

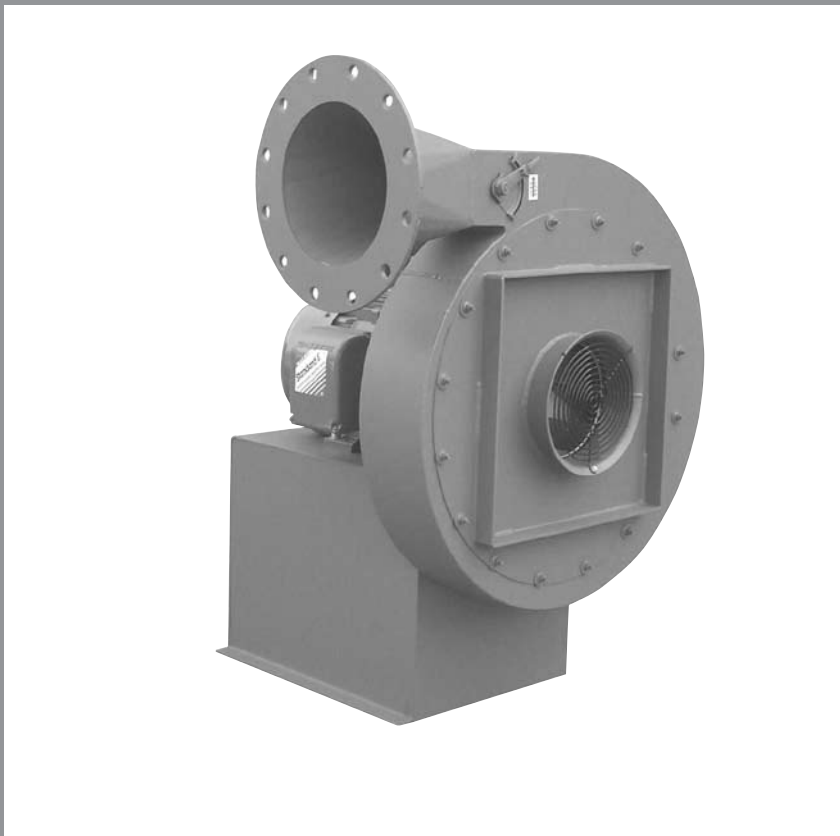
BULLETIN 1250

May 2009

Twin City Fan & Blower

TURBO PRESSURE BLOWERS

TYPE TBNA and TBNS



TBN Turbo Pressure Blowers

Introduction

The TBN series of fans are low volume, high-pressure blowers designed for stable operation throughout their operating range. Multiple outlet sizes and wheel diameters allow the most efficient selections across a wide range of operating points. These units incorporate a high efficiency wheel design at an economical price.

- Pneumatic conveying
- Exhausting
- Combustion air
- Air knives
- Chemical processes
- Thermal oxidation
- Aeration
- Seal air

Capabilities

- Static pressures to 57" w.g.
- Airflow capabilities to 5400 CFM
- High temperature applications to 600°F
- For higher performance requirements, see below.



*TBNA
Aluminum
Wheel*



*TBNS
Steel
Wheel*

Wheel Construction

TBNA

The TBNA offers a radial air handling wheel of riveted aluminum construction. A standard split taper-lock bushing allows for easy wheel removal from shaft. This wheel is available in both narrow "N" and wide "W" widths for optimum performance and high efficiency. The TBNA is designed to handle clean air applications with temperatures up to 200°F. The TBNA wheel is a non-reversible design.

TBNS

The TBNS is an all welded radial design steel wheel that is available in a variety of special materials. The TBNS wheel is furnished with a split taper-lock bushing for easy removal and maintenance. This wheel is available in both narrow "N" and wide "W" widths to meet specific performance requirements. The TBNS is designed to handle fumes, light particulates, and temperatures up to 600°F. The TBNS design is less efficient than the TBNA and requires a BHP correction. See the table in the Engineering Data section for correction factors. The TBNS wheel is a reversible design.

Housing Construction

All TBN fans come standard with heavy gauge, continuously welded steel housings and pedestals for rugged, heavy duty, long term service. All housings are reversible and rotatable. TBN fans come standard with an inlet venturi with screen and a round punched flanged outlet connection.



Type TBA

Twin City Fan & Blower also offers the Type TBA/TBR, Type MBO/MBR/MBW, and Type BCN Pressure Blowers. These blowers offer multiple outlet sizes and a variety of wheel designs and diameters to allow the most efficient selections across a wide range of operating points.

Capabilities: Static pressures to 125" w.g., volumes to 75,000 CFM, high temperature applications to 800°F.

Refer to Bulletins 1200 (TBA/TBR), 1400 (MBO/MBR/MBW), and 1450 (BCN) for more specific information.



Type MBO

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Arrangements

Arrangement 1 (Belt Driven)

The fan wheel on an Arrangement 1 is overhung on the shaft, i.e., mounted at the end of the shaft. The motor can be mounted in any of the four AMCA standard motor positions, W, X, Y or Z. The two fan bearings are mounted on the bearing pedestal, out of the airstream.

Maximum Temperatures:

200°F Aluminum Wheel – TBNA

300°F Steel Wheel – TBNS

600°F High Temperature Construction – TBNS

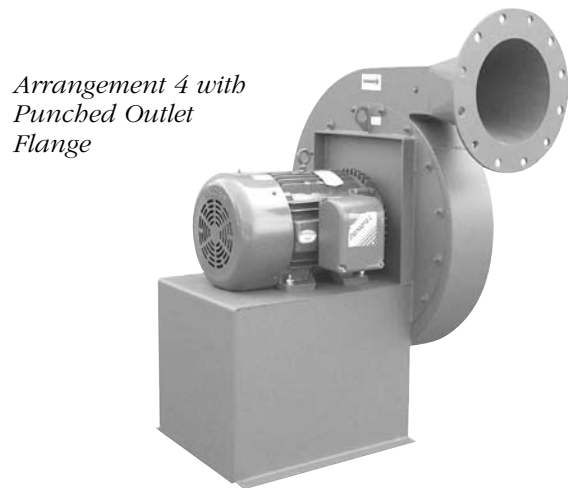


*Arrangement 1
with Optional Shaft
& Bearing Guard*

Arrangement 4 (Direct Drive)

The fan wheel on an Arrangement 4 is mounted directly on the motor shaft with the motor mounted on a pedestal. An Arrangement 4 offers a compact, low maintenance design, as there are no fan bearings, fan shaft or drive parts to maintain.

Maximum Temperature: 180°F.



*Arrangement 4 with
Punched Outlet
Flange*

Arrangement 8 (Direct Drive)

An Arrangement 8 is a modified version of an Arrangement 1 used for direct drive. The bearing pedestal is extended to accommodate the motor. A flexible coupling connects the fan and motor shaft.

Maximum Temperatures:

200°F Aluminum Wheel – TBNA

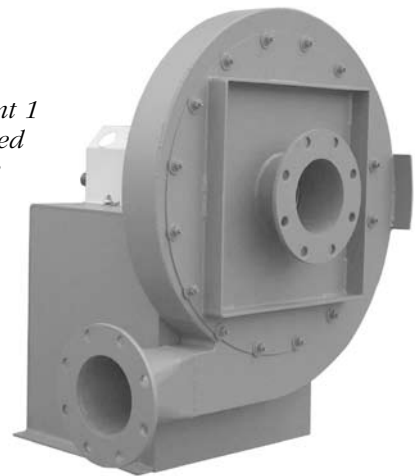
300°F Steel Wheel – TBNS

600°F High Temperature Construction – TBNS

*Arrangement 4
with Inlet Venturi
& Screen*



*Arrangement 1
with Punched
Inlet Flange*



Inlet and Outlet Connections/Accessories

Inlet Connections

The following inlet connections are available at no additional charge:

Inlet Venturi with Screen

Recommended for all non-ducted inlet installations to obtain catalog performance. Unless otherwise specified, an inlet venturi with screen will be furnished.

Flanged Inlet

For bolted pipe or duct connections. Flanged inlet is punched to ANSI 125/150 hole pattern.

Inlet Pipe Assembly

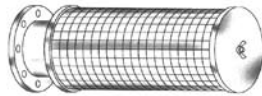
For slip-on pipe or duct connections.

Inlet Accessories

The following optional inlet side accessories are available:

Inlet Filter

Cleanable wire mesh filter with mounting assembly. Filter suitable for atmospheric air only and cannot be used in a ducted inlet application. Fan must be specified with flanged inlet.

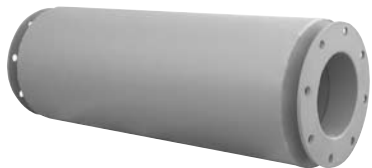


Inlet Filter With Hood

Inlet filter described above with a hood to protect against the elements.

Inlet Silencer

Welded steel construction with acoustical absorption material to reduce noise emanating from fan inlet. Flanged connection is suggested for mounting to the inlet of the fan. The opposite end of the silencer can be furnished with an inlet venturi, inlet flange, or inlet pipe assembly. Unless otherwise specified, the silencer will be furnished with flanges (punched) at both ends.



Outlet Connections

Flanged Outlet

Outlet flange punched to ANSI 125/150 hole pattern for bolted connection is standard.

Plain Pipe Outlet

An optional plain pipe outlet is available for slip type connections. Refer to the dimensional drawings.

Outlet Accessories

The following optional outlet side accessories are available:

Flexible Connector for Flanged Outlet

Companion flange with rubber sleeve and clamps offers flexible connection between the fan and outlet ductwork. Flexible rubber sleeve is good to 200°F operation.



Flexible Connector for Plain Pipe Outlet

Rubber sleeve with clamps for fans ordered with optional plain pipe outlet.

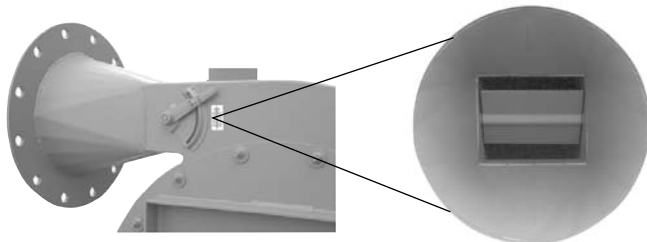


Outlet Blast Gate

A wafer-type butterfly valve for mounting to outlet flange allows controlling flow to full shutoff. Available for automatic control. Maximum temperature 250°F.

Built-in Outlet Damper

A low cost single blade damper installed near the discharge of the fan housing for volume control where moderate leakage can be allowed. Available for manual control only.



Outlet Silencer

Reduces noise emanating from fan outlet. Construction similar to inlet silencer.

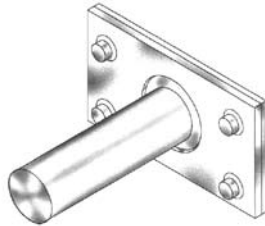
Accessories

Shaft Closure Plate

Aluminum plate to reduce air leakage from the fan housing.

Shaft Seal

Standard shaft seal is a ceramic felt material sandwiched between the housing and an aluminum retaining plate. Seal is good to 600°F. Shaft seal does not make fan gas tight. Contact factory for tighter sealing options.



Drain

Standard 3/4" NPT half coupling located at the lowest point of the housing. Available with or without plug.

Inspection Port

Heavy duty bolted panel provides access for wheel inspection.

Shaft & Bearing Guards

OSHA style to enclose the shaft and bearings. Painted safety yellow.

Belt Guards

OSHA style to enclose the V-belt drive. Painted safety yellow.

Coupling Guards

OSHA style to enclose the coupling. Painted safety yellow.

Unitary Base (Arrangement 1 only)

Steel structural base for mounting fan and motor on common structure. Allows for complete assembly of fan, motor, and v-belt drive. Must be bolted to a rigid support structure.

Isolation Base (Arrangements 1 and 4)

Unitary base with 1" deflection isolators. Not recommended for Arr. 8.

Inertia Base (All Arrangements)

Steel structural base complete with 1" deflection isolators and rebar. Concrete by others.

Vibration Rails

Available for Arrangement 4 with RIS isolators.

Motors

Twin City Fan & Blower provides and recommends 3600 RPM motors with cast housings and cast feet or with a full length fabricated steel base for trouble-free operation.

Optional Construction

High Temperature Construction

Available for Model TBNS only.

301 to 500°F Package includes shaft seal, shaft cooler with guard, high temperature grease, and TCF blue enamel paint.

501 to 600°F Package includes shaft seal, shaft cooler with guard, high temperature grease, and high temperature aluminum paint.

Special Materials Stainless steel and other special alloys are available in the type TBNS radial design.

Spark Resistant Construction

Available for Model TBNA only. Fan applications may involve the handling of fumes or vapors. Such applications require careful consideration by the system

designer to insure the safe handling of such gases. Twin City Fan & Blower offers the following classifications of spark resistant construction per AMCA Standard 99-0401-86. It is the specifier's or the user's responsibility to specify the type of spark resistant construction with full recognition of the potential hazards and the degree of protection required.

Construction

Type A All parts of the fan in contact with the airstream must be made of nonferrous material — usually aluminum and limited to 200°F.

Type B The fan shall have a nonferrous wheel and nonferrous rub ring about the opening through which the shaft passes — usually aluminum wheel and rub ring and limited to 200°F.

Type C Not available.

Engineering Data

Steel Wheel (TBNS) Horsepower Correction Factors

(Increase BHP from curves when using steel wheel)

SIZE	BHP CORRECTION FACTOR
14N to 18N	1.03
14W to 18W	1.09
19N to 22N	1.14
19W to 22W	1.12
23N to 26N	1.10
23W to 26W	1.10

Pressure Conversions

MULTIPLY	BY	TO OBTAIN
PSI	27.7123	IN. W.G.
PSI	16	OSI
OSI	1.732	IN. W.G.
OSI	0.0625	PSI
IN. W.G.	0.57737	OSI
IN. W.G.	0.03609	PSI

PSI = Pounds per square inch

OSI = Ounces per square inch

In. W.G. = Inches water gauge

Material Specifications

SIZE	HOUSING			MOTOR BASE	SHAFT DIA. ARR. 1 & 8	CODE ARR. 1 & 8	BEARING MAX. RPM	
	SIDES	SCROLL	FRAME				TBNA	TBNS ①
14 to 18	10 GA.	10 GA.	0.25" x 2"	0.25"	1 ³ / ₁₆	XHDB	4000	4000
19 to 22	10 GA.	10 GA.	0.25" x 2"	0.25"	1 ⁷ / ₁₆	RB	3900	3900
23 to 26	10 GA.	10 GA.	0.25" x 2"	0.25"	1 ⁷ / ₁₆	RB	3800	3600

Due to speed and load ratings, bearing substitution is not permitted. XHDB = Extra heavy duty ball bearings such as Link Belt P-U319

RB = Roller bearings such as Link Belt PB22423

① Derating of speed is not required for stainless steel or high temperature construction.

Bare Fan Weights (Lbs.)

SIZE	ARRANGEMENT 1		ARRANGEMENT 4		ARRANGEMENT 8	
	TBNA	TBNS	TBNA	TBNS	TBNA	TBNS
14N to 18N	202	212	185	195	282	292
14W to 18W	218	230	201	213	298	310
19N to 22N	278	292	252	266	395	409
19W to 22W	335	351	309	325	452	468
23N to 26N	392	432	366	406	524	564
23W to 26W	445	473	419	447	577	605

Inlet Suction Pressure Correction

If the inlet pressure is suction or negative, the static pressure required must be corrected by the inlet density ratio.

Example: Operating conditions: 70°F at sea level. System resistance at the inlet of the fan is 40".

The correction factor from the table at right is 0.902, or it can be calculated as follows:

$$(407.5 - 40") \div 407.5 = 0.902$$

Equivalent static pressure to be used for selection from the standard performance curves:

$$40" \div 0.902 = 44.36"$$

Actual air density at the inlet of the fan:

$$0.075 \text{ lb/ft}^3 \times 0.902 = 0.0676 \text{ lb/ft}^3$$

Wheel Weights and WR² (moment of inertia in lb-ft²)

SIZE	WHEEL			
	TBNA (ALUMINUM)		TBNS (STEEL)	
	WT. (LB)	WR ² (LB-FT ²)	WT. (LB)	WR ² (LB-FT ²)
14N	10.5	3.3	13.1	1.9
14W	10.5	4.0	12.8	2.0
15N	10.6	3.4	14.6	2.5
15W	10.6	4.1	14.6	2.7
16N	10.7	3.5	16.2	3.2
16W	10.7	4.2	16.5	3.4
17N	10.8	3.7	18.0	4.0
17W	10.9	4.5	18.5	4.3
18N	11.0	3.9	19.8	5.0
18W	11.1	4.7	20.5	5.4
19N	14.7	8.1	21.7	6.1
19W	14.9	9.7	22.0	6.4
20N	14.8	8.4	23.7	7.4
20W	15.2	10.1	24.1	7.8
21N	15.0	8.8	25.8	8.9
21W	15.5	10.6	26.4	9.5
22N	15.2	9.3	28.0	10.7
22W	15.8	11.2	28.8	11.3
23N	19.8	16.8	43.2	19.3
23W	21.1	21.6	43.9	20.3
24N	20.1	17.5	46.8	22.7
24W	21.5	22.5	47.8	24.1
25N	20.3	18.2	50.6	26.6
25W	21.9	23.4	51.9	28.2
26N	20.5	19.0	54.5	31.0
26W	22.3	24.4	56.1	32.9

Inlet Suction Pressure Correction Factors

INLET SUCTION PRESSURE (IN. W.G.)	CORRECTION FACTOR
5	0.988
10	0.975
15	0.963
20	0.951
25	0.939
30	0.926

INLET SUCTION PRESSURE (IN. W.G.)	CORRECTION FACTOR
35	0.914
40	0.902
45	0.890
50	0.877
55	0.865
60	0.853

Correction Factor = (407.5 - Inlet Suction Pressure) ÷ 407.5

Performance Data

Selection

The performance curves shown are for type TBNA and are based on standard air density: 70°F at sea level (0.075 lb/ft³). A brake horsepower correction factor must be applied for type TBNS (see page 6).

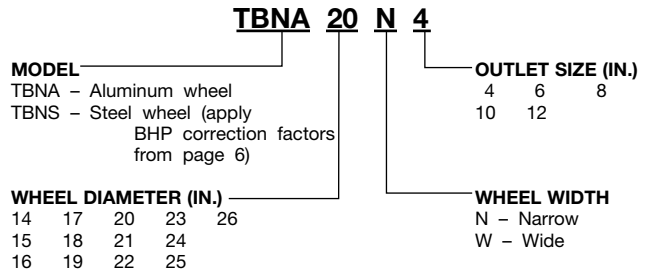
Selection Steps

1. Locate the CFM required on the horizontal axis.
2. Follow a vertical line up to the fan curve closest to the required SP. This will determine the fan size. The dotted lines represent system characteristic curves.
3. Interpolate BHP.

Selection Example:

Size = 22N4 RPM = 3500
 Density = 0.075 lb/ft³ Outlet Velocity = 5727 FPM
 CFM = 500 BHP (TBNA) = 4.85
 SP = 33.8" BHP (TBNS) = 4.85 x 1.14 = 5.53

Model Nomenclature

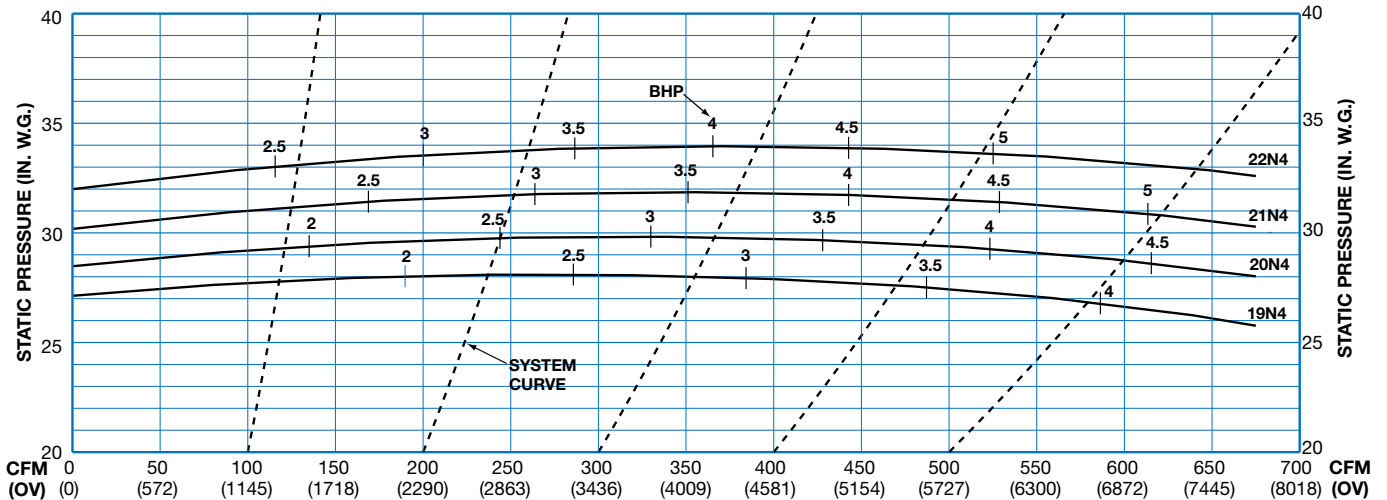


4 In. Outlet

Outlet Area: 0.09 ft²

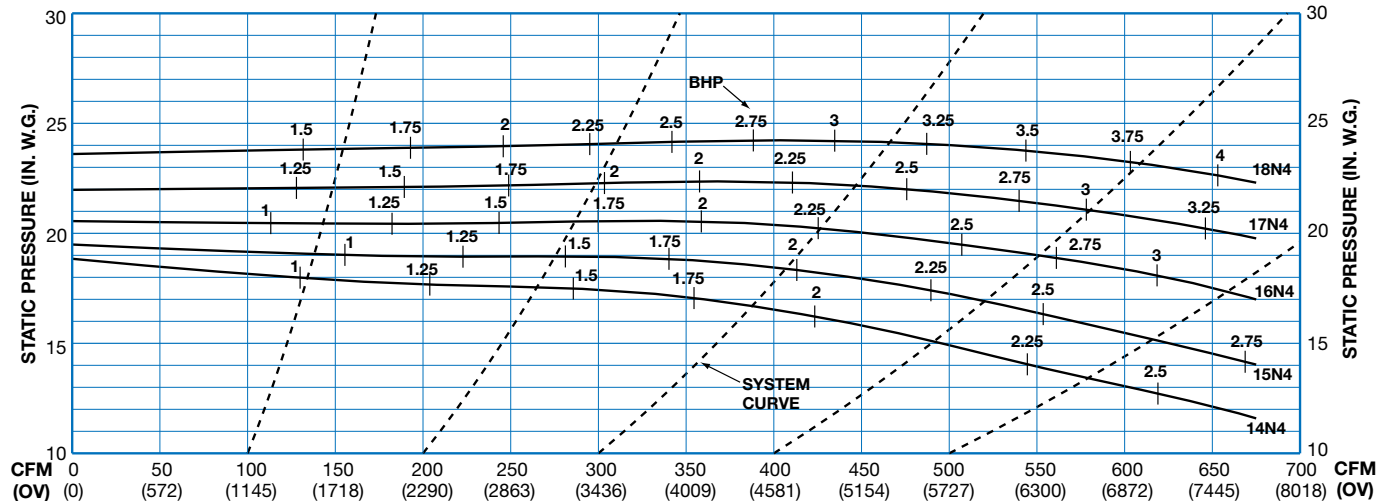
19N4, 20N4, 21N4, 22N4

3500 RPM



14N4, 15N4, 16N4, 17N4, 18N4

3500 RPM



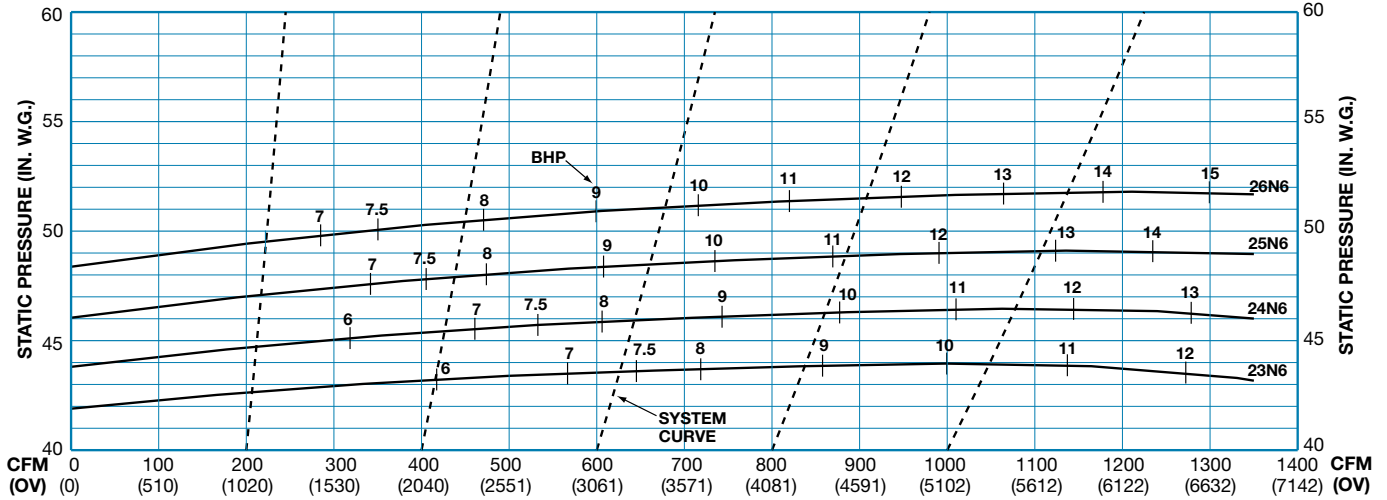
Performance shown is with a ducted outlet, and a ducted inlet or inlet with venturi.

6 In. Outlet

Outlet Area: 0.20 ft²

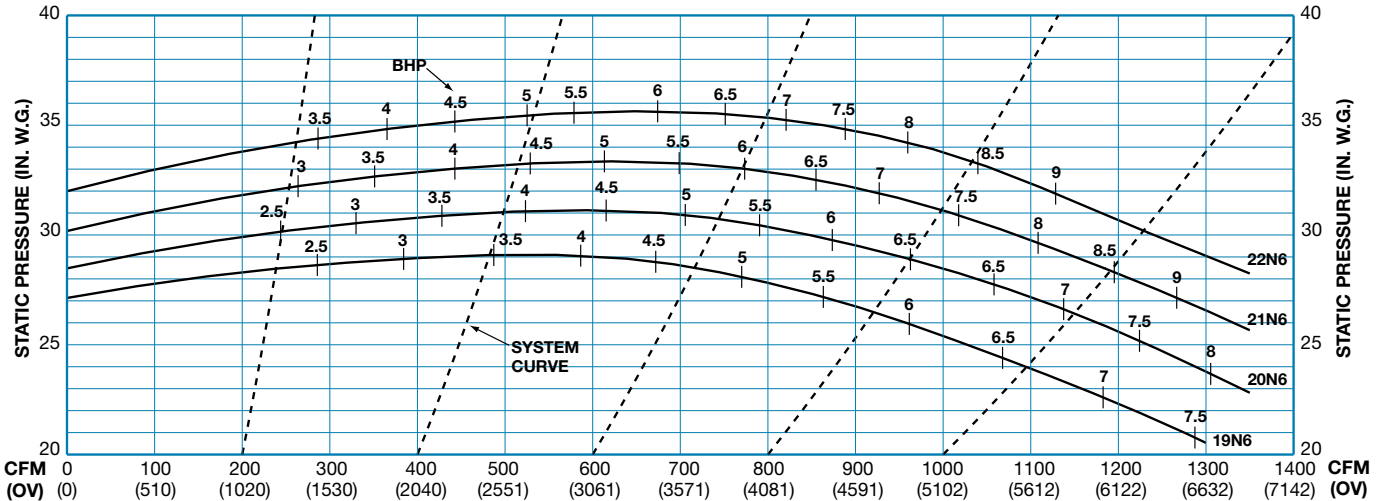
23N6, 24N6, 25N6, 26N6

3500 RPM



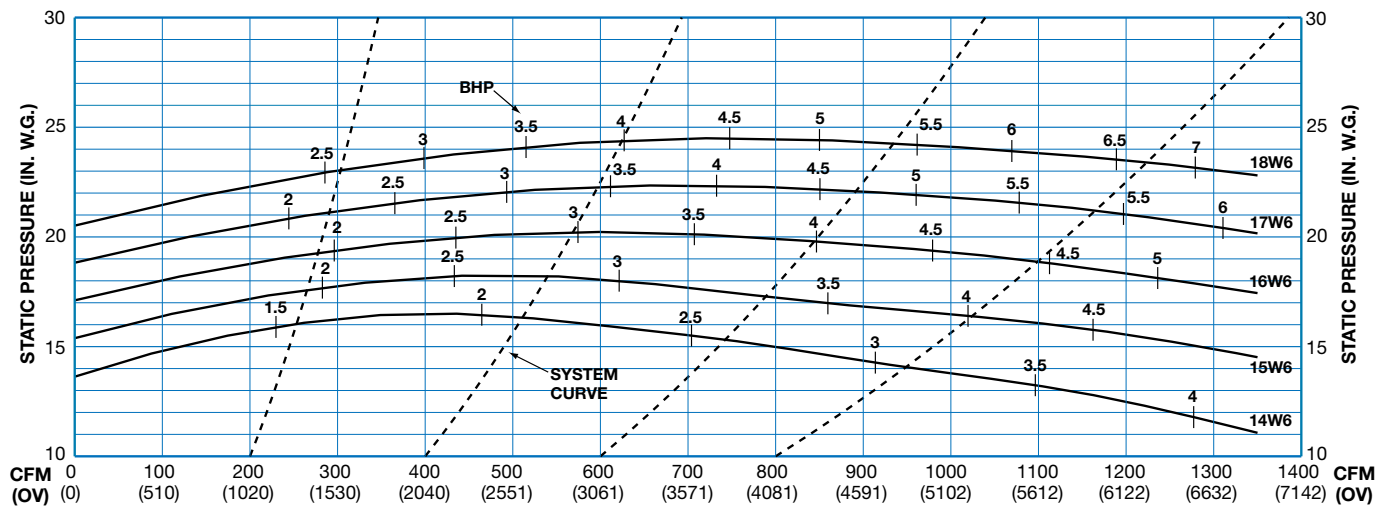
19N6, 20N6, 21N6, 22N6

3500 RPM



14W6, 15W6, 16W6, 17W6, 18W6

3500 RPM



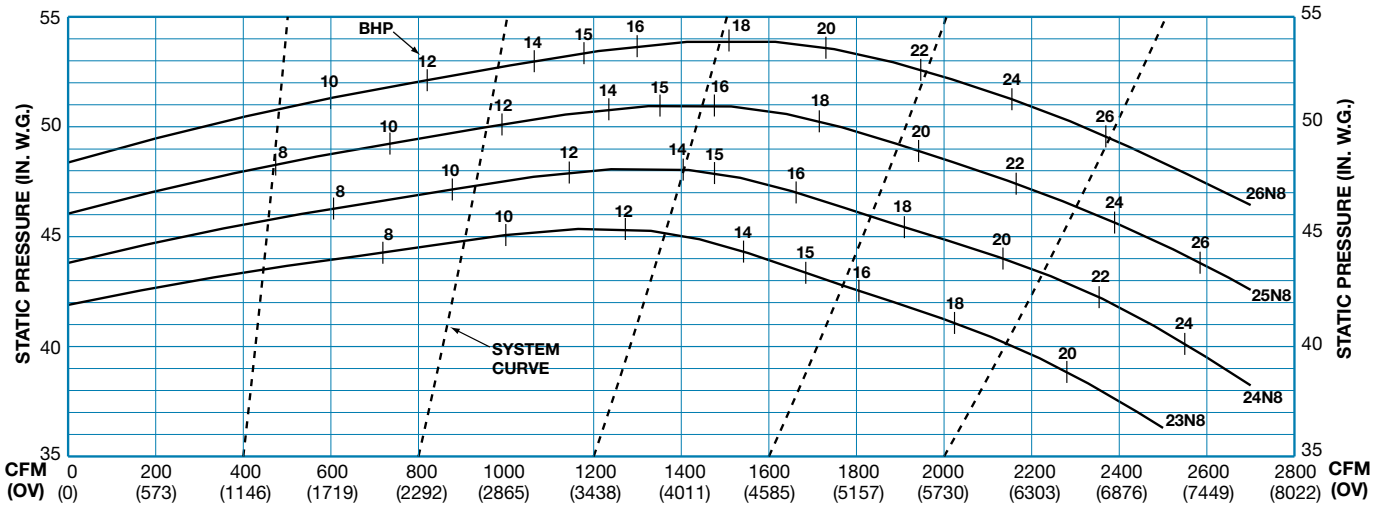
Performance shown is with a ducted outlet, and a ducted inlet or inlet with venturi.

8 In. Outlet

Outlet Area: 0.35 ft²

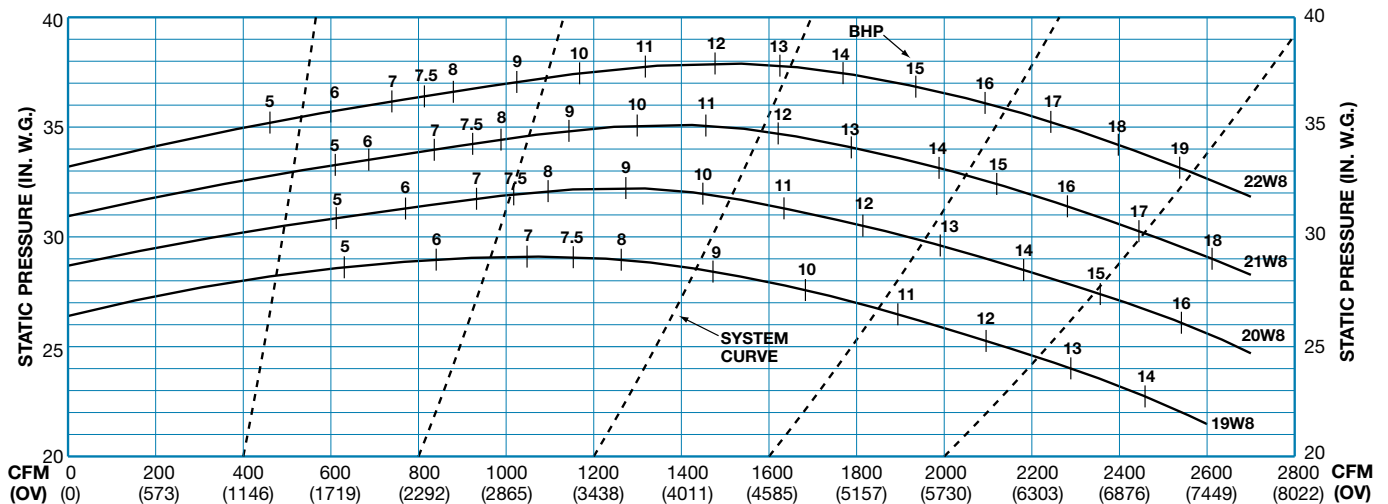
23N8, 24N8, 25N8, 26N8

3500 RPM



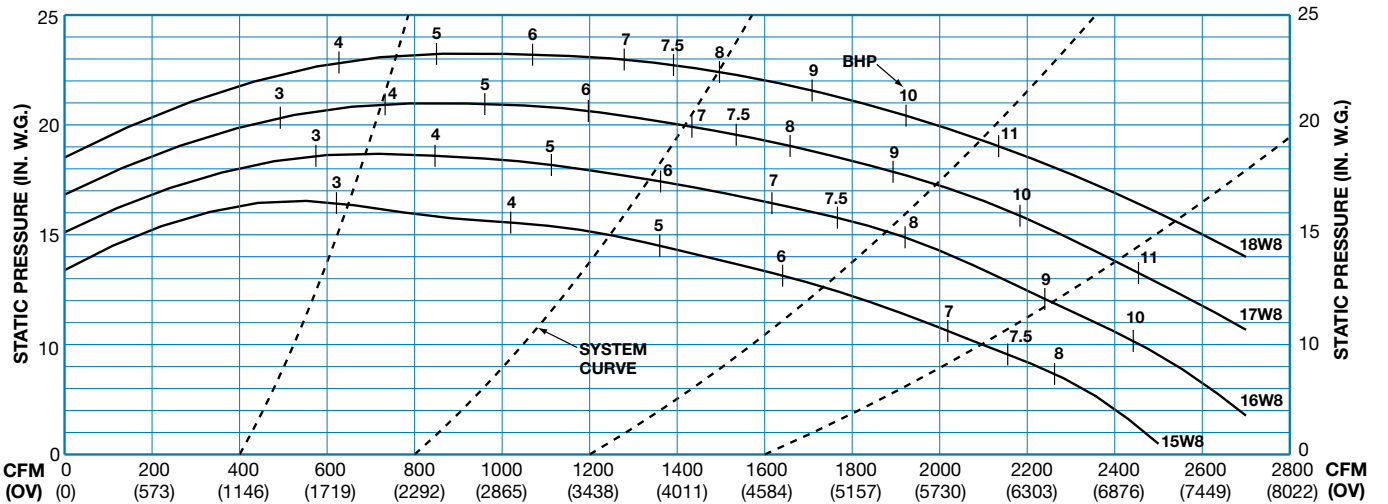
19W8, 20W8, 21W8, 22W8

3500 RPM



15W8, 16W8, 17W8, 18W8

3500 RPM



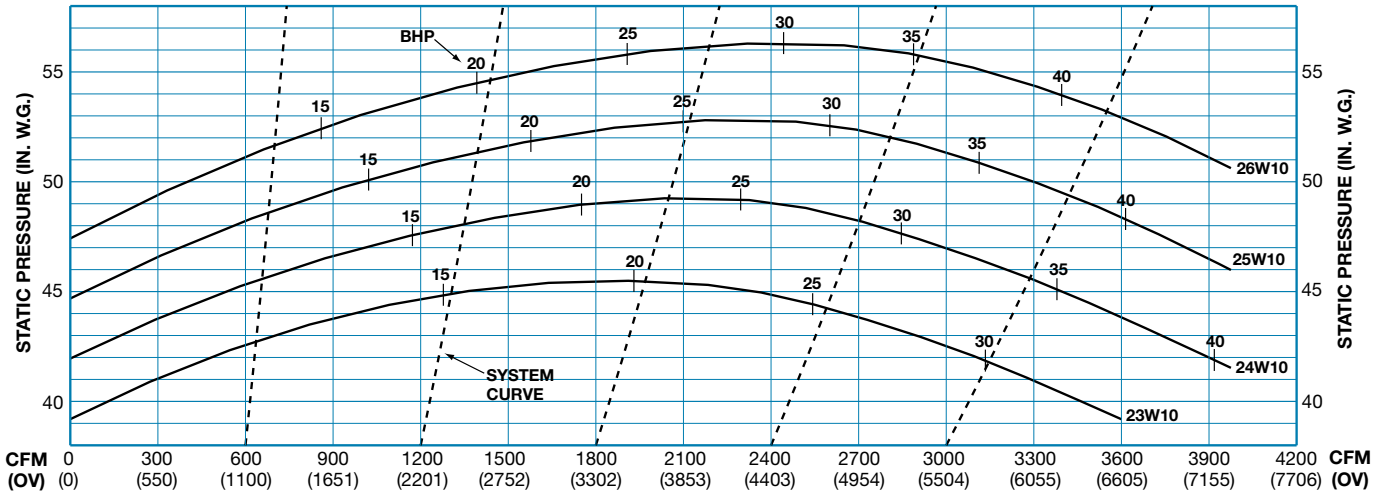
Performance shown is with a ducted outlet, and a ducted inlet or inlet with venturi.

10 In. Outlet

Outlet Area: 0.55 ft²

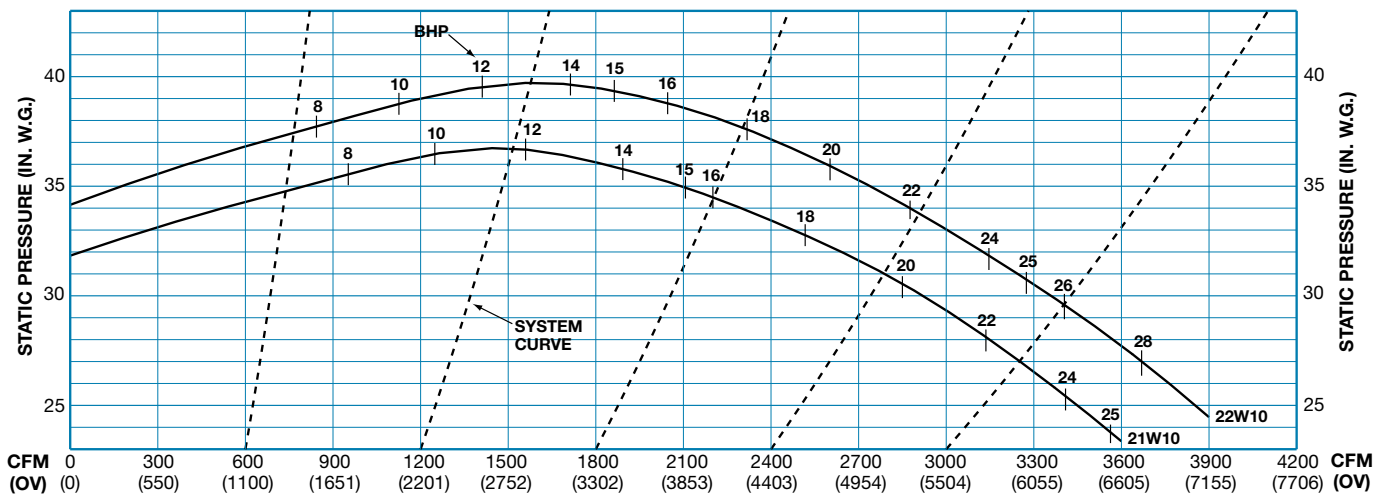
23W10, 24W10, 25W10, 26W10

3550 RPM



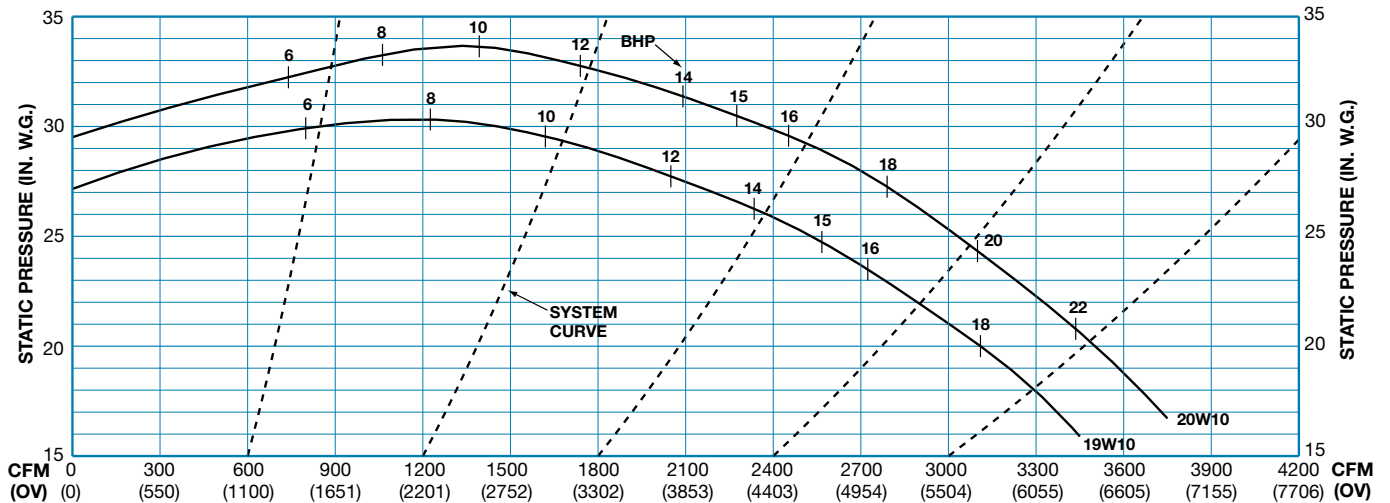
21W10, 22W10

3550 RPM



19W10, 20W10

3550 RPM



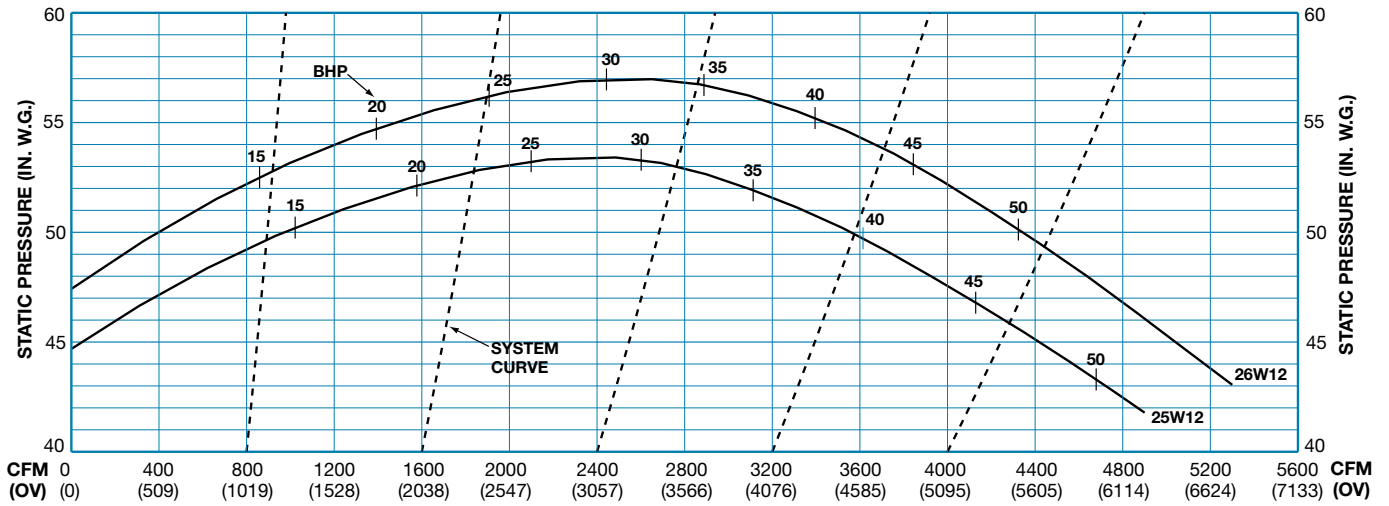
Performance shown is with a ducted outlet, and a ducted inlet or inlet with venturi.

12 In. Outlet

Outlet Area: 0.79 ft²

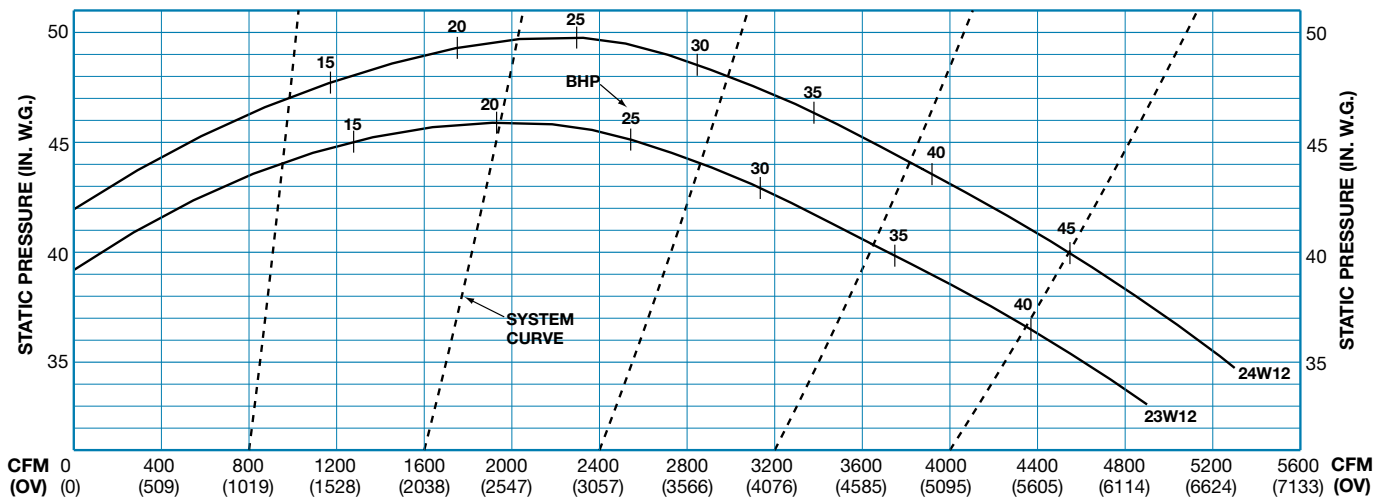
25W12, 26W12

3550 RPM



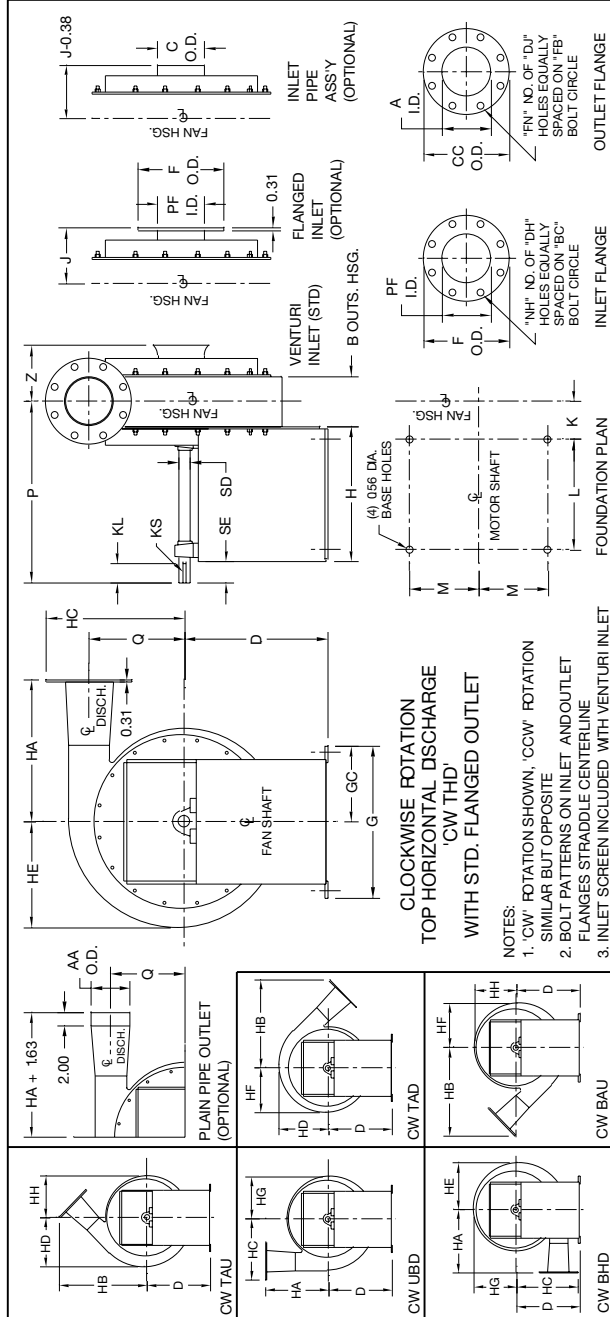
23W12, 24W12

3550 RPM



Performance shown is with a ducted outlet, and a ducted inlet or inlet with venturi.

TYPE 'BMA' AND 'BMS' APP. 15W51 ROTATABLE		DRAWN 12/20/99
TWIN CITY FAN & BLOWER		REVISED 10/01/03
MINNEAPOLIS, MINNESOTA 55442		DWG. No. BC16177D
JOB:	LOC.:	
S.O. NO.:		
CERT. BY:	DISCH	ROT
SIZE	SP	RPM
CRM	BHP	OV
ACCESSORIES REQD		
TS		



SIZE	A	AA	B	BC	C	CC	D	DH	DJ	F	FB	FN	G	GC	H	HA	HB	HC	HD	HE	HF	HG	HH	J	K	KL	KS	L	M	NH	P	PF	Q	SD	SE	Z
14N4, 15N4, 16N4, 17N4, 18N4	4.00	4.50	3.88	9.50	6.63	9.00	17.75	0.88	0.75	11.00	7.50	8	19.50	9.75	11.63	18.25	24.44	16.31	14.00	13.63	13.19	12.75	12.31	5.66	3.38	2.38	25x.13	8.63	8.88	8	16.19	6.00	11.75	1.19	2.63	4.56
14W6, 15W6, 16W6, 17W6, 18W6	6.00	6.63	6.25	11.75	8.63	11.00	17.75	0.88	0.88	13.50	9.50	8	19.50	9.75	11.63	18.25	25.13	17.31	14.00	13.63	13.19	12.75	12.31	6.69	4.50	2.38	25x.13	8.63	8.88	8	17.38	8.00	11.75	1.19	2.63	6.38
17W8, 18W8	8.00	8.63	6.25	11.75	8.63	13.50	17.75	0.88	0.88	13.50	11.75	8	19.50	9.75	11.63	18.25	26.00	18.56	14.00	13.63	13.19	12.75	12.31	6.69	4.50	2.38	25x.13	8.63	8.88	8	17.38	8.00	11.75	1.19	2.63	6.38
19N4, 20N4, 21N4, 22N4	4.00	4.50	3.88	9.50	6.63	9.00	23.00	0.88	0.75	11.00	7.50	8	23.50	11.75	17.13	17.75	26.25	19.38	17.00	16.50	16.00	15.50	15.00	6.06	3.38	3.25	38x.19	14.13	10.88	8	23.06	6.00	14.88	1.44	4.00	4.56
19N6, 20N6, 21N6, 22N6	6.00	6.63	3.88	9.50	6.63	11.00	23.00	0.88	0.88	11.00	9.50	8	23.50	11.75	17.13	17.75	26.94	20.38	17.00	16.50	16.00	15.50	15.00	6.06	3.38	3.25	38x.19	14.13	10.88	8	23.06	6.00	14.88	1.44	4.00	4.56
19W8, 20W8, 21W8, 22W8	8.00	8.63	6.25	11.75	8.63	13.50	23.00	0.88	0.88	13.50	11.75	8	23.50	11.75	17.13	17.75	27.88	21.63	17.00	16.50	16.00	15.50	15.00	6.69	4.50	3.25	38x.19	14.13	10.88	8	24.13	8.00	14.88	1.44	3.88	6.38
19W10, 20W10, 21W10, 22W10	10.00	10.75	6.25	14.25	8.63	16.00	23.00	1.00	1.00	16.00	14.25	12	23.50	11.75	17.13	17.75	31.56	22.88	17.00	16.50	16.00	15.50	15.00	6.69	4.50	3.25	38x.19	14.13	10.88	12	24.13	10.00	14.88	1.44	3.88	6.38
23N6, 24N6, 25N6, 26N6	6.00	6.63	5.00	11.75	8.63	11.00	24.00	0.88	0.88	13.50	9.50	8	23.50	11.75	17.13	19.00	29.81	23.13	20.00	19.50	18.88	18.25	17.69	6.94	3.88	3.88	38x.19	14.13	10.88	8	24.13	8.00	17.63	1.44	4.50	5.25
23N8, 24N8, 25N8, 26N8	8.00	8.63	5.00	11.75	8.63	13.50	24.00	0.88	0.88	13.50	11.75	8	23.50	11.75	17.13	19.00	30.69	24.38	20.00	19.50	18.88	18.25	17.69	6.94	3.88	3.88	38x.19	14.13	10.88	8	24.13	8.00	17.63	1.44	4.50	5.25
23W10, 24W10, 25W10, 26W10	10.00	10.75	7.25	14.25	10.75	16.00	24.00	1.00	1.00	16.00	14.25	12	23.50	11.75	17.13	23.00	34.38	25.63	20.00	19.50	18.88	18.25	17.69	7.19	5.00	3.88	38x.19	14.13	10.88	12	25.25	10.00	17.63	1.44	4.50	6.88
23W12, 24W12, 25W12, 26W12	12.00	12.75	7.25	17.00	10.75	19.00	24.00	1.00	1.00	19.00	17.00	12	23.50	11.75	17.13	23.00	35.44	27.13	20.00	19.50	18.88	18.25	17.69	7.19	5.00	3.88	38x.19	14.13	10.88	12	25.25	12.00	17.63	1.44	4.50	6.88

DIMENSIONS ARE NOT TO BE USED FOR CONSTRUCTION. CERTIFIED DRAWINGS AVAILABLE UPON REQUEST.

Typical Specifications

Fans shall be Type TBNA or TBNS Turbo Pressure Blowers as manufactured by Twin City Fan & Blower, Minneapolis, Minnesota.

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

HOUSING – Fan housings shall be constructed of continuously welded heavy gauge steel and shall be rotatable and reversible. A choice of inlet connections at no additional charge shall include an inlet venturi with screen, an inlet pipe assembly and a punched flange to ANSI 125/150. The outlet connection shall be flanged and punched to ANSI 125/150 with the option of a plain pipe assembly.

WHEEL – Type TBNA wheels shall be constructed of aluminum alloy with riveted construction. Type TBNS wheels shall be constructed of continuously welded heavy gauge steel or from a variety of special materials. Wheels shall be available in narrow and wide widths to meet specific performance requirements. Wheels shall be statically and dynamically balanced. The complete fan assembly shall be test balanced at the operating speed prior to shipment.

SHAFT (ARR. 1 & 8 ONLY) – Shafts shall be AISI 1040 or 1045 hot rolled steel, accurately turned, ground, polished, and ring gauged for accuracy. Shafts shall be sized for the first critical speed of at least 1.43 times the maximum speed.

BEARINGS (ARR 1, 8 ONLY) – Bearings shall be heavy duty, grease lubricated, anti-friction ball or roller, self-aligning, pillow block type and selected for a minimum average bearing life (AFBMA L-50) in excess of 200,000 hours at the maximum fan RPM.

FINISH AND COATING – The entire fan assembly, excluding the shaft, shall be thoroughly degreased and deburred before application of a rust-preventative primer. After the fan is completely assembled, a finish coat of paint shall be applied to the entire assembly. The fan shaft shall be coated with a petroleum-based rust protectant. Aluminum components shall be unpainted.

ACCESSORIES – When specified, accessories such as inlet filters, inlet filters with hoods, inlet and outlet silencers, flexible connectors for flanged outlet and plain pipe outlets, outlet blast gates, built-in outlet dampers, shaft closure plates, shaft seals, drains, inspection ports, shaft and bearing guards, belt guards, couplings, coupling guards, unitary bases, isolation bases, inertia bases, and vibration rails shall be provided by Twin City Fan & Blower to maintain one source responsibility.

FACTORY RUN TEST – All fans prior to shipment shall be completely assembled and test run as a unit at operating speed or maximum RPM allowed for the particular construction type. Each wheel shall be statically and dynamically balanced to in accordance with ANSI/AMCA 204-96 “Balance Quality and Vibration Levels for Fans” to Fan Application Category BV-3, Balance Quality Grade G6.3. Balance readings shall be taken by electronic type equipment in the axial, vertical, and horizontal directions on each of the bearings. Records shall be maintained and a written copy shall be available upon request.

GUARANTEE – Manufacturer shall guarantee the workmanship and materials for its Turbo Pressure Blowers for at least one (1) year from startup or eighteen (18) months from shipment, whichever occurs first.

Unlimited Options...

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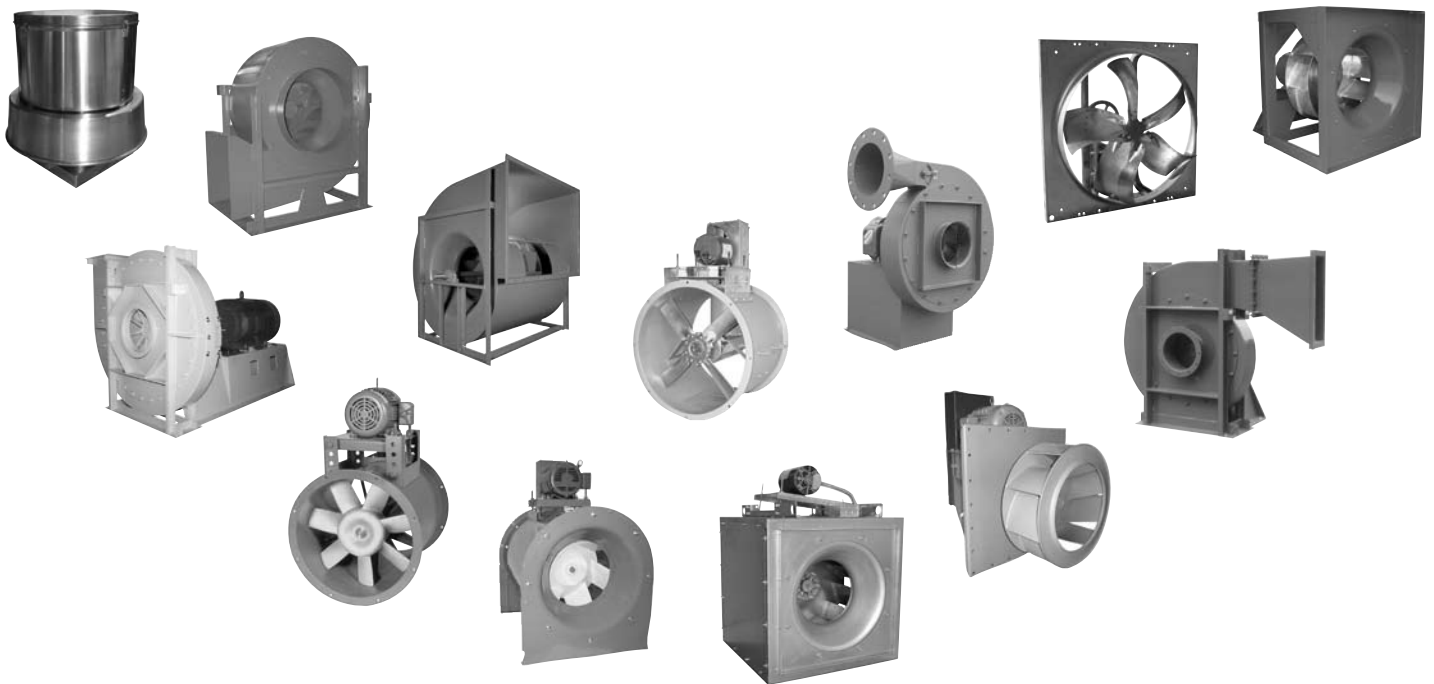
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