Engineering Data

BI BLOWER SELECTION GUIDE

The basic information needed to properly size a Central blower is the volume of air, in cubic feet per minute (CFM) and the static pressure (SP) in the duct system. The CFM is normally determined by health codes or accepted industry standards. Usually the SP is specified by the engineer, based on the length and size of duct and number of elbows in the system.

The rating tables for Central blowers are easy to use. The first column shows the volume in CFM. The second column shows the corresponding outlet velocity in feet per minute. The remaining columns show the RPM and brake horsepower (BHP) at the corresponding SP. Use the following steps to determine the RPM and BHP at required SP:

1. Choose the desired CFM.
2. Move over to the column for the specified SP.
3. Read the required RPM and BHP.*

Example: Find 800 CFM at 3/8 SP (See Fig. 2)

VOLUME CFM	O.V. FPM	SP, in. WG							
		1/4"		3/8"		1/2"		5/8"	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
700	2077	2130	0.19	2210	0.22	2290	0.24	2380	0.26
800	2374	2389	0.28	2455	0.30	2530	0.33	2610	0.35
900	2671	2620	0.37	2700	0.41	2770	0.44	2850	0.46
1000	2967	2850	0.48	2940	0.52	3010	0.56	3089	0.60

Fig. 2

* After determining the required BHP it is necessary to pick the suitable size of motor. The BHP shown in the rating tables does not include belt losses so choose a motor rated at least 10 percent higher than shown in rating table.

Each blower size is capable of operating over a wide range of CFM and static pressure, therefore there will be two or three different sizes that could qualify for a given application. Select a size where the CFM and SP falls in the shaded area on the rating tables. This assures that the selected blower is operating in the optimum range.

If the point in the rating table falls below the shaded area, it would be advisable to consider using the next larger size of blower, and, if the point falls above the shaded area, one should definitely consider using a smaller size of blower. Operating the fan outside the optimum efficiency range is not necessarily unsatisfactory. Other considerations such as noise level, brake horsepower, space limitations and engineering specifications may be governing factors.

Figure 1 shows the typical performance for the Central BI blowers, along with the curve of mechanical efficiency. The shaded area in this figure corresponds with the shaded area in the rating tables. (FC curves are available on request.)

Frequently specifications call for a maximum outlet velocity and tip speed. Outlet velocity, for volumes not shown, can be calculated by dividing the CFM by the outlet area of the blower. Tip speeds are determined by multiplying the RPM by the tip speed factor shown above each table.

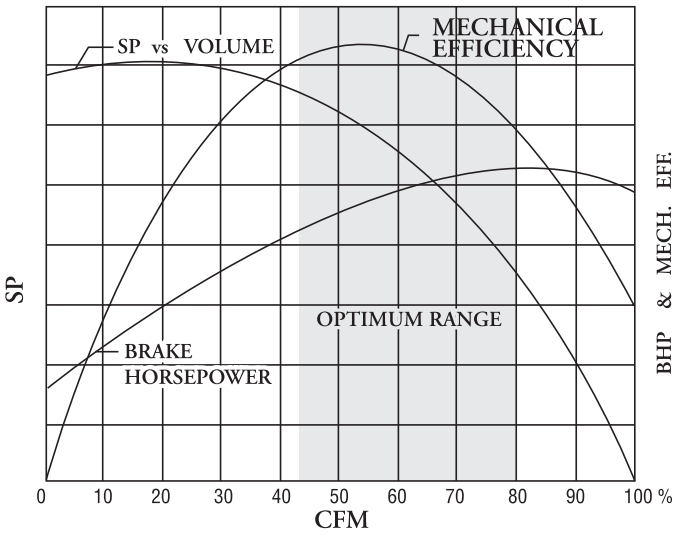

Fig. 1

AIR DENSITY CORRECTION FACTORS

CORRECTION FACTORS FOR TEMPERATURE		CORRECTION FACTORS FOR ALTITUDE	
Temp, °F	Factor	Feet	Factor
0	0.87	0	1.00
40	0.94	500	1.02
70	1.00	1000	1.04
100	1.06	1500	1.06
140	1.13	2000	1.08
180	1.21	3000	1.12
200	1.25	4000	1.16
250	1.34	5000	1.20
300	1.43	6000	1.25
350	1.53	7000	1.30

CALCULATION OF BLOWER PERFORMANCE AT NON-STANDARD TEMPERATURES AND ELEVATIONS

The performance tables in this catalog are based on handling air at 70° F and at sea level. These are considered to be standard conditions. For blowers operating at higher temperatures and elevations use the following procedure to determine correct CFM, static pressure and BHP.

1. Determine required CFM and static pressure at actual operating conditions.
2. Determine the combined correction factor by multiplying the temperature factor by the altitude factor for your application.
3. Multiply the static pressure by combined factor.
4. Select blower from the performance table for the required CFM and corrected static pressure.
5. Blower RPM remains as shown in table.
6. Divide the brake horsepower shown on table by the combined density factor to obtain the required brake horsepower at operating conditions.

Example:

1. *Blower required to handle 5800 CFM @ 2"; SP @ 200° F and at 5000 feet elevation.*
2. *Combined factor = 1.25 x 1.20 = 1.50*
3. *SP: 2 x 1.5= 3".*
4. *Select Central model # BI-22 at 5800 CFM @ 3"; SP = 1413 RPM and 4.35 BHP*
5. *BHP = 4.35/1.50 = 2.80 @ 200 ° F & 5000 ft.*