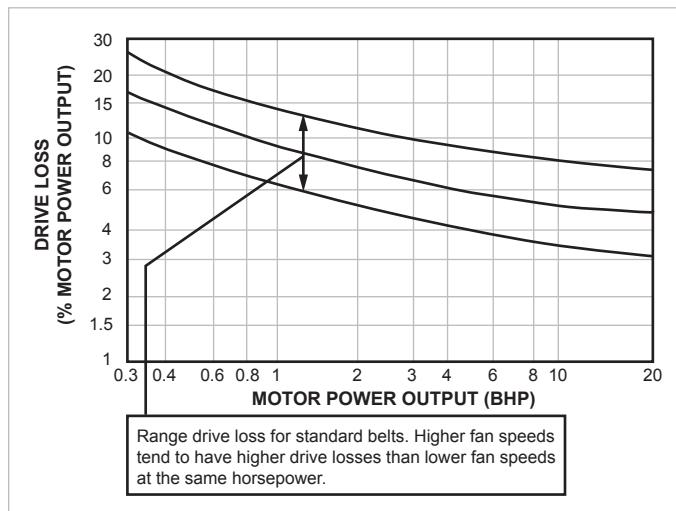
Use the Motor Availability chart (see Motor Selection) to select motor enclosures and voltages which can be installed in the fans.

*Note: Fumex fans are only one component of a total system. As such, performance is directly affected by the system. It is critical that system designers determine actual system losses to ensure that the actual flow is specified in the system range.*

### Belt Drive Losses

The AMCA Review Committee has developed the chart shown below for the purpose of estimating belt drive losses. To calculate total BHP (including drive losses): Find the BHP of your operating point on the x-axis on the graph below. Follow the vertical line to the curves indicating the range of drive losses. Look at the y-axis on the left and find the drive loss percentage. Calculate the total BHP by adding the drive loss to the operating point BHP. For BHP's below 0.3, use 30%.

### Drive Loss Reference Chart



*For totally enclosed, explosion proof, multi-speed and all 1.0 Service Factor motors, fan BHP plus drive losses should not exceed motor rated HP.*

*Graph reprinted from AMCA publication 203, with the express written permission from the Air Movement and Control Association, Inc., 30 West University Drive, Arlington Heights, IL 60004-1983.*































## ENGINEERING SPECIFICATIONS

### Model

FX = Centrifugal Fan  
WFX = Wall Mounted Centrifugal Fan  
FMX = High Capacity Centrifugal Fan

### Unit Size

08, 10, 11, 12, 13, 14, 16,  
18, 24, 27, 30, 36, 50

### Drive Type

D = Direct Drive  
B = Belt Drive

### Motor Tap

Q = 1725 RPM  
R = 1550 RPM  
S = 1300 RPM  
V = 1050 RPM  
Q1 = 1650 RPM  
Q2 = 1725 RPM

### Motor Speed

1 = Single Speed  
2 = 2S2W Single & Three Phase  
3 = 2S1W Three Phase

### Horse Power

1/50	1/12	1/5	3/4	3
1/30	1/11	1/4	1	5
1/25	1/7	1/3	1 1/2	7 1/2
1/20	1/6	1/2	2	10

### Enclosure

O = Open Drip Proof  
T = Totally Enclosed  
E = Explosion Proof  
X = Special

### Voltage

A = 110V	G = 230V	N = 440V
B = 115V	H = 240V	P = 460V
C = 120V	J = 277V	Q = 480V
D = 200V	K = 380V	R = 575V
E = 208V	L = 400V	S = 600V
F = 220V	M = 415V	X = Special

### Phase

1 = Single  
3 = Three

### Cycle

5 = 50 Hz  
6 = 60 Hz

### Efficiency

S = Standard  
H = High Efficiency

### Paint / Coating

0 = None  
F = Epoxy Powder Coat\*  
G = Epoxy Powder Coat with UV\*  
H = Hi-Temp Powder Coat\*  
J = Non-stick Powder Coat\*  
K = Phenolic Powder Coat\*  
L = Phenolic Powder Coat with UV\*  
N = Polyester Powder Coat  
X = Special  
*\* Not available with choice of color.*

### Color

0 = None  
50 = Chrome Green  
53 = Williamsburg Blue  
55 = Pale Green  
56 = Dove Gray  
61 = White  
63 = Oxford Beige  
65 = Dover White  
66 = Desert Tan  
70 = Black  
73 = Smoke Gray  
77 = Brick Red  
79 = Peppercorn  
81 = Pale Brown  
83 = Chocolate Brown  
85 = Timeless Bronze  
94 = Charcoal  
X = Special

### AMCA Spark Rating

0 = None  
C = Standard  
B = Optional

### Damper

0 = None  
BDD = Gravity Back Draft Damper  
MD1 = Gravity Back Draft Damper 115V  
MD2 = Gravity Back Draft Damper 230V  
MD4 = Gravity Back Draft Damper 460V  
ED1 = Explosion Proof Motor  
Operated Damper 115V

### Screen

0 = None  
B = Bird Screen  
S = Insect/Bird Screen

### Roof Curb

0 = None	K = UCA18	V = UG18
A = UCG8	L = UG12	W = URA12
B = UCG12	M = SA16	Y = URA18
C = UCG18	N = SFG12	1 = URG12
D = UCA8	P = SFG18	10 = SFA8
E = UCA12	Q = SG16	11 = USCG
F = SFA12	R = SRA16	12 = USCA
G = SFA18	S = SRG16	2 = URG18
H = SCG16	T = UA12	4 = UVA18
J = SCA16	U = UA18	5 = UVG18

### Slope

0 = None  
S = Single  
D = Double

### Metal Liner

0 = None  
L = Metal Liner

### Damper Holding Plate

0 = None  
P = Damper Holding Plate

### Neoprene Gasket

0 = None  
G = Gasket

### No Wooden Nailer

0 = None  
N = No Wooden Nailer

### Curb Paint/Coating

B = Air Dried Epoxy  
Q = Enamel

### Hinged Sub-base

0 = None  
H = Hinged Sub-base

### Mounting Pedestal

0 = None  
P = Mounting Pedestal

### Floating Hinge Kit

0 = None  
H = Floating Hinge Kit

### Aluminum Base

0 = None  
A = Aluminum Base

### Thermal Overload Protection

0 = None  
P = Thermal Overload Protection

### Disconnect Switch

0 = None  
1 = NEMA 1 Disconnect Switch  
3R = NEMA 3R Disconnect Switch  
4 = NEMA 4 Disconnect Switch  
7 = NEMA 7 Disconnect Switch  
9 = NEMA 9 Disconnect Switch

### Internal Wiring

0 = None  
1 = NEMA 1 Internal Wiring  
3R = NEMA 3R Internal Wiring

*Continued, next page.*

## ENGINEERING SPECIFICATIONS

**Transformer**

0 = None  
T = Transformer

**Speed Controller**

0 = None  
L = Loose  
M = Mounted

**Firestat Switch**

0 = None  
F = Firestat Switch

**Fatrap**

0 = None  
F = Fatrap

**Heat & Smoke Removal**

0 = None  
-HS = Heat & Smoke Removal

**Wall Mount**

0 = None  
W = Wall Mount

**High Pressure Wheel**

0 = None  
H = High Pressure Wheel

**High Wind Construction**

0 = None  
M = Miami Dade Approved

### Fumex - Direct Drive Units

Direct drive centrifugal roof exhaust upblast fan shall be Fumex FX, manufactured by PennBarry, Plano, TX 75074. The housing shall be weatherproof, utilize heavy gauge spun aluminum construction with a large rolled bead for strength, with galvanized (aluminum optional) base, with rigid galvanized steel internal support structures. Housing shall not provide any of the internal structural support. Units shall be equipped with an oversized electrical conduit chase through the curb cap and into the motor compartment for ease of wiring (except Explosion Proof). Units shall be pre-wired to a junction box mounted in the motor compartment and equipped with an electrical disconnect device (except Explosion Proof).

Statically and dynamically balanced backward inclined, centrifugal wheels shall be aluminum, spark-resistant, nonoverloading, and matched to deeply spun venturis. Motors shall be continuous duty, permanently lubricated, multispeed (for applicable models), have thermal overload protection, mounted out of the main airstream, be easily accessible for service, and furnished at the specified voltage, phase and enclosure. Each fan shall bear the AMCA Certified Ratings Seal for Air and Sound Performance, and shall be UL (UL Std. 705, UL Std. 762 optional applicable models) and CSA listed. If specified (Fatrap option), fan shall additionally provide UL 762 Listing rated at 400°F, motor pre-wired to a weather-proof junction box, and drain connection leading into a grease collector/separator box.

### Fumex - Belt Drive Units

Belt drive centrifugal roof exhaust upblast fan shall be Fumex FX/FMX, manufactured by PennBarry, Plano, TX 75074. The housing shall be weatherproof, utilize heavy-gauge spun aluminum construction with a large rolled bead for strength, with galvanized (aluminum optional except FMX) base, with rigid galvanized steel internal support structures. Housing shall not provide any of the internal structural support. Large diameter cooling tube shall provide ambient air to flow over motor. Units shall be equipped with an oversized electrical conduit chase through the curb cap and into the motor compartment for ease of wiring (except Explosion Proof). Units shall be prewired to a junction box mounted in the motor compartment and equipped with an electrical disconnect device (except Explosion Proof).

Statically and dynamically balanced backward inclined, centrifugal wheels shall be aluminum, spark-resistant, nonoverloading, and be matched to deeply spun venturis. Motors shall be continuous duty, ball bearing design, permanently lubricated, mounted out of the main airstream, and furnished at the specified voltage, phase, and enclosure. Shafts shall be turned, ground and polished. Heavy duty ball bearings are rated for a minimum L50 life exceeding 200,000 hours. Pulleys shall be adjustable, cast iron, machined, keyed, securely attached, and sized for 150% of the horsepower at its rated maximum speed. Each fan shall bear the AMCA Certified Ratings Seal for Air and Sound Performance (FX) or for Air performance (FMX), and shall be UL (UL Std. 705, UL Std. 762 optional) and CSA listed. If specified (Fatrap option), fan shall additionally provide UL 762 Listing rated at 400°F. (300°F FMX), motor pre-wired to a weather-proof junction box, and drain connection leading into a grease collector/separator box. If specified (heat and smoke removal option), fan shall additionally provide UL listing rated for 500°F at 4-hours and 1000°F at 1 hour, including steel wheel and additional cooling tube.



## PennBarry Product Solutions

### COMMERCIAL

Roof & Wall Exhaust Centrifugal Fans  
Ceiling, Wall, & Inline Centrifugal Fans  
Roof Supply Centrifugal Fans  
Square & Round Centrifugal Fans  
Wall Mounted Axial Fans  
Hooded Roof Axial Fans  
Upblast Roof Axial Fans  
Gravity Ventilators  
Roof Curbs

### INDUSTRIAL

Utility Vent Sets  
Freestanding Centrifugal Fans  
Industrial & Material Handling Fans  
Tubular Centrifugal Inline Fans  
Mixed Flow Centrifugal Fans  
Plug & Plenum Fans  
Wall Mounted Propeller Fans  
Tube Axial Fans  
Vane Axial Fans  
Bifurcator Fans  
Fume Exhaust

### ENERGY RECOVERY

Outdoor Units  
Indoor Units

### KITCHEN VENTILATION

Kitchen Hoods  
Make-Up Air Units  
Exhaust Fans



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