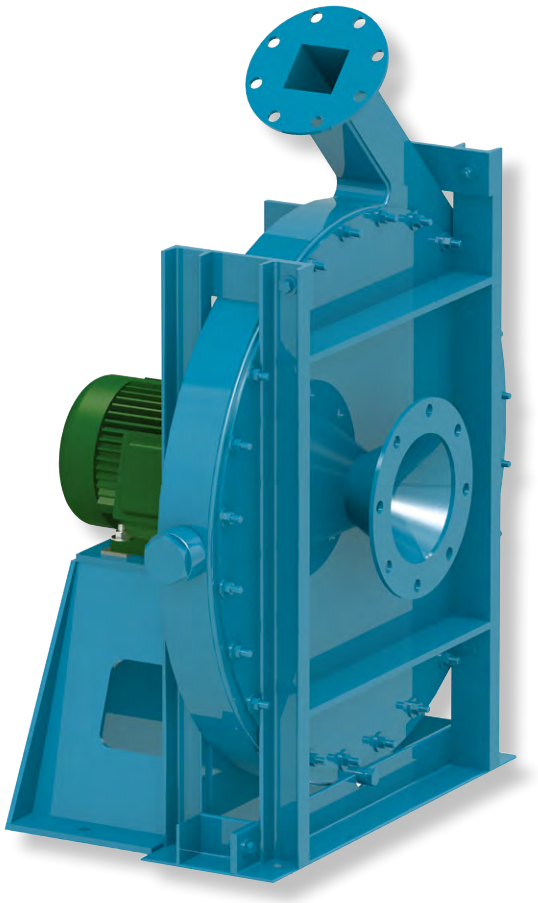
TCF

TWIN CITY FAN

INDUSTRIAL PROCESS AND
COMMERCIAL VENTILATION SYSTEMS

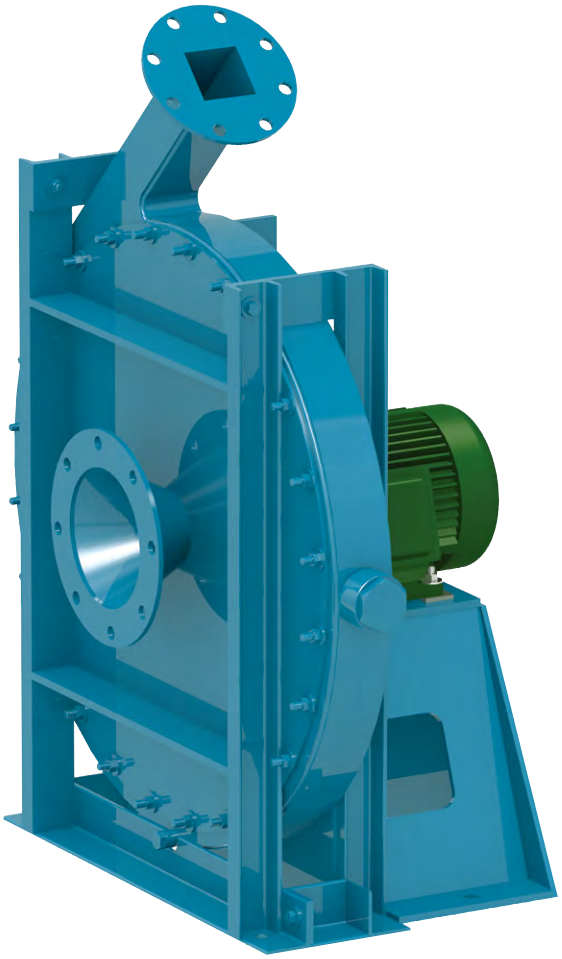
HIGH PRESSURE RADIAL PRESSURE BLOWERS

MODEL HRO | MODEL HRS



OVERVIEW

HRO I HRS



Arrangement 4

Model HRO and HRS fans from Twin City Fan & Blower are specifically designed to provide low flow and high static pressure for industrial applications. The wheel design offers maximum strength and reliability.

Available in three (3) designs, the HRO and HRS allow for flexibility in selection depending upon the application. The design allows for a low flow reducing or even eliminating the requirement for recirculating or exhausting excess air. Design 1 has the lowest flow, followed by Design 2, and then Design 3.

Typical Applications

- Air pollution control systems
- Combustion air
- Exhausting
- Gas boosting
- Glass blowing and cooling
- Liquid agitation
- Mist elimination
- Pneumatic conveying
- Pressure and vacuum drying
- Primary air supply to ejectors
- Product cooling
- Selective catalytic recovery
- Sulfur recovery
- Vapor recovery
- Water blow-off

Design Features

- Designed for continuous duty in high pressure, low flow applications
- Uniform pressures throughout the operating range

Model HRO

- Wheel: radial bladed with backplate and no front shroud
- Two (2) designs (Design 1 and 3)
- Capable of handling low particulate or vapor
- Volumes to 8,500 CFM
- Pressures to 103" w.g.

Model HRS

- Wheel: radial bladed with backplate and shroud
- Three (3) designs (Design 1, 2 and 3)
- Capable of handling low particulate or vapor
- Volumes to 10,000 CFM
- Pressures to 120" w.g.

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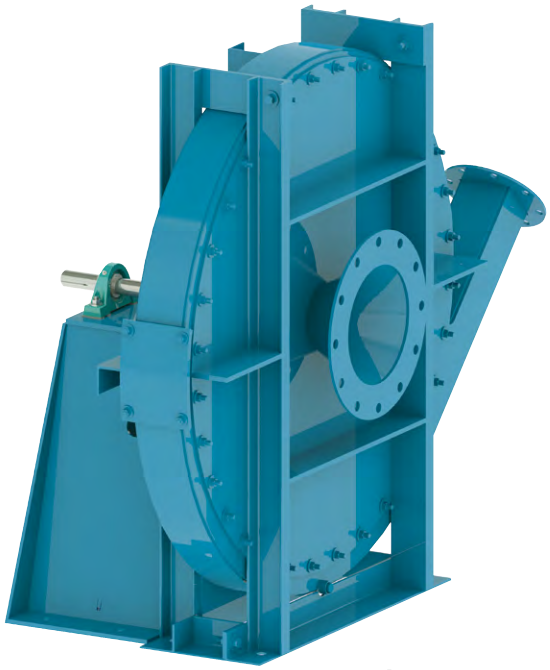
DRIVE ARRANGEMENTS

Arrangement 4
Arrangement 4 is a direct drive fan with the wheel mounted directly on the motor shaft. This drive arrangement is the most compact and requires minimum maintenance and service. Standard Arrangement 4 fans are suitable to 200°F operating temperature. Maximum rotational speeds for arrangement 4 fans can be found on page 6.

Arrangement 8
Arrangement 8 is a direct-drive unit with the wheel mounted on a separate fan shaft that is mounted to the fan pedestal with pillow block bearings (minimum L-10 40,000 hours). The fan shaft is connected to the motor shaft with a flexible coupling. Arrangement 8 blowers offer the ability to remove the motor for service without disturbing the fan assembly. Arrangement 8 units are limited to 300°F as standard. High temperature packages are available for up to 600°F. Maximum rotational speeds for arrangement 8 fans can be found on page 6.

Arrangement 1
V-belt drive fans are available in arrangement 1 only. Arrangement 1 units are limited to 300°F as standard. High temperature packages are available for up to 600°F. Maximum rotational speeds for arrangement 1 fans can be found on page 6.



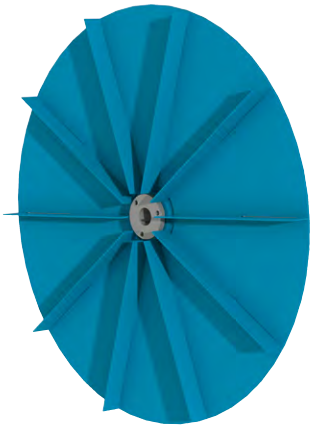
Arrangement 1

WHEEL DESIGN

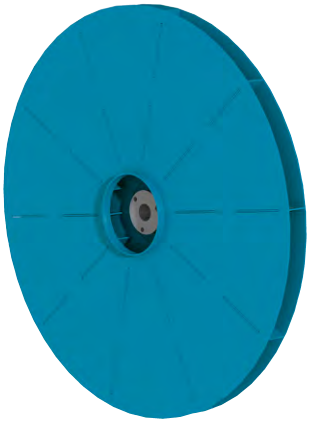
Wheel Construction
All wheels are constructed to insure maximum strength and reliability. Wheels are statically and dynamically balanced on the most modern electronic equipment. Every blower unit is given a final running mechanical test and trim balance before shipment.

HRO (Radial, Open Wheel)
The HRO wheel features a full back plate with radial blades that are constructed of steel. The HRO is ideal for light particulate- or vapor-laden gas streams. The HRO is only available in Designs 1 and 3.

HRS (Radial, Shrouded Wheel)
The HRS wheel features a full backplate and a fully shrouded frontplate. The HRS design develops the most pressure for a given speed and offers the highest efficiency. The HRS is available in Designs 1, 2, and 3.

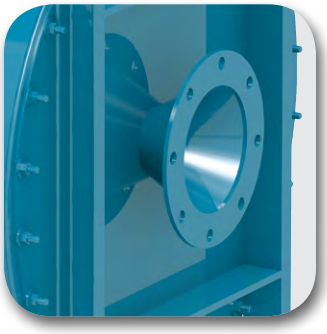


HRO Wheel



HRS Wheel

CONSTRUCTION FEATURES



Flanged Inlet

Flanged Outlet

Shaft Seal

Housing Drain with Plug

Shaft Seal

Standard shaft seals are mounted on the drive side of the blower housing. They consist of a ceramic felt element in compression to minimize air leakage. This shaft seal does not make the fan gas tight. Consult factory for other available shaft seal options.

Flanged Inlet

The standard flanged inlet enables attachment of rigid pipe connections on the blower inlet. The flange is drilled to match 125/150# ANSI pipe flange.

Flanged Outlet

The standard flanged outlet enables attachment of rigid pipe connections on the blower outlet. The flange is drilled to match 125/150# ANSI pipe flange.

Housing Drain with Plug

The standard housing drain consists of a 3/4" NPT half-coupling welded to the fan housing in the lowest point allowing for drainage of condensate from fan housing. A plug is included.

ACCESSORIES

Access Port

Shaft and Bearing Guard

Outlet Blast Gate

A manually actuated blast gate for mounting to the fan outlet flange allows for controlling flow to full shutoff. Available for automatic control. Maximum temperature 250°F.

Access Port

Heavy duty access port provides access for wheel inspection. Depending on the fan size, access port may be NPT coupling and plug or a panel.

Inlet Bell

Installations with an open inlet, an inlet bell (venturi) is required to achieve the catalog performance. Inlet screen is available.

Belt Guard

An OSHA belt guard protects personnel from the moving drive parts. A quick access guard is available.

Shaft and Bearing Guard

Solid sheet metal guards cover shaft and bearings and come with extended lube lines to a common point out either side of the guard. A guard spanning the shaft between the bearings is also available to provide easy access to bearings for lubrication and vibration monitoring. Optional painted safety yellow is available.

Split Housing

All sizes are designed to permit wheel removal through the fan inlet. Sizes 40 and larger are available with a horizontal, pie-shaped, or 3-way split housing, which allows removal of the wheel and shaft without disconnecting ductwork.

Spark Resistant Construction

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. 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 an 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 an aluminum wheel and rub ring and limited to 200°F.

Type C: Consult factory.

Nominally Leak-Tight Construction

When leakage is a concern, nominally leak-tight construction should be considered. For fans with positive pressure conditions at the inlet, please consult the factory.

Nominally leak-tight is available for arrangement 1 and arrangement 8 fans. Construction modifications may include, but are not limited to (depending on the application) continuously welded inlet and outlet flanges, close-centered bolts on all flanges, access doors, cover plates, Buna-N rubber shaft seal as standard (other mechanical seals available).

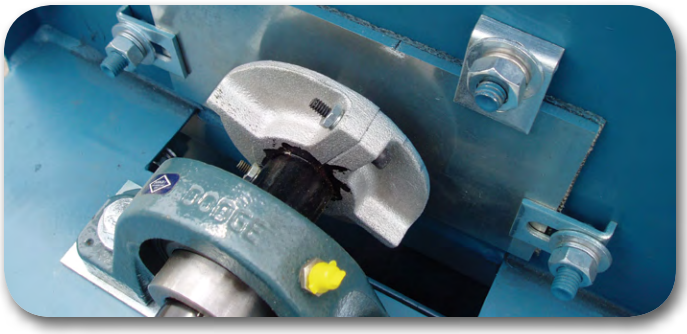
High Temperature Package Fan

Standard designs are suitable to 200°F for Arr. 4 and 300°F for Arr. 1 and Arr. 8 fans. Units in Arr. 1 and Arr. 8 fans can be modified to suit applications to 600°F. Apply to Twin City Fan for applications above 600°F.

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

501 to 600°F: Package includes the 301 to 500°F package modifications plus the addition of high-temp aluminum paint.

Special materials of construction are available. Consult factory for availability and pricing.



Bearing with Shaft Cooler & Shaft Seal

Table 1: Derating Factors for Safe Wheel Speed

Temperature (°F)	Alloy Steel	Stainless Steel
70	1.00	0.99
200	0.99	0.95
250	0.98	0.93
300	0.97	0.91
400	0.95	0.87
500	0.93	0.83
600	0.90	0.80
700	0.80	0.77
800	0.60	0.75

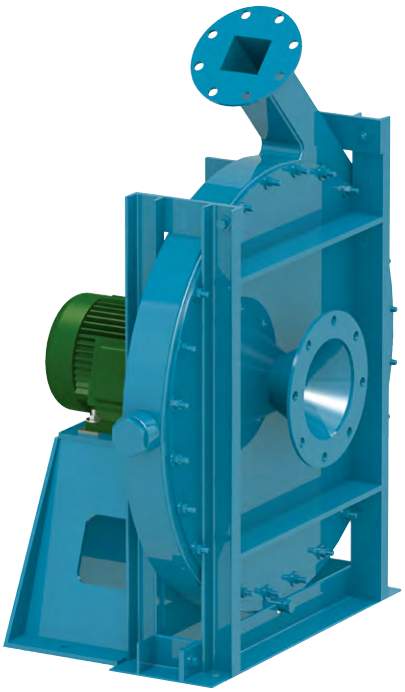


Table 2. Wheel Weights, WR^2

FAN SIZE	DESIGN 1		DESIGN 2		DESIGN 3	
	WHEEL WEIGHT (LBS)	WR^2 LB-FT^2	WHEEL WEIGHT (LBS)	WR^2 LB-FT^2	WHEEL WEIGHT (LBS)	WR^2 LB-FT^2
25	35	13.6	34	12.4	31	9.6
30	51	27.2	51	25.3	46	19.8
35	89	66.7	87	61.1	79	48.0
40	111	111	110	103	100	81.1
45	180	223	174	202	158	159
50	215	332	209	305	189	240
55	332	626	321	568	291	449
60	403	879	393	806	357	640
65	482	1253	471	1150	428	904
70	548	1664	538	1540	488	1213

Table 3. Maximum RPM, Shaft & Bearings

FAN SIZE	ARRANGEMENT 1				ARRANGEMENT 8			
	MAX RPM	MAX BHP	SHAFT DIA.	BEARING TYPE	MAX RPM	MAX BHP	SHAFT DIA.	BEARING TYPE
25	3600	10	1-3/16	HDB-C	3600	10	1-3/16	SDB-C
30	3600	25	2-3/16	HDB-C	3600	25	1-3/16	SDB-C
35	2700	50	1-15/16	RB-C & RB-CE	3600	50	1-7/16	SDB-C
40	2500	100	2-7/16	RB-C & RB-CE	3600	100	1-11/16	HDB-C
45	2500	200	2-7/16	RB-C & RB-CE	3600	200	2-3/16	HDB-C
50	1800	40	1-15/16	RB-C & RB-CE	1800	40	1-11/16	HDB
55	1800	60	2-3/16	RB-C & RB-CE	1800	60	1-15/16	HDB
60	1800	100	2-11/16	RB-C & RB-CE	1800	100	2-7/16	HDB
65	1800	150	3-7/16	RB-C & RB-CE	1800	150	2-3/16	RB-C & RB-CE
70	1800	250	3-7/16	RB-C & RB-CE	1800	250	2-11/16	RB-C & RB-CE

Note: The "C" in the bearing type denotes a concentric locking-type bearing.

Table 4. Minimum and Maximum Motor Frame Sizes for Arrangement 4 fans

HOUSING SIZE	MAXIMUM RPM	MINIMUM				MAXIMUM			
		1800 RPM (4-POLE MOTOR)		3600 RPM (2-POLE MOTOR)		1800 RPM (4-POLE MOTOR)		3600 RPM (2-POLE MOTOR)	
		BHP	FRAME SIZE	BHP	FRAME SIZE	BHP	FRAME SIZE	BHP	FRAME SIZE
25	3600	1	143T	3	145T	5	184T	10	215T
30	3600	1-1/2	145T	7-1/2	213T	10	215T	25	284TS
35	3600	3	182T	15	215T	25	284T	50	326TS
40	3600	7-1/2	213T	30	286TS	50	326T	100	405TS
45	3600	15	254T	50	326TS	75	365T	200	405TS
50	1800	20	256T	N/A	N/A	40	324T	N/A	N/A
55	1800	40	324T	N/A	N/A	60	364T	N/A	N/A
60	1800	60	364T	N/A	N/A	100	405T	N/A	N/A
65	1800	100	405T	N/A	N/A	150	445T	N/A	N/A
70	1800	125	444T	N/A	N/A	250	449T	N/A	N/A

Table 5. Bare Fan Weights

HOUSING SIZE	ARRANGEMENT 1			ARRANGEMENT 4		
	DESIGN 1	DESIGN 2	DESIGN 3	DESIGN 1	DESIGN 2	DESIGN 3
25	238	238	233	216	215	209
30	395	393	382	357	353	342
35	404	540	542	553	547	553
40	702	695	684	777	768	754
45	882	939	935	1085	1142	1139
50	1087	1079	1052	1049	1038	970
55	1464	1449	1407	1366	1348	1302
60	1745	1719	1678	1649	1619	1572
65	2064	2038	1971	1941	1880	1453
70	2431	2396	2300	2519	2477	2371

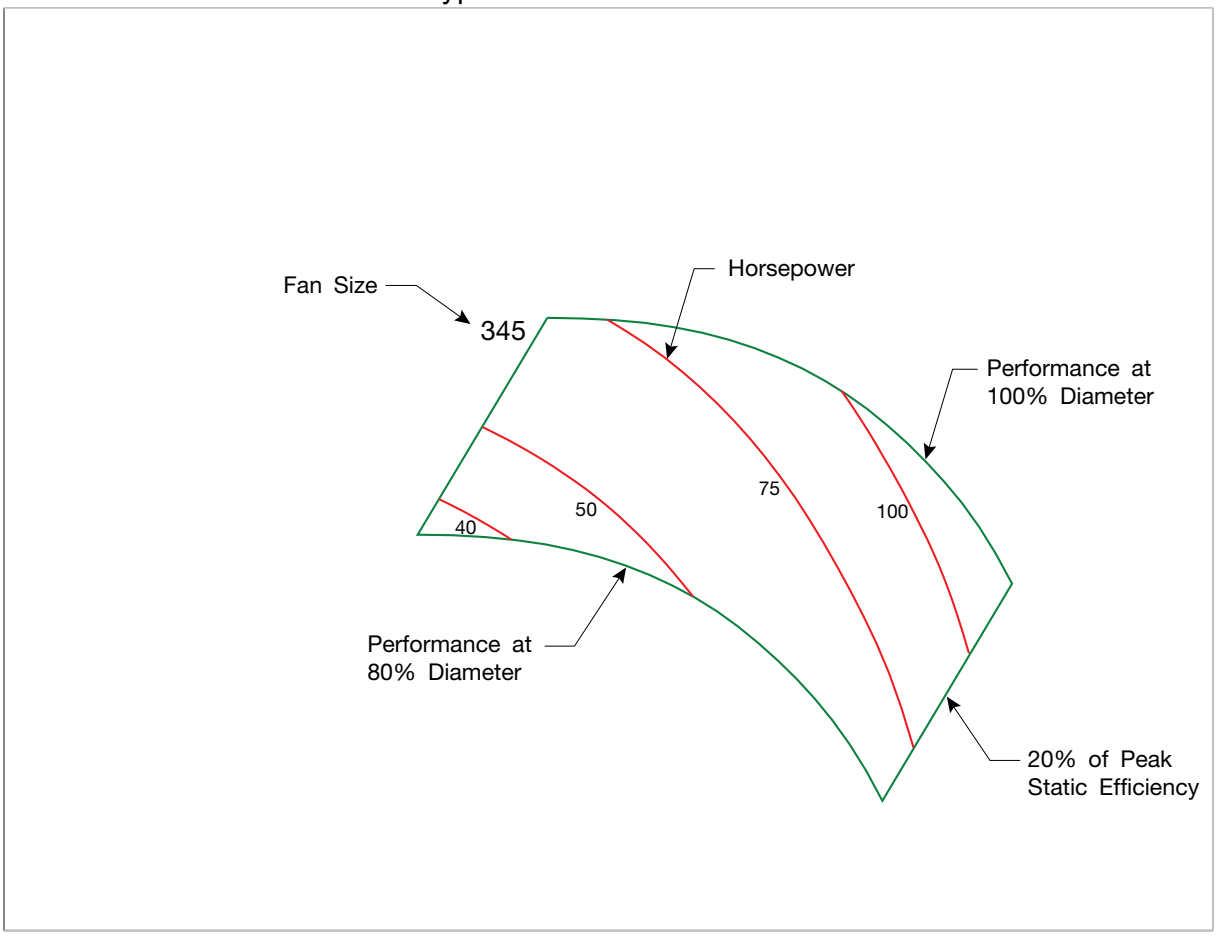
Note: Arrangement 1 weights do not include the weight of drives or motors. Arrangement 4 weights do not include the weight of the motor.

The performance curves in this catalog are based on fans handling standard air at a density of 0.075 pounds per cubic foot. This is equivalent to air at 70°F at sea level (29.92" Hg. barometric pressure). Thus, when specified performance is at a density other than standard, it must be converted to the equivalent standard conditions before entering the performance curves. The equivalent standard conditions can be calculated by using the Twin City Fan & Blower Fan Selector Program.

The fan selection curves on the following pages show performance at nominal diameter as well as 80% and 100% of nominal. Variation in wheel width is not available.

Performance curves utilize a logarithmic scale for the axes.

Typical Selection Curve



MODEL NOMENCLATURE

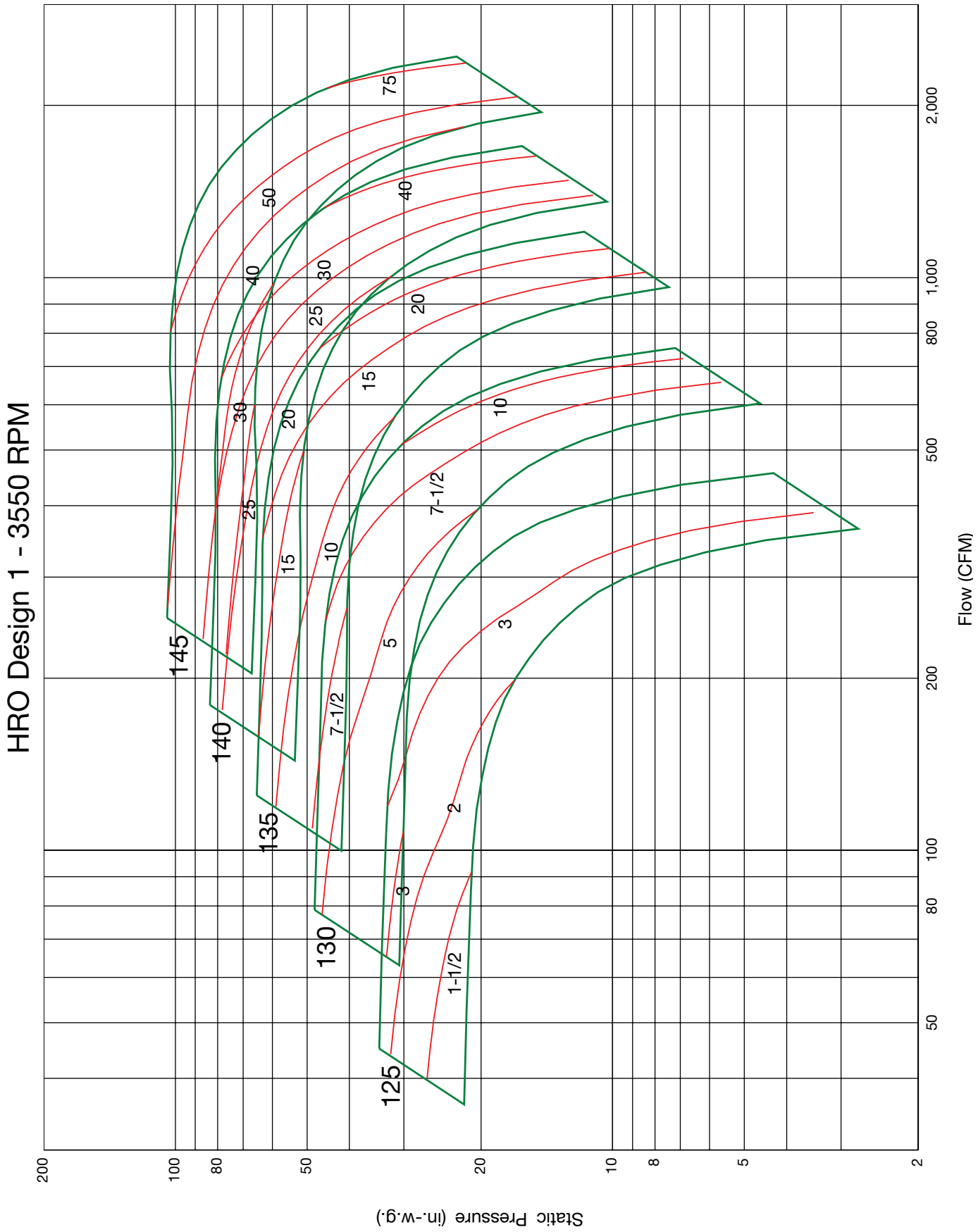
HRS - 3 - 45

Model
HRO = Open Front Wheel
HRS = Shrouded Wheel

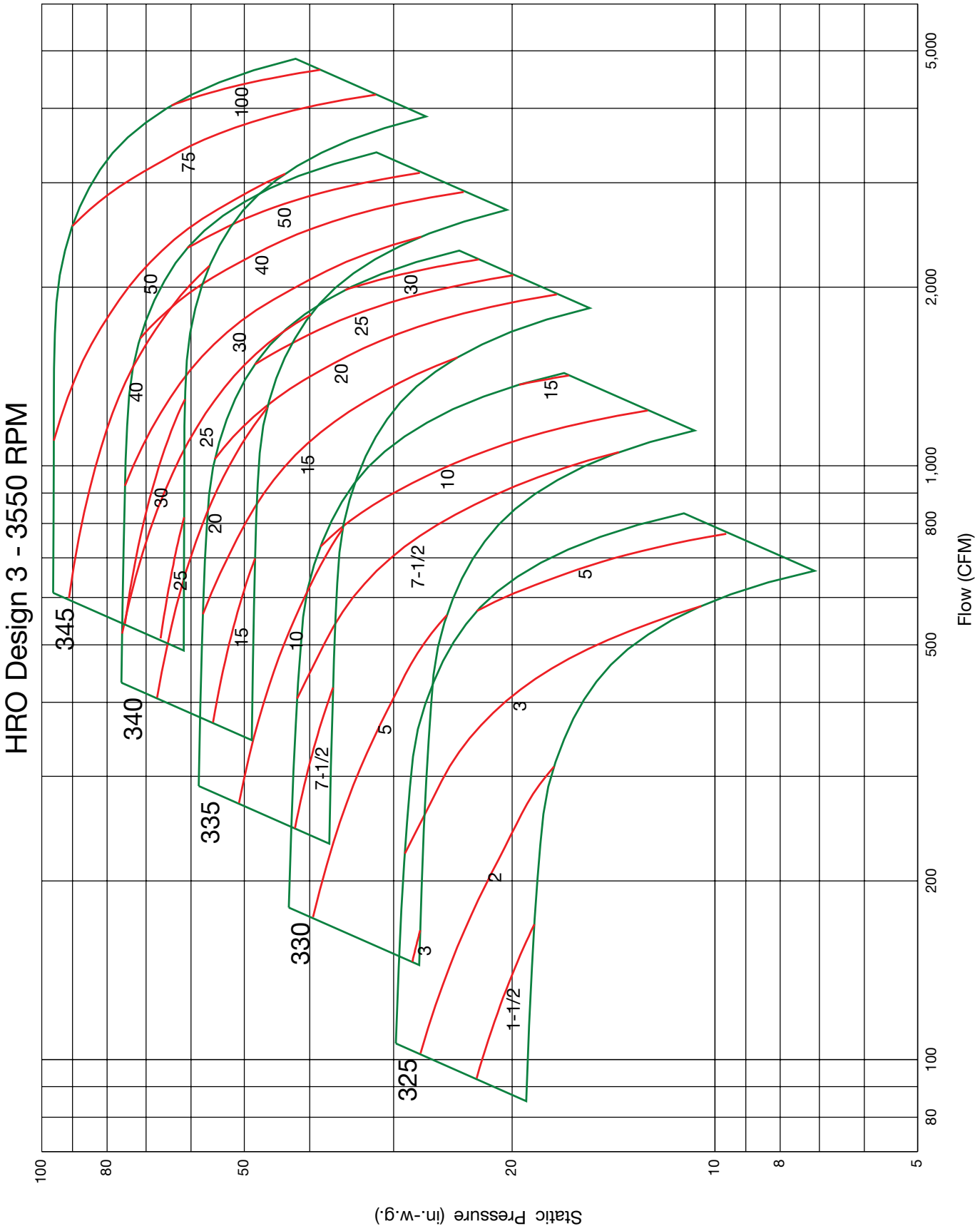
Design
Design 1 (HRO & HRS)
Design 2 (HRS Only)
Design 3 (HRO & HRS)

Housing Size
(25, 30, 35, 40, 45, 50, 55, 60, 65, 70)

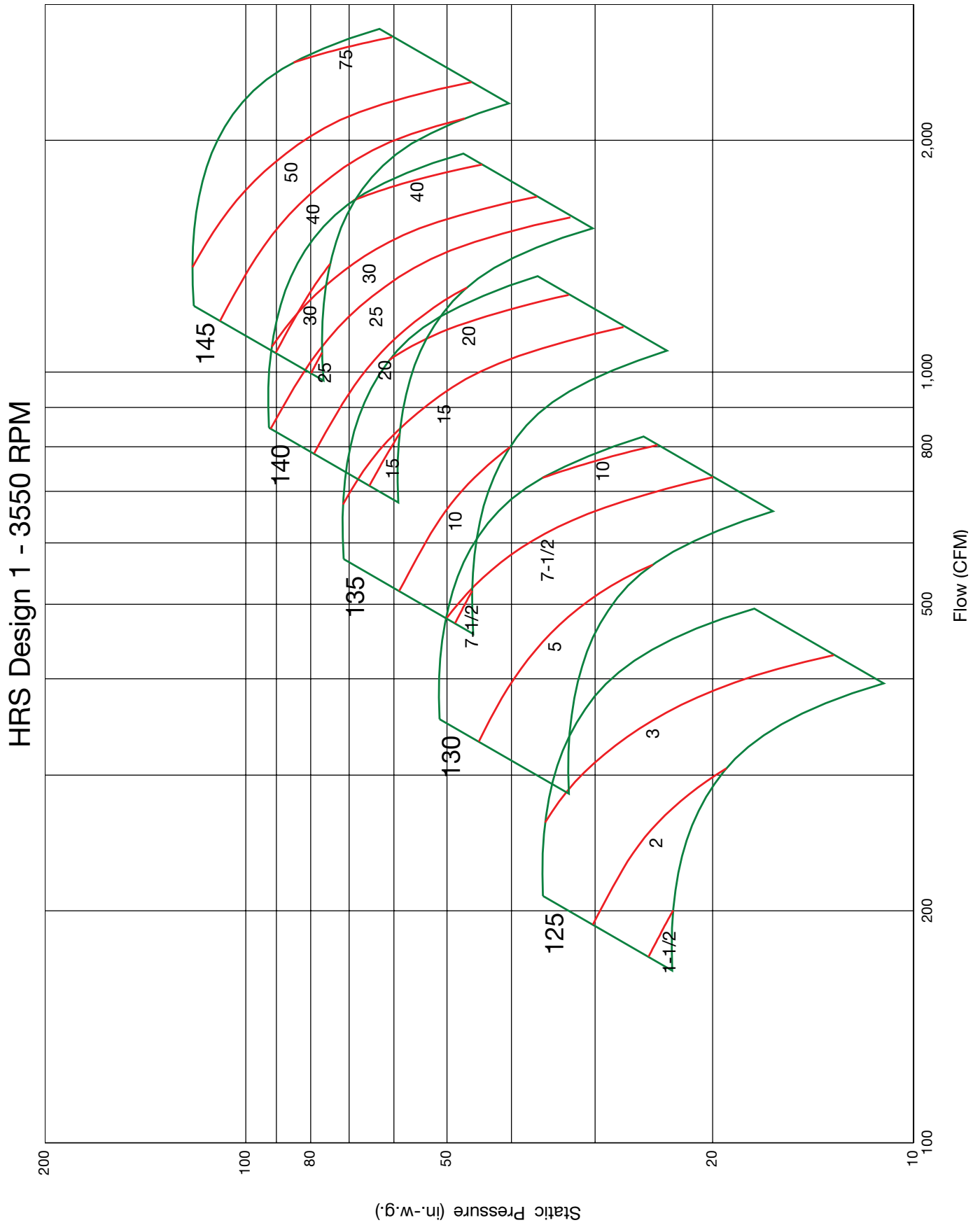
HRO – Design 1, 3550 RPM



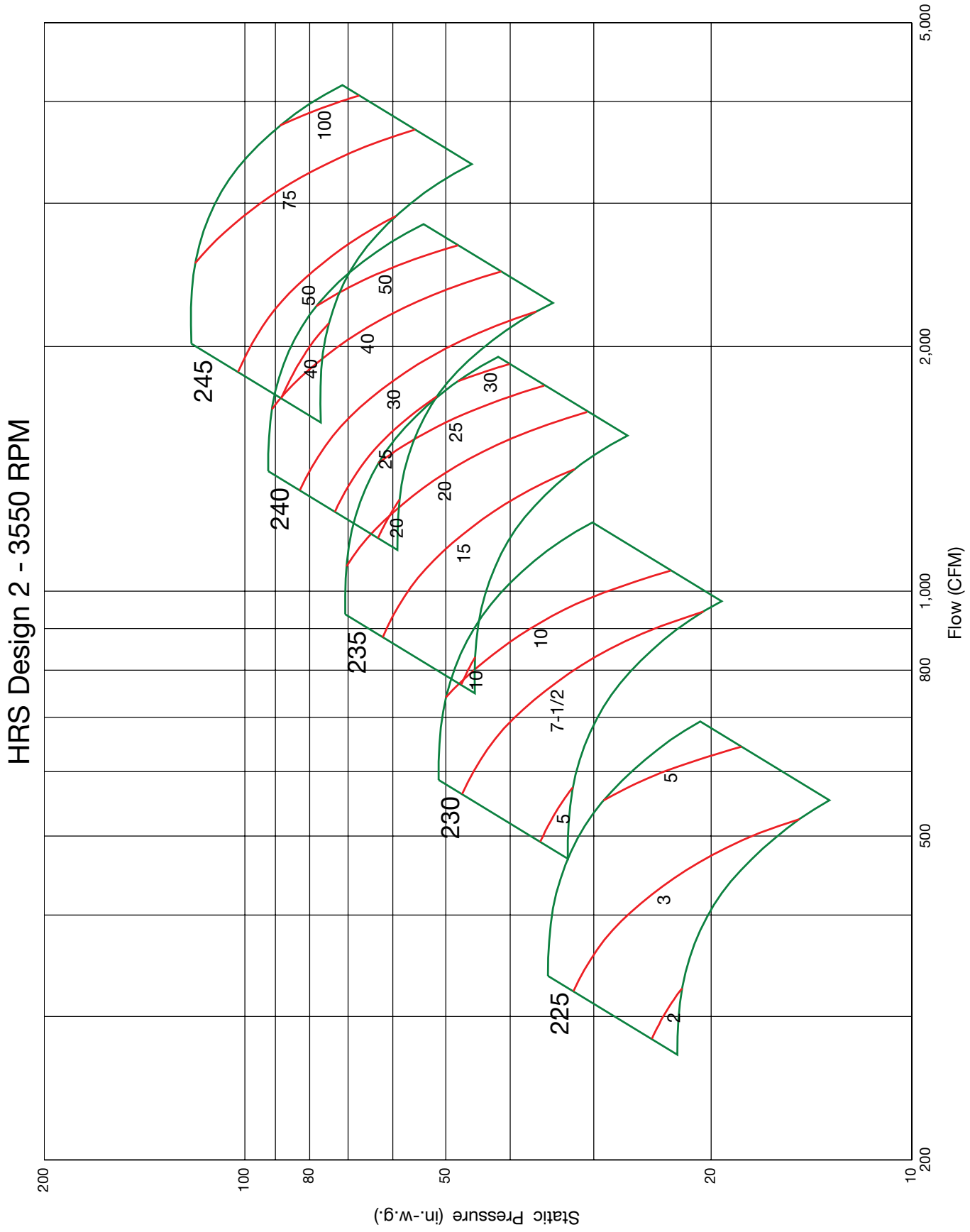
HRO – Design 3, 3550 RPM



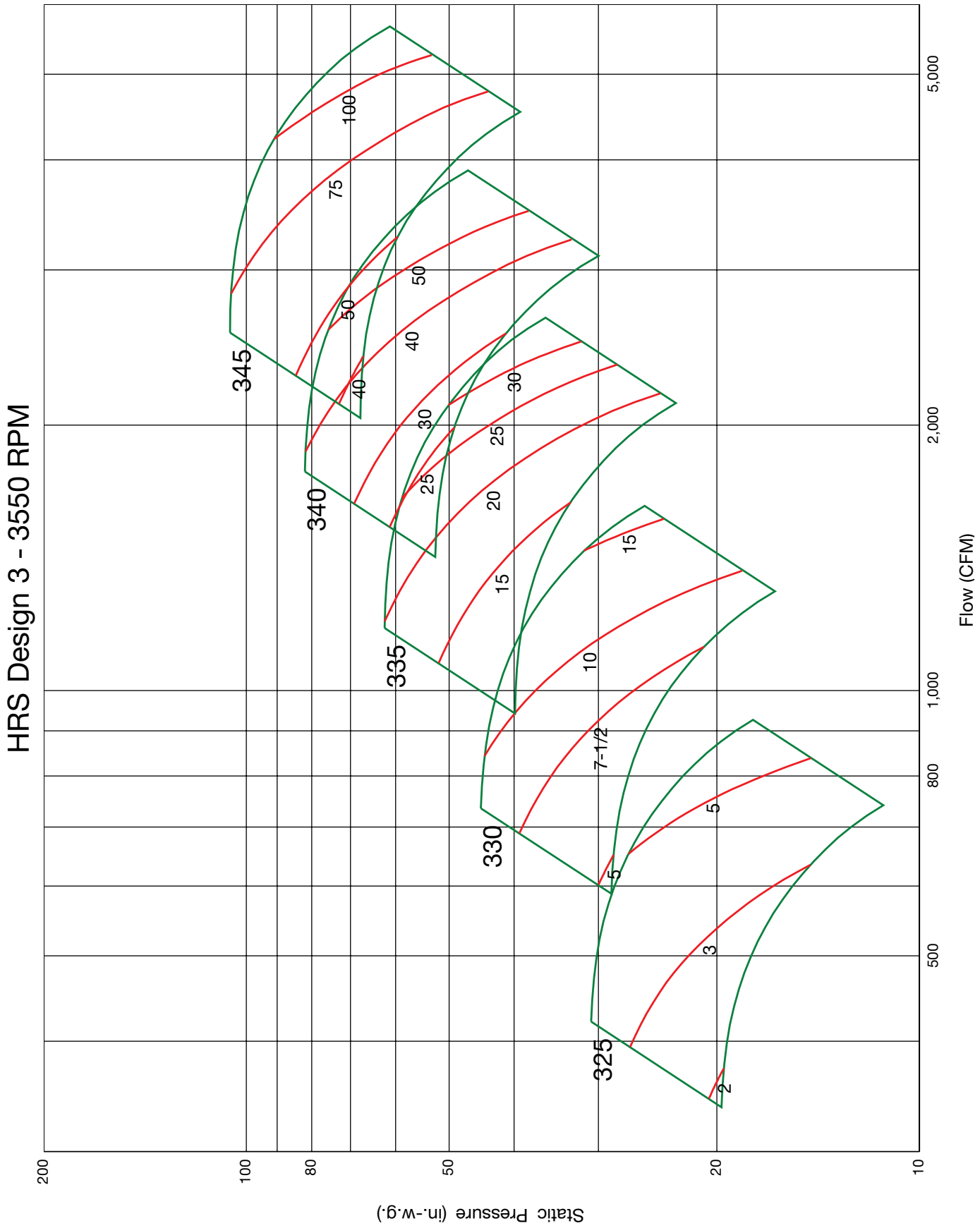
HRS – Design 1, 3550 RPM



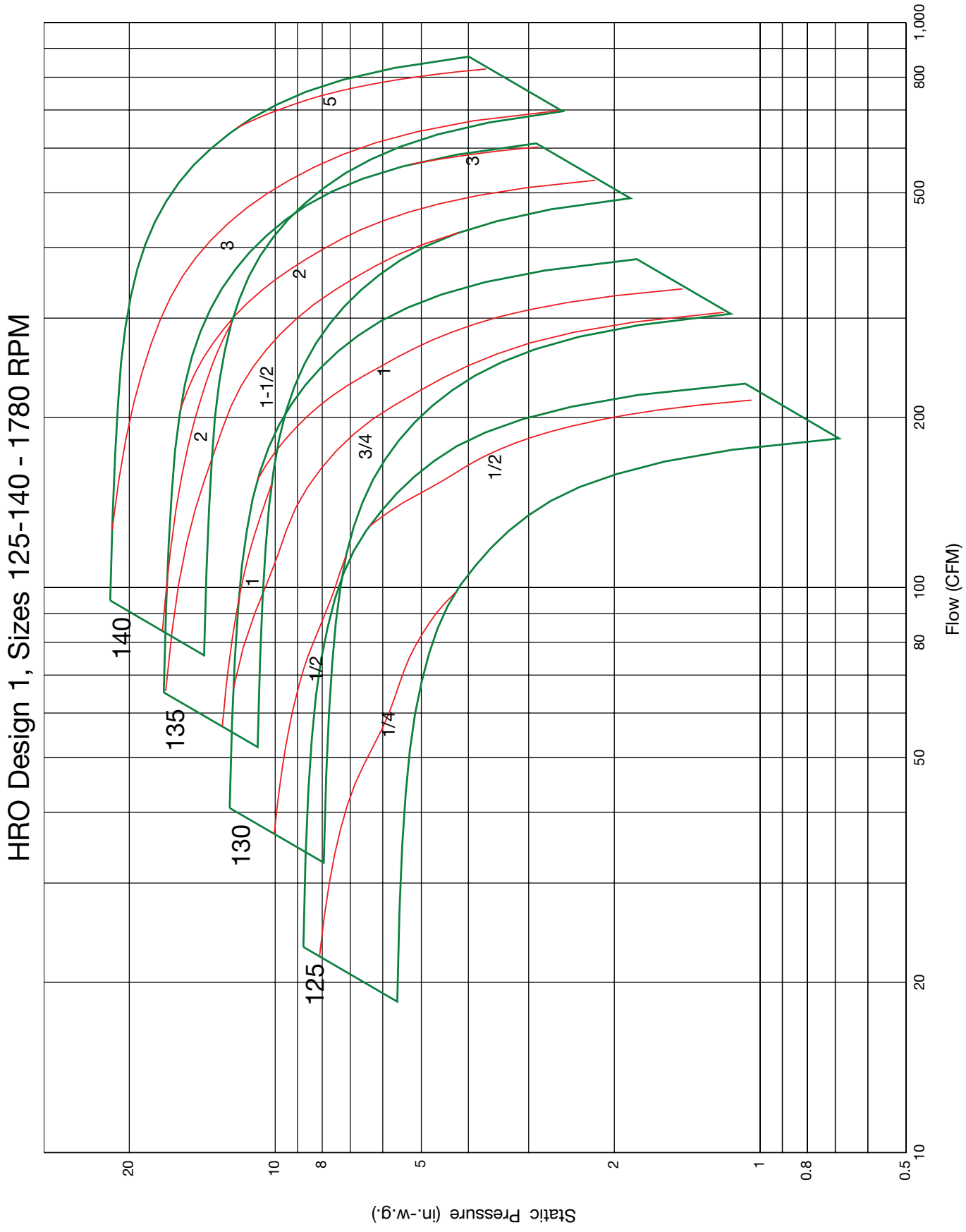
HRS – Design 2, 3550 RPM



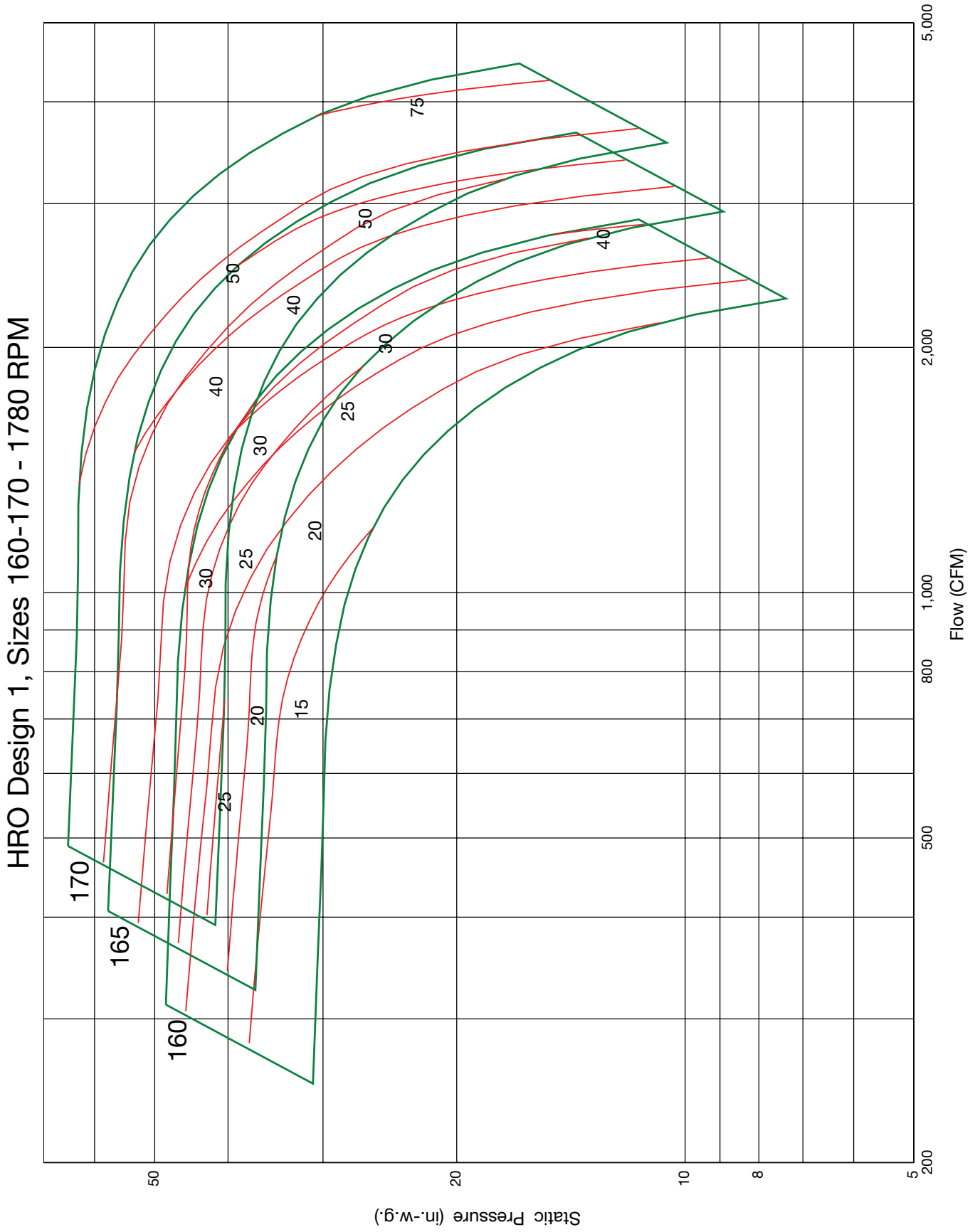
HRS – Design 3, 3550 RPM



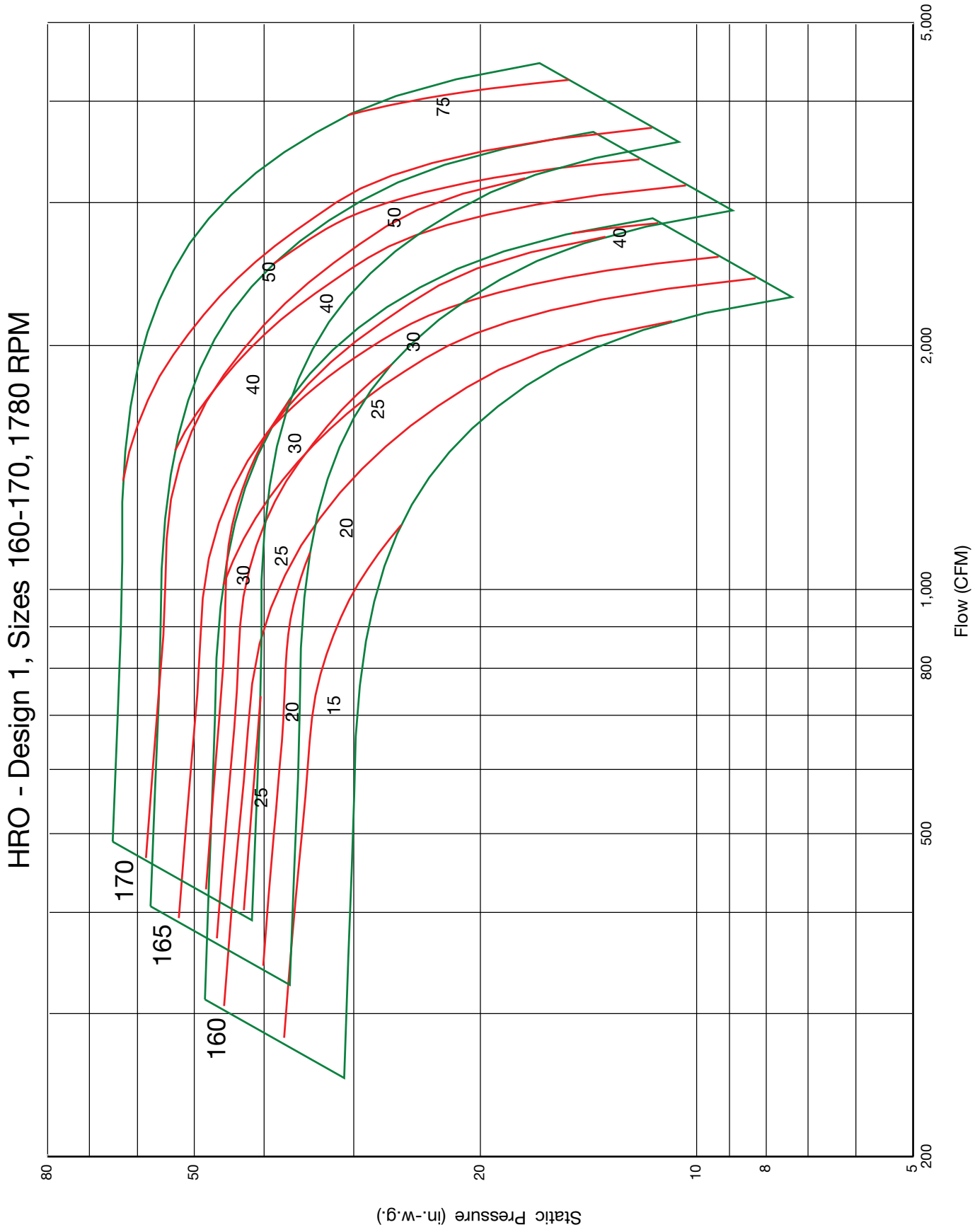
HRO – Design 1, Sizes 125-140, 1780 RPM



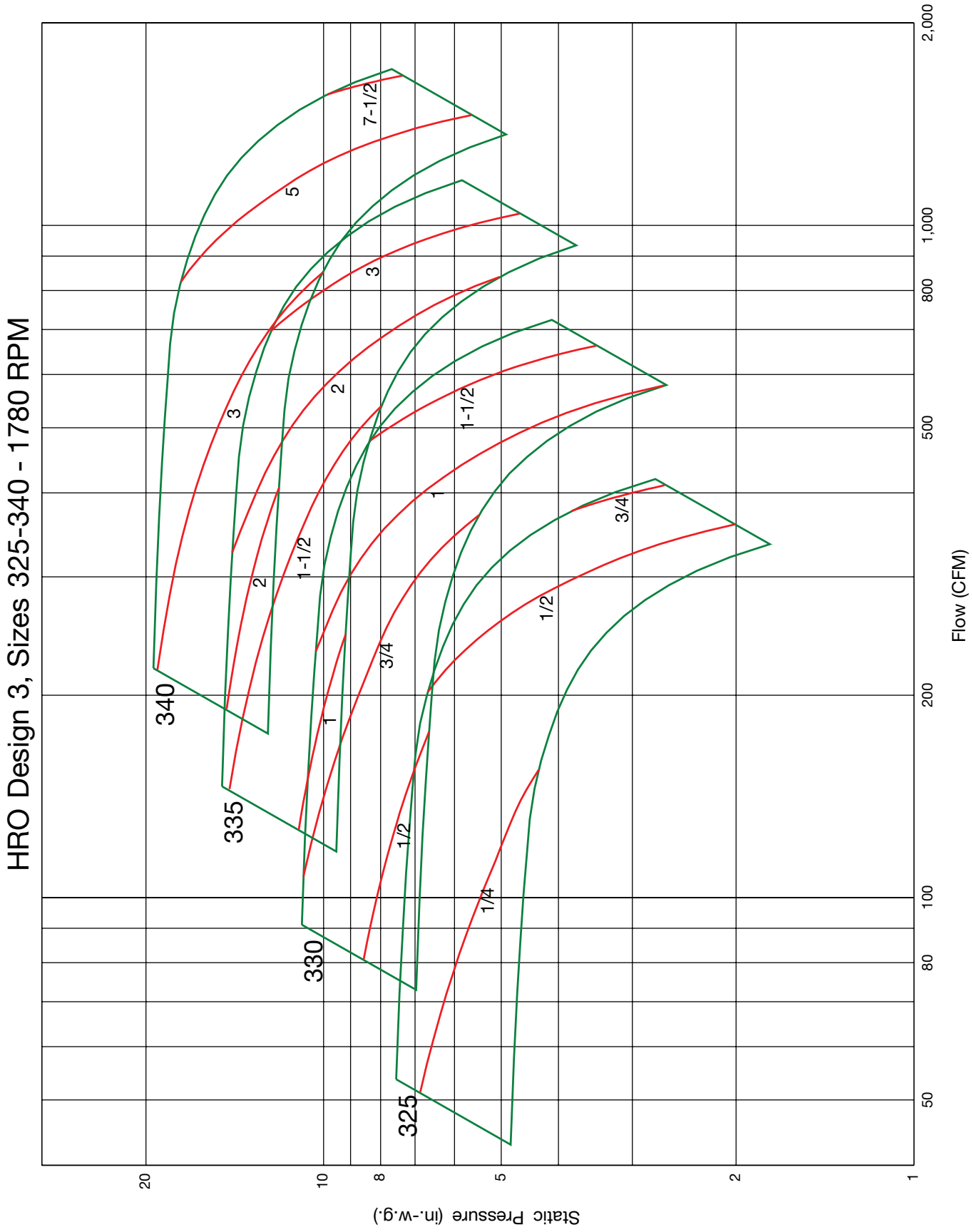
HRO – Design 1, Sizes 145-155, 1780 RPM



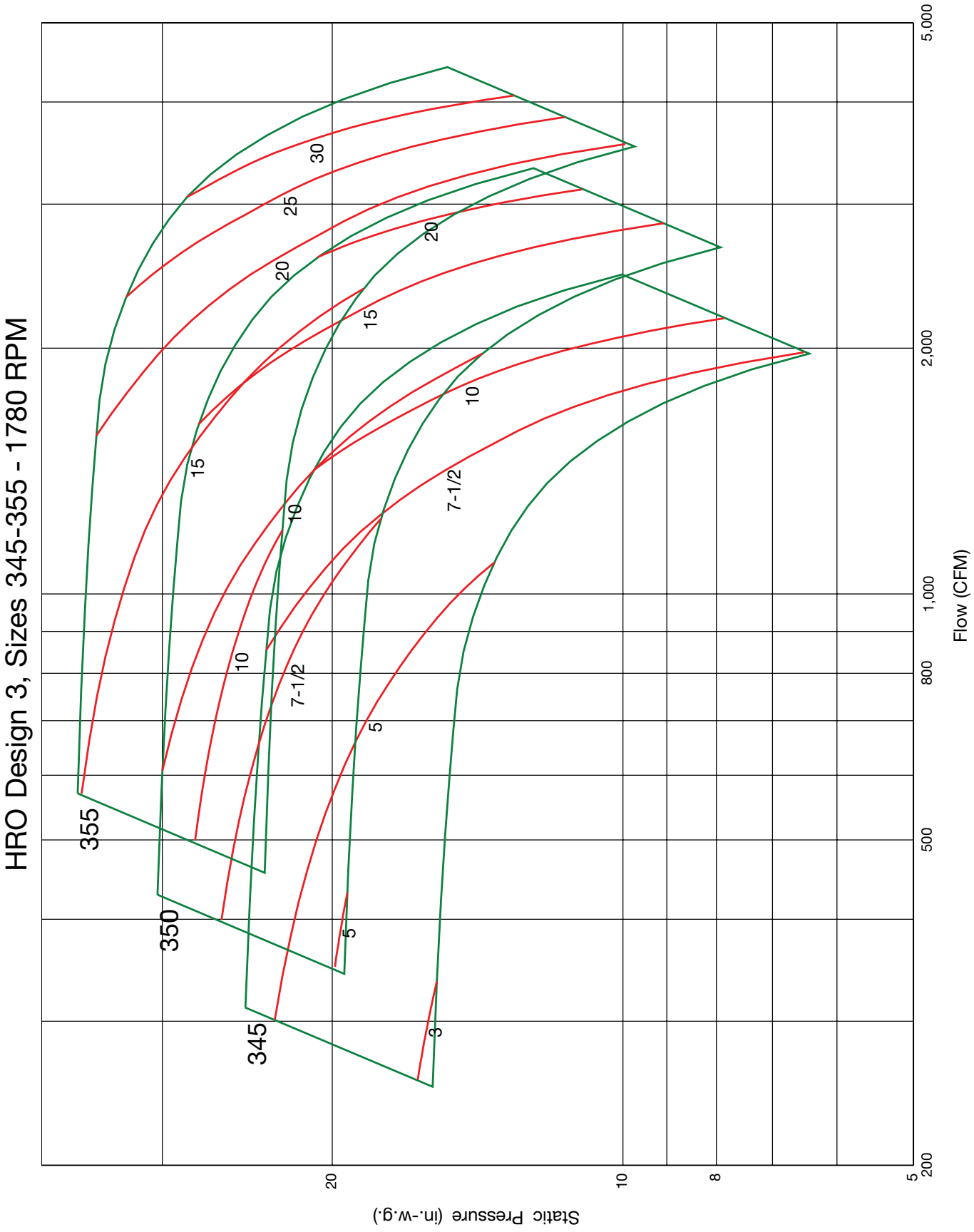
HRO – Design 1, Sizes 160-170, 1780 RPM



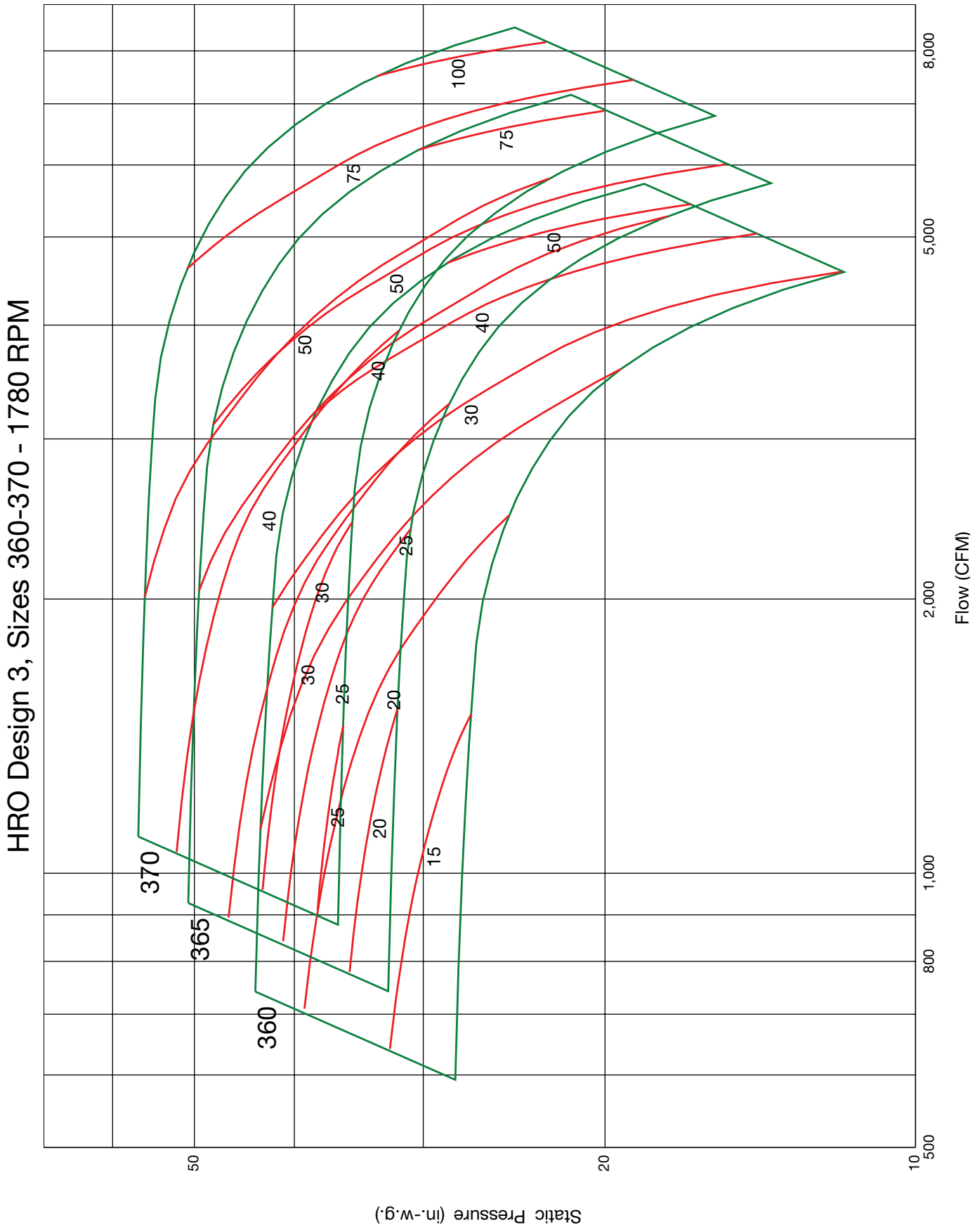
HRO – Design 3, Sizes 325-340, 1780 RPM



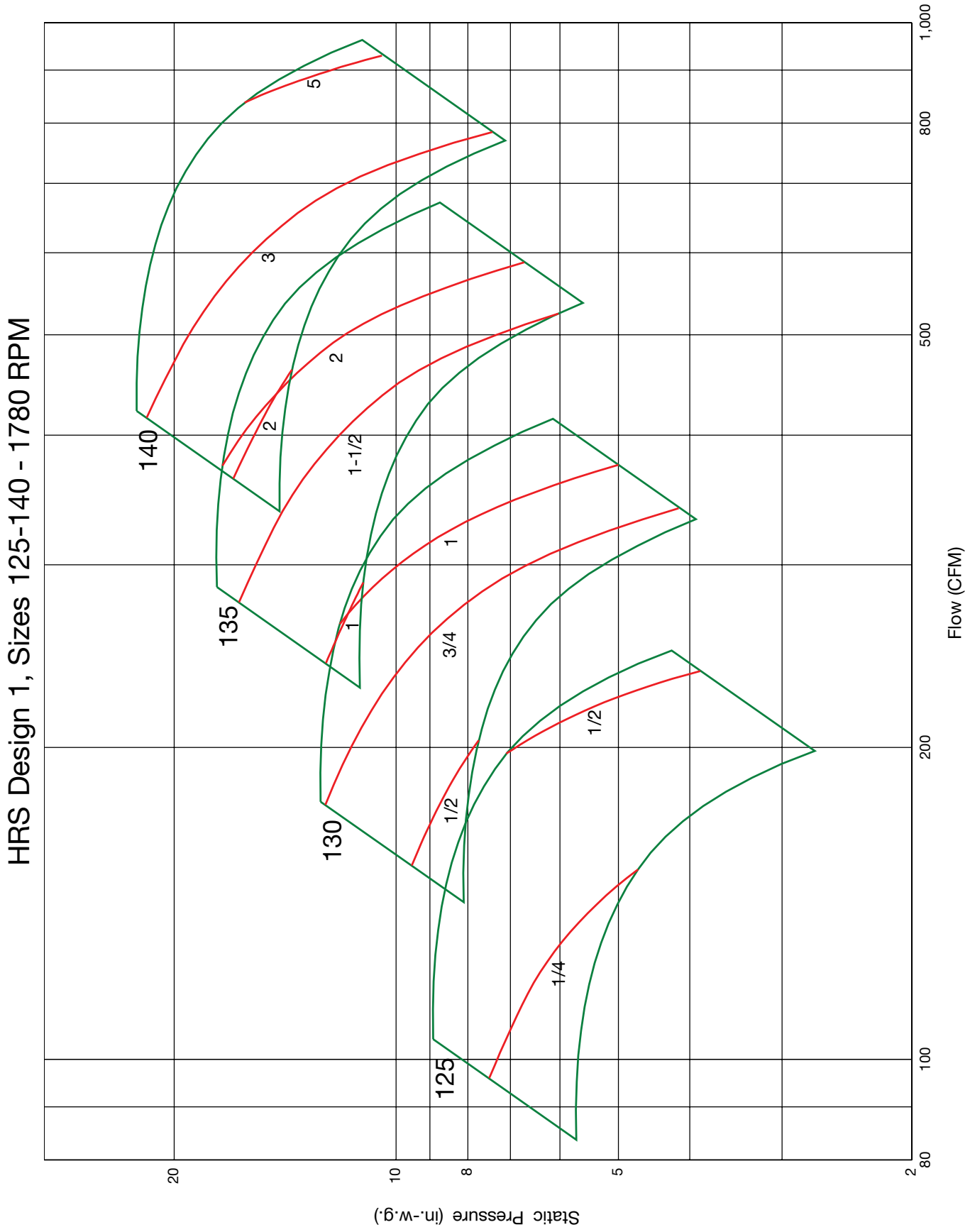
HRO – Design 3, Sizes 345-355, 1780 RPM



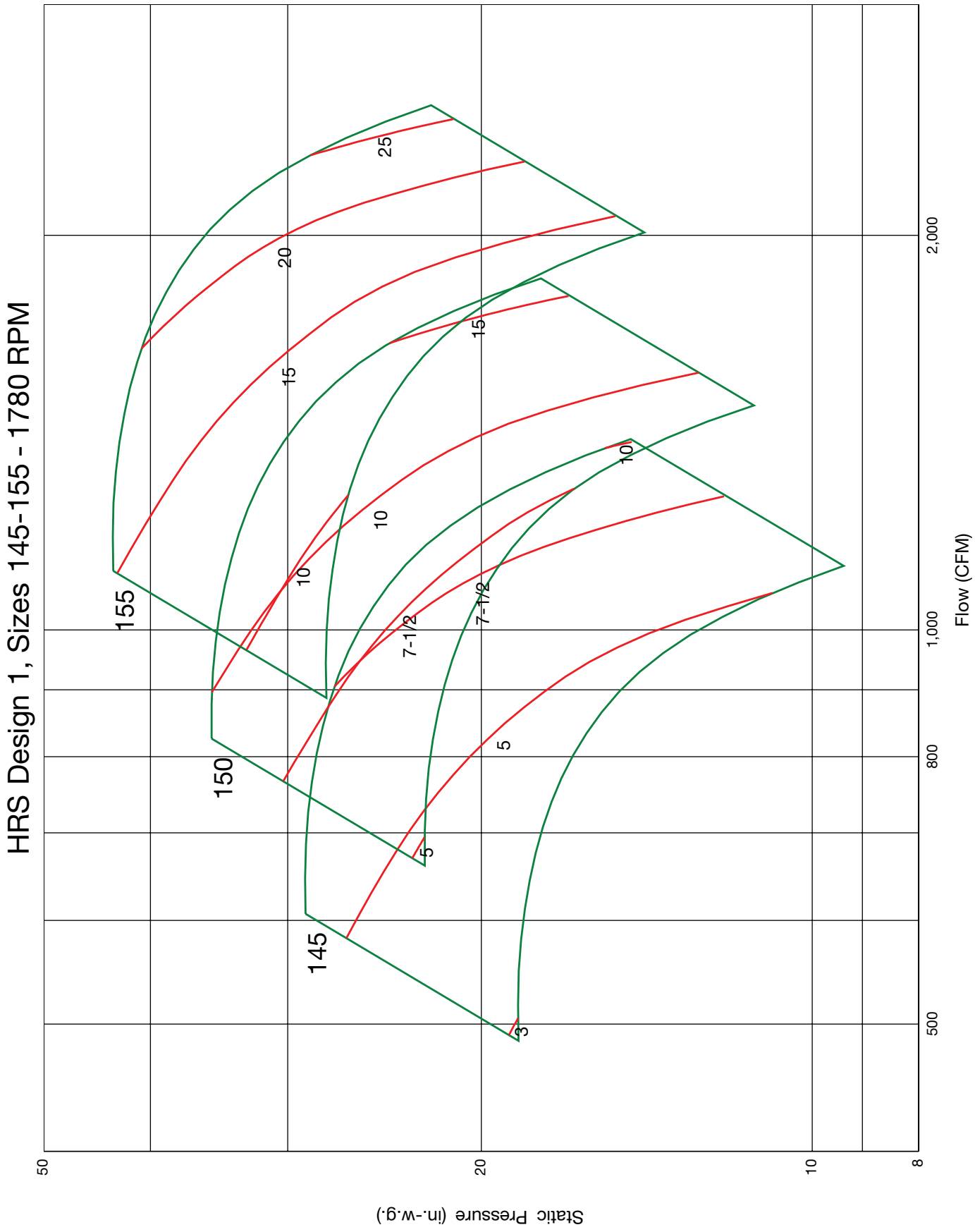
HRO – Design 3, Sizes 360-370, 1780 RPM



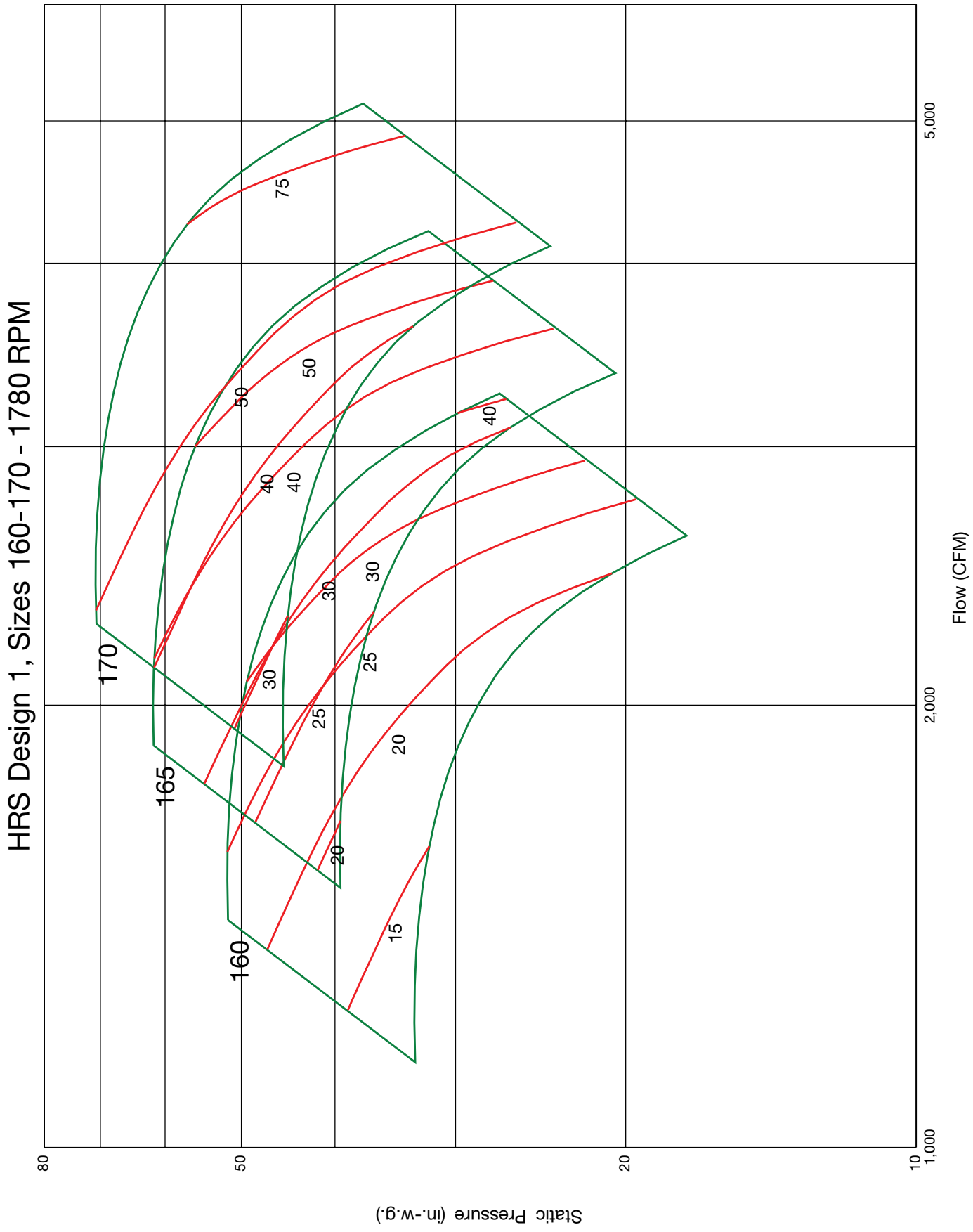
HRS – Design 1, Sizes 125-140, 1780 RPM



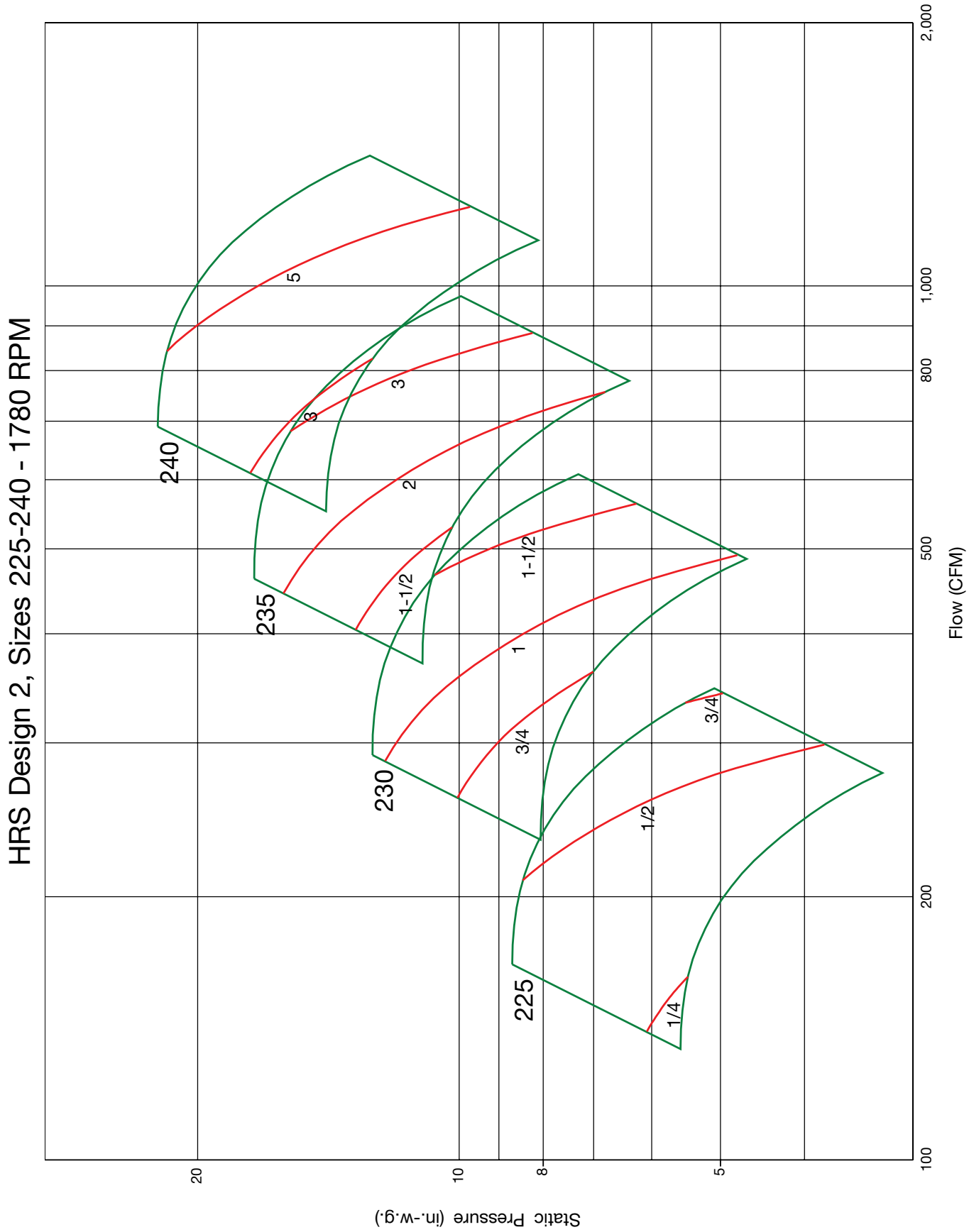
HRS – Design 1, Sizes 145-155, 1780 RPM



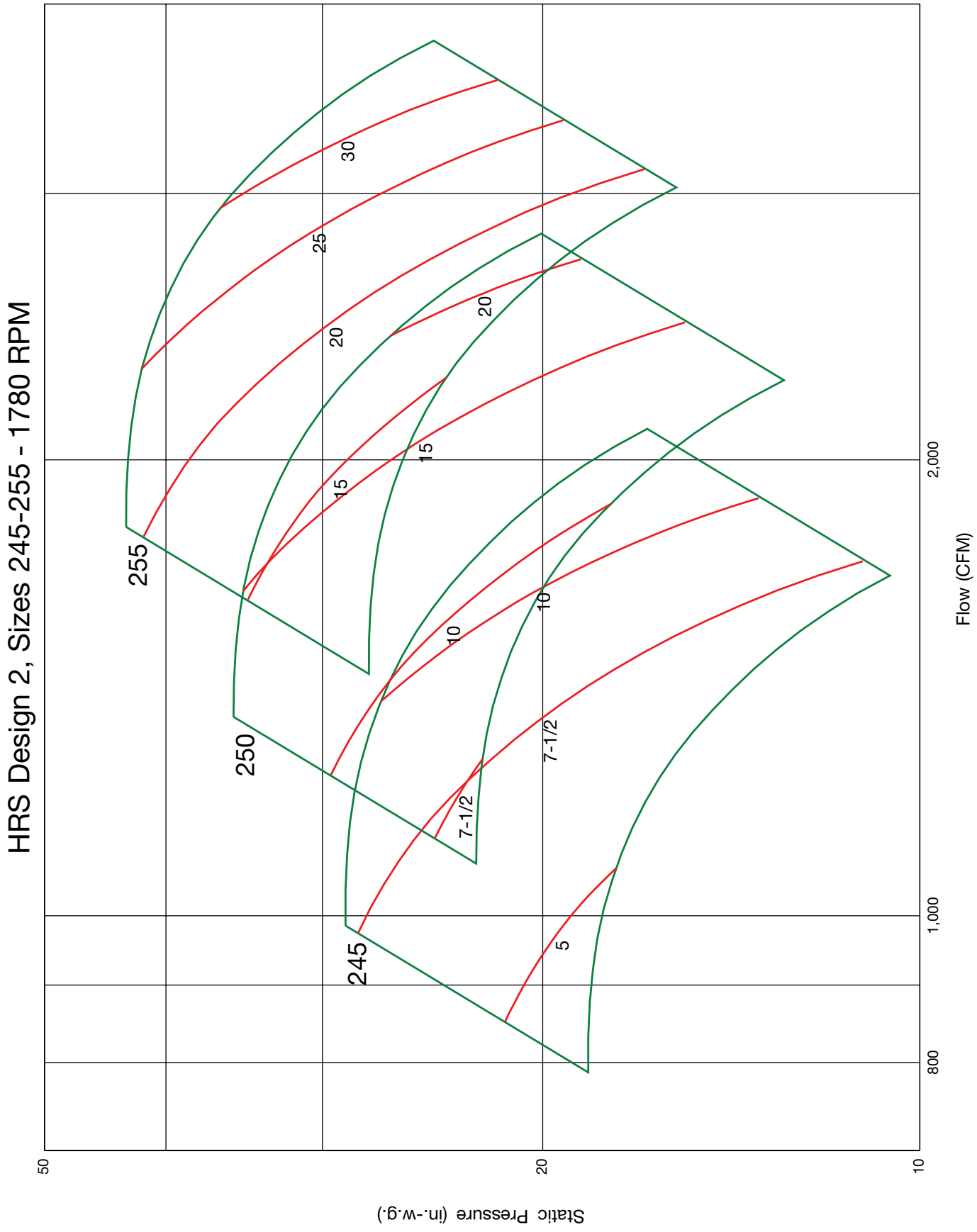
HRS – Design 1, Sizes 160-170, 1780 RPM



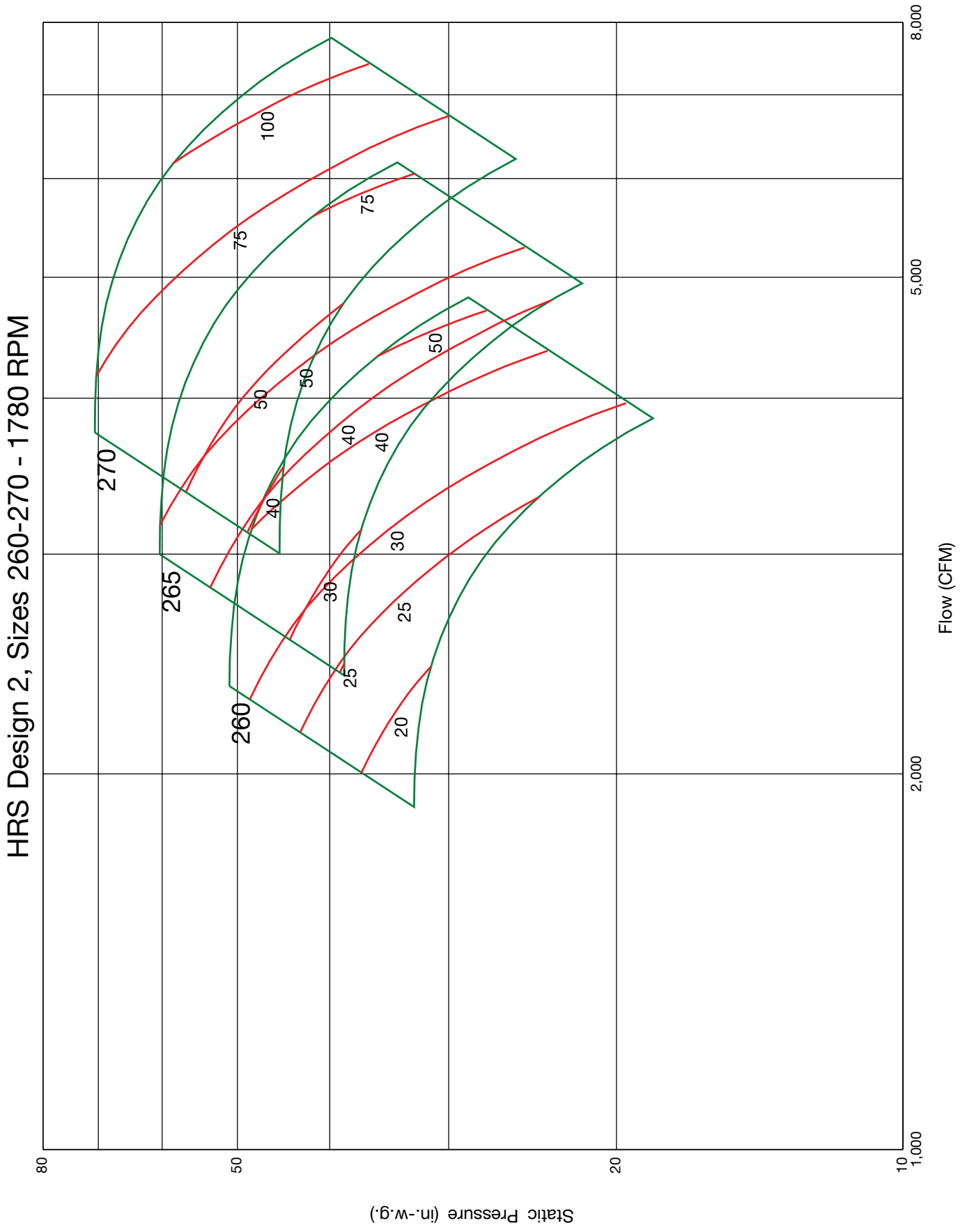
HRS – Design 2, Sizes 225-240, 1780 RPM



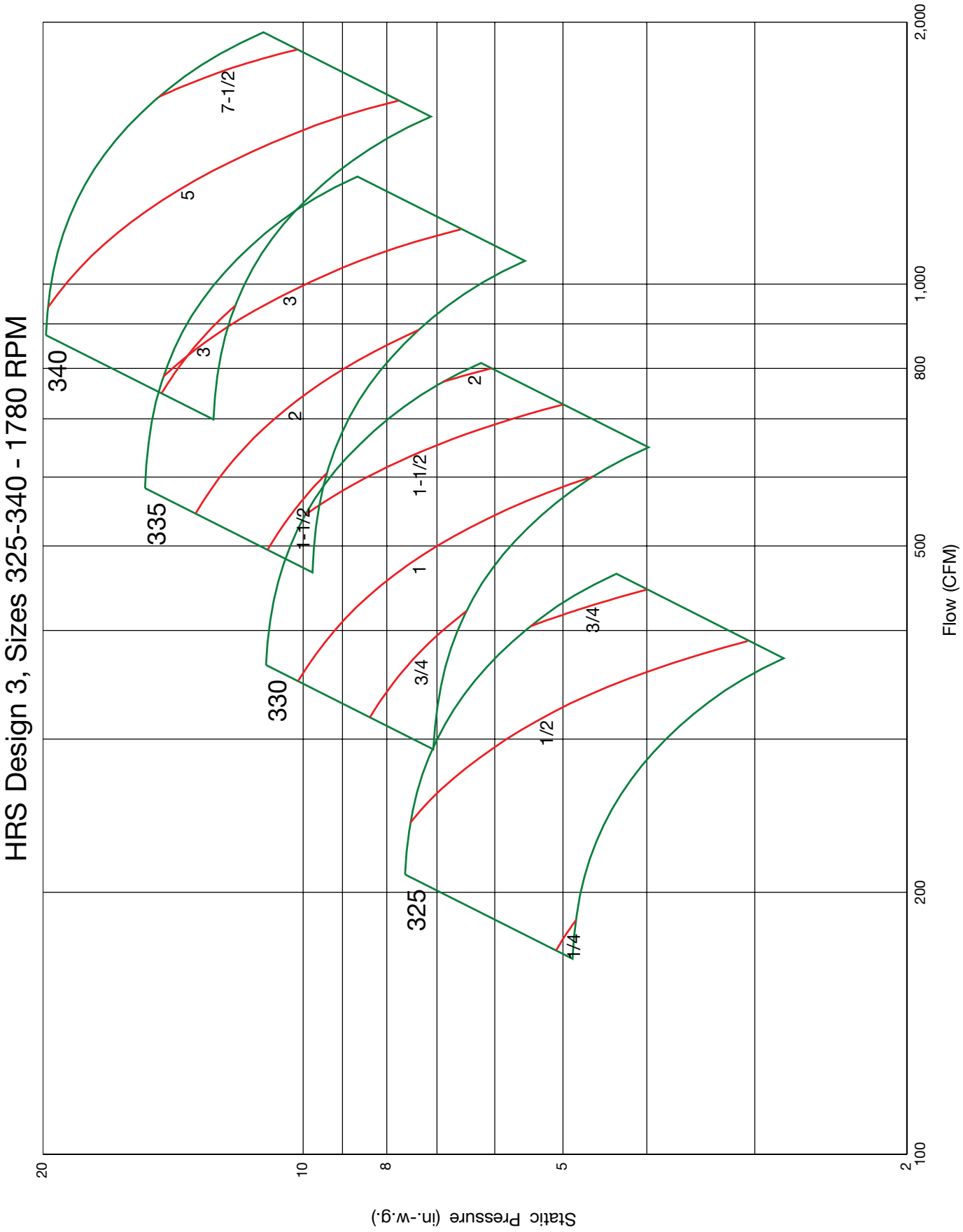
HRS – Design 2, Sizes 245-255, 1780 RPM



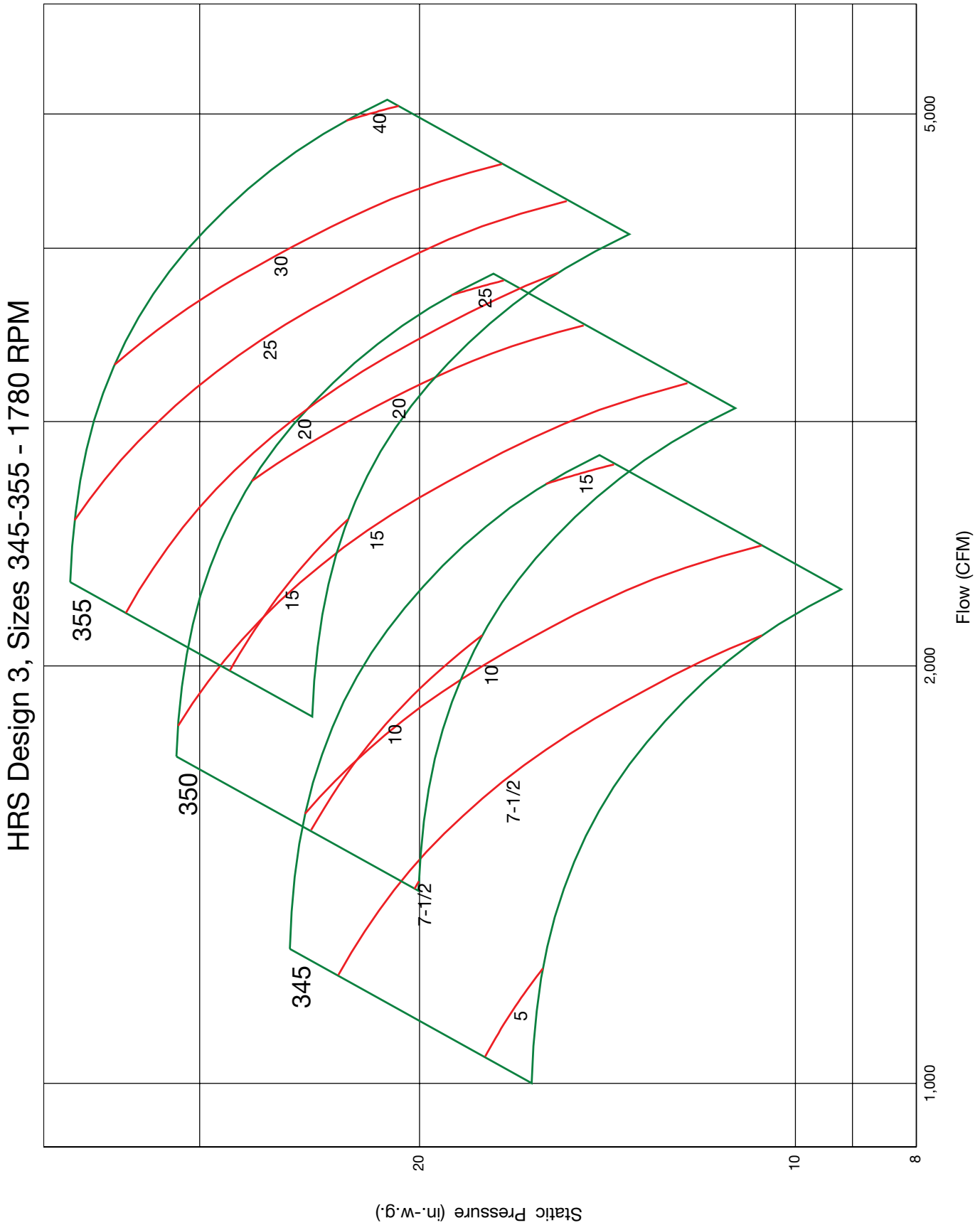
HRS – Design 2, Sizes 260-270, 1780 RPM



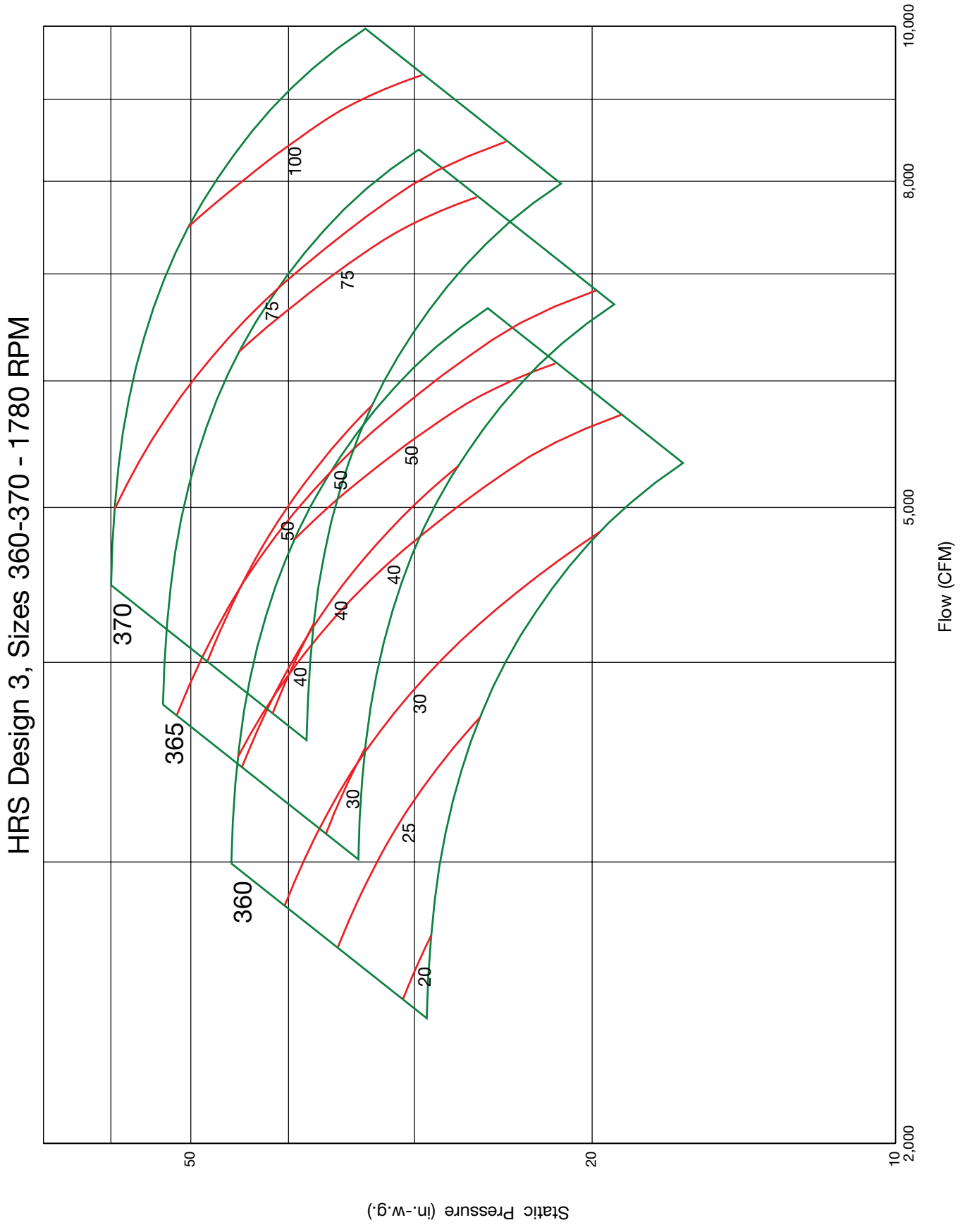
HRS – Design 3, Sizes 325-340, 1780 RPM



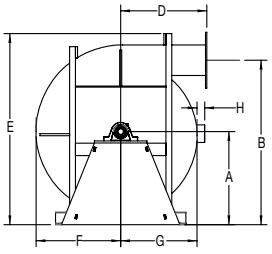
HRS – Design 3, Sizes 345-355, 1780 RPM



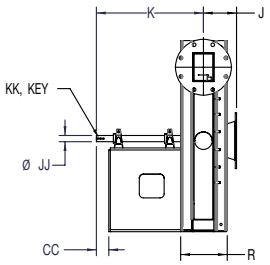
HRS – Design 3, Sizes 360-370, 1780 RPM

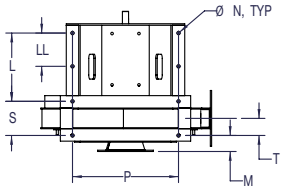


Arrangement 1, Design 1

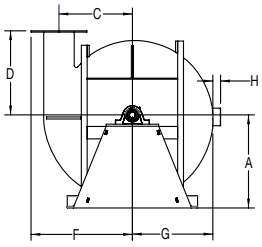


THD

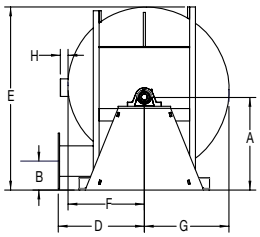




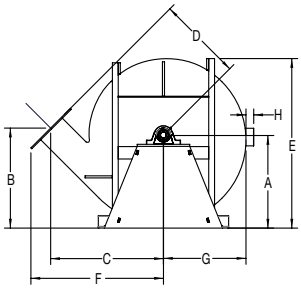
Foundation



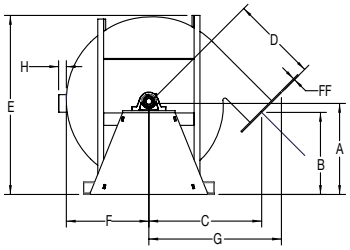
UBD



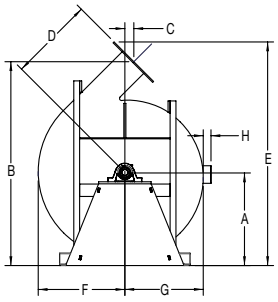
BHD



BAU



TAD



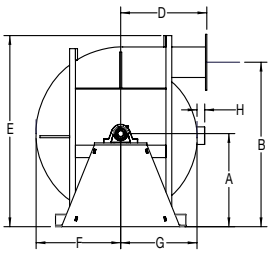
TAU

FAN SIZE	A		B						C						D	E					
	ALL DISCHARGES EXCEPT BHD1	BHD	TAD	THD	TAU	BAU	BHD	UBD	TAD	THD	TAU	BAU	BHD	UBD		TAD	THD	TAU	BAU	BHD	UBD
125	14.06	15.81	12.74	25.82	32.01	15.39	4.06	27.70	17.95	13.63	1.33	17.95	4.06	11.76	13.63	27.07	29.57	34.66	26.45	27.62	26.30
130	16.88	18.13	15.29	30.98	38.42	18.47	4.02	33.23	21.54	16.36	1.59	21.54	4.02	14.11	16.36	32.80	35.48	41.07	31.89	33.36	31.65
135	19.69	21.19	17.83	36.15	44.82	21.54	4.73	38.77	25.13	19.09	1.86	25.13	4.73	16.46	19.08	38.72	40.93	48.00	37.73	39.46	37.46
140	22.50	24.13	20.38	41.31	51.22	24.62	5.31	44.31	28.72	21.81	2.12	28.72	5.31	18.81	21.81	43.31	46.31	54.76	42.32	44.19	42.07
145	25.31	26.56	22.93	46.48	57.62	27.70	5.40	49.85	32.31	24.54	2.39	32.31	5.40	21.16	24.54	49.78	51.69	61.16	48.56	50.09	48.23
150	28.13	29.38	25.48	51.64	64.03	30.78	5.86	55.39	35.90	27.27	2.65	35.90	5.86	23.52	27.26	54.88	57.14	67.91	53.53	55.24	53.16
155	30.94	32.94	28.02	56.80	70.43	33.85	7.07	60.93	39.49	29.99	2.92	39.49	7.07	25.87	29.99	60.21	63.46	74.32	58.66	61.02	58.24
160	33.75	35.25	30.57	61.97	76.83	36.93	7.03	66.47	43.08	32.72	3.18	43.08	7.03	28.22	32.72	64.97	68.84	81.60	63.48	66.29	63.11
165	36.56	37.69	33.12	67.13	83.23	40.01	7.12	72.01	46.67	35.44	3.45	46.67	7.12	30.57	35.44	70.38	74.23	88.01	68.77	71.81	68.37
170	39.38	41.25	35.67	72.30	89.64	43.09	8.33	77.55	50.26	38.17	3.71	50.26	8.33	32.92	38.17	76.23	80.61	94.41	74.24	77.34	73.71

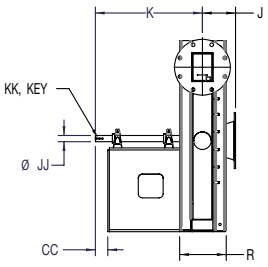
FAN SIZE	F						G						H	J	K	L	LL	M	N	P	R	S	T
	TAD	THD	TAU	BAU	BHD	UBD	TAD	THD	TAU	BAU	BHD	UBD											
125	12.70	12.85	13.01	20.60	12.23	15.51	20.60	13.63	12.39	12.70	12.85	12.55	1.88	4.65	20.86	11.00	–	2.24	0.69	19.54	6.76	4.82	2.41
130	15.24	15.42	15.61	24.19	14.68	17.86	24.19	16.36	14.87	15.24	15.42	15.05	1.56	5.21	23.50	11.19	–	2.07	0.81	21.11	9.27	6.27	3.14
135	17.78	17.99	18.21	28.31	17.13	20.96	28.31	19.08	17.34	17.78	17.99	17.56	1.69	6.13	24.30	12.31	–	2.70	0.81	20.87	9.86	6.86	3.43
140	20.32	20.56	20.81	32.26	19.57	23.81	32.26	21.81	19.82	20.32	20.56	20.07	1.81	6.94	26.68	13.56	–	3.26	0.81	27.20	10.38	7.38	3.69
145	22.86	23.13	23.41	35.85	22.02	26.16	35.85	24.54	22.30	22.86	23.13	22.58	1.81	7.80	29.66	16.69	–	3.86	0.81	21.66	10.89	7.89	3.95
150	25.40	25.70	26.02	39.79	24.47	29.02	39.79	27.26	24.78	25.40	25.70	25.09	2.13	8.68	28.92	16.25	–	4.45	0.81	23.96	11.47	8.47	4.24
155	27.94	28.27	28.62	43.38	26.91	31.37	43.38	29.99	27.25	27.94	28.27	27.60	2.13	9.54	31.20	16.88	–	4.55	1.06	30.69	13.99	9.99	4.99
160	30.48	30.84	31.22	47.85	29.36	34.97	47.85	32.72	29.73	30.48	30.84	30.11	2.38	10.36	33.01	17.62	–	5.11	1.06	41.02	14.50	10.50	5.25
165	33.02	33.41	33.82	51.44	31.80	37.32	51.44	35.44	32.21	33.02	33.41	32.62	2.38	11.22	34.93	18.62	9.31	5.71	1.06	36.32	15.02	11.02	5.51
170	35.56	35.98	36.42	55.03	34.25	39.67	55.03	38.17	34.69	35.56	35.98	35.13	2.38	12.03	37.31	18.81	9.41	5.80	1.06	38.69	17.53	12.47	6.24

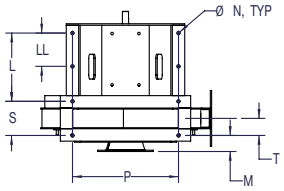
DIMENSIONS ARE SUBJECT TO CHANGE. CERTIFIED DRAWINGS AVAILABLE ON REQUEST.

Arrangement 1, Design 2

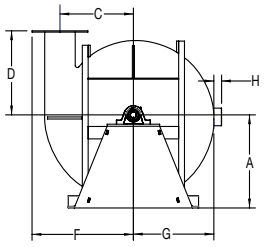


THD

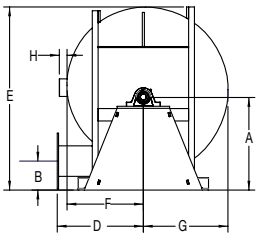




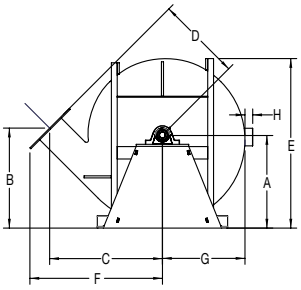
Foundation



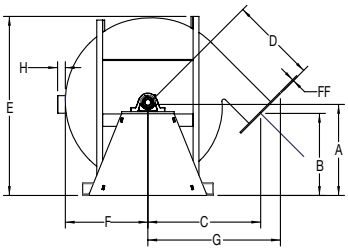
UBD



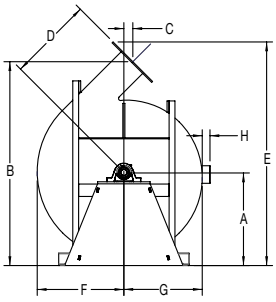
BHD



BAU



TAD



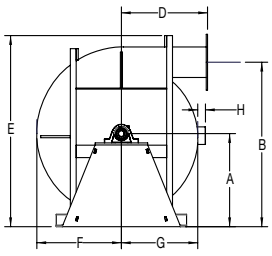
TAU

FAN SIZE	A	B						C						D	E					
	ALL DISCHARGES EXCEPT BHD1	BHD	TAD	THD	TAU	BAU	BHD	UBD	TAD	THD	TAU	BAU	BHD	UBD		TAD	THD	TAU	BAU	BHD	UBD
225	13.94	16.06	12.54	25.30	31.38	15.28	4.68	27.23	17.47	13.32	1.37	17.47	4.68	11.39	13.32	26.95	29.58	34.38	26.02	27.78	25.79
230	16.69	18.94	15.05	30.35	37.65	18.33	5.27	32.67	20.96	15.98	1.64	20.96	5.27	13.67	15.98	32.95	35.43	41.19	31.62	34.18	31.25
235	19.44	21.19	17.55	35.41	43.93	21.39	5.25	38.12	24.46	18.65	1.92	24.46	5.25	15.94	18.65	38.78	40.84	47.46	37.32	39.40	36.91
240	22.25	24.00	20.06	40.47	50.20	24.44	5.78	43.56	27.95	21.31	2.19	27.95	5.78	18.22	21.31	43.12	46.25	54.09	41.63	43.75	41.26
245	25.00	27.50	22.57	45.53	56.48	27.50	7.00	49.01	31.45	23.98	2.47	31.45	7.00	20.50	23.97	49.74	52.25	61.25	47.93	50.84	47.43
250	27.81	29.81	25.08	50.59	62.75	30.55	7.04	54.45	34.94	26.64	2.74	34.94	7.04	22.78	26.64	54.86	57.34	67.52	52.84	55.31	52.29
255	30.63	33.38	27.58	55.65	69.03	33.61	8.32	59.90	38.43	29.30	3.01	38.43	8.32	25.05	29.30	60.33	63.41	73.80	58.04	61.32	57.41
260	33.38	35.63	30.09	60.71	75.30	36.66	8.30	65.34	41.93	31.97	3.29	41.93	8.30	27.33	31.97	64.68	68.75	80.96	62.45	65.63	61.89
265	36.13	37.88	32.60	65.77	81.58	39.72	8.27	70.79	45.42	34.63	3.56	45.42	8.27	29.61	34.63	70.24	74.09	87.23	67.65	71.10	67.05
270	38.94	41.69	35.11	70.83	87.85	42.77	9.80	76.23	48.92	37.30	3.84	48.92	9.80	31.89	37.29	76.34	80.50	94.57	73.40	76.83	72.60

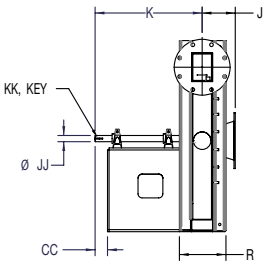
FAN SIZE	F						G						H	J	K	L	LL	M	N	P	R	S	T
	TAD	THD	TAU	BAU	BHD	UBD	TAD	THD	TAU	BAU	BHD	UBD											
225	12.58	12.81	13.05	20.48	11.88	15.64	20.48	13.32	12.11	12.58	12.81	12.35	1.56	4.80	21.01	11.00	–	2.24	0.69	18.92	7.07	5.13	2.57
230	15.10	15.38	15.66	24.50	14.26	18.67	24.50	15.98	14.53	15.10	15.38	14.81	1.69	5.09	23.99	11.19	–	1.77	0.81	20.48	9.65	6.65	3.32
235	17.62	17.94	18.27	27.99	16.64	20.94	27.99	18.65	16.95	17.62	17.94	17.28	1.69	5.52	25.33	12.31	–	1.88	0.81	20.16	10.30	7.30	3.65
240	20.13	20.50	20.88	31.84	19.01	23.72	31.84	21.31	19.37	20.13	20.50	19.75	1.81	5.81	28.31	13.56	–	1.88	0.81	26.41	10.87	7.87	3.94
245	22.65	23.06	23.49	36.22	21.39	27.25	36.22	23.97	21.79	22.65	23.06	22.22	2.13	6.29	31.79	16.69	–	2.04	0.81	21.04	11.51	8.51	4.26
250	25.17	25.63	26.10	39.71	23.77	29.53	39.71	26.64	24.22	25.17	25.63	24.69	2.13	6.95	31.27	16.25	–	2.41	0.81	23.34	12.09	9.09	4.55
255	27.68	28.19	28.71	43.21	26.14	31.80	43.21	29.30	26.64	27.68	28.19	27.16	2.38	7.62	33.80	16.88	–	2.29	1.06	29.74	14.67	10.67	5.34
260	30.20	30.75	31.32	47.59	28.52	35.33	47.59	31.97	29.06	30.20	30.75	29.63	2.38	8.28	35.84	17.62	–	2.66	1.06	39.86	15.25	11.25	5.62
265	32.71	33.31	33.93	51.08	30.89	37.61	51.08	34.63	31.48	32.71	33.31	32.10	2.38	8.95	38.00	18.62	9.31	3.04	1.06	35.21	15.83	11.83	5.91
270	35.23	35.88	36.54	55.63	33.27	41.39	55.63	37.29	33.90	35.23	35.88	34.57	2.38	9.61	40.61	18.81	9.41	2.94	1.06	37.58	18.40	13.34	6.67

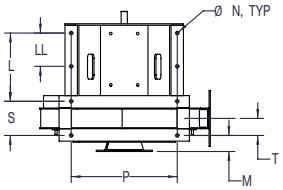
DIMENSIONS ARE SUBJECT TO CHANGE. CERTIFIED DRAWINGS AVAILABLE ON REQUEST.

Arrangement 1, Design 3

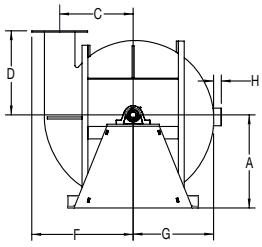


THD

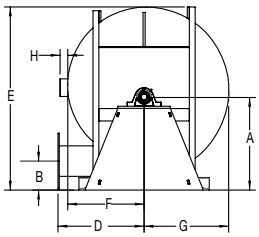




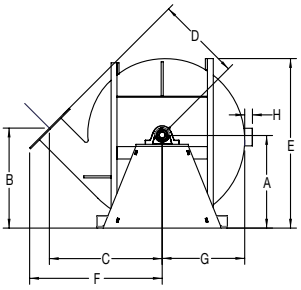
Foundation



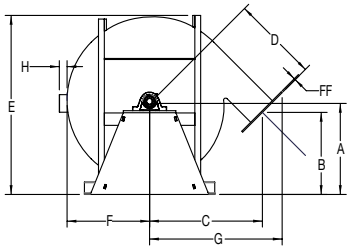
UBD



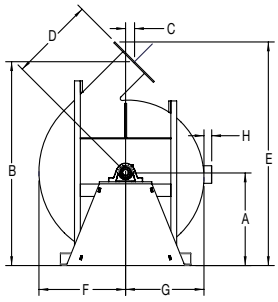
BHD



BAU



TAD



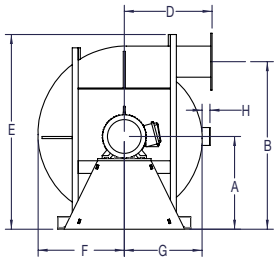
TAU

FAN SIZE	A	B						C						D	E					
	ALL DISCHARGES EXCEPT BHD1	BHD	TAD	THD	TAU	BAU	BHD	UBD	TAD	THD	TAU	BAU	BHD	UBD		TAD	THD	TAU	BAU	BHD	UBD
325	13.75	16.38	12.40	24.85	30.80	15.11	5.28	26.76	17.05	13.01	1.36	17.05	5.28	11.10	13.01	26.88	29.85	34.33	25.59	28.37	25.28
330	16.50	18.63	14.87	29.81	36.95	18.13	5.31	32.11	20.45	15.61	1.63	20.45	5.31	13.31	15.61	33.30	35.38	40.49	31.58	34.10	31.11
335	19.25	21.38	17.35	34.78	43.11	21.15	5.84	37.46	23.86	18.21	1.90	23.86	5.84	15.53	18.21	37.68	40.82	47.00	35.82	38.67	35.40
340	22.00	24.75	19.83	39.75	49.27	24.17	7.00	42.81	27.27	20.81	2.17	27.27	7.00	17.75	20.81	43.27	46.50	54.05	40.97	44.25	40.45
345	24.75	27.00	22.31	44.72	55.43	27.19	7.03	48.16	30.68	23.41	2.44	30.68	7.03	19.97	23.41	48.31	51.55	60.20	46.06	49.72	45.51
350	27.50	30.50	24.79	49.69	61.59	30.22	8.31	53.52	34.09	26.02	2.72	34.09	8.31	22.19	26.02	54.96	57.69	67.25	52.31	55.91	51.58
355	30.25	32.75	27.27	54.66	67.75	33.24	8.34	58.87	37.50	28.62	2.99	37.50	8.34	24.41	28.62	60.57	63.29	73.41	57.58	60.76	56.75
360	33.00	36.50	29.75	59.63	73.91	36.26	9.87	64.22	40.91	31.22	3.26	40.91	9.87	26.63	31.22	64.41	69.13	80.63	61.41	66.29	60.68
365	35.75	38.75	32.23	64.60	80.07	39.28	9.90	69.57	44.32	33.82	3.53	44.32	9.90	28.85	33.82	70.64	74.10	86.79	67.08	71.81	66.10
370	38.50	42.00	34.71	69.57	86.23	42.30	10.93	74.92	47.73	36.42	3.80	47.73	10.93	31.07	36.42	76.73	80.39	93.65	72.90	77.34	71.85

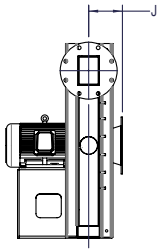
FAN SIZE	F						G						H	J	K	L	LL	M	N	P	R	S	T
	TAD	THD	TAU	BAU	BHD	UBD	TAD	THD	TAU	BAU	BHD	UBD											
325	12.46	12.78	13.09	20.58	11.53	16.10	20.58	13.01	11.83	12.46	12.78	12.15	1.56	4.92	21.13	11.00	–	2.24	0.69	17.67	7.30	5.37	2.68
330	14.96	15.33	15.71	23.99	13.84	18.31	23.99	15.61	14.20	14.96	15.33	14.58	1.69	5.23	24.13	11.19	–	1.77	0.81	19.03	9.93	6.93	3.46
335	17.45	17.89	18.32	27.75	16.15	21.03	27.75	18.21	16.57	17.45	17.89	17.01	1.81	5.69	25.50	12.31	–	1.88	0.81	26.88	10.63	7.63	3.81
340	19.94	20.44	20.94	32.05	18.45	24.50	32.05	20.81	18.93	19.94	20.44	19.44	2.13	6.00	28.50	13.56	–	1.88	0.81	24.62	11.25	8.25	4.13
345	22.43	23.00	23.56	35.45	20.76	26.72	35.45	23.41	21.30	22.43	23.00	21.87	2.13	6.44	32.06	16.69	–	1.97	0.81	27.79	11.94	8.94	4.47
350	24.93	25.55	26.18	39.75	23.07	30.19	39.75	26.02	23.67	24.93	25.55	24.30	2.38	6.75	31.94	16.25	–	1.97	0.81	21.97	12.56	9.56	4.78
355	27.42	28.11	28.79	43.16	25.37	32.41	43.16	28.62	26.03	27.42	28.11	26.73	2.38	7.06	34.88	16.88	–	1.47	1.06	27.84	15.19	11.19	5.59
360	29.91	30.66	31.41	47.63	27.68	36.13	47.63	31.22	28.40	29.91	30.66	29.16	2.38	7.48	37.20	17.62	–	1.58	1.06	37.35	15.81	11.81	5.91
365	32.40	33.22	34.03	51.04	29.98	38.35	51.04	33.82	30.76	32.40	33.22	31.59	2.38	8.07	39.50	18.62	9.31	1.85	1.06	32.83	16.44	12.44	6.22
370	34.90	35.77	36.65	55.15	32.29	41.57	55.15	36.42	33.13	34.90	35.77	34.02	2.38	8.67	42.21	18.81	9.41	1.67	1.06	35.04	19.06	14.00	7.00

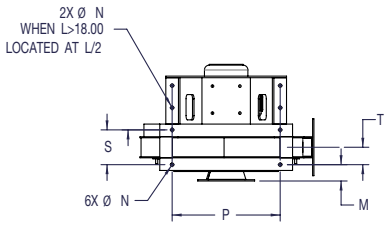
DIMENSIONS ARE SUBJECT TO CHANGE. CERTIFIED DRAWINGS AVAILABLE ON REQUEST.

Arrangement 4, Design 1

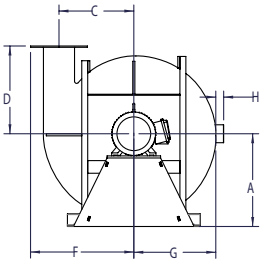


THD

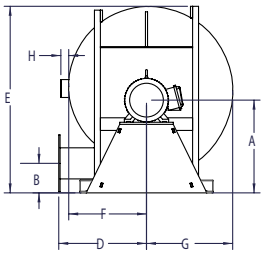




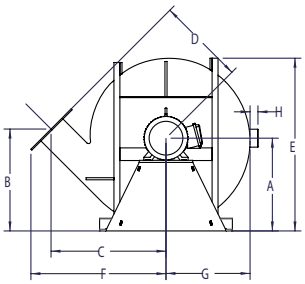
Foundation



UBD



BHD



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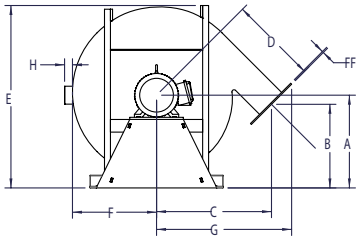

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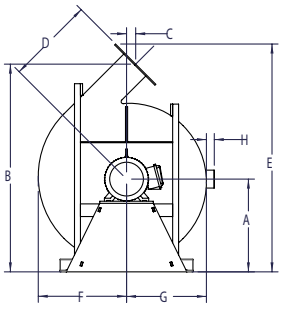


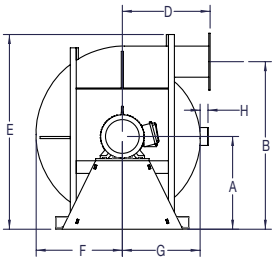
TAU

FAN SIZE	A	B						C						D	E					
	ALL DISCHARGES EXCEPT BHD1	BHD	TAD	THD	TAU	BAU	BHD	UBD	TAD	THD	TAU	BAU	BHD	UBD		TAD	THD	TAU	BAU	BHD	UBD
125	14.06	15.81	12.74	25.82	32.01	15.39	4.06	27.70	17.95	13.63	1.33	17.95	4.06	11.76	13.63	27.07	29.57	34.66	26.45	27.62	26.30
130	16.88	18.13	15.29	30.98	38.42	18.47	4.02	33.23	21.54	16.36	1.59	21.54	4.02	14.11	16.36	32.80	35.48	41.07	31.89	33.36	31.65
135	19.69	21.19	17.83	36.15	44.82	21.54	4.73	38.77	25.13	19.09	1.86	25.13	4.73	16.46	19.08	38.72	40.93	48.00	37.73	39.46	37.46
140	22.50	24.13	20.38	41.31	51.22	24.62	5.31	44.31	28.72	21.81	2.12	28.72	5.31	18.81	21.81	43.31	46.31	54.76	42.32	44.19	42.07
145	25.31	26.56	22.93	46.48	57.62	27.70	5.40	49.85	32.31	24.54	2.39	32.31	5.40	21.16	24.54	49.78	51.69	61.16	48.56	50.09	48.23
150	28.13	29.38	25.48	51.64	64.03	30.78	5.86	55.39	35.90	27.27	2.65	35.90	5.86	23.52	27.26	54.88	57.14	67.91	53.53	55.24	53.16
155	30.94	32.94	28.02	56.80	70.43	33.85	7.07	60.93	39.49	29.99	2.92	39.49	7.07	25.87	29.99	60.21	63.46	74.32	58.66	61.02	58.24
160	33.75	35.25	30.57	61.97	76.83	36.93	7.03	66.47	43.08	32.72	3.18	43.08	7.03	28.22	32.72	64.97	68.84	81.60	63.48	66.29	63.11
165	36.56	37.69	33.12	67.13	83.23	40.01	7.12	72.01	46.67	35.44	3.45	46.67	7.12	30.57	35.44	70.38	74.23	88.01	68.77	71.81	68.37
170	39.38	41.25	35.67	72.30	89.64	43.09	8.33	77.55	50.26	38.17	3.71	50.26	8.33	32.92	38.17	76.23	80.61	94.41	74.24	77.34	73.71

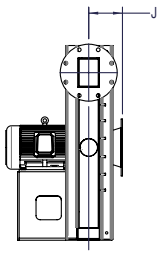
FAN SIZE	F						G						H	J	M	N	P	R	S	T
	TAD	THD	TAU	BAU	BHD	UBD	TAD	THD	TAU	BAU	BHD	UBD								
125	12.70	12.85	13.01	20.60	12.23	15.51	20.60	13.63	12.39	12.70	12.85	12.55	1.88	4.65	2.24	0.69	19.54	6.76	4.82	2.41
130	15.24	15.42	15.61	24.19	14.68	17.86	24.19	16.36	14.87	15.24	15.42	15.05	1.56	5.21	2.07	0.81	21.11	9.27	6.27	3.14
135	17.78	17.99	18.21	28.31	17.13	20.96	28.31	19.08	17.34	17.78	17.99	17.56	1.69	6.13	2.70	0.81	20.87	9.86	6.86	3.43
140	20.32	20.56	20.81	32.26	19.57	23.81	32.26	21.81	19.82	20.32	20.56	20.07	1.81	6.94	3.26	0.81	27.20	10.38	7.38	3.69
145	22.86	23.13	23.41	35.85	22.02	26.16	35.85	24.54	22.30	22.86	23.13	22.58	1.81	7.80	3.86	0.81	21.66	10.89	7.89	3.95
150	25.40	25.70	26.02	39.79	24.47	29.02	39.79	27.26	24.78	25.40	25.70	25.09	2.13	8.68	4.45	0.81	23.96	11.47	8.47	4.24
155	27.94	28.27	28.62	43.38	26.91	31.37	43.38	29.99	27.25	27.94	28.27	27.60	2.13	9.54	4.55	1.06	30.69	13.99	9.99	4.99
160	30.48	30.84	31.22	47.85	29.36	34.97	47.85	32.72	29.73	30.48	30.84	30.11	2.38	10.36	5.11	1.06	41.02	14.50	10.50	5.25
165	33.02	33.41	33.82	51.44	31.80	37.32	51.44	35.44	32.21	33.02	33.41	32.62	2.38	11.22	5.71	1.06	36.32	15.02	11.02	5.51
170	35.56	35.98	36.42	55.03	34.25	39.67	55.03	38.17	34.69	35.56	35.98	35.13	2.38	12.03	5.80	1.06	38.69	17.53	12.47	6.24

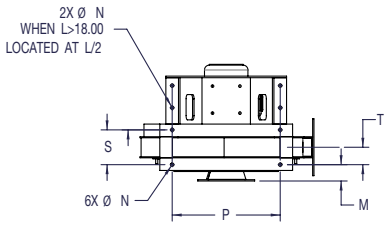
DIMENSIONS ARE SUBJECT TO CHANGE. CERTIFIED DRAWINGS AVAILABLE ON REQUEST.

Arrangement 4, Design 2

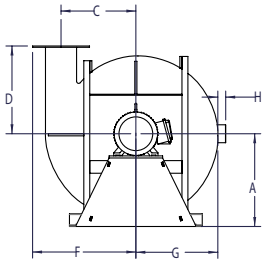


THD

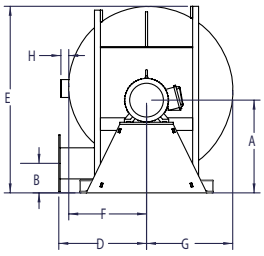




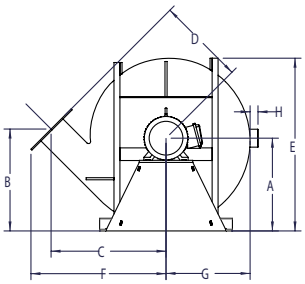
Foundation



UBD



BHD



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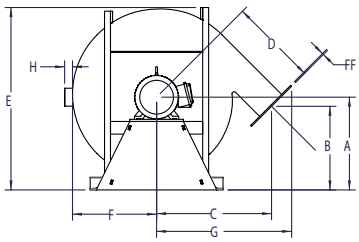

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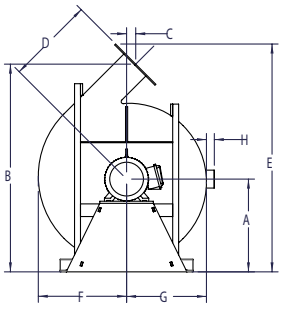


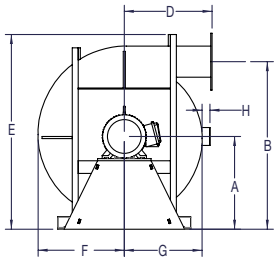
TAU

FAN SIZE	A		B						C						D	E					
	ALL DISCHARGES EXCEPT BHD1	BHD	TAD	THD	TAU	BAU	BHD	UBD	TAD	THD	TAU	BAU	BHD	UBD		TAD	THD	TAU	BAU	BHD	UBD
225	13.94	16.06	12.54	25.30	31.38	15.28	4.68	27.23	17.47	13.32	1.37	17.47	4.68	11.39	13.32	26.95	29.58	34.38	26.02	27.78	25.79
230	16.69	18.94	15.05	30.35	37.65	18.33	5.27	32.67	20.96	15.98	1.64	20.96	5.27	13.67	15.98	32.95	35.43	41.19	31.62	34.18	31.25
235	19.44	21.19	17.55	35.41	43.93	21.39	5.25	38.12	24.46	18.65	1.92	24.46	5.25	15.94	18.65	38.78	40.84	47.46	37.32	39.40	36.91
240	22.25	24.00	20.06	40.47	50.20	24.44	5.78	43.56	27.95	21.31	2.19	27.95	5.78	18.22	21.31	43.12	46.25	54.09	41.63	43.75	41.26
245	25.00	27.50	22.57	45.53	56.48	27.50	7.00	49.01	31.45	23.98	2.47	31.45	7.00	20.50	23.97	49.74	52.25	61.25	47.93	50.84	47.43
250	27.81	29.81	25.08	50.59	62.75	30.55	7.04	54.45	34.94	26.64	2.74	34.94	7.04	22.78	26.64	54.86	57.34	67.52	52.84	55.31	52.29
255	30.63	33.38	27.58	55.65	69.03	33.61	8.32	59.90	38.43	29.30	3.01	38.43	8.32	25.05	29.30	60.33	63.41	73.80	58.04	61.32	57.41
260	33.38	35.63	30.09	60.71	75.30	36.66	8.30	65.34	41.93	31.97	3.29	41.93	8.30	27.33	31.97	64.68	68.75	80.96	62.45	65.63	61.89
265	36.13	37.88	32.60	65.77	81.58	39.72	8.27	70.79	45.42	34.63	3.56	45.42	8.27	29.61	34.63	70.24	74.09	87.23	67.65	71.10	67.05
270	38.94	41.69	35.11	70.83	87.85	42.77	9.80	76.23	48.92	37.30	3.84	48.92	9.80	31.89	37.29	76.34	80.50	94.57	73.40	76.83	72.60

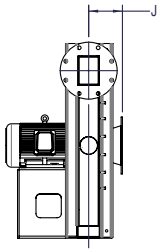
FAN SIZE	F						G						H	J	M	N	P	R	S	T
	TAD	THD	TAU	BAU	BHD	UBD	TAD	THD	TAU	BAU	BHD	UBD								
225	12.58	12.81	13.05	20.48	11.88	15.64	20.48	13.32	12.11	12.58	12.81	12.35	1.56	4.80	2.24	0.69	18.92	7.07	5.13	2.57
230	15.10	15.38	15.66	24.50	14.26	18.67	24.50	15.98	14.53	15.10	15.38	14.81	1.69	5.09	1.77	0.81	20.48	9.65	6.65	3.32
235	17.62	17.94	18.27	27.99	16.64	20.94	27.99	18.65	16.95	17.62	17.94	17.28	1.69	5.52	1.88	0.81	20.16	10.30	7.30	3.65
240	20.13	20.50	20.88	31.84	19.01	23.72	31.84	21.31	19.37	20.13	20.50	19.75	1.81	5.81	1.88	0.81	26.41	10.87	7.87	3.94
245	22.65	23.06	23.49	36.22	21.39	27.25	36.22	23.97	21.79	22.65	23.06	22.22	2.13	6.29	2.04	0.81	21.04	11.51	8.51	4.26
250	25.17	25.63	26.10	39.71	23.77	29.53	39.71	26.64	24.22	25.17	25.63	24.69	2.13	6.95	2.41	0.81	23.34	12.09	9.09	4.55
255	27.68	28.19	28.71	43.21	26.14	31.80	43.21	29.30	26.64	27.68	28.19	27.16	2.38	7.62	2.29	1.06	29.74	14.67	10.67	5.34
260	30.20	30.75	31.32	47.59	28.52	35.33	47.59	31.97	29.06	30.20	30.75	29.63	2.38	8.28	2.66	1.06	39.86	15.25	11.25	5.62
265	32.71	33.31	33.93	51.08	30.89	37.61	51.08	34.63	31.48	32.71	33.31	32.10	2.38	8.95	3.04	1.06	35.21	15.83	11.83	5.91
270	35.23	35.88	36.54	55.63	33.27	41.39	55.63	37.29	33.90	35.23	35.88	34.57	2.38	9.61	2.94	1.06	37.58	18.40	13.34	6.67

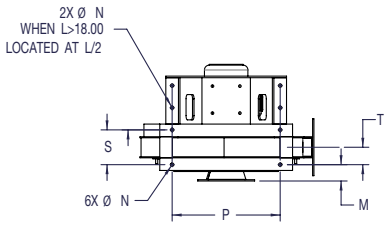
DIMENSIONS ARE SUBJECT TO CHANGE. CERTIFIED DRAWINGS AVAILABLE ON REQUEST.

Arrangement 4, Design 3

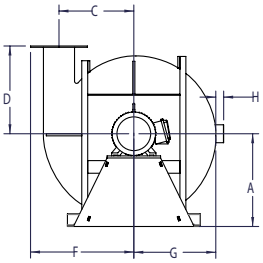


THD





Foundation



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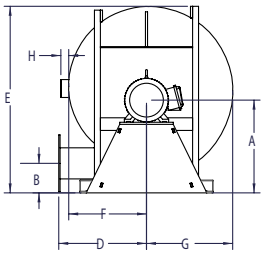
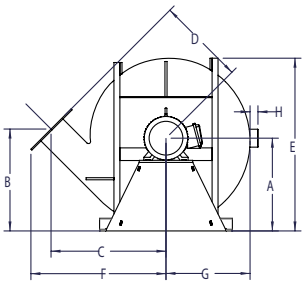


BHD



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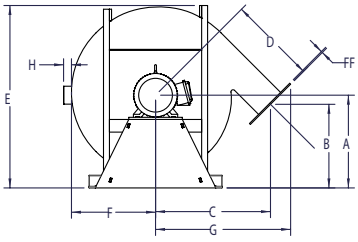
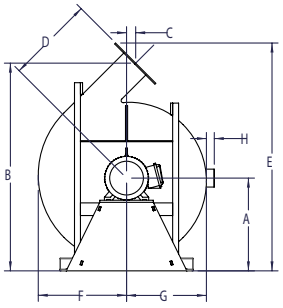


TAD



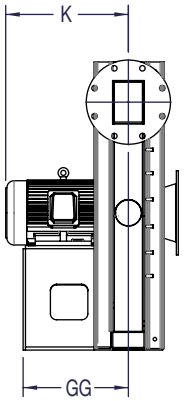
TAU

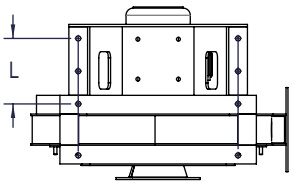
FAN SIZE	A	B						C						D	E					
	ALL DISCHARGES EXCEPT BHD1	BHD	TAD	THD	TAU	BAU	BHD	UBD	TAD	THD	TAU	BAU	BHD	UBD		TAD	THD	TAU	BAU	BHD	UBD
325	13.75	16.38	12.40	24.85	30.80	15.11	5.28	26.76	17.05	13.01	1.36	17.05	5.28	11.10	13.01	26.88	29.85	34.33	25.59	28.37	25.28
330	16.50	18.63	14.87	29.81	36.95	18.13	5.31	32.11	20.45	15.61	1.63	20.45	5.31	13.31	15.61	33.30	35.38	40.49	31.58	34.10	31.11
335	19.25	21.38	17.35	34.78	43.11	21.15	5.84	37.46	23.86	18.21	1.90	23.86	5.84	15.53	18.21	37.68	40.82	47.00	35.82	38.67	35.40
340	22.00	24.75	19.83	39.75	49.27	24.17	7.00	42.81	27.27	20.81	2.17	27.27	7.00	17.75	20.81	43.27	46.50	54.05	40.97	44.25	40.45
345	24.75	27.00	22.31	44.72	55.43	27.19	7.03	48.16	30.68	23.41	2.44	30.68	7.03	19.97	23.41	48.31	51.55	60.20	46.06	49.72	45.51
350	27.50	30.50	24.79	49.69	61.59	30.22	8.31	53.52	34.09	26.02	2.72	34.09	8.31	22.19	26.02	54.96	57.69	67.25	52.31	55.91	51.58
355	30.25	32.75	27.27	54.66	67.75	33.24	8.34	58.87	37.50	28.62	2.99	37.50	8.34	24.41	28.62	60.57	63.29	73.41	57.58	60.76	56.75
360	33.00	36.50	29.75	59.63	73.91	36.26	9.87	64.22	40.91	31.22	3.26	40.91	9.87	26.63	31.22	64.41	69.13	80.63	61.41	66.29	60.68
365	35.75	38.75	32.23	64.60	80.07	39.28	9.90	69.57	44.32	33.82	3.53	44.32	9.90	28.85	33.82	70.64	74.10	86.79	67.08	71.81	66.10
370	38.50	42.00	34.71	69.57	86.23	42.30	10.93	74.92	47.73	36.42	3.80	47.73	10.93	31.07	36.42	76.73	80.39	93.65	72.90	77.34	71.85

FAN SIZE	F						G						H	J	M	N	P	R	S	T
	TAD	THD	TAU	BAU	BHD	UBD	TAD	THD	TAU	BAU	BHD	UBD								
325	12.46	12.78	13.09	20.58	11.53	16.10	20.58	13.01	11.83	12.46	12.78	12.15	1.56	4.92	2.24	0.69	17.67	7.30	5.37	2.68
330	14.96	15.33	15.71	23.99	13.84	18.31	23.99	15.61	14.20	14.96	15.33	14.58	1.69	5.23	1.77	0.81	19.03	9.93	6.93	3.46
335	17.45	17.89	18.32	27.75	16.15	21.03	27.75	18.21	16.57	17.45	17.89	17.01	1.81	5.69	1.88	0.81	26.88	10.63	7.63	3.81
340	19.94	20.44	20.94	32.05	18.45	24.50	32.05	20.81	18.93	19.94	20.44	19.44	2.13	6.00	1.88	0.81	24.62	11.25	8.25	4.13
345	22.43	23.00	23.56	35.45	20.76	26.72	35.45	23.41	21.30	22.43	23.00	21.87	2.13	6.44	1.97	0.81	27.79	11.94	8.94	4.47
350	24.93	25.55	26.18	39.75	23.07	30.19	39.75	26.02	23.67	24.93	25.55	24.30	2.38	6.75	1.97	0.81	21.97	12.56	9.56	4.78
355	27.42	28.11	28.79	43.16	25.37	32.41	43.16	28.62	26.03	27.42	28.11	26.73	2.38	7.06	1.47	1.06	27.84	15.19	11.19	5.59
360	29.91	30.66	31.41	47.63	27.68	36.13	47.63	31.22	28.40	29.91	30.66	29.16	2.38	7.48	1.58	1.06	37.35	15.81	11.81	5.91
365	32.40	33.22	34.03	51.04	29.98	38.35	51.04	33.82	30.76	32.40	33.22	31.59	2.38	8.07	1.85	1.06	32.83	16.44	12.44	6.22
370	34.90	35.77	36.65	55.15	32.29	41.57	55.15	36.42	33.13	34.90	35.77	34.02	2.38	8.67	1.67	1.06	35.04	19.06	14.00	7.00

DIMENSIONS ARE SUBJECT TO CHANGE. CERTIFIED DRAWINGS AVAILABLE ON REQUEST.

Arrangement 4, Pedestal Dimensions
Design 1, Design 2 and Design 3





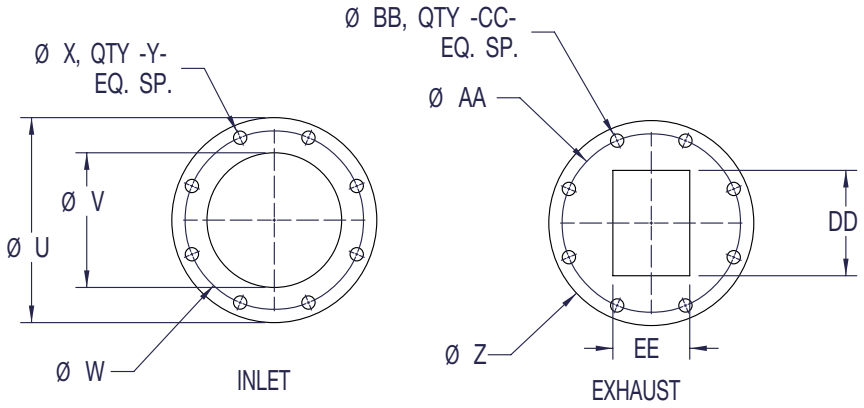
Foundation

FAN SIZE	FRAME SIZE	K
_25	143T	11.99
	145T	12.74
	182T/184T	12.99
	213T/215T	14.99
_30	145T	12.54
	182T/184T	12.79
	213T/215T	14.79
	254T/256T	19.42
	284TS	21.29
_35	182T/184T	13.08
	213T/215T	15.08
	254T/256T	19.71
	284T	21.58
	284TS	21.58
	286TS	21.96
	324TS	23.58
	326TS	24.46
_40	213T/215T	15.46
	254T/256T	20.08
	284T	21.96
	286T	22.33
	286TS	22.33
	324T	23.96
	326T	24.83
	324TS	23.96
	326TS	24.83
	364TS/365TS	25.46
	404TS/405TS	28.58
_45	254T/256T	19.96
	284T	21.84
	286T	22.21
	324T	23.84
	326T	24.71
	326TS	24.71
	364T/365T	25.34
	364TS/365TS	25.34
	404TS/405TS	28.46
	444TS	32.96
	445TS/447TS	32.96
_50	256T	19.77
	284T	21.64
	286T	22.02
	284TS	21.64
	286TS	22.02
	324T	23.64
_55	324T	23.52
	326T	24.39
	364T	25.02
_60	364T/365T	26.07
	404T/405T	29.20
_65	405T	29.00
	444T/445T	33.50
_70	444T/445T	33.31
	447T/449T	42.06

FAN SIZE	FRAME SIZE	L	GG
_25	143T/145T	9.99	12.17
	182T/184T	11.74	13.92
	213T/215T	13.49	15.67
_30	145T	9.79	11.98
	182T/184T	11.54	13.73
	213T/215T	13.29	15.48
	254T/256T	17.29	19.48
	284TS	17.79	19.98
_35	182T/184T	11.83	14.02
	213T/215T	13.58	15.77
	254T/256T	17.58	19.77
	284T	19.33	21.52
	284TS/286TS	19.33	21.52
	324TS/326TS	21.08	23.27
_40	213T/215T	13.96	16.14
	254T/256T	17.96	20.14
	284T/286T	19.71	21.89
	286TS	19.71	21.89
	324T/326T	21.46	23.64
	324TS/326TS	21.46	23.64
	364TS/365TS	22.58	24.77
	404TS/405TS	24.83	27.02
_45	254T/256T	17.84	20.03
	284T/286T	19.59	21.78
	324T/326T	21.34	23.53
	326TS	21.34	23.53
	364T/365T	22.46	24.65
	364TS/365TS	22.46	24.65
	404TS/405TS	24.71	26.90
	444TS/445TS	28.34	30.53
	447TS	36.46	38.65
_50	256T	17.64	19.83
	284T/286T	19.39	21.58
	284TS/286TS	19.39	21.58
	324T	19.64	21.83
_55	324T/326T	21.02	23.20
	364T	21.27	23.45
_60	364T/365T	23.20	25.39
	404T/405T	25.45	27.64
_65	405T	25.25	27.44
	444T/445T	28.88	31.07
_70	444T/445T	28.69	30.87
	447T/449T	36.81	39.00

DIMENSIONS ARE SUBJECT TO CHANGE. CERTIFIED DRAWINGS AVAILABLE ON REQUEST.

Inlet/Outlet Dimensions



FAN SIZE	U	V	W	X	Y	Z	AA	BB	CC	DD	EE	FF OUTLET FLANGE THICKNESS
125	10.00	5.50	8.50	0.88	8	7.50	6.00	0.75	4	2.22	2.19	0.25
130	11.00	6.56	9.50	0.88	8	7.50	6.00	0.75	4	2.74	2.62	0.25
135	13.50	7.69	11.75	0.88	8	9.00	7.50	0.75	8	3.11	3.06	0.25
140	13.50	8.75	11.75	0.88	8	10.00	8.50	0.88	8	3.63	3.50	0.25
145	16.00	9.88	14.25	1.00	12	10.00	8.50	0.88	8	4.14	3.94	0.25
150	16.00	10.94	14.25	1.00	12	11.00	9.50	0.88	8	4.53	4.37	0.25
155	19.00	12.06	17.00	1.00	12	11.00	9.50	0.88	8	5.05	4.81	0.31
160	19.00	13.13	17.00	1.00	12	13.50	11.75	0.88	8	5.56	5.25	0.31
165	21.00	14.25	18.75	1.13	12	13.50	11.75	0.88	8	6.08	5.69	0.31
170	23.50	15.31	21.25	1.13	16	13.50	11.75	0.88	8	6.60	6.12	0.31

FAN SIZE	U	V	W	X	Y	Z	AA	BB	CC	DD	EE	FF FLANGE THICKNESS
225	10.00	5.42	8.50	0.88	8	8.50	7.00	0.75	8	2.53	3.16	0.31
230	11.00	6.50	9.50	0.88	8	10.00	8.50	0.88	8	3.11	3.80	0.31
235	13.50	7.58	11.75	0.88	8	10.00	8.50	0.88	8	3.55	4.43	0.31
240	13.50	8.67	11.75	0.88	8	11.00	9.50	0.88	8	4.12	5.06	0.31
245	16.00	9.75	14.25	1.00	12	13.50	11.75	0.88	8	4.58	5.70	0.31
250	16.00	10.83	14.25	1.00	12	13.50	11.75	0.88	8	5.15	6.33	0.31
255	19.00	11.92	17.00	1.00	12	13.50	11.75	0.88	8	5.73	6.96	0.31
260	19.00	13.00	17.00	1.00	12	16.00	14.25	1.00	12	6.31	7.59	0.31
265	21.00	14.08	18.75	1.13	12	16.00	14.25	1.00	12	6.89	8.23	0.31
270	23.50	15.17	21.25	1.13	16	19.00	17.00	1.00	12	7.47	8.86	0.31

FAN SIZE	U	V	W	X	Y	Z	AA	BB	CC	DD	EE	FF FLANGE THICKNESS
325	10.00	5.52	8.50	0.88	8	10.00	8.50	0.88	8	2.77	3.98	0.31
330	11.00	6.63	9.50	0.88	8	10.00	8.50	0.88	8	3.39	4.78	0.31
335	13.50	7.75	11.75	0.88	8	11.00	9.50	0.88	8	3.88	5.58	0.31
340	13.50	8.87	11.75	0.88	8	13.50	11.75	0.88	8	4.50	6.38	0.31
345	16.00	9.98	14.25	1.00	12	13.50	11.75	0.88	8	5.00	7.17	0.31
350	16.00	11.10	14.25	1.00	12	16.00	14.25	1.00	12	5.62	7.97	0.31
355	19.00	12.22	17.00	1.00	12	16.00	14.25	1.00	12	6.25	8.77	0.31
360	19.00	13.34	17.00	1.00	12	19.00	17.00	1.00	12	6.88	9.56	0.31
365	21.00	14.38	18.75	1.13	12	19.00	17.00	1.00	12	7.50	10.36	0.31
370	23.50	15.50	21.25	1.13	16	21.00	18.75	1.13	12	8.13	11.16	0.31

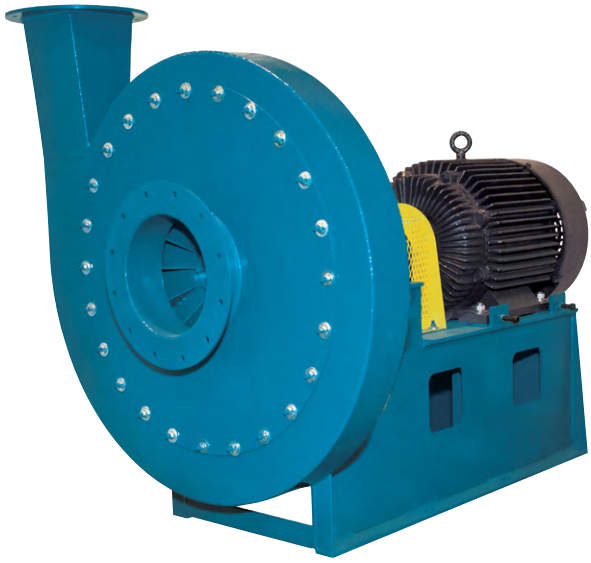
DIMENSIONS ARE SUBJECT TO CHANGE. CERTIFIED DRAWINGS AVAILABLE ON REQUEST.

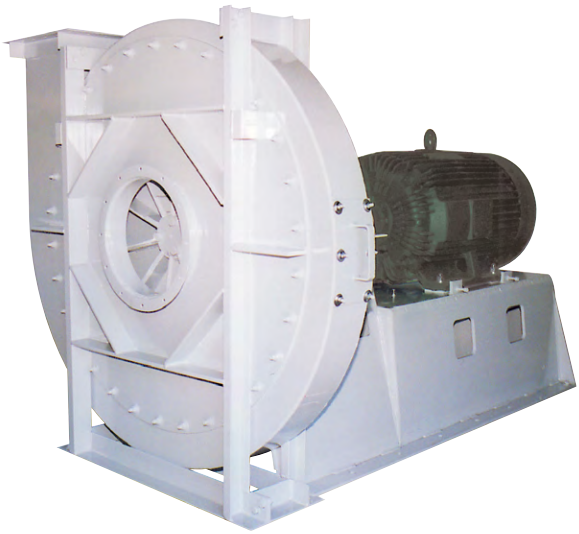
ALTERNATIVE HIGH PRESSURE FANS

TBR
Radial bladed with backplate and shroud for low volume, high pressure applications.

Airflow to 8,000 CFM
Static pressures to 100" w.g.

Additional information can be found in Catalog 1200.





MBO / MBR / MBW
Three (3) wheel designs

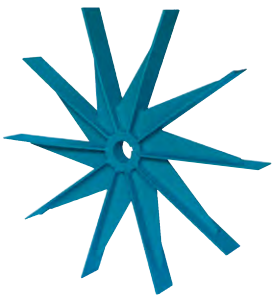
Airflow to 19,000 CFM
Static pressures over 125” w.g.

MBO - Open radial blades for handling hot, stick and abrasive airstreams

MBR - Radial blades with front and back plate for handling clean, hot, or particulate laden airstreams. The most pressure and highest efficiency at a given speed of any MB-Series fan

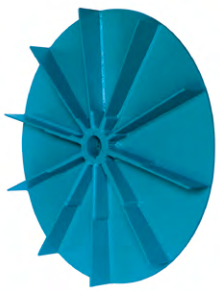
MBW - Radial blades with back plate and no front plate to handle long, stringy, or fibrous materials.

Additional information can be found in Catalog 1400.

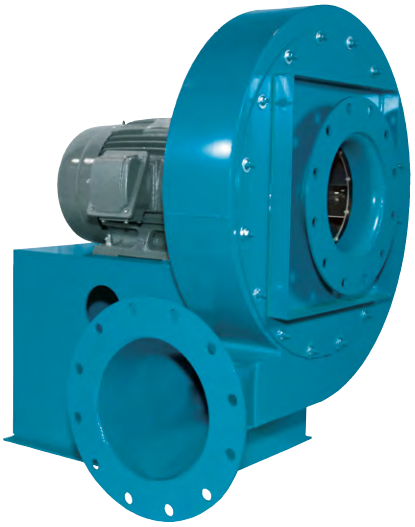


MBO Wheel

MBR Wheel



MBW Wheel



TBNA / TBNS
Turbo Pressure Blowers are used for applications requiring lower volumes and higher air pressures.

Airflow to 5,400 CFM
Static pressures up to 57” w.g.

TBNS - Radial steel wheel designed to handle fumes, light particulates, and temperatures up to 600°F (315°C)

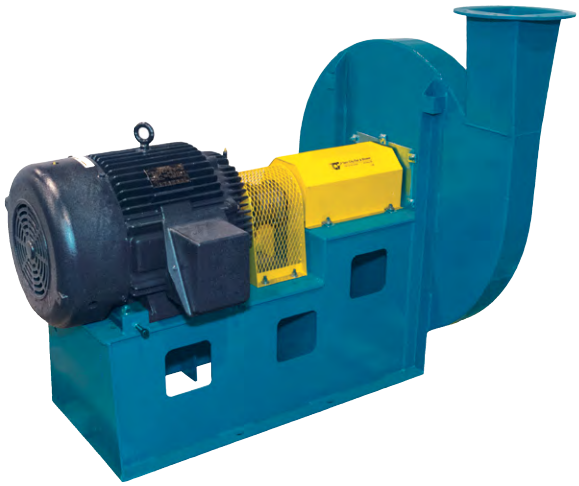
TBNA - Backward inclined aluminum wheel designed to handle clean-air applications up to 200°F

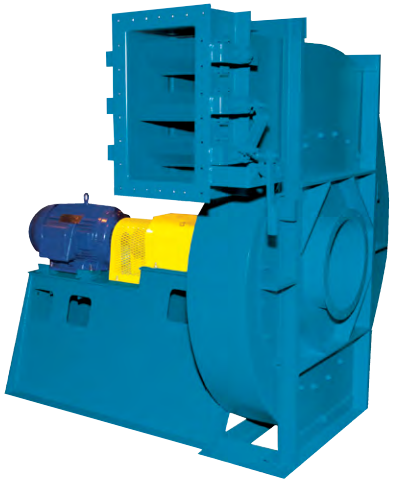
Additional information can be found in Catalog 1250.

TBA
Backward inclined blade for clean-air applications.

Airflow to 28,700 CFM
Static pressures to 70" w.g.

Additional information can be found in Catalog 1200.





BCN
Lower volume, higher pressure fan utilizing a high efficiency, backward curved, non-overloading blade design. Suitable for clean to light particulate-laden air.

Airflow to 75,000 CFM
Static pressures to 100” w.g.

Additional information can be found in Catalog 1450.

Model

HRO

Furnish and install Model HRO High Pressure Radial Pressure Blower as manufactured by Twin City Fan & Blower, Minneapolis, Minnesota. Fans shall be specifically designed to handle specified volume and pressure to ensure rated performance.

PERFORMANCE — Fans shall be tested in accordance with ANSI/AMCA Standard 210 (air performance) and AMCA Standard 300 (sound performance) in an AMCA accredited laboratory.

HOUSING — Housings shall be made of a heavy gauge steel with continuously welded construction and braced with structural members to eliminate any resonant vibration and provide smooth operation. A shaft seal, drain with plug, flanged inlet and flanged outlet shall be provided as standard equipment. Inlet and outlet flanges shall be punched to ANSI 125/150# pattern.

WHEEL — Wheels shall be of heavy gauge welded construction; riveted wheels are not acceptable. Blade orientation shall be radial in design to handle hot, sticky and abrasive airstreams as well as clean air applications. HRO wheels shall be open (no inlet shroud) to allow for particulate and vapor loading.

SHAFT (ARR 1 & 8 ONLY) — Shafts are to be solid material selected for AISI 1040 or 1045 hot rolled steel, accurately turned, ground, polished, and ring gauged for accuracy. Shaft design shall be of sufficient diameter to allow the first critical speed to be at least 1.43 times the maximum fan operating speed.

BEARINGS (ARR 1 & 8 ONLY) — Fans shall be supplied with heavy duty self-aligning grease lubricated anti-friction ball or roller bearings to provide long bearing life. Bearing support members shall be fabricated of heavy steel designed to insure maximum rigidity. Bearings shall be 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.

FACTORY RUN TEST — All fans prior to shipment shall be completely assembled. All fans up to 200 HP shall be 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 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 HRO fans for at least one year from startup, or eighteen months from shipment, whichever occurs first.

TCF
TWIN CITY FAN

Model

HRS

Furnish and install Model HRS High Pressure Radial Pressure Blower as manufactured by Twin City Fan & Blower, Minneapolis, Minnesota. Fans shall be specifically designed to handle specified volume and pressure to ensure rated performance.

PERFORMANCE — Fans shall be tested in accordance with ANSI/AMCA Standard 210 (air performance) and AMCA Standard 300 (sound performance) in an AMCA accredited laboratory.

HOUSING — Housings shall be made of a heavy gauge steel with continuously welded construction and braced with structural members to eliminate any resonant vibration and provide smooth operation. A shaft seal, drain with plug, flanged inlet and flanged outlet shall be provided as standard equipment. Inlet and outlet flanges shall be punched to ANSI 125/150# pattern.

WHEEL — Wheels shall be of heavy gauge welded construction; riveted wheels are not acceptable. Blade orientation shall be radial in design to handle hot, sticky and abrasive airstreams as well as clean air applications. Wheel inlet side shall be shrouded providing more efficiency and allow light particulate and vapor loading.

SHAFT (ARR 1 & 8 ONLY) — Shafts are to be solid material selected for AISI 1040 or 1045 hot rolled steel, accurately turned, ground, polished, and ring gauged for accuracy. Shaft design shall be of sufficient diameter to allow the first critical speed to be at least 1.43 times the maximum fan operating speed.

BEARINGS (ARR 1 & 8 ONLY) — Fans shall be supplied with heavy duty self-aligning grease lubricated anti-friction ball or roller bearings to provide long bearing life. Bearing support members shall be fabricated of heavy steel designed to insure maximum rigidity. Bearings shall be 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.

FACTORY RUN TEST — All fans prior to shipment shall be completely assembled. All fans up to 200 HP shall be 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 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 HRS fans for at least one year from startup, or eighteen months from shipment, whichever occurs first.

TCF
TWIN CITY FAN

INDUSTRIAL PROCESS AND COMMERCIAL VENTILATION SYSTEMS

CENTRIFUGAL FANS | UTILITY SETS | PLENUM & PLUG FANS | INLINE CENTRIFUGAL FANS

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CENTRIFUGAL ROOF & WALL EXHAUSTERS | CEILING VENTILATORS | GRAVITY VENTILATORS | DUCT BLOWERS

RADIAL BLADED FANS | RADIAL TIP FANS | HIGH EFFICIENCY INDUSTRIAL FANS | PRESSURE BLOWERS

LABORATORY EXHAUST FANS | FILTERED SUPPLY FANS | MANCOOLERS | FIBERGLASS FANS | CUSTOM FANS

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