

VCR | Free Standing Centrifugal Fan

MOVING YOUR WAY

CERTIFIED RATINGS



PennBarry certifies that the VCR Backward Inclined and Airfoil Fans shown herein are licensed to bear the AMCA seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.

FANSIZER®

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FanSizer software allows you to select the best centrifugal or axial unit for your application. Input CFM and static pressure, and FanSizer will make the optimum selection. It allows you to complete job schedules which you can store, modify and print in seconds. Features include: on-line help, on-screen product drawings and dimensions, and complete text specifications. In addition, you can convert job schedules to ASCII code for use with other programs like word processing.

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FanCad is a library of drawings for use with computer-aided design (CAD) systems. FanCad's pre-drawn details can save hours of drafting time. Included are all popular PennBarry fans and related items.

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- What's New
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Following publication of this catalog changes may have been made in standard equipment, options and the like that would not be included.

We reserve the right to make changes at any time, without notice, to models, specifications, options, availability, etc.

This bulletin illustrates the appearance of PennBarry products at the time of publication and we reserve the right to make changes in design and construction at anytime without notice. Your local sales representative is the best source for current information.

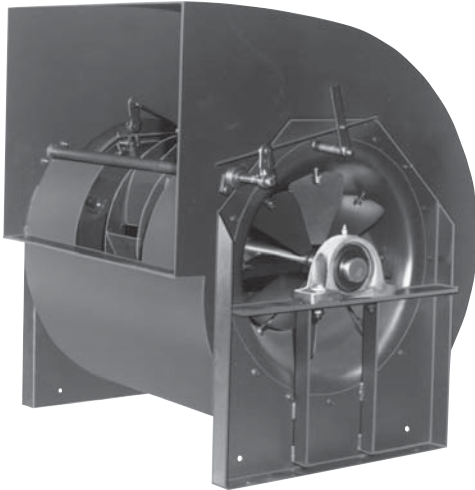
General Information

VCR Fan

PennBarry products are backed by extensive research and testing in an AMCA Accredited Laboratory. These tests assure the customer that PennBarry products are of the highest quality in design, construction and performance. Before leaving the plant, each fan is carefully subjected to a test at the field operating rpm. Dynamic balancing is performed by experienced personnel using electronic equipment to ensure smooth and trouble-free operation.

Commercial

The high volume capacities of the VCR backward inclined and VCR airfoil fans make them excellent for use in hotels, office buildings, manufacturing plants and hospitals. Variable inlet vanes and discharge dampers make it easy to adjust the airflow for the greatest comfort and efficiency.



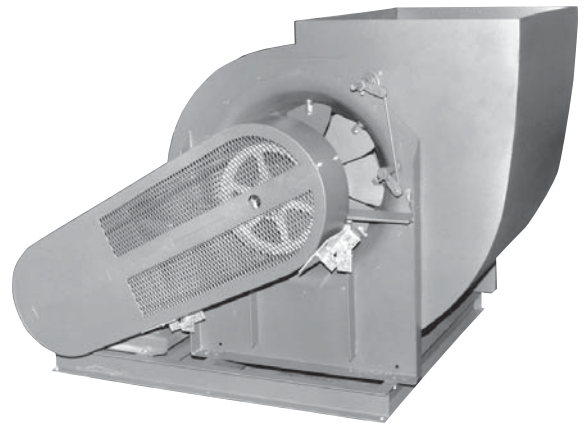
Arrangement 3 DWDI with Vanes

Industrial

PennBarry VCR backward inclined fans are heavy-duty and can handle a variety of atmospheric conditions including fumes, abrasives and high temperatures. Customers from industries as diverse as paper, automotive and textiles have found PennBarry backward inclined fans to be suited for their industrial process applications. Because of their high efficiencies and low sound power levels, these fans are recommended for clean air and lower temperatures only. A wide range of accessories are available to expand the versatility of both fans.

Original Equipment Manufacturers

High quality PennBarry component parts are offered for unitary HVAC and process equipment systems. Available in a variety of materials and wheel diameters, fans and parts can be specially constructed to meet the specifications of HVAC and process equipment. Backward inclined wheels are furnished in diameters from 10.5" to 89" and airfoil wheels are available in 18.25" to 89" diameters.



SWSI on Unitary Base with Variable Inlet Vanes and a Belt Guard

Quality is built into every PennBarry product

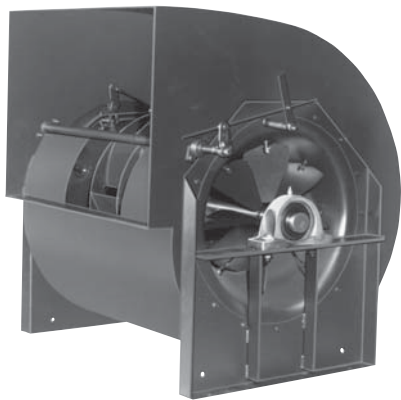
All PennBarry fans are ruggedly built for long, dependable service. VCR fans are no exception. VCR fans offer many construction features not found on other fans.

Housings

VCR housings use heavy-gauge steel, continuously welded to assure no air leakage. They are rigidly braced to prevent vibration and pulsation. Side bracing on most VCR fans is achieved by steel angle which is welded to the fan housing. Class I and II fans, size 660 and larger, and Class III and IV, size 542 and larger, are braced across the scroll with angle or channel. Housings on sizes 105 through 270 are field rotatable.

Bearing Pedestals

Bearing supports are rigid and properly braced to provide a firm foundation for the shaft and bearings. Bearing pedestals for Class I and II VCR fans in Arrangements 1, 9 and 10 through size 600 are the "open" design. The open pedestal weighs less without sacrificing structural integrity. Class I and II fans above size 600 and all Class III and IV fans have the traditional enclosed trapezoidal pedestal constructed of heavy steel plate.

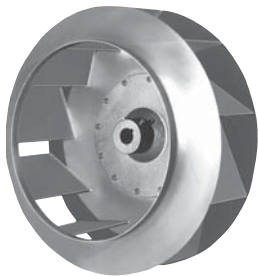


Arrangement 3 DWDI
with "Open" Bearing Pedestal Design

Wheels

VCR fans are available with backward inclined or airfoil wheels on a standard basis. Backward inclined (BI) and Airfoil (AF) type wheels are very efficient and non-overloading.

Backward inclined wheels are designed to provide optimum performance for most operating conditions. The solid, single thickness blades are firmly attached to the backplate using welds. A spun wheel cone is then welded to the blades. The wheel cone is matched to the inlet cone providing the exact overlap to maximize the fan's efficiency. The double width wheel is constructed as one integral assembly.



Single Width
Backward Inclined Wheel

Backward inclined wheels are available in diameters from 10.5" through 89" for air volumes up to

464,000 cfm and static pressure up to 18" W.G. The maximum operating temperature is 1000°F. Standard construction

material is mild steel, but wheels can also be manufactured in aluminum, abrasion resistant steel, stainless steel, Corten and other materials.

Airfoil wheels provide the highest efficiency of all centrifugal fan designs. The blades are die cut and carefully formed to provide aerodynamically efficient airflow into the fan. Double width wheels are constructed as one assembly.

Airfoil wheels can be provided in wheel diameters ranging from 18.25" through 89" for air volumes up to 460,000 cfm and static pressures up to 18" W.G. The maximum operating temperature is 750°F. Mild steel is the standard construction material with aluminum and stainless steel wheels available upon request.

Shafts

Only the finest turned, ground and polished shafting is used in PennBarry VCR fans. First critical shaft speed on Class I and II fans is at least 125% of the fan's maximum operating speed. For all Class III and IV fans the first critical speed is at least 142% of the originally specified operating speed.

Bearings

VCR fans are equipped with heavy-duty, self-aligning pillowblock bearings from the most respected American manufacturers. The most commonly supplied types are single row ball bearings in a one-piece cast iron pillowblock (shown at left), double row spherical roller bearings in a one-piece cast iron pillowblock, and double row spherical roller bearings in a two-piece split pillowblock.



Single Row Ball Bearing

The standard L_{10} bearing life on Class I and II VCR fans is 20,000 hours; optional bearings are available that increase the L_{10} life to 40,000 hours and 80,000 hours. Standard L_{10} bearing life in Class III and IV VCR fans is 40,000 hours, and 80,000 hour bearings are optional.

Balancing

All PennBarry fans are statically and dynamically balanced using precision instruments to guarantee minimum vibration during operation. Each wheel is individually balanced and a final balance test is performed on the completed fan assembly. Before shipment the exact vibration for the entire assembly is recorded on the fan as proof of the final dynamic balance at the factory.

Fan Arrangements

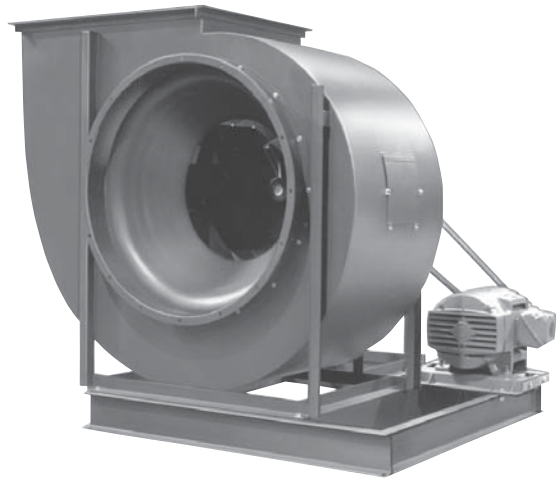
VCR Fan

Arrangement 1

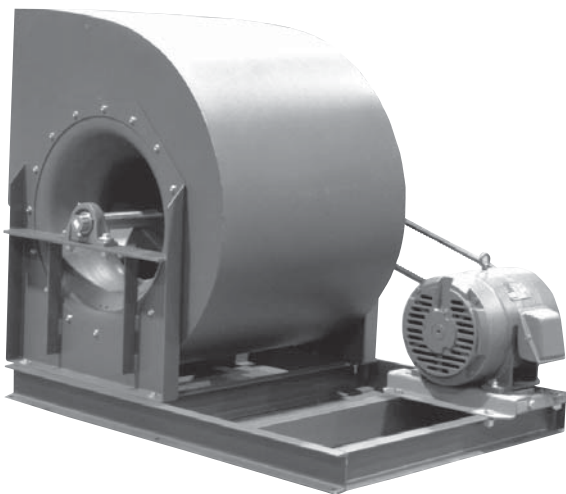
This arrangement is popular for industrial applications and for applications where single width fans are required. Two bearings are mounted on a sturdy pedestal and the fan wheel is overhung into the housing. With appropriate accessories, this fan can handle temperatures up to 1000°F with the backward inclined wheel. Arrangement 1 is suitable for either belt drive or direct drive. It is available for all class VCR fans and all sizes except 105.

Arrangement 3 SWSI

This arrangement is most often used for general air handling and ventilation applications. The fan wheel is suspended between bearings on either side of the fan housing. One bearing is located in the fan inlet and one in the airstream. Arrangement 3 SWSI is suitable for either belt drive or direct drive and is offered for all class VCR fans and all sizes except 105. Maximum operating temperature for Arrangement 3 SWSI fans is limited to 180°F, due to the bearings in the airstream.



Unitary Base Assembly Package
Arrangement 1 Backward Inclined



Arrangement 3 SWSI on Unitary Base

Arrangement 3 DWDI

Double width fans approximately double the air volume capacities of single width fans and allow maximum air handling with minimum unit size. Air enters the fan from both sides, exposing both bearings to the airstream. Arrangement 3 DWDI can be either belt drive or direct drive and is offered on all VCR fans except size 105. Maximum operating temperature is 180°F, due to the bearings in the airstream.

Arrangement 4

On Arrangement 4 fans the fan wheel is mounted directly on the motor shaft. There are no separate fan bearings so the motor bearings carry the full weight of the wheel. Arrangement 4 fans are offered in sizes up to 365 and in Class I, II, or III construction. Maximum operating temperature is 180°F, due to the bearings in the airstream.

Arrangement 7 SWSI & DWDI

These arrangements can be either belt drive or direct drive, but direct drive is more common. Arrangement 7 is very similar to Arrangement 3 except that Arrangement 7 fans have an integral motor mounting pedestal. On single width versions one bearing is in the airstream. On double width fans both bearings are in the airstream. Arrangement 7 is offered for single and double width fans (except size 105) in Class I, II and III. Maximum operating temperature is 180°F, due to the bearings in the airstream.

Arrangement 8

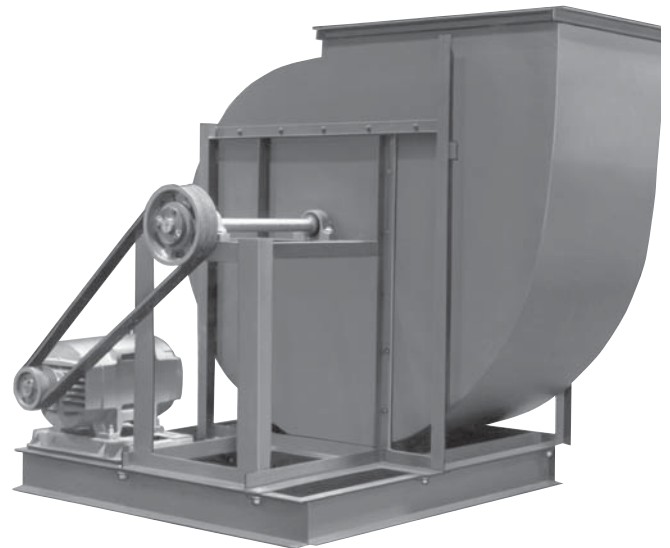
Arrangement 8 is similar to Arrangement 1 with the addition of an integral motor mounting pedestal. Direct drive is the most common version, but belt drive Arrangement 8 VCR fans are also available. This configuration is offered for single width VCR fans (except size 105) in Class I, II and III. With appropriate accessories, this fan can handle temperatures up to 1000°F with the backward inclined wheel.

Arrangement 9

Similar to Arrangement 1, Arrangement 9 is offered for all classes of VCR fans and for all sizes except 105. Arrangement 9 fans are for belt drive only and the motor is mounted on the side of the bearing pedestal. Arrangement 9 is suitable for operating temperatures up to 750°F.

Arrangement 10

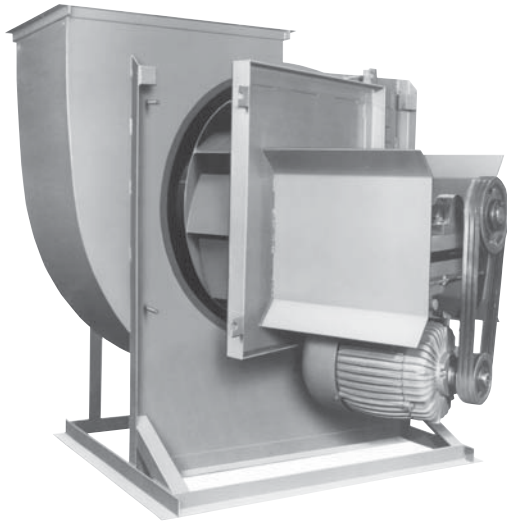
Arrangement 10 is usually used for general ventilation applications. The motor is mounted on the inside of an open type bearing pedestal. This space saving configuration is offered for all Class I, II and III VCR fans. Arrangement 10 can be used for operating temperatures up to 750°F.



Unitary Base Assembly Package
Arrangement 10 Open Jack Stand

Options and Accessories

VCR Fan



SwingOut Fan

SwingOut Fan

PennBarry SwingOut fans offer superior accessibility for air handling systems that must be cleaned or serviced regularly. Ductwork does not need to be disturbed so downtime is minimized.

On a SwingOut fan the entire rotating assembly and power train is mounted on a hinged access door which is reinforced with angle iron framing. Hinges employ ball type thrust bearings to assure proper wheel alignment. Door latches are hand opened without tools. Gaskets on the swing out assembly assure a tight seal.

SwingOut fans are available with backward inclined and airfoil wheels, in wheel diameters from 22 1/4" through 49".

Access Doors



Access doors are designed to provide easy inspection or cleaning of the fan interior and wheel. The standard type door on PennBarry VCR fans is the hinged, quick opening type. Hardware is stainless steel to resist corrosion.

Raised access doors are available for when high operating temperatures require the fan to be insulated. The interior part of the door holds 4" of insulation. To prevent turbulence in the airstream, the inside surface of the raised door is flush with the inside surface of the fan scroll. Like the standard type door, the raised door is hinged and hardware is stainless steel.

Spark Resistant Construction

AMCA Standards define three types of spark resistant construction:

Type A — All parts of the fan in contact with the airstream must be made of non-ferrous material.

Type B — The fan shall have a non-ferrous impeller and non-ferrous ring about the opening through which the shaft passes. Ferrous hubs, shafts, and hardware are allowed if construction is such that a shift of impeller or shaft will not permit two ferrous parts of the fan to rub or strike.

Type C — The fan must be so constructed that a shift of the wheel will not permit two ferrous parts of the fan to rub or strike.

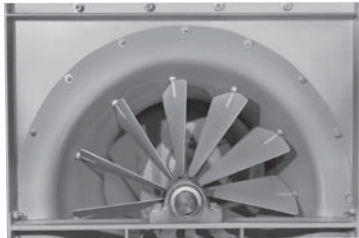
All three types of spark resistant construction are offered on VCR fans. Aluminum and monel are used to manufacture parts that must be non-ferrous. Arrangements 3 and 7 cannot have spark resistant construction because bearings are not allowed in the airstream of spark resistant fans. All airstream accessories must also be non-ferrous on Type A construction.

Drains

Drains are available on all fans except those with bottom horizontal or bottom angular down discharges. Drains are located at the lowest point of the scroll. Standard type is 3/4" NPT external threads.

Variable and Fixed Inlet Vanes

Regulating the airflow at the fan inlet with variable inlet vanes is much more efficient than regulating airflow at the fan discharge with dampers. When inlet vanes are partially closed, incoming air is prespun in the direction of the wheel rotation.



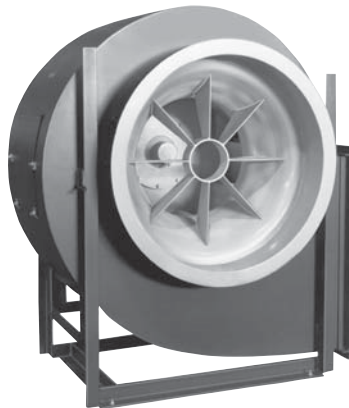
Nestled Inlet Vane

Three types of inlet vanes are offered on VCR fans. Nested variable inlet vanes — mounted within the fan inlet cone—are available on Class I, II, and III fans, size 165 and larger, and on Class IV fans, size 490 and larger.

Externally mounted variable inlet vanes are bolted to the fan's inlet flange. External vanes are available on all class VCR fans and on all sizes except 105.

Fixed inlet vanes—welded to the fan inlet cone—are available on Class 1 and II fans, size 270 through 600.

Standard construction of both nested and external inlet vanes are suitable for operating temperatures to 200°F. Both types feature stainless steel rods and bronze oilite bushings. High temperature inlet vanes, nested and external, can be used up to 600°F. The high temperature design has powdered metal bushings rather than the bronze oilite type. Inlet vanes are suitable for either manual or automatic control.



Fan with Fixed Inlet Vane

Discharge Dampers

Discharge dampers are more heavily constructed than shutters. Dampers can be used to control air in addition to keeping out weather and backdrafts. Both parallel blade and opposed blade types can be supplied. The latter should be specified for most volume control applications, because the opposed blade design distributes airflow more uniformly than the parallel blade design.



Discharge Damper

Discharge dampers are suitable for either manual or automatic control and can be used with all discharge positions. Dampers are flanged on both sides and mount to the discharge flange of the fan. Standard construction can be used when the operating temperature is up to 200°F, but a high temperature design is supplied for temperatures to 600°F.

Belt Guards

The standard, totally enclosed belt guards have a solid sheet metal back and removable front. Belt guards are normally shipped loose with required mounting clips. On Arrangement 9 and 10 fans, when the motor and drive are mounted at the factory, belt guards are shipped mounted on the fan.

Weather Covers

Weather resistant covers enclosing the drive assembly, motor, shaft and bearings are available for Arrangement 10 VCR fans. These covers protect the shaft, bearings and drive from moisture and excessive dirt. Standard weather covers can be used for operating temperatures up to 300°F. Specially vented weather covers are available for temperatures up to 500°F.

Discharge Shutters



Discharge Shutter

Gravity operated discharge shutters open when the fan is running and close when the fan is not running. They shut out weather and backdrafts, but do not control airflow. Motorized shutters are available for tighter shutoff. The gravity shutters are not suitable for downblast or angular down discharge positions. Gravity and motorized shutters are limited to 200°F.

Inlet and Discharge Screens

Screens are recommended whenever there is an unducted inlet or discharge. They protect personnel from injury and guard against foreign objects entering the fan. Inlet screens are heavy-gauge zinc plated steel wire. Discharge screens are heavy-gauge wire.

Options and Accessories

VCR Fan

Inlet Boxes

Inlet boxes are frequently requested for some applications and we offer inlet boxes for both single and double width fans. Inlet boxes are designed to be aerodynamically efficient. On all Arrangement 3 SWSI and Arrangement 3 DWDI fans with inlet boxes, independent bearing pedestals are required because bearings must be mounted outside the inlet box.

Flanges

Discharge flanges, unpunched, are standard equipment on Class I and II VCR fans, size 402 and larger, and on all Class III and IV VCR fans. Discharge flanges are available as options on smaller size Class I and II fans. Inlet flanges are available on all fans, as are companion flanges for inlets and discharges.

Special Coatings

The standard paint on PennBarry VCR fans is a tough, corrosion resistant enamel, but special coatings are often required to protect fans in difficult conditions. Please consult your representative for additional coatings offered.

Bolted Construction

In some cases, especially in retrofit projects, limited space may prevent the installation of a fully assembled fan. For these difficult-to-fit applications, Arrangement 3 fans are offered with totally bolted construction. The housing and frame can be assembled right at the jobsite. Bolted construction is available for all classes in sizes 245 and larger.

Split Housings

To facilitate handling, split housing construction is available on all VCR fans, size 270 and larger. Scroll sections are bolted together and can be easily separated for cleaning or repair. Fans can be split vertically or horizontally. They can have pie splits for wheel removal or they can be split into three sections.

Shaft Seals

Shaft seals are available on all single width VCR fans, and are standard equipment on fans with heat fan packages. The aluminum retainer plate is bolted to the fan housing. A heat resistant material is used for the seal on the standard shaft seal. Neoprene, teflon, and stuffing box shaft seals are also supplied.

Heat Fan Packages

Arrangements 1, 8, 9 and 10 VCR fans in standard construction are suitable for operating temperatures to 300°F. Heat fan packages are available on these arrangements for temperatures of 500°F, 750°F and 1000°F. The 500°F package includes a shaft cooler and guard, a shaft seal, high temperature grease bearings and a motor heat shield on Arrangements 9 and 10. The 750°F package adds high temperature paint. On applications to 1000°F, consult your representative.

Vibration Isolation Equipment

VCR fans can be supplied with vibration rails, unitary bases or inertia frames.

Other Available Extras

Special Bearings - Contact Factory

Scroll Volume Dampers

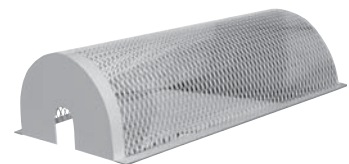
Weep Holes on
Airfoil Blades

Shaft Guards

Narrow Width Fans

Dual Shaft Extensions

Special Nameplates



Shaft Guard

Consult your representative for details.

Dimensional Data for Backward Inclined Fans

VCR Fan

Wheel Weights, WR², Maximum RPM

In selecting small motors for use with relatively large fans, care should be used to ensure sufficient motor torque. The starting torque capability of the motor should be compared to the WR² value for the given fan wheel.

Single Width – Single Inlet

Size	CLASS I				CLASS II				CLASS III				CLASS IV			
	Wheel Weight	① WR ² (lb-ft ²)	② Max. Fan RPM	③ Max. Wheel RPM	Wheel Weight	① WR ² (lb-ft ²)	② Max. Fan RPM	③ Max. Wheel RPM	Wheel Weight	① WR ² (lb-ft ²)	② Max. Fan RPM	③ Max. Wheel RPM	Wheel Weight	① WR ² (lb-ft ²)	② Max. Fan RPM	③ Max. Wheel RPM
105	11	0.80	3820	3920	13	1.1	4391	4417	–	–	–	–	–	–	–	–
122	13	1.65	3195	3663	18	2.5	4168	4729	22	2.8	5241	5645	25	3.3	5760	6435
135	15	2.45	2895	3166	21	3.7	3786	4080	26	4.2	4774	5562	29	4.8	5222	5562
150	19	3.95	2589	2858	25	5.5	3384	3871	30	6.2	4288	4749	33	7.0	4707	4749
165	27	6.5	2376	2797	33	8.7	3100	3611	36	9.1	3887	4117	40	10.5	4276	4796
182	33	10.5	2084	2405	40	13.0	2722	3104	42	13.6	3425	3539	57	17.0	3763	4123
200	39	15.0	1904	2096	49	19.5	2475	2706	52	20.9	3121	3594	65	24.0	3434	3594
222	64	27.5	1708	1786	73	33.0	2228	2306	82	38.0	2810	3063	106	46.0	3083	3943
245	73	39.0	1551	1996	83	46.0	2028	2275	110	57.5	2555	2650	132	73.0	2801	3413
270	84	56.0	1384	1725	97	68.0	1803	1967	128	81.5	2276	2950	158	108.0	2540	2950
300	703	89.0	1247	1473	118	106.0	1622	1697	149	127.0	2049	2519	184	160.0	2288	2519
330	135	128.0	1131	1277	150	151.0	1470	1696	177	188.0	1864	2183	217	233.0	2078	2183
365	169	212.0	1011	1098	196	238.0	1322	1458	232	308.0	1669	1877	292	378.0	1882	2186
402	257	353.0	914	948	287	414.0	1201	1259	320	480.0	1512	1621	394	590.0	1696	1888
445	294	505.0	832	929	331	590.0	1086	1083	392	700.0	1368	1394	457	850.0	1537	1624
490	335	722.0	752	937	402	860.0	985	1207	453	1010.0	1240	1406	530	1220.0	1397	1532
542	530	1310.0	679	804	584	1510.0	889	1036	679	1875.0	1122	1207	705	1930.0	1257	1315
600	644	2055.0	618	754	684	2220.0	802	1037	790	2720.0	1015	1037	858	2960.0	1125	1130
660	743	3040.0	562	653	790	3190.0	729	899	924	3930.0	922	980	1120	4370.0	974	980
730	926	4700.0	507	562	996	5170.0	657	773	1091	5800.0	832	842	1295	6400.0	937	1028
807	1170	7500.0	453	589	1256	8200.0	558	664	1405	8700.0	732	786	1527	9450.0	848	884
890	1385	11150.0	416	509	1488	12000.0	543	574	1648	12750.0	625	713	1788	13600.0	764	764

Double Width – Double Inlet

Size	CLASS I				CLASS II				CLASS III				CLASS IV			
	Wheel Weight	① WR ² (lb-ft ²)	② Max. Fan RPM	③ Max. Wheel RPM	Wheel Weight	① WR ² (lb-ft ²)	② Max. Fan RPM	③ Max. Wheel RPM	Wheel Weight	① WR ² (lb-ft ²)	② Max. Fan RPM	③ Max. Wheel RPM	Wheel Weight	① WR ² (lb-ft ²)	② Max. Fan RPM	③ Max. Wheel RPM
122	20	2.7	3495	3663	27	4.0	4730	4729	35	4.6	5753	5645	40	5.5	-	6435
135	23	4.0	3167	3166	37	6.1	4294	4080	40	7.0	5238	5562	44	8.1	-	5562
150	28	6.3	2830	2858	42	9.0	3871	3871	52	10.5	4687	4749	58	12.1	-	4749
165	44	10.5	2590	2797	58	14.3	3518	3611	73	16.0	4278	4117	80	18.7	-	4796
182	56	17.5	2100	2405	68	20.3	2731	3104	84	23.7	3465	3539	95	28.5	3746	4123
200	63	24.8	1923	2096	95	33.5	2504	2706	100	36.3	3114	3594	110	40.5	3746	3594
222	114	43.0	1725	1786	131	54.0	2252	2306	143	61.0	2821	3063	170	77.0	2884	3943
245	127	61.0	1563	1996	146	75.0	2030	2275	177	94.0	2565	2650	207	118.0	2803	3413
270	144	88.0	1180	1725	170	112.0	1844	1967	207	133.0	2303	2950	242	176.0	2529	2950
300	174	143.0	1264	1473	212	178.0	1660	1697	239	210.0	2091	2519	313	268.0	2267	2519
330	210	211.0	1151	1277	250	259.0	1506	1696	315	318.0	1893	2183	400	410.0	2078	2183
365	270	388.0	1056	1098	312	385.0	1391	1458	380	490.0	1735	1877	476	630.0	1880	2186
402	393	570.0	948	948	435	650.0	1247	1259	483	755.0	1575	1621	555	915.0	1698	1888
445	449	820.0	866	929	503	945.0	1130	1083	562	1100.0	1414	1394	650	1330.0	1545	1624
490	515	1180.0	784	937	583	1380.0	1026	1207	656	1600.0	1294	1406	768	1940.0	1386	1532
542	806	2050.0	706	804	885	2340.0	926	1036	1072	2980.0	1166	1207	1100	3070.0	1258	1315
600	998	3310.0	643	754	1036	3470.0	835	1037	1240	4300.0	1056	1037	1300	4600.0	1128	1130
660	1151	5050.0	585	653	1225	5000.0	761	899	1445	6300.0	961	980	1520	6650.0	977	980
730	2135	8950.0	528	562	2270	9900.0	688	773	2500	10800.0	868	842	2560	11300.0	933	1028
807	2450	13000.0	477	589	2620	14500.0	618	664	2800	15400.0	782	786	2900	16000.0	849	884
890	2750	18400.0	432	509	3000	20500.0	564	574	3170	22000.0	713	713	3300	23000.0	750	764

① WR² is for complete rotating assembly. See Engineering Data 16000.

② Maximum fan RPM is based on AMCA Fan Class Operating Limits (see page 107) – See Catalog Tabular Data.

③ Maximum wheel RPM to be used for high temperature/material derate – see page 111.

NOTES: On Class I, II and III fans, shaft and bearing sizes are based on the fan's maximum cataloged operating speed. Since "Class IV" is not defined by AMCA, shaft and bearing sizes on "Class IV" fans are designed to meet or exceed specified conditions.

Dimensional Data for Airfoil Fans

VCR Fan

Wheel Weights, WR², Maximum RPM

In selecting small motors for use with relatively large fans, care should be used to ensure sufficient motor torque. The starting torque capability of the motor should be compared to the WR² value for the given fan wheel.

Single Width – Single Inlet

Size	CLASS I				CLASS II				CLASS III				CLASS IV			
	Wheel Weight	WR ² (lb-ft ²) ^①	Max. Fan RPM	Max. Wheel RPM	Wheel Weight	WR ² (lb-ft ²) ^①	Max. Fan RPM	Max. Wheel RPM	Wheel Weight	WR ² (lb-ft ²) ^①	Max. Fan RPM	Max. Wheel RPM	Wheel Weight	WR ² (lb-ft ²) ^①	Max. Fan RPM	Max. Wheel RPM
182	38	11.3	2256	2339	39	11.3	2959	3039	54	16.7	3735	3818	74	22.7	4071	4079
200	46	16.2	2077	2135	46	16.2	2703	2773	64	25.7	3409	3483	85	32.0	3714	3728
222	69	27.3	1875	1919	69	27.4	2413	2493	96	43.8	3065	3131	118	48.8	3341	3344
245	78	38.3	1691	1742	79	38.5	2199	2264	123	62.7	2780	2844	148	78.5	3038	3042
270	101	63.0	1479	1545	102	63.5	1928	2007	144	87.0	2423	2524	178	110.0	2748	2756
300	124	100.0	1328	1390	125	101.0	1730	1806	169	139.0	2182	2271	210	175.0	2479	2480
330	158	144.0	1209	1264	159	145.0	1579	1642	193	201.0	1984	2065	247	254.0	2250	2254
365	184	211.0	1073	1124	185	212.0	1401	1458	255	319.0	1759	1833	322	390.0	2038	2039
402	297	387.0	972	1119	298	388.0	1264	1322	372	536.0	1598	1662	431	602.0	1847	1848
445	343	558.0	882	922	345	562.0	1150	1196	453	784.0	1447	1503	502	873.0	1667	1673
490	397	808.0	799	837	419	816.0	1043	1086	525	1110.0	1314	1365	578	1248.0	1516	1517
542	575	1319.0	719	756	606	1422.0	940	981	730	1889.0	1186	1233	786	2038.0	1361	1364
600	657	1891.0	651	683	697	2048.0	847	887	851	2740.0	1071	1115	954	3150.0	1237	1241
660	753	2793.0	594	621	805	3030.0	769	806	991	3940.0	972	1013	1233	4548.0	1124	1127
730	939	4280.0	537	562	943	4300.0	700	729	1173	5827.0	879	916	1473	6888.0	1012	1018
807	1277	7562.0	484	508	1283	7598.0	631	659	1506	8733.0	796	828	1728	10154.0	920	922
890	1514	11088.0	440	461	1521	11141.0	575	598	1683	12765.0	723	751	2031	14826.0	834	836

Double Width – Double Inlet

Size	CLASS I				CLASS II				CLASS III				CLASS IV			
	Wheel Weight	WR ² (lb-ft ²) ^①	Max. Fan RPM	Max. Wheel RPM	Wheel Weight	WR ² (lb-ft ²) ^①	Max. Fan RPM	Max. Wheel RPM	Wheel Weight	WR ² (lb-ft ²) ^①	Max. Fan RPM	Max. Wheel RPM	Wheel Weight	WR ² (lb-ft ²) ^①	Max. Fan RPM	Max. Wheel RPM
182	62	18.3	2285	2339	66	18.4	2949	3039	108	31.8	3720	3818	128	39.8	4067	4079
200	72	26.1	2086	2135	89	27.1	2694	2773	126	46.2	3401	3483	147	56.0	3712	3728
222	122	43.0	1872	1919	122	43.4	2416	2493	171	73.4	3049	3131	191	83.2	3313	3344
245	137	60.0	1691	1742	137	61.2	2197	2264	202	105.0	2776	2844	237	131.0	3025	3042
270	167	97.0	1473	1545	168	97.5	1911	2007	235	146.0	2409	2524	278	182.0	2747	2756
300	203	157.0	1330	1390	211	159.0	1719	1806	276	236.0	2164	2271	360	299.0	2474	2480
330	242	230.0	1202	1264	250	232.0	1564	1642	353	346.0	1972	2065	455	456.0	2352	2254
365	279	333.0	1080	1124	287	337.0	1406	1458	421	522.0	1758	1833	529	662.0	1960	2039
402	417	608.0	980	1119	419	611.0	1263	1322	577	879.0	1586	1662	615	958.0	1781	1848
445	516	887.0	884	922	519	891.0	1146	1196	667	1283.0	1421	1503	721	1358.0	1670	1673
490	600	1291.0	805	837	603	1298.0	1040	1086	788	1857.0	1308	1365	846	2020.0	1495	1517
542	883	2084.0	725	756	915	2191.0	938	981	1160	3042.0	1178	1233	1222	3303.0	1340	1364
600	1008	3009.0	657	683	1050	3172.0	850	887	1346	4417.0	1071	1115	1463	4938.0	1273	1241
660	1155	4504.0	596	621	1235	4762.0	772	806	1560	6364.0	974	1013	1702	7105.0	1110	1127
730	2222	8274.0	520	562	2232	8313.0	699	729	2665	10904.0	879	916	2892	12399.0	1007	1018
807	2732	13335.0	486	508	2744	13398.0	631	659	3000	15652.0	794	828	3282	17683.0	921	922
890	3070	18776.0	441	461	3085	18865.0	571	598	3413	21972.0	717	751	3742	25215.0	834	836

① WR² is for complete rotating assembly. See Engineering Data 16000.

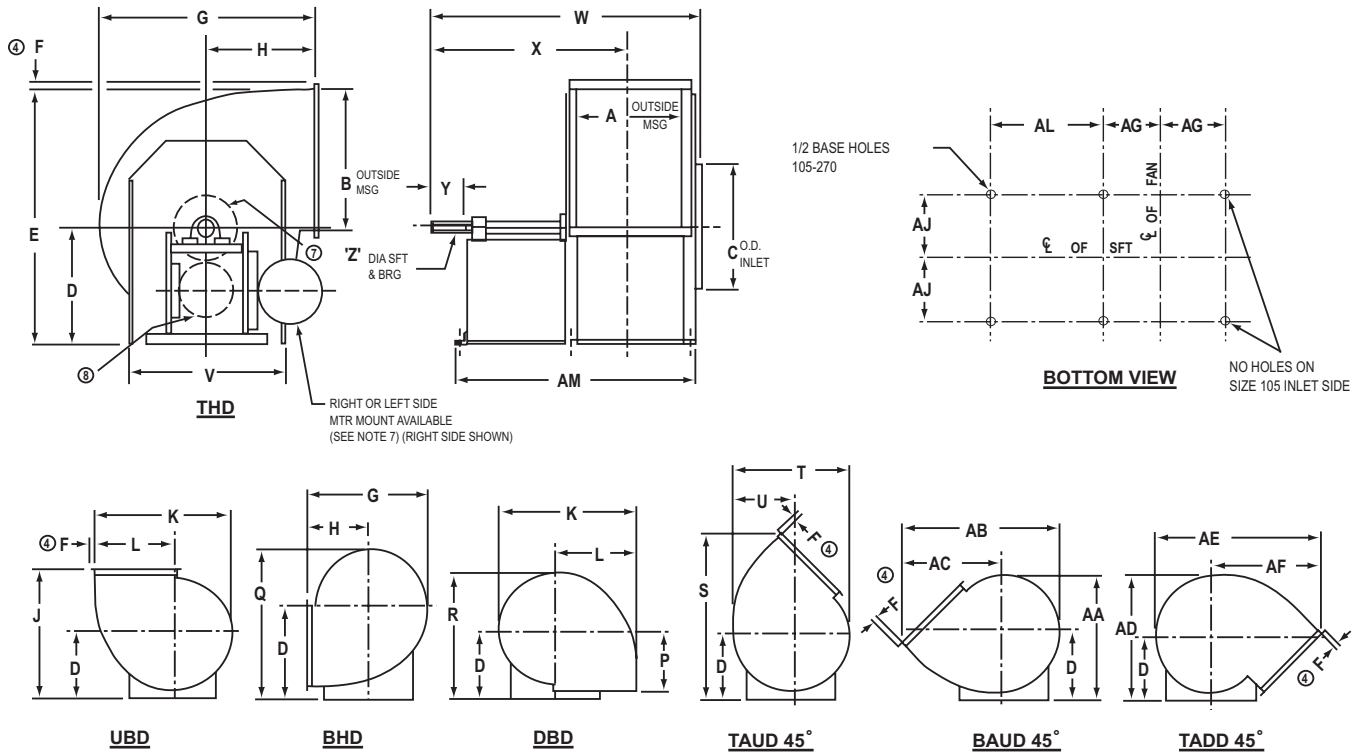
② Maximum fan RPM is based on AMCA Fan Class Operating Limits (see page 107) – See Catalog Tabular Data.

③ Maximum wheel RPM to be used for high temperature/material derate – see page 111.

NOTES: On Class I, II and III fans, shaft and bearing sizes are based on the fan's maximum cataloged operating speed. Since "Class IV" is not defined by AMCA, shaft and bearing sizes on "Class IV" fans are designed to meet or exceed specified conditions.

VCR Dimensional Data

BI & AF – Arrangement 1, 4, 9 & 10, SWSI, Class I & II



Notes

- CW rotation shown; CCW rotation similar but opposite.
- AF available in sizes 182 through 270.
- BI available in sizes 105 through 270.
- Discharge angles optional on all sizes. (Hole punching optional on all sizes.)
- On specific sales orders, see Fan Data Schedule for performance and accessory information.
- On Arrangement 9, the standing motor position is left side for CW units and right side for CCW units.
- Dimensions for Arrangement 4 are the same as shown except motor is mounted on pedestal in lieu of shaft and bearings.
- On Arrangement 10, the motor is located within the pedestal.
- Housing is field rotatable to the discharges shown.
- Unit size 105 has no inlet stand.

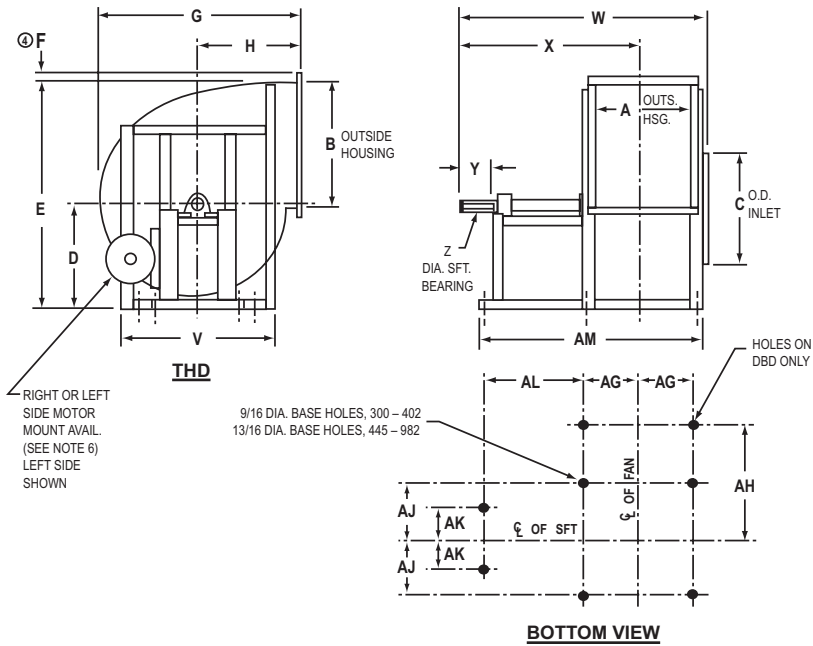
Size	A	B	C	"D" Centerline of Fan						E	④ F	G	H	J	K	L	P	Q	R	S	T
				THD	UBD	BHD	DBD	TAUD	BAUD												
105	8 3/8	11 3/16	11 1/8	18	18	18	18	18	18	29 1/8	1 1/4	17 11/16	8 5/8	26 5/8	19 1/8	11 1/8	8 5/8	26	27 1/16	32	17
122	9 3/4	13	13 1/4	20	20	20	20	20	20	32 15/16	1 1/4	20 13/16	10 1/4	30 1/4	22 1/4	12 15/16	10 1/4	29 5/16	30 9/16	36 7/16	19 7/8
135	10 13/16	14 5/16	14 9/16	20	20	20	20	20	20	34 1/4	1 1/4	22 7/8	11 1/4	31 1/4	24 1/2	14 1/4	11 1/4	30 1/4	31 5/8	38	21 7/8
150	11 15/16	15 7/8	16 3/16	22	22	22	22	22	22	37 13/16	1 1/4	25 7/16	12 1/2	34 1/2	27 1/4	15 13/16	12 1/2	33 7/16	34 15/16	42	24 5/16
165	13 3/16	17 3/8	17 3/4	23	23	23	23	23	23	40 5/16	1 1/4	28	13 3/4	36 3/4	29 7/8	17 5/16	13 3/4	35 9/16	37 1/4	45	26 3/4
182	14 3/8	19 3/8	19 1/2	23	23	23	23	23	23	42 5/16	1 1/4	30 3/16	14 1/2	37 1/2	33 1/8	19 5/16	14 1/2	36 13/16	38 11/16	46 15/16	29 5/8
200	16	21 1/4	21 3/8	26	26	26	26	26	26	47 3/16	1 1/4	32 7/8	15 5/8	41 5/8	36 3/8	21 3/16	15 5/8	41 3/16	43 1/4	52 1/16	32 1/2
222	17 1/2	23 5/8	23 3/4	26	26	26	26	26	26	49 9/16	1 1/4	36 5/8	17 1/2	43 1/2	40 7/16	23 9/16	17 1/2	42 7/8	45 1/8	55	36
245	19 1/2	25 15/16	26 1/16	28	28	28	28	28	28	53 7/8	1 1/4	40 5/16	19 1/4	47 1/4	44 7/16	25 7/8	19 1/4	46 9/16	49 1/16	60	39 3/4
270	21 9/16	28 5/8	28 1/2	31	31	31	31	31	31	59 9/16	1 1/4	44 5/16	21 1/8	52 1/8	49	28 9/16	21 1/8	51 7/16	54 3/16	67	43 3/4

Size	U	V	W	X	Y	Z - CLASS I		Z - CLASS II		AA	AB	AC	AD	AE	AF	AG	AJ	AL	AM	Max Mtr. Frame ARR. 9 & 10
						SFT	KWY	SFT	KWY											
105	9 9/16	13 7/16	25 9/16	20 1/16	2	1	1/4 x 1/8	-	-	25 7/16	22 1/2	14	27 9/16	24 3/8	15 7/8	5 1/16	6 1/8	13 1/2	24 5/8	145T
122	11 3/16	17 3/16	32	23 7/8	2 1/2	1	1/4 x 1/8	1 3/16	1/4 x 1/8	28 11/16	26 3/8	16 7/16	31 3/16	31 11/16	21 3/4	5 7/8	7 3/4	16	29	184T
135	12 5/16	17 11/16	33 1/8	24 7/16	2 1/2	1	1/4 x 1/8	1 3/16	1/4 x 1/8	29 9/16	28 15/16	18	32 5/16	34 5/16	23 3/8	6 7/16	7 3/4	16	30 1/8	184T
150	13 11/16	19 11/16	37 3/4	28 1/2	3	1	1/4 x 1/8	1 3/16	1/4 x 1/8	32 5/8	32 3/16	20	35 11/16	37 7/16	25 1/4	6 15/16	8 3/4	19	34 1/8	213T
165	15 1/16	20 11/16	39	29 1/8	3	1 3/16	1/4 x 1/8	1 7/16	3/8 x 3/16	34 11/16	35 3/8	22	38 11/16	40 3/8	27	7 9/16	9 1/4	19	35 3/8	215T
182	16 5/8	22 11/16	41 1/8	30 3/16	3 1/2	1 3/16	1/4 x 1/8	1 7/16	3/8 x 3/16	36	38 11/16	23 15/16	39 5/8	44 1/8	29 3/8	8 3/16	9 1/4	19	36 5/8	215T
200	18 1/4	25 3/16	47 3/4	36	3 1/2	1 3/16	1/4 x 1/8	1 7/16	3/8 x 3/16	40 1/4	42 1/4	26 1/16	44 1/4	47 5/8	31 7/16	9 1/4	11	24	44 1/4	254T
222	20 3/8	27 3/16	49 1/2	37	4	1 7/16	3/8 x 3/16	1 11/16	3/8 x 3/16	41 5/8	47	29	46 3/8	52 1/2	34 1/2	10	11	24	45 3/4	254T
245	22 3/8	29 15/16	53	39 1/2	4 1/2	1 7/16	3/8 x 3/16	1 11/16	3/8 x 3/16	45 3/8	51 3/4	32	50 3/8	57 7/16	37 5/8	11	12	25	48 3/4	256T
270	24 3/4	33 3/16	55 1/8	40 9/16	4 1/2	1 7/16	3/8 x 3/16	1 11/16	3/8 x 3/16	50	56 15/16	35 1/8	55 3/4	62 7/16	40 5/8	12	12 1/2	25	50 3/4	256T

TOLERANCE ± 1/8 Not to be used for construction. Certified drawings available upon request.

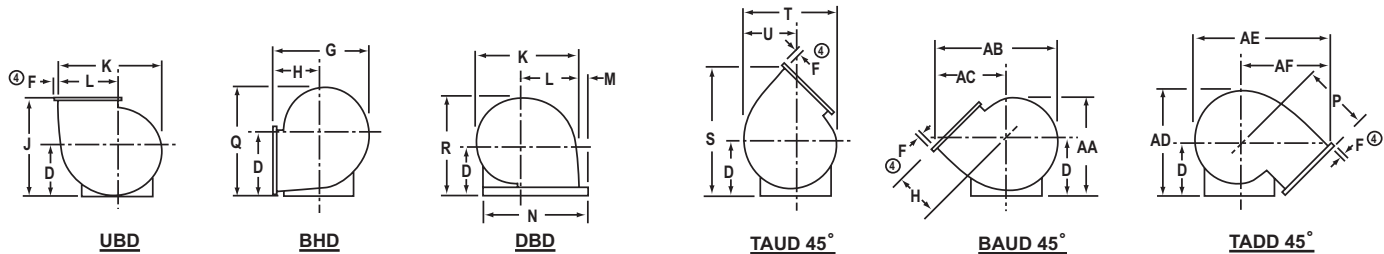
VCR Dimensional Data

BI & AF – Arrangement 1, 4, & 9, SWSI, Class I & II



Notes

1. CW rotation shown; CCW rotation similar but opposite.
2. AF available in sizes 300 through 890.
3. BI available in sizes 300 through 890.
4. Discharge angles standard on sizes 402 thru 890 only. (Hole punching optional on all sizes.)
5. On specific sales orders, see Fan Data Schedule for performance and accessory information.
6. On Arrangement 9, the standing motor position is left side for CW units and right side for CCW units.
7. Dimensions for Arrangement 4 through size 365 are the same as shown except motor is mounted on pedestal in lieu of shaft and bearings.
8. On DBD sizes 300 through 890, discharge is extended to base.



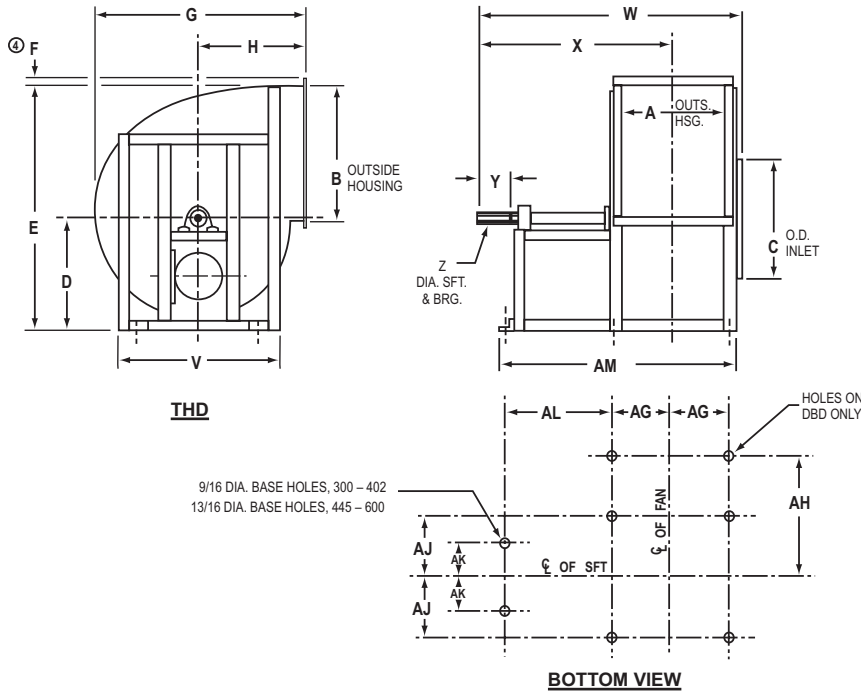
Size	"D" Centerline of Fan									E	F	G	H	J	K	L	M	N	P	Q	R	S	
	THD	UBD	BHD	DBD	TAUD	BAUD	TADD																
300	23 11/16	31 13/16	31 5/8	27	27	35	27	27	35	27	58 3/4	1 1/2	49 1/4	23 7/16	50 7/16	54 1/2	31 3/4	2 1/2	54 3/4	32 7/16	57 3/4	52 13/16	66 1/8
330	26 1/4	34 15/16	34 3/4	27	35	38	27	35	38	35	61 7/8	1 1/2	54 3/16	25 13/16	60 13/16	59 7/8	34 7/8	2 1/2	59 7/8	34 9/16	63	55 3/8	77 7/8
365	28 7/8	38 11/16	38 1/2	35	35	41	35	35	41	35	73 5/8	1 1/2	60 1/8	28 5/8	63 5/8	66 5/16	38 5/8	2 1/2	65 1/8	37 1/8	68 11/16	66 1/2	82 5/8
402	32 1/16	42 9/16	42 7/16	37	37	45 1/2	37	37	45 1/2	37	79 1/2	2	66 11/16	32	69	73 1/16	42 1/2	2 1/2	71	41	76 1/16	71 11/16	89 3/8
445	35 1/4	47 3/16	46 7/8	37	41	50	37	41	50	37	84 1/16	2	72 1/8	33 3/4	74 3/4	80 7/8	47 1/16	3	78 7/8	44	83 13/16	75 3/8	98 1/4
490	39	51 13/16	51 5/8	39	44	55	39	44	55	39	90 3/4	2	79 11/16	37 1/2	81 1/2	88 7/8	51 3/4	3	85 3/4	47 3/4	92 1/8	81 3/16	107 1/8
542	42 3/4	57 7/16	57 1/8	44	49	60	44	49	60	44	101 3/8	2	87 1/4	40 1/2	89 1/2	98 9/16	57 3/8	4	95 7/8	51 3/4	101 3/16	90 3/4	118 1/4
600	47 3/8	63 7/16	63 1/8	48	54	66 1/2	48	54	66 1/2	48	111 3/8	2	96 3/16	44 1/2	98 1/2	108 7/8	63 3/8	4	104 7/8	56	112	99 11/16	130 3/8
660	52 1/2	69 13/16	69 3/8	52 1/2	59	73 1/4	49	55 3/4	63	49 1/2	122 1/4	2 1/2	105 3/4	49	108	119 5/8	69 3/4	5	114 3/4	61 1/2	123 1/8	105 3/4	139 3/4
730	57 7/8	77 1/4	76 3/4	57	64 1/2	80 3/4	57 3/4	61 3/4	69 1/2	54 1/4	134 1/8	2 1/2	120 5/8	57 3/4	122 1/4	132 1/2	77 1/8	5	126 1/8	67	136 1/8	120 5/8	157 1/8
807	63 13/16	85 7/16	84 7/8	63	72	89	63 3/4	67 1/2	76 1/2	59 1/2	148 5/16	2 1/2	133 5/16	63 3/4	135 3/4	146 9/16	85 5/16	5	138 1/8	72 3/4	150 1/4	133 5/16	172 7/8
890	70 1/8	94 1/4	93 3/8	69 1/4	78 1/4	97 3/4	70 1/2	73 3/4	85	65 1/2	163 3/8	2 1/2	147 1/8	70 1/2	148 3/4	161 5/8	94 1/8	5	152 3/8	85	165 1/4	147 1/8	190 1/4

Size	T	U	V	W	X	Y	Z - CLASS I				Z - CLASS II				AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	Max. Mtr. Frame ARR. 9 & 10
							SFT		KWY		SFT		KWY														
							ODP & TEFC																				
300	48 3/4	27 1/2	41	63 3/8	45 7/8	5 1/2	1 11/16	3/8 x 3/16	1 15/16	1/2 x 1/4	56 1/4	63 5/16	39	54 1/2	69 5/8	45 1/4	13 1/4	33 1/8	16 3/8	13 3/8	28	56 3/4	284T				
330	53 1/2	30 1/4	45	64 7/8	47 1/8	5 1/2	1 11/16	3/8 x 3/16	1 15/16	1/2 x 1/4	61 1/4	69 9/16	42 7/8	65 1/4	75 5/8	49	14 1/2	36 1/4	18 3/8	13 3/8	28	59 1/4	286T				
365	59 1/2	33 1/2	48	68	48 7/16	5 1/2	1 11/16	3/8 x 3/16	1 15/16	1/2 x 1/4	67	77 1/8	48 1/2	83 1/8	53 1/2	15 13/16	40	19 7/8	13 3/8	28	61 7/8	286T					
402	65 1/2	37	52	73 3/4	53 1/16	5 1/2	1 15/16	1/2 x 1/4	2 3/16	1/2 x 1/4	74	85 1/4	52 5/8	74	91 5/8	59	17 7/16	43 7/8	21 7/8	14 3/8	31	68 1/8	326T				
445	72 3/8	40 7/8	57 1/2	77 3/8	54 5/8	5 1/2	2 3/16	1/2 x 1/4	2 7/16	5/8 x 5/16	81 1/2	93 1/4	57 1/8	77 7/8	100 3/4	64 5/8	19 1/4	48 3/4	23 7/8	15 5/8	31	72 1/4	326T				
490	79 5/8	44 7/8	62	85 5/8	60	6	2 3/16	1/2 x 1/4	2 7/16	5/8 x 5/16	89 3/4	102 7/8	63 1/8	83 7/8	110 3/8	70 5/8	21 1/8	53 3/8	26 1/8	16 5/8	34	79	364T				
542	88 1/4	49 3/4	69	92 3/8	64 7/8	6	2 7/16	5/8 x 5/16	2 11/16	5/8 x 5/16	98 1/2	113 1/4	69 1/4	93 3/4	121	77	23 1/2	59 1/2	28 5/8	18 1/8	37	87 3/4	365T				
600	97 1/2	55	75	98 1/4	68 7/16	7	2 7/16	5/8 x 5/16	2 11/16	5/8 x 5/16	109	124 7/8	76 1/4	103	133	84 3/8	25 13/16	65 1/2	31 5/8	18 1/8	37	92 3/8	404T				
660	107	60 1/2	80	104 3/4	72 1/2	7	2 7/16	5/8 x 5/16	2 15/16	3/4 x 3/8	109 1/2	137 3/8	84	110	146 1/8	92 3/4	28 7/8	72 3/8	33 1/8	33 1/8	39	10 11/2	444T				
730	118 5/8	67	88	113 3/4	78 13/16	7 1/2	2 11/16	5/8 x 5/16	3 7/16	7/8 x 7/16	121 1/8	154 1/2	95 3/8	121 1/4	161 1/8	102	31 9/16	79 3/4	37 1/8	37 1/8	42	109 7/8	445T				
807	130 7/8	73 3/4	95 1/2	123 1/4	85 5/16	8	2 15/16	3/4 x 3/8	3 7/16	7/8 x 7/16	133 5/8	170 5/8	105 3/8	133 1/4	176 7/8	111 5/8	34 9/16	87 15/16	40 7/8	40 7/8	45	118 7/8	445T				
890	144 5/8	81 5/8	106 1/2	132 1/2	91 7/16	8	3 7/16	7/8 x 7/16	3 7/16	7/8 x 7/16	148	188 1/2	116 1/2	147 1/8	198 7/8	126 7/8	37 11/16	96 3/8	46 3/8	46 3/8	48	128 1/8	445T				

TOLERANCE ± 1/8 Not to be used for construction. Certified drawings available upon request.

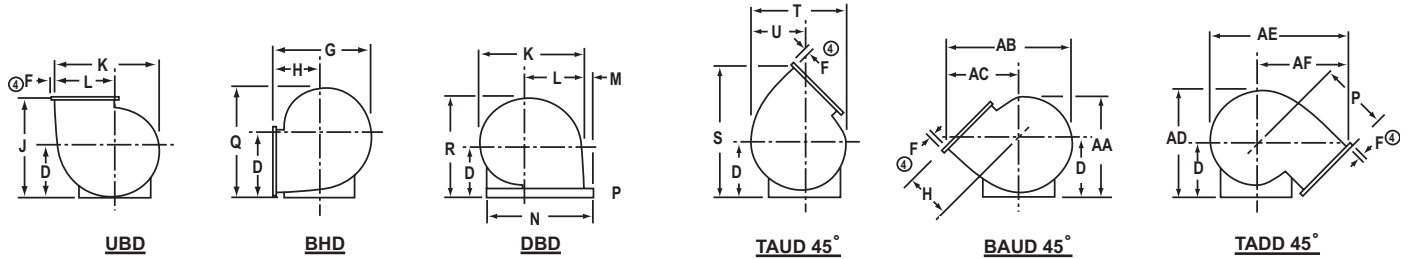
VCR Dimensional Data

BI & AF – Arrangement 10, SWSI, Class I & II



Notes

1. CW rotation shown; CCW rotation similar but opposite.
2. AF available in sizes 300 through 600.
3. BI available in sizes 300 through 600.
4. Discharge angles standard on sizes 402 through 600 only. (Hole punching optional on all sizes.)
5. On specific sales orders, see Fan Data Schedule for performance and accessory information.
6. On DBD sizes 300 through 600, discharge is extended to base.



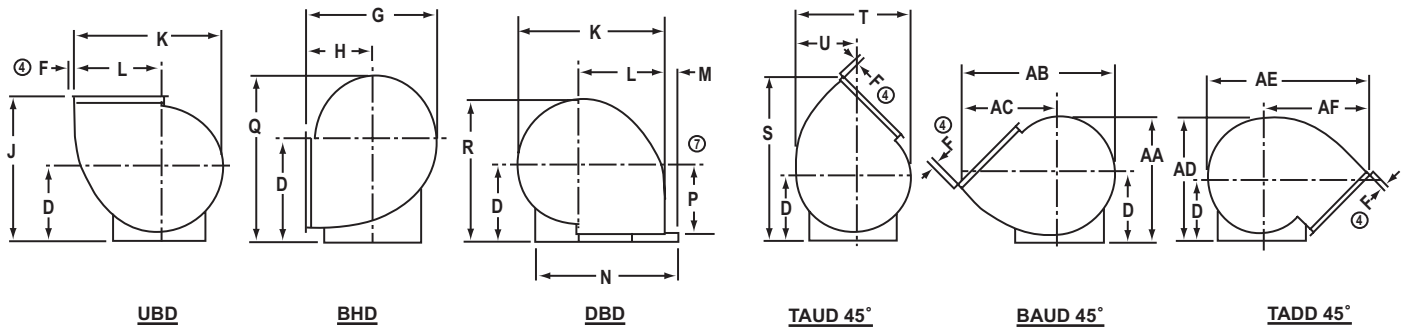
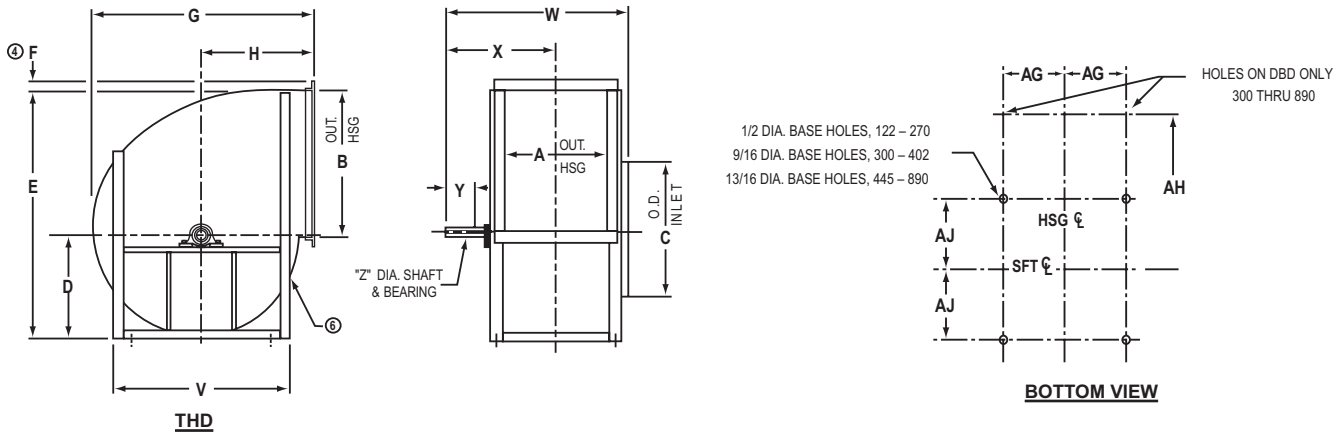
Size	A	B	C	"D" Centerline of Fan								E	F	G	H	J	K	L	M	N	P	Q	R	S
				THD	UBD	BHD	DBD	TAUD	BAUD	TADD														
300	23 11/16	31 13/16	31 5/8	35	35	35	35	35	35	35	66 3/4	1 1/2	49 1/4	23 7/16	58 7/16	54 1/2	31 3/4	2 1/2	54 3/4	32 7/8	57 3/4	60 13/16	74 1/8	
330	26 1/4	34 15/16	34 3/4	35	35	38	35	35	38	35	69 7/8	1 1/2	54 3/16	25 13/16	60 13/16	59 7/8	34 7/8	2 1/2	59 7/8	34 9/16	63	63 3/8	77 7/8	
365	28 7/8	38 11/16	38 1/2	35	35	41	35	35	41	35	73 5/8	1 1/2	60 1/8	28 5/8	63 5/8	66 5/16	38 5/8	2 1/2	65 1/8	37 1/8	68 11/16	66 1/2	82 5/8	
402	32 1/16	42 9/16	42 7/16	37	37	45 1/2	37	37	45 1/2	37	79 1/2	2	66 11/16	32	69	73 1/16	42 1/2	2 1/2	71	41	76 1/16	71 11/16	89 3/8	
445	35 1/4	47 3/16	46 7/8	41	41	50	41	41	50	41	88 1/16	2	72 1/8	33 3/4	74 3/4	80 7/8	47 1/16	3	78 7/8	44	83 13/16	79 3/8	98 1/4	
490	39	51 13/16	51 5/8	44	44	55	44	44	55	44	95 3/4	2	79 11/16	37 1/2	81 1/2	88 7/8	51 3/4	3	85 3/4	47 3/4	92 1/8	86 3/16	107 1/8	
542	42 3/4	57 7/16	57 1/8	44	49	60	44	49	60	44	101 3/8	2	87 1/4	40 1/2	89 1/2	98 9/16	57 3/8	4	95 7/8	51 3/4	101 3/16	90 3/4	118 1/4	
600	47 3/8	63 7/16	63 1/8	48	54	66 1/2	48	54	66 1/2	48	111 3/8	2	96 3/16	44 1/2	98 1/2	108 7/16	63 3/8	4	104 7/8	56	112	99 11/16	130 3/8	

Size	T	U	V	W	X	Y	Z - CLASS I		Z - CLASS II		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	Max Mtr. Frame ARR. 9 & 10 ODP & TEFC
							SFT	KWY	SFT	KWY													
300	48 3/4	27 1/2	41	63 3/8	45 7/8	5 1/2	1 11/16	3/8 x 3/16	1 15/16	1/2 x 1/4	56 1/4	63 5/16	39	54 1/2	69 5/8	45 1/4	13 1/4	33 1/8	16 3/8	13 3/8	28	56 3/4	284T
330	53 1/2	30 1/4	45	64 7/8	47 1/8	5 1/2	1 11/16	3/8 x 3/16	1 15/16	1/2 x 1/4	61 1/4	69 9/16	42 7/8	65 1/4	75 5/8	49	14 1/2	36 1/4	18 3/8	13 3/8	28	59 1/4	286T
365	59 1/2	33 1/2	48	68	48 7/16	5 1/2	1 11/16	3/8 x 3/16	1 15/16	1/2 x 1/4	67	77 1/8	47 1/2	68 1/2	83 1/8	53 1/2	15 13/16	40	19 7/8	13 3/8	28	61 7/8	286T
402	65 1/2	37	52	73 3/4	53 1/16	5 1/2	1 15/16	1/2 x 1/4	2 3/16	1/2 x 1/4	74	85 1/4	52 5/8	74	91 5/8	59	17 7/16	43 7/8	21 7/8	14 3/8	31	68 1/8	326T
445	72 3/8	40 7/8	57 1/2	77 3/8	54 5/8	5 1/2	2 3/16	1/2 x 1/4	2 7/16	5/8 x 5/16	81 1/2	93 1/4	57 1/8	77 7/8	100 3/4	64 5/8	19 1/4	48 3/4	23 7/8	15 5/8	31	72 1/4	326T
490	79 5/8	44 7/8	62	85 5/8	60	6	2 3/16	1/2 x 1/4	2 7/16	5/8 x 5/16	89 3/4	102 7/8	63 1/8	83 7/8	110 3/8	70 5/8	21 1/8	53 3/8	26 1/8	16 5/8	34	79	364T
542	88 1/4	49 1/4	69	92 3/8	64 7/8	6	2 7/16	5/8 x 5/16	2 11/16	5/8 x 5/16	98 1/2	113 1/4	69 1/4	93 3/4	121	77	23 1/2	59 1/2	28 5/8	18 1/8	37	87 3/4	365T
600	97 1/2	55	75	98 1/4	68 7/16	7	2 7/16	5/8 x 5/16	2 11/16	5/8 x 5/16	109	124 7/8	76 1/4	103	133	84 3/8	25 13/16	65 1/2	31 5/8	18 1/8	37	92 3/8	404T

Tolerance ± 1/8 Not to be used for construction. Certified drawings available upon request.

VCR Dimensional Data

BI & AF – Arrangement 3, SWSI, Class I & II



Notes

1. CW rotation shown; CCW rotation similar but opposite.
2. AF available in sizes 182 through 890.
3. BI available in sizes 122 through 890.
4. Discharge angles standard on sizes 402 thru 890 only. (Hole punching optional on all sizes.)
5. On specific sales orders, see Fan Data Schedule for performance and accessory information.
6. On sizes 300 through 890, side bracing is steel angle as shown.
On sizes 122 through 270, side bracing is formed by 90 breaks in drive side plates and inlet side plates.
7. On DBD sizes 300 thru 890, discharge is extended to base.

VCR Dimensional Data

BI & AF – Arrangement 3, SWSI, Class I & II / Cont.

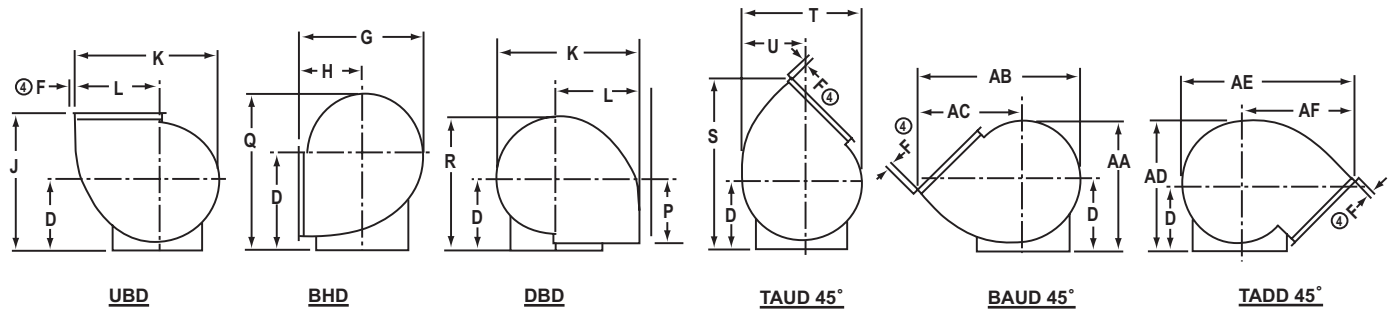
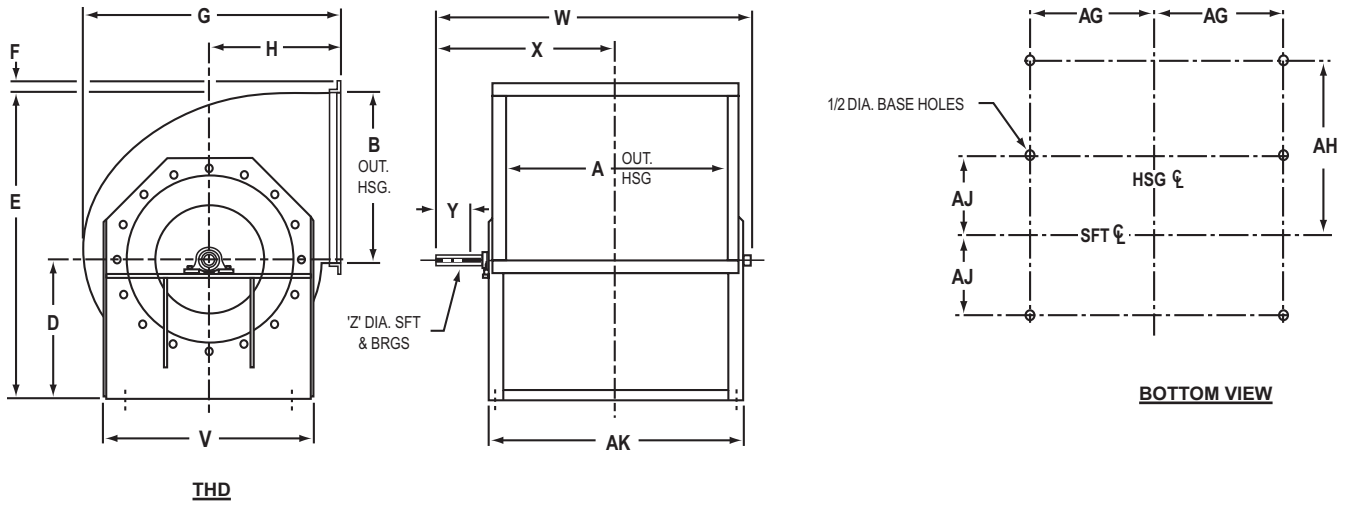
Size	A	B	C	"D" Centerline of Fan							E	④ F	G	H	J	K	L	M	N	⑦ P	Q	R
				THD	UBD	BHD	DBD	TAUD	BAUD	TADD												
122	9 3/4	13	13 1/4	11 1/2	11 1/2	15	11 1/2	11 1/2	15	15	24 7/16	1 1/4	20 13/16	10 1/4	21 3/4	22 1/4	12 15/16	-	-	10 1/4	24 5/16	22 1/16
135	10 13/16	14 5/16	14 9/16	12 3/4	12 3/4	16 1/4	12 3/4	12 3/4	16 1/4	16 1/4	27	1 1/4	22 7/8	11 1/4	24	24 1/2	14 1/4	-	-	11 1/4	26 1/2	24 3/8
150	11 15/16	15 7/8	16 3/16	12 3/4	14	18	12 3/4	14	18	18	28 9/16	1 1/4	25 7/16	12 1/2	26 1/2	27 1/4	15 13/16	-	-	12 1/2	29 7/16	25 11/16
165	13 3/16	17 3/8	17 3/4	14	15 1/4	19 1/2	14	15 1/4	19 1/2	19 1/2	31 5/16	1 1/4	28	13 3/4	29	29 7/8	17 5/16	-	-	13 3/4	32 1/16	28 1/4
182	14 3/8	19 3/8	19 1/2	15	17	21 1/2	15	17	21 1/2	21 1/2	34 5/16	1 1/4	30 3/16	14 1/2	31 1/2	33 1/8	19 5/16	-	-	14 1/2	35 5/16	30 11/16
200	16	21 1/4	21 3/8	16 1/4	20	23 1/2	16 1/4	20	20	20	37 7/16	1 1/4	32 7/8	15 5/8	35 5/8	36 3/8	21 3/16	-	-	15 5/8	38 11/16	33 1/2
222	17 1/2	23 5/8	23 3/4	18	20 1/2	26	18	20 1/2	26	20 1/2	41 9/16	1 1/4	36 5/8	17 1/2	38	40 7/16	23 9/16	-	-	17 1/2	42 7/8	37 1/8
245	19 1/2	25 15/16	26 1/16	20	22 1/2	28	20	22 1/2	28	22 1/2	45 7/8	1 1/4	40 5/16	19 1/4	41 3/4	44 7/16	25 7/8	-	-	19 1/4	46 9/16	41 1/16
270	21 9/16	28 5/8	28 1/2	22	24 3/4	31	22	24 3/4	31	24 3/4	50 9/16	1 1/4	44 5/16	21 1/8	45 7/8	49	28 9/16	-	-	21 1/8	51 7/16	45 3/16
300	23 11/16	31 13/16	31 5/8	24	27	35	24	26	29 1/2	26	55 3/4	1 1/2	49 1/4	23 7/16	50 7/16	54 1/2	31 3/4	2 1/2	54 1/4	24	57 3/4	49 13/16
330	26 1/4	34 15/16	34 3/4	27	30	38	26 1/2	28 1/2	32 1/2	28	61 7/8	1 1/2	54 3/16	25 13/16	55 13/16	59 7/8	34 7/8	2 1/2	59 3/8	26 1/2	63	54 7/8
365	28 7/8	38 11/16	38 1/2	29 1/2	33 1/2	41	29	31 1/2	35 1/2	29 1/2	68 1/8	1 1/2	60 1/8	28 5/8	62 1/8	66 5/16	38 5/8	2 1/2	64 5/8	29	68 11/16	60 1/2
402	32 1/16	42 9/16	42 7/16	32 1/2	36 1/2	45 1/2	32	35	39 1/2	32	75	2	66 11/16	32	68 1/2	73 1/16	42 1/2	2 1/2	70 1/2	32	76 1/16	66 11/16
445	35 1/4	47 3/16	46 7/8	35 1/2	40	50	34	38	43	36	82 9/16	2	72 1/8	33 3/4	73 3/4	80 7/8	47 1/16	3 1/2	79 5/16	34	83 13/16	72 3/8
490	39	51 13/16	51 5/8	39	44	55	37 1/2	42	47	38	90 3/4	2	79 11/16	37 1/2	81 1/2	88 7/8	51 3/4	3 1/2	86 1/4	37 1/2	92 1/8	79 11/16
542	42 3/4	57 7/16	57 1/8	43 1/2	49	60	40 1/2	46	52	42	100 7/8	2	87 1/4	40 1/2	89 1/2	98 9/16	57 3/8	3 1/2	94 7/8	40 1/2	10 13/16	87 1/4
600	47 3/8	63 7/16	63 1/8	48	54	66 1/2	44 1/2	51	57	45	111 3/8	2	96 3/16	44 1/2	98 1/2	108 7/8	63 3/8	3 1/2	103 7/8	44 1/2	112	96 3/16
660	52 1/2	69 13/16	69 3/8	52 1/2	59	73 1/4	49	55 3/4	63	49 1/2	122 1/4	2 1/2	105 3/4	49	108	119 5/8	69 3/4	5	114 3/4	49	123 1/8	105 3/4
730	57 7/8	77 1/4	76 3/4	57	64 1/4	80 3/4	57 3/4	61 3/4	69 1/2	54 1/4	134 1/8	2 1/2	120 5/8	57 3/4	122 1/4	132 1/2	77 1/8	5	126 1/8	57 3/4	136 1/8	120 5/8
807	63 13/16	85 7/16	84 7/8	63	72	89	63 3/4	67 1/2	76 1/2	59 1/2	148 5/16	2 1/2	133 5/16	63 3/4	135 3/4	146 9/16	85 5/16	5	138 1/8	63 3/4	150 1/4	133 5/16
890	70 1/8	94 1/4	93 3/8	69 1/4	78 1/4	97 3/4	70 1/2	73 3/4	85	65 1/2	163 3/8	2 1/2	147 1/8	70 1/2	148 3/4	161 5/8	94 1/8	5	152 3/8	70 1/2	165 1/4	147 1/8

Size	S	T	U	V	CLASS I		CLASS II		Y	"Z" - CLASS I		"Z" - CLASS II		AA	AB	AC	AD	AE	AF	AG	AH	AJ
					W	X	W	X		SFT	KWY	SFT	KWY									
122	27 15/16	19 7/8	11 3/16	16	19 1/2	101 5/16	21 7/8	12 1/8	2 1/2	1	1/4 x 1/8	1 3/16	1/4 x 1/8	23 11/16	26 3/8	16 7/16	26 3/16	31 11/16	21 3/4	6 1/8	-	6 5/8
135	30 3/4	21 7/8	12 5/16	17 1/2	20 1/2	11 7/16	22 7/8	12 5/8	2 1/2	1	1/4 x 1/8	1 3/16	1/4 x 1/8	25 13/16	28 15/16	18	28 9/16	34 5/16	23 3/8	6 11/16	-	7 1/4
150	34	24 5/16	13 11/16	19	22 1/8	12 1/2	24 1/2	13 3/4	3	1	1/4 x 1/8	13/16	1/4 x 1/8	28 5/8	32 3/16	20	31 11/16	37 7/16	25 1/4	7 1/4	-	8
165	37 1/4	26 3/4	15 1/16	20 1/2	23 7/8	13 3/8	26 7/8	15	3	1	1/4 x 1/8	1 7/16	3/8 x 3/16	31 3/16	35 3/8	22	34 1/16	40 3/8	27	7 7/8	-	8 5/8
182	40 15/16	29 5/8	16 5/8	22 1/2	28	15 3/4	28 1/2	16 1/16	3 1/2	1 3/16	1/4 x 1/8	1 11/16	3/8 x 3/16	34 1/2	38 11/16	23 15/16	38 1/8	44 1/8	29 3/8	8 11/16	-	9 5/8
200	46 1/16	32 1/2	18 1/4	25	29 5/8	16 1/2	30 1/8	16 7/8	3 1/2	1 3/16	1/4 x 1/8	1 11/16	3/8 x 3/16	34 1/4	42 1/4	26 1/16	38 1/4	47 5/8	31 7/16	9 1/2	-	10 7/8
222	49 1/2	36	20 3/8	27 1/4	31 5/8	17 3/4	32 1/8	18 1/8	4	1 3/16	1/4 x 1/8	1 11/16	3/8 x 3/16	41 5/8	47	29	40 7/8	52 1/2	34 1/2	10 1/4	-	11 1/8
245	54 1/2	39 3/4	22 3/8	29 3/4	34 1/4	19 1/8	34 1/8	19 1/8	4	1 7/16	3/8 x 3/16	1 11/16	3/8 x 3/16	45 3/8	51 3/4	32	44 7/8	57 7/16	37 5/8	11 1/4	-	11 1/8
270	60 3/4	43 3/4	24 3/4	33	36 1/4	20 3/16	36 1/4	20 3/16	4	1 11/16	3/8 x 3/16	1 11/16	3/8 x 3/16	50	56 15/16	35 1/8	49 1/2	62 7/16	40 5/8	12 5/16	-	13 1/8
300	65 1/8	48 3/4	27 1/2	40	38 1/4	21 1/8	38 5/8	21 3/8	4	1 11/16	3/8 x 3/16	1 5/16	1/2 x 1/4	50 3/4	63 5/16	39	53 1/2	69 5/8	45 1/4	13 1/4	33 1/8	16 7/8
330	71 3/8	53 1/2	30 1/4	44	40 7/8	22 3/8	41 1/4	22 5/8	4	1 11/16	3/8 x 3/16	1 5/16	1/2 x 1/4	55 3/4	69 9/16	42 7/8	58 1/4	75 5/8	49	141 1/2	36 1/4	18 7/8
365	79 1/8	59 1/2	33 1/2	47	44 1/2	24 3/4	44 7/8	25	5	1 11/16	3/8 x 3/16	1 5/16	1/2 x 1/4	61 1/2	77 1/4	47 5/8	63	83 1/8	53 1/2	15 13/16	40	20 3/8
402	87 3/8	65 1/2	37	51	49	27	49 5/8	27 3/8	5	1 5/16	1/2 x 1/4	2 3/16	1/2 x 1/4	68	85 3/8	52 3/4	69	92 1/4	59 5/8	17 7/16	43 7/8	22 3/8
445	95 1/4	72 3/8	40 7/8	57 1/2	52 3/4	29 1/8	53 3/8	29 1/2	5 1/2	1 5/16	1/2 x 1/4	2 3/16	1/2 x 1/4	74 1/2	93 3/8	57 1/4	76 7/8	100 3/4	64 5/8	19 1/2	48 15/16	23 5/8
490	105 1/8	79 5/8	44 7/8	62	57	31 3/8	57 3/4	31 7/8	5 1/2	2 3/16	1/2 x 1/4	2 7/16	5/8 x 5/16	81 3/4	102 7/8	63 1/8	82 7/8	110 3/8	70 5/8	21 3/8	53 5/8	25 7/8
542	115 1/4	88 1/4	49 3/4	68	62	34 3/16	62 1/8	34 1/4	6	2 7/16	5/8 x 5/16	2 11/16	5/8 x 5/16	90 1/2	113 1/4	69 1/4	91 3/4	121	77	23 1/4	59 1/4	28 7/8
600	127 3/8	97 1/2	55	74	67 5/8	37	67 7/8	37 1/4	6	2 7/16	5/8 x 5/16	2 15/16	3/4 x 3/8	99 1/2	125	76 3/8	100	133 1/8	84 1/2	25 9/16	65 1/4	31 7/8
660	139 3/4	107	60 1/2	80	75 7/8	41 5/8	77 5/8	42 3/4	7	2 11/16	5/8 x 5/16	3 7/16	7/8 x 7/16	109 1/2	137 3/8	84	110	146 1/8	92 3/4	28 7/8	72 3/8	33 1/8
730	157 1/8	118 5/8	67	88	81 7/8	45	83 1/2	46	7 1/2	2 15/16	3/4 x 3/8	3 7/16	7/8 x 7/16	121 1/8	154 1/2	95 3/8	121 1/4	161 1/8	102	31 9/16	79 3/4	37 1/8
807	172 7/8	130 7/8	73 3/4	95 1/2	88 3/8	48 1/2	89 7/8	49 1/2	8	2 15/16	3/4 x 3/8	3 7/16	7/8 x 7/16	133 5/8	170 5/8	105 3/8	133 1/4	176 7/8	111 5/8	34 9/16	87 15/16	40 7/8
890	190 1/4	144 5/8	81 5/8	106 1/2	96 1/4	52 5/8	96 5/8	52 3/4	8	3 7/16	7/8 x 7/16	3 15/16	1 x 1/2	148	188 3/8	116 1/2	147 1/8	198 7/8	126 7/8	37 11/16	96 3/4	46 3/8

TOLERANCE ± 1/8 Not to be used for construction. Certified drawings available upon request.

VCR Dimensional Data

BI & AF – Arrangement 3, DWDI, Class I & II



Notes

1. CW rotation shown; CCW rotation similar but opposite.
2. AF available in sizes 182 through 270.
3. BI available in sizes 122 through 170.
4. Discharge angles standard on sizes 122 thru 270 only. (Hole punching optional on all sizes.)
5. On specific sales orders, see Fan Data Schedule for performance and accessory information.

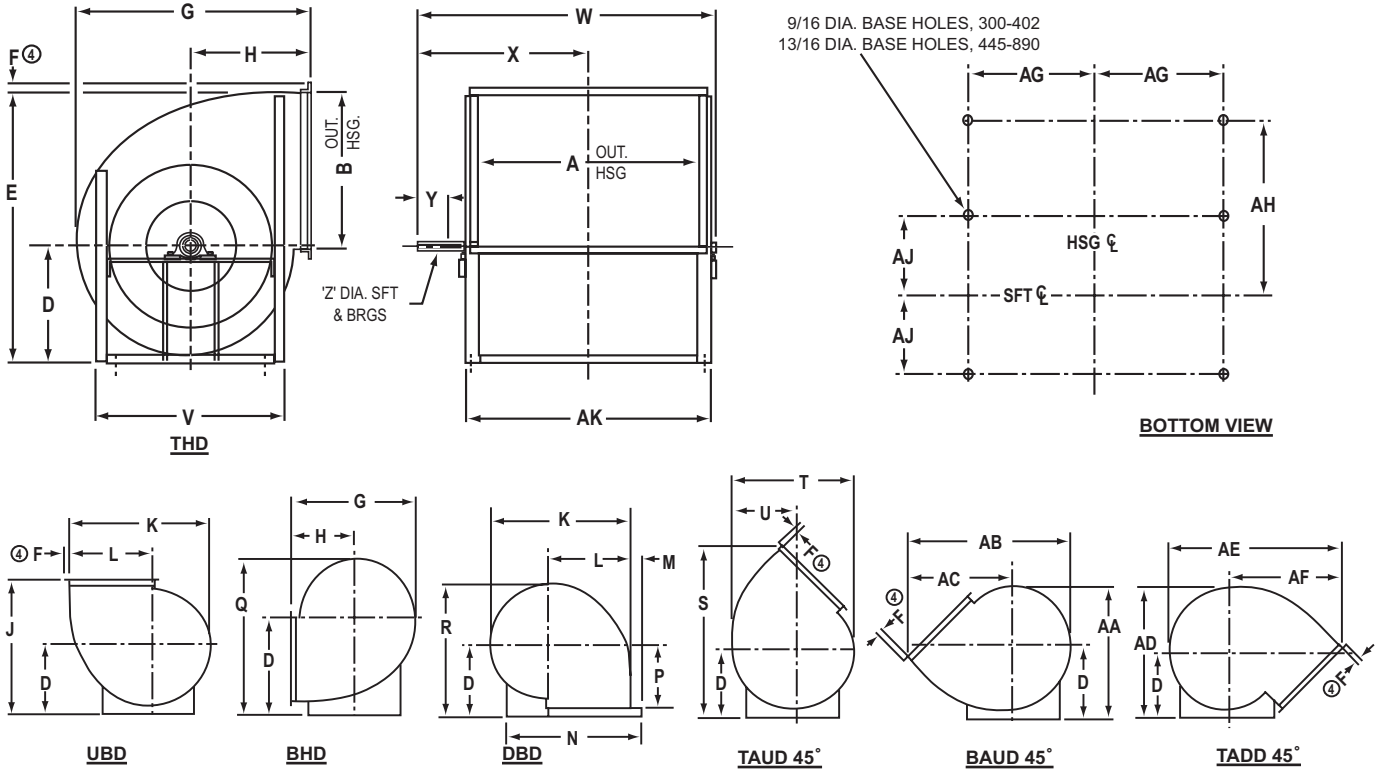
Size	A	B	"D" CENTERLINE OF FAN							E	F	G	H	J	K	L	M	N	P	Q	R	S	T
			THD	UBD	BHD	DBD	TAUD	BAUD	TADD														
122	17 1/2	13	11 1/2	11 1/2	15	11 1/2	11 1/2	15	15	24 7/16	1 1/4	20 13/16	10 1/4	21 3/4	22 1/4	12 15/16	—	—	10 1/4	24 5/16	22 1/16	27 15/16	19 7/8
135	19 3/8	14 5/16	12 3/4	12 3/4	16 1/4	12 3/4	12 3/4	16 1/4	16 1/4	27	1 1/4	22 7/8	11 1/4	24	24 1/2	14 1/4	—	—	11 1/4	26 1/2	24 3/8	30 3/4	21 7/8
150	21 1/4	15 7/8	12 3/4	14	18	12 3/4	14	18	18	28 9/16	1 1/4	25 7/16	12 1/2	26 1/2	27 1/4	15 13/16	—	—	12 1/2	29 7/16	25 11/16	34	24 5/16
165	23 5/8	17 3/8	14	15 1/4	19 1/2	14	15 1/4	19 1/2	19 1/2	31 5/16	1 1/4	28	13 3/4	29	29 7/8	17 5/16	—	—	13 3/4	32 1/16	28 1/4	37 1/4	26 3/4
182	25 13/16	19 3/8	15	17	21 1/2	15	17	21 1/2	21 1/2	34 5/16	1 1/4	30 3/16	14 1/2	31 1/2	33 1/8	19 5/16	—	—	14 1/2	35 5/16	30 11/16	40 15/16	29 5/8
200	28 11/16	21 1/4	16 1/4	20	23 1/2	16 1/4	20	20	20	37 7/16	1 1/4	32 7/8	15 5/8	35 5/8	36 3/8	21 3/16	—	—	15 5/8	38 11/16	33 1/2	46 1/16	32 1/2
222	31 3/8	23 5/8	18	20 1/2	26	18	20 1/2	26	20 1/2	41 9/16	1 1/4	36 5/8	17 1/2	38	40 7/16	23 9/16	—	—	17 1/2	42 7/8	37 1/8	49 1/2	36
245	34 7/8	25 15/16	20	22 1/2	28	20	22 1/2	28	22 1/2	45 7/8	1 1/4	40 5/16	19 1/4	41 3/4	44 7/16	25 7/8	—	—	19 1/4	46 9/16	41 1/16	54 1/2	39 3/4
270	38 5/16	28 5/8	22	24 3/4	31	22	24 3/4	31	24 3/4	50 9/16	1 1/4	44 5/16	21 1/8	45 7/8	49	28 9/16	—	—	21 1/8	51 7/16	45 3/16	60 3/4	43 3/4

Size	U	V	CLASS I		CLASS II		Y	"Z" CLASS I			"Z" CLASS II			AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK
			W	X	W	X		SFT	DR. EXT.	KWY	SFT	DR. EXT.	KWY										
			W	X	W	X		SFT	DR. EXT.	KWY	SFT	DR. EXT.	KWY										
122	11 3/16	16	26 1/2	15 3/8	28 5/8	16 5/8	3	1 3/16	1 3/16	1/4 x 1/8	1 7/16	1 7/16	3/8 x 3/16	23 11/16	26 3/8	16 7/16	26 3/16	31 11/16	21 3/4	10	—	6 5/8	21 3/4
135	12 5/16	17 1/2	28 1/4	16 1/4	30 1/2	17 1/2	3	1 3/16	1 3/16	1/4 x 1/8	1 11/16	1 11/16	3/8 x 3/16	25 13/16	28 15/16	18	28 9/16	34 5/16	23 3/8	11	—	7 1/4	23 3/4
150	13 11/16	19	33 3/8	19 1/4	33 3/8	19 1/4	3 1/2	1 7/16	1 7/16	3/8 x 3/16	1 11/16	1 11/16	3/8 x 3/16	28 5/8	32 3/16	20	31 11/16	37 7/16	25 1/4	11 15/16	—	8	25 5/8
165	15 1/16	20 1/2	35 3/4	20 3/8	36 1/8	20 5/8	3 1/2	1 7/16	1 7/16	3/8 x 3/16	1 15/16	1 15/16	1/2 x 1/4	31 3/16	35 3/8	22	34 9/16	40 3/8	27	13 1/8	—	8 5/8	28
182	16 5/8	22 1/2	39	22 1/4	42 7/8	22 7/8	4	1 11/16	1 11/16	3/8 x 3/16	2 3/16	2 3/16	1/2 x 1/4	34 1/2	38 11/16	23 15/16	38 1/8	44 1/8	29 3/8	14 1/2	—	9 5/8	31 1/4
200	18 1/4	25	41 7/8	23 3/4	42 7/8	24 1/4	4	1 11/16	1 11/16	3/8 x 3/16	2 3/16	2 3/16	1/2 x 1/4	34 1/4	42 1/4	26 1/16	38 1/4	47 5/8	31 7/16	15 15/16	—	10 7/8	34 1/8
222	20 3/8	27 1/4	45 3/8	25 3/4	46 5/8	26 5/8	4 1/2	1 15/16	1 15/16	1/2 x 1/4	2 7/16	2 7/16	5/8 x 5/16	41 5/8	47	29	40 7/8	52 1/2	34 1/2	17 1/4	—	11 1/8	36 3/4
245	22 3/8	29 3/4	50 1/2	28 5/8	51 1/8	29 1/8	5	2 3/16	2 3/16	1/2 x 1/4	2 7/16	2 7/16	5/8 x 5/16	45 3/8	51 3/4	32	44 7/8	57 7/16	37 5/8	19	—	11 1/8	40 1/4
270	24 3/4	33	54	30 3/8	54 5/8	30 7/8	5	2 3/16	2 3/16	1/2 x 1/4	2 11/16	2 11/16	5/8 x 5/16	50	56 15/16	35 1/8	49 1/2	62 7/16	40 5/8	20 3/4	—	13 1/8	43 3/4

Tolerance ± 1/8 Not to be used for construction. Certified drawings available upon request.

VCR Dimensional Data

BI & AF – Arrangement 3, DWDI Class I & II



Notes

- CW rotation shown; CCW rotation similar but opposite.
- AF available in sizes 182 through 890.
- BI available in sizes 122 through 890.
- Discharge angles standard on sizes 402 thru 890 only. (Hole punching optional on all sizes.)
- On specific sales orders, see Fan Data Schedule for performance and accessory information.
- On DBD, discharge is extended to base.
- *Shaft smaller on BI.

Size	A	B	"D" CENTERLINE OF FAN							E	F	G	H	J	K	L	M	N	P	Q	R	S	T
			THD	UBD	BHD	DBD	TAUD	BAUD	TADD														
300	42 7/16	31 13/16	24	27	35	24	26	29 1/2	26	55 3/4	1 1/2	49 1/4	23 7/16	50 7/16	54 1/2	31 3/4	2 1/2	54 1/4	24	57 3/4	49 13/16	65 1/8	48 3/4
330	47 3/16	34 15/16	27	30	38	26 1/2	28 1/2	32 1/2	28	61 7/8	1 1/2	54 3/16	25 13/16	55 13/16	59 7/8	34 7/8	2 1/2	59 3/8	26 1/2	63	54 7/8	71 3/8	53 1/2
365	51 3/4	38 11/16	29 1/2	33 1/2	41	29	31 1/2	35 1/2	29 1/2	68 1/8	1 1/2	60 1/8	28 5/8	62 1/8	66 5/16	38 5/8	2 1/2	64 5/8	29	68 11/16	60 1/2	79 1/8	59 1/2
402	57 1/2	42 9/16	32 1/2	36 1/2	45 1/2	32	35	39 1/2	32	75	2	66 11/16	32	68 1/2	73 1/16	42 1/2	2 1/2	70 1/2	32	76 1/16	66 11/16	87 3/8	65 1/2
445	63 1/4	47 3/16	35 1/2	40	50	34	38	43	36	82 9/16	2	72 1/8	33 3/4	73 3/4	80 7/8	47 1/16	3 1/2	79 5/16	34	83 13/16	72 3/8	95 1/4	72 3/8
490	70	51 13/16	39	44	55	37 1/2	42	47	38	90 3/4	2	79 11/16	37 1/2	81 1/2	88 7/8	51 3/4	3 1/2	86 1/4	37 1/2	92 1/8	79 11/16	105 1/8	79 5/8
542	77	57 7/16	43 1/2	49	60	40 1/2	46	52	42	100 7/8	2	87 1/4	40 1/2	89 1/2	98 9/16	57 3/8	3 1/2	94 7/8	40 1/2	101 3/16	87 1/4	115 1/4	88 1/4
600	85 1/8	63 7/16	48	54	66 1/2	44 1/2	51	57	45	111 3/8	2	96 3/16	44 1/2	98 1/2	108 7/8	63 3/8	3 1/2	103 7/8	44 1/2	112	96 3/16	127 3/8	97 1/2
660	94 1/4	69 13/16	52 1/2	59	73 1/4	49	55 3/4	63	49 1/2	122 1/4	2 1/2	105 3/4	49	108	119 5/8	69 3/4	5	114 3/4	49	123 1/8	105 3/4	139 3/4	107
730	104	77 1/4	57	64 1/4	80 3/4	57 3/4	61 3/4	69 1/2	54 1/4	134 1/8	2 1/2	120 5/8	57 3/4	122 1/4	132 1/2	77 1/8	5	126 1/8	57 3/4	136 1/8	120 5/8	157 1/8	118 5/8
807	114 11/16	85 7/16	63	72	89	63 3/4	67 1/2	76 1/2	59 1/2	148 5/16	2 1/2	133 5/16	63 3/4	135 3/4	146 9/16	85 5/16	5	138 1/8	63 3/4	150 1/4	133 5/16	172 7/8	130 7/8
890	126 3/8	94 1/4	69 1/4	78 1/4	97 3/4	70 1/2	73 3/4	85	65 1/2	163 3/8	2 1/2	147 1/8	70 1/2	148 3/4	161 5/8	94 1/8	5	152 3/8	70 1/2	165 1/4	147 1/8	190 1/4	144 5/8

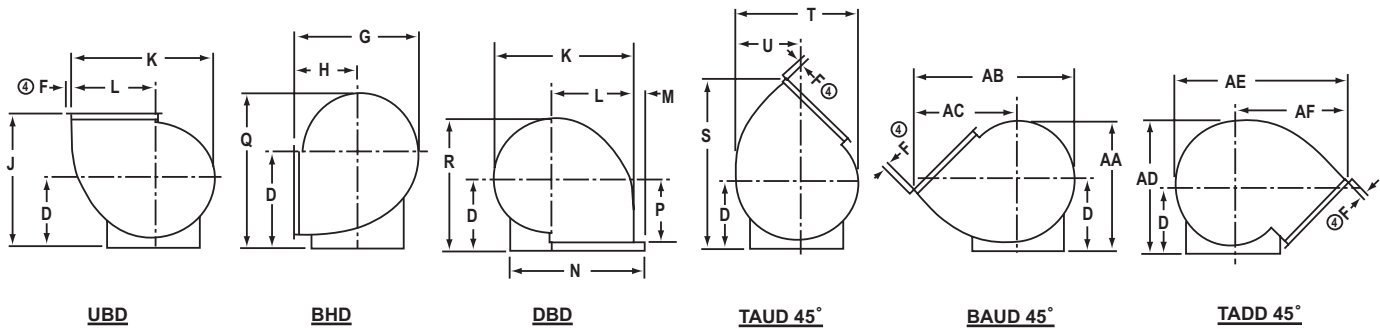
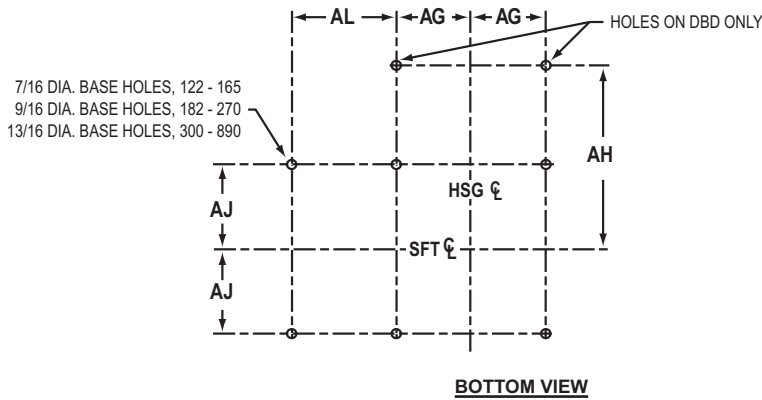
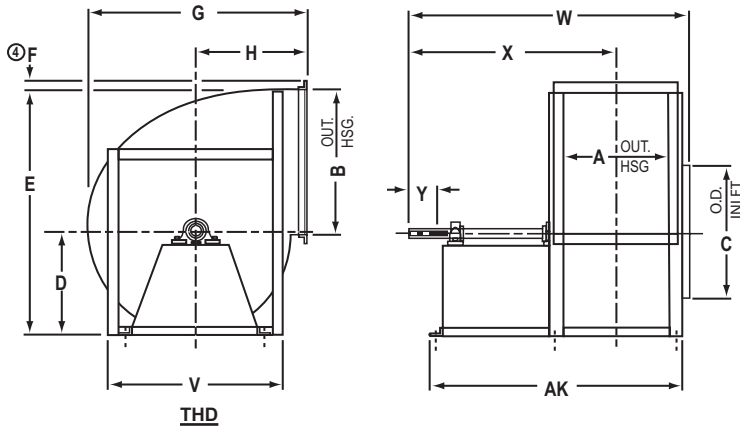
Size	U	V	CLASS I		CLASS II		Y	"Z" CLASS I			"Z" CLASS II			AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK
			W	X	W	X		SFT	DR. EXT.	KWY	SFT	DR. EXT.	KWY										
300	27 1/2	40	59 7/8	33 3/4	60	33 3/4	5 1/2	2 7/16	2 7/16	5/8 x 5/16	2 11/16	2 11/16	5/8 x 5/16	50 3/4	63 5/16	39	53 1/2	69 5/8	45 1/4	22 5/8	33 1/8	16 7/8	47 7/16
330	30 1/4	44	63 5/8	35 5/8	63 5/8	35 5/8	5 1/2	2 7/16	2 7/16	5/8 x 5/16	2 15/16	2 7/16	5/8 x 5/16	55 3/4	69 9/16	42 7/8	58 1/4	75 5/8	49	25	36 1/4	18 7/8	52 3/16
365	33 1/2	47	68 5/8	38 1/8	68 5/8	38 1/8	5 1/2	2 11/16	2 11/16	5/8 x 5/16	3 7/16	2 7/16	5/8 x 5/16	61 1/2	77 1/4	47 5/8	63	83 1/8	53 1/2	27 1/4	40	20 3/8	56 3/4
402	37	51	74 7/8	41 5/8	74 3/8	41 1/4	6	2 15/16	2 15/16	3/4 x 3/8	3 7/16	2 7/16	5/8 x 5/16	68	85 3/8	52 3/4	69	92 1/4	59 5/8	30 1/8	43 7/8	22 3/8	62 1/2
445	40 7/8	57 1/2	80	43 7/8	80 3/4	44 3/8	6	3 3/16	2 3/16	1/2 x 1/4	3 15/16	2 11/16	5/8 x 5/16	74 1/2	93 3/8	57 1/4	76 7/8	100 3/4	64 5/8	33 1/2	48 15/16	23 5/8	70 1/4
490	44 7/8	62	88 3/8	48 3/4	91 1/2	50 5/8	7	3 7/16	2 7/16	5/8 x 5/16	3 15/16	3 7/16	7/8 x 7/16	81 3/4	102 7/8	63 1/8	82 7/8	110 3/8	70 5/8	36 7/8	53 5/8	25 7/8	77
542	49 3/4	68	96 1/2	52 3/4	98 1/2	54 1/8	7	3 15/16	2 11/16	5/8 x 5/16	4 7/16	3 7/16	7/8 x 7/16	90 1/2	113 1/4	69 1/4	91 3/4	121	77	40 3/8	59 1/4	28 7/8	84
600	55	74	105 5/8	57 7/8	107 5/8	59 1/4	8	3 15/16	2 11/16	5/8 x 5/16	4 15/16	3 7/16	7/8 x 7/16	99 1/2	125	76 3/8	100	133 1/8	84 1/2	44 1/2	65 1/4	31 7/8	92 1/8
660	60 1/2	80	115 1/8	62 3/4	116 3/4	63 3/4	8	4 7/16	2 15/16	3/4 x 3/8	4 15/16	3 7/16	7/8 x 7/16	109 1/2	137 3/8	84	110	146 1/8	92 3/4	49 3/4	72 3/8	33 1/8	104 1/4
730	67	88	127 1/2	69 5/8	127 1/2	69 5/8	9	4 15/16	3 7/16	7/8 x 7/16	5 15/16	3 15/16	1 x 1/2	121 1/8	154 1/2	95 3/8	121 1/4	161 1/8	102	54 5/8	79 3/4	37 1/8	114
807	73 3/4	95 1/2	138 1/4	75	139 7/8	75 5/8	9	5 15/16	3 15/16	1 x 1/2	6 7/16	4 7/16	1 x 1/2	133 5/8	170 5/8	105 3/8	133 1/4	176 7/8	111 5/8	60	87 15/16	40 7/8	124 11/16
890	81 5/8	106 1/2	153	82 1/2	153	82 1/2	9	6 7/16	4 7/16	1 x 1/2	*6 11/16	4 7/16	1 x 1/2	148	188 3/8	116 1/2	147 1/8	198 7/8	126 7/8	65 13/16	96 3/4	46 3/8	136 3/8

Tolerance ± 1/8

Not to be used for construction. Certified drawings available upon request.

VCR Dimensional Data

BI & AF – Arrangement 1, SWSI, Class III



Notes

1. CW rotation shown; CCW rotation similar but opposite.
2. AF available in sizes 182 through 890.
3. BI available in sizes 182 through 890.
4. Discharge angles standard on all sizes. (Hole punching optional on all sizes.)
5. On specific sales orders, see Fan Data Schedule for performance and accessory information.

VCR Dimensional Data

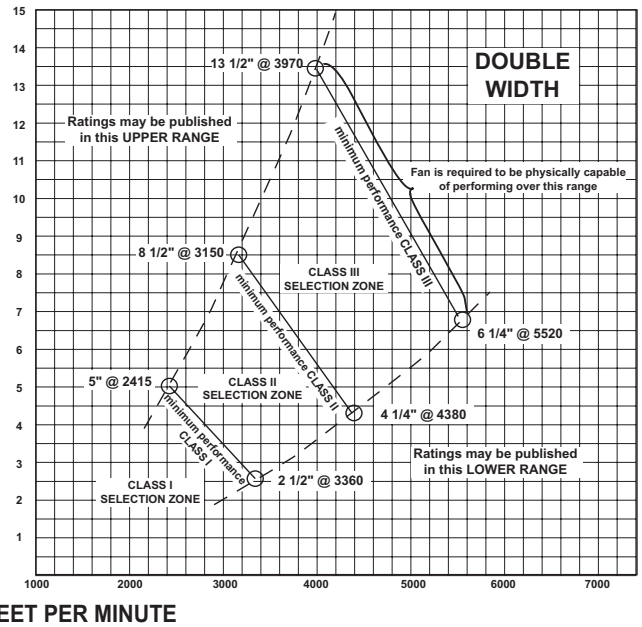
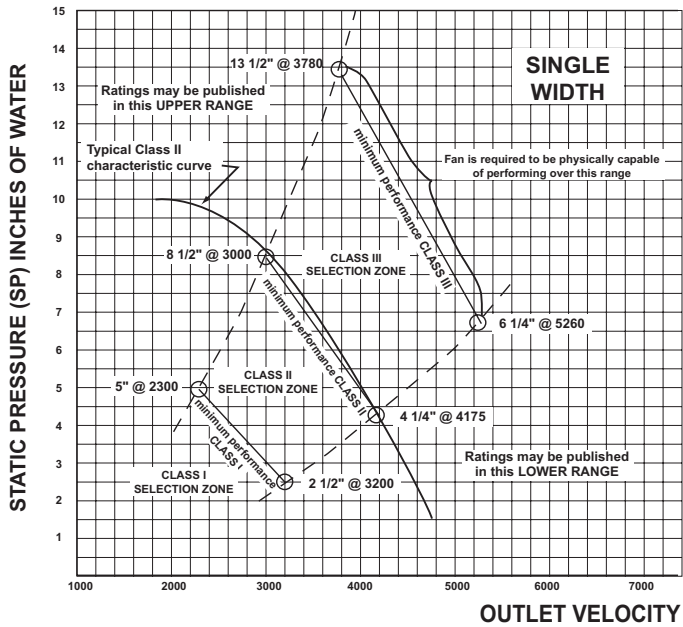
BI & AF – Arrangement 1, SWSI Class III / Cont.

Size	A	B	C	"D" Centerline of Fan							E	F ^④	G	H	J	K	L	M	N	P	Q	R	S
				THD	UBD	BHD	DBD	TAUD	BAUD	TADD													
122	9 13/16	13 1/8	13 1/4	10 1/4	11 1/2	15	10 1/4	11	12 1/4	15 1/4	23 1/4	1 1/4	21	10 3/8	21 7/8	22 3/8	13	2	24 7/8	10 1/4	24 3/8	20 7/8	28 1/2
135	10 7/8	14 7/16	14 9/16	11 1/4	12 3/4	16 1/4	11 1/4	12	13 1/4	16	25 9/16	1 1/4	23 1/16	11 3/8	24 1/8	24 5/8	14 5/16	2	26 13/16	11 1/4	26 9/16	22 15/16	31 1/8
150	12	16	16 3/16	12 1/4	14	18	12 1/2	13 1/4	14 3/4	16 3/4	28 1/8	1 1/4	25 5/8	12 5/8	26 5/8	27 3/8	15 7/8	2	29 1/4	12 1/2	29 1/2	25 1/2	34 5/16
165	13 1/4	17 1/2	17 3/4	13 1/2	15 1/4	19 1/2	13 3/4	14 1/2	16 1/4	17 1/2	30 7/8	1 1/2	28 3/16	13 7/8	29 1/8	30	17 3/8	2	31 1/2	13 3/4	32 1/8	28 1/16	37 11/16
182	14 7/16	19 1/2	19 1/2	14 3/4	16 3/4	22	14 1/2	15 3/4	17 3/4	18 1/2	34 1/8	1 1/2	30 3/8	14 5/8	31 3/8	33 1/4	19 3/8	2	34 7/8	14 1/2	35 7/8	30 1/4	41 1/16
200	16 1/16	21 1/2	21 3/8	16 1/4	18 1/4	24	16	17 1/4	19 1/4	19 1/2	37 9/16	1 1/2	33 3/8	16	34 1/4	36 5/8	21 5/16	2	37 13/16	16	39 5/16	33 3/8	45 7/16
222	17 9/16	23 7/8	23 3/4	18	20 1/2	26 1/2	18	19 1/4	22	21	41 11/16	2	37 5/16	18	38 1/2	40 11/16	23 11/16	2 1/2	42 5/16	18	43 1/2	37 5/16	50 3/8
245	19 11/16	26 3/16	26 1/16	20	22 1/2	28 3/4	19 1/2	21 1/4	24	22	46	2	40 11/16	19 1/2	42	44 11/16	26	2 1/2	45 3/4	19 1/2	47 7/16	40 11/16	55
270	21 3/4	28 7/8	28 1/2	22	24 3/4	31 1/2	21 1/2	23 1/2	26 1/4	23 1/2	50 11/16	2	44 13/16	21 1/2	46 1/4	49 1/4	28 11/16	2 1/2	49 11/16	21 1/2	52 1/16	44 13/16	60 11/16
300	23 13/16	32	31 5/8	24 1/2	27 1/2	34 3/4	24	26	29 1/2	26	56 5/16	2	49 15/16	24	51 1/2	54 11/16	31 13/16	3	55 13/16	24	57 5/8	49 15/16	67 5/16
330	26 3/8	35 1/8	34 3/4	27	30	37 3/4	26 1/2	28 1/2	32 1/4	27 3/4	61 15/16	2	55	26 1/2	56 1/2	60 1/16	34 15/16	3	60 7/16	26 1/2	62 7/8	55	73 13/16
365	29	38 7/8	38 1/2	29 1/2	33 1/2	41 1/2	29	31 1/2	35 1/2	29 1/4	68 3/16	2	60 9/16	29	62 1/2	66 1/2	38 11/16	3	65 11/16	29	69 5/16	60 9/16	81 1/16
402	32 3/16	42 3/4	42 7/16	33	37	45 1/2	32	35 1/4	39 1/2	31 3/4	75 9/16	2	66 13/16	32	69	73 1/4	42 9/16	4	72 13/16	32	76 3/16	66 13/16	89 5/8
445	35 3/8	47 3/8	46 7/8	35 1/2	40	50	33 3/4	38 1/2	43 1/4	36 1/4	82 11/16	2	72 3/16	33 3/4	73 3/4	81 1/16	47 3/16	4	79 7/16	33 3/4	83 7/8	72 3/16	97 5/8
490	39 1/8	52	51 5/8	39	44	54 3/4	37 1/2	42 1/4	47 1/2	38 3/4	90 13/16	2	79 3/4	37 1/2	81 1/2	89 1/16	51 13/16	4	86 9/16	37 1/2	92	79 3/4	107 7/16
542	42 7/8	57 5/8	57 1/8	43 1/2	49	60 3/4	40 1/2	46 1/2	52 1/4	42 1/4	101 15/16	2 1/2	87 3/8	40 1/2	89 1/2	98 3/4	57 7/16	5	96 7/16	40 1/2	102 1/16	87 3/8	118 1/16
600	47 1/2	63 5/8	63 1/8	48	54	66 3/4	44 1/2	51 1/4	57 1/2	45	111 1/2	2 1/2	96 1/4	44 1/2	98 1/2	109 1/16	63 7/16	5	105 7/16	44 1/2	112 3/8	96 1/4	129 11/16
660	52 5/8	70	69 3/8	52 1/2	59	73 3/4	49	55 3/4	63	49 1/2	123 5/16	3	105 13/16	49	108	119 13/16	69 13/16	6	116 5/16	49	123 3/4	105 13/16	142 3/4
730	58	77 3/4	76 3/4	57	64 1/2	81 1/4	57 3/4	61 3/4	69 1/2	54 1/4	135 3/16	3	120 11/16	57 3/4	122 1/4	132 5/8	77 3/16	6	127 11/16	57 3/4	136 11/16	120 11/16	159 5/8
807	63 15/16	85 9/16	84 7/8	63	72	89 1/2	63 3/4	67 1/2	76 1/2	59 1/2	149 3/8	3	133 3/8	63 3/4	135 3/4	146 11/16	85 3/8	6	139 5/8	63 3/4	150 13/16	133 3/8	175 9/16
890	70 1/8	94 3/8	93 3/8	69 1/4	78 1/4	98 1/4	70 1/2	73 3/4	85	65 1/2	164 7/16	3	174 3/16	70 1/2	148 3/4	161 3/4	94 3/16	6	153 15/16	70 1/2	165 13/16	147 3/16	192 1/2

Size	T	U	V	W	X	Y	"Z" - BI		"Z" - AF		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AL	AM
							SFT	KWY	SFT	KWY											
122	20	11 1/4	19 3/4	26 3/4	18 13/16	3	1 11/16	3/8 x 3/16	--	--	21	27 1/2	17 1/2	26 1/2	32 3/4	22 3/4	6 1/16	14 1/8	6 1/2	10 1/2	24 3/8
135	22	12 3/8	21	28 1/4	19 13/16	3	1 11/16	3/8 x 3/16	--	--	22 7/8	30 1/8	19 1/8	28 3/8	35 7/16	24 7/16	6 9/16	15 7/16	7 1/8	11	25 7/8
150	24 7/16	13 3/4	22 3/4	31 3/8	22 3/8	3 1/2	1 11/16	3/8 x 3/16	--	--	25 7/16	33 5/16	21 1/16	30 1/2	38 5/8	26 3/8	7 1/8	17	8	12 1/2	28 1/2
165	26 7/8	15 1/8	24 1/4	33 1/8	23 1/2	3 1/2	1 11/16	3/8 x 3/16	--	--	28	36 5/8	23 3/16	32 5/8	41 3/4	28 5/16	7 3/4	18 1/2	8 3/4	13	30 1/4
182	29 11/16	16 3/4	27	36 3/8	26 1/8	4 1/2	1 11/16	3/8 x 3/16	1 11/16	3/8 x 3/16	30 11/16	40 1/8	25 5/16	35 1/4	45 1/2	30 11/16	8 3/8	20 1/2	9 5/8	14	32 1/2
200	32 11/16	18 7/16	29	39	27 15/16	4 1/2	1 11/16	3/8 x 3/16	1 11/16	3/8 x 3/16	33 1/2	44 1/16	28 3/16	37 15/16	49 1/2	33 3/16	9 3/16	22 7/16	10 5/8	15	35 1/8
222	36 5/16	20 1/2	32 1/4	43 1/2	31 3/16	5	1 15/16	1/2 x 1/4	1 15/16	1/2 x 1/4	37 13/16	49 1/4	31 1/8	41 1/2	55 1/16	36 15/16	10 3/16	25 1/16	11 1/2	17	39 5/8
245	40	22 9/16	34 1/2	48	34 5/8	6	2 3/16	1/2 x 1/4	2 3/16	1/2 x 1/4	41 7/16	53 11/16	33 3/4	44 9/16	59 3/8	39 7/16	11 1/4	27 3/8	12 5/8	18 1/2	43 1/4
270	44	24 13/16	37	52	37 5/8	6	2 3/16	1/2 x 1/4	2 3/16	1/2 x 1/4	45 7/16	59 1/8	37 3/16	48 5/16	64 9/16	42 5/8	12 1/4	30 1/16	13 7/8	20 1/2	47 1/4
300	48 15/16	27 9/16	42	58 1/8	42 3/16	7	2 7/16	5/8 x 5/16	2 7/16	5/8 x 5/16	50 7/8	65 3/4	41 5/16	53 9/16	72	47 9/16	13 9/16	33 7/16	15 5/8	22 1/2	52 3/8
330	53 3/4	30 5/16	45	62 5/8	45 7/16	7	2 11/16	5/8 x 5/16	2 11/16	5/8 x 5/16	55 11/16	72 1/8	45 5/16	58 1/16	78 3/8	51 9/16	14 13/16	36 5/16	17 1/8	24 1/2	56 7/8
365	59 5/8	33 5/8	48	66 3/4	48 1/4	7	2 11/16	5/8 x 5/16	2 11/16	5/8 x 5/16	61 1/2	79 5/16	49 9/16	62 7/8	85 5/16	55 9/16	16 1/8	40 5/16	18 5/8	26	61
402	65 11/16	37 1/16	52 1/2	73 3/4	52 5/8	8	2 11/16	5/8 x 5/16	2 11/16	5/8 x 5/16	68 1/8	87 1/8	54 3/8	68 13/16	93 1/2	60 3/4	18 1/4	44 11/16	20 3/8	28	68 1/4
445	72 9/16	40 15/16	56 1/2	80 1/4	57 9/16	8	3 7/16	7/8 x 7/16	3 7/16	7/8 x 7/16	74 7/8	95 5/16	59 1/8	77 3/16	102 9/16	66 3/8	19 13/16	49 5/16	22 3/8	31	74 3/8
490	79 13/16	45	61 1/2	86 3/4	62 3/16	9	3 7/16	7/8 x 7/16	3 7/16	7/8 x 7/16	82 5/16	105	65 3/16	83 3/4	112 1/4	72 7/16	21 11/16	53 15/16	24 7/8	33	80 1/8
542	88 7/16	49 7/8	68	92 1/2	65 1/16	9	3 15/16	1 x 1/2	3 15/16	1 x 1/2	90 13/16	115 11/16	71 9/16	92 1/8	123 5/8	79 1/2	24 1/16	60 1/16	27 1/8	34	86 7/8
600	97 3/4	55 1/8	74	100 1/2	70 3/4	9 1/2	4 15/16	1 1/4 x 5/8	4 15/16	1 1/4 x 5/8	100 1/8	127 3/16	78 7/16	100 1/8	135 1/4	86 1/2	26 3/8	66 1/16	30 1/8	37	94 1/2
660	107 3/16	60 9/16	81	110 1/8	76 13/16	10	4 15/16	1 1/4 x 5/8	4 15/16	1 1/4 x 5/8	109 5/8	140 7/16	87	110 1/16	149 3/16	95 3/4	29 7/16	72 15/16	32 5/8	40	104 5/8
730	119	67 1/4	89	119 1/4	83 1/4	10 1/2	4 15/16	1 1/4 x 5/8	4 15/16	1 1/4 x 5/8	121 1/4	157 1/8	97 7/8	121 1/2	163 5/8	104 3/8	32 1/8	80 5/16	36 5/8	43	113
807	131 11/16	74 3/16	96 1/2	128 1/4	89 1/4	10 1/2	5 7/16	1 1/4 x 5/8	5 7/16	1 1/4 x 5/8	134	173 13/16	108 1/16	133 11/16	180 7/16	114 11/16	35 1/8	88 1/2	40 3/8	46	122
890	145 5/8	81 11/16	107 1/2	137 7/8	95 13/16	11	5 7/16	1 1/4 x 5/8	5 7/16	1 1/4 x 5/8	148 15/16	191	118 3/4	147 3/16	191 3/16	128 15/16	38 3/16	97 5/16	45 7/8	49	131 1/8

Tolerance ± 1/8 Not to be used for construction. Certified drawings available upon request.

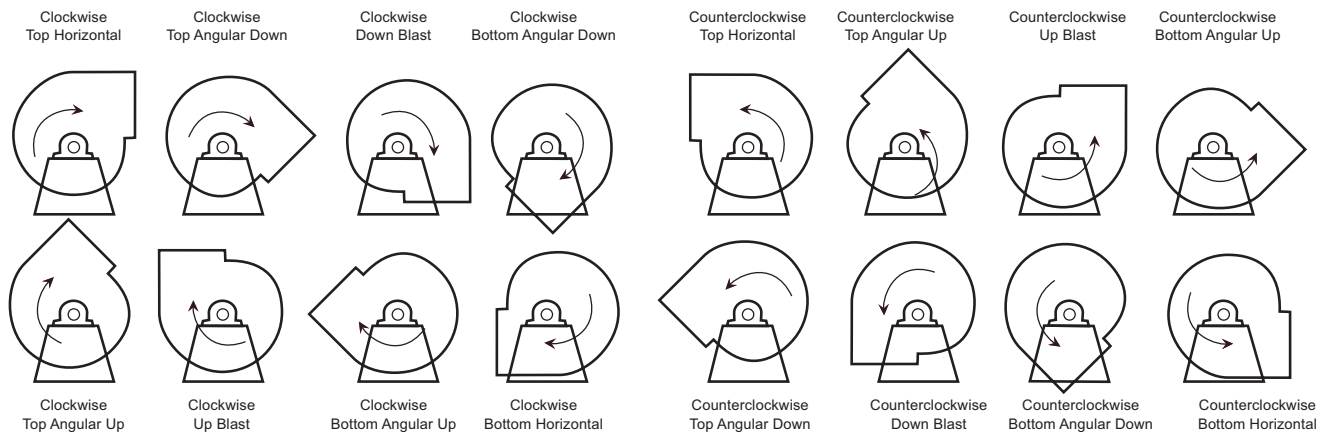
AMCA Fan Class Operating Limits



The diagram above is a reproduction of AMCA Standard 2408-69 which indicates the operating limits for Classes I, II and III centrifugal fans. Since fans are selected on the basis of outlet velocity and static pressure, class selection for a fan can easily be made by locating the fan's desired performance on the chart. All values are based on air handled at 70°F and 29.92" barometer.

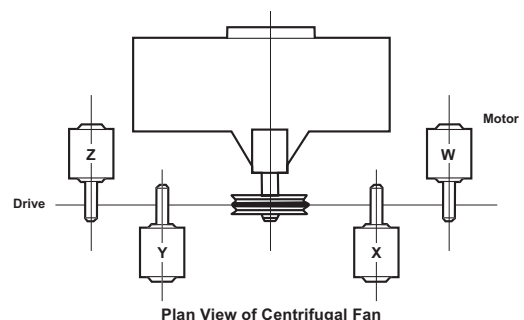
Rotation and Discharge

The direction of rotation is determined from the drive side of the fan. On single inlet fans, drive side is always opposite the fan inlet. On double inlet fans, drive side is the side with the extended shaft. The direction of discharge is determined in accordance with the diagrams below. The angle of discharge is referred to the horizontal axis of fan and designated in degrees above or below such standard reference axis.



Motor Positions

The diagram on the right indicates the standard terms for identifying motor position on the drive side of the fan. The location of the motor is determined by facing the drive side of the fan and designating the position by the letters, W, X, Y and Z. These positions are commonly used with Arrangements 1 and 3.

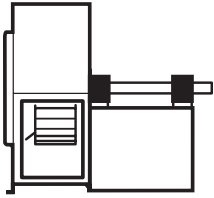


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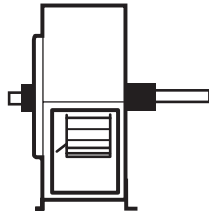
Engineering Notes

VCR Fan

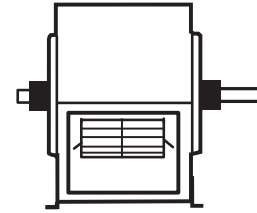
Drive Arrangements for Centrifigbual Fans



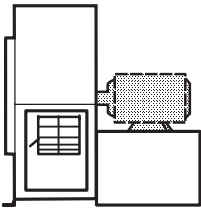
ARR. 1 SWSI For belt drive or direct connection. Impeller overhung. Two bearings on base.



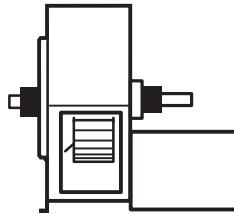
ARR. 3 SWSI For belt drive or direct connection. One bearing on each side and supported by fan housing.



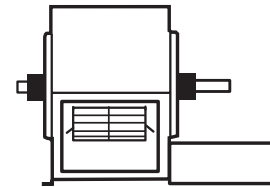
ARR. 3 DWDI For belt drive or direct connection. One bearing on each side and supported by fan housing.



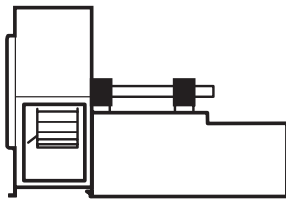
ARR. 4 SWSI For direct drive. Impeller overhung on prime mover shaft. No bearings on fan. Prime mover base mounted or integrally direct connected.



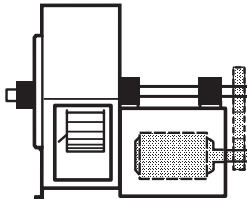
ARR. 7 SWSI For belt drive or direct connection. Arrangement 3 plus base for prime mover.



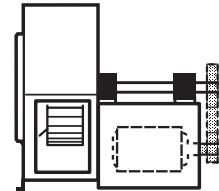
ARR. 7 DWDI For belt drive or direct connection. Arrangement 3 plus base for prime mover.



ARR. 8 SWSI For belt drive or direct connection. Arrangement 1 plus extended base for prime mover.

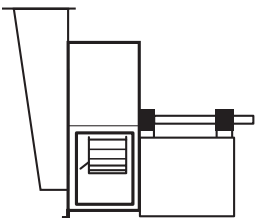


ARR. 9 SWSI For belt drive. Impeller overhung, two bearings, with prime mover outside base.

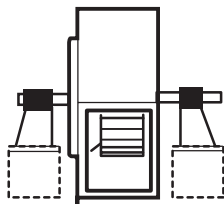


ARR. 10 SWSI For belt drive. Impeller overhung, two bearings, with prime mover inside base.

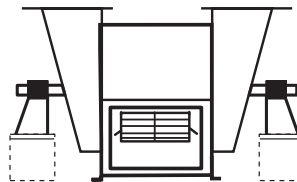
Inlet Boxes and Bearing Pedestals



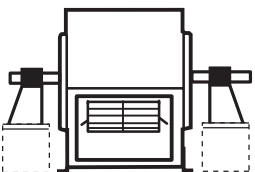
ARR. 1 SWSI with Inlet Box For belt drive or direct connection. Impeller overhung, two bearings on base. Inlet box may be self-supporting.



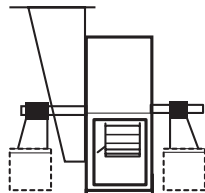
ARR. 3 SWSI with Independent Pedestals For belt drive or direct connection fan. Housing is self-supporting. One bearing on each side supported by independent pedestals.



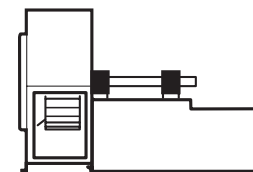
ARR. 3 DWDI with Inlet Box and Independent Pedestals For belt drive or direct connection fan. Housing is self-supporting. One bearing on each side supported by independent pedestals with shaft



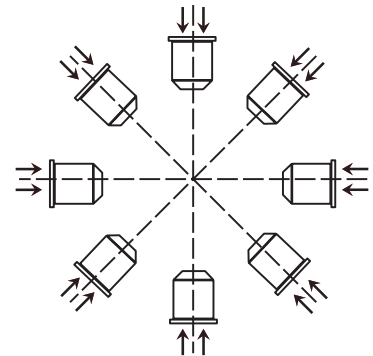
ARR. 3 DWDI with Independent Pedestals For belt drive or direct connection fan. Housing is self-supporting. One bearing on each side supported by independent pedestals.



ARR. 3 SWSI with Inlet Box and Independent Pedestals For belt drive or direct connection fan. Housing is self-supporting. One bearing on each side is supported by independent pedestals with shaft extending through inlet box.



ARR. 8 SWSI with Inlet Box For belt drive or direct connection. Impeller overhung, two bearings on base plus extended base for prime mover. Inlet box may be self-supporting.



1. Reference line is the top vertical axis through center of fan shaft.
2. Position of inlet box and air entry to inlet box is determined from DRIVE SIDE OF FAN.
3. Position of inlet box is designated in degrees clockwise from top vertical axis as shown, and may be any intermediate angle as required.
4. Positions 135° to 225° in some cases interfere with floor structure.

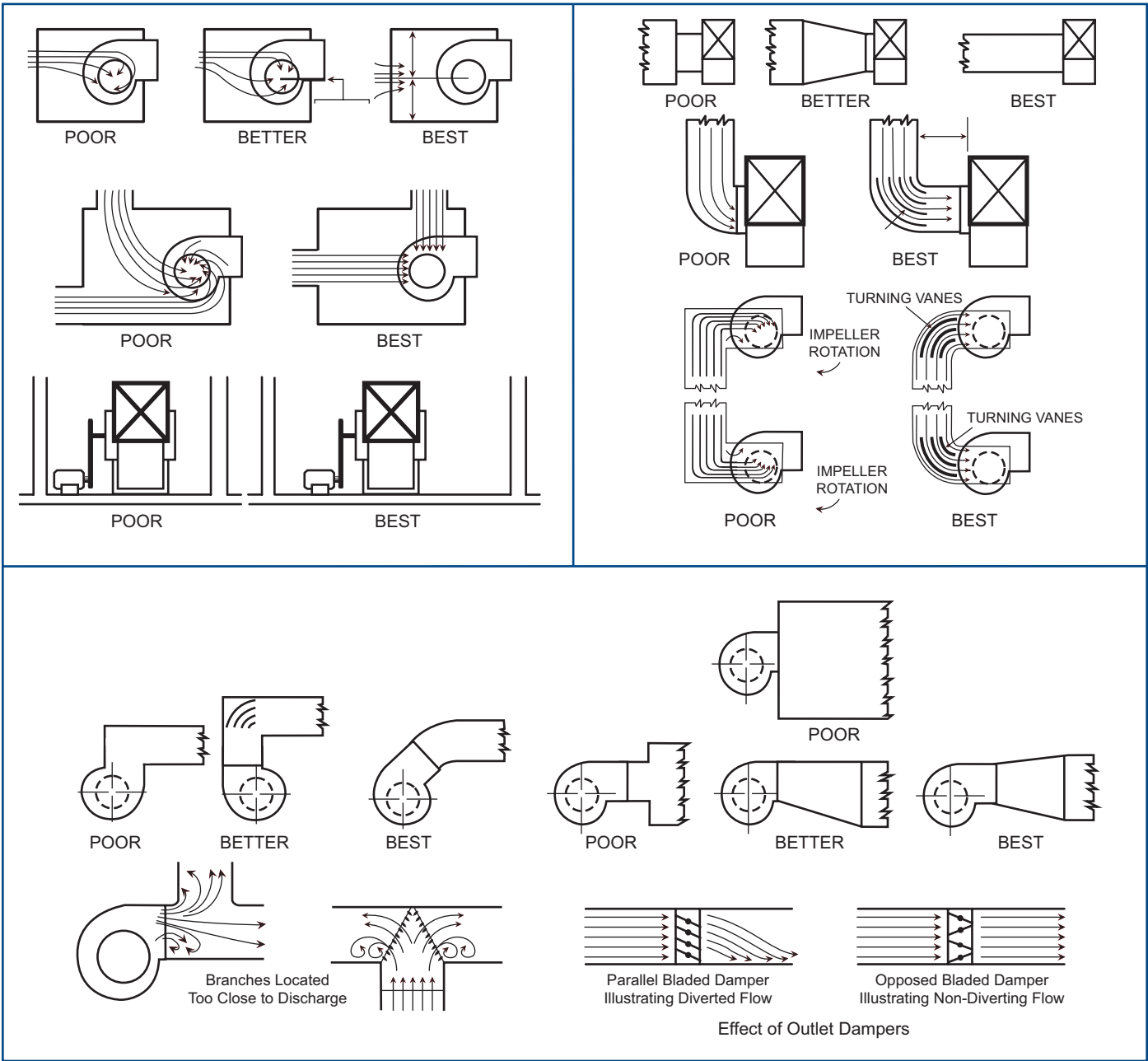
Special attention should be paid to **Fan Installation**. Improper installation will adversely affect fan and system performance resulting in increased energy usage. Improper installation will also increase noise levels. The ideal fan installation has long sections of straight duct attached to the fan inlet and discharge. However, ideal conditions are frequently not possible.

Duct elbows and branches located too close to the fan, and abrupt changes in duct size are some features that cause airstream turbulence. The impact of these features can be minimized by proper placement, use of turning vanes and use of smooth transition sections. Fan inlets should not be

obstructed; fans should be installed at least one inlet diameter from walls. In addition, pre-spin of inlet air should be avoided. Inlet pre-spin always reduces fan efficiency, no matter whether the pre-spin is with the fan rotation or against fan rotation.

The sketches below are intended to show correct and incorrect methods for handling the most common fan installations.

Several good references are available on the subjects of fan performance and fan installation. Some of these references are published by AMCA and ASHRAE. Another excellent source of information is your PennBarry representative.



Engineering Notes

VCR Fan

A fan operating at any given speed has the potential for delivering numerous different combinations of volumes and static pressures. Volume is normally expressed in cubic feet per minute (CFM); static pressure (SP) is normally expressed in inches of water gauge. Plotting all the potential combinations, or operating points, results in a smooth pressure-volume curve. See "Typical Performance Curve" on the next page. The specific point of operation for a fan running at a given RPM is determined by the system in which the fan is running. The relative position of that operating point on the curve can be expressed as a percent of free delivery.

Fan laws are a set of simple mathematical equations which are used to determine the effects of various changes on a fan operating under a given set of circumstances. For example, if the speed of a fan in a fixed system is increased, the following results will occur:

- Air volume will increase in a direct proportion to the increase in speed,
- Static pressure will increase as the square of the increase in speed, and
- Brake horsepower will increase as the cube of the increase in speed.

The following fan laws will cover most application questions. Equations can be combined if, for example, the effects of changing both air volume and air density must be calculated.

Effect of Varying Speed

Fan size and gas density remain constant.

$$CFM_c = CFM \times \left(\frac{RPM_c}{RPM} \right) \quad SP_c = SP \times \left(\frac{RPM_c}{RPM} \right)^2$$

$$TP_c = TP \times \left(\frac{RPM_c}{RPM} \right)^2 \quad VP_c = VP \times \left(\frac{RPM_c}{RPM} \right)^2$$

$$BHP_c = BHP \times \left(\frac{RPM_c}{RPM} \right)^3$$

Effect of Changing Density

Fan size and speed remain constant.

$$CFM_c = CFM \quad SP_c = SP \times d_c / d$$

$$TP_c = TP \times d_c / d \quad VP_c = VP \times d_c / d$$

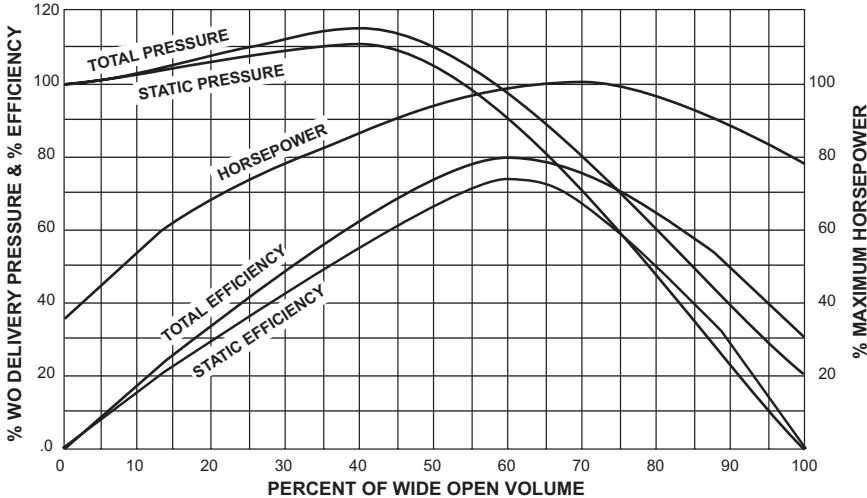
$$BHP_c = BHP \times d_c / d$$

Metric and Imperial Conversion Factors

MEASUREMENT	IMPERIAL UNIT	METRIC UNIT	CONVERSION FACTOR*
Volume Flow Rate	cfm (ft ³ /min)	cubic meters per second (m ³ /sec)	4.7195 x 10 ⁻⁴
	cfm (ft ³ /min)	cubic meters per hour (m ³ /h)	1.6990
	cfm (ft ³ /min)	liters per second (l/s)	4.7195 x 10 ⁻¹
	cfs (ft ³ /sec)	cubic meters per second (m ³ /s)	2.8316 x 10 ⁻²
Pressure	inches w.g.	pascal (pa or N/m ²)	2.4909 x 10 ²
	inches w.g.	kilopascal (kPa)	2.4909 x 10 ⁻¹
	inches w.g.	millibar (mbar)	2.4909
	inches Hg.	kilopascal (kPa)	3.3864
Power	hp (bhp or ahp)	watt (W or J/s)	7.4570 x 10 ²
	hp	kilowatt (kW)	7.4570 x 10 ⁻¹
Torque	lbf-in (lb-force-in)	newton meter (Nm)	1.1298 x 10 ⁻¹
	lbf-ft (lb-force-ft)	newton meter (Nm)	1.3558
Density	lb/ft ³	kilogram per cubic meter (kg/m ³)	1.6018 x 10
Tip Speed Outlet Velocity or Duct Velocity	fpm (ft/min)	meters per second (m/s)	5.0800 x 10 ⁻³
	fps (ft/sec)	meters per second (m/s)	3.0480 x 10 ⁻¹
	mph (miles/hr)	meters per second (m/s)	4.4704 x 10 ⁻¹
Dimensions	inches	millimeters (mm)	2.5400 x 10
	feet	meter (m)	3.0480 x 10 ⁻¹
	thou (mil) = .001 in	micrometer (µm)	2.5400 x 10
Moment of Inertia	lb-ft ²	kilogram meter squared (kg m ²)	4.2140 x 10 ⁻²
	slug-ft ²	kilogram meter squared (kg m ²)	1.3558
Energy (Work or Heat Equivalent)	hp hr (horsepower hour)	megajoule (MJ)	2.6845
	Btu (British thermal unit)	Kilojoule (kJ)	1.0551
	ft-lbf	joule (J)	1.3558
	kW hr	megajoule (MJ)	3.6000
Temperature	°F	kelvin	(°F + 459.67) ÷ 1.8
	°F	celsius (°C)	(°F - 32) ÷ 1.8

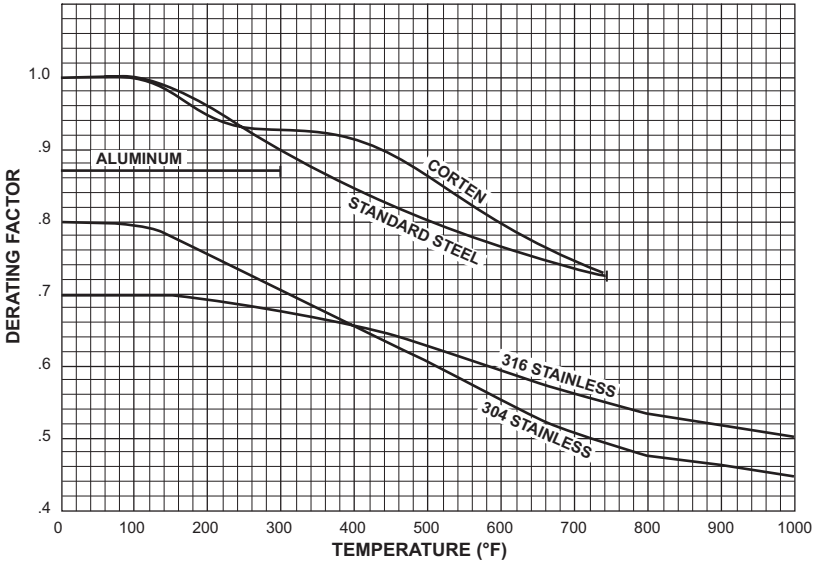
*Multiply imperial unit by this factor to obtain metric unit, except on temperature conversions.

Typical Performance Curve for Backward Inclined and Airfoil Fans

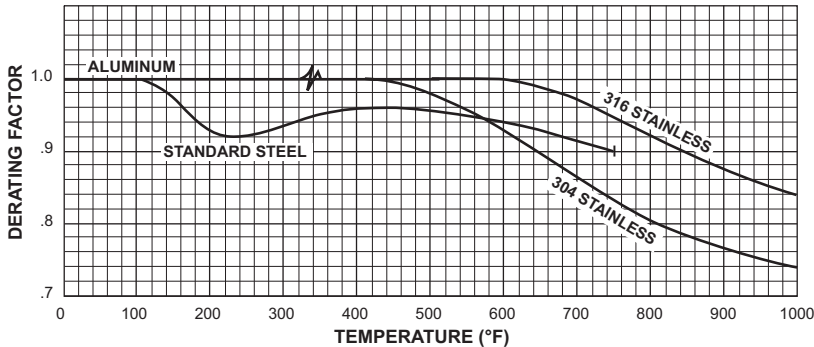


RPM Reduction Factors for High Temperature Operation

BACKWARD INCLINED WHEELS



AIRFOIL WHEELS



Engineering Notes

VCR Fan

Density Correction and Fan Selection

The performance tables which begin on page 20 enable you to determine precise speed and power requirements. Note that maximum efficiency points are in bold. For sound information refer to the backward inclined and airfoil "Sound Power Levels" section.

In accordance with AMCA standards, VCR performance tables are based on the standard air density of .075 lbs./cu. ft. This is the density of dry air at 70°F at 29.92" Hg barometric pressure (sea level).

To use the performance tables for densities other than .075:

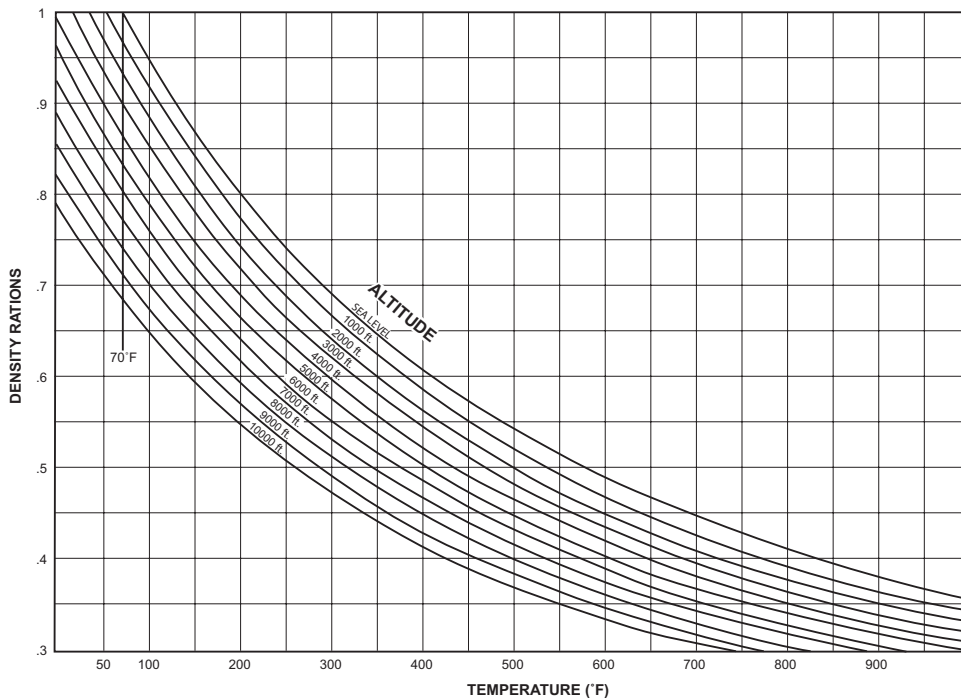
1. Determine the density ratio from the graph on this page using the actual temperature and altitude.
2. Divide the actual static pressure by the density ratio to establish the standard (equivalent) static pressure.
3. Use the standard static pressure and actual CFM to determine the fan RPM and brake horsepower (BHP) from the appropriate performance table.
4. Multiply the BHP from the table by the density ratio to find the actual BHP. It should be noted that a high temperature fan is often started up moving cold air. In such cases, motor starting requirements should reflect the actual air density at start up conditions.

Fan Selection Example: A single width airfoil fan is specified for the following job requirements: 15,000 CFM; 2.75" SP; 350°F air temperature; 2,000 feet above sea level; maximum outlet velocity (OV) 2,000 feet per minute.

1. From the graph below, the air density ratio is determined to be 0.61.

2. Divide the 2.75" actual static pressure by the air density ratio. The resulting standard (equivalent) static pressure is 4.5".
3. A quick examination of SWSI airfoil tables reveals that five different size fans, 270 through 402, can handle 15,000 CFM at 4.5" SP. However, the 2,000 FPM maximum outlet velocity reduces the possible fan selections to sizes 365 and 402 only. Since the 365 is more efficient, has a lower first cost, and takes up less space than the 402, the 365 is obviously the best selection.
4. The performance table indicates that the 365 AF will run at 993 RPM at 13.21 BHP. However, the BHP shown is based on a density of .075 lbs./cu. ft. and should be adjusted to actual conditions. Multiplying 13.21 BHP by the density ratio 0.61 gives the actual BHP of 8.06. While the fan is running at the specified conditions, a 10 horsepower motor will be sufficient, but cold air startup may require the use of a larger motor.
5. To be sure the 365 AF Class I fan is suitable for this application, the maximum wheel RPM must be checked at the operating temperature. From page 10 the maximum RPM for steel wheel at standard temperatures is found to be 1124. By using the bottom table on page 111, the de-rating factor for steel at 350°F is .955. Therefore, the maximum RPM at 350°F is $1124 \times .955 = 1073$, well above the 993 RPM required in this example.
6. The maximum allowable operating temperature for a single width VCR fan with standard construction is 300°F. Therefore, in this example situation, a 500°F heat fan package (see page 8) must be ordered on the fan selected.

Air Density Ratios at various altitudes and air temperatures



Furnish and install as shown on the plans the VCR airfoil and backward inclined fans as manufactured by PennBarry of Richardson, TX 75081. Unless otherwise noted, all fans shall conform to the layout shown on the drawings. Motor horsepowers and outlet velocities shall not be exceeded.

Fans shall be constructed of low carbon steel and painted with an approved corrosion resistant coating. Each fan shall receive a documented inspection by a qualified inspector before leaving the factory. The inspection will include welding, dimensions, bearings and overall workmanship.

Wheels and Housings

The wheel diameters and discharge areas shall be in accordance with the standard sizes adopted by AMCA for non-overloading fans. Wheels shall be the efficient, non-overloading airfoil or backward inclined types only. Inlets shall be fully streamlined and housings shall be suitably braced to prevent vibration or pulsation. Housings shall be constructed of heavy-gauge steel and shall be continuously welded throughout. The standard coating shall be durable and heat resistant up to 500°F.

Shaft and Bearings

The first critical shaft speed of Class I or II fans shall be at least 125% of the fan's maximum operating speed. The first critical speed of Class III and IV fans shall be at least 142% of the fan's maximum operating speed. Bearings shall be designed for heavy-duty service with a minimum L_{10} life of 20,000, 40,000 or 80,000 hours. Bearings ratings are based on the fan's maximum cataloged operating speed. Bearings shall be either single row or double row spherical roller type in a one-piece cast iron housing, or a double row spherical roller type in a split cast iron pillowblock. Bearings shall be rigidly supported on heavy structural supports.

Accessories

Accessories shall be provided as called for in the plans and specifications. Required accessories include special bearings, spark resistant construction, access door, drain, variable inlet vanes with stainless steel rods, discharge shutter, discharge screen, shaft seal, inlet flange, discharge flange, companion flanges, belt guard, weather cover, and split housing.

Performance

Fan performance shall be based on tests conducted in accordance with AMCA Standard Test Code for Air Moving Devices. All fans shall have a sharply rising pressure characteristic extending through the operating range and continuing to rise well beyond the efficiency peak to assure quiet and stable operation under all conditions. Horsepower characteristics shall be truly non-overloading and shall reach a peak in the normal selection area. Fan manufacturer shall provide sound power ratings in the eight octave bands which shall be based on AMCA Standard 300-05, test setup number 1. Sound power ratings shall be in decibels referenced 10^{-12} watts.

Balancing

A factory dynamic balance shall be made on all fans after their assembly. An IRD or PMC analyzer shall be used to measure velocity, and the final reading shall not exceed 0.1 inches per second.

Submittals

Submittals for approval of equipment shall include _____ copies of outline drawings, sound power ratings, and pressure-volume performance curves showing point of operation.

One Year Limited Warranty

Centrifugal Fan – VCR

What Products Are Covered

PennBarry Commercial and Industrial Fans (each, a “PennBarry Product”)

One Year Limited Warranty For PennBarry Products

PennBarry warrants to the original commercial purchaser that the PennBarry Products will be free from defects in material and workmanship for a period of one (1) year from the date of shipment.

Exclusive Remedy

PennBarry will, at its option, repair or replace (without removal or installation) the affected components of any defective PennBarry Product; repair or replace (without removal or installation) the entire defective PennBarry Product; or refund the invoiced price of the PennBarry Product. In all cases, a reasonable time period must be allowed for warranty repairs to be completed.

What You Must Do

In order to make a claim under these warranties:

1. You must be the original commercial purchaser of the PennBarry Product.
2. You must promptly notify us within the warranty period of any defect and provide us with any substantiation that we may reasonably request.
3. The PennBarry Product must have been installed and maintained in accordance with good industry practice and any specific PennBarry recommendations.

Exclusions

These warranties do not cover defects caused by:

1. Improper design or operation of the system into which the PennBarry Product is incorporated.
2. Improper installation.
3. Accident, abuse or misuse.
4. Unreasonable use (including any use for non-commercial purposes, failure to provide reasonable and necessary maintenance as specified by PennBarry, misapplication and operation in excess of stated performance characteristics).
5. Components not manufactured by PennBarry.

Limitations

1. In all cases, PennBarry reserves the right to fully satisfy its obligations under the Limited Warranties by refunding the invoiced price of the defective PennBarry Product (or, if the PennBarry Product has been discontinued, of the most nearly comparable current product).
2. PennBarry reserves the right to furnish a substitute or replacement component or product in the event a PennBarry Product or any component of the product is discontinued or otherwise unavailable.
3. PennBarry’s only obligation with respect to components not manufactured by PennBarry shall be to pass through the warranty made by the manufacturer of the defective component.

General

The foregoing warranties are exclusive and in lieu of all other warranties except that of title, whether written, oral or implied, in fact or in law (including any warranty of merchantability or fitness for a particular purpose).

PennBarry hereby disclaims any liability for special, punitive, indirect, incidental or consequential damages, including without limitation lost profits or revenues, loss of use of equipment, cost of capital, cost of substitute products, facilities or services, downtime, shutdown or slowdown costs.

The remedies of the original commercial purchaser set forth herein are exclusive and the liability of PennBarry with respect to the PennBarry Products, whether in contract, tort, warranty, strict liability or other legal theory shall not exceed the invoiced price charged by PennBarry to its customer for the affected PennBarry Product at the time the claim is made.

Inquiries regarding these warranties should be sent to: PennBarry, 1401 North Plano Road, Richardson, TX 75081.

OTHER PENNBARRY PRODUCTS

CENTRIFUGAL PRODUCTS



Domex
Centrifugal
Roof Exhausters



Fumex Fatrap
Kitchen Hood Centrifugal
Roof Exhausters



Zephyr
Ceiling and Inline Fans



Dynamo
Centrifugal Blowers



Centrex Inliner
Centrifugal Inline Fans



LC Dynafan
Low Contour Centrifugal
Roof Exhausters

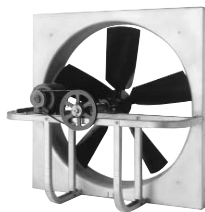


ESI
Efficient Silent
Inline Fan



Fume Exhaust
Curb Mounted
Centrifugal Fans

AXIAL / GRAVITY PRODUCTS



Breezeway
Propeller Wall Fans



HI-EX
Power Roof Ventilator



Tubeaxial
Inline Fans



Vaneaxial
Inline Fans



Powered Airette
Axial Roof Ventilators



Airette
Gravity Intake/Relief Hood



Domex Axial
Axial Roof Ventilators



Axcentrix
Bifurcator Fan

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