

## **FIBERGLASS INLINE CENTRIFUGAL FANS**

**Model CBDF**

# Design & Construction

Aerovent's Fiberglass CBDF Inline Centrifugal Fan is designed to provide straight-through airflow. This combines the compact advantage of an axial flow fan with the performance characteristics of a centrifugal fan. Constructed of fiberglass (FRP), the CBDF fan is primarily used for exhausting gases, fumes and vapors from chemical processes.

Airstream parts are constructed of fiberglass reinforced plastic for resistance to a wide variety of acids, alkalis, and other chemical agents. Please refer to the "Corrosion Resistance Guide" on page 3 for a list of the specific chemical agents. For applications that require exhausting chemicals that may attack polyester resin, special resins and reinforcing materials are available, as an option, to withstand these conditions.

## Advantages of Fiberglass Fans

- Superior corrosion resistance to gases, fumes, and vapors
- Lower maintenance costs
- More economical than stainless steel construction
- Lighter weight than steel

## Design Features

- **Wheel Design** — Aerovent's CBDF fiberglass "FA" wheel design features a backward inclined airfoil blade. This wheel design offers a power limiting characteristic with the added advantage of high operating efficiency and low noise levels.
- **Corrosion Resistance** — All airstream parts are designed with fiberglass reinforced plastic and are resistant to most chemicals. Please refer to the "Corrosion Resistance Guide" on page 3 for a list of the specific chemicals.
- **Non-Overloading Power Characteristic** — Designed to prevent motor overload under variable operating conditions.
- **Straightening Vanes** — Designed to improve the efficiency and the pressure characteristics by minimizing turbulence downstream from the fan and converting rotational energy at the wheel discharge into useful work.
- **Flanged Inlet And Outlet With Drilled Bolt Pattern** — Designed to ensure housing concentricity and housing strength, while permitting easy duct mounting.
- **Sealed Bearing Cover** — Designed to protect the bearings and belts from airstream contaminants.
- **Bearing Lubrication Lines** — Extended to the outside of the fan housing for ease of maintenance.
- **All Welded Steel Motor Base** — Designed with a slide rail base for belt tension adjustment.
- **Arrangement 9 Belt Driven** — Offers performance flexibility. The fan's performance can easily be changed by adjusting the motor sheave on adjustable speed drives or changing the sheaves on constant speed drives.
- **Available Sizes** — 12" through 39".
- **Rotation** — Designed for counterclockwise rotation.



*FA Wheel  
Design*



## Construction Features

- **Housing with Integral Flanges** — Constructed of polyester resin reinforced with glass cloth and mat to provide resistance to most chemicals and long service life. The bearing base and drive enclosure are supported by tapered gussets interlocked into the outer housing. These structural parts are constructed of laminated glass and resin.
- **Straightening Vanes** — Constructed of laminated glass and resin interconnected to the inner and outer shell.
- **Shaft** — Constructed of 316 stainless steel, machined and keyed, with the end drilled and tapped.
- **Shaft Seal** — Heavy Viton type that rides against a heavy Teflon wear plate to protect the shaft and bearings from contact with the airstream. Seal is not gas tight.
- **Bearings** — Sealed pillow block type to provide long service.
- **Motor Base** — Constructed of steel and bolted between wide gussets integral to the fan housing flanges. A fiberglass reinforced plastic motor cover is available as an option to protect personnel from the moving drive components and to protect the motor from the weather.
- **Product Finish** — All fiberglass parts are coated inside and outside with resin, approximately 10 mils in thickness, to seal and provide protection from ultra-violet light. This results in a smooth, high gloss finish. All steel parts are finished with gray epoxy paint.

# Corrosion Resistance Guide

The following table lists gases, fumes, and vapors that are commonly exhausted from chemical processes. Using the “Legend of Symbols,” the table indicates how Aerovent’s standard fiberglass fans will withstand exhausting the particular gas, fume, or vapor.

This data is based on a maximum temperature of 200°F (93°C).

## Legend of Symbols

- S — Satisfactory Application
- L — Limited Life or Life Tests Incomplete
- U — Unsatisfactory

APPLICATION	SATURATED VAPOR	DRY VAPOR	EXCESS DRY AIR	APPLICATION	SATURATED VAPOR	DRY VAPOR	EXCESS DRY AIR
<b>ACIDS</b>				<b>ALKALINE SALTS</b>			
Acetic	L	S	S	Sodium Bicarbonate	L	S	S
Aqua Regia	U	U	L	Sodium Carbonate	L	S	S
Boric	S	S	S	Sodium Chloride	L	S	S
Butyric	S	S	S	Sodium Cyanide	L	S	S
Carbonic	S	S	S	Trisodium, Phosphate	L	L	S
Chromic	S	S	S	<b>ALKALIS</b>			
Citric	S	S	S	Ammonium Hydroxide	U	L	S
Formic	L	S	S	Calcium Hydroxide	U	L	S
Hydrochloric	S	S	S	Potassium Hydroxide	U	L	S
Hydrocyanic	L	S	S	Sodium Hydroxide	U	L	S
*Hydrofluoric	L	S	S	Sodium Hypochlorite	U	L	S
Hypochlorous	L	S	S	<b>KETONES</b>			
Lactic	S	S	S	Acetone	U	L	S
Maleic	S	S	S	Methyl Ethyl Ketone	U	U	L
Nitric	L	S	S	Methyl Isobutyl Ketone	U	U	L
Oleic	S	S	S	<b>ESTERS</b>			
Oxalic	S	S	S	Butyl Acetate	U	L	S
Perchloric	U	U	U	Ethyl Acetate	U	U	S
Phosphoric	S	S	S	Zinc Acetate	S	S	S
Picric	L	S	S	<b>GASES</b>			
Stearic	S	S	S	Ammonia	L	S	S
Sulfuric	S	S	S	Bromine	U	U	U
Sulfurous	S	S	S	Carbon Dioxide	S	S	S
Tannic	S	S	S	Carbon Disulfide	L	L	S
Tartaric	S	S	S	Chlorine	L	S	S
<b>SALTS, ACID &amp; NEUTRAL</b>				*Fluorine	L	S	S
Alum	S	S	S	*Hydrogen Fluoride	L	S	S
Aluminum Chloride	S	S	S	Hydrogen Sulfide	S	S	S
Aluminum Sulphate	S	S	S	Sulfur Dioxide	S	S	S
Ammonium Chloride	S	S	S	<b>HYDROCARBONS</b>			
Ammonium Nitrate	S	S	S	Benzene	U	U	U
Ammonium Sulphate	S	S	S	Fuel Oil	S	S	S
Calcium Chloride	S	S	S	Gasoline	S	S	S
Calcium Sulphate	S	S	S	Kerosene	S	S	S
Copper Chloride	S	S	S	Lubricating Oil	S	S	S
Copper Sulphate	S	S	S	Mineral Oil	S	S	S
Ferric Chloride	S	S	S	Toluene	U	U	U
Ferric Nitrate	S	S	S	Vegetable Oil	S	S	S
Ferric Sulphate	S	S	S	Naphtha	S	S	S
Magnesium Salts	S	S	S	Methane	S	S	S
Nickel Salts	S	S	S	Butane	S	S	S
Potassium Chloride	S	S	S	Propane	S	S	S
Potassium Nitrate	S	S	S	Xylol	S	S	S
Potassium Sulphate	S	S	S	<b>CHLORINATED SOLVENTS</b>			
Sodium Chloride	S	S	S	Carbon Tetrachloride	L	S	S
Sodium Sulphate	S	S	S	Chlorobenzene	U	U	U
Sodium Sulphite	S	S	S	Chloroform	U	U	U
Stannous Chloride	S	S	S	Perchloroethylene	U	U	L
Zinc Chloride	S	S	S	Trichloroethylene	U	U	L
Zinc Sulphate	S	S	S				
<b>ALCOHOLS</b>				<b>GLYCOLS</b>			
	S	S	S		S	S	S

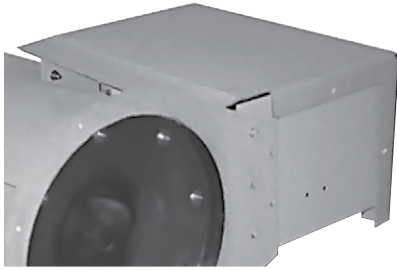
\* Surface finished with Synthetic Surfacing Veil Required.

# Accessories

---

## Motor Cover

The fiberglass motor cover extends over the entire base, motor and drive assembly to protect personnel from the moving drive parts and to protect the motor from precipitation.



## Inlet and Outlet Screen 304 or 316 Stainless Steel

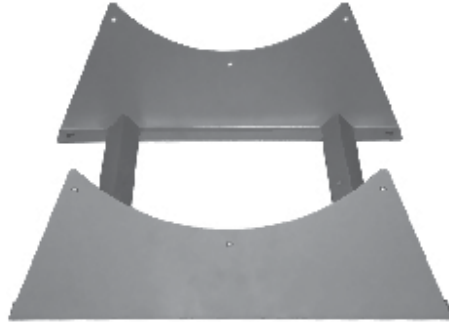
Screens offer protection to personnel from the fan's moving parts and are recommended for use when no ductwork is attached to the inlet and/or outlet. Inlet and outlet screens are constructed of expanded metal in 304 or 316 stainless steel.

## Housing Drain

A 1" PVC pipe with a female pipe thread is located in the housing to permit drainage of liquid. For horizontal applications only.

## Horizontal Support Legs

Support legs are available for standard platform or floor mounting and are bolted to the inlet and outlet flange. The support legs are constructed of steel and coated with gray epoxy paint.



## Bolted Inspection Door

The bolted inspection door is recommended to inspect the internal parts of the fan.

# Modifications

---

## Special Fiberglass Materials

Please contact the factory to ensure a suitable material is selected for the specific application.

- **Vinyl Ester** — Provides increased corrosion resistance to stronger acids, chlorine, and oxidizing agents. For use in industrial applications such as chemical and water treatment plants, and commercial applications where urban or salt-air corrosion exists.
- **Surface Veil** — Produces a smooth, reinforced final surface with greater corrosion resistance and protection from ultraviolet rays.
- **Fire-Retardant Resin** — Reduces the resin's tendency to burn by achieving a flame-spread rating of 25 or less.

## Spark Resistant Construction

Spark resistant construction for fiberglass fans is recommended when the fan is handling explosive fumes. Although fiberglass is a non-sparking material, it can build and retain a static charge that can be potentially hazardous. With spark resistant construction, the fan is statically grounded by graphite impregnation to reduce a static charge build-up.

## Exterior 316 Stainless Steel Hardware

Exterior 316 stainless steel hardware is recommended when the environment outside the airstream is corrosive.



# Roof Ventilator Design & Construction

For roof mounted exhaust applications, the Fiberglass CBDF Inline Centrifugal Fan can be converted into a roof ventilator with the addition of a fiberglass stack cap, curb base, and motor cover. See page 10 for dimensional data.

**Note:** When selecting performances from the rating tables for the roof ventilator design (with stack cap), allow 1/8" for stack cap loss. A minimum flow rate is required to fully open the stack cap damper blades. Please refer to the chart below.

## Design Advantages

The Fiberglass CBDF Roof Ventilator design:

- Offers a quiet and efficient roof ventilator
- Offers a long service life for fume exhaust applications
- Permits fumes to be exhausted high above the roof line and away from surrounding ventilation systems

## Construction Features

- The stack cap windband section is constructed from a one-piece mold with drain channels and drain holes to allow water to flow out.
- The stack cap damper blades are reinforced with a turned-down flange at the blade edge that seals the fan discharge when the fan is shut off.
- The stack cap damper rods are constructed of fiberglass with PVC bearings to offer a long service life.
- The curb base is constructed from a one-piece mold that offers a no-seam base, thus eliminating the chance of water leakage.
- The curb base is reinforced to offer additional support for a long service life.

## Minimum CFM (m<sup>3</sup>/s) Values

The following table shows the minimum CFM (m<sup>3</sup>/s) required to fully open the fiberglass damper blades.

FAN SIZE	MINIMUM VOLUME	
	CFM (ENGLISH)	m <sup>3</sup> /s (METRIC)
12	2700	1.274
16	4700	2.218
20	7600	3.587
25	15000	7.080
32	19600	9.251
39	29500	13.924

## Design Features

**Stack Caps** — Designed with backdraft dampers that protect the interior of the building from precipitation when the fan is shut off.



Minimum outlet velocity of 1700 FPM required for full open damper operation.  
Maximum outlet velocity not to exceed 3000 FPM.

**Curb Bases** — Designed for mounting vertical fans on roof curbs and to provide easy installation of the unit.



**Motor Covers** — Designed to protect the motor and drive parts from the weather and to dissipate motor heat through the vents.





# Temperature and Altitude Correction For Air Density Ratios

The performance tables in this bulletin are based on standard air density: 70°F at sea level (0.075 lbs./cu.ft. density). The fan performance tables provide the fan RPM and brake horsepower requirements for the given CFM and static pressure, at standard air density.

When the fan performance is not at standard conditions, the performance must be converted to standard conditions before entering the fan performance tables. The fan performance is converted to standard conditions by using the “Temperature and Altitude Density Ratio” from Table 1 below.

The following is an example explaining how to convert the fan’s performance to standard conditions.

**Example:** A Size 25 CBDF is to provide 8,010 CFM at 2.5" SP, at 150°F at 1,000 ft. elevation (0.0628 lbs./cu. ft. density).

- For 150°F and 1,000 ft. elevation, the temperature and altitude density ratio table shows a density ratio of 0.838.
- The operating static pressure is 2.5" SP.
- Using the temperature and altitude density ratio, the static pressure at standard conditions is determined as follows:

$$\text{Operating SP} \div \frac{\text{Temp. \& Alt.}}{\text{Density Ratio}} = \frac{\text{SP at Std.}}{\text{Conditions}}$$

**For this example:**

$$2.5" \text{ SP} \div 0.838 = 3" \text{ SP at Standard Conditions}$$

Turn to page 8 for the Size 25 CBDF fan performance table. Using 8,010 CFM at 3" SP at standard conditions, find the RPM and brake horsepower. The answer is 1,572 RPM and 6.34 BHP. **Note:** 6.34 BHP is the brake horsepower required at standard conditions and is also referred to as the “cold brake horsepower” or “starting brake horsepower.”

The actual brake horsepower at the operating condition of 150°F and 1,000 ft. elevation is determined by the following equation:

$$\frac{\text{BHP at Std.}}{\text{Conditions}} \times \frac{\text{Temp. \& Alt.}}{\text{Density Ratio}} = \frac{\text{BHP at Oper.}}{\text{Conditions}}$$

**For this example:**

$$6.34 \times 0.838 = 5.31 \text{ BHP at Operating Conditions}$$

Therefore, the Size 25 CBDF fan providing 8,010 CFM at 2.5" SP, at 150°F will run at 1,572 RPM and will require 5.31 BHP at operating conditions and 6.34 BHP at starting.

Table 1. Temperature and Altitude Density Ratios

AIR TEMP °F	ALTITUDE IN FEET ABOVE SEA LEVEL											
	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	15000
	BAROMETRIC PRESSURE IN INCHES OF MERCURY											
	29.92	28.86	27.82	26.82	25.84	24.90	23.98	23.09	22.22	21.39	20.58	16.89
-50	1.293	1.247	1.201	1.159	1.116	1.076	1.036	0.997	0.960	0.924	0.889	0.729
0	1.152	1.111	1.071	1.032	0.995	0.959	0.923	0.889	0.856	0.824	0.792	0.650
50	1.039	1.003	0.967	0.932	0.897	0.864	0.833	0.801	0.772	0.743	0.715	0.586
70	1.000	0.964	0.930	0.896	0.864	0.832	0.801	0.772	0.743	0.714	0.688	0.564
100	0.946	0.912	0.880	0.848	0.818	0.787	0.758	0.730	0.703	0.676	0.651	0.534
150	0.869	0.838	0.808	0.770	0.751	0.723	0.696	0.671	0.646	0.620	0.598	0.490
200	0.803	0.774	0.747	0.720	0.694	0.668	0.643	0.620	0.596	0.573	0.552	0.453

## Maximum Safe Speeds

When operating at temperatures other than 70°F, the maximum speed of the fan is affected. To determine the maximum speed at the operating temperature, a “Maximum Safe Speed Temperature Factor” (Table 3) is applied to the “Maximum Safe Speed at 70°F” (Table 2).

Table 2. Maximum Safe Speed at 70°F

FAN SIZE	MAXIMUM SPEED (RPM)
12	4005
16	3153
20	2523
25	2002
32	1576
39	1261

Table 3. Maximum Safe Speed Temperature Factors

TEMPERATURE		FACTOR
°F	°C	
70	21	1.00
100	38	1.00
150	66	0.85
200	93	0.55

**Example:** The maximum safe speed for a Size 25 CBDF operating at 150°F is 1,702 RPM. The calculation is shown below.

$$\begin{matrix} \text{Max. RPM} \\ \text{at 70°F} \\ \text{(Table 2)} \end{matrix} \times \begin{matrix} \text{Temp. Factor} \\ \text{(Table 3)} \end{matrix} = \begin{matrix} \text{Max. RPM} \\ \text{at Operating} \\ \text{Temp.} \end{matrix}$$

**For this example:**

$$2,002 \times 0.85 = 1,702 \text{ Max. RPM at 150°F}$$

To use the performance tables for metric values, a “Metric Conversion Factors” table is included below for converting metric volume flow and pressure to English units and back to metric.

Table 4. Metric Conversion Factors

DESCRIPTION	ENGLISH UNIT	METRIC UNIT	CONVERSION FACTOR	
			ENGLISH TO METRIC	METRIC TO ENGLISH
VOLUME	CFM	m³/s	.000472	2118.90
PRESSURE	Inches w.g.	kPa	.24866	4.02156
POWER	BHP	kW	.74570	1.3410
VELOCITY	fpm	m/s	.00508	196.85
SPEED	RPM	rps	.01667	60.00
AREA	ft²	m²	.09290	10.7640
CIRCUMFERENCE	ft	m	.30480	3.2808
DIAMETER	in.	mm	25.400	0.03937

# Performance Data

## Size 12 CBDF

Outlet Area = 1.80 Sq. Ft. Tip Speed = 3.25 x RPM

CFM	OV	STATIC PRESSURE															
		0.5"		1.0"		1.5"		2.0"		2.5"		3.0"		3.5"		4.0"	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
720	400	1214	0.09	1548	0.19	1827	0.29	2076	0.40								
900	500	1346	0.12	1642	0.23	1904	0.35	2136	0.47	2349	0.61	2547	0.75				
1080	600	1492	0.16	1760	0.28	1998	0.42	2219	0.56	2420	0.70	2607	0.86	2784	1.01	2953	1.18
1260	700	1646	0.20	1893	0.34	2112	0.49	2315	0.65	2507	0.81	2687	0.98	2855	1.15	3016	1.33
1440	800	1805	0.25	2037	0.41	2241	0.57	2428	0.75	2607	0.93	2778	1.11	2940	1.30	3095	1.49
1620	900	1969	0.31	2188	0.48	2378	0.66	2556	0.85	2722	1.05	2881	1.25	3036	1.46	3185	1.67
1800	1000	2137	0.39	2343	0.57	2525	0.77	2691	0.97	2849	1.18	2999	1.40	3143	1.62	3284	1.85
1980	1100	2308	0.47	2502	0.68	2676	0.89	2834	1.11	2984	1.33	3127	1.56	3264	1.80	3397	2.05
2160	1200	2482	0.57	2665	0.79	2831	1.02	2983	1.25	3125	1.49	3262	1.74	3393	1.99	3520	2.25
2340	1300	2658	0.69	2830	0.92	2989	1.17	3136	1.42	3273	1.67	3403	1.93	3528	2.20	3650	2.48
2520	1400	2835	0.82	2998	1.07	3150	1.33	3291	1.60	3424	1.87	3549	2.14	3669	2.43	3786	2.72
2700	1500	3014	0.97	3169	1.24	3313	1.51	3450	1.79	3578	2.08	3700	2.37	3815	2.67	3927	2.97
2880	1600	3194	1.14	3341	1.42	3479	1.72	3610	2.01	3735	2.31	3853	2.62	3965	2.94		
3060	1700	3375	1.32	3515	1.63	3648	1.94	3773	2.25	3893	2.57						
3240	1800	3557	1.53	3691	1.85	3817	2.18	3939	2.51								
3420	1900	3740	1.77	3867	2.10	3989	2.44										
3600	2000	3923	2.02														
CFM	OV	STATIC PRESSURE															
		4.5"		5.0"		5.5"		6.0"		6.5"		7.0"		7.5"		8.0"	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1080	600	3114	1.36														
1260	700	3169	1.51	3318	1.70	3461	1.90	3599	2.10	3732	2.31						
1440	800	3243	1.69	3385	1.89	3522	2.10	3654	2.31	3784	2.53	3910	2.75				
1620	900	3328	1.88	3465	2.10	3598	2.32	3726	2.54	3850	2.77	3971	3.00				
1800	1000	3422	2.08	3555	2.31	3683	2.55	3808	2.79	3929	3.04						
1980	1100	3526	2.29	3653	2.54	3777	2.80	3898	3.05								
2160	1200	3642	2.52	3763	2.79	3881	3.06	3997	3.33								
2340	1300	3768	2.76	3883	3.04	3995	3.33										
2520	1400	3900	3.01														

## Size 16 CBDF

Outlet Area = 2.68 Sq. Ft. Tip Speed = 4.12 x RPM

CFM	OV	STATIC PRESSURE															
		0.5"		1.0"		1.5"		2.0"		2.5"		3.0"		3.5"		4.0"	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1072	400	928	0.14	1199	0.28	1424	0.44										
1340	500	1018	0.18	1262	0.34	1474	0.52	1661	0.72	1833	0.92						
1608	600	1120	0.23	1341	0.42	1537	0.62	1715	0.84	1877	1.06	2029	1.30	2172	1.55	2307	1.81
1876	700	1230	0.28	1433	0.50	1612	0.73	1780	0.96	1936	1.21	2080	1.47	2216	1.73	2346	2.01
2144	800	1343	0.35	1533	0.59	1700	0.84	1855	1.10	2002	1.38	2142	1.66	2273	1.95	2397	2.24
2412	900	1460	0.43	1639	0.69	1797	0.97	1942	1.25	2079	1.55	2211	1.86	2337	2.17	2458	2.49
2680	1000	1580	0.53	1750	0.81	1898	1.11	2036	1.42	2165	1.74	2289	2.07	2408	2.41	2524	2.75
2948	1100	1703	0.64	1864	0.95	2005	1.27	2135	1.60	2259	1.94	2376	2.30	2489	2.66	2599	3.03
3216	1200	1827	0.77	1979	1.10	2116	1.45	2240	1.80	2357	2.17	2470	2.54	2577	2.93	2681	3.33
3484	1300	1954	0.92	2098	1.28	2229	1.64	2348	2.02	2460	2.41	2568	2.81	2671	3.22	2771	3.63
3752	1400	2081	1.09	2218	1.47	2343	1.86	2459	2.26	2567	2.67	2670	3.09	2769	3.52	2865	3.96
4020	1500	2210	1.29	2340	1.69	2460	2.10	2572	2.53	2677	2.96	2776	3.40	2871	3.86	2964	4.32
4288	1600	2340	1.50	2463	1.93	2578	2.37	2687	2.82	2789	3.28	2885	3.74	2977	4.21	3066	4.70
4556	1700	2470	1.75	2588	2.20	2699	2.66	2803	3.13	2902	3.61	2996	4.10	3085	4.60		
4824	1800	2602	2.01	2714	2.49	2820	2.98	2921	3.48	3016	3.98	3108	4.49				
5092	1900	2734	2.31	2841	2.82	2943	3.33	3040	3.85	3133	4.38						
5360	2000	2866	2.64	2969	3.17	3067	3.71										
5628	2100	2999	3.00	3098	3.55												
5896	2200	3133	3.39														
CFM	OV	STATIC PRESSURE															
		4.5"		5.0"		5.5"		6.0"		6.5"		7.0"		7.5"		8.0"	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1876	700	2470	2.30	2589	2.60	2704	2.90										
2144	800	2516	2.55	2631	2.86	2741	3.18	2849	3.52	2953	3.86	3054	4.21				
2412	900	2573	2.82	2683	3.15	2790	3.49	2893	3.84	2994	4.19	3092	4.56				
2680	1000	2636	3.10	2744	3.46	2847	3.83	2947	4.19	3045	4.57	3139	4.95				
2948	1100	2706	3.41	2810	3.79	2911	4.17	3009	4.57	3103	4.97						
3216	1200	2783	3.73	2882	4.13	2980	4.54	3075	4.96								
3484	1300	2867	4.06	2962	4.49	3055	4.93	3146	5.37								
3752	1400	2958	4.41	3049	4.87	3138	5.33										
4020	1500	3054	4.79	3141	5.27												
4288	1600	3153	5.19														

# Size 20 CBDF

Outlet Area = 4.67 Sq. Ft. Tip Speed = 5.15 x RPM

CFM	OV	STATIC PRESSURE															
		0.5"		1.0"		1.5"		2.0"		2.5"		3.0"		3.5"		4.0"	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1868	400	0.774	0.24	982	0.48	1156	0.74	1312	1.03								
2335	500	0.861	0.32	1045	0.60	1208	0.90	1353	1.22	1486	1.56	1610	1.92	1726	2.30		
2802	600	0.957	0.41	1123	0.73	1271	1.08	1408	1.44	1534	1.82	1651	2.21	1761	2.61	1867	3.04
3269	700	1058	0.53	1211	0.89	1347	1.28	1473	1.68	1592	2.10	1704	2.53	1810	2.98	1910	3.43
3736	800	1162	0.67	1306	1.07	1432	1.49	1549	1.94	1659	2.41	1765	2.88	1866	3.36	1963	3.86
4203	900	1269	0.84	1405	1.28	1523	1.74	1633	2.23	1736	2.73	1835	3.25	1930	3.78	2023	4.32
4670	1000	1379	1.04	1506	1.52	1619	2.02	1722	2.55	1820	3.09	1913	3.65	2003	4.22	2090	4.81
5137	1100	1490	1.27	1610	1.80	1718	2.34	1816	2.90	1909	3.48	1998	4.08	2083	4.70	2165	5.32
5604	1200	1604	1.54	1716	2.11	1819	2.70	1914	3.30	2002	3.92	2087	4.55	2168	5.21	2247	5.87
6071	1300	1718	1.86	1824	2.47	1923	3.10	2014	3.74	2099	4.40	2180	5.07	2257	5.76	2333	6.47
6538	1400	1834	2.22	1934	2.87	2028	3.54	2116	4.23	2198	4.93	2276	5.64	2350	6.37	2423	7.11
7005	1500	1950	2.62	2045	3.32	2135	4.04	2219	4.76	2299	5.50	2374	6.26	2446	7.02	2516	7.80
7472	1600	2067	3.08	2158	3.83	2243	4.58	2324	5.35	2401	6.13	2474	6.93				
7939	1700	2185	3.60	2271	4.38	2353	5.18	2430	5.99	2505	6.82						
8406	1800	2303	4.17	2385	5.00	2464	5.84										
8873	1900	2422	4.81	2501	5.68												

CFM	OV	STATIC PRESSURE															
		4.5"		5.0"		5.5"		6.0"		6.5"		7.0"		7.5"		8.0"	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2802	600	1967	3.48	2064	3.94												
3269	700	2006	3.90	2098	4.38	2188	4.88	2274	5.40	2358	5.93	2439	6.47				
3736	800	2056	4.37	2144	4.89	2230	5.41	2313	5.95	2393	6.51	2472	7.08				
4203	900	2112	4.87	2198	5.43	2281	6.00	2361	6.57	2439	7.16	2514	7.75				
4670	1000	2175	5.40	2258	6.00	2338	6.61	2416	7.23	2492	7.86						
5137	1100	2245	5.96	2324	6.61	2401	7.26	2476	7.92								
5604	1200	2323	6.55	2397	7.24	2470	7.94										
6071	1300	2406	7.18	2477	7.91												
6538	1400	2493	7.86														

# Size 25 CBDF

Outlet Area = 8.01 Sq. Ft. Tip Speed = 6.49 x RPM

CFM	OV	STATIC PRESSURE															
		0.5"		1.0"		1.5"		2.0"		2.5"		3.0"		3.5"		4.0"	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3204	400	636	0.42	794	0.82	929	1.26	1050	1.73	1160	2.24						
4005	500	713	0.56	853	1.04	978	1.54	1090	2.08	1193	2.64	1289	3.22	1380	3.85	1466	4.49
4806	600	798	0.74	924	1.28	1036	1.86	1141	2.47	1239	3.10	1330	3.75	1415	4.42	1497	5.11
5607	700	885	0.96	1003	1.57	1106	2.21	1201	2.90	1292	3.60	1379	4.32	1461	5.07	1539	5.83
6408	800	976	1.23	1086	1.91	1182	2.62	1271	3.37	1355	4.15	1435	4.95	1513	5.76	1588	6.59
7209	900	1070	1.55	1173	2.30	1263	3.08	1346	3.90	1425	4.74	1500	5.61	1572	6.51	1643	7.41
8010	1000	1165	1.94	1261	2.76	1348	3.61	1426	4.49	1501	5.40	1572	6.34	1640	7.30	1706	8.29
8811	1100	1262	2.40	1352	3.29	1434	4.21	1510	5.16	1580	6.14	1647	7.14	1712	8.17	1775	9.22
9612	1200	1360	2.93	1444	3.90	1522	4.89	1595	5.91	1663	6.95	1727	8.02	1789	9.11	1849	10.23
10413	1300	1459	3.55	1538	4.59	1613	5.65	1682	6.74	1748	7.86	1809	8.99	1868	10.15	1925	11.33
11214	1400	1559	4.25	1634	5.37	1704	6.51	1771	7.67	1834	8.85	1894	10.06	1951	11.28		
12015	1500	1659	5.05	1730	6.25	1797	7.46	1861	8.69	1922	9.95	1980	11.22				
12816	1600	1760	5.96	1828	7.23	1892	8.52	1953	9.82								
13617	1700	1862	6.98	1926	8.32	1987	9.68										
14418	1800	1964	8.11														

CFM	OV	STATIC PRESSURE															
		4.5"		5.0"		5.5"		6.0"		6.5"		7.0"		7.5"		8.0"	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
5607	700	1613	6.60	1684	7.40	1754	8.21	1821	9.05	1886	9.92	1949	10.80				
6408	800	1659	7.44	1728	8.31	1795	9.18	1859	10.08	1921	10.98	1982	11.91				
7209	900	1711	8.33	1778	9.27	1842	10.21	1905	11.18	1965	12.16						
8010	1000	1770	9.28	1833	10.30	1895	11.32	1955	12.35								
8811	1100	1836	10.29	1895	11.38	1953	12.48										
9612	1200	1907	11.37	1963	12.53												
10413	1300	1981	12.53														



# Size 32 CBDF

Outlet Area = 12.80 Sq. Ft. Tip Speed = 8.25 x RPM

CFM	OV	STATIC PRESSURE															
		0.5"		1.0"		1.5"		2.0"		2.5"		3.0"		3.5"		4.0"	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
5120	400	498	0.67	623	1.32	731	2.02	826	2.77	912	3.59						
6400	500	558	0.89	669	1.65	768	2.47	857	3.33	938	4.22	1014	5.17	1085	6.17	1153	7.21
7680	600	624	1.17	724	2.04	813	2.97	896	3.95	973	4.95	1045	6.00	1112	7.07	1177	8.19
8960	700	692	1.52	785	2.49	867	3.53	942	4.63	1014	5.76	1083	6.91	1148	8.10	1209	9.32
10240	800	763	1.95	850	3.03	926	4.17	996	5.37	1063	6.62	1126	7.90	1188	9.21	1247	10.53
11520	900	836	2.46	917	3.65	989	4.91	1055	6.21	1117	7.56	1176	8.96	1234	10.39	1290	11.84
12800	1000	910	3.07	986	4.38	1055	5.74	1117	7.15	1176	8.61	1232	10.11	1286	11.66	1338	13.23
14080	1100	985	3.78	1057	5.21	1122	6.69	1182	8.21	1237	9.77	1291	11.38	1342	13.03	1392	14.71
15360	1200	1062	4.62	1129	6.17	1191	7.76	1248	9.39	1301	11.06	1352	12.77	1401	14.52	1449	16.31
16640	1300	1139	5.59	1202	7.26	1261	8.96	1316	10.71	1368	12.49	1416	14.31	1463	16.16	1508	18.05
17920	1400	1217	6.70	1276	8.49	1332	10.31	1385	12.17	1435	14.06	1482	15.99	1527	17.95	1570	19.95
19200	1500	1295	7.96	1351	9.87	1405	11.81	1455	13.78	1503	15.79	1549	17.83				
20480	1600	1374	9.38	1427	11.41	1478	13.47	1526	15.56	1573	17.68						
21760	1700	1453	10.98	1504	13.13	1552	15.31										
23040	1800	1532	12.76														

CFM	OV	STATIC PRESSURE															
		4.5"		5.0"		5.5"		6.0"		6.5"		7.0"		7.5"		8.0"	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
7680	600	1238	9.35	1298	10.56	1355	11.79	1410	13.07								
8960	700	1268	10.56	1324	11.84	1379	13.15	1432	14.50	1483	15.90	1533	17.32				
10240	800	1304	11.90	1358	13.29	1410	14.69	1461	16.12	1510	17.58	1558	19.07				
11520	900	1344	13.32	1396	14.81	1447	16.33	1496	17.89	1544	19.46						
12800	1000	1389	14.83	1439	16.45	1488	18.08	1535	19.74								
14080	1100	1440	16.43	1487	18.17	1533	19.93										
15360	1200	1495	18.14	1539	19.99												
16640	1300	1553	19.98														

# Size 39 CBDF

Outlet Area = 19.96 Sq. Ft. Tip Speed = 10.31 x RPM

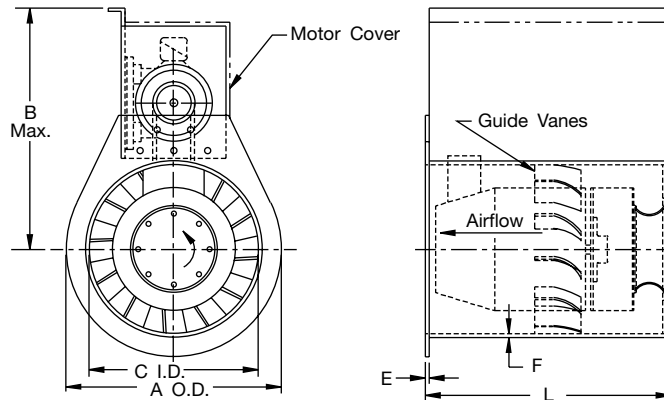
CFM	OV	STATIC PRESSURE															
		0.5"		1.0"		1.5"		2.0"		2.5"		3.0"		3.5"		4.0"	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
7984	400	398	1.05	499	2.05	584	3.14	660	4.32	730	5.60						
9980	500	446	1.39	535	2.58	614	3.85	685	5.19	750	6.58	811	8.06	868	9.62	922	11.25
11976	600	499	1.83	579	3.18	650	4.63	716	6.15	778	7.73	836	9.36	890	11.03	941	12.77
13972	700	553	2.37	628	3.89	693	5.51	754	7.21	811	8.97	866	10.78	918	12.64	967	14.54
15968	800	610	3.03	679	4.72	740	6.50	797	8.38	850	10.32	901	12.32	950	14.35	997	16.43
17964	900	668	3.82	733	5.69	790	7.64	843	9.68	893	11.79	941	13.97	986	16.20	1031	18.47
19960	1000	727	4.77	788	6.82	843	8.95	893	11.15	940	13.42	985	15.76	1028	18.17	1070	20.63
21956	1100	787	5.89	844	8.12	897	10.42	944	12.79	989	15.23	1032	17.73	1073	20.31	1113	22.93
23952	1200	848	7.19	902	9.61	951	12.08	997	14.63	1040	17.24	1081	19.91	1120	22.64	1158	25.43
25948	1300	910	8.69	960	11.30	1007	13.96	1052	16.68	1093	19.46	1132	22.29	1169	25.19	1206	28.14
27944	1400	972	10.42	1020	13.21	1064	16.05	1107	18.95	1147	21.90	1184	24.91	1220	27.97	1255	31.09
29940	1500	1034	12.38	1080	15.35	1122	18.38	1163	21.46	1201	24.59	1238	27.77				
31936	1600	1097	14.59	1140	17.75	1181	20.97	1220	24.23	1257	27.53						
33932	1700	1161	17.07	1201	20.42	1240	23.82										
35928	1800	1224	19.84														

CFM	OV	STATIC PRESSURE															
		4.5"		5.0"		5.5"		6.0"		6.5"		7.0"		7.5"		8.0"	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
11976	600	991	14.59	1038	16.47	1084	18.40										
13972	700	1014	16.48	1059	18.47	1103	20.51	1145	22.63	1186	24.80	1226	27.02				
15968	800	1043	18.55	1086	20.72	1128	22.92	1169	25.15	1208	27.42	1246	29.75				
17964	900	1075	20.76	1117	23.10	1157	25.47	1197	27.90	1235	30.35						
19960	1000	1111	23.12	1151	25.65	1190	28.20	1228	30.78								
21956	1100	1151	25.61	1189	28.33	1226	31.08										
23952	1200	1195	28.27	1231	31.17												
25948	1300	1241	31.14														

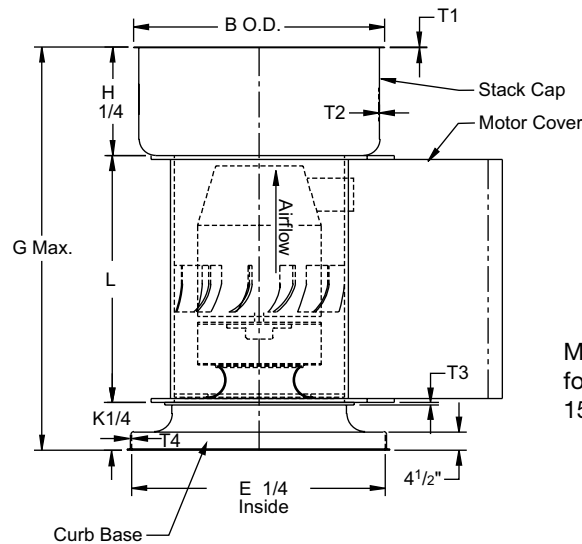
# Dimensional Data

## Belt Driven CBDF Inline Centrifugal Fan



FAN SIZE	OUTLET AREA (FT <sup>2</sup> )	DIMENSIONS (INCHES)						MAX MOTOR FRAME
		A	B	C	E	F	L	
12	1.80	21½	29⅞	18¾	⅜	⅜	24	213T
16	2.68	25½	31⅞	22¾	⅜	⅜	28	213T
20	4.67	33¼	42¾	29¼	⅜	¼	36	286T
25	8.01	42⅝	49¼	38⅝	⅜	⅝	44	324T
32	12.80	52⅞	60¾	48⅞	½	⅜	55½	364T
39	19.96	64½	70½	60½	½	⅜	69	365T

## Belt Driven CBDF Inline Centrifugal Roof Ventilator



Minimum outlet velocity required for full open damper operation is 1500 FPM.

FAN SIZE	DIMENSIONS (INCHES)									
	B	E	G	H	K	L	T1	T2	T3	T4
12	24½	29⅞	40¾	8	8	24	¼	⅜	⅜	⅜
16	29½	33⅞	47⅞	11	7⅞	28	¼	⅜	⅜	⅜
20	37¼	43⅞	59¼	14	8½	36	¼	⅜	⅜	⅜
25	46½	51⅞	75	19	11¼	44	¼	⅜	½	¼
32	58	61⅞	89¾	24	10½	55½	¼	⅜	½	¼
39	72	78	111½	30	11¾	69	¼	⅜	½	¼

# Typical Specifications

## Model CBDF Belt Driven Inline Centrifugal Fan

Fiberglass Inline Centrifugal Fans, where indicated on drawings and schedules, shall be Model CBDF belt driven fans as manufactured by Aerovent, Minneapolis, Minnesota, and shall be of the size and capacity as indicated in the fan schedule. Model CBDF fans shall be tested in accordance with ANSI/ASHRAE 51-1985 and ANSI/AMCA 210-85 test codes and shall be guaranteed by the manufacturer to deliver at the rated published performance levels. In addition, each unit shall be factory run tested prior to shipment.

**CONSTRUCTION** — The fan housing shall be constructed of polyester resin reinforced with fiberglass cloth and mat with integral flanges. The flanges are designed to ensure housing concentricity, housing strength and to permit duct mounting. Tapered gussets interlocked into the outer housing shall support the bearing base and drive enclosure. Straightening vanes constructed of laminated glass and resin shall be interconnected to the inner and outer shell. A Viton type shaft seal and Teflon wear plate, to protect the shaft and bearings, shall be supplied as standard. The motor base shall be constructed of mild steel and bolted between gussets integral with the fan housing flanges. The motor base shall be finished with a gray air dried epoxy paint.

Bearings and belts are enclosed in an air insulated fiberglass housing to protect them from the airstream gases, fumes, and vapors.

**WHEEL** — The Model CBDF fiberglass non-overloading, backward inclined wheel shall be constructed using glass cloth impregnated with vinyl ester resin and shall be secured to a 316 stainless steel fan shaft with a stainless steel bolt. Wheels shall be statically and dynamically balanced to ensure quiet operation.

**BEARINGS** — Model CBDF belt driven fans shall be supplied with pillow block type bearings with lubrication lines extended to the outside of the fan housing for easy maintenance. Bearings shall have a minimum L-10 life as defined by AFBMA of at least 20,000 hours (100,000 hours average life). Bearings and belts shall be enclosed in an air-insulated fiberglass housing for protection.

**DRIVE** — All drive selections on Model CBDF belt driven fans shall be designed with a 1.4 service factor, unless otherwise specified. Sheaves shall be cast iron with static conducting belts. Belt adjustment shall be accomplished with an adjustable motor slide rail base.

**MOTOR** — Belt driven fan motors shall be NEMA Design B, standard industrial, continuous duty, ball bearing, variable torque, and shall be provided with the enclosure model, voltage, phase, and hertz as listed in the fan schedule.

**BALANCING** — The wheel assembly 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. In addition, belt driven fan wheels shall be balanced on the fan shaft after final assembly in the fan casing, in the manufacturing facility, to the following peak velocity values, filter-in, at the fan test speed:

Fan Application Category	Rigidly Mounted (in./s)	Flexibly Mounted (in./s)
BV-3	0.15	0.20

**FINISH** — All steel parts shall be finished with a gray air dried epoxy paint. All fiberglass parts shall be coated inside and outside with resin (with UV inhibitor), approximately 10 mils in thickness, to seal the surface and provide a smooth, shiny finish. Optional resins and finishes include: Vinyl Ester, Surface Veil and Fire-Retardant Resin.

**SOUND POWER LEVELS** — The sound power level of the fan(s) shall not exceed:

Octave Band-CPS (Sound Power  $10^{-12}$ )

63	125	250	500	1000	2000	4000	8000

**ACCESSORIES** — The fan(s) shall be furnished complete with:

- Fiberglass Curb Base
- Fiberglass Stack Cap
- Inlet Guard (304SS/316SS)
- Outlet Guard (304SS/316SS)
- Horizontal Support Legs
- Exterior 316 Stainless Steel Hardware
- Fiberglass Motor Cover
- Housing Drain
- Bolted Inspection Door
- Spark Resistant Construction
- Ceiling Suspension Brackets
- Stack Cap Bird Screen

---

**PROPELLER FANS | TUBEAXIAL & VANEAXIAL FANS | CENTRIFUGAL FANS & BLOWERS | ROOF VENTILATORS  
INDUSTRIAL AIR HANDLERS | AIR MAKE-UP | FIBERGLASS FANS | CUSTOM FANS**



**AEROVENT**  
A Twin City Fan Company

**AEROVENT**   
INDUSTRIAL VENTILATION SYSTEMS

**[WWW.AEROVENT.COM](http://WWW.AEROVENT.COM)**

---

**5959 Trenton Lane N | Minneapolis, MN 55442 | Phone: 763-551-7500 | Fax: 763-551-7501**