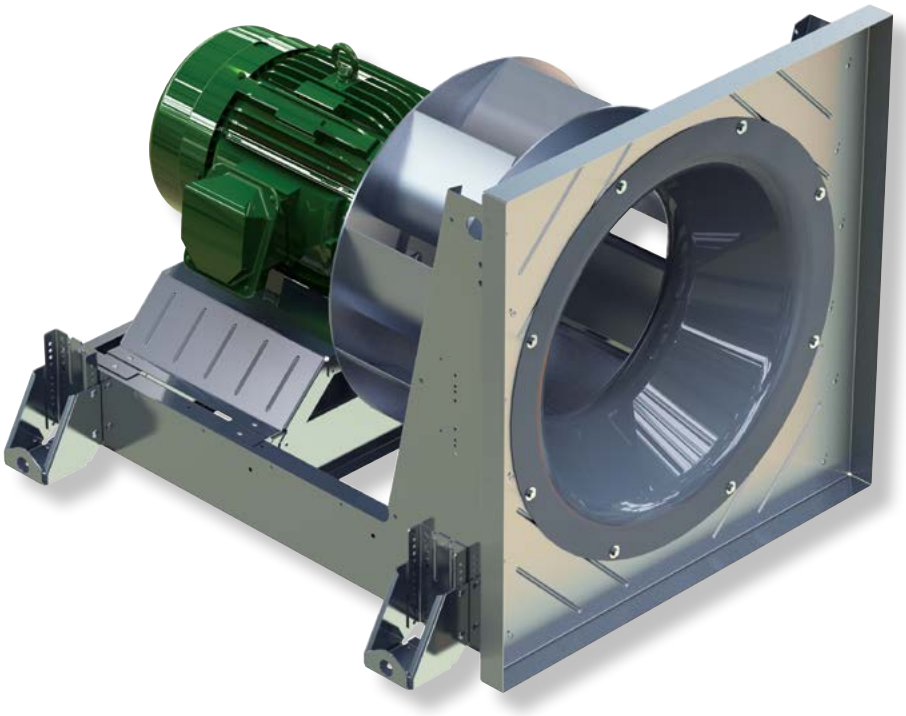
TCF

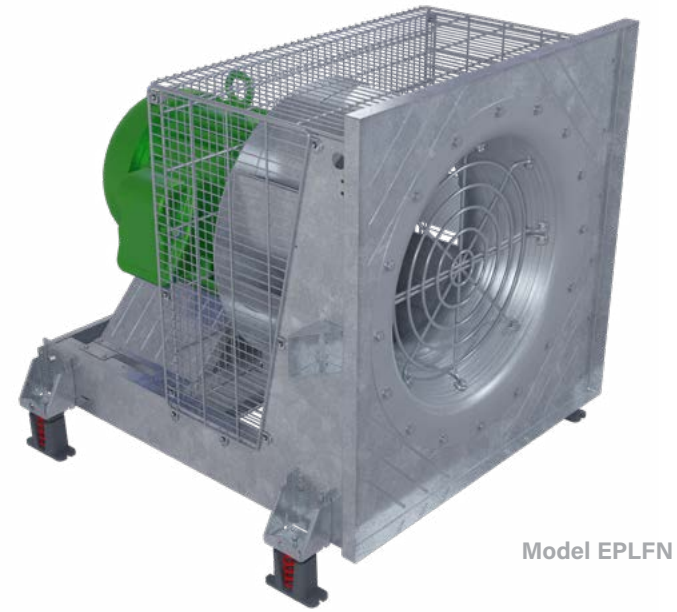
TWIN CITY FAN

INDUSTRIAL PROCESS AND
COMMERCIAL VENTILATION SYSTEMS

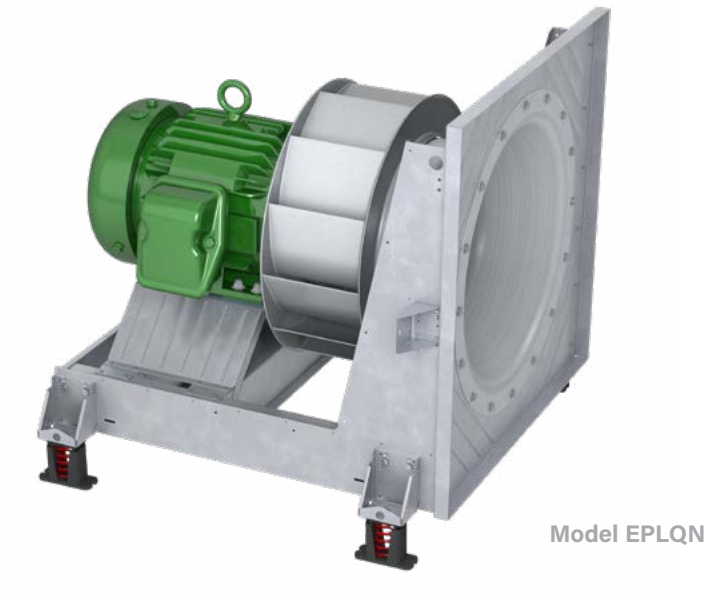
COMMERCIAL DUTY PLENUM FANS

EPLFN | EPLQN





Model EPLFN



Model EPLQN

Twin City Fan & Blower certifies that the Model EPLFN and Model EPLQN Plenum 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*.

Overview

EPLFN I EPLQN

Plenum fans are unhoused fans designed to operate inside of field-fabricated or factory-built air handling units.

The fan impeller pressurizes the entire surrounding air plenum in which the fan is installed, allowing air ducts from any direction to be directly connected to the air handling unit enclosure. This design generally saves space by eliminating the fan housing, transitions and diffusers within the air handling unit.

Plenum fans have found a ready acceptance in the air conditioning industry. In addition, the construction versatility, adaptability in the direction of the discharges, suitability for internal isolation and application of sound panels, and generally lower cost makes it a very popular fan arrangement.

Benefits of a Plenum Fan

Saves Space – There are no housings, transitions or diffusers within the air handling unit.

Efficiency – Plenum fans can be as efficient or more efficient than scroll type fans at specific operating points towards the bottom of the fan curve.

Lower cost – Plenum fans are less expensive than scroll type fans.

Models EPLFN & EPLQN (Arrangement 4)

Twin City Fan & Blower's models EPLFN and EPLQN commercial duty plenum fans incorporate the same performance and quality characteristics of the E-Series plenum fans, but in a lighter weight, more economical design. The innovative fan structure and adjustable frame assembly are both patent pending designs. The EPLFN and EPLQN offer a competitive cost advantage over full-framed plenum fan designs in light- to medium-duty applications with static pressures of 12" w.g. or less.

The compact direct drive EPLFN and EPLQN offers reduced maintenance by eliminating shafts, bearings and V-belt drives. The EPLFN and EPLQN are a great choice for applications requiring clean airstreams as there is no belt residue in the airstream. The arrangement 4 configuration offers space savings with a reduced fan footprint. Different performance points can be achieved either through impeller width reduction or varying motor speeds. Models EPLFN and EPLQN are AMCA certified for Sound and Air.

Overview

EPLFN I EPLQN

EPLFN
The model EPLFN features a highly efficient and cost effective, 9-bladed airfoil impeller design. The high efficiency of the EPLFN will often allow the use of smaller fans without increasing power requirements.

EPLQN
The Better Sound Quality model EPLQN features a 12-bladed airfoil impeller design that flattens the sound spectrum and reduces the dominance of pure tones.

Sizes
12.25" to 49" impeller diameters (315 mm to 1,245 mm)

Performance
Airflow to 68,800 CFM (116,900 m^3/hour)
Static pressure to 12" w.g. (2,980 Pa)

Classes
Class I available in sizes 122MK2 – 365MK2
Class II available in sizes 122MK2 – 490
Class III available in sizes 165MK2 – 365MK2

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.

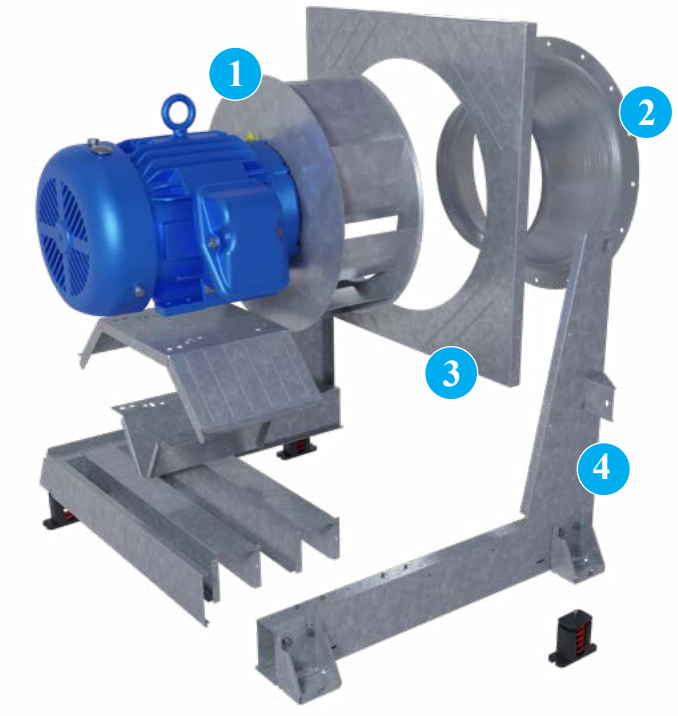
Construction Features

1. **Impellers** High efficiency, non-overloading airfoil impellers are provided on all EPLFN and EPLQN fan sizes. Aluminum impellers are standard on all sizes. All impellers balanced to level G6.3.

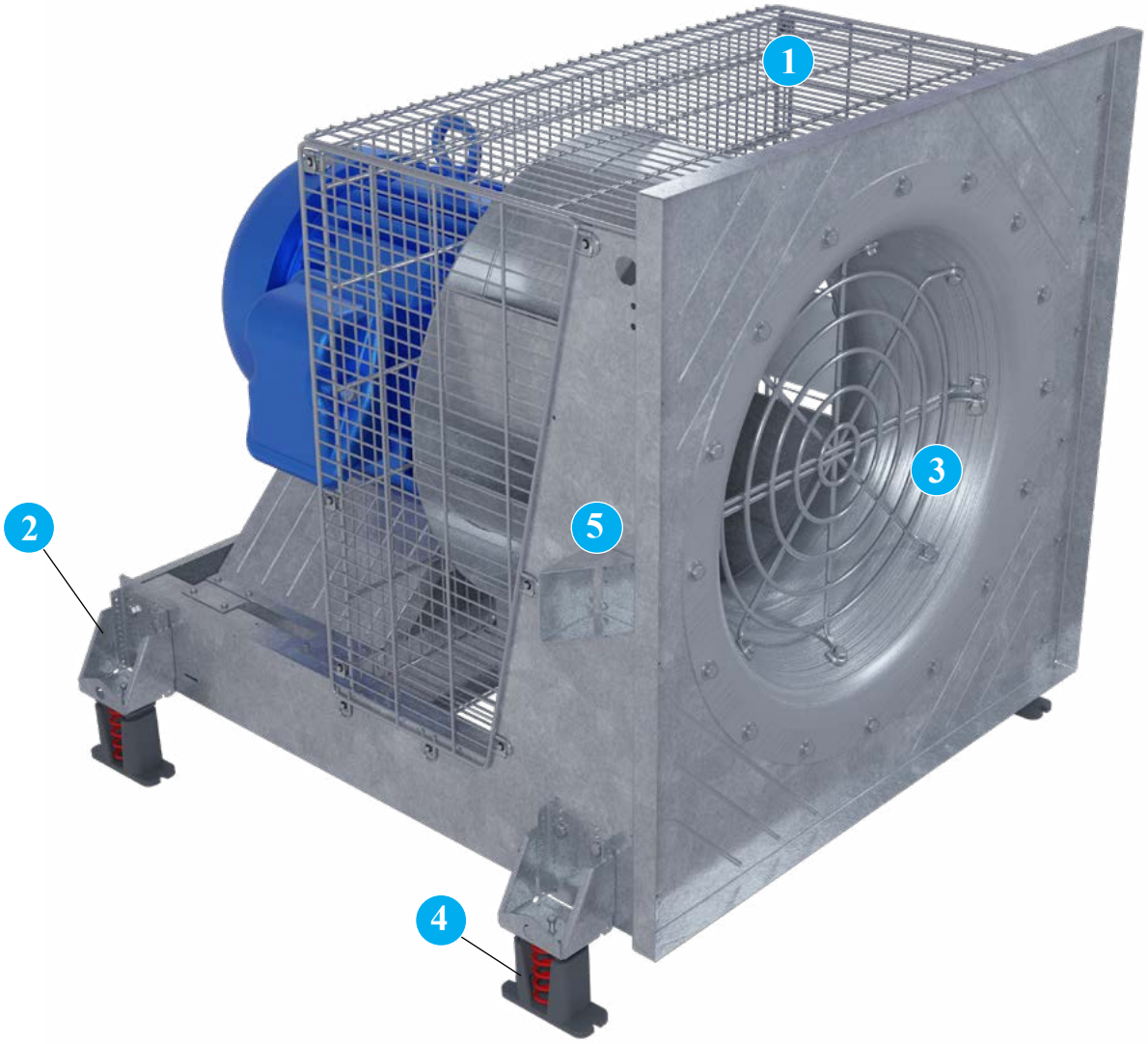
2. **Inlet Cones**
Heavy-gauge, spun steel inlet cones are closely matched to the impeller intake rim to ensure efficient and quiet operation.

3. **Inlet Plate**
Fan inlet cones shall mount to heavy-gauge steel inlet plate. A steel lip suitable for attachment of a boot connector shall surround the unit.

4. **Frame** Models EPLFN and EPLQN feature heavy-gauge galvanized or finish painted steel mounting rails and motor mount for strength and rigidity in direct drive applications.



OPTIONS/ACCESSORIES



1 **Protective Enclosure** Grill style protective enclosure completely encloses all sides and the back of the fan impeller to protect personnel from moving fan parts. The panels are individually removable to provide access to the impeller for service or inspection. Enclosures are available with or without a panel to enclose the bottom of the fan. Protective enclosures are plated wire.

2 **Height Saving Brackets** Mounting brackets that allow fan to be mounted closer to the floor grade and lower the overall fan height.

3 **Inlet Screen** Heavy-gauge screen mounted to fan inlet for easy removal.

4 **Vibration Isolators** Spring type vibration isolation mounts are available to reduce the transmission of fan vibration in 1" or 2" deflection.

5 **Thrust Restraints** Steel brackets located near the fan inlet panel to mount thrust restraint isolators (supplied by others).

Other Accessories Include:

- Special Width Impeller
- Special Diameter Impeller
- Stainless Steel Nameplate
- Pressure Transducer/Transmitter
- RIS Isolators
- Seismic Isolators

Piezometer Ring (Airflow Measuring System)

A piezometer ring is available on plenum fans, as well as other Twin City Fan & Blower housed fans, as part of an airflow measuring system, based on the principle of a flow nozzle. The inlet cone of the fan is used as the flow nozzle. The flow can be calculated by measuring the pressure drop through the inlet cone. No tubes or sensors are inserted in the high velocity airstream, which could obstruct airflow.

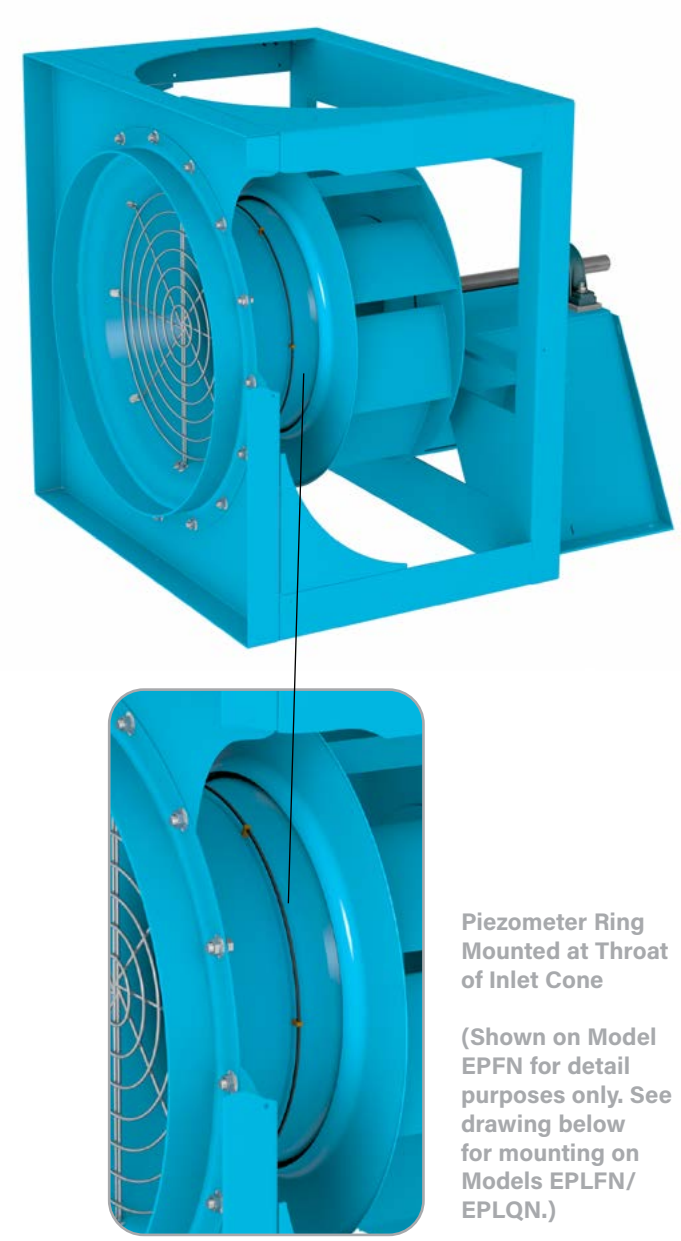
The system consists of a piezometer ring mounted at the throat and a static pressure tap mounted on the face of the inlet cone. A differential pressure transducer and digital display can also be provided.

The pressure drop is measured from the tap located on the face of the inlet cone to the piezometer ring in the throat. The inlet tap is connected to the high-pressure side of the transducer and the piezometer ring is connected to the low-pressure side. See diagram on right.

Based on Twin City Fan & Blower laboratory tests, the system was determined to be accurate within +/-5%.

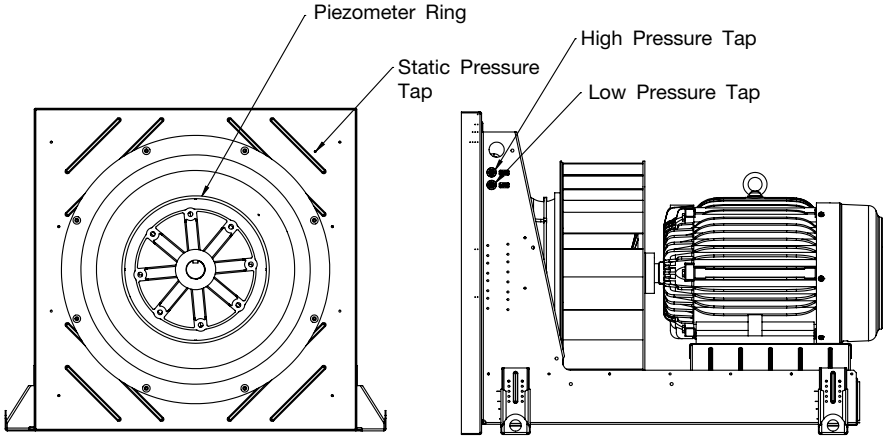
Refer to Twin City Fan & Blower Installation, Operation and Maintenance Manual IM-105.

NOTE: Twin City Fan & Blower does not recommend placement of flow measuring probes inside the fan inlet cone in the path of airflow. These devices create disturbances and unpredictable performance losses. Twin City Fan & Blower will not be responsible for loss of performance due to such devices.



Piezometer Ring Mounted at Throat of Inlet Cone

(Shown on Model EPFN for detail purposes only. See drawing below for mounting on Models EPLFN/ EPLQN.)



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Location and Placement of Fans in Air Handlers

1. Center the fan inlets in both the horizontal and vertical planes.
2. For inlet clearance, see Figure 1. The flow should converge at an angle not greater than 45° when approaching the opening for the fan inlet. A minimum of one fan impeller diameter clearance is recommended.
3. In the fan outlet plenum, a minimum wall clearance of one-half fan impeller diameter to the periphery of the fan impeller is recommended.
4. Figure 1 shows that the minimum clearance between the back of the fan impeller and the nearest component downstream (Dim. E) should be one impeller diameter. Small clearances do not allow the flow to equalize behind the fan impeller and the pressure drop of the downstream component is increased.
5. When the flow enters the inlet plenum perpendicular to the fan/motor shaft, large system effect losses can occur. See Figure 2 for a recommended flow baffle or a vortex breaker that may help preserve rated fan performance.
6. When two or more fans are installed in a plenum, divide the plenum into imaginary cells of equal area. Center the fan inlets on each cell. See Figure 3.

Figure 1. Recommended Location of Fan in Plenum

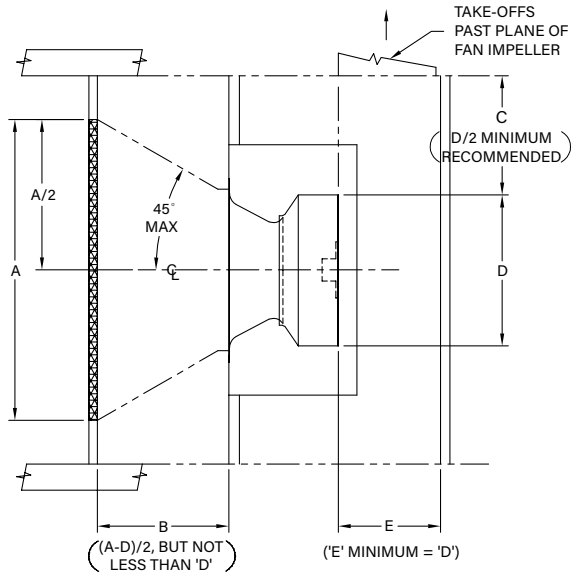
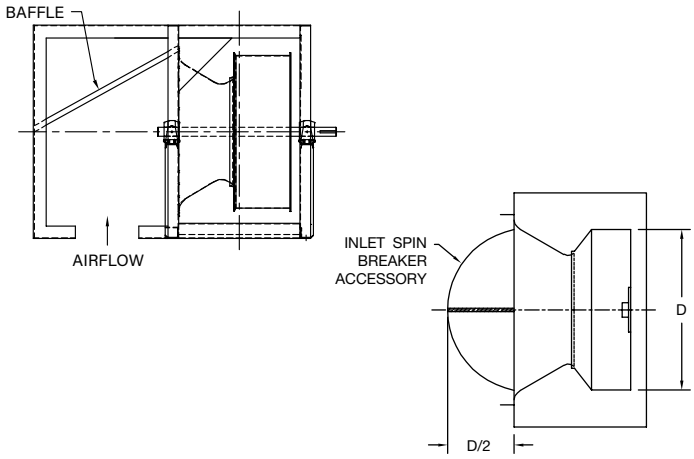


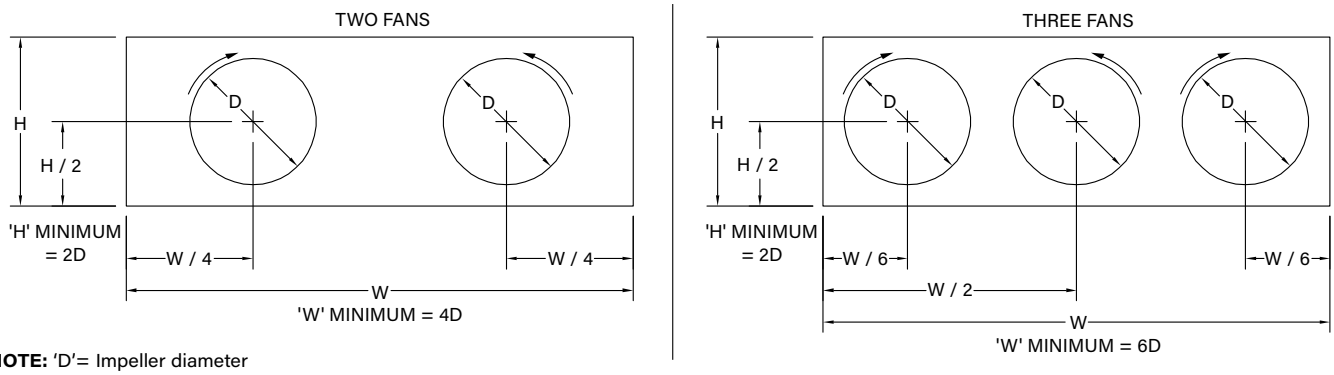
Figure 2. Flow Baffle and Vortex Spin Breaker Location



Installation Recommendations

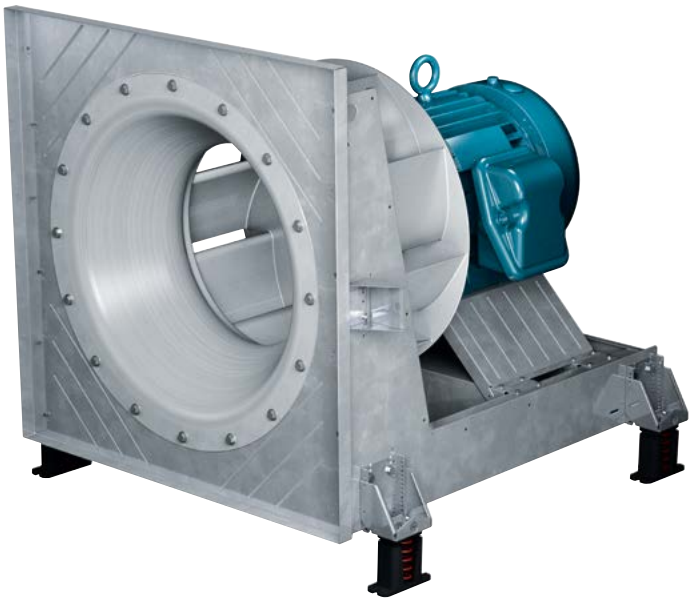
1. Install the fan so the flexible connector on the inlet remains uncollapsed during operation.
2. Install thrust restraints (snubbers) to maintain the axial position of the fan when it is generating pressure.
3. Peripheral equipment, such as electrical components, inverters, control panels, etc., should be positioned away from the high velocity air entering or leaving the fan.
4. Adjust springs on the isolation base so that spring deflection is approximately equal for all isolators.
5. Follow safety, installation, start-up and maintenance instructions supplied with each fan.

Figure 3. Location of Counter-Rotating Fans



NOTE: 'D'= Impeller diameter

To achieve the air velocity in the discharge duct and overcome the loss associated with the air entering the ductwork, additional resistance must be added to the external static pressure (ESP) requirements of the fan. Different types of duct entrances and locations will require varying correction factors. Therefore, prior to selecting a fan, make the following correction, depending upon the type of duct and its location.



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ADDITIONAL DUCT ENTRANCE LOSS TO BE ADDED TO FAN ESP	
DISCHARGE TYPE	**CORRECTION FACTOR**
▪ Radial and ducted with bellmouth	1.1 x Duct Velocity Pressure
▪ Radial and ducted without bellmouth	1.4 x Duct Velocity Pressure
▪ Radial without duct or bellmouth	1.8 x Duct Velocity Pressure
▪ Flow parallel to shaft and ducted with bellmouth	1.6 x Duct Velocity Pressure
▪ Flow parallel to shaft and ducted without bellmouth	1.9 x Duct Velocity Pressure
▪ Flow parallel to shaft without duct or bellmouth	2.4 x Duct Velocity Pressure

Example: A system requires 30,000 CFM at 5" SP at standard air density with one 4 ft diameter duct with bellmouth placed in a radial discharge. Determine RPM and brake horsepower:

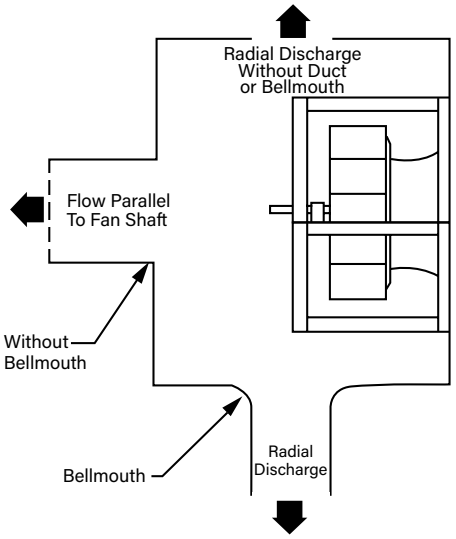
Duct area = $(4^2 \times \rho) \div 4 = 12.57$ ft^2

Duct velocity = 30,000 ÷ 12.57 = 2387 FPM

Duct velocity pressure = $(2387 \div 4005)^2 = 0.355$ @ std. cond.

Entrance loss correction factor = 1.1 x duct velocity pressure
= 1.1 x 0.355 = 0.39

Thus, select the fan for = 5" + 0.39" = 5.39" S.P.



Maximum RPM, Impeller Weights & WR²

EPLFN

SIZE	IMPELLER DIA. (IN.)	CLASS I			CLASS II			CLASS III		
		MAX RPM (70°F)	WT. (LB.)	WR² (LB-FT²)	MAX RPM (70°F)	WT. (LB.)	WR² (LB-FT²)	MAX RPM (70°F)	WT. (LB.)	WR² (LB-FT²)
122MK2	12.25	3388	11	1.4	4000	11	1.4	---	---	---
150MK2	15.00	3006	15	3.0	3909	15	3.0	---	---	---
165MK2	16.50	2668	17	4.4	3468	17	4.4	4000	20	5.1
182MK2	18.25	2302	17	6.1	2930	18	6.1	3767	21	6.2
200MK2	20.00	2101	21	6.4	2674	21	7.4	3438	24	9.3
222MK2	22.25	1888	30	12	2403	30	12	3090	34	15
245MK2	24.50	1715	35	21	2183	35	21	2806	38	22
270MK2	27.00	1556	40	29	1981	40	29	2546	47	32
300MK2	30.00	1401	49	46	1783	54	51	2291	58	52
330MK2	33.00	1273	62	70	1620	67	76	2083	72	77
365MK2	36.50	1151	73	103	1465	79	112	1884	84	114
402	40.25	---	---	---	1329	93	165	---	---	---
445	44.50	---	---	---	1202	135	253	---	---	---
490	49.00	---	---	---	1091	164	391	---	---	---

EPLQN

SIZE	IMPELLER DIA. (IN.)	CLASS I			CLASS II			CLASS III		
		MAX RPM (70°F)	WT. (LB.)	WR² (LB-FT²)	MAX RPM (70°F)	WT. (LB.)	WR² (LB-FT²)	MAX RPM (70°F)	WT. (LB.)	WR² (LB-FT²)
122MK2	12.25	3388	12	1.6	4000	12	1.6	---	---	---
150MK2	15.00	3006	17	3.5	3909	17	3.5	---	---	---
165MK2	16.50	2668	20	5.3	3468	20	5.3	4000	22	5.6
182MK2	18.25	2302	20	7.2	2930	20	7.2	3767	23	7.4
200MK2	20.00	2101	24	10	2674	24	8.4	3438	27	10
222MK2	22.25	1888	34	14	2403	34	14	3090	38	17
245MK2	24.50	1715	39	24	2183	39	24	2806	43	24
270MK2	27.00	1556	46	35	1981	46	35	2546	53	38
300MK2	30.00	1401	57	55	1783	61	59	2291	65	59
330MK2	33.00	1273	72	81	1620	77	87	2083	82	88
365MK2	36.50	1151	85	120	1465	91	129	1884	96	130
402	40.25	---	---	---	1329	107	190	---	---	---
445	44.50	---	---	---	1202	150	294	---	---	---
490	49.00	---	---	---	1091	183	451	---	---	---

Bare Fan Weights

SIZE	IMPELLER DIA. (IN.)	WEIGHT (LB.)					
		EPLFN			EPLQN		
		CLASS I	CLASS II	CLASS III	CLASS I	CLASS II	CLASS III
122MK2	12.25	41	41	---	42	42	---
150MK2	15.00	51	51	---	52	52	---
165MK2	16.50	62	62	66	64	64	67
182MK2	18.25	78	78	83	79	79	85
200MK2	20.00	101	101	106	103	103	108
222MK2	22.25	123	123	131	126	126	134
245MK2	24.50	151	151	158	155	155	163
270MK2	27.00	179	179	187	185	185	193
300MK2	30.00	250	250	257	258	258	265
330MK2	33.00	302	302	312	313	313	323
365MK2	36.50	369	369	371	383	383	385
402	40.25	---	789	---	---	803	---
445	44.50	---	1035	---	---	1050	---
490	49.00	---	1225	---	---	1244	---

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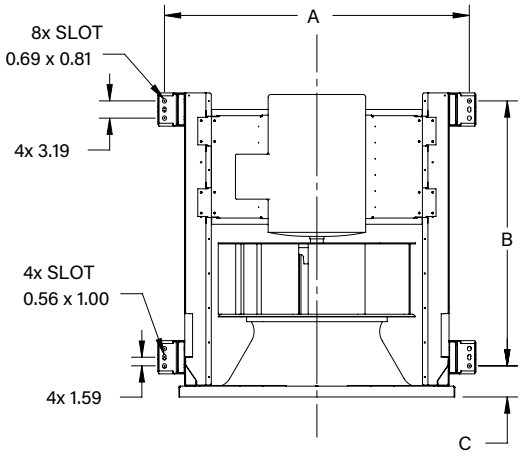
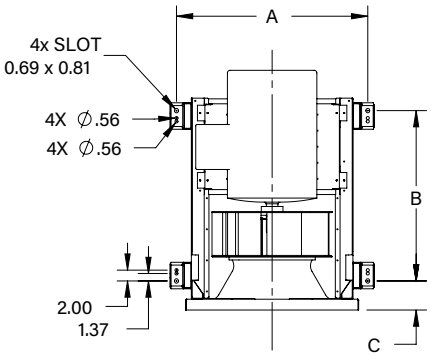
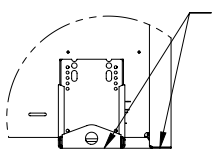
Class I and II

FAN SIZE 245MK2 TO 365MK2

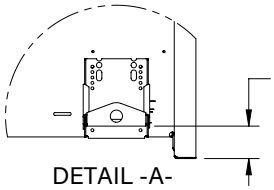


FAN SIZE 122MK2 TO 222MK2

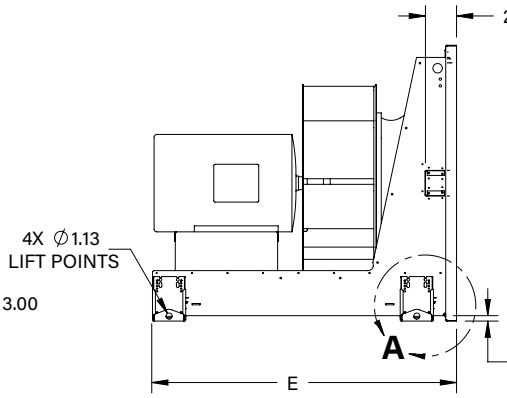


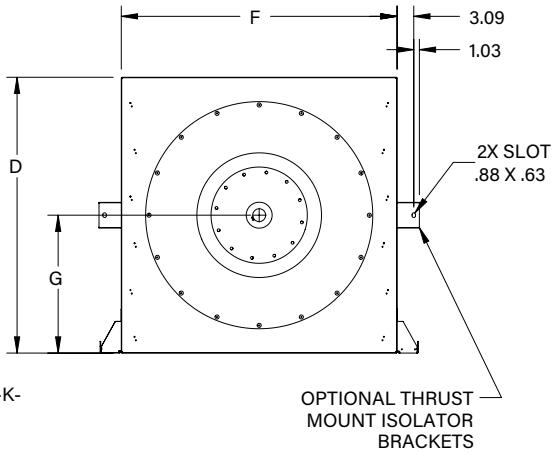


DETAIL -A-
STANDARD
MOUNT OPTION



DETAIL -A-
HEIGHT SAVER
MOUNT OPTION





SIZE	A	B	C	D	E	F	G	K	MOTOR SIZE
122MK2	23.38	16.50	5.06	20.00	23.12	20.00	10.00	1.00	56-184T
150MK2	25.38 25.38	16.88 19.75	5.25 5.25	22.00 22.00	23.68 26.56	22.00 22.00	11.00 11.00	0.75 0.75	56-145T 182T-215T
165MK2	27.38 27.38	19.00 25.75	5.38 5.38	24.00 24.00	25.93 32.68	24.00 24.00	12.00 12.00	1.00 1.00	56-184T 213T-256T
182MK2	29.38 29.38	22.19 29.00	5.38 5.38	26.00 26.00	29.12 35.93	26.00 26.00	13.00 13.00	1.75 1.75	56-184T 213T-286T
200MK2	32.38 32.38	22.44 30.00	5.38 5.38	29.00 29.00	29.38 36.94	29.00 29.00	14.50 14.50	1.75 1.75	56-184T 213T-286T
222MK2	35.38 35.38	26.44 31.50	5.38 5.38	32.00 32.00	33.38 39.30	32.00 32.00	16.00 16.00	2.75 2.75	56-184T 213T-326T
245MK2	39.38 39.38	30.75 34.69	5.38 5.38	34.00 34.00	37.72 41.66	34.00 34.00	17.00 17.00	1.75 1.75	143T-215T 254T-326T
270MK2	43.38 43.38	33.25 37.00	5.38 5.38	38.00 38.00	40.22 43.97	38.00 38.00	19.00 19.00	2.00 2.00	213T-256T 284T-365T
300MK2	47.38 47.38	37.25 42.25	5.38 5.38	42.00 42.00	44.23 49.23	42.00 42.00	21.00 21.00	2.00 2.00	213T-256T 284T-365T
330MK2	51.38 51.38	41.12 47.00	5.38 5.38	46.00 46.00	48.11 53.99	46.00 46.00	23.00 23.00	2.00 2.00	254T-286T 324T-405T
365MK2	56.38 56.38	43.37 49.00	5.75 5.75	51.00 51.00	50.74 56.36	51.00 51.00	25.50 25.50	2.00 2.00	254T-286T 324T-405T

AC1005411C

Model

EPLFN

Fans shall be Model EPLFN cost-effective, centrifugal plenum (plug) type, as manufactured by Twin City Fan & Blower, Minneapolis, Minnesota.

PERFORMANCE — Performance ratings shall conform to AMCA Standard 208 (fan energy index), 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, and fan energy index (FEI).

Fans shall have a sharply rising pressure characteristic extending through the operating range and continuing to rise beyond the peak efficiency to ensure quiet and stable operation. Fans shall have a non-overloading design with self-limiting horsepower characteristics and shall reach a peak in the normal selection area. All fans shall be capable of operating over the minimum pressure class limits as specified in AMCA Standard 99.

CONSTRUCTION — Fans shall be unhoused and incorporate a non-overloading type backward inclined airfoil blade impeller, heavy-gauge galvanized or finish painted steel frame and inlet plate.

FRAME AND INLET PANEL — Inlet plates shall be of heavy-gauge galvanized or finish painted steel construction. The inlet plate incorporates a removable spun inlet cone designed for smooth airflow into the accompanying inlet retaining ring of the fan impeller. A square, formed lip suitable for attachment of a boot connector shall surround the unit.

IMPELLER — Impellers shall have a spun non-tapered style blade retaining ring on the inlet side to allow higher efficiencies over the performance range of the fan. All impellers on direct drive arrangement 4 fans shall have airfoil shaped, extruded aluminum blades. EPLFN impellers shall have nine blades for high efficiencies. All impellers shall be statically and dynamically balanced on precision electronic balancers to a level of G6.3 (per ANSI 2-19) or better.

FINISH AND COATING — The entire fan assembly, excluding the shaft, shall be properly washed and pretreated before application of a rust-preventative primer, if called out on the order. After the fan is completely assembled, a finish coat of paint shall be applied to the entire assembly, if called out on the order. The fan shaft shall be coated with a petroleum-based rust protectant.

ACCESSORIES — When specified, accessories shall be provided by Twin City Fan & Blower to maintain one source responsibility.

FACTORY RUN TEST — All fans prior to shipment shall be completely assembled and test run as a unit at the specified operating speed or maximum RPM allowed for the particular construction type. Each impeller shall be statically and dynamically balanced in accordance with ANSI/AMCA 204-96 "Balance Quality and Vibration Levels for Fans" to Fan Application Category BV-3, Balance Quality Grade G6.3. Balance readings shall be taken by electronic type equipment in the axial, vertical and horizontal directions. Records shall be maintained and a written copy shall be available upon request.

Model

EPLQN

Fans shall be Model EPLQN cost-effective, centrifugal plenum (plug) type, as manufactured by Twin City Fan & Blower, Minneapolis, Minnesota.

PERFORMANCE — Performance ratings shall conform to AMCA Standard 208 (fan energy index), 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, and fan energy index (FEI).

Fans shall have a sharply rising pressure characteristic extending through the operating range and continuing to rise beyond the peak efficiency to ensure quiet and stable operation. Fans shall have a non-overloading design with self-limiting horsepower characteristics and shall reach a peak in the normal selection area. All fans shall be capable of operating over the minimum pressure class limits as specified in AMCA Standard 99.

CONSTRUCTION — Fans shall be unhoused and incorporate a non-overloading type backward inclined airfoil blade impeller, heavy-gauge galvanized or finish painted steel frame and inlet plate.

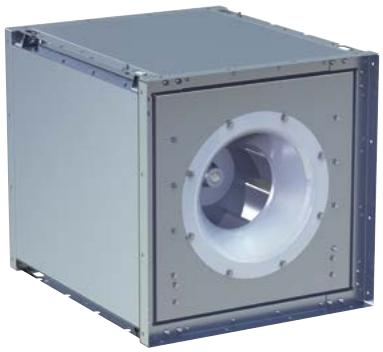
FRAME AND INLET PANEL — Inlet plates shall be of heavy-gauge galvanized or finish painted steel construction. The inlet plate incorporates a removable spun inlet cone designed for smooth airflow into the accompanying inlet retaining ring of the fan impeller. A square, formed lip suitable for attachment of a boot connector shall surround the unit.

IMPELLER — Impellers shall have a spun non-tapered style blade retaining ring on the inlet side to allow higher efficiencies over the performance range of the fan. All impellers on direct drive arrangement 4 fans shall have airfoil shaped, extruded aluminum blades. EPLQN impellers shall have twelve blades for better sound quality. All impellers shall be statically and dynamically balanced on precision electronic balancers to a level of G6.3 (per ANSI 2-19) or better.

FINISH AND COATING — The entire fan assembly, excluding the shaft, shall be properly washed and pretreated before application of a rust-preventative primer, if called out on the order. After the fan is completely assembled, a finish coat of paint shall be applied to the entire assembly, if called out on the order. The fan shaft shall be coated with a petroleum-based rust protectant.

ACCESSORIES — When specified, accessories shall be provided by Twin City Fan & Blower to maintain one source responsibility.

FACTORY RUN TEST — All fans prior to shipment shall be completely assembled and test run as a unit at the specified operating speed or maximum RPM allowed for the particular construction type. Each impeller shall be statically and dynamically balanced in accordance with ANSI/AMCA 204-96 "Balance Quality and Vibration Levels for Fans" to Fan Application Category BV-3, Balance Quality Grade G6.3. Balance readings shall be taken by electronic type equipment in the axial, vertical and horizontal directions. Records shall be maintained and a written copy shall be available upon request.



Model MPLQN

Model MPLFN
Fan Array

Models

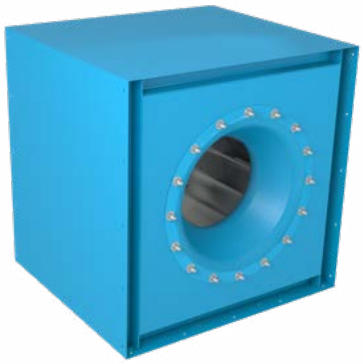
MPLFN | MPLQN | MPLFN | MPLQS

Sizes
12.25" to 36.5" impeller diameters

Performance
Airflow to 44,000 CFM
Static pressure to 12" w.g.

Classes
Class I & II available in sizes 122 to 365.
Class III available in sizes 165 to 365.

See Catalog 495 for more information



Model MPQN

Model MPQS
Fan Array

Models

MPQN | MPQS

Sizes
12.25" to 36.5" impeller diameters

Performance
Airflow to 44,000 CFM
Static pressure to 12" w.g.

Classes
Class I & II available in sizes 122 to 365.
Class III available in sizes 165 to 365.

See Catalog 490 for more information

Models (E-Series)

EPF | EPFN | EPQ | EPQN

Sizes

12.4" to 73.0" impeller diameters

Performance

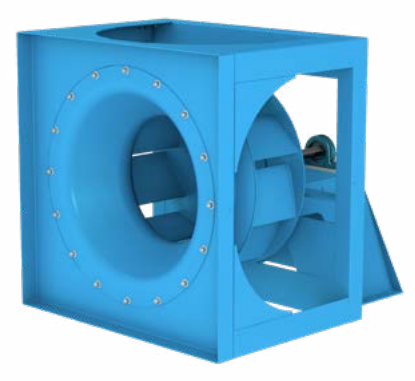
Airflow to 170,000 CFM
Static pressure to 10" w.g.

Classes

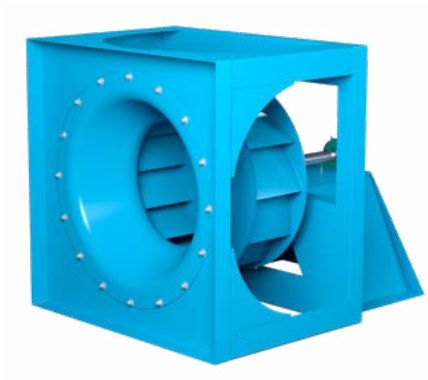
Class I, II & III

See Catalog 470 for more information

Model EPFN



Model EPQN



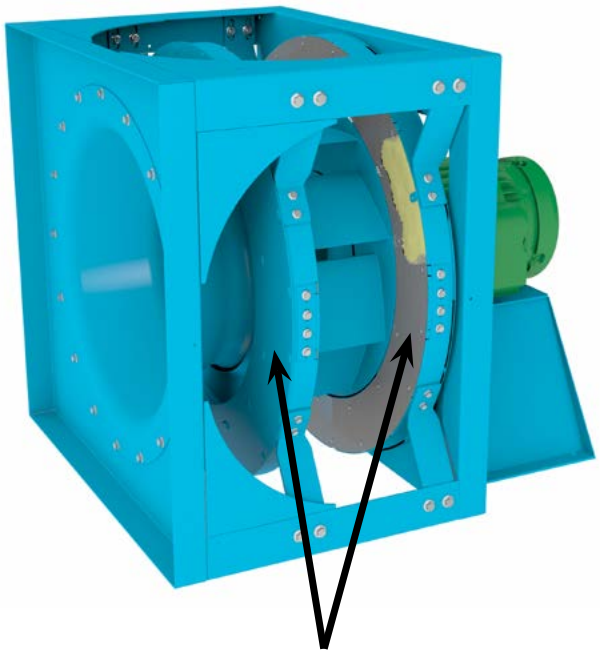
Aero Acoustic Diffuser™ For E-Series Plenum Fans

Traditional acoustic silencers attenuate sound at the expense of additional pressure drop resulting in higher power consumption and lower aerodynamic efficiencies. Twin City Fan and Blower's patented Aero Acoustic Diffuser™ (U.S. Patent 8025477) achieves discharge sound power reduction by up to 3dBA. Static pressure is boosted and aerodynamic static efficiency increases by up to 4%.

When used with Twin City Fan's E-Series plenum fans, static efficiency up to 80% is achieved on a size 365 (36.5" impeller diameter)...the best in the industry.

Higher air handling unit system pressure drops, equating to more coil rows or high efficiency filters, can be handled with the same size fan running at the same speed. In certain cases, a smaller size fan may be selected for a given application.

See Catalog 471 for more information



Aero Acoustic Diffuser™
mounted on EPFN E-Series

(U.S. Patent 8025477)

INDUSTRIAL PROCESS AND COMMERCIAL VENTILATION SYSTEMS

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CENTRIFUGAL ROOF & WALL EXHAUSTERS | CEILING VENTILATORS | GRAVITY VENTILATORS | DUCT BLOWERS
RADIAL BLADED FANS | RADIAL TIP FANS | HIGH EFFICIENCY INDUSTRIAL FANS | PRESSURE BLOWERS
LABORATORY EXHAUST FANS | FILTERED SUPPLY FANS | MANCOOLERS | FIBERGLASS FANS | CUSTOM FANS

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