

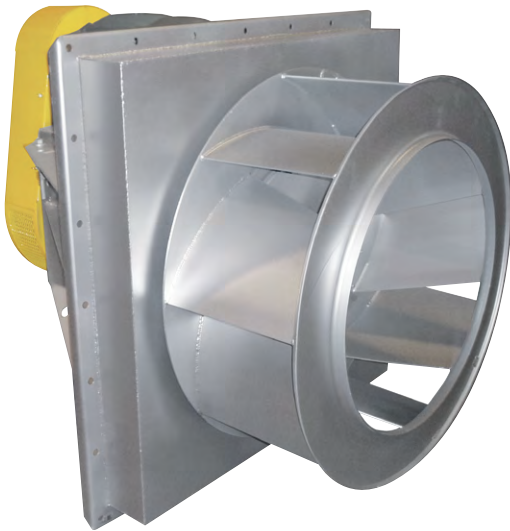


INDUSTRIAL PROCESS AND  
COMMERCIAL VENTILATION SYSTEMS

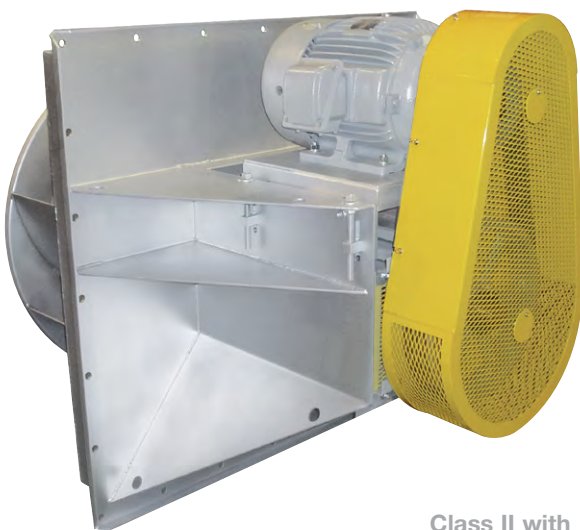
# HIGH EFFICIENCY PLUG FANS

MODEL BEPL





Class II with 100 mm Insulated Plug and High Temperature Aluminum Paint



Class II with OSHA Belt Guard

## Model BEPL

### High Efficiency Plug Fan

BEPL plug fans from Twin City Fan & Blower are compact, versatile and offer the highest efficiency in the industry. Their versatility allows them to be used for air circulation in a variety of industrial applications including air heaters, degreasers, dryers, dust collectors, kilns, ovens, parts washers, penthouses, smoke houses, space heaters, spray booths and other high temperature applications.

Plug fans are housed in the customer's enclosure in applications where the system plenum acts as the fan housing. This configuration saves space since connecting ductwork and motor support pedestals are generally not needed. More space savings can be obtained by utilising the impeller compartment as a pressurised chamber in lieu of a fan scroll. The use of multiple discharges from the pressurized chamber allows for additional savings by reducing ducting requirements.

BEPL plug fans feature SWSI backward curved, non-overloading, single thickness airfoil type impellers. The unique impeller design offers increased efficiency over competitor's airfoil blade designs yet can handle airstreams not conducive to traditional hollow airfoil shapes.

The plug fan's motor and drive are protected from high temperatures by the customer's chamber wall or the optional 100 mm or 152 mm insulated plug. The motor and drive are mounted to the plug panel which may be bolted or welded in place. The plug assembly may be mounted with the shaft in either the vertical or horizontal position for maximum flexibility. Horizontal construction is standard. Vertical mounting can be provided when specified. An all welded housing and an integral inlet cone are available as options.

#### Sizes

315mm to 1245mm impeller diameters

#### Performance

Airflow to 35.8 m<sup>3</sup>/sec

Static pressure to 2980 Pa.



# Model BEPL

## High Efficiency Plug Fan

m3/sec	Pa	MANUFACTURER	RPM	BkW
10.85	622	Twin City BEPL	1015	11.50
		Manufacturer "A" AF	1107	12.38
		Manufacturer "A" BI	1005	13.05
		Manufacturer "B" AF	971	13.38
17.46	1243	Twin City BEPL	1442	28.71
		Manufacturer "A" AF	1593	32.59
		Manufacturer "A" BI	1425	34.38
		Manufacturer "B" AF	1400	37.29

Nominal 914 mm Impeller Diameter

CFM	SP	MANUFACTURER	RPM	BkW
14.16	622	Twin City BEPL	716	10.74
		Manufacturer "A" AF	783	11.63
		Manufacturer "A" BI	713	12.30
		Manufacturer "B" AF	725	13.02
23.6	1243	Twin City BEPL	1111	37.21
		Manufacturer "A" AF	1226	41.72
		Manufacturer "A" BI	1103	43.89
		Manufacturer "B" AF	1117	51.38

Nominal 1118 mm Impeller Diameter

Model BEPL Plug Fans are designed to maximize efficiency. This is illustrated by the following charts, which compare the new BEPL Plug Fan and other manufacturers' airfoil (AF) and backward inclined (BI) fans.

## TYPICAL INSTALLATIONS

Mounting is accomplished by providing a hole larger than the impeller diameter through the chamber wall. The impeller, shaft, motor, and drive assembly is then positioned to the inlet cone (mounted in opposite wall) and secured in place. See Figure A.

Another method is to provide a hole sized only for the impeller drive shaft. The impeller is then positioned through the opening for the inlet cone after the drive and panel assembly has been securely mounted. See Figure B.

Plug fans may be applied with open impeller (unhoused) or with a housing as shown in Figure C. Performance data in this catalogue is for unhoused impeller application.

Walls must be designed by the users to support the dynamic loads of the fan without resonance to eliminate vibration and bearing failure.

Plenum System

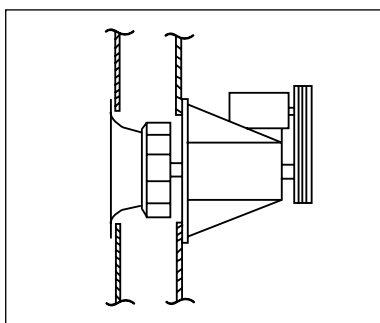
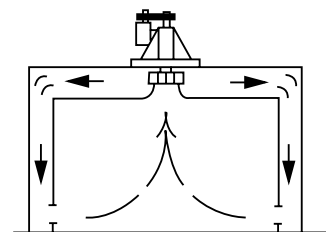


Figure A

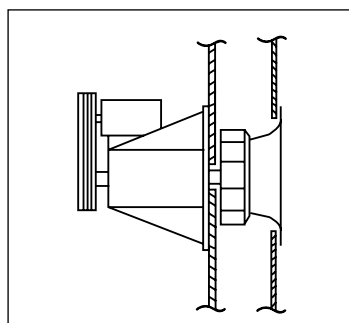


Figure B

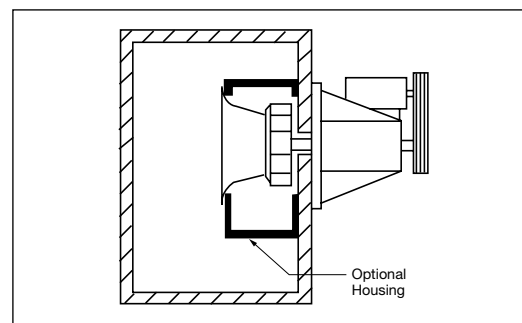
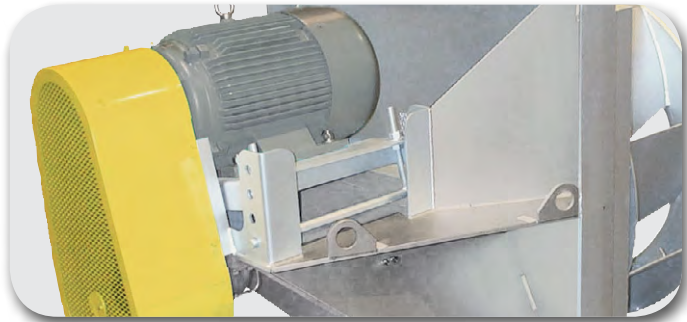


Figure C



Adjustable Motor Base



Continuously Welded Impeller



Inlet Cones



Pillow Block  
Bearing & Shaft

## Adjustable Motor Base

The motor base is standard with leveling and tension adjustment to ensure proper drive belt alignment. The motor base is heavy-gauge steel and prepunched to accept the standard motor frame specified.

## Plug Panel

Constructed of minimum 5mm steel with formed flanges to maintain flatness and rigidity. Panel is prepunched for bolt mounting. Panel assembly may also be welded in place. The “cross frame” bearing support is designed for maximum stability and load spreading. Bearings are serviceable without disassembly of panel or frame.

## Plug Assembly

Available for both horizontal and vertical applications. Horizontal construction is standard. Vertical construction will be provided when specified.

## Inlet Cones

Heavy-gauge and spun to match the impeller intake rim to insure smooth airflow. Inlet cone flange is prepunched for mounting. Inlet cones are shipped loose as standard. An integral inlet cone is optional.

## Impellers

Impellers are assembled of die-formed, matched components, continuously welded to both back plate and front rim. Impellers are statically and dynamically balanced.

## Shafts

Shafts are AISI Grade 1040 or 1045 hot-rolled steel accurately turned, ground, polished and ring-gauged for verification. Shafts are sized for a first critical speed of at least 1.43 times the maximum speed of the class.

## Bearings

Either ball or spherical roller, heavy duty, self-aligning, pillow block type bearings are provided. Bearing selection is based on L-10 minimum life of 40,000 hours or average life of 200,000 hours. Split roller bearings are not recommended.

## High Temperature Construction

149-260°C: Includes high temperature grease, expansion and non-expansion bearings, ceramic shaft seal and shaft cooler.

261-426°C: Includes the modifications above with the addition of high temperature aluminum paint. Minimum 100mm insulation is required and is available as an optional item from TCF. Be sure to apply derating factors for high temperature construction. See Table 7 on page 8.

427-538°C: Includes the modifications above with the addition of 316 stainless steel impeller and shaft. Also includes shaft extension for the required 150mm insulation. 150mm insulated plug is available as an optional item. Be sure to apply stainless steel derating factors for temperature. See Table 7 on page 8.

## Insulated Plug

Protects motor and drive components from heat. An insulated plug is recommended for temperatures above 260°C. Available in 50mm, 100mm, and 150mm thicknesses. Special thicknesses to match customer's insulated wall are available. Plug is assembled to mounting panel when ordered. See Table 1 on page 7 for maximum RPMs based on different thicknesses of the plug.

## Spark Resistant Construction

Fan applications may involve the handling of potentially explosive or flammable particles, fumes or vapors. Such applications require careful consideration by the system designer to insure the safe handling of such gases. Twin City Fan & Blower offers the following classifications of spark resistant construction per AMCA Standard 99-0401-86. It is the specifier or the user's responsibility to specify the type of spark resistant construction with full recognition of the potential hazards and the degree of protection required.

Type B - BEPL impellers employ high strength steel, therefore construction in aluminium must be reviewed by the factory for availability. The maximum temperature is not to exceed 120°C. Pricing available upon application review with substantial reduction in speed.

Type C - The fan shall be so constructed that a shift of the impeller or shaft will not permit two ferrous parts of the fan to rub or strike. This is accomplished by using a mild steel inlet cone with a Monel rub ring for temperatures up to 426°C. Consult factory for construction to 538°C.



## All Welded Housing

Heavy-gauge steel housing is provided with impeller opening on each side and weld studs on the inlet side for cone mounting. Specify rotation and discharge as viewed from drive side to insure proper stud placement. Housing supports and attachments for wall mounting to be provided by others. See page 23 for dimensions.

## Variable Inlet Vanes

Vane blades are cantilever design or center supported, equipped with permanently lubricated bearings and ball joints for smooth and easy operation. Vane assemblies are external type for sizes 122 through 165 and nested for sizes 182 through 490. Standard inlet vanes are applicable to 148°C. Consult factory for higher temperatures.

## Integral Inlet Cone Assembly

Includes four pieces of angle, welded to the insulated plug or mounting panel, which serve to pre-align the inlet funnel within the impeller. The entire unit can be installed or removed through the same hole in the customer's enclosure, without the need for additional mounting or alignment of the inlet cone.

# PLUG FAN SELECTION

The performance curves in this catalogue are based on fans handling standard air at a density of 1.2014 kilogram per cubic meter. This is equivalent to air at 20°C at sea level (759.968mm Hg barometric pressure). When specified performance is at a density different than standard, it must be converted to the equivalent standard conditions before the fan can be selected from the performance curves. The performance data and examples in this catalogue are for unshoused BEPL plug fans.

## Example 1. Standard Density

**Given:** 8.02 m<sup>3</sup>/sec at 746 Pa. TSP (system). Installation is a two-wall arrangement with a impeller-to-wall clearance of 171mm.

Step 1. Entering the performance curves we find that a 270 BEPL plug fan will deliver 8.02 m<sup>3</sup>/sec at 746 Pa. SP operating at 1652 RPM with 9.11 brake kilowatt.

Step 2. Catalogue performance must be corrected for impeller-to-wall arrangement. Determine the impeller and plenum type from the arrangements shown in Figure 1 on page 8. Determine the clearance "C" based upon the closest wall. Performance will not be affected by any additional walls spaced greater than C x 3 from the impeller.

The selected 270 BEPL fan has a impeller diameter of 685mm ("D"). Application is two walls with 171mm clearance ("C"). Therefore, C ÷ D = 171 ÷ 685 = 0.25 or 1/4 which is equivalent to D ÷ 4.

Step 3. Next, determine the Percent of Wide Open Volume (% WOV) at which the fan is to operate. From Table 5 on page 8 find that the WOV factor is 12.63 for a 270 BEPL fan.

$$\% \text{ WOV} = \frac{8.02 \times 100}{1652 \times 12.63} = 81.5$$

Step 4. By interpolation from Table 4 on page 8, for the two wall column of D ÷ 4 at 81.5% WOV, we find the RPM factor of 1.02 and the BHP factor of 1.05.

Corrected unshoused performance for 8.02 m<sup>3</sup>/sec at 746 PA SP standard air is:

$$\begin{aligned} \text{RPM} &= 1652 \times 1.02 = 1685 \\ \text{BkW} &= 9.11 \times 1.05 = 9.57 \end{aligned}$$

## Example 2. Nonstandard Density

**Given:** 8.02 m<sup>3</sup>/sec at 746 Pa. TSP (system), 149°C, 1219 meter altitude. Installation is a two-wall arrangement with a impeller-to-wall clearance of 171mm.

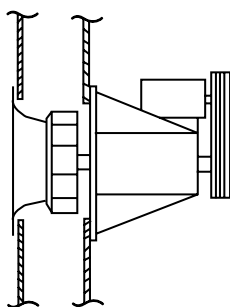
Step 1. To enter the performance curves the operating SP must be corrected to equivalent standard conditions. From Table 6 on page 8 find the correction factor of 0.604 for 149°C and 1219 meter altitude. The corrected equivalent static pressure is equal to:

$$\text{SP (Catalogue)} = \frac{746 \text{ Pa. TSP (system)}}{0.604} = 5.0$$

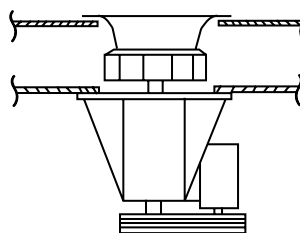
Fan selection is then made for 8.02 m<sup>3</sup>/sec at 1243 Pa SP. Entering the performance curves, we find that a 270 BEPL fan will deliver 8.02 m<sup>3</sup>/sec at 1805 RPM with 13.24 BkW. It must be remembered that this BkW is cataloged at standard 20°C air at sea level.

Steps 2, 3, & 4. Continue the correction procedure with Steps 2, 3 and 4 as shown in Example 1. Wall arrangement = D ÷ 4, % WOV = 74.6, RPM = 1841, and BkW = 13.9.

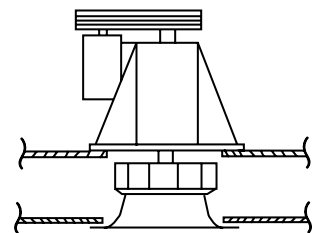
## TYPICAL INSTALLATIONS



Horizontal



Vertical Down



Vertical Up

To ensure proper motor selection, consideration must be given to starting torque requirements (fan impeller inertia  $WR^2$ ) along with the operating BkW. Table 1 lists the  $WR^2$  factors for different impeller sizes to be used in evaluating the capability of a

selected motor. In some cases it may be necessary to provide a larger horsepower motor, even though it may not be dictated by the operating BkW, to bring the fan to speed.

Table 1. Maximum Fan RPMs, Impeller Weights and  $WR^2$  (refer to Table 7 for derates at elevated temperatures)

FAN SIZE	CLASS II					CLASS III				
	MAXIMUM RPM			IMPELLER WT. (kg)	$WR^2$ (kg-m <sup>2</sup> )	MAXIMUM RPM			IMPELLER WT. (kg)	$WR^2$ (kg-m <sup>2</sup> )
	NO PLUG	100mm PLUG	150mm PLUG			NO PLUG	100mm PLUG	150mm PLUG		
122	3777	3777	3000	9.5	0.1	-	-	-	-	-
150	3352	3352	2875	10.9	0.2	-	-	-	-	-
165	2975	2975	2425	14.5	0.3	-	-	-	-	-
182	2566	2566	2566	16.8	0.5	3453	3453	3230	20.9	0.5
200	2341	2341	2341	19.1	0.7	3151	3151	2965	23.6	0.7
222	2105	2105	1905	30.4	1.2	2833	2833	2833	35.4	1.2
245	1911	1911	1765	35.8	1.8	2572	2572	2435	44.5	2.1
270	1734	1734	1734	47.6	2.7	2334	2334	2334	50.4	2.9
300	1561	1561	1561	54.0	3.9	2101	2101	2101	63.1	4.9
330	1419	1419	1419	61.7	5.6	1910	1910	1910	74.8	6.5
365	1283	1283	1283	79.4	9.5	1727	1727	1550	95.7	11.1
402	1163	1163	1163	92.5	13.9	1566	1566	1566	111.0	16.2
445	1052	1052	1052	152.0	22.8	1416	1416	1416	166.0	26.1
490	956	956	956	171.0	32.5	1286	1286	1286	208.0	42.7

Table 2. Bare Fan and Accessory Weights

FAN SIZE	CLASS III				
	BARE FAN		INSULATED PLUG	HOUSING	INLET VANES
	CLASS II	CLASS III			
122	63.5	-	11.34	10.9	20.4
150	65.8	-	11.34	13.6	23.6
165	83.9	-	14.5	20	26.3
182	104	194	14.5	29	13.2
200	106	205	14.5	36	15.0
222	112	230	15.9	44	17.2
245	114	264	15.9	53	18.1
270	155	323	18.1	65	20.4
300	158	343	18.1	107	20.4
330	171	435	24.9	130	22.7
365	199	496	24.9	159	22.7
402	266	647	34	219	24.9
445	296	740	34	237	27.2
490	436	792	43	288	29.5

Table 3. High Temperature Applications

TEMP. RANGE	BEARING TYPE	LUBRICATION	OTHER REQUIREMENTS
TO 148°C	BALL OR ROLLER	GREASE	STANDARD CONSTRUCTION
149 TO 260°C	EXPANSION AND NON-EXPANSION	HIGH TEMPERATURE GREASE	CERAMIC SHAFT SEAL, SHAFT COOLER
261 TO 426°C	EXPANSION AND NON-EXPANSION	HIGH TEMPERATURE GREASE	HIGH TEMPERATURE ALUMINIUM PAINT 100mm MINIMUM INSULATION REQUIRED BY TCF OR CUSTOMER CERAMIC SHAFT SEAL, SHAFT COOLER
427 TO 538°C	EXPANSION AND NON-EXPANSION	HIGH TEMPERATURE GREASE	316 STAINLESS STEEL WHEEL AND SHAFT 150mm MINIMUM INSULATION REQUIRED BY TCF OR CUSTOMER HIGH TEMPERATURE ALUMINUM PAINT CERAMIC SHAFT SEAL, SHAFT COOLER

Figure 1. Impeller and Plenum Arrangement

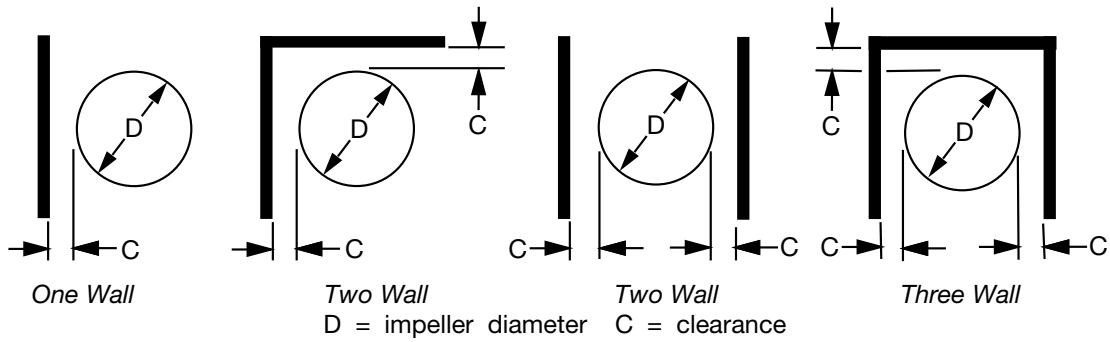


Table 4. Wall Proximity Factors

% WOV	FACTOR	C = D/8			C = D/4			C = D/2		
		ONE WALL	TWO WALL	THREE WALL	ONE WALL	TWO WALL	THREE WALL	ONE WALL	TWO WALL	THREE WALL
95	RPM	1.02	1.03	1.09	1.01	1.02	1.06	1.01	1.01	1.03
	BkW	1.06	1.08	1.29	1.04	1.06	1.20	1.02	1.02	1.08
85	RPM	1.02	1.02	1.08	1.01	1.02	1.06	1.01	1.01	1.03
	BkW	1.05	1.07	1.26	1.03	1.05	1.18	1.02	1.02	1.08
75	RPM	1.01	1.02	1.07	1.01	1.02	1.05	1.00	1.01	1.02
	BkW	1.04	1.06	1.23	1.03	1.05	1.16	1.01	1.02	1.07
65	RPM	1.01	1.02	1.06	1.01	1.01	1.04	1.00	1.01	1.02
	BkW	1.04	1.06	1.19	1.03	1.04	1.14	1.01	1.02	1.06
55	RPM	1.01	1.02	1.05	1.01	1.01	1.04	1.00	1.01	1.02
	BkW	1.03	1.05	1.16	1.02	1.03	1.12	1.01	1.02	1.05
45	RPM	1.01	1.01	1.04	1.01	1.01	1.03	1.00	1.00	1.01
	BkW	1.02	1.04	1.13	1.02	1.03	1.09	1.01	1.01	1.04

Table 5. WOV Factors

SIZE	WOV FACTOR	D
122	0.00049	315
150	0.00091	355
165	0.00120	400
182	0.00172	464
200	0.00227	508
222	0.00321	565
245	0.00429	622
270	0.00600	686
300	0.00817	762
330	0.01088	838
365	0.01445	927
402	0.01938	1022
445	0.02619	1130
490	0.03497	1245

Table 6. Temperature and Altitude Correction Factors

AIR TEMP °C	ALTITUDE IN METRES ABOVE SEA LEVEL											
	0	300	600	900	1200	1500	1750	2000	2500	3000	3500	4000
	BAROMETRIC PRESSURE IN mm Hg (Torr)											
	759.96	733.34	707.46	682.33	657.88	634.18	614.98	596.22	560.17	525.87	493.24	462.35
BAROMETRIC PRESSURE IN kPa												
	101.32	97.77	94.32	90.97	87.71	84.55	81.99	79.49	74.68	70.11	65.76	61.64
20	1.000	0.965	0.931	0.898	0.866	0.834	0.809	0.785	0.737	0.692	0.649	0.608
40	0.936	0.903	0.871	0.840	0.810	0.781	0.757	0.734	0.690	0.648	0.608	0.569
60	0.880	0.849	0.819	0.790	0.762	0.734	0.712	0.690	0.649	0.609	0.571	0.535
80	0.830	0.801	0.773	0.745	0.719	0.693	0.672	0.651	0.612	0.574	0.539	0.505
100	0.786	0.758	0.731	0.705	0.680	0.656	0.636	0.616	0.579	0.544	0.510	0.478
125	0.736	0.710	0.685	0.661	0.637	0.614	0.596	0.578	0.543	0.509	0.478	0.448
150	0.693	0.668	0.645	0.622	0.600	0.578	0.561	0.543	0.511	0.479	0.450	0.421
175	0.654	0.631	0.609	0.587	0.566	0.546	0.529	0.513	0.482	0.453	0.425	0.398
200	0.620	0.598	0.577	0.556	0.536	0.517	0.501	0.486	0.457	0.429	0.402	0.377
225	0.588	0.568	0.548	0.528	0.509	0.491	0.476	0.462	0.434	0.407	0.382	0.358
250	0.560	0.541	0.522	0.503	0.485	0.468	0.453	0.440	0.413	0.388	0.364	0.341
275	0.535	0.516	0.498	0.480	0.463	0.446	0.433	0.420	0.394	0.370	0.347	0.325
300	0.511	0.494	0.476	0.459	0.443	0.427	0.414	0.401	0.377	0.354	0.332	0.311

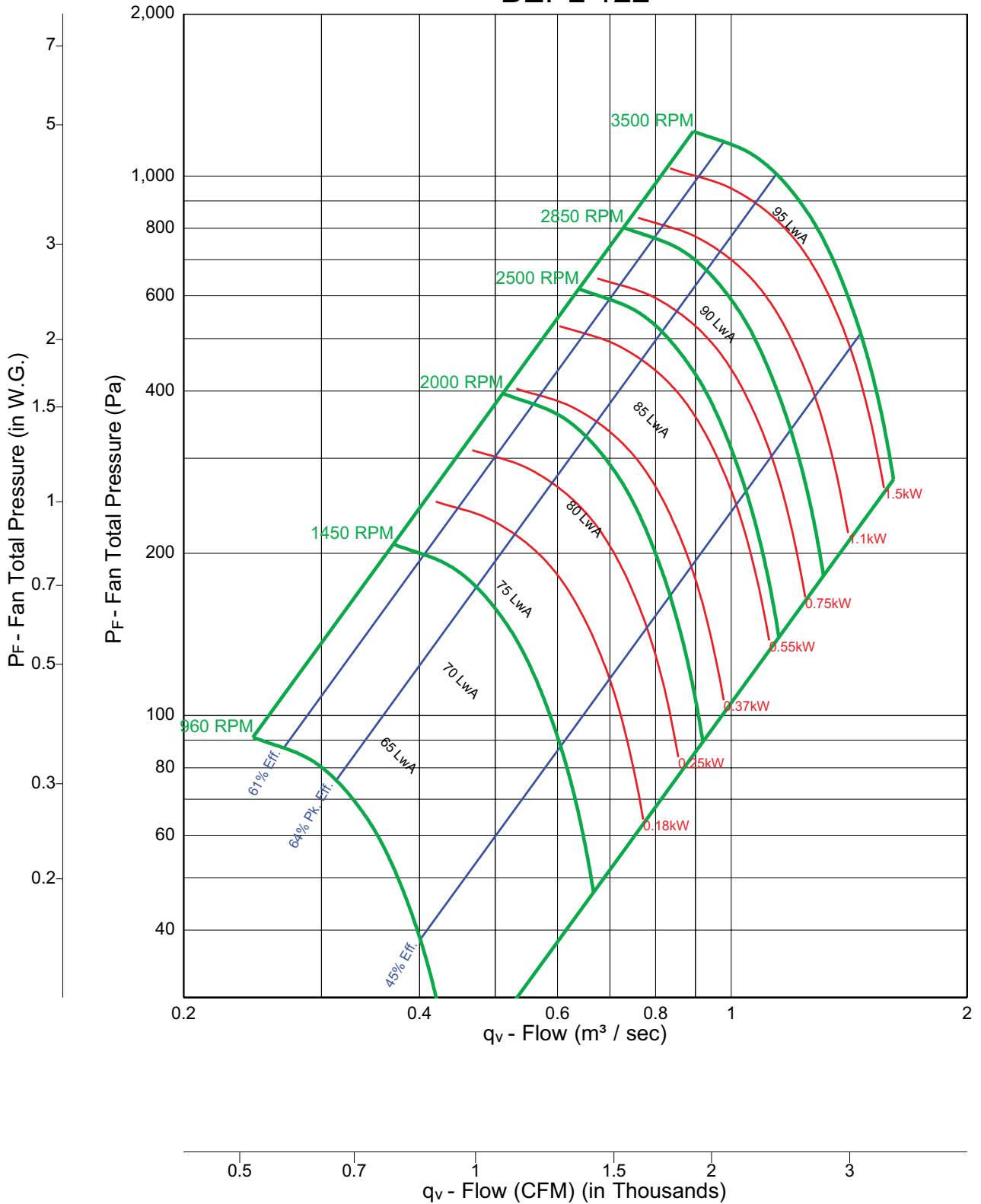
Table 7. Derate Values

TEMP. (°C)	DERATING FACTOR	
	STANDARD STEEL	STAINLESS STEEL
21	1.000	1.000
93	0.990	0.950
149	0.975	0.916
204	0.955	0.877
260	0.930	0.841
316	0.904	0.809
371	0.880	0.7
427	0.837	0.754

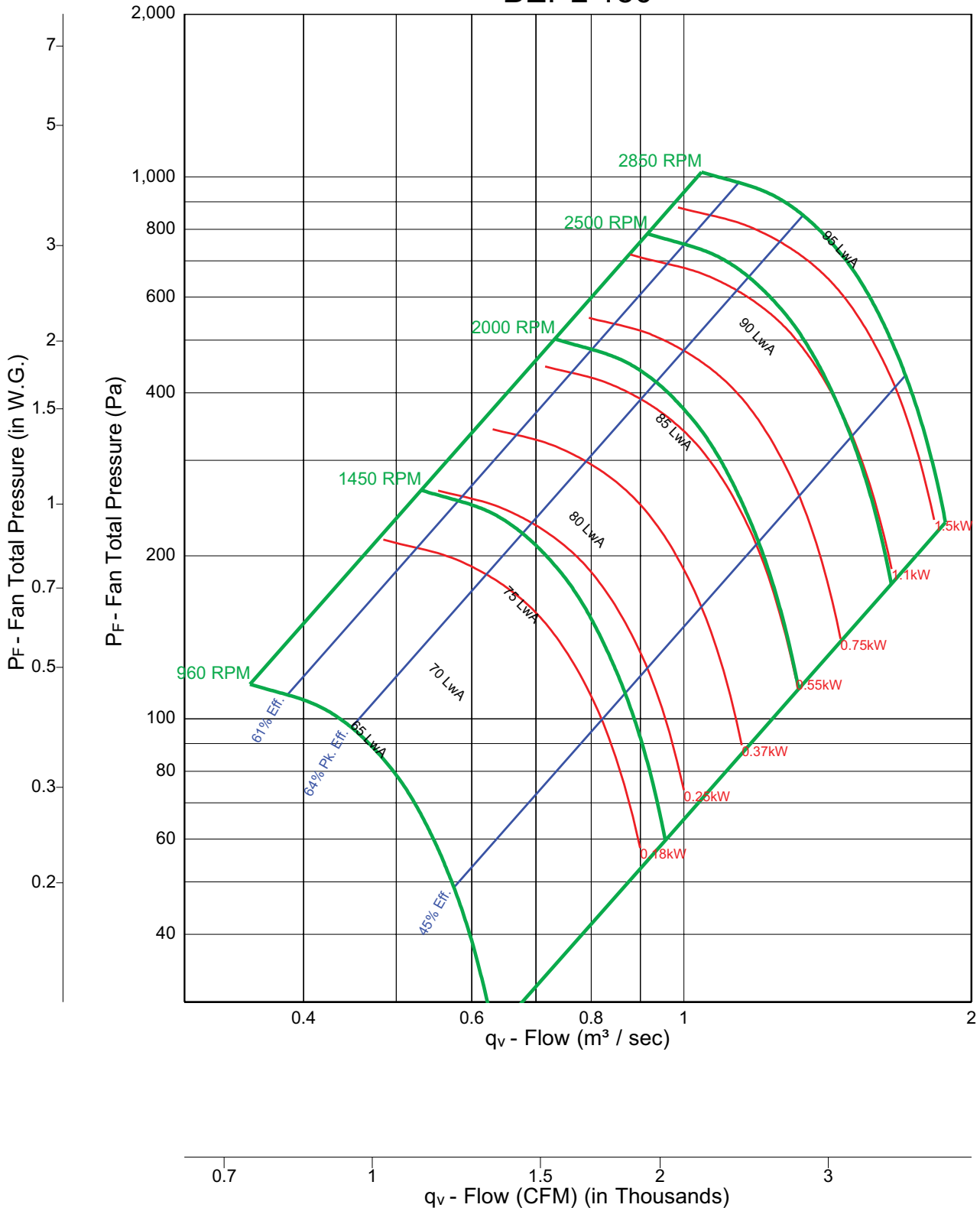
NOTE: For aluminum construction, consult factory for maximum speeds.



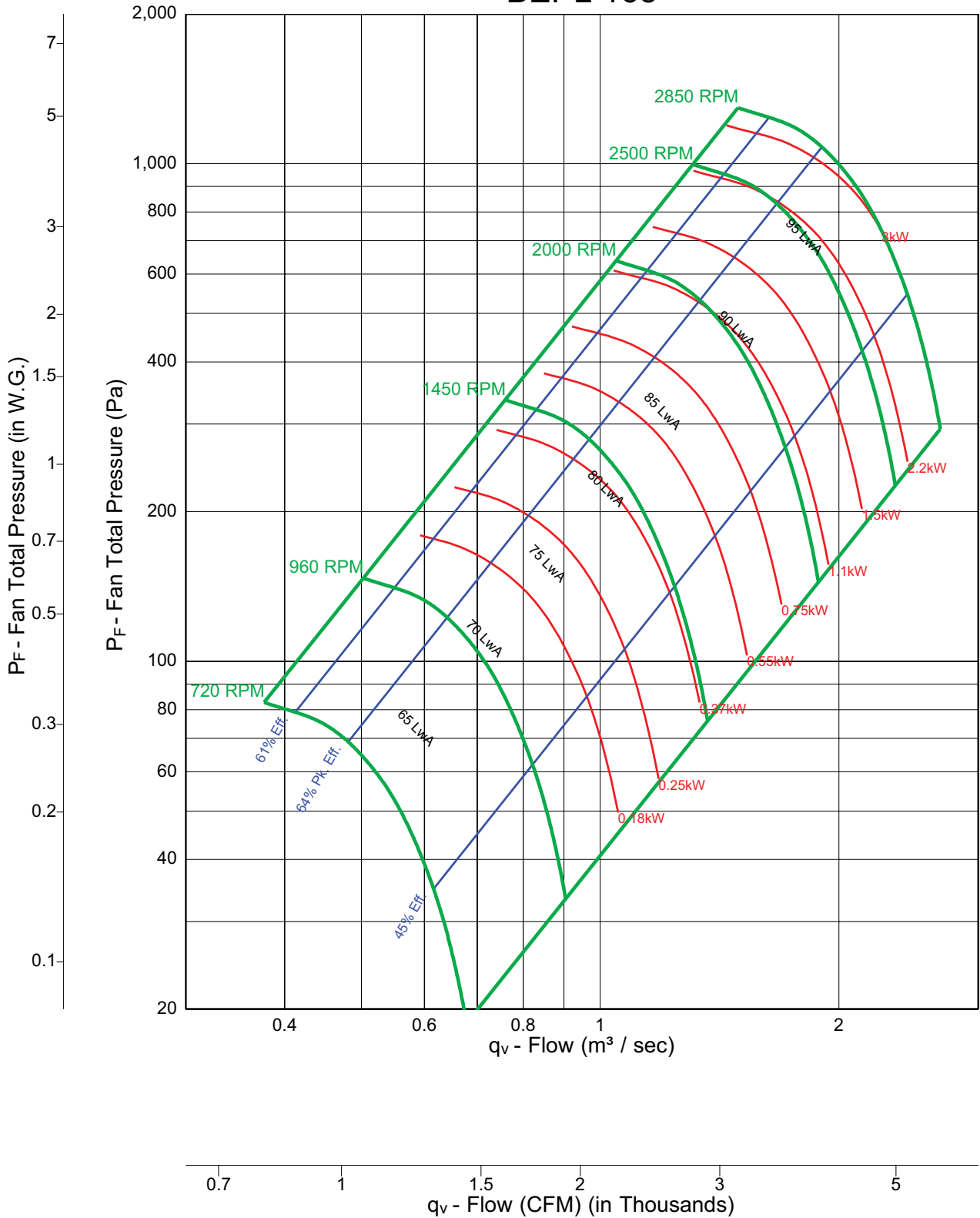
### BEPL 122



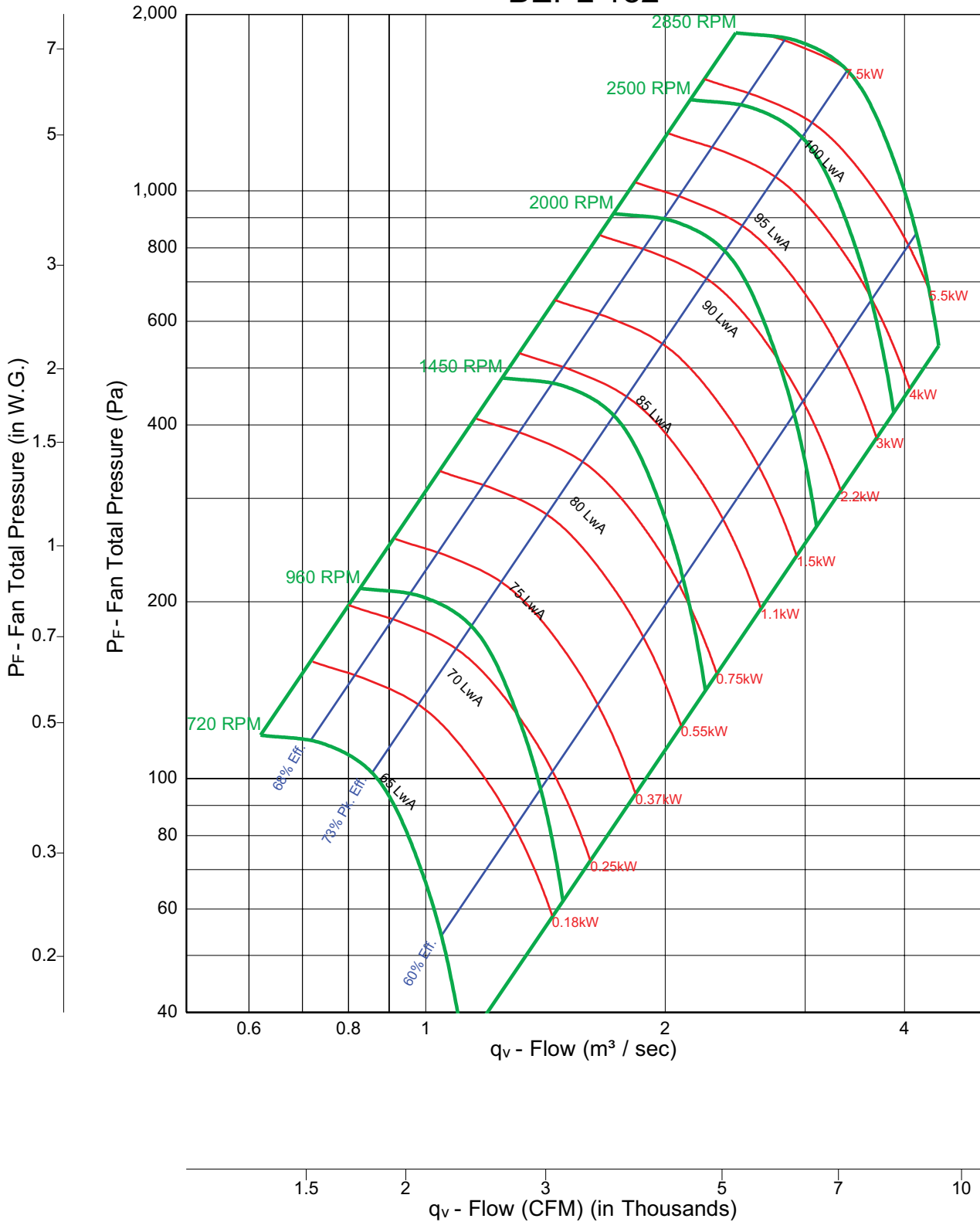
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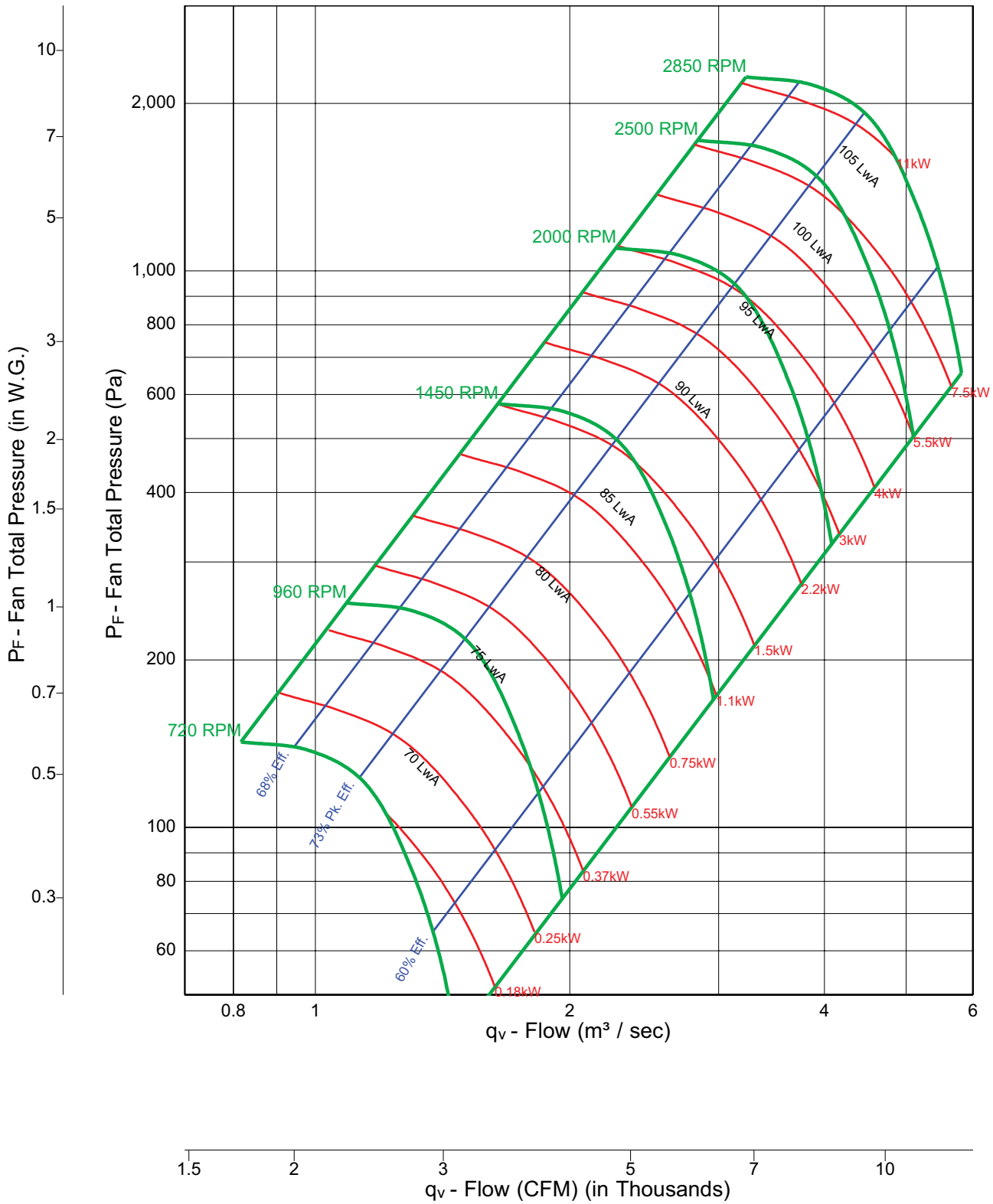
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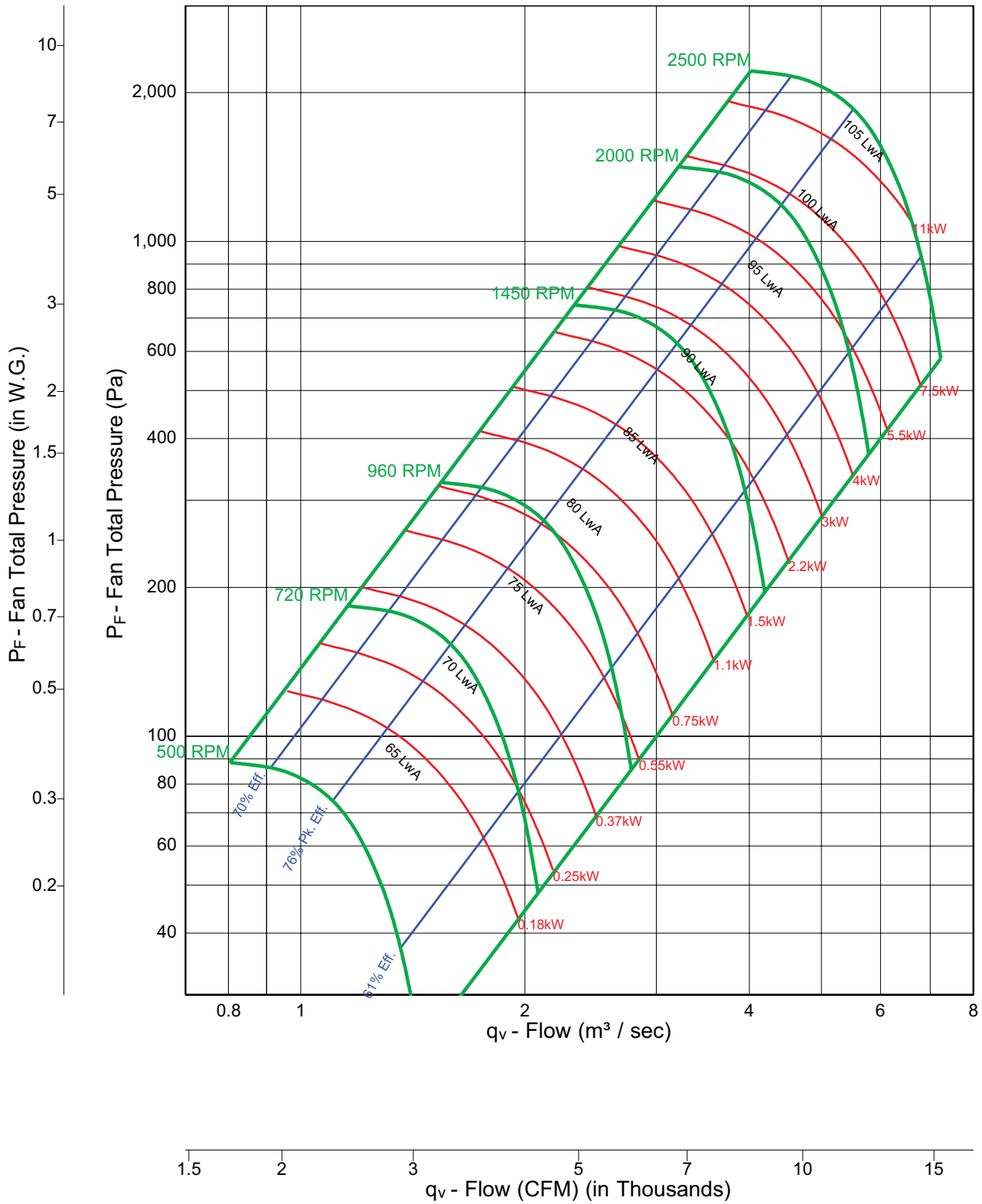
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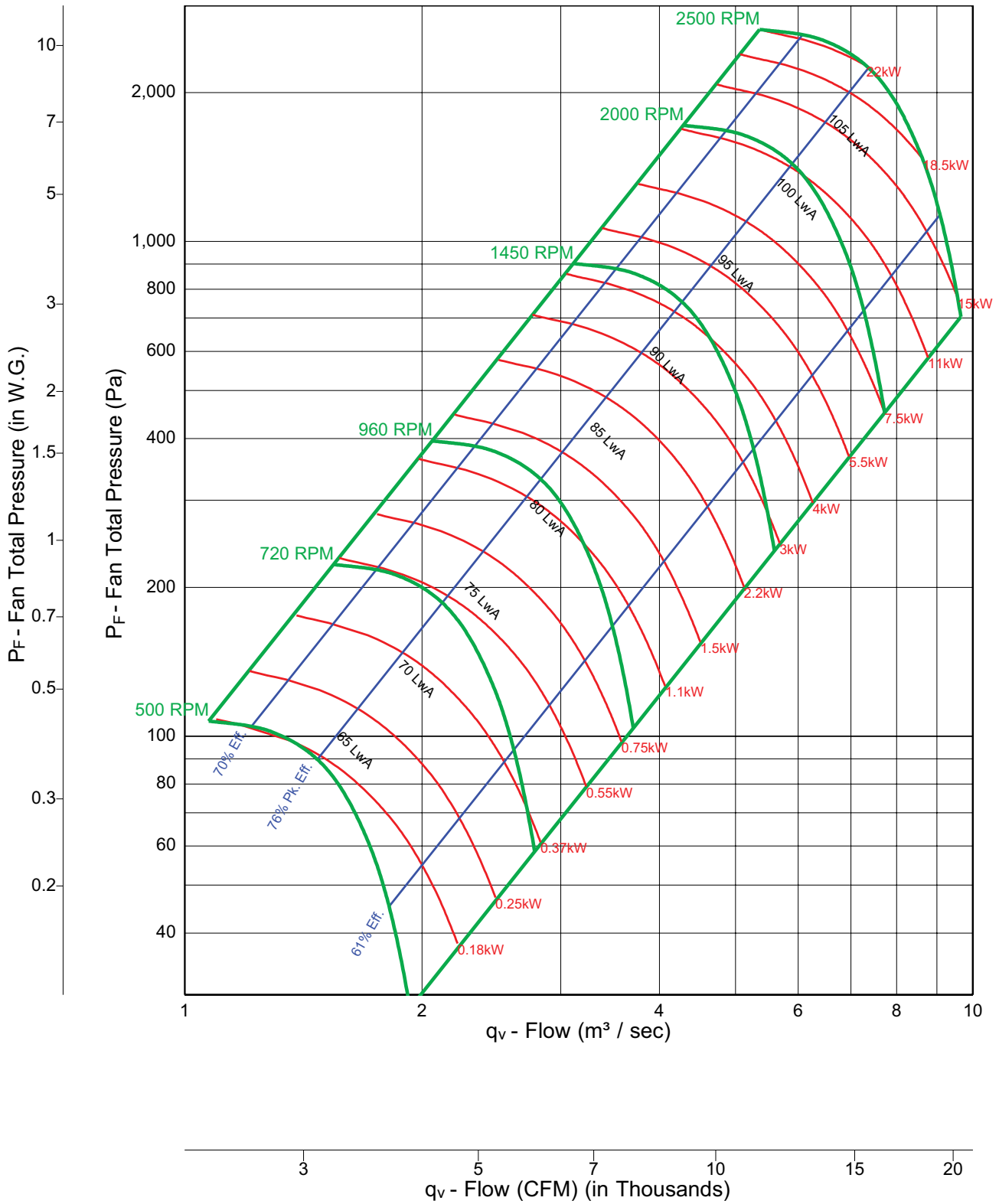
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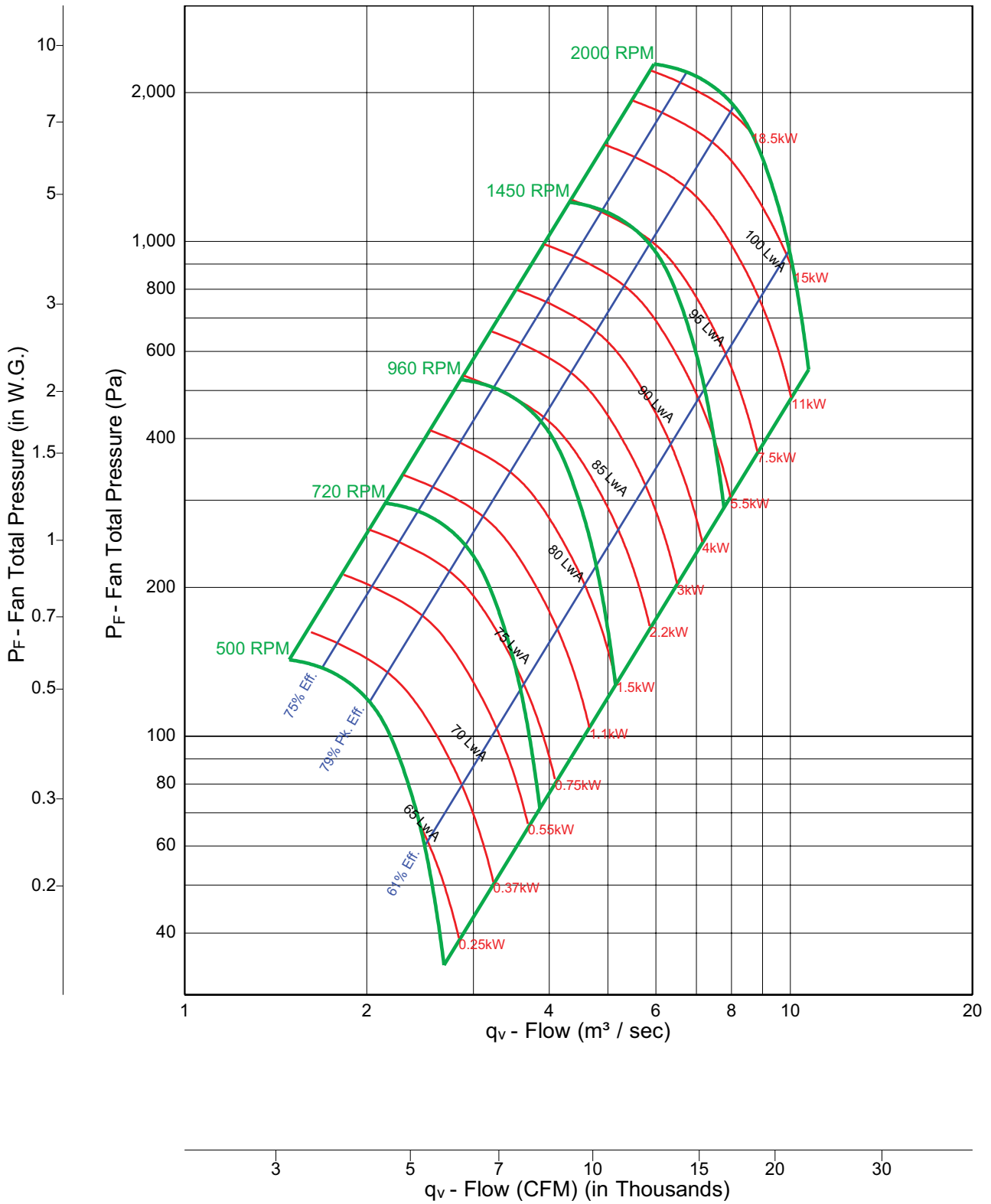
### BEPL 222



### BEPL 245

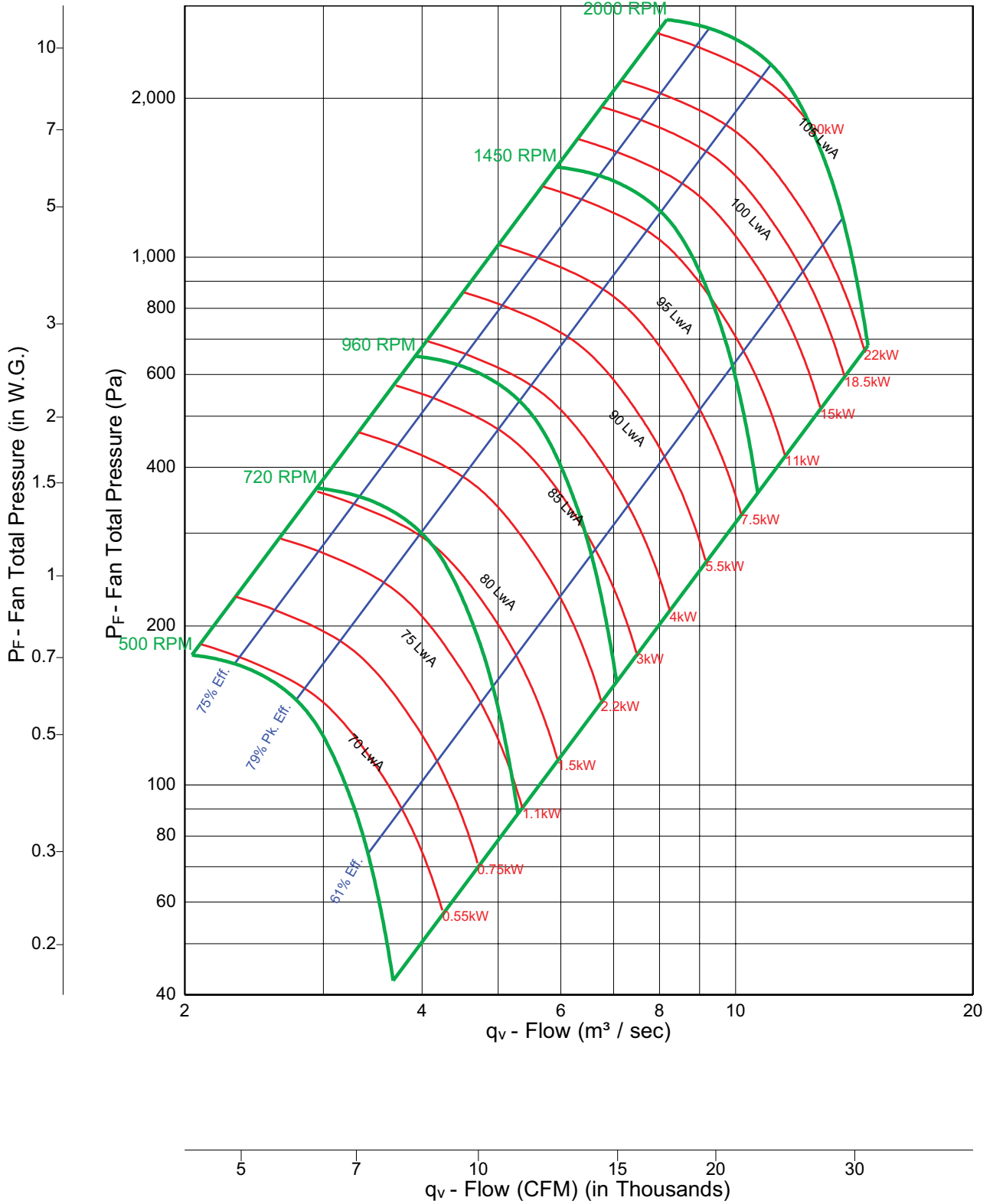


### BEPL 270

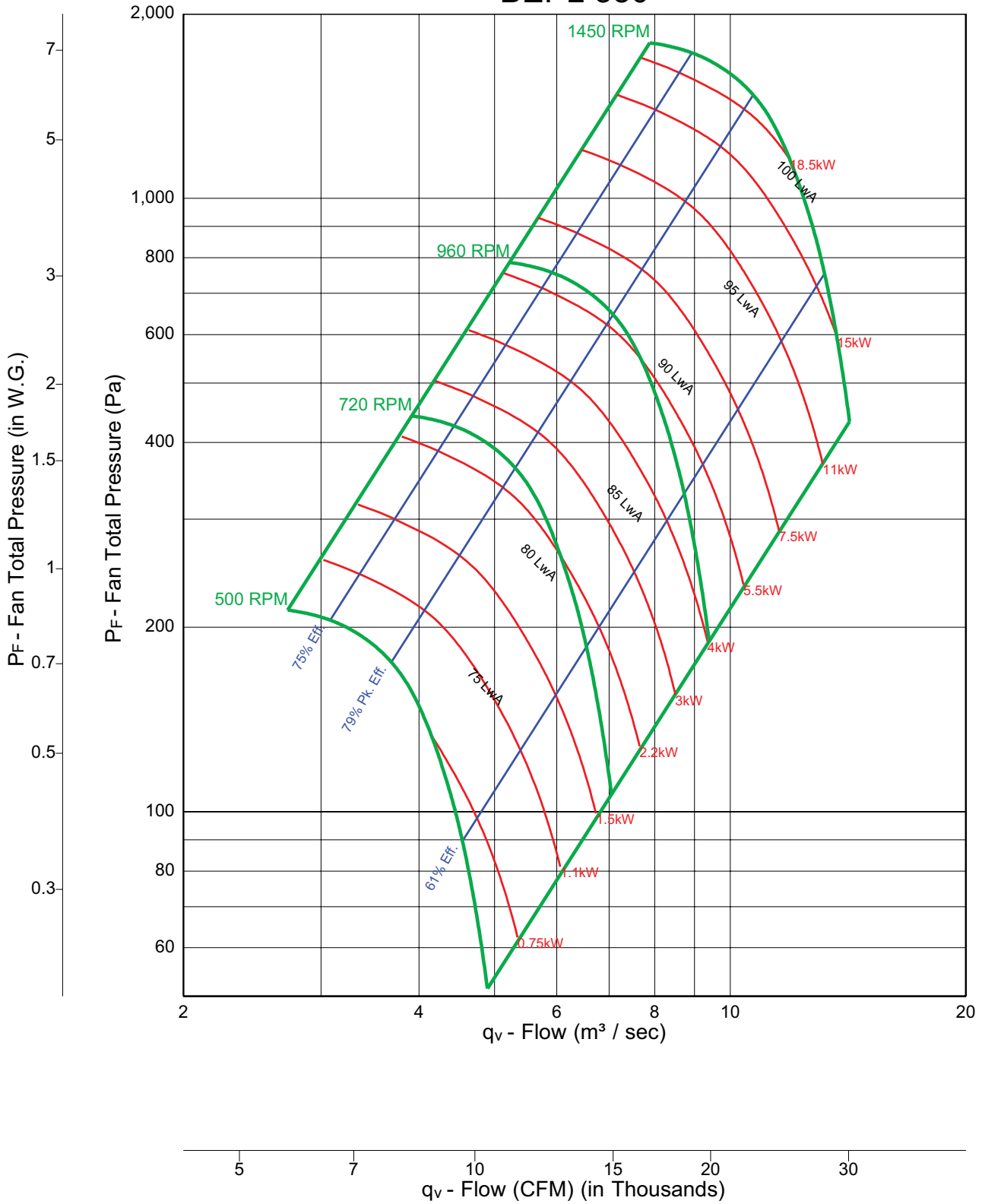




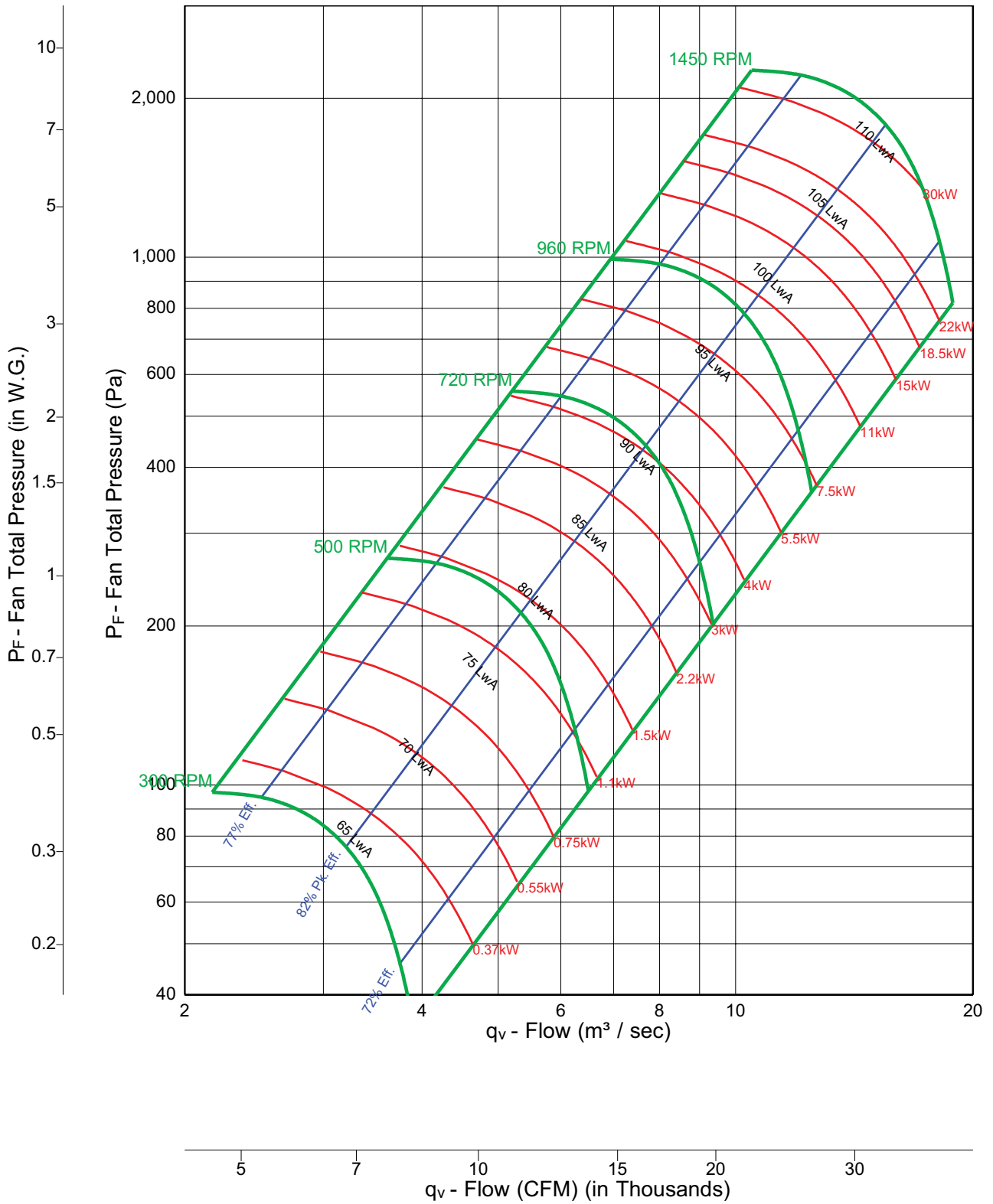
### BEPL 300



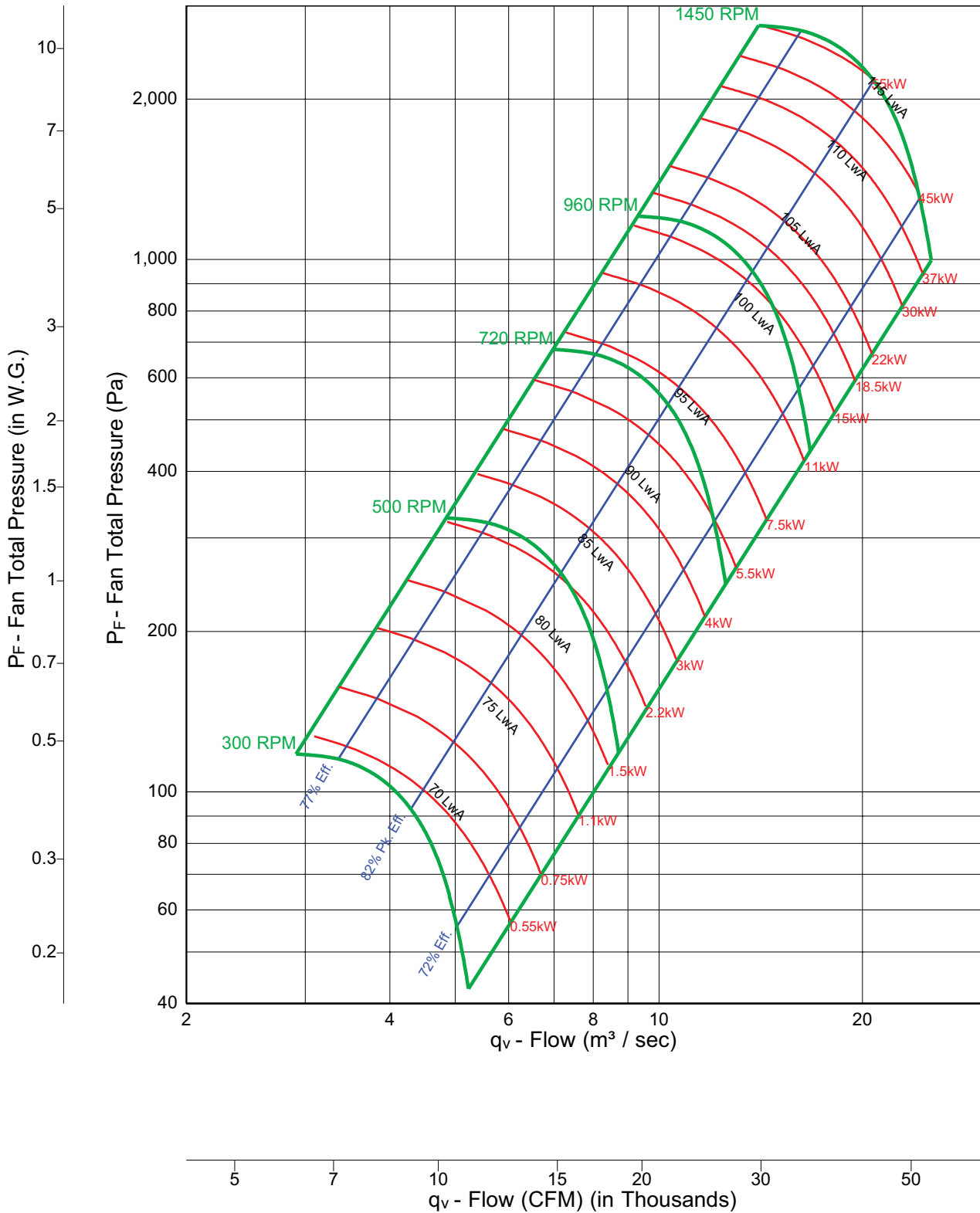
BEPL 330



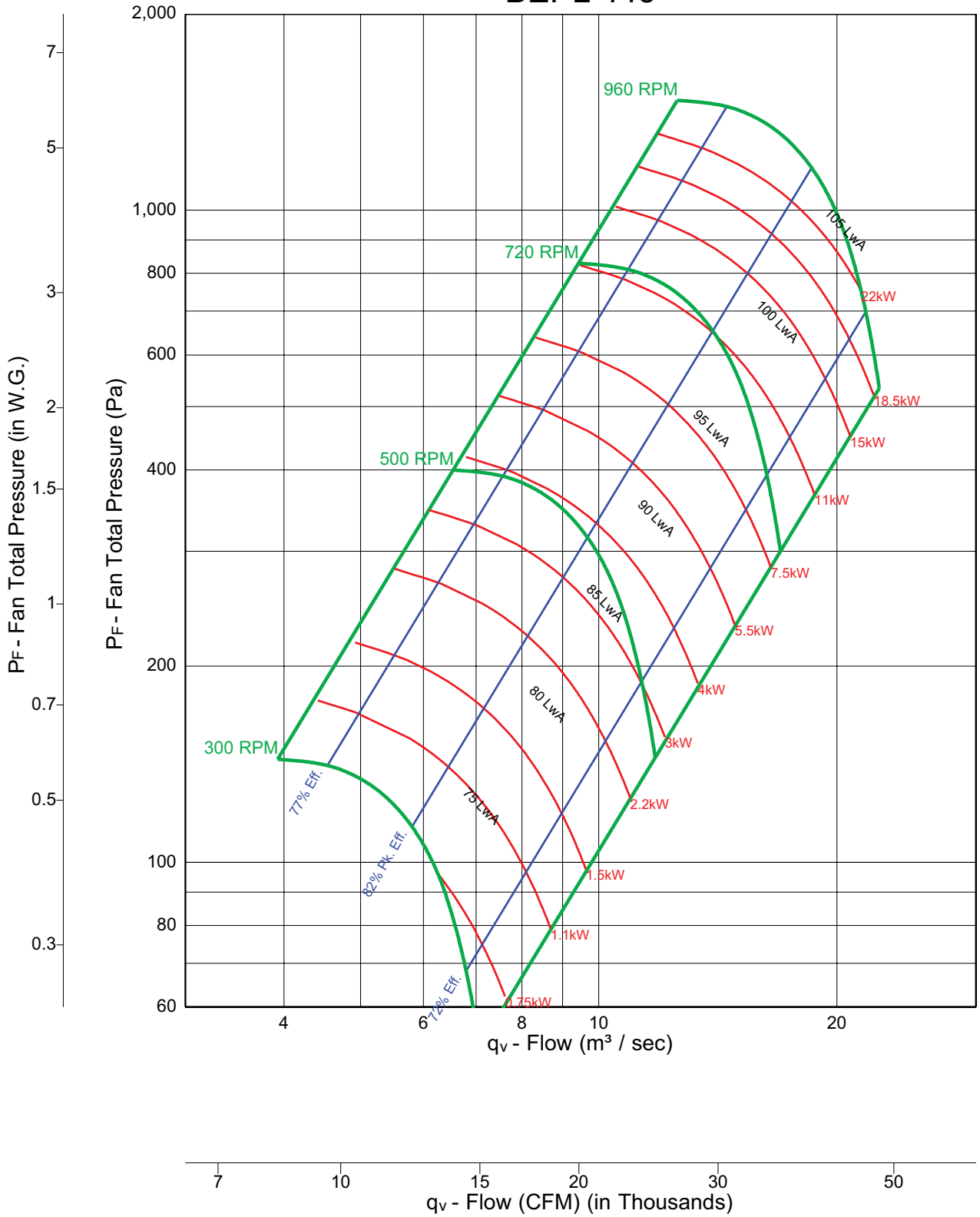
### BEPL 365



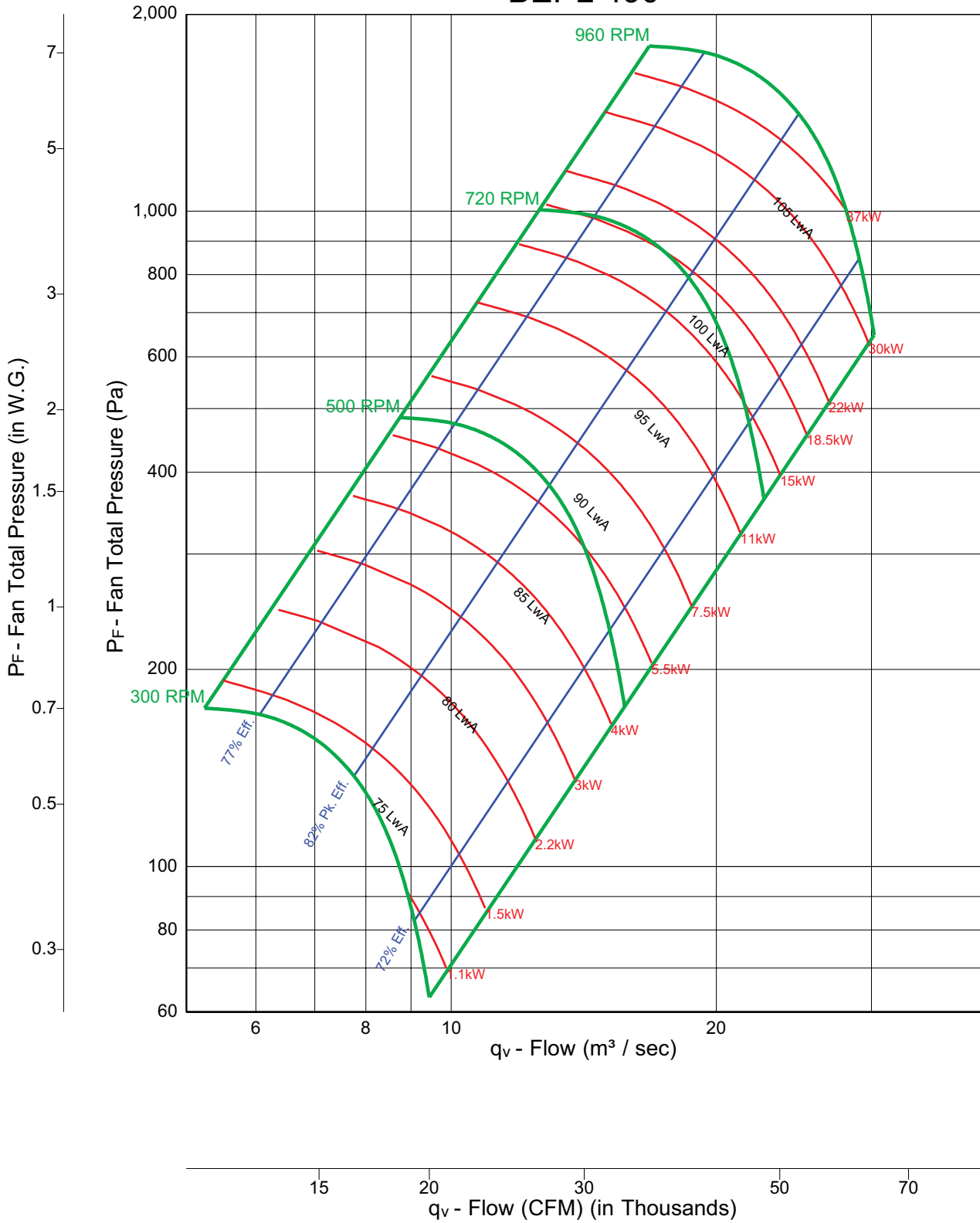
BEPL 402



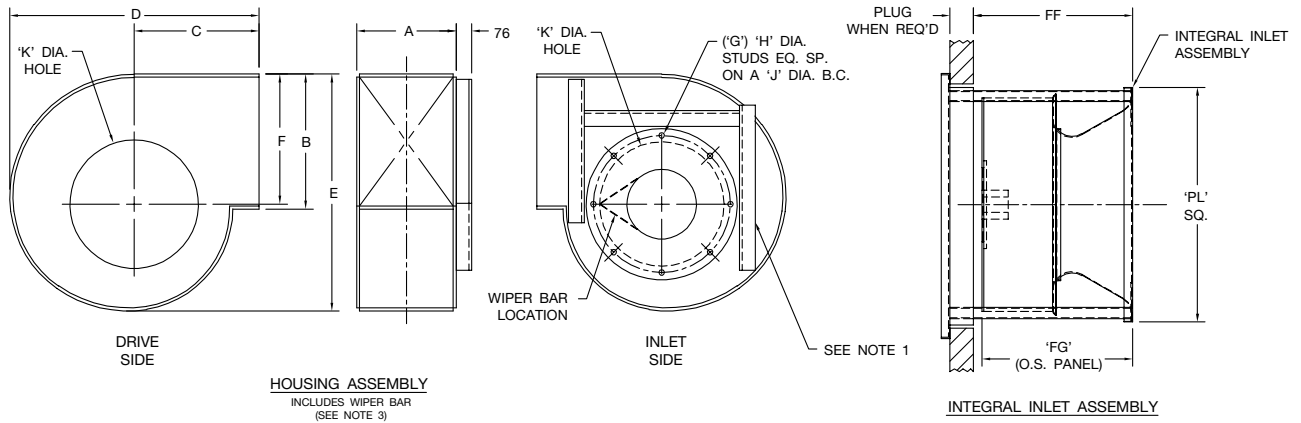
### BEPL 445



BEPL 490



# Accessories



**NOTES:**

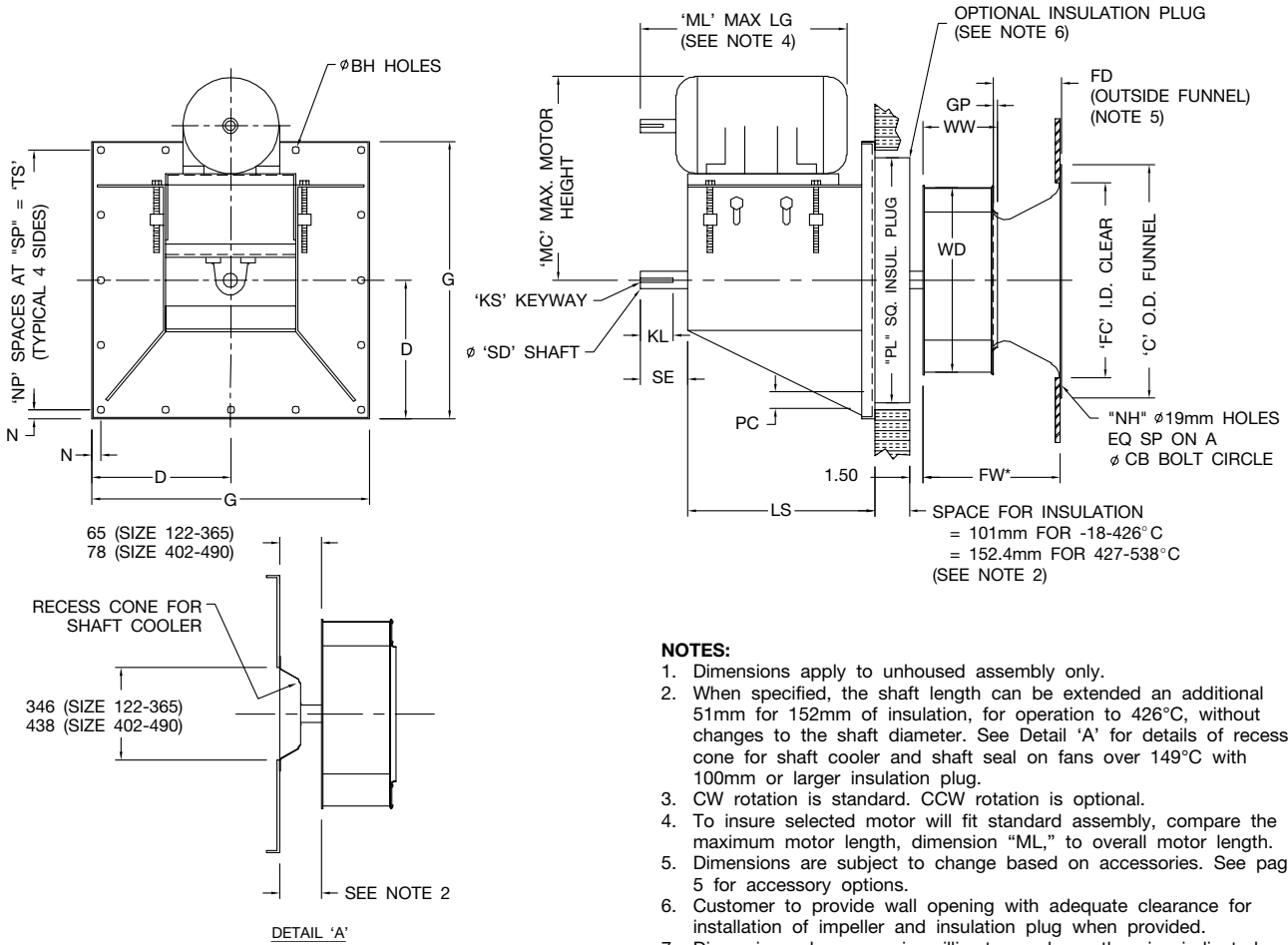
1. Inlet side frame angle on sizes 402, 445, and 490 only.
2. CW rotation is shown. CCW is similar but opposite.
3. Wiper bar mounted on inlet cone when TCF housing is supplied. Orient with respect to discharge as shown. Not supplied with spark resistant construction. Wiper bar is required to prevent re-circulation of air.
4. Dimensions shown are in millimeters unless otherwise indicated.

SIZE	A		B		C	D		E		F		G	H	J	K	PL	FF	FG
	CL 2	CL 3	CL 2	CL 3		CL 2	CL 3	CL 2	CL 3	CL 2	CL 3							
122	254	254	351	351	319	638	638	602	602	335	335	8	9.5 - 16	403	359	489	257	219
150	279	279	397	397	348	708	708	678	678	378	378	8	9.5 - 16	448	405	489	284	246
165	310	310	446	446	376	783	783	762	762	425	425	8	9.5 - 16	498	454	660	316	278
182	363	367	492	495	356	754	756	842	845	490	492	8	9.5 - 16	533	495	660	368	330
200	397	400	538	541	389	829	830	922	926	537	538	8	9.5 - 16	594	543	660	402	363
222	436	440	598	602	437	921	922	1024	1027	597	598	8	9.5 - 16	648	603	718	440	402
245	480	483	662	665	483	1018	1019	1130	1134	659	660	8	9.5 - 16	705	686	718	483	445
270	524	527	730	734	532	1122	1124	1248	1251	727	729	16	9.5 - 16	756	737	816	527	489
300	575	578	810	813	592	1246	1248	1384	1388	806	808	16	9.5 - 16	854	803	816	579	541
330	630	633	894	897	654	1375	1376	1526	1529	891	892	16	9.5 - 16	946	883	988	633	595
365	694	697	984	988	724	1524	1526	1686	1689	973	983	16	9.5 - 16	1035	1003	988	697	659
402	760	764	645	1087	800	1681	1683	1858	1861	1081	1083	16	9.5 - 16	1120	1080	1226	765	727
445	837	840	1199	1202	886	1858	1859	2053	2056	1449	1197	16	9.5 - 16	1235	1200	1226	842	803
490	916	919	1321	1324	978	2050	2051	2262	2265	1318	1319	16	9.5 - 16	1350	1321	1321	921	883

AC1001437

Dimensions are not to be used for construction. Certified drawings are available upon request.

# Class II



**NOTES:**

1. Dimensions apply to unhooded assembly only.
2. When specified, the shaft length can be extended an additional 51mm for 152mm of insulation, for operation to 426°C, without changes to the shaft diameter. See Detail 'A' for details of recess cone for shaft cooler and shaft seal on fans over 149°C with 100mm or larger insulation plug.
3. CW rotation is standard. CCW rotation is optional.
4. To insure selected motor will fit standard assembly, compare the maximum motor length, dimension "ML," to overall motor length.
5. Dimensions are subject to change based on accessories. See page 5 for accessory options.
6. Customer to provide wall opening with adequate clearance for installation of impeller and insulation plug when provided.
7. Dimensions shown are in millimeters unless otherwise indicated.

SIZE	BH	C	CB	D	FC	FD	FR	FW	G	GP	KL	KS	LS
122	14	400	375	289	337	111	132M	215	578	6	102	10 x 5	445
150	14	464	438	289	411	137	132M	243	578	6	102	10 x 5	470
165	14	508	483	376	451	151	132M	273	753	6	102	10 x 5	470
182	14	559	533	376	495	167	160M	326	753	10	114	13 x 6	533
200	14	619	594	376	543	183	160M	359	753	10	114	13 x 6	533
222	14	676	648	406	603	203	160L	398	813	11	114	13 x 6	572
245	14	727	705	406	686	224	160L	440	813	13	114	13 x 6	572
270	18	787	756	465	736	246	180M	484	930	14	127	13 x 6	584
300	18	886	854	465	803	273	180M	535	930	15	127	13 x 6	584
330	18	978	946	645	883	300	180L	590	1108	17	127	13 x 6	622
365	18	1067	1035	645	1003	332	180L	653	1108	19	140	13 x 6	622
402	18	1153	1121	699	1080	367	200L	721	1397	21	140	13 x 6	699
445	18	1267	1235	699	1200	405	200L	797	1397	23	140	16 x 8	699
490	18	1381	1350	699	1321	446	200L	876	1397	25.0	140	16 x 8	699

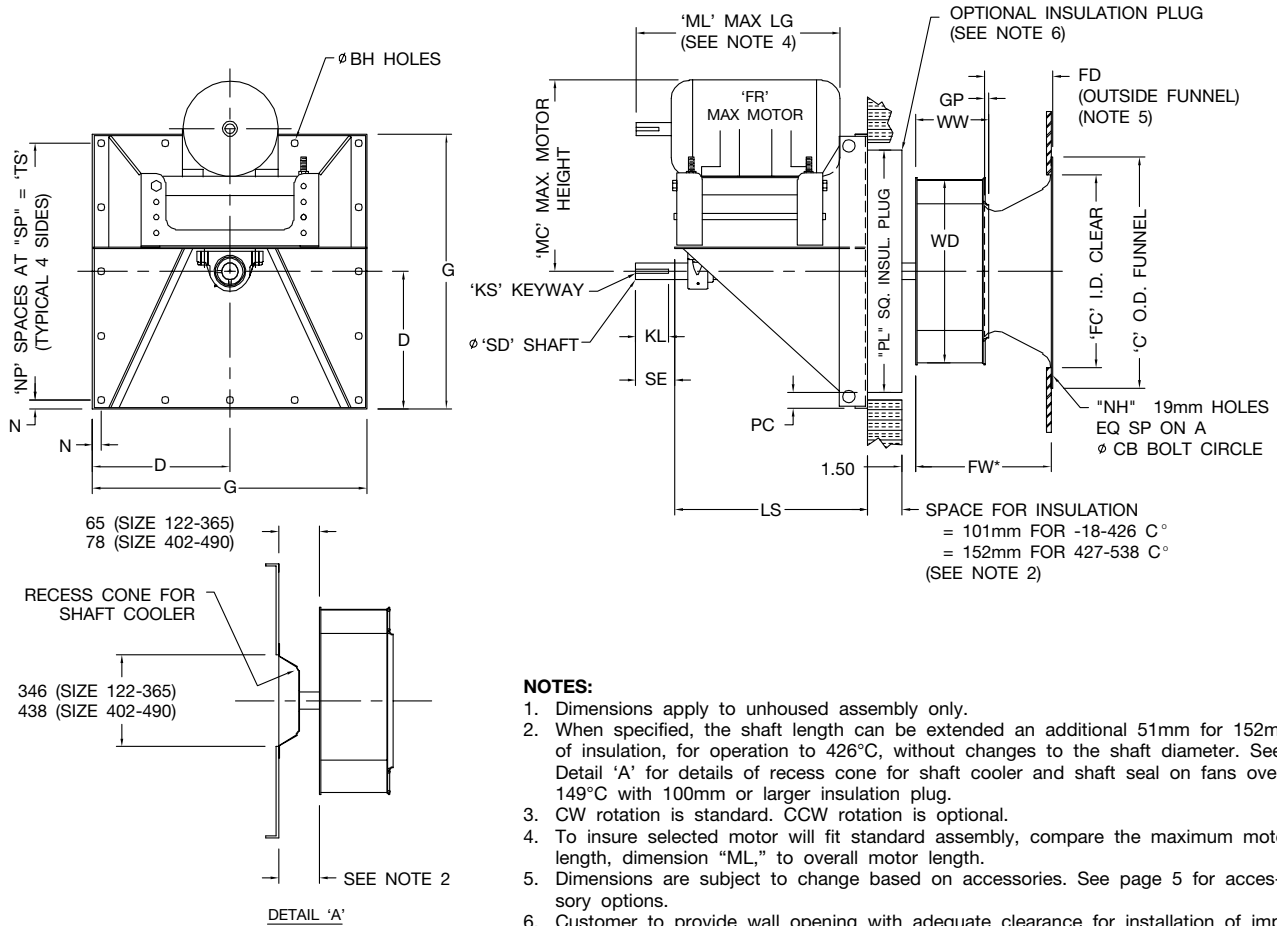
SIZE	MC	ML	N	NH	NP	PC	PL	SD	SE	SP	TS	WD	WW
122	616	486	25	8	4	44	489	43	127	132	527	315	129
150	616	511	25	8	4	44	489	43	127	132	527	355	144
165	616	511	27	8	4	46	660	43	127	175	699	400	161
182	699	612	27	8	4	46	660	49	140	175	699	464	171
200	699	613	27	8	4	46	660	49	140	175	699	508	189
222	699	648	29	8	4	48	718	49	140	189	756	565	209
245	699	648	29	8	4	48	718	49	140	189	756	622	231
270	749	676	32	8	6	57	816	56	152	145	867	686	255
300	749	676	32	16	6	57	816	56	152	145	867	762	281
330	749	715	35	16	6	60	988	56	152	173	1038	838	309
365	749	715	35	16	6	60	988	56	165	173	1038	927	343
402	838	794	32	16	6	86	1226	56	165	222	1334	1022	378
445	838	794	32	16	6	86	1226	62	165	222	1334	1130	417
490	838	794	32	16	6	64	1321	62	165	222	1334	1245	458

AC1001435

Dimensions are not to be used for construction. Certified drawings are available upon request.



# Class III



**NOTES:**

1. Dimensions apply to unhoused assembly only.
2. When specified, the shaft length can be extended an additional 51mm for 152mm of insulation, for operation to 426°C, without changes to the shaft diameter. See Detail 'A' for details of recess cone for shaft cooler and shaft seal on fans over 149°C with 100mm or larger insulation plug.
3. CW rotation is standard. CCW rotation is optional.
4. To insure selected motor will fit standard assembly, compare the maximum motor length, dimension "ML," to overall motor length.
5. Dimensions are subject to change based on accessories. See page 5 for accessory options.
6. Customer to provide wall opening with adequate clearance for installation of impeller and insulation plug when provided.
7. Dimensions shown are in millimeters unless otherwise indicated.

SIZE	BH	C	CB	D	FC	FD	FR	FW	G	GP	KL	KS	LS
182	14	559	533	376	495	167	160L	326	753	10	114	16 x 8	635
200	14	619	594	376	543	183	180M	359	753	10	140	16 x 8	686
222	14	676	648	645	603	203	180L	398	813	11	140	16 x 8	686
245	14	727	705	645	686	224	200M	440	813	13	152	16 x 8	775
270	18	787	756	465	737	246	200L	484	930	14	152	16 x 8	778
300	18	886	854	465	803	273	200L	535	930	15	152	16 x 8	778
330	18	978	946	554	883	300	225M	590	1108	17	165	16 x 8	822
365	18	1067	1035	554	1003	332	250M	653	1108	19	203	16 x 8	962
402	18	1153	1121	699	1080	367	250M	721	1397	21	203	16 x 8	975
445	18	1267	1235	699	1200	405	250M	797	1397	23	203	22 x 11	975
490	18	1381	1350	699	1321	446	250M	876	1397	25	203	22 x 11	975

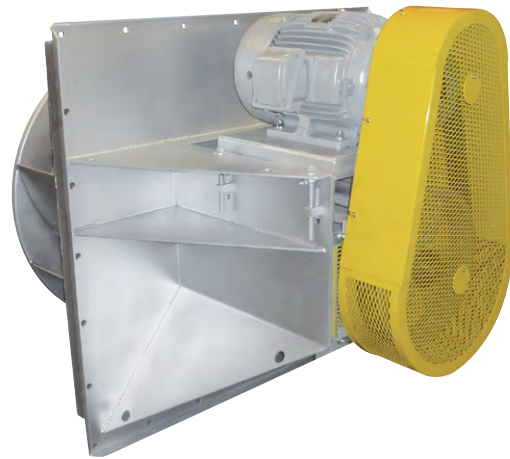
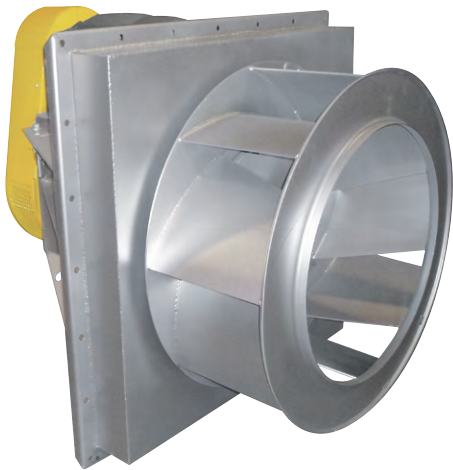
SIZE	MC	ML	N	NH	NP	PC	PL	SD	SE	SP	TS	WD	WW
182	673	645	27	8	4	46	660	62	114	175	699	464	171
200	711	734	27	8	4	46	660	62	140	175	699	508	189
222	711	813	29	8	4	48	718	68	140	189	756	565	209
245	813	813	29	8	4	48	718	68	152	189	756	622	231
270	813	813	32	8	6	57	816	68	152	145	867	686	255
300	813	813	32	16	6	57	816	68	152	145	867	762	281
330	864	873	35	16	6	60	988	68	165	173	1038	838	309
365	965	1048	35	16	6	60	988	68	203	173	1038	927	343
402	965	1048	32	16	6	86	1226	75	203	222	1334	1022	378
445	965	1048	32	16	6	86	1226	87	203	222	1334	1130	417
490	965	1048	32	16	6	64	1321	87	203	222	1334	1245	458

AC1001436

Dimensions are not to be used for construction. Certified drawings are available upon request.

## Belt Centers

MOTOR FRAME SIZE	CLASS II								CLASS III											
	122-165		182-245		270-365		402-490		182		200-222		245-270		300		365-402		445-490	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
80	330	419	356	445	368	457	406	495	239	340	239	340	236	338	236	338	236	338	249	351
90S-90L	330	419	356	445	368	457	406	495	239	340	239	340	236	338	236	338	236	338	249	351
112S-112M	356	445	381	470	394	483	432	521	264	366	264	366	262	363	262	363	262	363	274	376
132S-132M	376	465	401	490	414	503	452	541	284	386	284	386	279	381	282	384	282	384	295	396
160M-160L	—	—	427	516	439	528	478	566	376	478	376	478	371	472	373	475	373	475	386	488
180M-180L	—	—	—	—	457	546	495	584	—	—	396	498	391	493	391	493	391	493	404	505
200M-200L	—	—	—	—	—	—	521	610	—	—	—	—	447	574	447	574	447	574	460	587
225S-225M	—	—	—	—	—	—	—	—	—	—	—	—	—	—	472	599	472	599	485	612
250S-250M	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	528	655	541	668





## Model BEPL

Fans shall be Model BEPL Single Thickness Airfoil, as manufactured by Twin City Fan & Blower, Minneapolis, Minnesota.

**PERFORMANCE** — Fans shall be tested and rated in accordance with industry accepted test codes and shall be guaranteed by the manufacturer to deliver rated published performance levels.

**PLUG PANEL** — Plug panel shall be of minimum 5 mm steel with formed flanges to maintain flatness and rigidity. Panel shall be prepunched for bolt mounting. The "Cross Frame" bearing support shall be designed for maximum stability and load spreading. Bearings shall be serviceable without disassembly of panel or frame. Plug assembly is available for both horizontal and vertical application. Horizontal construction is standard. Vertical construction must be specified.

**IMPELLER** — BEPL impellers shall be backward curved, non-overloading, single thickness airfoil type, designed for maximum efficiency and quiet operation. Impellers shall be constructed of heavy gauge steel, continuously welded to a flat impeller cone and backplate. Partial welding will not be acceptable.

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

**BEARINGS** — Bearings shall be either ball or spherical roller, heavy duty, self-aligning, pillow block type. Bearing selection is based upon L-10 minimum life of 40,000 hours or L-50 minimum life of 200,000 hours.

**OPTIONAL ALL WELDED HOUSING** — Housing shall be of heavy gauge steel. Housing shall be provided with impeller opening on each side and weld studs on inlet side for cone mounting. Specify rotation and discharge as viewed from drive side to insure proper stud placement. Housing supports and attachments for wall mounting to be provided by others.

**ADJUSTABLE MOTOR BASE** — Adjustable motor base is standard and shall have a four point leveling and tension adjustment to insure proper drive belt alignment. The motor base shall be heavy gauge steel and prepunched to accept standard motor frame specified.

**OPTIONAL INLET VANES** — Inlet vane blades are cantilever design or with centered supports equipped with permanently lubricated needle bearings and ball joints for smooth and easy operation. Vane assemblies are external type for sizes 122 through 165 and nested for sizes 182 through 490. Standard inlet vanes are applicable to 149°C. Consult factory for higher temperatures.

**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 on each of the bearings. Records shall be maintained and a written copy shall be available upon request.

**GUARANTEE** — The manufacturer shall guarantee the workmanship and materials for its BEPL Single Blade Airfoil Plug Fans for at least one (1) year from startup or eighteen (18) months from shipment, whichever occurs first. Fans shall be Model BEPL Single Thickness Airfoil, as manufactured by Twin City Fan & Blower, Minneapolis, Minnesota.

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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  
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