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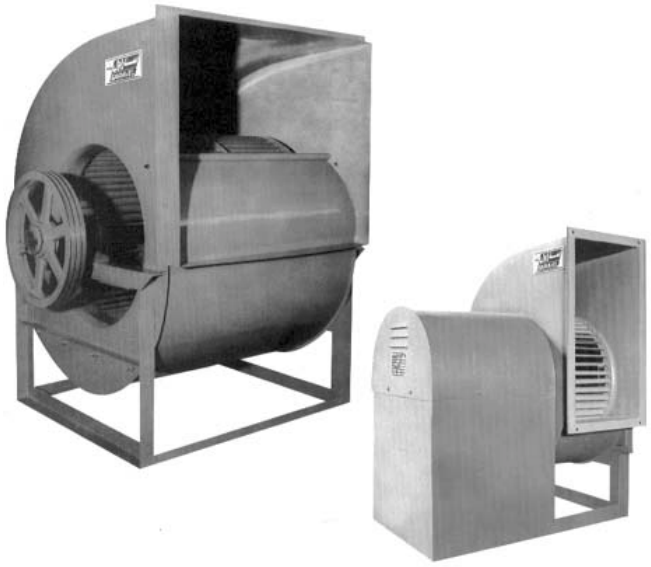

SARAVEL CENTRIFUGAL FANS

For Airconditioning & Industrial Application

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INTRODUCTION

SARAVEL centrifugal fans are designed to furnish efficient, dependable air movement in a variety of industrial, commercial, and residential applications. With volumes ranging from 2500 to 43000 CFM and static pressures from ½ " to 8" w.g., the broad range of capacities along with choice of construction materials, makes *SARAVEL* fans a versatile unit for any air movement application.

Fans can be suited for multiple arrangement or complete ready-to-install assemblies can be supplied to furnish maximum capacity in minimum space.The following design features are incorporated into the construction of *SARAVEL* centrifugal fans:

UNIT HOUSINGS
All casings are fabricated from heavy gauge galvanized steel sheets for durable service life and freedom from vibration. Inlets are die-formed in housing side with close running tolerance to the fan wheel to prevent air bypass.

FAN PARTS
Shafts: All fan shafts are made of carbon steel and are precision machined to provide an accurate fit with the fan bearings and the wheel hub. For applications in humid or corrosive environments the shafts can be phosphatized. Solid and hollow shafts are designed to operate in less than 20% of the critical speed.

Bearings: All bearings used in *SARAVEL* fans are silent type, self aligning, pillow ball or roller bearings and are sealed, thus ensuring containment of the lubricant and exclusion of moisture, dust and other contaminants.

Wheels: Heavy gauge galvanized steel sheet is used in the construction of the *SARAVEL* fan wheel.

Hub: Standard hub is made of gray cast iron, bolted to centerplate.

The complete fan section including all rotating assemblies: fan wheels, shafts, sheaves, and pulleys, are balanced both statically and dynamically toassure smooth and quiet operation.

FINISHES
Standard finish is air dried enamel.

ACCESSORIES
The following items can be furnished as per engineering specification as optional accessories

Fan Guards: Shaft, bearing, and belt guards are available as standard items for SWSI fans and optional for DWDI fans.

Vibration Isolation Bases: Structural angle, structural channel, inertia bases, and unitary bases are available with or without vibration isolators.

Screens: Safety screens are available for mounting in the fan inlet or outlet in non-ducted applications.

Special Material: Aluminum or stainless steel units are available.

SPECIAL COATINGS
The following coating material can be provided depending on the particular environmental conditionsof the installation location:

Bitumen: Offers excellent moisture and fair protection against very mild concentration of most organic and inorganic acids.

Epoxys: Offers protection against mild acid or caustic environment.

Phenolics: Offers resistance to high concentrations of organic or inorganic acids with the exception of strong oxidizing agents.

SELECTION EXAMPLES

FAN SIZE SELECTION

The size selection guide below outlines the normal operating ranges of *SARAVEL* centrifugal fans. In addition it serves as a quick reference guide to the acceptable operating parameters of the fans.

TABLE 1. RECOMMENED FAN OUTLET VELOCITIES FT/MIN.

STATIC PRESS IN.W.G.	QUIETEST RANGE FOR AIR HANDLING UNITS		MOST ECONOMICAL RANGE FOR INDUSTRIAL UNITS		FAN SIZE	OUTLET AREA (Ft²)
	MAX.	MIN.	MAX.	MIN.		
1/2	800	1700	1200	2200	9	0.88
3/4	900	1800	1400	2400		
1	900	2000	1600	2600	11	1.34
1 1/2	1000	2000	1800	2800	13	1.53
2	1100	2000	2000	3000	14	2.22
2 1/2	1200	2200	2100	3200	16	2.44
3	1300	2400	2200	3300	17	3.00
3 1/2	1600	2600	2300	3400	19	3.53
4	1800	2800	2500	3500	22	5.69
4 1/2	2000	3000	2600	3600	26	7.39
5	2200	3200	2800	3800	29	9.35
6	2400	3600	3000	4200	32	11.52
7	2600	3800	3200	4300		
8	2800	4000	3500	4400		

FAN SIZE SELECTION EXAMPLE

Select *SARAVEL* for an air handling unit to have a volume rating of 8,000 CFM at total static pressure of 2" w.g.

1. From TABLE1, Size Selection Guide at 2" SP for
2. the air handling unit the range of outlet velocities is
3. 1100 to 2000 ft/min : Avg.= 1550 ft/min.

2. The approximate fan outlet area is found according to the following method:

$$\text{Outlet Area} = \frac{\text{CFM}}{\text{OV}} = \frac{8000}{1550} = 5.16 \text{ ft}^2$$

3. From Size Selection Guide Table the nearest outlet area corresponds to a fan size of 22 having an outlet area of 5.69 ft².

4. Check actual outlet velocities for full desired range
of volumes and pressures to see if these fall within recommended limits.

$$\frac{8000}{5.16} = 1550 \text{ ft/min } \textbf{OK}$$

FAN PERFORMANCE DETERMINATION

The capacity tables listed on pages 7 thru 17 outline the operating parameters of double width-double inlet (DWDI) fans at standard conditions (70°F, 29.921 inches of mercury barometric pressure, Density = 0.075 lbs/ft³). When more than one fan are used in parallel combination, CFM and HP listed in the table must be multiplied by the number of fans, Approximate performance for single width-single inlet (SWSI) fans is obtained by dividing CFM and BHP shown in the ratings table by 2.

Please refer to the Examples Section for an illustration of the selection procedure for DWDI and SWSI fans.

When air density is other than standard, correction must be made to the performance shown in the rating tables.

Where CFM and static pressure are specified at other than standard density, the specified SP must be multiplied by the density factor, DF to obtain the equivalent static pressure. The equivalent static pressure along with the specified CFM can than be used to enter the ratings tables to obtain the RPM and the equivalent BHP. The BHP at the specified density equals the equivalent BHP divided by the density factor. Please refer to the Examples Section for an illustration of the above discussion. The density factors for various temperatures and altitudes

are listed in Tables 2 and 3 For high temperature drying or for evaporative applications, the Density Factor may be computed as follows:

1. Humidity Ratio, W, is first calculated according to
2. the following formula:

$$W = \frac{\text{lbs/hr of water evaporated}}{\text{CFM at Std. Conditions x 4.5}}$$

3. Next, the density at the given condition can be calculated as follows:

$$\text{Density (lbs/ft}^3\text{)} = \frac{1+W}{13.33+21.4w} \times \frac{1}{\text{DF for Temp.}} \times \frac{1}{\text{DF for Elev.}}$$

Where the DF for Temp. is found from Table 3 and DF for Elev. is found from Table 2.

4. The density factor is found using the following equation:

$$\text{Density Factor} = \frac{0.075 \text{ lbs/ft}^3}{\text{Density at condition}}$$

$$\text{TOT .CFM @Condition} = \frac{\text{(CFM @ Std. Condition x 4.5)}}{\text{Density at Condition x 60}} + \frac{\text{(lbs/hr of water evaporated)}}{\text{Density at Condition x 60}}$$

EXAMPLE 1: DWDI Fan Selection
An application call for selection of a DWDI fan based on the following conditions:

Air Delivery: 12000 CFM
Total Static Pressure: 3.75"w.g.
Elevation: 4000 ft
Temperature: 175°F

From TABLE 2 the Density Factor for the altitude of 4000ft is 1.158. The Density Factor for the tempera-ture of 175°F is 1.198. The combined effect of the density factors is thus, $C_{EFFECTIVE}$

$$C_{EFFECTIVE} = 1.158 \times 1.198 = 1.387$$

The equivalent static pressure can be calculated according to the following relation:

$$\text{Equiv. SP} = \text{SP at given condition} \times C_{EFFECTIVE}$$
$$= 3.75" \times 1.387 = 5.175"$$

From TABLE 9 for a fan Size 17 by double interpola -tion at the Equiv. SP and 12000 CFM, the following values can be obtained:

RPM = 1408
BHP = 19.24

The BHP at the given condition can be determined as follows :

$$\text{BHM} = \frac{19.24}{1.387} = 13.87 \sim \text{adding 10 to 20\% to account for belt slippage} = 15\text{HP}$$

From page 19 with 12000 CFM at 5.175"w.g. Static pressure the sound power level can be read from the sound ratings curve on page 19 for size 17 fan as 95 db.

EXAMPLE 2: SWSI Fan Selection
The following method outlines the selection of a Single Width-Single Inlet SWSI fan based on the following conditions:

Air Delivery: 8000 CFM
Total Static Pressure: 1" w.g.
Elevation: Sea Level
Temperature: 70°F

Since this is a SWSI fan type and the rating tables are based on DWDI configuration, the given CFM must be multiplied by 2 to obtain the equivalent CFM in the ratings tables.

$$8000 \times 2 = 16000 \text{ CFM}$$

Next, from TABLE 11, a 22" fan can be selected at the following operating conditions:

RPM = 607
BHP = 8.36

Since the given brake horsepower corresponds to double the actual required CFM, a correction needs to be applied to the value of the brake horse power:

$$\text{BHP} = \frac{8.36}{2} = 4.18 \times 1.20 = 5.01$$

The multiplier in effect adds to 20% to the motor BHP to account for belt slippage and friction losses etc.. The next larger standard motor size is 5.5 HP.

CORRECTION FACTORS

TABLE 2. DENSITY FACTOR VS. ALTITUDE

ELEV.FT.	DENS. FACTOR	TEMP.°F	DENSITY FACTOR AT% REL.HUM.			
			25%	50%	75%	100%
0	1.000	70	1.003	1.005	1.007	1.010
1000	1.037	100	1.062	1.071	1.007	1.083
2000	1.076	125	1.118	1.133	1.147	1.162
3000	1.116	150	1.181	1.210	1.242	1.272
4000	1.158	175	1.253	1.312	1.379	1.445
5000	1.202	200	1.344	1.461	1.597	1.752
6000	1.248					
7000	1.296					

TABLE 3. DENSITY FACTOR VS. TEMP.

TEMP. °F.	DENS.FACTOR
-75	0.726
-50	0.774
-25	0.821
0	0.868
25	0.915
50	0.962
70	1.000
100	1.057
125	1.104
150	1.151
175	1.198
200	1.245
225	1.293
250	1.340
275	1.387
300	1.434
325	1.481
350	1.528
375	1.576
400	1.623
425	1.670
450	1.717
475	1.764
500	1.811

TABLE 4. DWDI-SINGLE FAN

FAN SIZE	WHEEL DIAMETER	OUTLET AREA (ft^2)	TIP SPEED
9	9 3/4"	0.88	RPM x 2.55

CFM	1/2" SP		3/4" SP		1" SP		1 1/4" SP		1 1/2" SP		2" SP		2 1/2" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
700	758	0.09	948	0.15										
750	761	0.10	939	0.15	1105	0.22								
850	774	0.12	930	0.17	1087	0.23	1233	0.31						
950	797	0.14	934	0.19	1075	0.25	1215	0.33	1346	0.40				
1050	826	0.16	949	0.21	1074	0.28	1202	0.35	1329	0.43				
1150	859	0.19	972	0.25	1084	0.31	1199	0.38	1317	0.46	1543	0.64		
1250	893	0.23	1000	0.29	1103	0.35	1207	0.42	1314	0.50	1528	0.68		
1350	929	0.27	1066	0.33	1128	0.39	1224	0.46	1320	0.54	1518	0.72	1713	0.92
1450	965	0.31	1032	0.38	1157	0.45	1246	0.52	1335	0.60	1517	0.77	1702	0.98
1600	1021	0.39	1119	0.46	1205	0.54	1288	0.61	1369	0.69	1532	0.87	1698	1.07
1800	1096	0.50	1192	0.59	1275	0.67	1351	0.76	1425	0.84	1569	1.02	1713	1.22
2000			1266	0.75	1347	0.84	1420	0.93	1490	1.02	1622	1.21	1751	1.42
2200			1341	0.92	1421	1.03	1492	1.14	1559	1.23	1684	1.44	1802	1.65
2400					1495	1.24	1566	1.38	1631	1.48	1751	1.70	1863	1.92
2600							1641	1.64	1705	1.76	1822	2.00	1930	2.23
2800							1716	1.93	1779	2.08	1894	2.33	1999	2.58
3000									1854	2.42	1968	2.71	2071	2.98
3200											2042	3.13	2143	3.41
3400											2117	3.57	2217	3.89
3600													2292	4.43
3700													2330	4.71

CFM	3"SP		3 1/2"SP		4"SP		5" SP		6" SP		7" SP		8" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1250														
1350														
1450	1885	1.16												
1600	1866	1.30	2020	1.52										
1800	1861	1.45	2010	1.69	2146	1.93								
2000	1880	1.64	2012	1.88	2146	2.14	2404	2.71						
2200	1919	1.88	2037	2.12	2157	2.38	2399	2.95	2634	3.56				
2400	1971	2.16	2079	2.40	2187	2.66	2405	3.22	2628	3.86	2842	4.52		
2600	2032	2.48	2131	2.72	2231	2.99	2429	3.56	2632	4.19	2838	4.87	3036	5.60
2800	2097	2.84	2192	3.10	2285	3.37	2468	3.95	2654	4.57	2842	5.25	3033	6.00
3000	2166	3.25	2257	3.52	2345	3.81	2518	4.39	2689	5.02	2863	5.70	3039	6.44
3200	2237	3.70	2326	3.99	2410	4.29	2575	4.89	2735	5.53	2896	6.21	3059	6.95
3400	2309	4.20	2396	4.51	2479	4.82	2637	5.45	2789	6.11	2940	6.79	3092	7.53
3600	2383	4.75	2468	5.08	2549	5.40	2702	6.06	2849	6.74	2992	7.44	3135	8.18
3700	2420	5.04	2505	5.38	2585	5.71	2736	6.38	2880	7.07	3020	7.78	3159	8.53

RATING TABLES

TABLE 5. DWDI-SINGLE FAN

FAN SIZE	WHEEL DIAMETER	OUTLET AREA (ft^2)	TIP SPEED
11	11 3/8"	1.34	RPM x 2.98

CFM	1/2" SP		3/4" SP		1" SP		1 1/4" SP		1 1/2" SP		2" SP		2 1/2" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1000	640	0.13												
1100	649	0.14	776	0.22	915	0.29								
1300	674	0.18	790	0.26	908	0.34	1016	0.43						
1500	711	0.24	811	0.31	911	0.40	1014	0.49	1108	0.59				
1700	754	0.30	844	0.38	932	0.47	1020	0.56	1110	0.67	1283	0.90		
1900	798	0.38	884	0.47	963	0.56	1041	0.66	1120	0.76	1281	1.00	1436	1.26
2100	844	0.48	927	0.57	1001	0.67	1072	0.77	1143	0.87	1286	1.11	1432	1.38
2300	890	0.59	971	0.69	1043	0.79	1110	0.90	1175	1.01	1303	1.24	1435	1.51
2500	938	0.72	1017	0.83	1087	0.94	1151	1.05	1212	1.16	1330	1.40	1450	1.67
2700	986	0.86	1063	0.98	1132	1.10	1194	1.22	1253	1.34	1364	1.59	1474	1.86
2900			1110	1.16	1117	1.29	1238	1.41	1295	1.54	1402	1.81	1505	2.08
3100			1158	1.35	1223	1.49	1284	1.63	1339	1.77	1443	2.04	1540	2.33
3300			1206	1.56	1270	1.72	1330	1.87	1384	2.02	1485	2.31	1579	2.60
3500					1318	1.98	1376	2.13	1430	2.29	1529	2.60	1620	2.91
3700					1366	2.24	1422	2.42	1476	2.59	1573	2.91	1663	3.24
3900							1470	2.74	1522	2.92	1619	3.26	1707	3.60
4200							1518	3.07	1593	3.47	1688	3.84	1774	4.21
4600									1688	4.51	1781	4.72	1865	5.13
5000											1876	5.74	1957	6.18
5400											1972	6.83	2051	7.39
5600													2099	8.04

CFM	3"SP		3 1/2"SP		4"SP		5" SP		6" SP		7" SP		8" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2100														
2300	1562	1.79												
2500	1571	1.97	1687	2.28										
2700	1584	2.16	1696	2.48	1805	2.81								
2900	1607	2.38	1710	2.70	1814	3.05	2022	3.80						
3100	1636	2.63	1731	2.95	1827	3.30	2024	4.06						
3300	1670	2.92	1759	3.24	1848	3.59	2031	4.34	2212	5.17				
3500	1707	3.23	1791	3.56	1876	3.91	2046	4.67	2219	5.51				
3700	1747	3.58	1828	3.92	1908	4.28	2068	5.03	2230	5.87	2391	6.75		
3900	1789	3.95	1867	4.31	1944	4.67	2096	5.44	2247	6.27	2402	7.18	2547	7.88
4200	1854	4.59	1929	4.96	2003	5.35	2146	6.14	2286	6.98	2428	7.89	2572	8.87
4600	1943	5.54	2016	5.94	2086	6.36	2220	7.19	2350	8.06	2478	8.98	2608	9.96
5000	2034	6.63	2106	7.07	2173	7.51	2302	8.40	2424	9.32	2543	10.27	2662	11.26
5400	2126	7.87	2197	8.35	2263	8.82	2388	9.78	2506	10.75	2618	11.74	2724	12.66
5600	2173	8.53	2243	9.03	2309	9.52	2432	10.51	2548	11.51	2658	12.52		

RATING TABLES

TABLE 6. DWDI-SINGLE FAN

FAN SIZE	WHEEL DIAMETER	OUTLET AREA (ft^2)	TIP SPEED
13	13"	1.53	RPM x 3.41

CFM	1/2" SP		3/4" SP		1" SP		1 1/4" SP		1 1/2" SP		2" SP		2 1/2" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1200	571	0.15	717	0.25										
1300	572	0.16	709	0.26	835	0.36								
1500	581	0.20	700	0.29	819	0.40	928	0.51						
1700	600	0.24	703	0.33	808	0.44	913	0.56	1010	0.69				
1900	625	0.29	717	0.38	809	0.49	903	0.61	997	0.75				
2100	653	0.35	737	0.44	819	0.55	903	0.67	989	0.81	1154	1.10		
2300	683	0.42	762	0.52	837	0.63	913	0.75	990	0.89	1145	1.19	1295	1.54
2500	714	0.50	790	0.61	860	0.72	929	0.85	999	0.98	1141	1.28	1284	1.63
2700	745	0.59	820	0.71	886	0.83	950	0.95	1014	1.09	1144	1.39	1276	1.74
2900	777	0.69	850	0.82	914	0.95	975	1.08	1035	1.21	1154	1.52	1275	1.86
3100			880	0.94	944	1.08	1002	1.22	1058	1.36	1170	1.66	1282	2.00
3300			911	1.08	974	1.22	1030	1.37	1084	1.52	1189	1.83	1294	2.17
3500			943	1.24	1004	1.38	1060	1.54	1112	1.69	1212	2.01	1310	2.36
3800					1051	1.66	1106	1.83	1156	1.99	1252	2.33	1343	2.69
4200							1168	2.26	1217	2.44	1308	2.82	1392	3.19
4600									1279	2.97	1367	3.38	1448	3.77
5000									1342	3.58	1428	4.02	1507	4.45
5400											1490	4.75	1567	5.21
5800											1554	5.57	1629	6.07
6200													1692	7.03
6400													1724	7.54

CFM	3"SP		3 1/2"SP		4"SP		5" SP		6" SP		7" SP		8" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2300														
2500	1422	2.01												
2700	1409	2.12	1536	2.53										
2900	1400	2.24	1523	2.66	1634	3.15								
3100	1397	2.38	1513	2.80	1628	3.25								
3300	1400	2.55	1508	2.96	1618	3.41								
3500	1410	2.74	1510	3.15	1613	3.59	1817	4.23						
3800	1434	3.07	1525	3.48	1618	3.92	1807	4.90	1986	5.94				
4200	1475	3.58	1557	4.00	1640	4.44	1807	5.41	1978	6.49	2140	7.63		
4600	1525	4.19	1601	4.62	1676	5.07	1826	6.03	1979	7.11	2135	8.29	2284	9.49
5000	1581	4.89	1652	5.34	1721	5.80	1859	6.78	1998	7.85	2139	9.02	2282	10.28
5400	1639	5.69	1707	6.16	1773	6.64	1901	7.65	2029	8.73	2157	9.89	2288	11.14
5800	1699	6.58	1766	7.08	1829	7.59	1951	8.64	2069	9.74	2188	10.90	2308	12.15
6200	1761	7.57	1826	8.11	1887	8.65	2005	9.74	2117	10.88	2228	12.07	2339	13.32
6400	1792	8.10	1856	8.65	1917	9.21	2033	10.33	2142	11.49	2250	12.69	2357	13.95

RATING TABLES

TABLE 7. DWDI-SINGLE FAN

FAN SIZE	WHEEL DIAMETER	OUTLET AREA (ft^2)	TIP SPEED
14	14 5/8"	2.22	RPM x 3.83

CFM	1/2" SP		3/4" SP		1" SP		1 1/4" SP		1 1/2" SP		2" SP		2 1/2" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1800	489	0.23	596	0.35										
2000	501	0.27	597	0.38	682	0.50								
2400	532	0.36	611	0.48	690	0.61	760	0.75	840	0.92				
2800	570	0.49	640	0.61	706	0.75	773	0.90	842	1.07	972	1.43		
3200	611	0.64	676	0.78	735	0.93	793	1.08	852	1.25	972	1.63	1084	2.04
3600	653	0.83	715	0.99	771	1.15	824	1.31	875	1.48	979	1.86	1086	2.29
4000	696	1.06	757	1.24	811	1.41	860	1.59	907	1.76	1000	2.15	1094	2.58
4400	739	1.31	799	1.53	851	1.71	899	1.91	944	2.10	1029	2.50	1113	2.93
4800			842	1.87	893	2.07	939	2.28	983	2.48	1064	2.91	1141	3.35
5200			885	2.23	935	2.48	981	2.70	1023	2.92	1101	3.38	1174	3.84
5600					979	2.94	1023	3.18	1065	3.42	1141	3.91	1211	4.39
6000					1023	3.43	1066	3.72	1107	3.98	1181	4.50	1249	5.01
6400							1109	4.33	1149	4.60	1222	5.15	1289	5.70
6800							1152	4.97	1192	5.29	1264	5.88	1330	6.46
7200									1236	6.06	1307	6.68	1371	7.29
7600									1280	6.87	1349	7.56	1413	8.20
8000											1393	8.52	1456	9.20
8400											1437	9.56	1498	10.28
8800											1481	10.65	1541	11.45
9200													1585	12.72
9400													1607	13.38

CFM	3"SP		3 1/2"SP		4"SP		5" SP		6" SP		7" SP		8" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3600	1186	2.74												
4000	1189	3.05	1280	3.53										
4400	1199	3.40	1285	3.92	1368	4.44								
4800	1219	3.83	1296	4.35	1376	4.90	1531	6.08						
5200	1246	4.33	1317	4.85	1389	5.40	1535	6.61						
5600	1278	4.90	1344	5.43	1410	5.98	1544	7.19	1682	8.49				
6000	1313	5.54	1376	6.09	1438	6.65	1561	7.87	1687	9.21	1811	10.62		
6400	1351	6.26	1411	6.82	1470	7.41	1585	8.64	1702	9.98	1820	11.43	1937	12.96
6800	1391	7.05	1449	7.64	1505	8.24	1614	9.50	1723	10.85	1833	12.30	1945	13.87
7200	1431	7.91	1488	8.54	1542	9.16	1647	10.46	1750	11.82	1853	13.29	1957	14.85
7600	1472	8.86	1528	9.51	1581	10.17	1682	11.51	1780	12.91	1877	14.38	1975	15.95
8000	1514	9.88	1569	10.57	1621	11.26	1720	12.65	1814	14.09	1906	15.59	1999	17.16
8400	1556	11.00	1610	11.72	1661	12.44	1758	13.89	1849	15.38	1938	16.91	2027	18.50
8800	1598	12.20	1652	12.96	1703	13.72	1798	15.23	1887	16.77	1973	18.34	2058	19.96
9200	1641	13.50	1684	14.30	1745	15.09	1838	16.67	1925	18.26	2009	19.87	2091	21.53
9400	1663	14.18	1716	14.99	1766	15.80	1859	17.41	1945	19.03	2028	20.67	2109	22.35

RATING TABLES

TABLE 8. DWDI-SINGLE FAN

FAN SIZE	WHEEL DIAMETER	OUTLET AREA (ft^2)	TIP SPEED
16	16 1/4"	2.44	RPM x 4.25

CFM	1/2" SP		3/4" SP		1" SP		1 1/4" SP		1 1/2" SP		2" SP		2 1/2" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2000	432	0.25	538	0.39										
2200	437	0.28	533	0.42	621	0.58								
2600	452	0.35	532	0.49	614	0.66	689	0.83	768	1.04				
3000	476	0.45	545	0.60	614	0.76	685	0.95	756	1.15	887	1.60		
3400	504	0.58	566	0.73	626	0.89	687	1.08	750	1.28	874	1.75		
3800	533	0.73	592	0.89	646	1.06	700	1.25	755	1.45	866	1.92	972	2.44
4200	563	0.90	620	1.08	671	1.26	720	1.45	768	1.66	867	2.12	968	2.66
4600	610	1.09	649	1.30	698	1.49	744	1.70	788	1.91	877	2.37	968	2.90
5000			679	1.55	726	1.76	770	1.98	812	2.20	894	2.67	976	3.20
5400			709	1.84	756	2.07	798	2.30	838	2.53	915	3.02	990	3.55
5800			740	2.15	786	2.41	828	2.66	866	2.91	939	3.42	1010	3.95
6200					817	2.80	858	3.06	895	3.33	966	3.86	1033	4.41
6600					847	3.20	888	3.50	925	3.79	994	4.35	1058	4.93
7000							918	4.00	955	4.29	1022	4.89	1084	5.49
7400							949	4.52	985	4.85	1052	5.48	1112	6.11
7800									1016	5.46	1082	6.12	1141	6.79
8200									1048	6.10	1112	6.82	1170	7.52
8600											1142	7.57	1200	8.31
9000											1173	8.39	1230	9.16
9400											1204	9.23	1261	10.07
9800													1291	11.04

CFM	3"SP		3 1/2"SP		4"SP		5" SP		6" SP		7" SP		8" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
4200	1065	3.23	1165	3.87										
4600	1060	3.49	1153	4.13	1240	4.80								
5000	1060	3.78	1145	4.42	1230	5.11								
5400	1067	4.13	1144	4.76	1223	5.45	1377	6.94						
5800	1080	4.54	1151	5.16	1224	5.84	1370	7.35	1513	9.00				
6200	1098	5.00	1164	5.63	1231	6.31	1367	7.80	1504	9.48				
6600	1119	5.53	1181	6.16	1243	6.84	1369	8.33	1498	9.99	1624	11.77		
7000	1144	6.11	1202	6.76	1360	7.44	1377	8.92	1497	10.57	1619	12.38	1738	14.31
7400	1170	6.75	1225	7.42	1281	8.11	1391	9.59	1503	11.23	1617	13.03	1732	14.99
7800	1197	7.45	1251	8.14	1303	8.85	1408	10.34	1513	11.98	1620	13.77	1728	15.71
8200	1225	8.21	1277	8.93	1328	9.65	1427	11.17	1527	12.82	1628	14.59	1730	16.52
8600	1254	9.03	1305	9.78	1354	10.52	1450	12.08	1544	13.73	1640	15.51	1736	17.42
9000	1283	9.92	1333	10.69	1382	11.46	1447	13.06	1565	14.73	1655	16.52	1747	18.43
9400	1313	10.87	1362	11.66	1410	12.47	1500	14.11	1587	15.82	1674	17.62	1760	19.53
9800	1343	11.88	1392	12.71	1438	13.54	1527	15.24	1611	16.98	1694	18.81	1777	20.73

RATING TABLES

TABLE 9. DWDI-SINGLE FAN

FAN SIZE	WHEEL DIAMETER	OUTLET AREA (ft^2)	TIP SPEED
17	17 7/8"	3.00	RPM x 4.68

CFM	1/2" SP		3/4" SP		1" SP		1 1/4" SP		1 1/2" SP		2" SP		2 1/2" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2500	393	0.31	487	0.48										
2750	399	0.35	484	0.52	560	0.71								
3250	415	0.45	485	0.62	557	0.82	623	1.03	693	1.25				
3750	439	0.58	499	0.76	560	0.96	622	1.18	685	1.43	802	1.98		
4250	465	0.75	521	0.93	574	1.14	627	1.36	682	1.61	792	2.18	895	2.80
4750	493	0.94	546	1.14	594	1.36	641	1.58	689	1.83	786	2.40	885	3.04
5250	522	1.17	573	1.39	618	1.62	661	1.86	704	2.11	790	2.67	879	3.31
5750	550	1.42	601	1.68	644	1.93	685	2.18	724	2.44	802	3.00	882	3.64
6250			629	2.02	672	2.28	711	2.55	748	2.82	820	3.40	892	4.04
6750			657	2.40	700	2.68	738	2.97	773	3.26	841	3.86	908	4.51
7250			686	2.80	728	3.14	766	3.45	800	3.76	865	4.38	927	5.04
7750					756	3.64	794	3.97	828	4.30	891	4.97	950	5.65
8250					785	4.17	822	4.56	856	4.91	917	5.61	974	6.32
8750							851	5.21	884	5.58	945	6.32	1000	7.07
9250							880	5.89	913	6.31	973	7.10	1027	7.88
9750									942	7.12	1001	7.95	1054	8.77
10250									972	7.96	1029	8.86	1082	9.74
10750											1058	9.86	1111	10.77
11250											1087	10.94	1139	11.89
11750											1116	12.06	1167	13.09
12250													1196	14.38

CFM	3"SP		3 1/2"SP		4"SP		5" SP		6" SP		7" SP		8" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
4750	977	3.73												
5250	968	4.02	1053	4.77										
5750	963	4.35	1044	5.12	1121	5.93								
6250	965	4.74	1040	5.51	1114	6.34								
6750	975	5.21	1043	5.97	1111	6.80	1246	8.59						
7250	989	5.75	1052	6.51	1115	7.33	1243	9.15	1370	11.14				
7750	1008	6.37	1066	7.14	1124	7.95	1243	9.75	1364	11.77				
8250	1029	7.07	1084	7.84	1138	8.67	1248	10.45	1361	12.46	1472	14.61		
8750	1053	7.84	1105	8.63	1156	9.47	1259	11.25	1363	13.25	1470	15.43	1574	17.74
9250	1078	8.69	1128	9.50	1177	10.35	1273	12.15	1371	14.14	1471	16.30	1572	18.65
9750	1104	9.61	1152	10.45	1199	11.33	1291	13.15	1383	15.14	1477	17.29	1572	19.62
10250	1131	10.61	1178	11.49	1223	12.39	1311	14.25	1398	16.25	1487	18.40	1576	20.56
10750	1159	11.69	1205	12.61	1249	13.53	1333	15.45	1417	17.47	1500	19.62	1585	21.94
11250	1187	12.85	1232	13.81	1275	14.77	1357	16.74	1437	18.80	1517	20.97	1597	23.28
11750	1215	14.09	1260	15.09	1302	16.09	1382	18.13	1459	20.23	1536	22.43	1612	24.75
12250	1243	15.43	1288	16.47	1329	17.51	1408	19.61	1483	21.76	1557	24.00	1630	26.34

TABLE 10. DWDI-SINGLE FAN

FAN SIZE	WHEEL DIAMETER	OUTLET AREA (ft^2)	TIP SPEED
19	19 1/2"	3.53	RPM x 5.10

CFM	1/2" SP		3/4" SP		1" SP		1 1/4" SP		1 1/2" SP		2" SP		2 1/2" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3000	374	0.39	467	0.62										
3300	371	0.42	463	0.66	542	0.92	606	1.17						
3900	371	0.51	455	0.75	534	1.03	602	1.33	663	1.64				
4500	381	0.62	452	0.86	526	1.15	595	1.48	657	1.82	766	2.51		
5100	396	0.77	458	1.01	522	1.30	587	1.63	649	1.99	760	2.76	856	3.55
5700	413	0.94	471	1.20	526	1.48	583	1.81	641	2.18	752	3.00	850	3.86
6300	432	1.15	486	1.43	537	1.72	587	2.04	639	2.40	744	3.24	842	4.16
6900	452	1.38	504	1.69	552	2.00	597	2.33	643	2.68	738	3.50	833	4.45
7500			522	1.99	568	2.32	611	2.67	653	3.02	738	3.83	826	4.77
8100			541	2.34	586	2.68	627	3.05	666	3.42	744	4.22	824	5.14
8700			562	2.71	604	3.10	644	3.47	682	3.86	755	4.69	828	5.59
9300					623	3.56	662	3.95	699	4.36	768	5.21	836	6.12
9900					644	4.05	680	4.49	716	4.91	784	5.80	847	6.73
10500							700	5.08	734	5.52	800	6.44	861	7.40
11100							721	5.70	754	6.19	817	7.14	877	8.14
11700									774	6.89	835	7.91	893	8.95
12300											853	8.74	910	9.82
12900											873	9.65	928	10.76
13500											893	10.64	947	11.77
14100											914	11.67	965	12.87
14700													985	14.05

CFM	3"SP		3 1/2"SP		4"SP		5" SP		6" SP		7" SP		8" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
5700	937	4.74												
6300	931	5.11	1010	6.08										
6900	923	5.47	1004	6.51	1079	7.58								
7500	914	5.82	996	6.93	1072	8.06								
8100	906	6.19	987	7.33	1064	8.53	1203	10.98						
8700	903	6.62	979	7.76	1054	8.99	1195	11.57	1320	14.23				
9300	905	7.13	975	8.25	1047	9.48	1186	12.15	1312	14.94	1425	17.79		
9900	911	7.73	976	8.83	1043	10.04	1176	12.73	1303	15.64	1418	18.63		
10500	921	8.42	981	9.51	1043	10.69	1196	13.36	1294	16.33	1410	19.45	1519	22.64
11100	934	9.18	990	10.27	1048	11.44	1166	14.07	1285	17.04	1401	20.25	1510	23.57
11700	948	10.01	1002	11.13	1056	12.03	1166	14.88	1279	17.82	1329	21.06	1501	24.49
12300	964	10.92	1016	12.06	1067	13.24	1170	15.81	1276	18.71	1385	21.93	1491	25.41
12900	981	11.90	1031	13.07	1081	14.28	1178	16.85	1277	19.71	1380	22.89	1483	26.37
13500	998	12.95	1047	14.19	1095	15.40	1188	18.00	1282	20.83	1378	23.97	1477	27.42
14100	1016	14.08	1064	15.33	1111	16.60	1200	19.24	1289	22.08	1381	25.18	1474	28.58
14700	1034	15.28	1082	16.57	1127	17.88	1214	20.58	1300	23.44	1386	26.52	1474	29.87

RATING TABLES

TABLE 11.DWDI-SINGLE FAN

FAN SIZE	WHEEL DIAMETER	OUTLET AREA (ft^2)	TIP SPEED
22	22 3/4"	5.69	RPM x 5.95

CFM	1/2" SP		3/4" SP		1" SP		1 1/4" SP		1 1/2" SP		2" SP		2 1/2" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
4500	314	0.58	393	0.91										
5000	315	0.65	389	0.98	454	1.35								
6000	322	0.82	385	1.16	447	1.56	503	1.98	558	2.44				
7000	337	1.07	390	1.41	444	1.81	498	2.26	550	2.75	644	3.81		
8000	355	1.38	403	1.74	449	2.14	497	2.59	544	3.09	636	4.21	719	5.41
9000	376	1.76	420	2.14	461	2.56	503	3.01	545	3.51	629	4.64	710	5.90
10000	398	2.23	439	2.63	478	3.07	515	3.54	552	4.04	628	5.16	703	6.44
11000	421	2.75	460	3.21	496	3.67	531	4.16	565	4.68	633	5.81	701	7.08
12000			482	3.90	516	4.38	549	4.89	580	5.43	643	6.59	705	7.86
13000			505	4.70	537	5.20	569	5.74	598	6.29	656	7.49	713	8.78
14000			530	5.56	559	6.14	589	6.70	618	7.28	673	8.51	726	9.83
15000					583	7.22	611	7.79	638	8.40	691	9.67	741	11.03
16000					607	8.36	634	9.03	660	9.65	710	10.97	759	12.38
17000							658	10.42	682	11.06	730	12.42	777	13.87
18000							682	11.88	705	12.63	752	14.03	797	15.52
19000									728	14.27	774	15.81	817	17.34
20000											796	17.77	838	19.34
21000											820	19.92	860	21.53
22000											844	22.16	882	23.82
23000														
24000														

CFM	3"SP		3 1/2"SP		4"SP		5" SP		6" SP		7" SP		8" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
9000	785	7.25												
10000	777	7.85	846	9.31										
11000	770	8.50	838	10.03	902	11.60								
12000	768	9.27	831	10.83	894	12.45								
13000	771	10.18	829	11.71	888	13.36	999	16.91						
14000	779	11.25	833	12.78	886	14.42	995	18.04	1099	21.95				
15000	791	12.48	840	14.02	890	15.66	992	19.26	1092	23.26	1188	27.51		
16000	805	13.86	851	15.42	898	17.70	992	20.66	1087	24.65	1181	29.00		
17000	821	15.39	865	16.98	909	18.66	996	22.26	1086	26.23	1175	30.58	1262	35.16
18000	839	17.09	881	18.72	922	20.42	1005	24.06	1088	28.03	1172	32.36	1257	37.03
19000	858	18.95	899	20.63	938	22.37	1016	26.06	1094	30.04	1173	34.36	1254	39.01
20000	878	20.99	917	22.72	955	24.50	1030	28.25	1103	32.27	1178	36.59	1254	41.23
21000	898	23.22	936	24.99	973	26.81	1045	30.64	1115	34.72	1186	39.06	1257	43.69
22000	920	25.65	956	27.46	992	29.33	1061	33.24	1129	37.38	1196	41.77	1264	46.41
23000	942	28.29	977	30.14	1012	32.05	1079	36.05	1145	40.27	1209	44.71	1273	49.38
24000	964	31.14	998	33.03	1032	34.98	1098	39.07	1161	43.37	1223	47.88	1285	52.60

TABLE 12. DWDI-SINGLE FAN

FAN SIZE	WHEEL DIAMETER	OUTLET AREA (ft^2)	TIP SPEED
26	26"	7.39	RPM x 6.81

CFM	1/2" SP		3/4" SP		1" SP		1 1/4" SP		1 1/2" SP		2" SP		2 1/2" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
6000	267	0.73	336	1.16										
6500	268	0.80	332	1.22	392	1.71								
7500	274	0.97	327	1.37	383	1.87	435	2.43						
8500	284	1.20	330	1.60	378	2.07	427	2.63	473	3.22				
9500	297	1.48	338	1.89	379	2.35	422	2.89	466	3.51	551	4.94		
10500	311	1.80	349	2.24	386	2.71	424	3.23	462	3.82	542	5.24	619	6.89
11500	326	2.18	362	2.65	396	3.14	430	3.67	464	4.24	536	5.60	609	7.23
12500	342	2.62	376	3.13	407	3.65	439	4.19	470	4.76	534	6.08	601	7.64
13500	358	3.12	390	3.66	421	4.22	450	4.78	479	5.37	536	6.67	597	8.18
14500	375	3.65	406	4.27	435	4.86	462	5.45	489	6.07	543	7.38	597	8.86
15500			422	4.95	449	5.57	476	6.20	501	6.85	552	8.19	602	9.66
16500			438	5.71	465	6.37	490	7.03	515	7.71	562	9.10	609	10.59
17500			464	6.51	481	7.24	505	7.95	529	8.66	574	10.11	619	11.63
18500					497	8.20	520	8.95	543	9.70	587	11.21	629	12.78
19500					513	9.26	536	10.05	558	10.83	601	12.42	641	14.04
21000					539	10.37	560	11.91	582	12.75	622	14.45	660	16.17
23000							610	14.51	614	15.64	652	17.49	688	19.35
25000									646	18.75	684	20.99	718	23.00
27000											716	24.99	749	27.15
29000											749	29.26	797	31.56
31000														

CFM	3"SP		3 1/2"SP		4"SP		5" SP		6" SP		7" SP		8" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
11500														
12500	665	9.42												
13500	659	9.94	719	11.87										
14500	654	10.55	712	12.47	768	14.54								
15500	654	11.31	707	13.16	761	15.24								
16500	657	12.21	706	14.02	756	16.02	856	20.54						
17500	663	13.25	708	15.03	754	16.98	850	21.44						
18500	671	14.43	713	16.20	756	18.10	845	22.44	935	27.40				
19500	681	15.73	721	17.50	761	19.40	844	23.63	929	28.55	1017	33.32		
21000	698	17.94	735	19.76	772	21.68	848	25.85	925	30.60	1005	35.98	1080	41.51
23000	723	21.24	758	23.17	792	25.15	859	29.34	928	33.96	999	39.10	1071	44.81
25000	751	25.03	783	27.09	815	29.17	877	33.49	940	38.11	1003	43.12	1068	48.61
27000	781	29.33	811	31.53	841	33.74	900	38.27	958	42.99	1015	48.00	1073	53.37
29000	811	34.17	841	35.52	869	38.88	925	43.65	979	48.56	1032	53.66	1086	59.04
31000	843	39.60	871	42.09	899	44.60	952	49.65	1003	54.79	1053	60.07	1104	65.54

RATING TABLES

TABLE 13. DWDI-SINGLE FAN

FAN SIZE	WHEEL DIAMETER	OUTLET AREA (ft^2)	TIP SPEED
29	29 1/4"	9.35	RPM x 7.66

CFM	1/2" SP		3/4" SP		1" SP		1 1/4" SP		1 1/2" SP		2" SP		2 1/2" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
8000	237	0.97	296	1.51										
8500	238	1.05	293	1.57	346	2.23								
9500	243	1.23	291	1.73	340	2.36	388	3.10						
10500	251	1.46	292	1.95	336	2.55	381	3.27	424	4.08				
11500	259	1.72	297	2.22	336	2.80	376	3.50	417	4.30				
12500	268	2.02	304	2.54	339	3.13	375	3.80	412	4.57	487	6.38		
13500	278	2.36	312	2.91	344	3.51	377	4.17	411	4.91	481	6.70	548	8.79
14500	289	2.74	321	3.33	351	3.95	381	4.61	412	5.34	476	7.06	541	9.13
15500	300	3.17	331	3.79	359	4.44	387	4.12	416	5.84	474	7.51	535	9.52
17000	317	3.92	346	4.60	373	5.30	399	6.02	425	6.76	477	8.41	531	10.34
19000	342	4.97	368	5.85	393	6.62	417	7.40	440	8.19	487	9.87	533	11.74
21000			391	7.33	414	8.18	437	9.03	459	9.88	501	11.66	543	13.54
23000			415	8.94	436	10.00	458	10.92	479	11.85	518	13.75	556	15.71
25000					460	11.96	480	13.11	500	14.11	537	16.15	573	18.22
27000							503	15.61	522	16.69	557	18.87	591	21.08
29000							526	18.27	544	19.60	578	21.93	611	24.28
31000									567	22.69	600	25.35	631	27.86
33000											623	29.17	653	31.82
35000											646	33.40	675	36.19
37000											669	37.85	697	40.78
39000														

CFM	3"SP		3 1/2"SP		4"SP		5" SP		6" SP		7" SP		8" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
13500														
14500														
15500	597	11.51												
17000	587	12.57	638	14.88										
19000	581	13.86	631	16.25	677	18.66								
21000	584	15.61	628	17.89	672	20.42	759	25.95						
23000	594	17.79	633	20.03	672	22.46	753	28.01	830	34.16				
25000	608	20.37	643	22.63	678	25.03	750	30.38	825	36.56	897	43.25		
27000	624	23.33	656	25.66	689	28.08	754	33.35	822	39.31	891	46.05	958	53.22
29000	642	26.67	672	29.10	703	31.59	763	36.89	824	42.73	887	49.23	952	56.48
31000	661	30.38	690	32.94	719	35.54	775	40.95	832	46.77	889	53.13	949	60.13
33000	681	34.49	710	37.18	737	39.91	790	45.50	843	51.40	896	57.72	951	64.56
35000	703	39.02	730	41.85	756	44.71	807	50.54	857	56.58	907	62.94	957	69.73
37000	725	43.98	750	46.97	776	49.97	825	56.06	872	62.30	920	68.77	967	75.59
39000	747	49.41	772	52.55	796	55.70	844	62.07	890	68.54	935	75.19	979	82.10

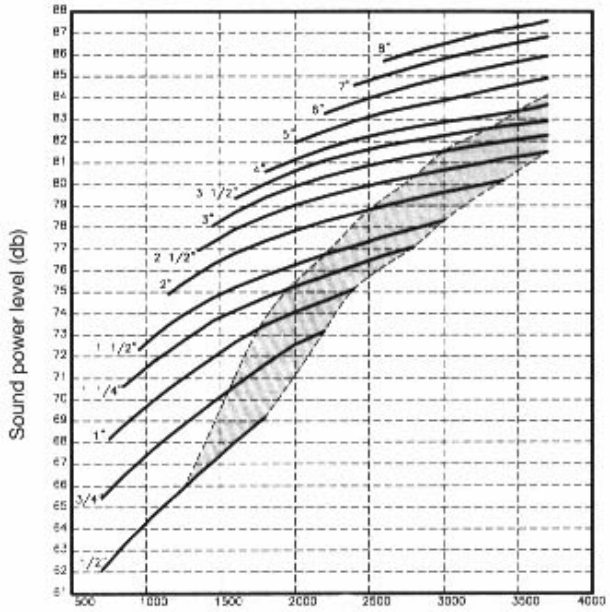
TABLE 14. DWDI-SINGLE FAN

FAN SIZE	WHEEL DIAMETER	OUTLET AREA (ft^2)	TIP SPEED
32	32 1/2"	11.52	RPM x 8.50

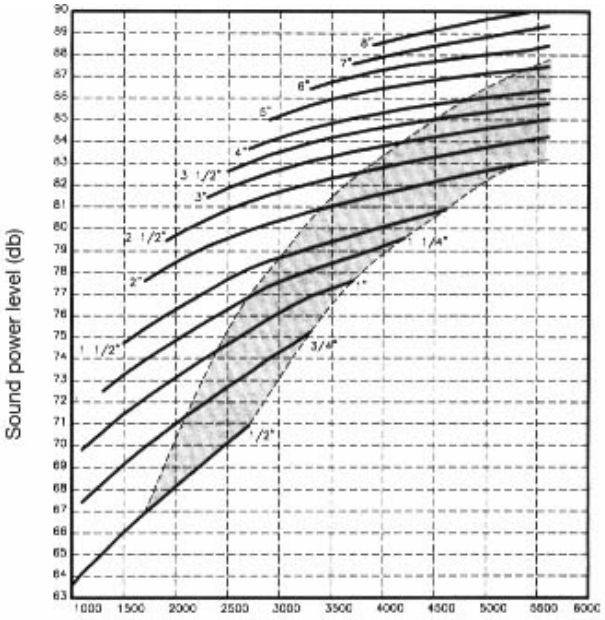
CFM	1/2" SP		3/4" SP		1" SP		1 1/4" SP		1 1/2" SP		2" SP		2 1/2" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
10000	214	1.22	266	1.87										
10500	215	1.30	264	1.93	312	2.74								
11500	218	1.47	261	2.09	307	2.88	350	3.80						
12500	223	1.68	262	2.29	303	3.05	345	3.96	385	5.00				
13500	229	1.93	264	2.54	302	3.27	341	4.15	379	5.16				
14500	235	2.20	268	2.83	303	3.55	338	4.40	374	5.38				
15500	242	2.51	274	3.16	305	3.88	337	4.71	371	5.66	440	7.72		
17000	253	3.04	283	3.74	312	4.48	341	5.30	370	6.22	432	8.40	489	10.88
19000	269	3.86	297	4.63	323	5.42	348	6.26	374	7.16	427	9.23	482	11.72
21000	285	4.84	311	5.68	336	6.54	359	7.42	383	8.35	429	10.38	478	12.75
23000	302	5.90	327	6.90	350	7.83	372	8.78	394	9.75	436	11.81	479	14.12
25000			344	8.32	366	9.32	386	10.34	406	11.37	445	13.51	484	15.81
27000			360	9.84	382	11.02	401	12.10	420	13.20	457	15.45	493	17.81
29000					398	12.93	417	14.09	435	15.27	470	17.65	504	20.10
31000					415	14.96	433	16.32	451	17.57	484	20.09	516	22.66
33000							450	18.81	467	20.13	499	22.80	530	25.50
35000							467	21.43	483	22.96	514	25.78	544	28.62
37000									500	26.08	530	29.05	558	32.04
39000									517	29.35	546	32.62	574	35.76
41000											563	36.52	590	39.80
43000											580	40.75	606	44.18

CFM	3"SP		3 1/2"SP		4"SP		5" SP		6" SP		7" SP		8" SP	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
15500														
17000														
19000	534	14.46												
21000	527	15.50	575	18.94										
23000	523	16.74	569	19.73	613	22.85								
25000	524	18.37	565	21.23	607	24.41	668	31.50						
27000	529	20.36	566	23.13	604	26.19	681	33.22						
29000	537	22.68	571	25.44	605	28.42	676	35.19	746	42.83				
31000	547	25.32	579	28.11	610	31.07	675	37.66	742	45.27	807	53.66		
33000	559	28.27	589	31.12	618	34.11	678	40.61	739	47.99	802	56.36	865	65.42
35000	572	31.51	601	34.46	628	37.51	683	44.02	740	51.25	799	59.37	859	68.42
37000	586	35.06	613	38.13	639	41.28	691	47.87	745	55.04	799	62.97	854	71.75
39000	600	38.93	626	42.13	651	45.39	701	52.12	751	59.32	802	67.14	853	75.71
41000	615	43.12	640	46.47	665	49.84	713	56.77	760	64.06	807	71.86	856	80.29
43000	631	47.65	655	51.14	679	54.66	725	61.82	770	69.25	815	77.10	861	85.47

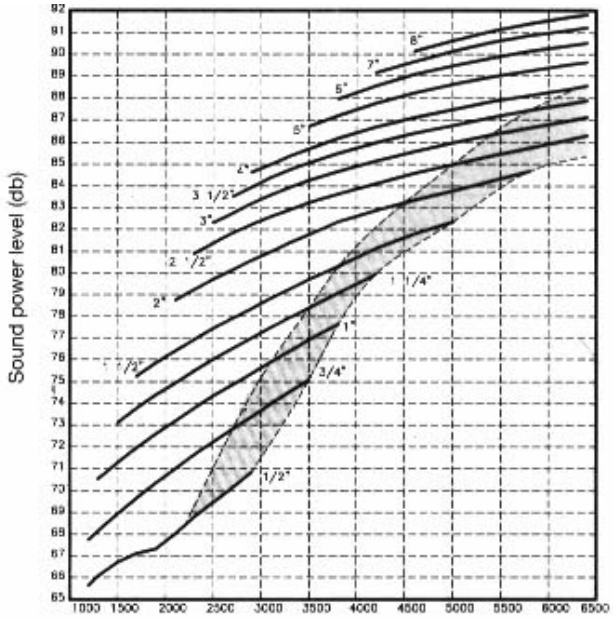
SOUND RATINGS



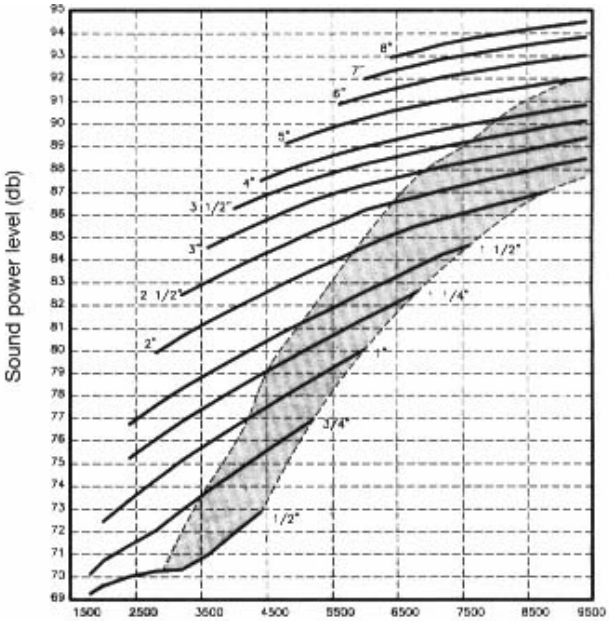
Volumetric air flow rate (CFM) SIZE 9



Volumetric air flow rate (CFM) SIZE 11



Volumetric air flow rate (CFM) SIZE 13

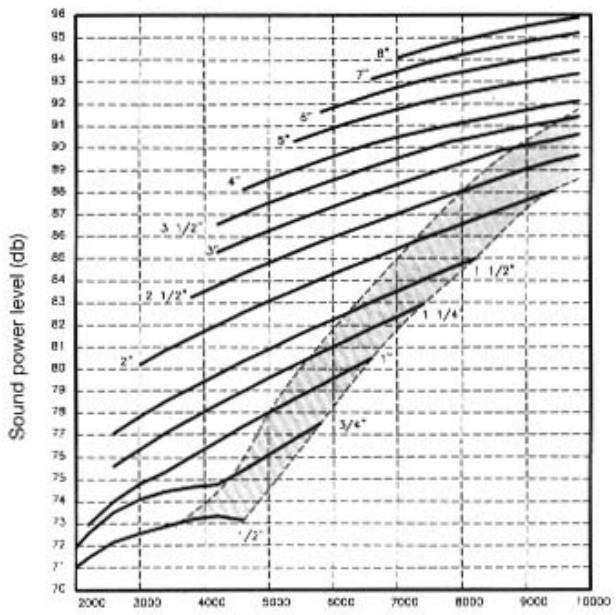


Volumetric air flow rate (CFM) SIZE 14

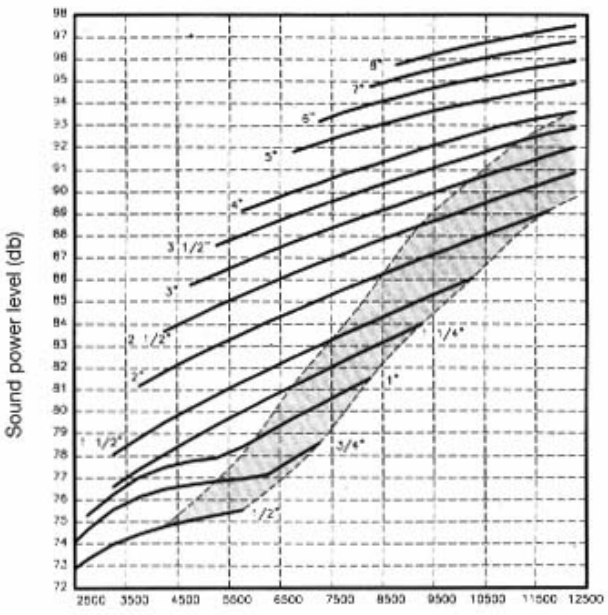
Note:

1. When sound power level falls within the shaded area, add 3 to 6db to the given sound power level from left boundary of the region to the right boundary respectively.
2. Sound ratings are based on a distance of 1m from the fan.

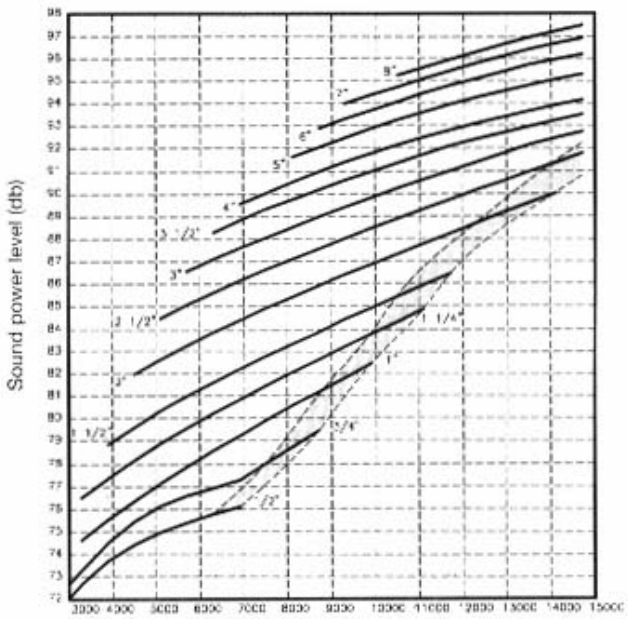
SOUND RATINGS



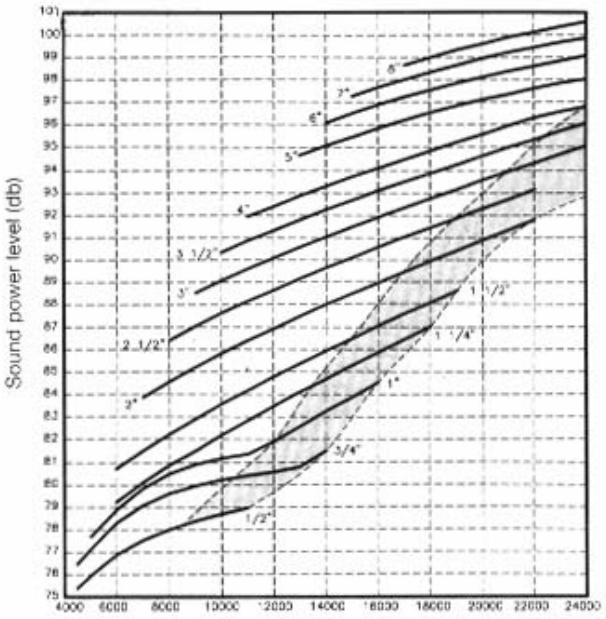
Volumetric air flow rate (CFM) SIZE 16



Volumetric air flow rate (CFM) SIZE 17



Volumetric air flow rate (CFM) SIZE 19

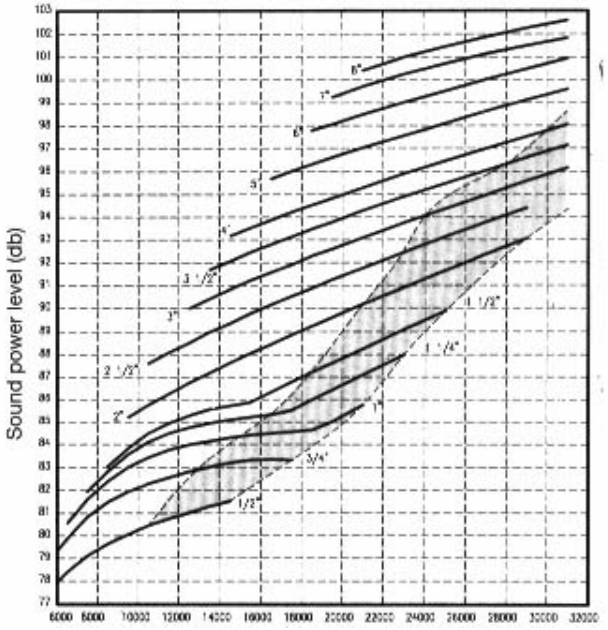


Volumetric air flow rate (CFM) SIZE 22

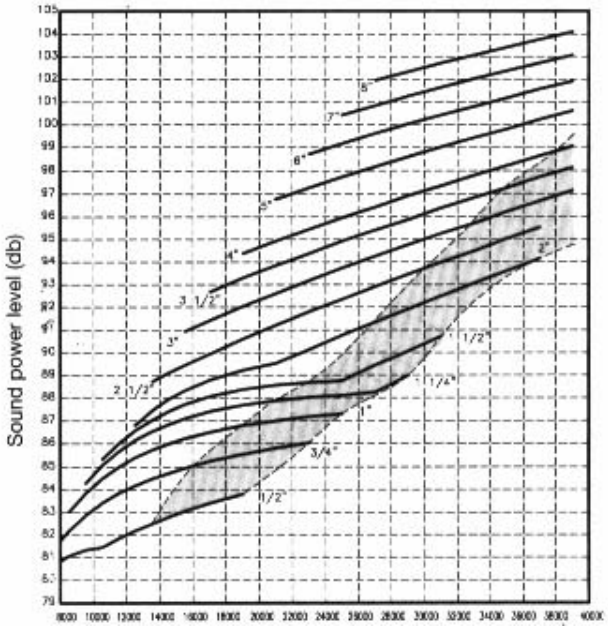
Note:

1. When sound power level falls within the shaded area, add 3 to 6db to the given sound power level from left boundary of the region to the right boundary respectively.
2. Sound ratings are based on a distance of 1m from the fan.

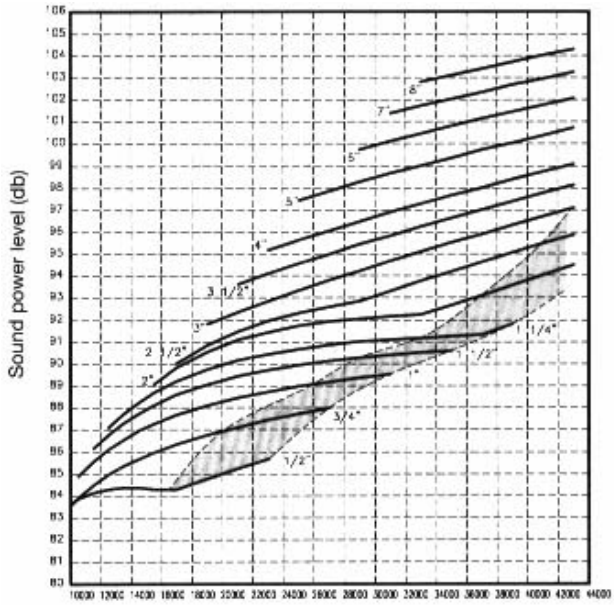
SOUND RATINGS



Volumetric air flow rate (CFM) SIZE 26



Volumetric air flow rate (CFM) SIZE 29



Volumetric air flow rate (CFM) SIZE 32

Note:

1. When sound power level falls within the shaded area, add 3 to 6db to the given sound power level from left boundary of the region to the right boundary respectively.
2. Sound ratings are based on a distance of 1m from the fan.

OUTLET DUCTS

Figure 1 shows changes in velocity profiles at various distances from centrifugal and axial flow fan outlets. By definition, 100% effective duct length is a minimum of two and one half (2-1/2) equivalent duct diameters. For velocities greater than 2500 fpm, add 1 duct diameter for each additional 1000 fpm. To calculate 100% effective duct length, for an outlet duct area neither greater than 105% nor less than 95% of fan outlet area assume a minimum of 2-1/2 duct diameter for each additional 1000 fpm.

EXAMPLE: 5000 FPM = 5 Equivalent duct diameters. If the duct is rectangular with side dimensions a and b, the equivalent duct diameter is equal to $(4\ ab/\pi)^{0.5}$

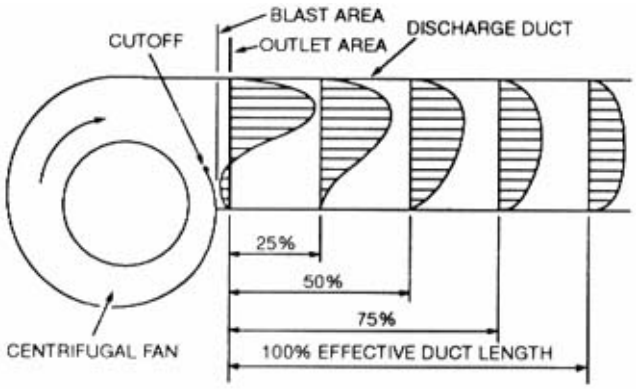


FIGURE 1. FAN OUTLET VELOCITY PROFILES

Proper design of transitions is the key to the optimum performance an air handling system. If the diffusion angle to a larger duct does not exceed 12°, losses are minimized and most of the velocity pressure reduction is regained as static pressure. Conversely, in going from a larger to a smaller duct, if the conversion angle does not exceed 30°, no losses occur.

When the air is to be discharged into a plenum and the plenum is situated opposite the fan, plenum outlet should be at least 1 1/2 fan diameters away for low outlet velocity (1500 FPM) and 3 diameters away for high outlet velocity (3500 FPM). The cross-sectional area of the plenum should be at least four times larger than the fanoutlet area as shown in Figure 3.

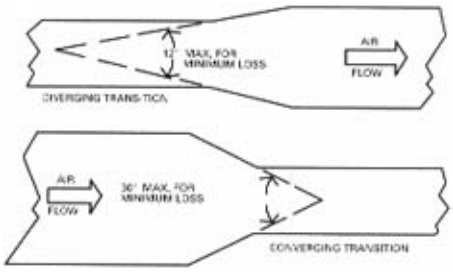


FIGURE 2. OPTIMUM TRANSITION DESIGN

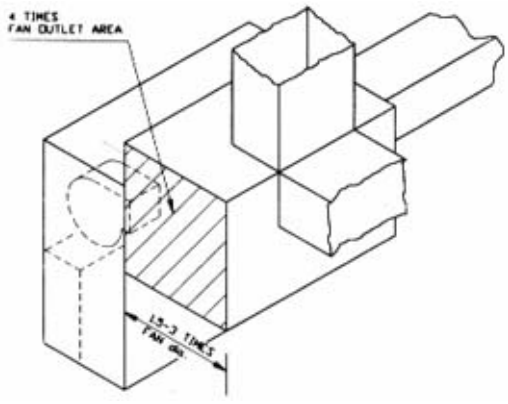


FIGURE 3. PLENUM DISCHARGE

If an elbow is to be located near the fan outlet, it should have a ratio of minimum radius to duct equivalent diameter of 1.5 and should be arranged to give the most uniform airflow possible. Figure 4 illustrates the most optimum arrangement of the elbow location at the fan outlet. In addition, the following corrections should be applied to the pressure drop.

Pressure Drop Correction For SWSI Fans
ΔP x 1.00 □ Elbow at Positions A and C
ΔP x 1.25 □ Elbow at Position B
ΔP x 0.85 □ Elbow at Position D

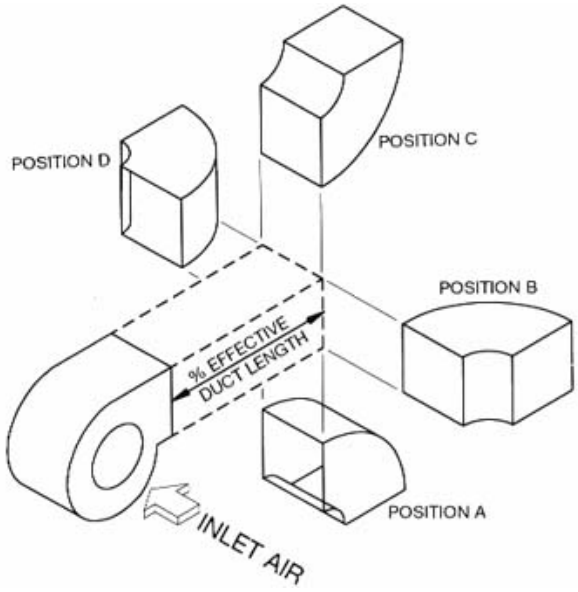


FIGURE 4. ELBOW CONECTIONS FOR UTILITY FANS (SWSI)

FAN DIMENSIONS

TABLE 15. COMPLETE DOUBLE INLET FANS (DWDI)

FAN SIZE	THD		BHD		UBD		C	D	E	F
	A	B	A	B	A	B				
9	530	400	470	400	475	430	490	150	270	315
11	655	460	580	455	585	500	585	170	350	370
13	695	520	610	520	610	570	585	195	350	420
14	810	580	715	580	710	640	680	220	445	470
16	850	640	750	640	735	710	680	245	445	520
17	940	680	815	675	790	770	735	245	495	575
19	1020	735	885	735	855	840	755	275	535	625
22	1175	850	1020	850	980	975	1020	315	730	730
26	1385	1040	1225	1040	1185	1170	1130	410	830	830
29	1570	1160	1400	1160	1345	1310	1220	465	935	935
32	1730	1280	1530	1280	1470	1450	1320	520	1040	1040

COMPLETE DOUBLE INLET FANS (DWDI) (Continued)

FAN SIZE	G	H	J	K	L	M	N	Keyway in Drive Hub		Shaft Ext. Dia.	Weight in Kg
								Width	Depth		
9	245	285	40	330	210	175	205	6	3	25	24
11	290	365	40	380	260	200	240	6	3	25	32
13	330	365	45	380	260	225	280	6	3	25	35
14	370	440	45	425	305	250	310	6	3	25	45
16	405	445	45	425	305	275	350	6	3	25	50
17	450	490	50	455	335	300	380	6	3	25	55
19	485	535	50	465	345	325	410	6	3	25	70
22	560	615	50	590	470	350	480	10	5	35	100
26	645	740	50	640	520	400	575	10	5	45	165
29	730	840	50	655	535	450	640	12	6	55	270
32	810	920	50	705	585	500	710	12	6	55	325

NOTE: 1. All dimensions are in mm.
2. Roughing in dimensions.

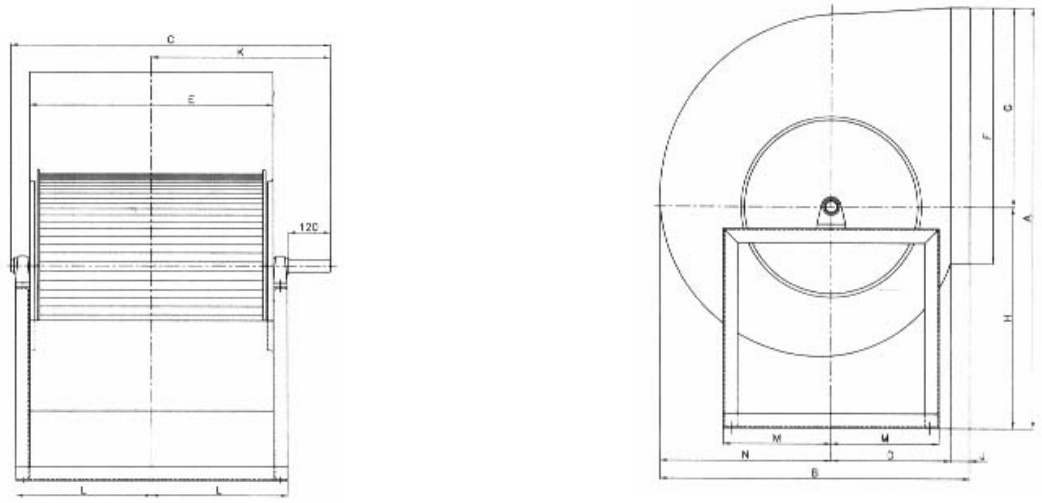


FIGURE 5. TOP HORIZONTAL DISCHARGE SHOWN.
BOTTOM HORIZONTAL DISCHARGE AND UP BLAST DISCHARGE AVAILABLE. CENTRIFUGAL FANS ARE AVAILABLE IN EITHER CLOCKWISE OR COUNTER-CLOCKWISE (SHOWN) ROTATION.

BELT DRIVEN UTILITY FAN DIMENSIONS

TABLE 16. COMPLETE SINGLE INLET FANS (SWSI)

FAN SIZE	THD		BHD		UBD		C	D	E	F
	A	B	A	B	A	B				
9	530	400	470	400	475	430	600	150	150	315
11	655	460	580	455	585	500	640	170	190	370
13	695	520	610	520	610	570	690	195	190	420
14	810	580	715	580	710	640	790	220	240	470
16	850	640	750	640	735	710	840	245	240	520
17	940	680	815	675	790	770	910	245	265	575
19	1020	735	885	735	855	840	980	275	285	625
22	1175	850	1020	850	980	975	1130	315	380	730
26	1385	1040	1225	1040	1185	1170	1185	410	430	830
29	1570	1160	1400	1160	1345	1310	1295	465	485	935
32	1730	1280	1530	1280	1470	1450	1350	520	540	1040

COMPLETE SINGLE INLET FANS (SWSI) (Continued)

FAN SIZE	G	H	J	L	M	N	P	R	Weight in Kg Less Motor
9	245	285	40	100	125	125	250	400	40
11	290	365	40	120	145	150	300	400	50
13	330	365	45	120	145	175	330	450	55
14	370	440	45	145	170	200	370	500	65
16	405	445	45	145	170	225	410	550	70
17	450	490	50	155	180	225	450	600	80
19	485	535	50	165	190	250	500	650	95
22	560	615	50	215	240	300	580	750	130
26	645	740	50	240	270	350	660	850	200
29	730	840	50	275	305	400	740	900	315
32	810	920	50	300	330	450	830	950	370

NOTE: 1. All dimensions are in mm.
2. Roughing in dimensions.

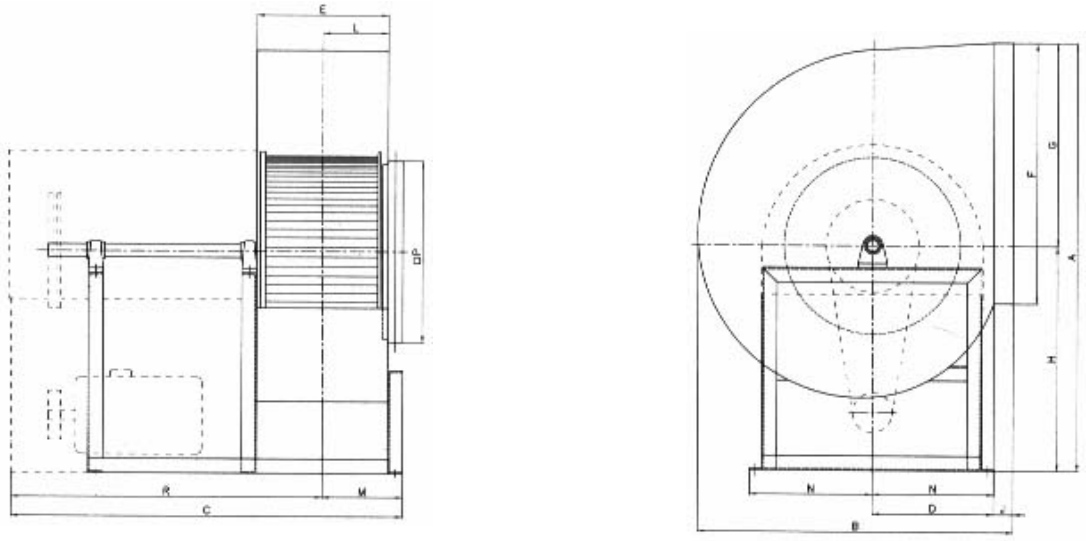


FIGURE 6. LEFT SIDE INTEL AND TOP HORIZONTAL DISCHARGE SHOWN.
BOTTOM HORIZONTAL DISCHARGE, UP BLAST DISCHARGE AND RIGHT SIDE INTEL AVAILABLE.

Furnish and install as shown on the plans, *SARAVEL* Forward Curved Centrifugal Fans of the arrangement indicated.

UNIT HOUSINGS

Housings are to be of heavy gage galvanized steel sheets for durable service life and freedom from vibration. Inlets shall be die-formed in housing side with close running tolerance to the fan wheel to prevent air bypass.

FAN PARTS

Shafts: All fan shafts are to be of hot rolled carbon steel and shall be accurately turned and gaged to provide an accurate fit with the fan bearings and the wheel hub. For applications in humid or corrosive environments the shafts shall be phosphatized as per engineering specifications. Solid and hollow shafts are designed to operate in less than 20% of the critical speed.

Bearings: All bearings used are to be heavy duty, grease lubricated, anti-friction ball or roller, self aligning, pillow block type selected for minimum average bearing life in excess of 200,000 hours at the maximum RPM

Wheels: Forward curved wheels shall be fabricated of heavy gage galvanized steel sheet. All fan blades shall be die formed and designed for maximum efficiency and quiet operation.

Hub: Standard hub shall be made of gray cast iron, riveted to centerplate.

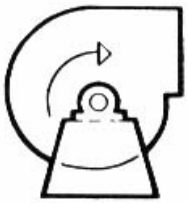
The complete fan section including all rotating assemblies: fan wheels, shafts, sheaves, and pulleys, shall be balanced both statically and dynamically to assure smooth and quiet operation.

FINISHES

Each fan component shall be thoroughly degreased and deburred before the application of air dried enamel.

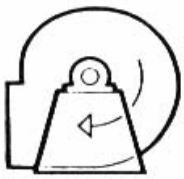
ROTATION AND DISCHARGE DESIGNATION

Clockwise
Up Blast CW 360



Clockwise
Top Horizontal CW 90

Clockwise
Down Blast CW 180



Clockwise
Bottom Horizontal CW 270

Counter Clockwise
Up Blast CCW 360

Counter Clockwise
Top Horizontal CCW 90

Counter Clockwise
Up Blast CCW 180

Counter Clockwise
Bottom Horizontal CCW 270

Notes:

1. Direction of rotation is determined from drive side of fan.
2. On single inlet fans, drive side is always considered as the side opposite fan inlet.
3. On double inlet fans with drives on both sides, drive side is that with the higher powered drive unit.
4. Direction of discharge is determined in accordance With diagrams. Angle of discharge is referred to the vertical axis of fan and designated in degrees from such standard reference axis. Angle of discharge maybe any intermediate angle as required.
5. For fan inverted for ceiling suspension, or side wall mounting, direction of rotation and discharge is determined when fan is resting on floor.

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