H-SERIES

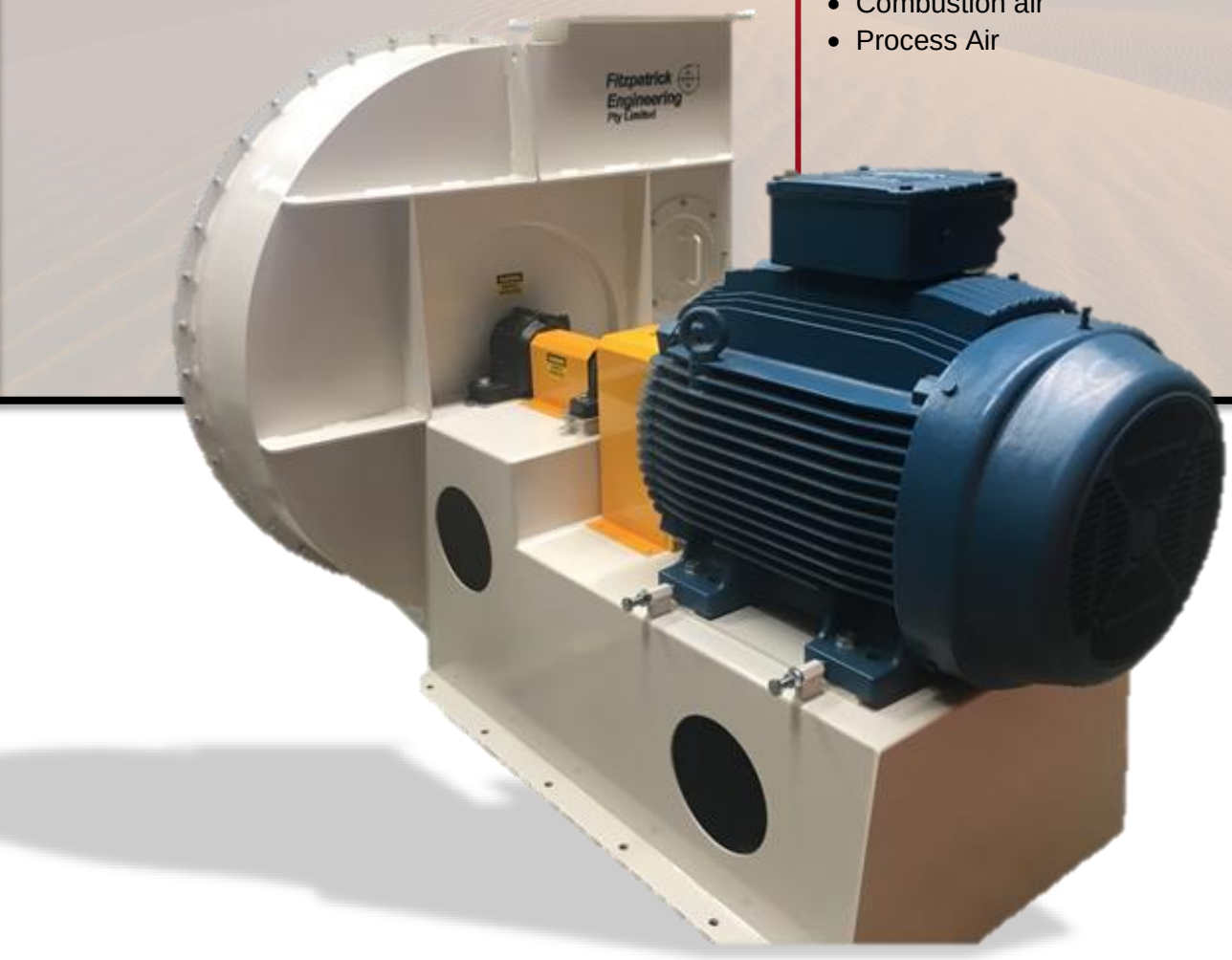
AUSTRALIAN MADE

BUILT TO LAST | STRENGTH | MANPOWER

CENTRIFUGAL BLOWERS.

SINGLE & MULTISTAGE BLOWERS & EXHAUSTERS FOR HIGH PRESSURE, LOW VOLUME CLEAN AIR APPLICATIONS

- Pressures to 50kPa (7psi.)
- Coal washery jig blowers
- Floatation cells
- Air slides
- Vacuum dewatering
- Combustion air
- Process Air



Fitzpatrick Industrial Fans & Blowers

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H-Series

An Introduction to H-Series Blowers

The H Series blowers are a family of single & multistage centrifugal blowers for low flow rate, high pressure applications. Typical volume flow rates range 0.2 to 5 cu.m/sec. Design pressures range from 2 to 18kPa for single stage units, to 50kPa for multistage units. Most units operate at 2900rpmdirect driven by 2 pole motors & can be used for blowing or exhaust applications.

Dust Loading

Like all other high-pressure blowers, the H-Series are basically clean air machines & are not suitable for applications where a high dust load, or wet & sticky dust must pass through the blower. H-Series blowers will tolerate atmospheric dust in moderation & do not have the sensitivity to dust of positive displacement compressors. For operation in extremely dusty conditions, Inlet filters should be used.

Arrangements

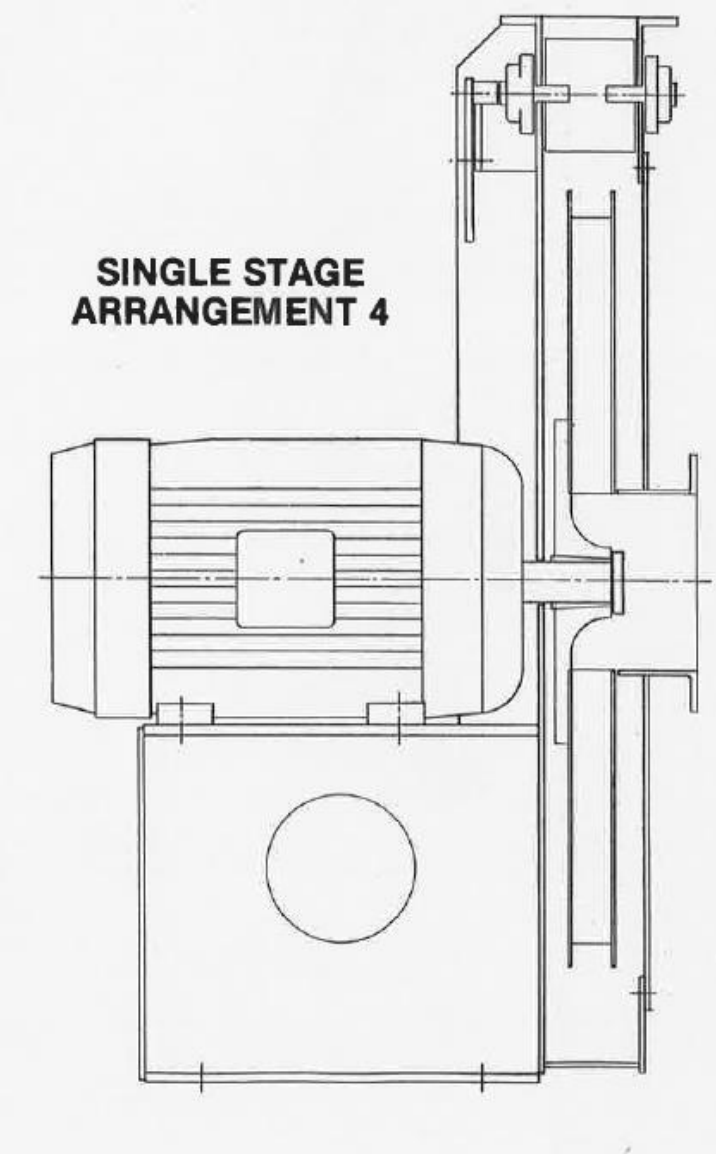
Arrangement 4 direct drive, with the impeller supported by the motor shaft is the most common & economical configuration for small & medium size single stage blowers. Arrangement 8 is used for single stage blowers when high pressures & flow rates produce bearing loads beyond the capacity of the motor bearings, or when elevated temperatures are encountered. Arrangement 8 is the most common configuration for two stage blowers. Arrangement 7 is normally used for 3 & 4 stage blowers & very-high pressure two stage units. Belt driven arrangement 1 blowers can be supplied when a 4-pole motor is specified or when large changes in duty are expected with time. The high radial loads produced by vee belts, combined with high rotational speed can make long bearing life difficult to achieve. Higher initial cost & lower drive efficiency also make the belt driven arrangement 1 configuration less popular. Vee belt drive is not a preferred drive option with H-Series blowers.

ARRANGEMENT 4
- The preferred arrangement for single stage blowers.
- Lowest cost.
- Most impact

ARRANGEMENT 8
- The preferred arrangement for small & medium size two stage units & large single stage blowers.
- Lowest cost two stage configuration.

ARRANGEMENT 3 & 7
- The preferred arrangement for large multi-stage units or medium size two stage units with steel impellers.

ARRANGEMENT 1 & 9
- Used only for belt driven single stage o small two stage units.



Air Density

The pressure & power consumption of any fan or blower is directly related to the inlet air or gas density. The high pressures developed by the H-Series blowers results in a marked difference in performance between blowing & exhaust applications. Normal atmospheric pressure at sea level is 101kPa (406 inches water gauge). When a blower is operating on an exhaust system at – 20kPa, the effective barometric pressure at the blower inlet will be reduced from 101 kPa to 81 kPa. The inlet air density, pressure capability & power consumption will change by the same ratio.

A most important consequence of the density change is the effect it has on blower selection. For a given pressure, an exhaust application will require a larger impeller diameter. It is important to specify at the enquiry stage whether the system pressure loss is all on the inlet side (exhausting), discharge side (blowing), or a combination of both.

Temperature Rise

A rise in air temperature is a consequence of any compression process & should be taken into account when calculating the discharge volume flow rate. The air temperature rise through the compressor may be calculated with reasonable accuracy using the following formula.

$$\text{Temperature rise } \Delta T = \frac{0.998\ \Delta P}{Cp.\ W.\ Eff}$$

ΔT = air or gas temperature rise (degrees celcius)

ΔP = pressure rise across blower (kPa)

W = air or gas density (kg/m³)

Cp = specific heat at constant pressure (kJ/kg.C°)

Eff = blower efficiency (expressed as a fraction)

Cp at normal barometric pressure = 1.006kJ/kg.C° at 20°C and 1.025kJ/kg.C° at 200°C (for air).

The above formula cannot be used to calculate the air temperature rise at conditions of low flow rate & low efficiency (i.e. the closed damper running condition).
EXAMPLE: Calculate the air temperature rise across a two stage blower operating at a pressure of 20 kPa with inlet air density of 1.2kg/m³. Inlet air temperature is 20°C & the blower efficiency 60%.

$Cp = 1.006 kJ/kg.C°$

$$\Delta T = \frac{0.998 \times \Delta P}{Cp.\ W.\ Eff}$$

$$= \frac{0.998 \times 20}{1.006 \times 1.2 \times 0.60}$$

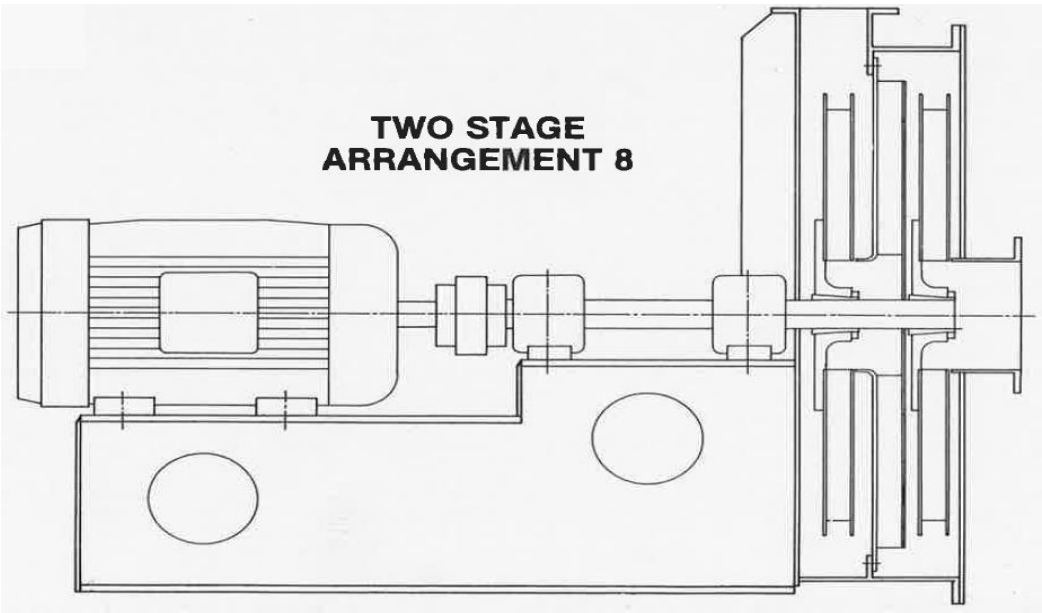
$\Delta T = 27.6°C$

Power Characteristics

Like radial bladed fans & blowers, the power consumption of H-Series blowers increases with flow rate. It is usual to select a motor to provide the design power consumption plus a margin of approximately 20% to cover variations in the pressure loss of the duct system & other contingencies. If a blower is run against low resistance due to disconnected ductwork or an open inspection door for example, the power consumption could be very much higher than the rated motor power. A manual discharge damper can be a useful device for reducing flow rate & power consumption if large variations in pressure loss of the system are expected.
Low flow rate, high pressure blowers typically have very high moments of inertia relative to the size of the drive motors & discharge dampers can be very useful in reducing power consumption during starting.

Guarantee

The performance of the H-Series blower range at a selected duty is guaranteed to be within the class B tolerance band of British standard BS.848 Part 1 1980. The blowers are guaranteed against faulty workmanship or materials for a period of 12 months from the date of delivery. The warranty on purchased items such as motors, pulleys or bearings, will be limited to that of the original supplier.



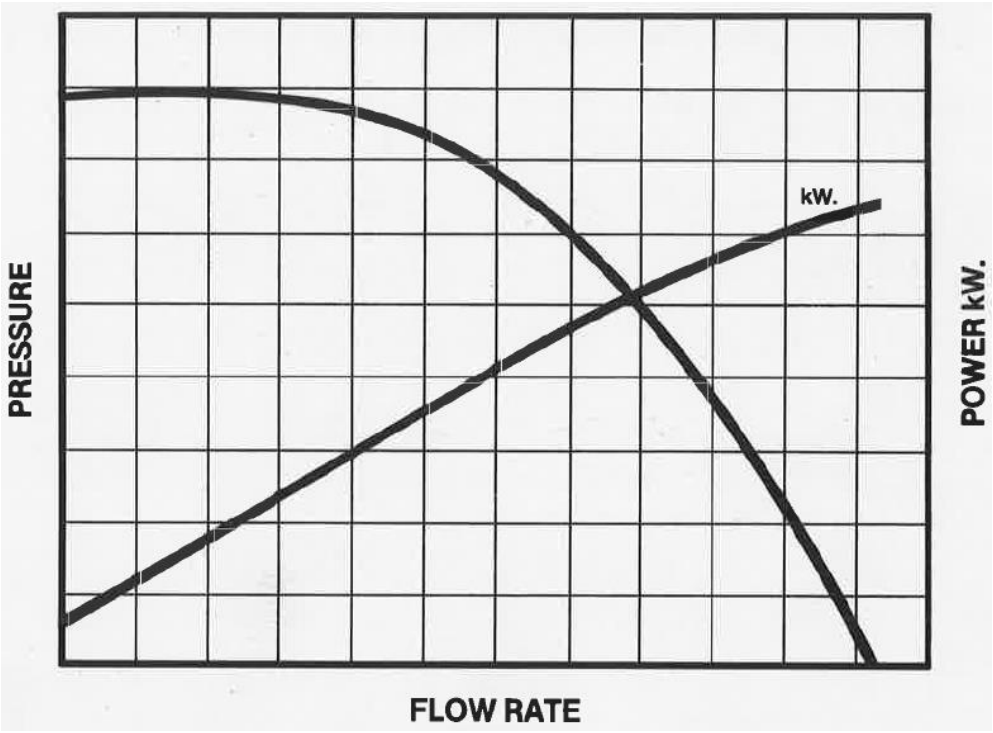
Bearings

Bearings will be supplied to achieve a minimum L10 life of 50,000 hours. Heavy duty twin row self-aligning ball bearings with grease lubricated SN600 housings are common on small & medium size units. Grease lubricated twin row spherical roller bearings are used on some medium size units. Oil bath or oil re-circulation lubrication with spherical roller bearings will be supplied with large multistage blowers when bearings loads & speeds are beyond the capacity of grease lubricated bearings.

surging

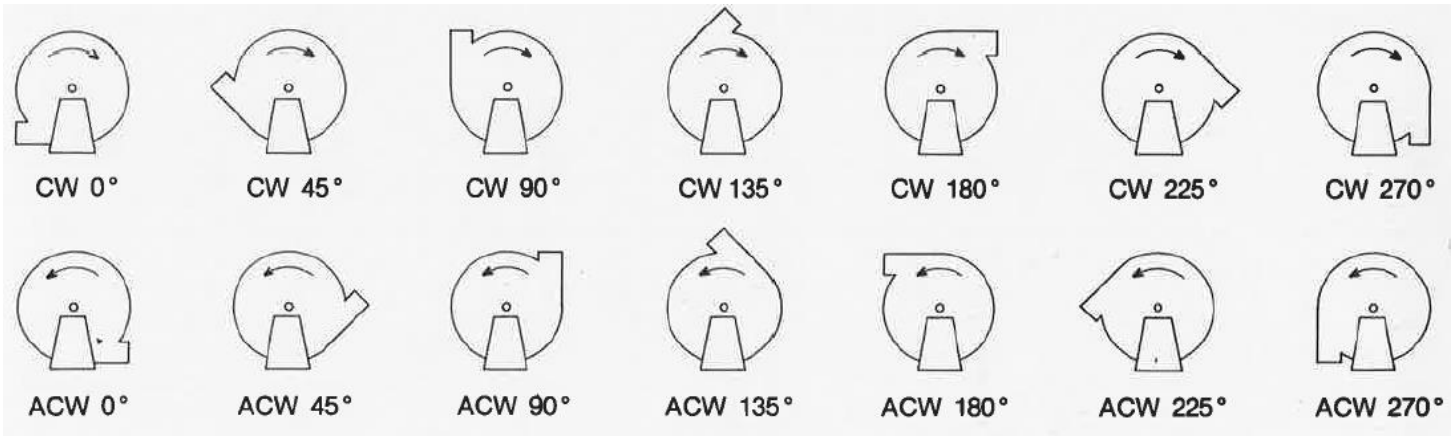
Single & multi-stage H-Series blowers are highly resistant to problems with surging. On low volume duct systems, multi-stage units can be throttled back close to zero flow rate without pressure pulsations occurring. Extremely long duct systems or high-volume plenums can (but rarely) give rise to surging which can be avoided by restricting the minimum volume flow rate.

Typical Pressure, Flow Rate, Power Relationship For H-Series Blowers



Blower Rotation & Discharge Positions

Direction of rotation is determined when looking from the drive side. Discharge position is measured from the bottom horizontal position which is taken as zero degrees.

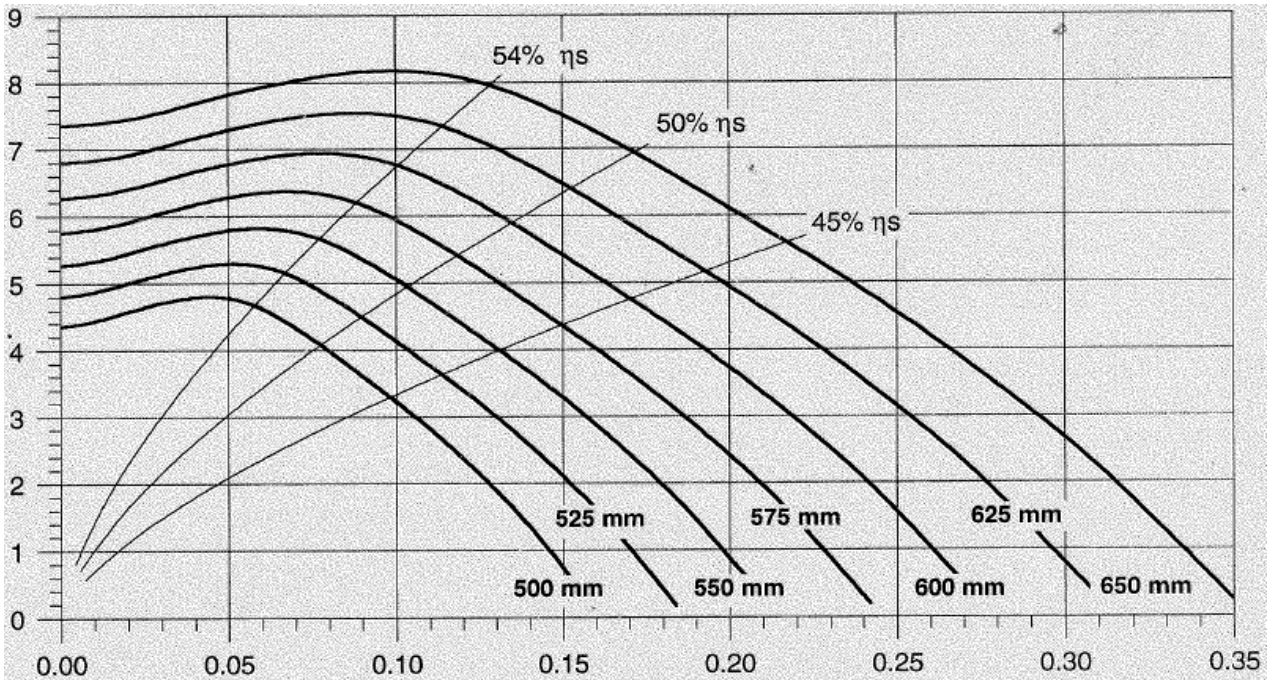


H22 C

Radial Blade High Pressure Fans

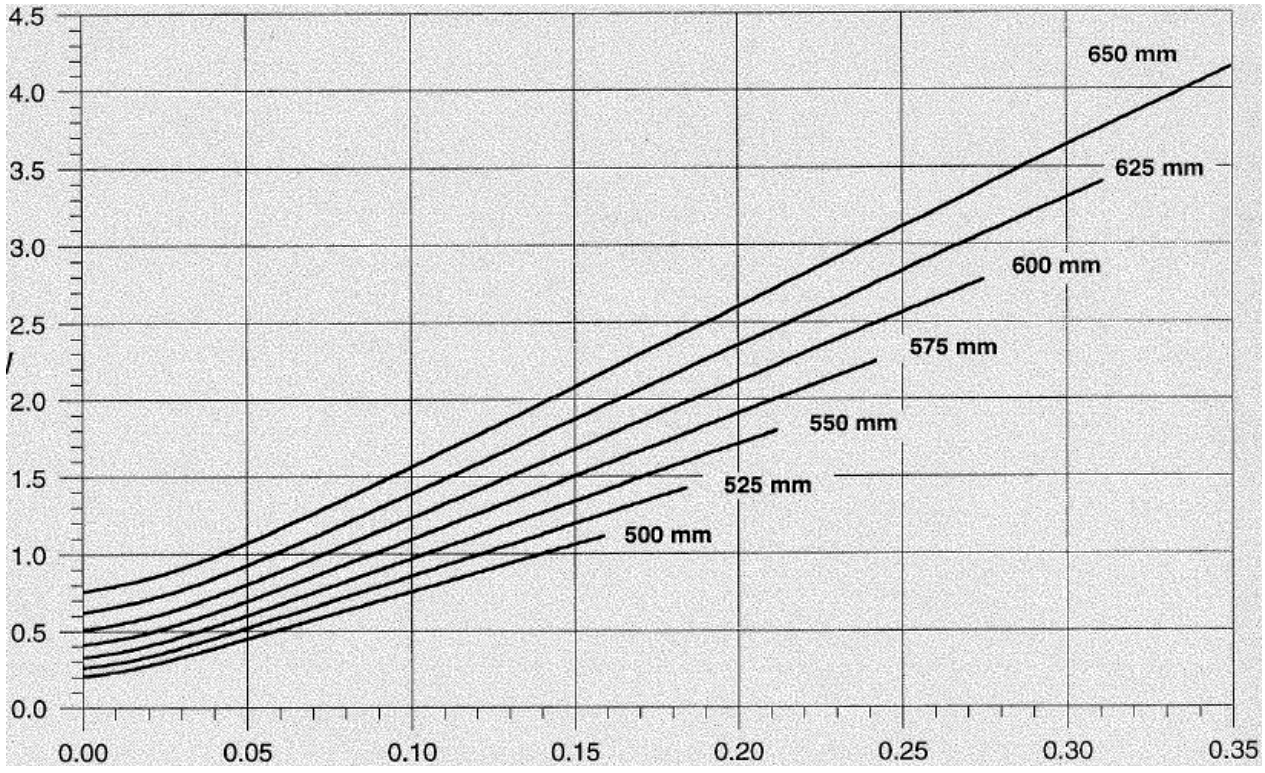
2930 rpm. 20 deg C Air Density 1.200 kg/cu.m

Sizes 500mm to 650mm



Volume Flow Rate (Inlet) cu.m./sec

F.S.P = Fan Static Pressure kW = Fan Shaft Power



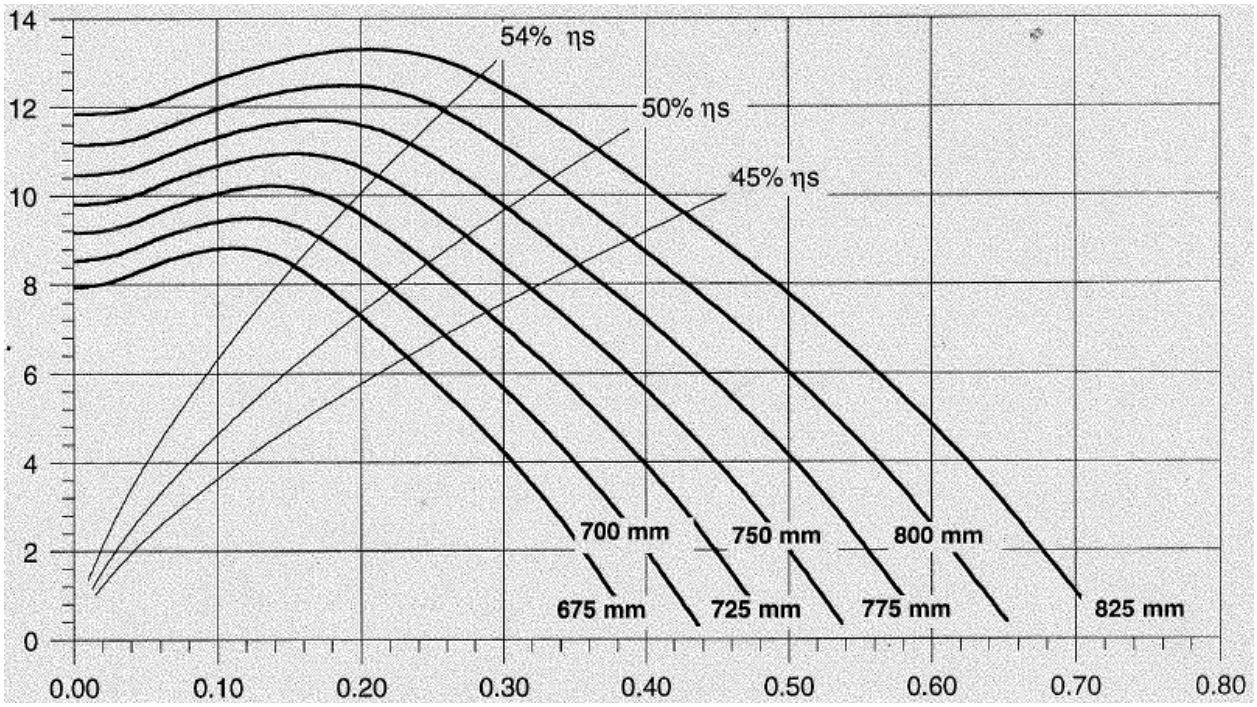
Volume Flow Rate (Inlet) cu.m./sec

H22 C

Radial Blade High Pressure Fans

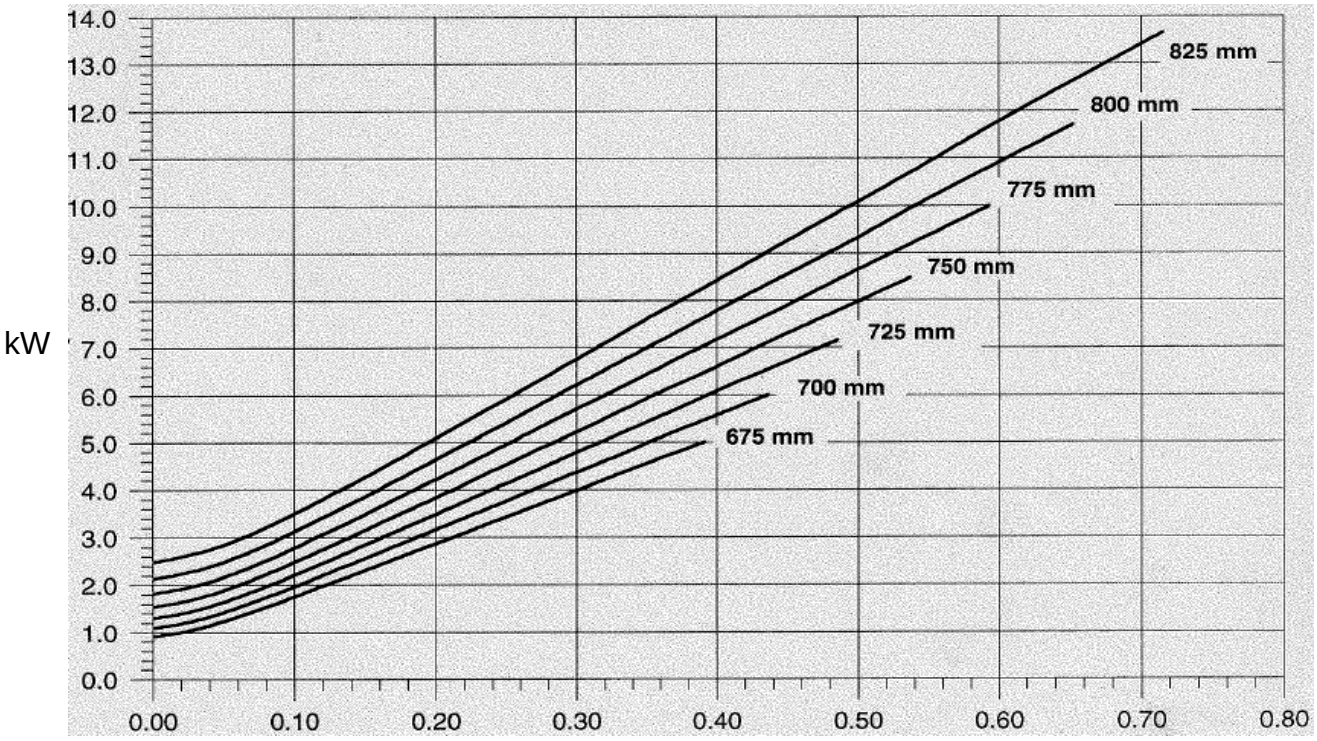
2930 rpm. 20 deg C Air Density 1.200 kg/cu.m

Sizes 675mm to 825mm



Volume Flow Rate (Inlet) cu.m./sec

F.S.P = Fan Static Pressure kW = Fan Shaft Power



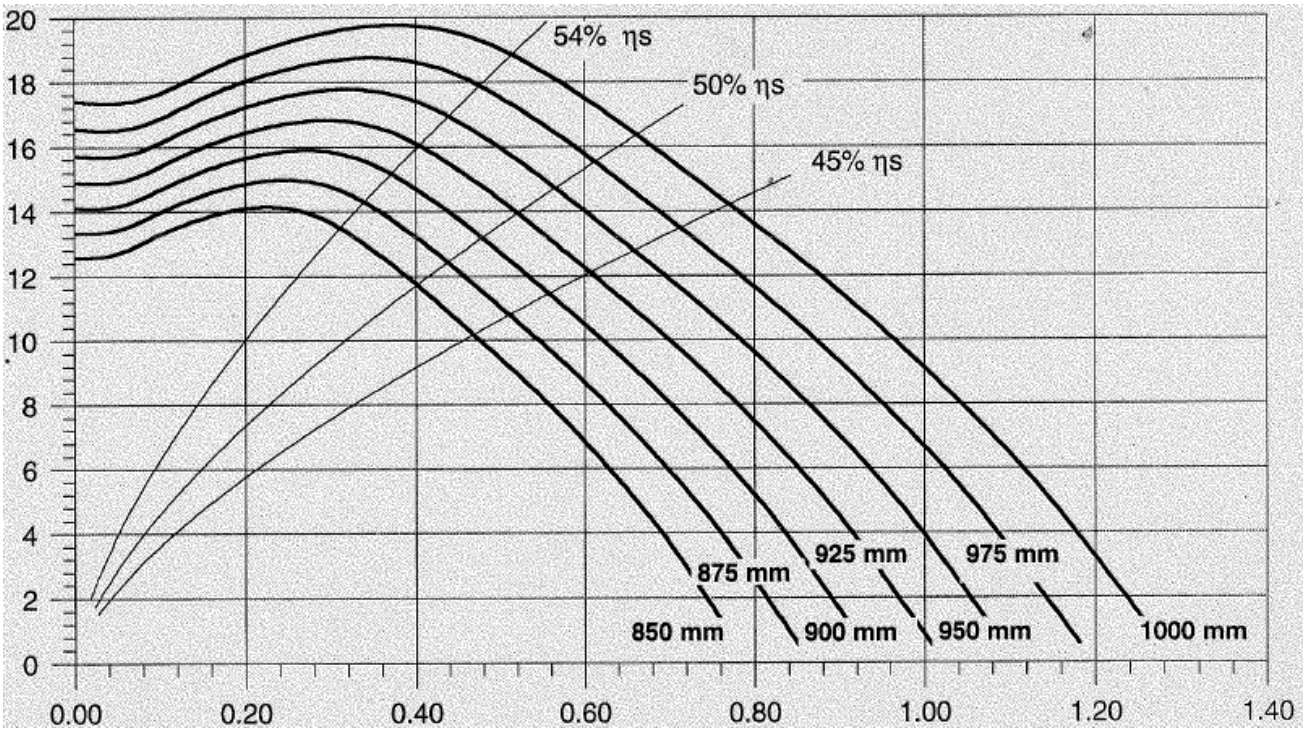
Volume Flow Rate (Inlet) cu.m./sec

H22 C

Radial Blade High Pressure Fans

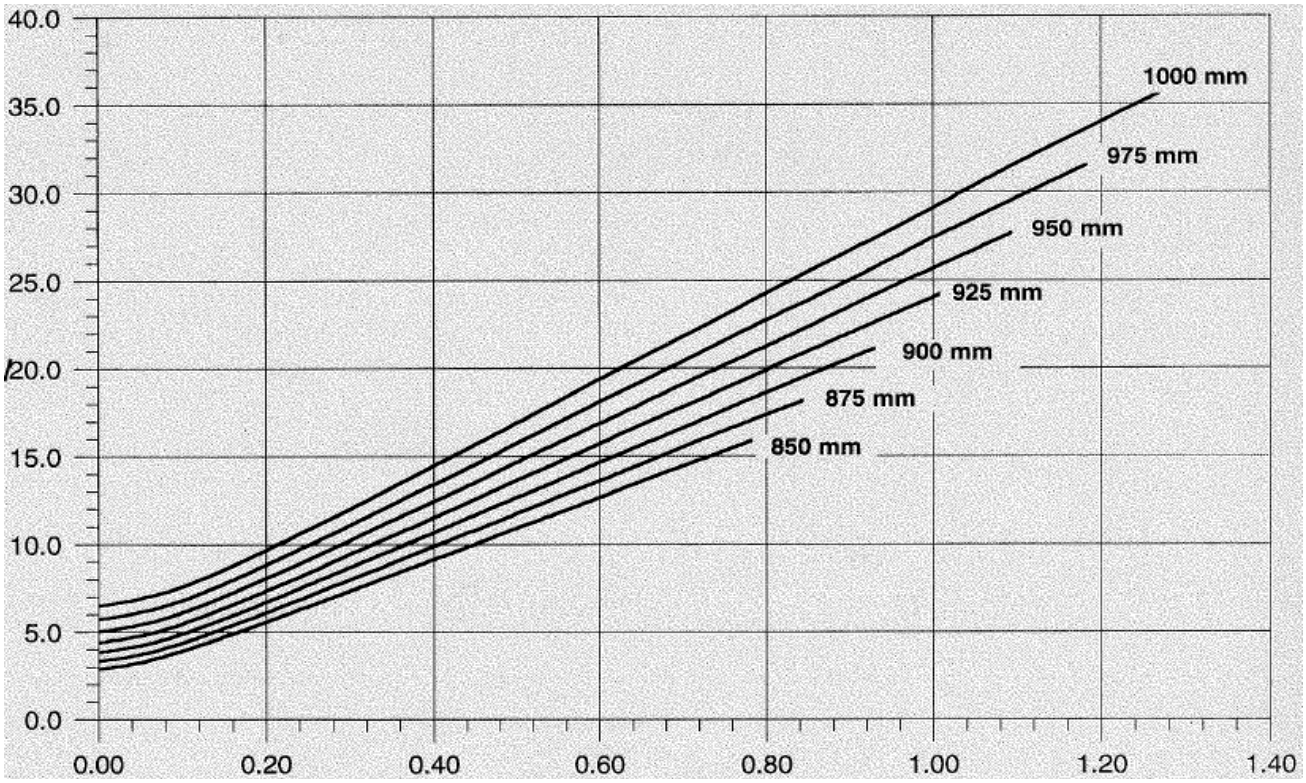
2930 rpm. 20 deg C Air Density 1.200 kg/cu.m

Sizes 850mm to 1000mm

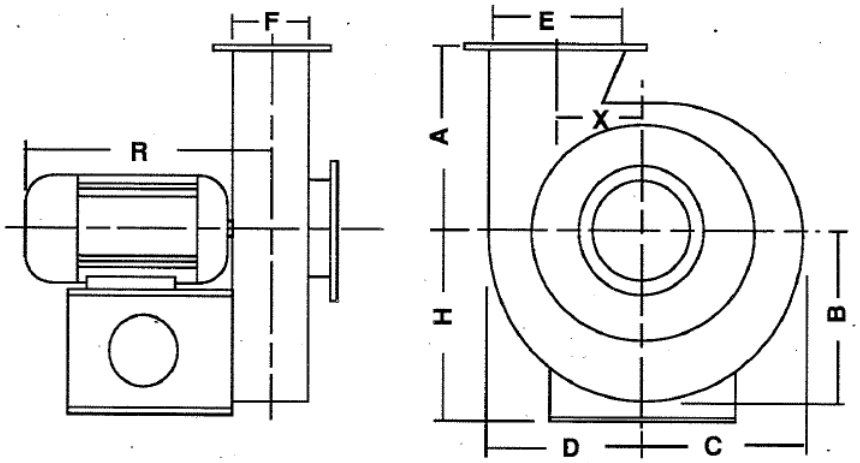


Volume Flow Rate (Inlet) cu.m./sec

F.S.P = Fan Static Pressure kW = Fan Shaft Power

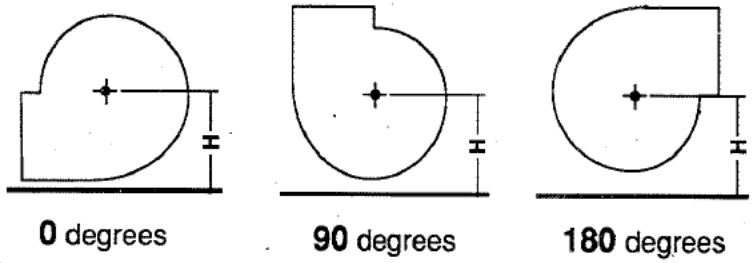


Volume Flow Rate (Inlet) cu.m./sec



Arrangement 4 Direct Drive

Size 315mm to 1000mm

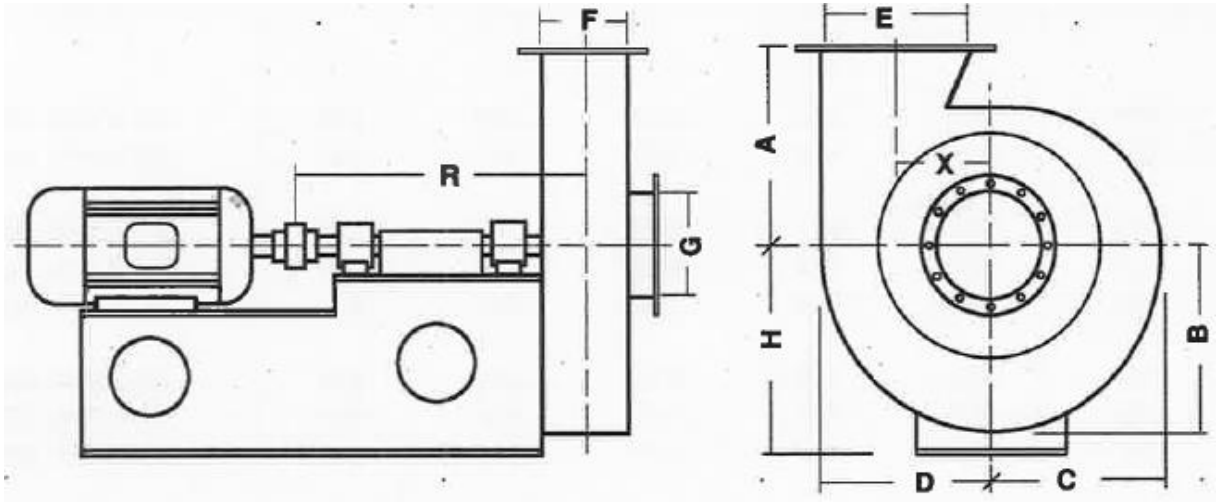


Discharge Position & Height

Note: Dimension R is dependant on motor frame size. Dimension R will be approximately equal to F/2 +motor overall length – motor shaft length + 20mm

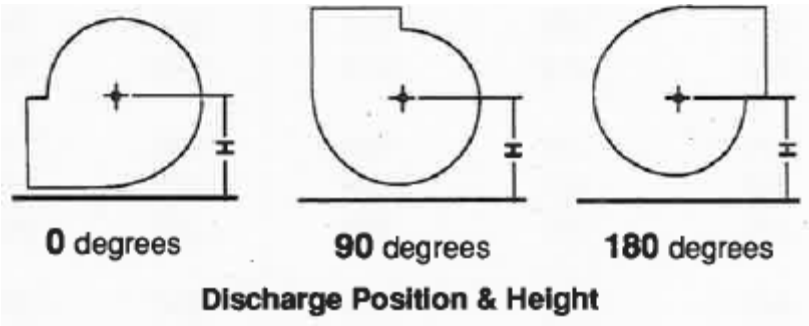
H37 Plate Blade High Pressure Fans

Fan	A	B	C	D	E	F	X	Shaft Centre line height "H" 0 Degrees	90 Degrees	180 Degrees
315 mm H 37	251	238	223	258	104	44	193	380	260	250
355 mm H 37	283	267	250	289	118	50	217	410	290	280
400 mm H 37	319	299	280	324	132	56	245	440	320	310
450 mm H 37	359	336	315	365	148	62	276	490	360	340
500 mm H 37	399	372	348	404	166	70	306	520	400	370
560 mm H 37	447	415	388	450	184	78	343	570	440	410
630 mm H 37	503	465	435	505	208	88	386	630	490	460
710 mm H 37	567	522	488	567	234	98	435	690	550	510
800 mm H 37	639	586	548	637	264	112	490	760	610	570
900 mm H 37	719	659	616	715	298	126	550	840	680	640
1000 mm H 37	798	730	683	793	330	140	612	910	760	710



Arrangement 8 Direct Drive

Size 315mm to 1000mm



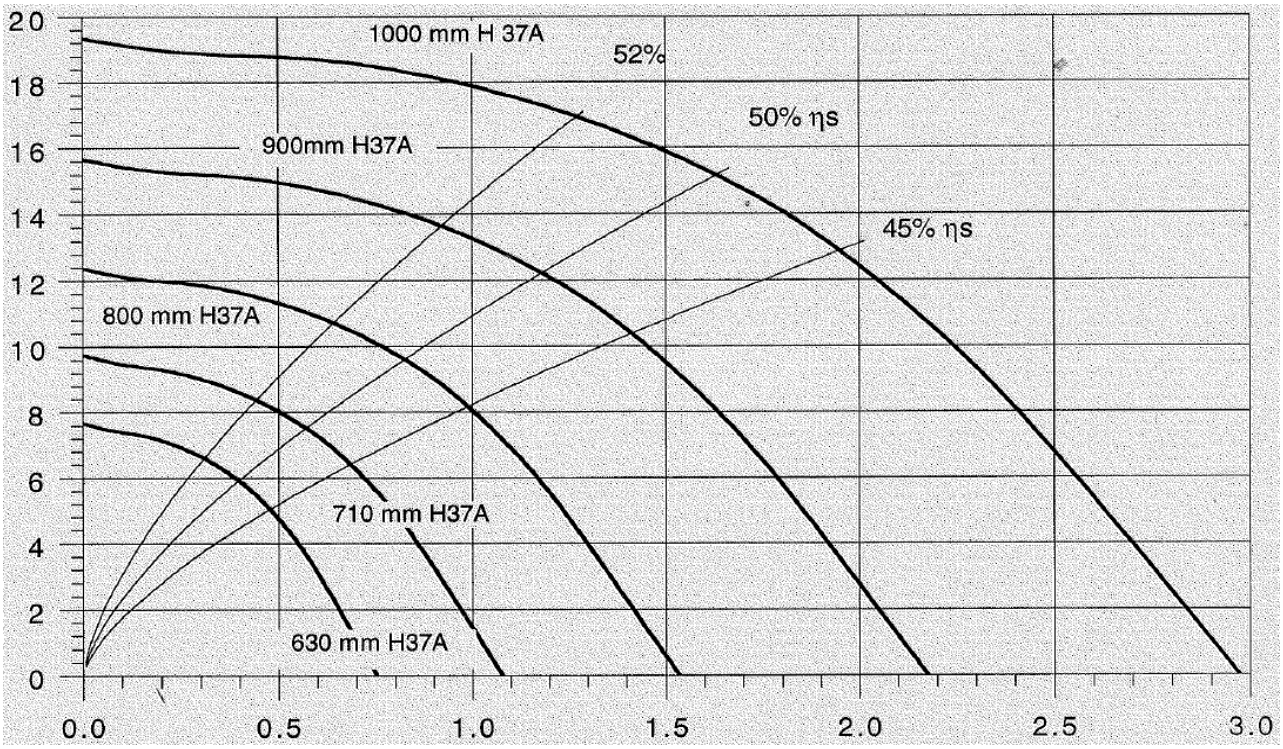
H37 Plate Blade High Pressure Fans

Fan	A	B	C	D	E	F	R	X	Shaft Centre line height "H" 0 Degrees	90 Degrees	180 Degrees
315 mm H 37	251	238	223	258	104	44	420	193	380	260	250
355 mm H 37	283	267	250	289	118	50	440	217	410	290	280
400 mm H 37	319	299	280	324	132	56	460	245	440	320	310
450 mm H 37	359	336	315	365	148	62	490	276	490	360	340
500 mm H 37	399	372	348	404	166	70	510	306	520	400	370
560 mm H 37	447	415	388	450	184	78	540	343	570	440	410
630 mm H 37	503	465	435	505	208	88	570	386	630	490	460
710 mm H 37	567	522	488	567	234	98	610	435	690	550	510
800 mm H 37	639	586	548	637	264	112	650	490	760	610	570
900 mm H 37	719	659	616	715	298	126	690	550	840	680	640
1000 mm H 37	798	730	683	793	330	140	740	612	910	760	710

H37” A Series High Pressure Fans

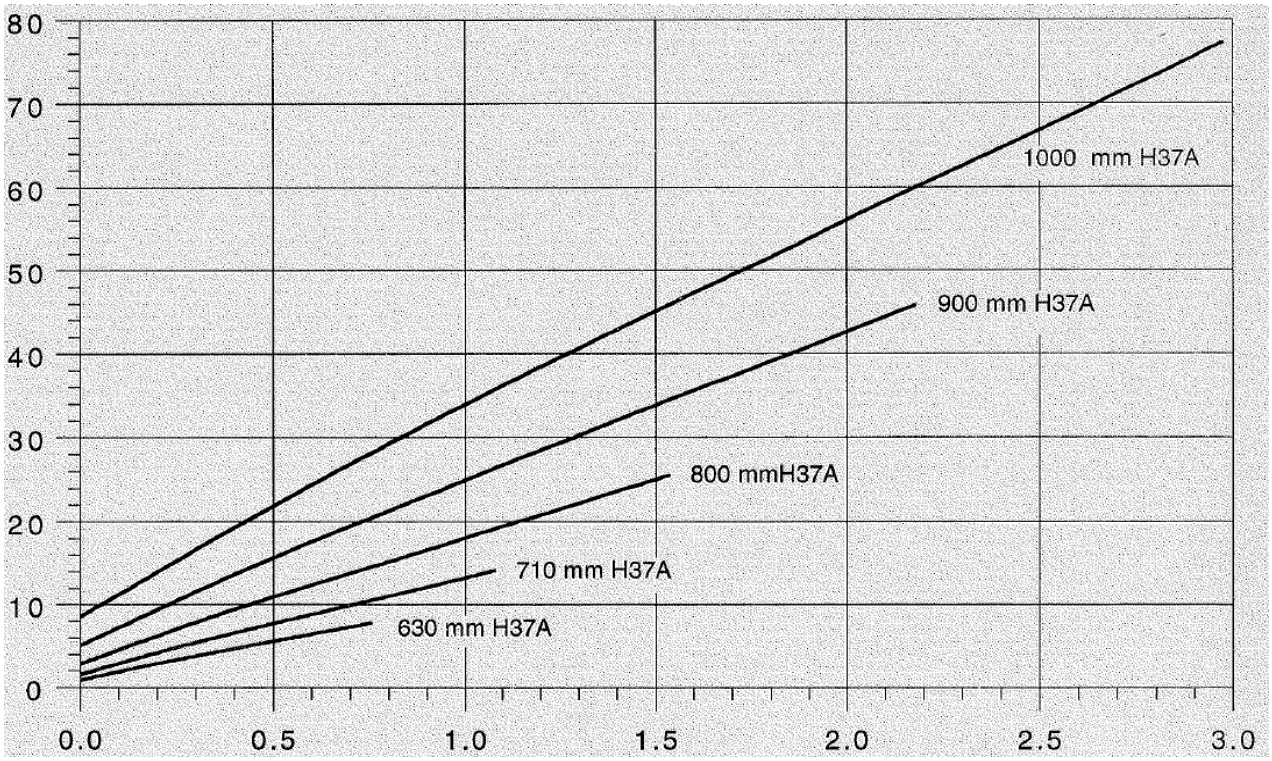
2930 rpm. 20 deg C Air Density 1.200 kg/cu.m

Sizes 630mm to 1000mm



Volume Flow Rate (Inlet) cu.m./sec

F.S.P = Fan Static Pressure kW = Fan Shaft Power

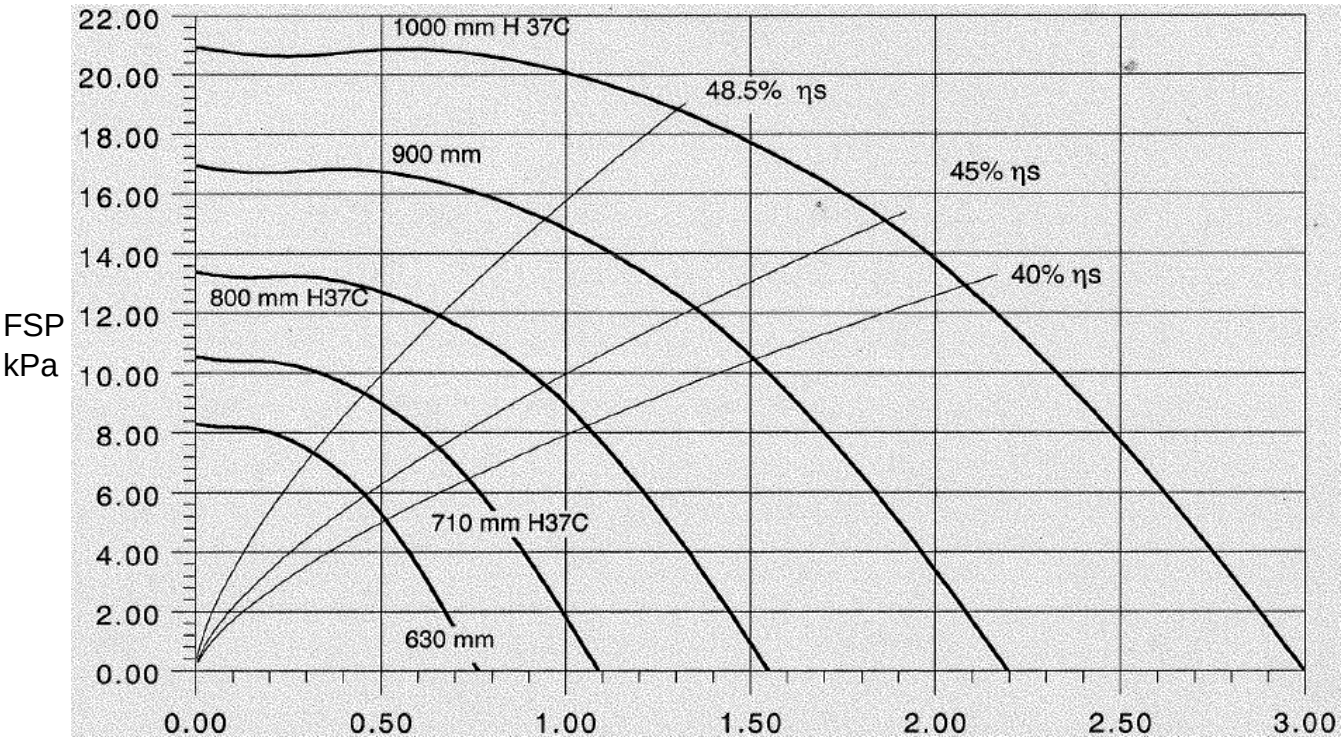


Volume Flow Rate (Inlet) cu.m./sec

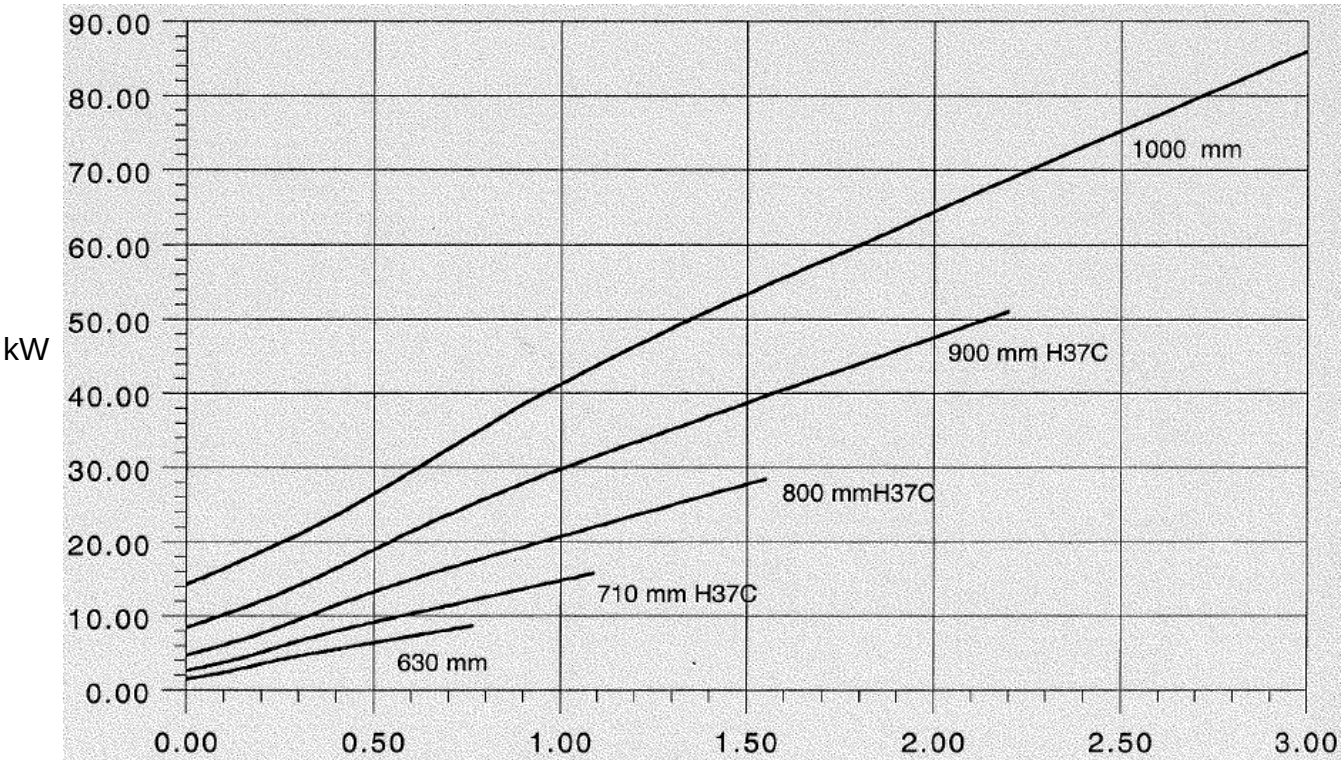
H37” C Series High Pressure Fans

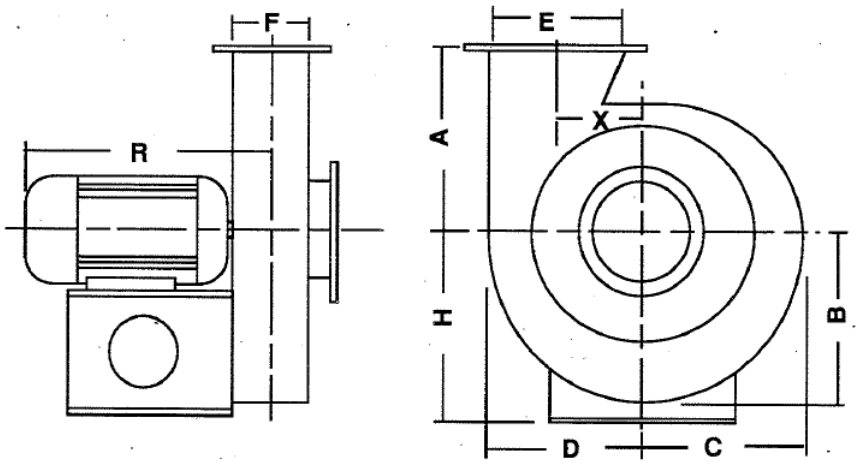
2930 rpm. 20 deg C Air Density 1.200 kg/cu.m

Sizes 630mm to 1000mm



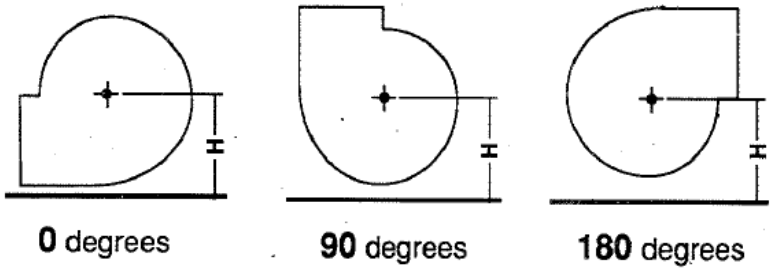
F.S.P = Fan Static Pressure kW = Fan Shaft Power





Arrangement 4 Direct Drive

Size 315mm to 1000mm

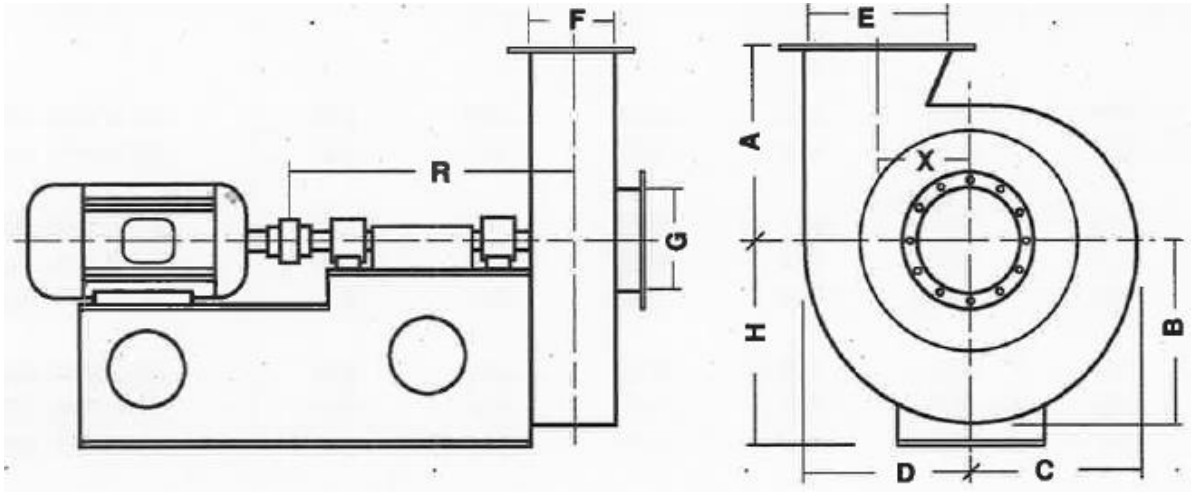


Discharge Position & Height

Note: Dimension R is dependent on motor frame size. Dimension R will be approximately equal to F/2 +motor overall length – motor shaft length + 20mm

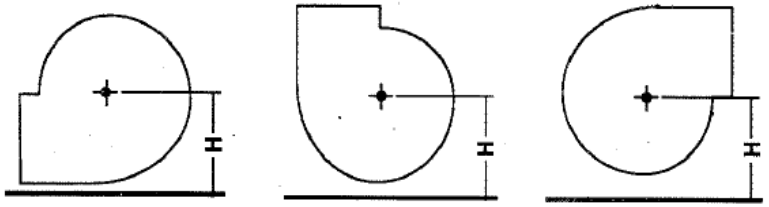
H58 Plate Blade High Pressure Fans

Fan	A	B	C	D	E	F	G	X	Shaft Centre line height "H" 0 Degrees	90 Degrees	180 Degrees
315 mm H 58	257	261	237	292	146	52	126	206	410	290	260
355 mm H 58	290	292	266	328	164	58	142	233	450	320	290
400 mm H 58	327	328	298	367	184	66	160	262	490	350	320
450 mm H 58	368	369	335	414	208	74	180	297	530	390	360
500 mm H 58	409	408	371	458	230	82	200	330	580	430	400
560 mm H 58	458	457	415	512	258	92	224	367	630	480	440
630 mm H 58	515	512	464	574	290	104	250	413	690	540	490
710 mm H 58	580	574	520	644	326	118	282	465	760	600	550
800 mm H 58	654	645	584	724	368	132	318	524	840	670	610
900 mm H 58	735	724	657	814	414	148	358	591	930	750	680
1000 mm H 58	817	803	728	902	460	166	398	656	1020	830	750



Arrangement 8 Direct Drive

Size 315mm to 1000mm



Discharge Position & Height

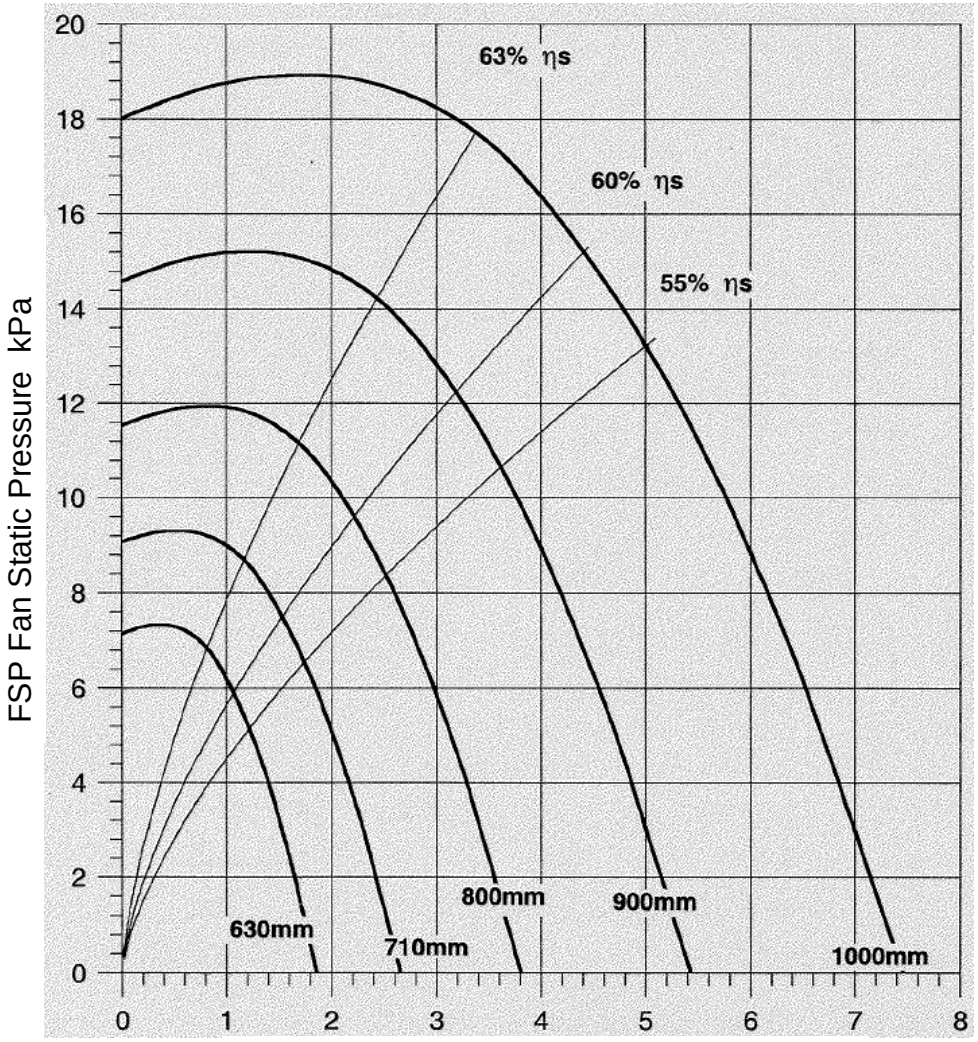
H58 Plate Blade High Pressure Fans

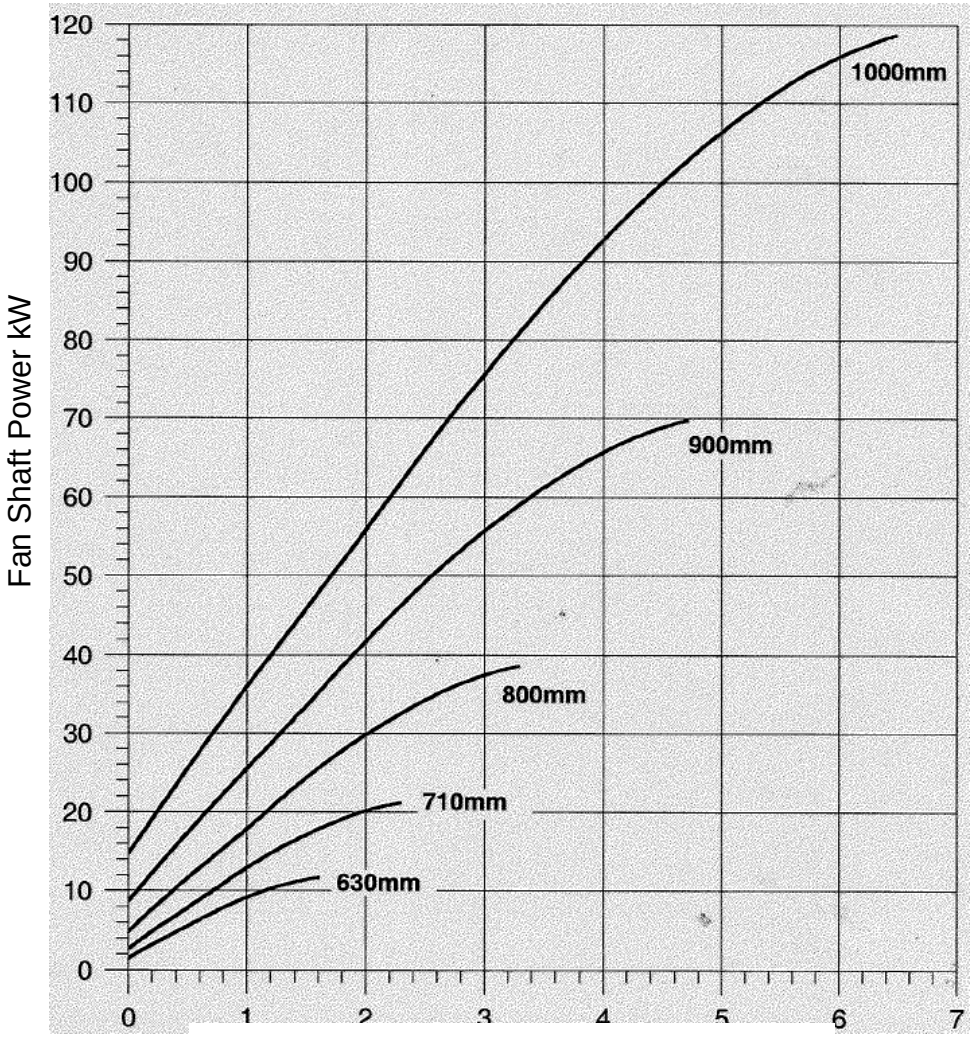
Fan	A	B	C	D	E	F	G	R	X	Shaft Centre line height "H" 0 Degrees	90 Degrees	180 Degrees
315 mm H 58	257	261	237	292	146	52	126	430	206	410	290	260
355 mm H 58	290	292	266	328	164	58	142	450	233	450	320	290
400 mm H 58	327	328	298	367	184	66	160	470	262	490	350	320
450 mm H 58	368	369	335	414	208	74	180	490	297	530	390	360
500 mm H 58	409	408	371	458	230	82	200	520	330	580	430	400
560 mm H 58	458	457	415	512	258	92	224	550	367	630	480	440
630 mm H 58	515	512	464	574	290	104	250	580	413	690	540	490
710 mm H 58	580	574	520	644	326	118	282	620	465	760	600	550
800 mm H 58	654	645	584	724	368	132	318	660	524	840	670	610
900 mm H 58	735	724	657	814	414	148	358	710	591	930	750	680
1000 mm H 58	817	803	728	902	460	166	398	750	656	1020	830	750

H58” A Series High Pressure Fans

2930 rpm. 20 deg C Air Density 1.20 kg/cu.m

Sizes 630mm to 1000mm

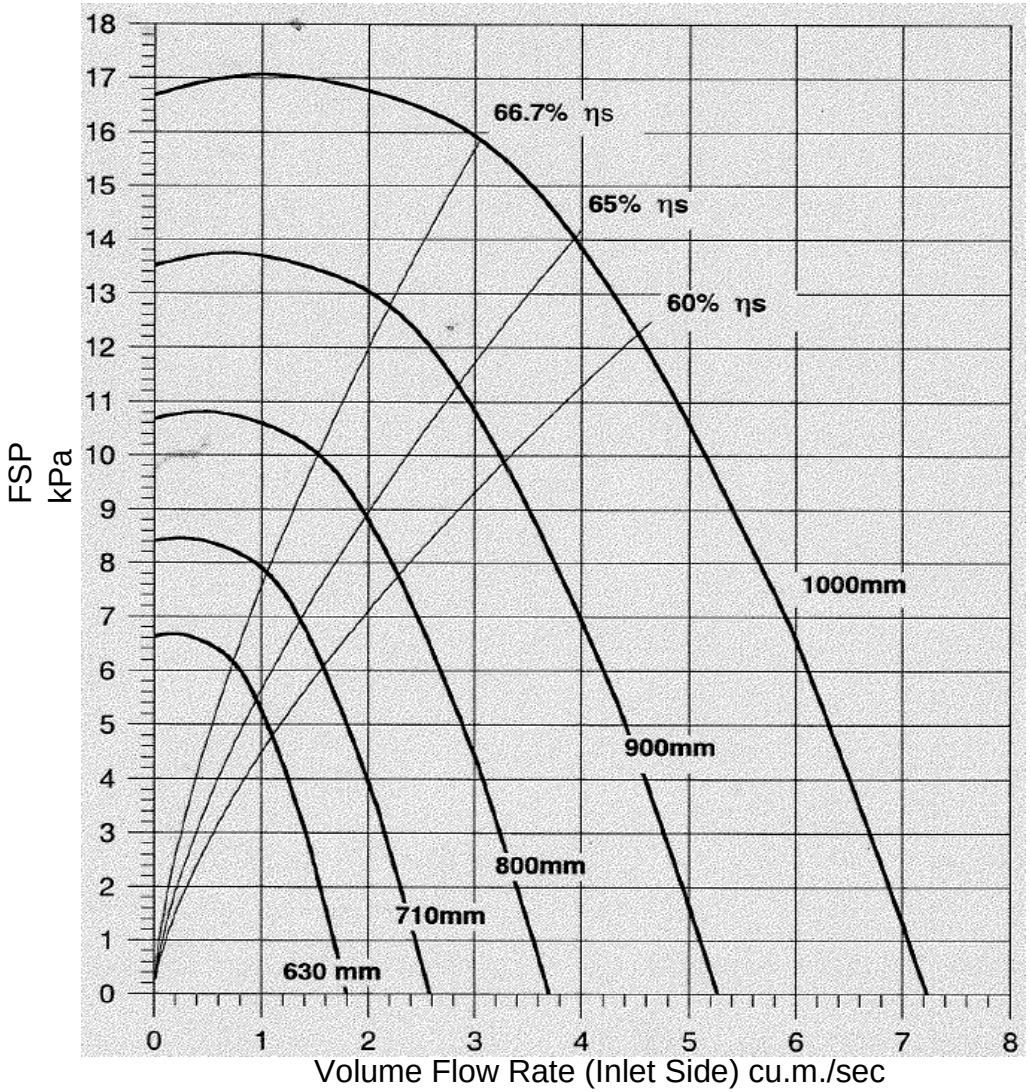


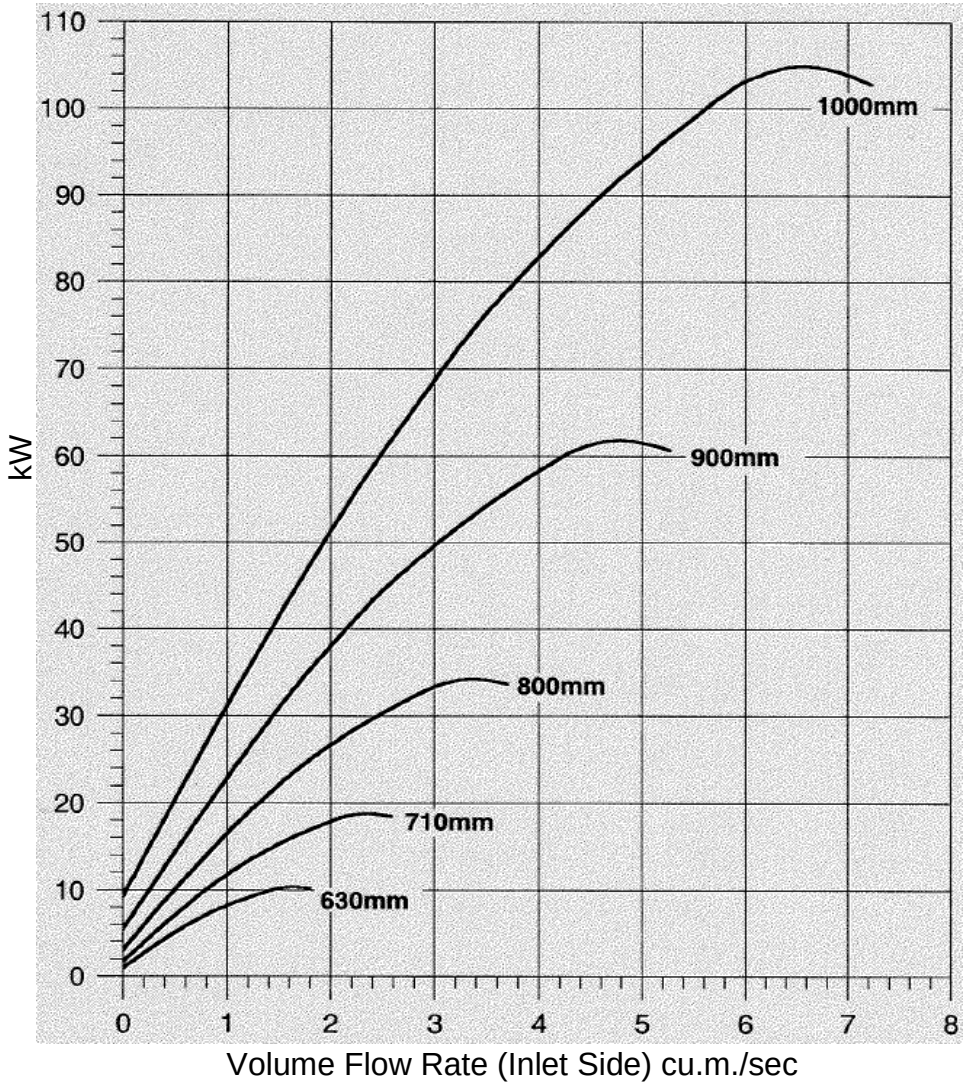


H58” N Series High Pressure Fans

2930 rpm. 20 deg C Air Density 1.20 kg/cu.m

Sizes 630mm to 1000mm

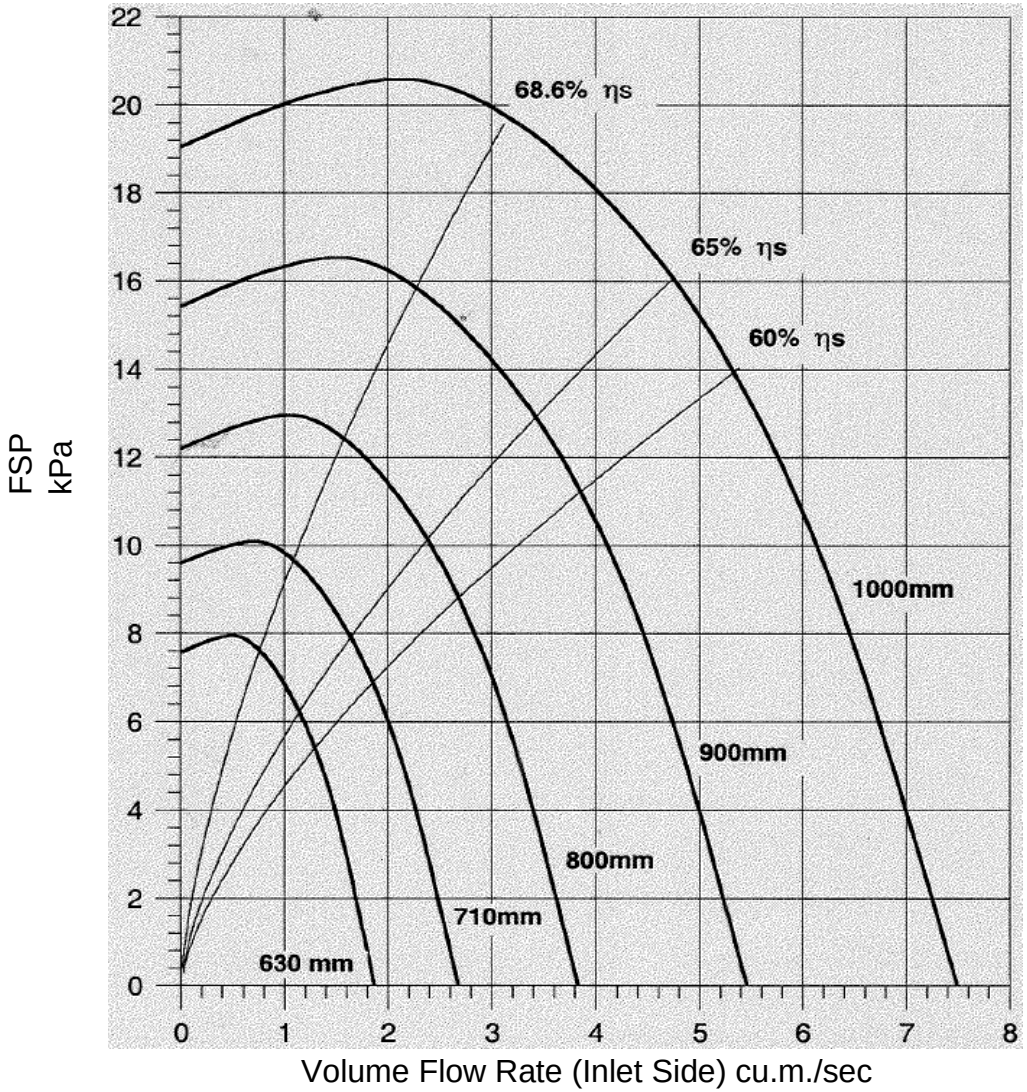


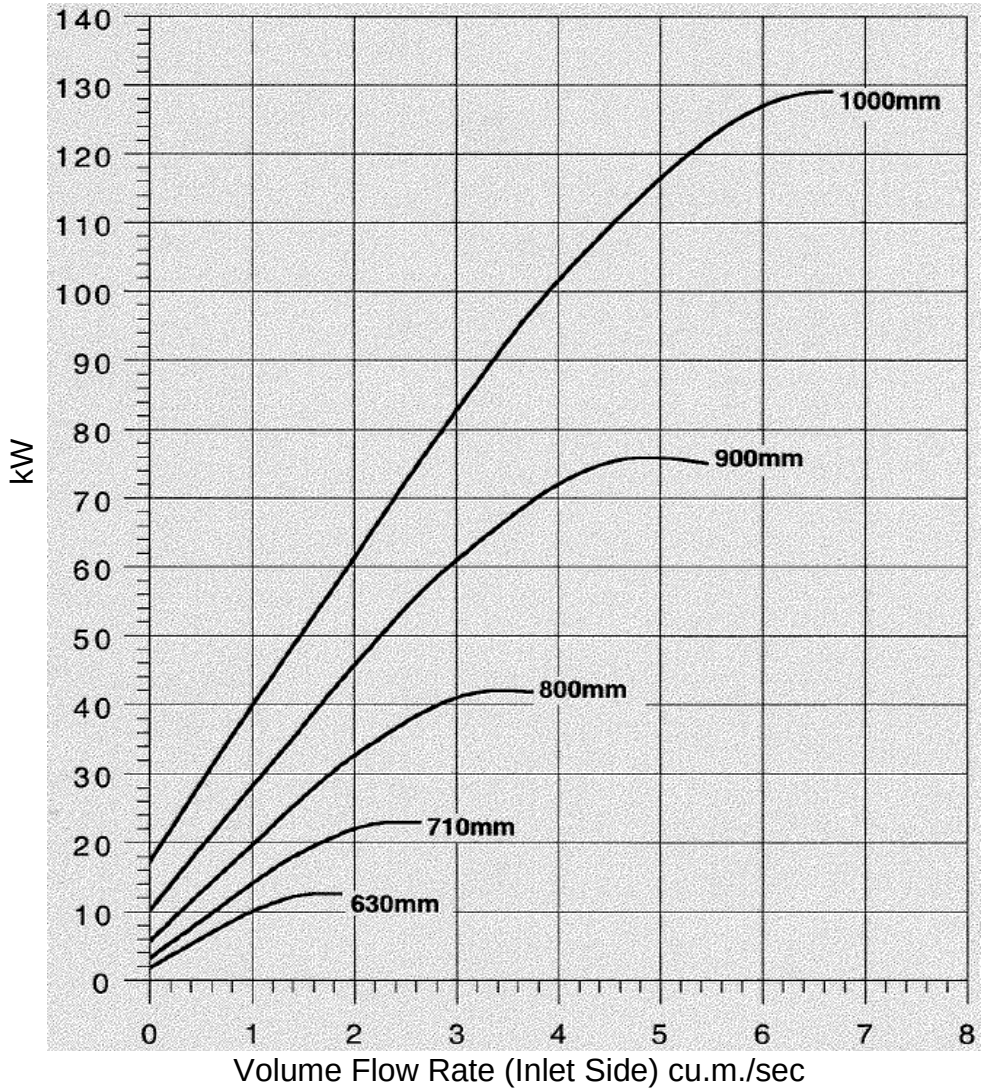


H58” B Series High Pressure Fans

2930 rpm. 20 deg C Air Density 1.20 kg/cu.m

Sizes 630mm to 1000mm

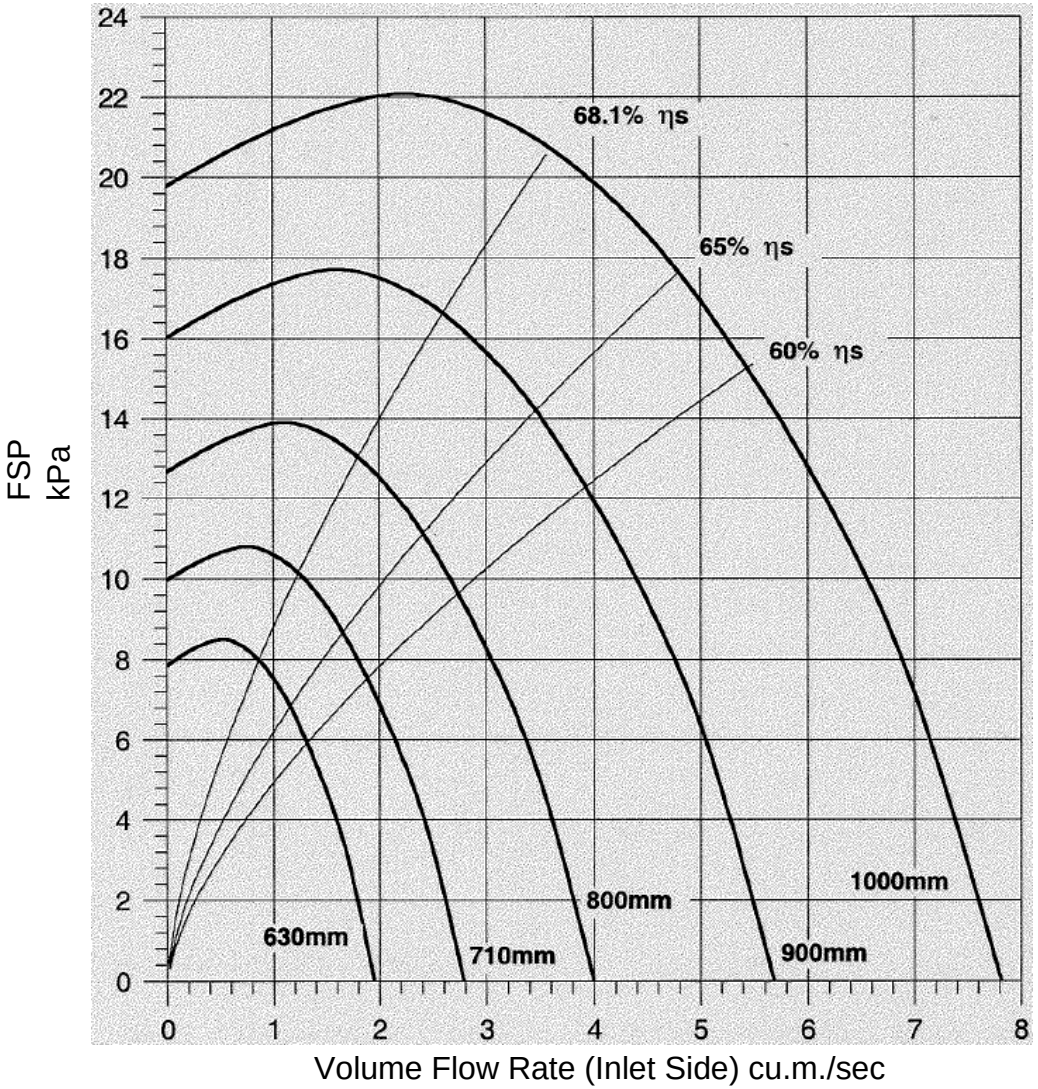


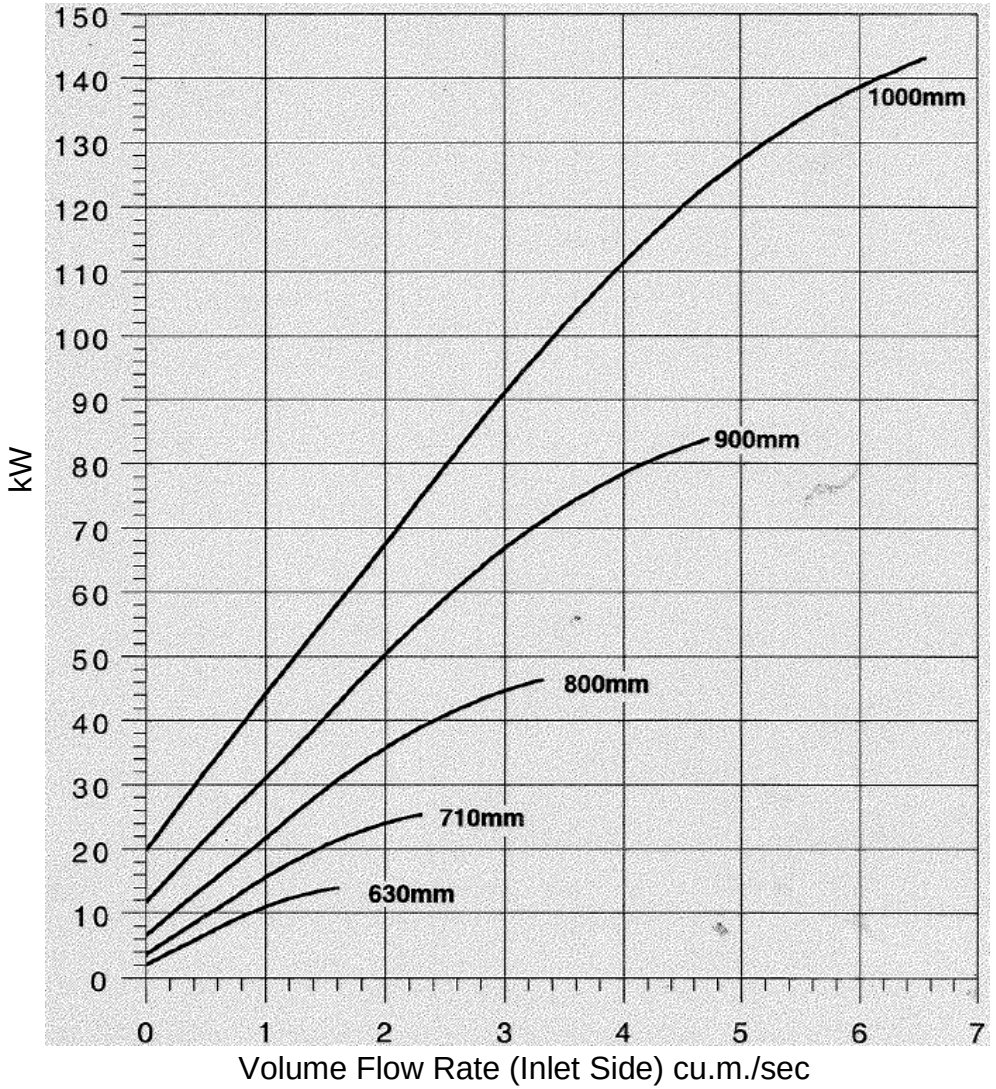


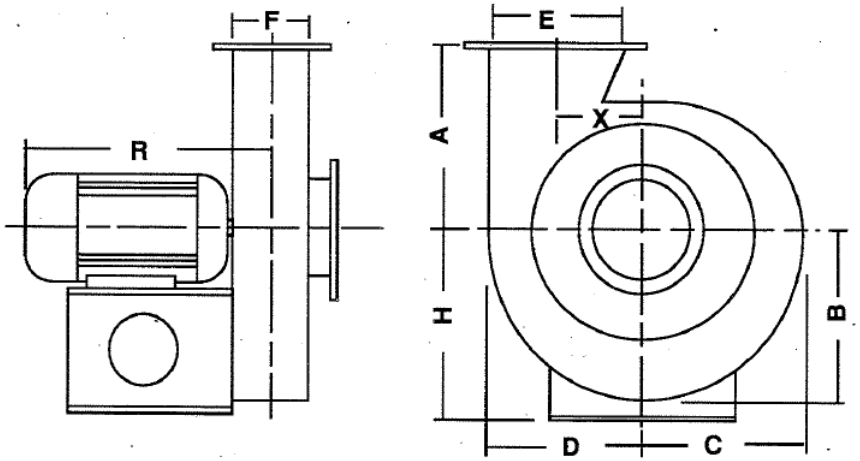
H58” C Series High Pressure Fans

Sizes 630mm to 1000mm

2930 rpm. 20 deg C Air Density 1.20 kg/cu.m

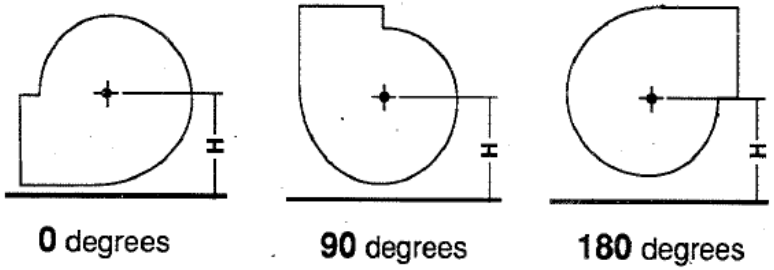






Arrangement 4 Direct Drive

Size 315mm to 800mm

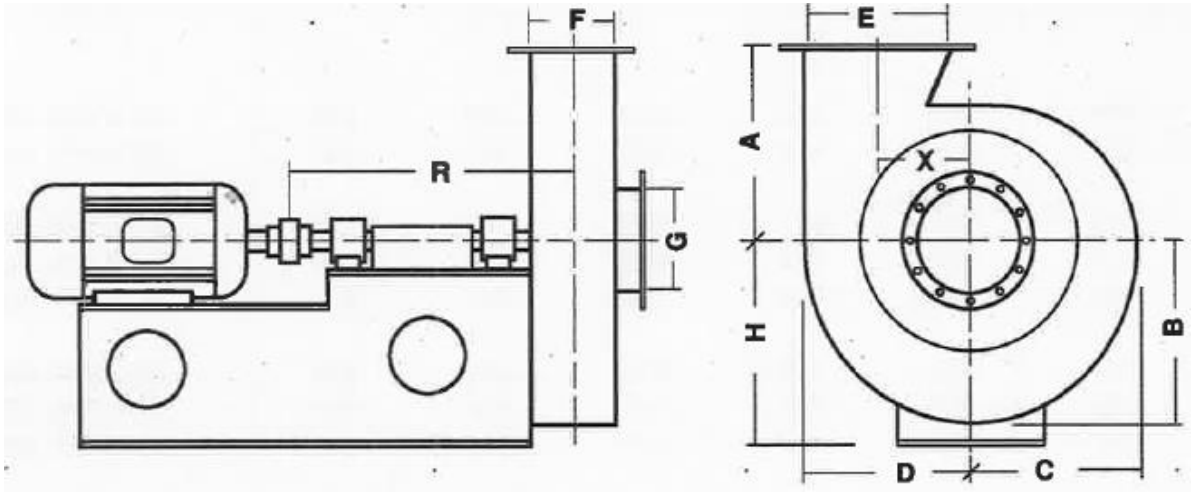


Discharge Position & Height

Note: Dimension R is dependent on motor frame size. Dimension R will be approximately equal to F/2 +motor overall length – motor shaft length + 20mm

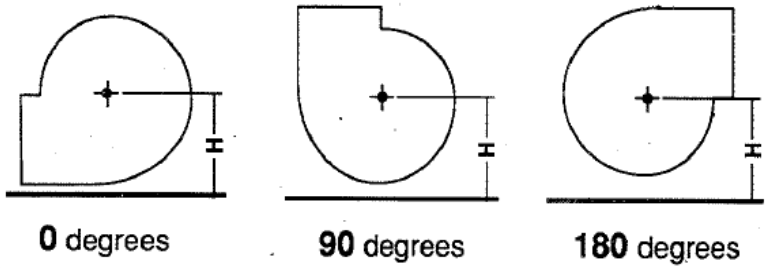
H105 Plate Blade High Pressure Fans

Fan	A	B	C	D	E	F	X	Shaft Centre line height "H" 0 Degrees	90 Degrees	180 Degrees
315 mm H 105	283	299	263	346	202	108	232	470	320	280
355 mm H 105	319	336	294	388	228	122	261	510	360	320
400 mm H 105	360	376	330	436	256	138	295	560	400	350
450 mm H 105	405	422	370	489	288	156	332	610	450	390
500 mm H 105	450	467	409	542	320	172	369	660	490	430
560 mm H 105	504	524	459	608	360	192	413	730	550	480
630 mm H 105	567	587	514	682	404	216	465	800	610	540
710 mm H 105	639	661	579	767	456	244	523	890	690	600
800 mm H 105	720	743	650	863	514	276	590	980	770	680



Arrangement 8 Direct Drive

Size 315mm to 800mm



Discharge Position & Height

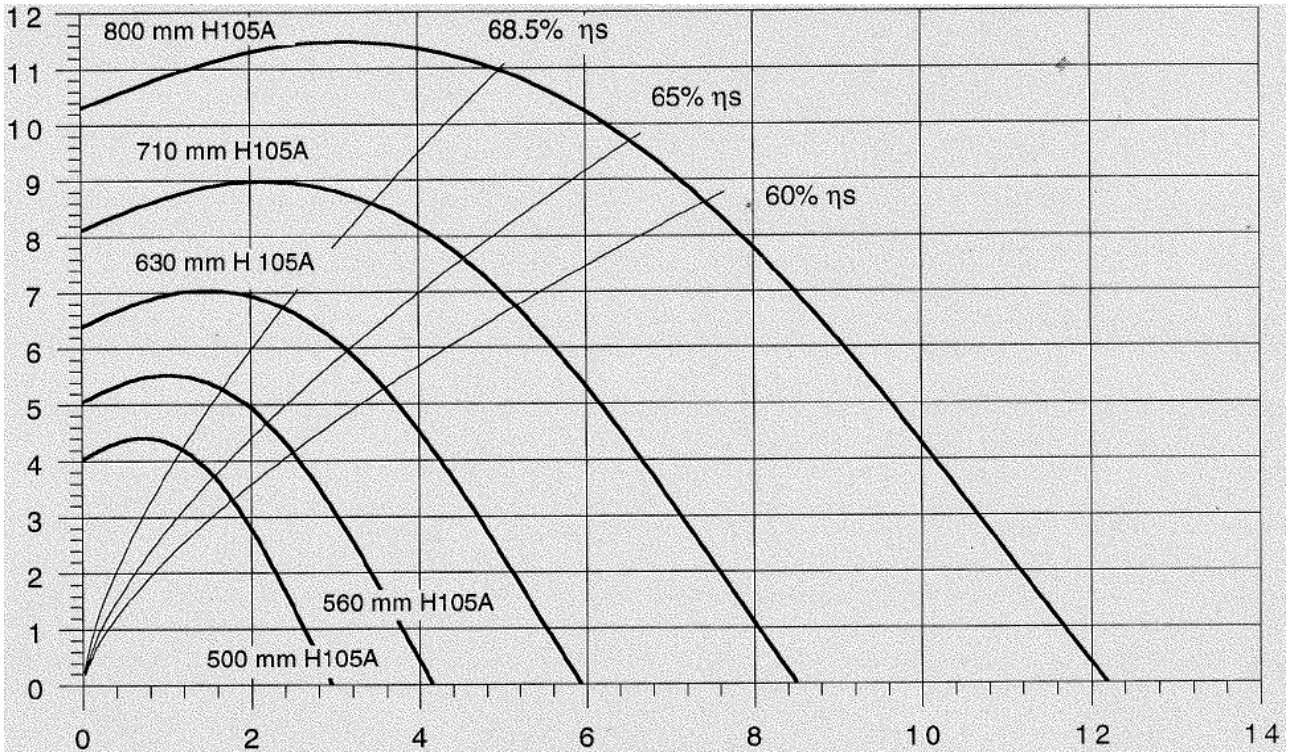
H105 Plate Blade High Pressure Fans

Fan	A	B	C	D	E	F	R	X	Shaft Centre line height "H" 0 Degrees	90 Degrees	180 Degrees
315 mm H 105	283	299	263	346	202	108	460	232	470	320	280
355 mm H 105	319	336	294	388	228	122	480	261	510	360	320
400 mm H 105	360	376	330	436	256	138	500	295	560	400	350
450 mm H 105	405	422	370	489	288	156	530	332	610	450	390
500 mm H 105	450	467	409	542	320	172	560	369	660	490	430
560 mm H 105	504	524	459	608	360	192	590	413	730	550	480
630 mm H 105	567	587	514	682	404	216	630	465	800	610	540
710 mm H 105	639	661	579	767	456	244	680	523	890	690	600
800 mm H 105	720	743	650	863	514	276	730	590	980	770	680

H105” A Series High Pressure Fans

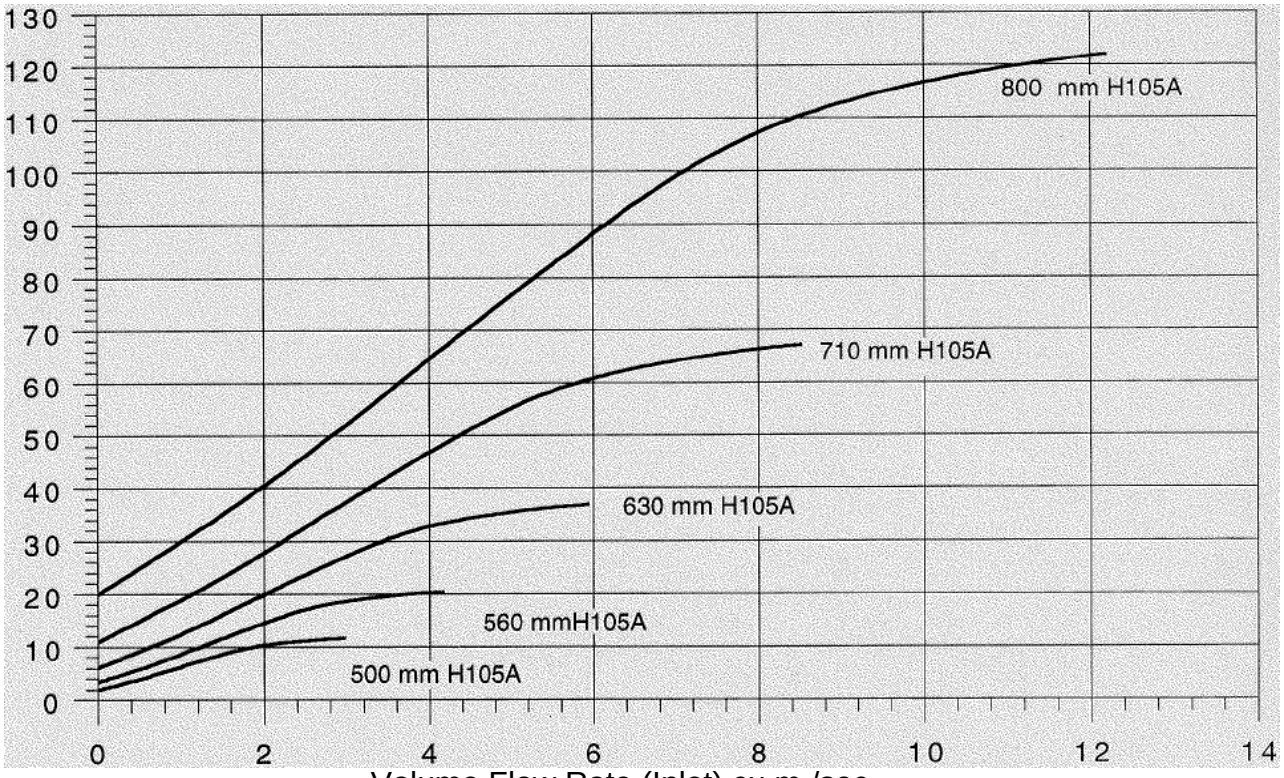
2930 rpm. 20 deg C Air Density 1.200 kg/cu.m

Sizes 500mm to 800mm



Volume Flow Rate (Inlet) cu.m./sec

F.S.P = Fan Static Pressure kW = Fan Shaft Power

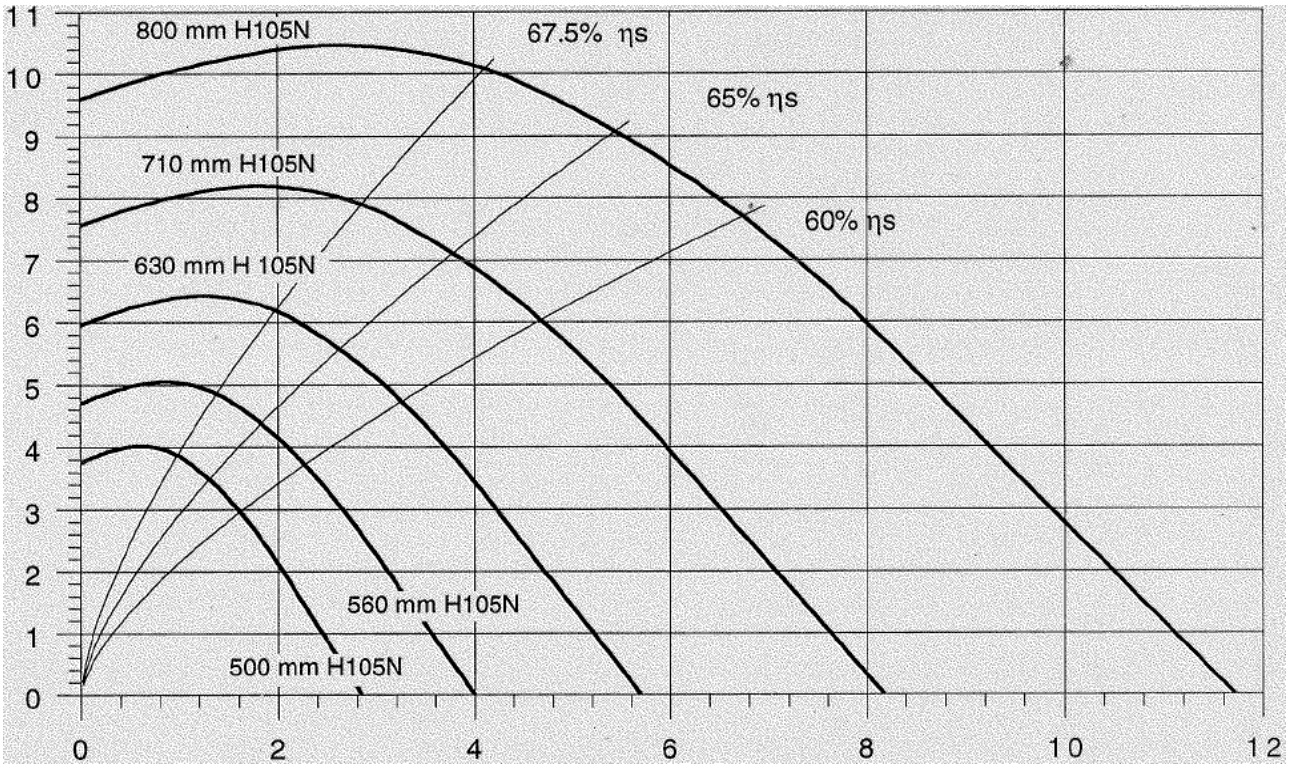


Volume Flow Rate (Inlet) cu.m./sec

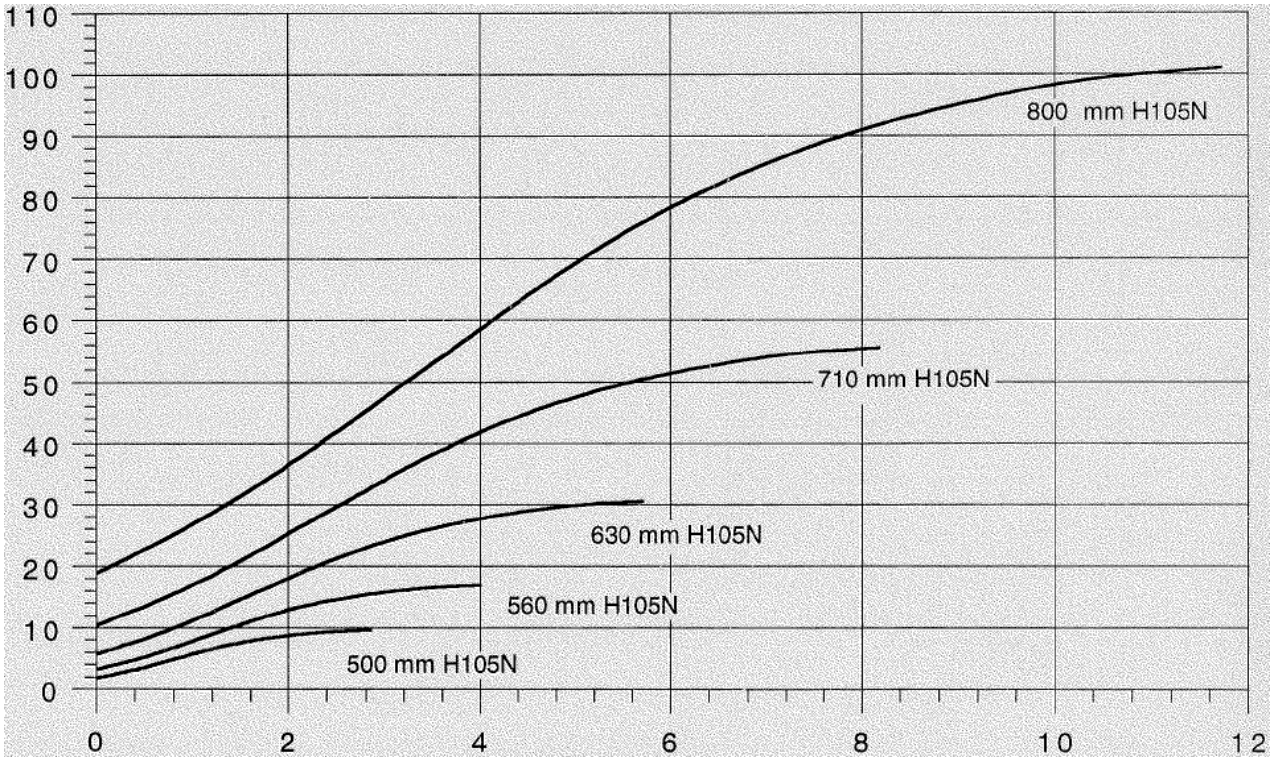
H105” N Series High Pressure Fans

2930 rpm. 20 deg C Air Density 1.200 kg/cu.m

Sizes 500mm to 800mm



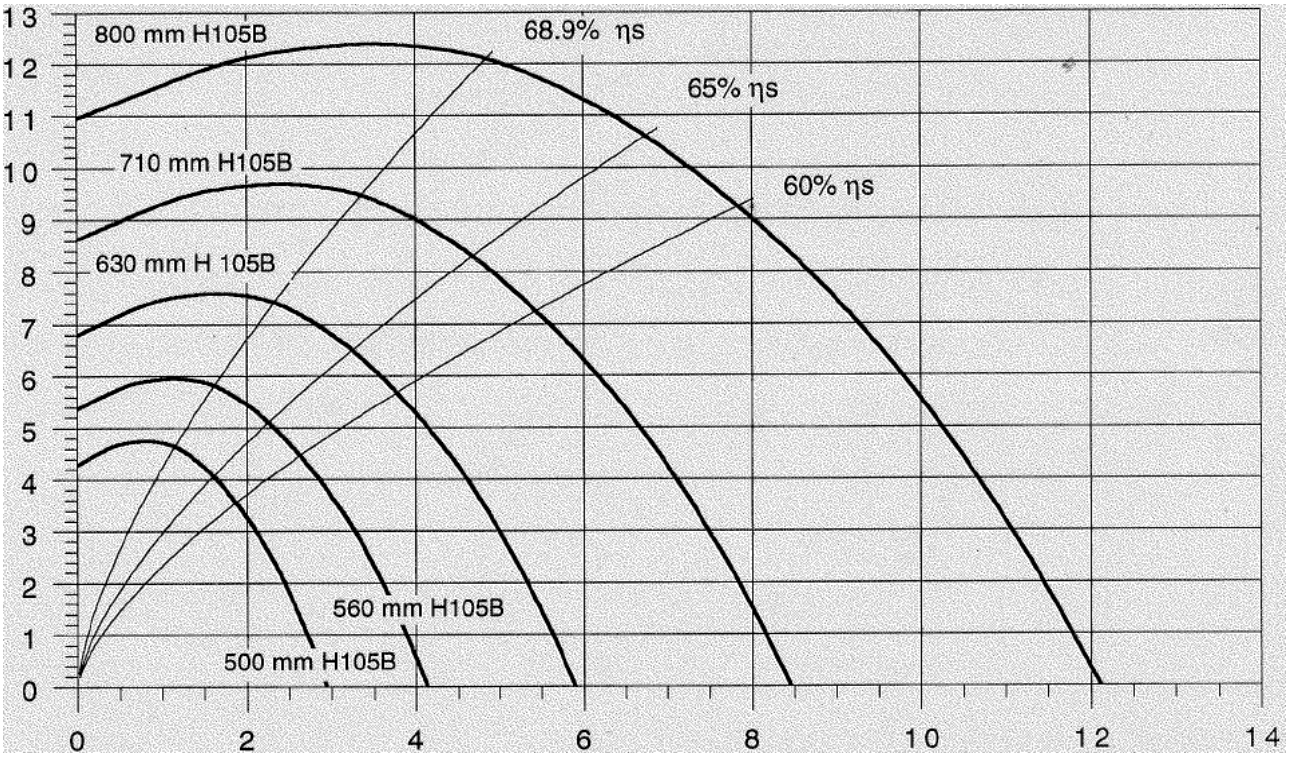
F.S.P = Fan Static Pressure kW = Fan Shaft Power



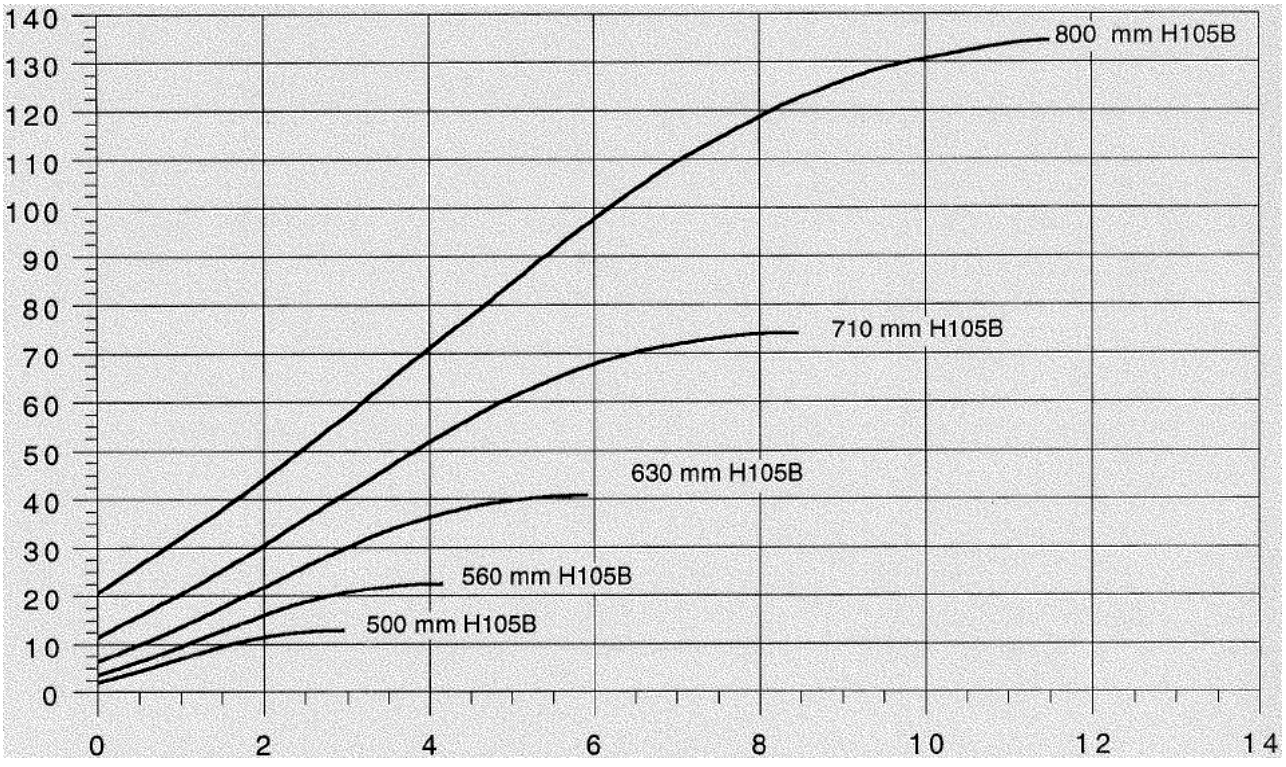
H105” B Series High Pressure Fans

2930 rpm. 20 deg C Air Density 1.200 kg/cu.m

Sizes 500mm to 800mm



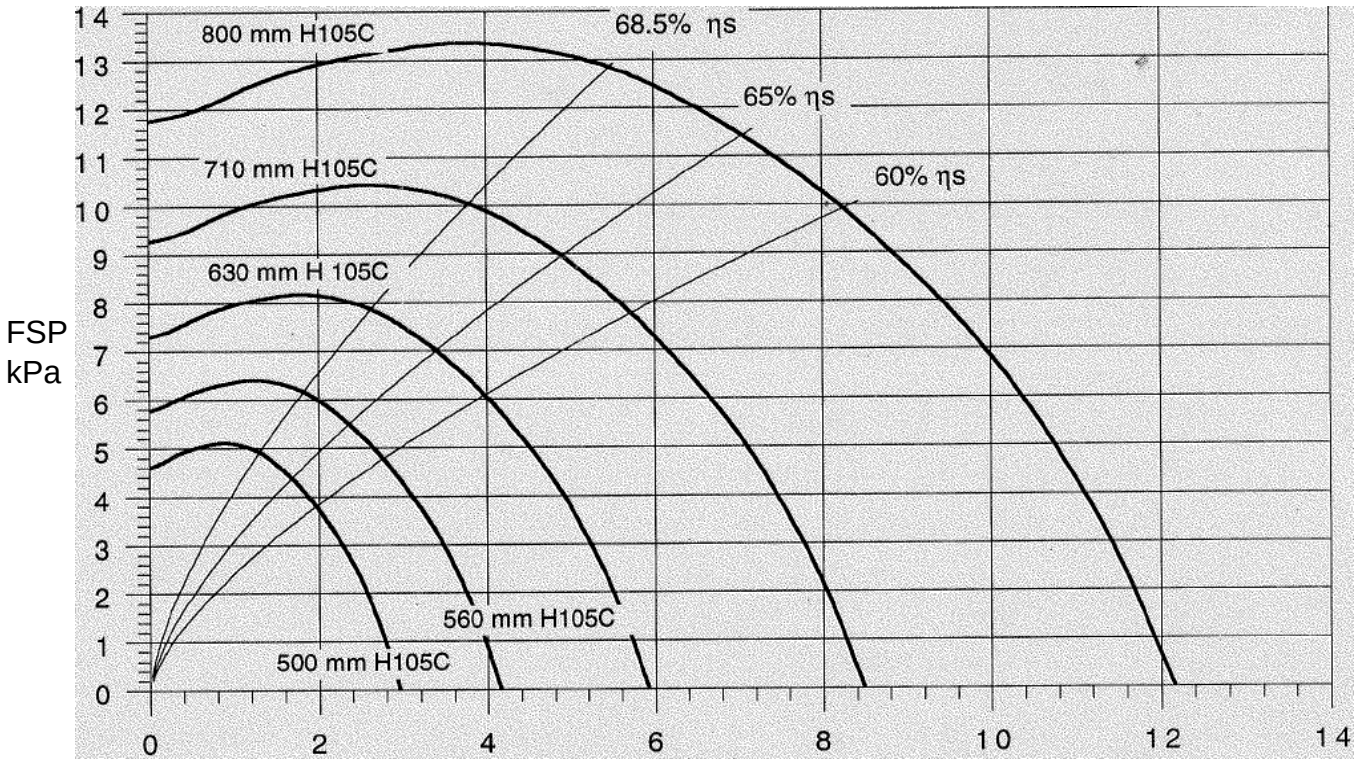
F.S.P = Fan Static Pressure kW = Fan Shaft Power



H105” C Series High Pressure Fans

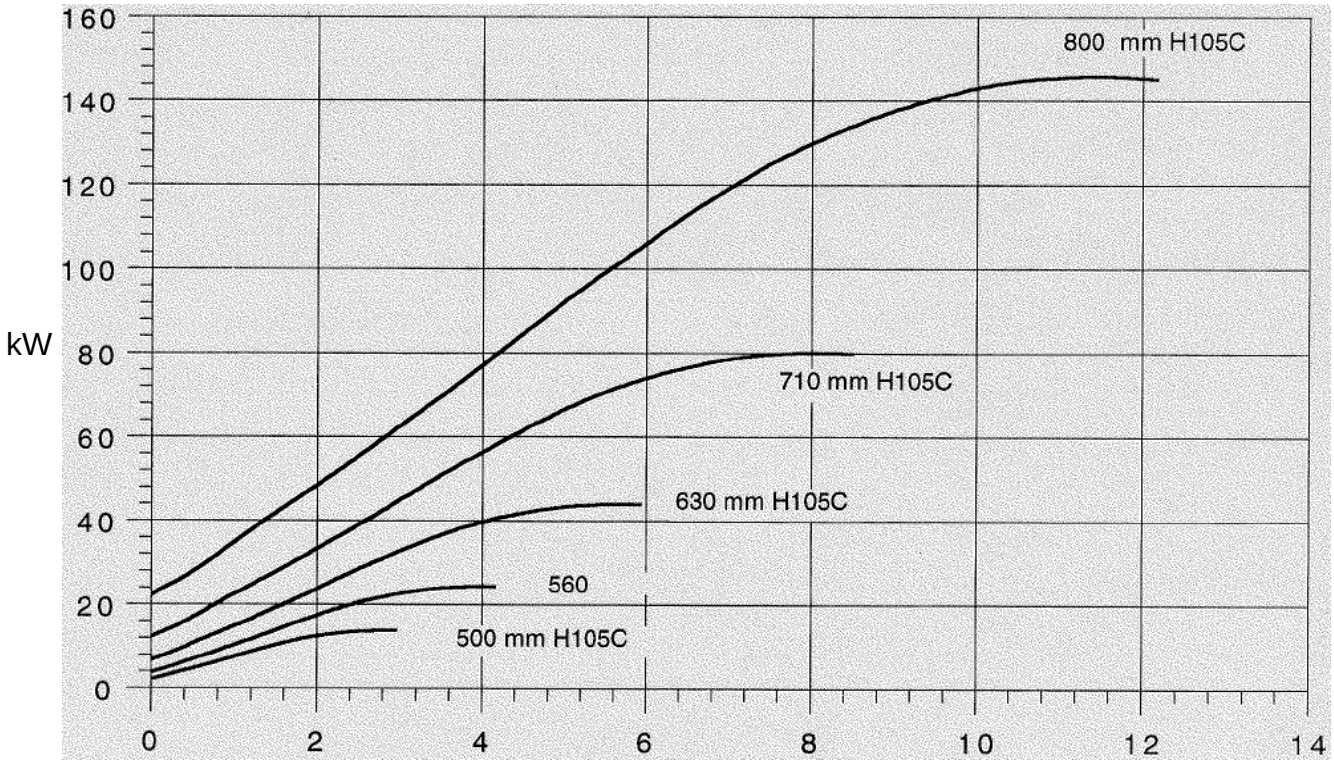
2930 rpm. 20 deg C Air Density 1.200 kg/cu.m

Sizes 500mm to 800mm



Volume Flow Rate (Inlet) cu.m./sec

F.S.P = Fan Static Pressure kW = Fan Shaft Power



Volume Flow Rate (Inlet) cu.m./sec

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Fitzpatrick Industrial Fans