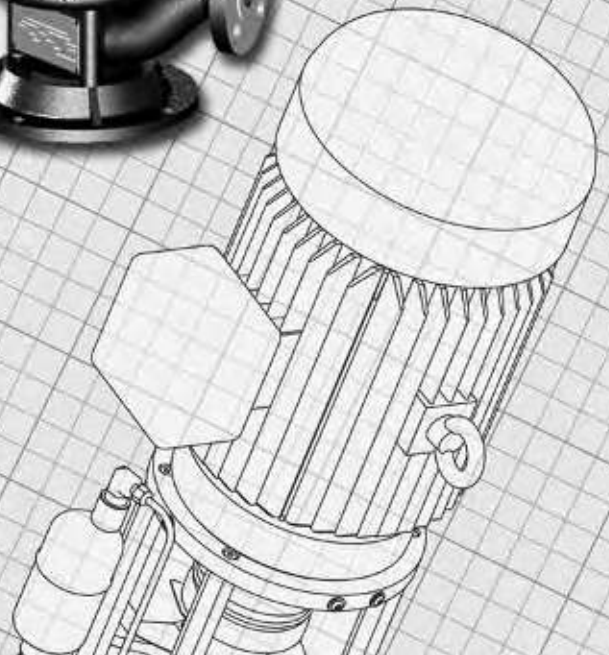


# SERIES RAV/RWAV

High Temperature Air-Cooled Vertical Inline Pumps

## DATA PAK



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**FAN COOLED, VERTICAL, SINGLE STAGE, END SUCTION, ENCLOSED IMPELLER, CENTRIFUGAL, HIGH TEMPERATURE PUMPS**  
**THESE PUMPS ARE DESIGNED SPECIFICALLY FOR USE WITH HOT OIL/HOT WATER/GLYCOL**

<b>MECHANICAL DESIGN SPECIFICATIONS</b>				
<b>PUMP TYPE</b>	<b>RAV3096</b>	<b>RAV3146</b>	<b>RWAV4096</b>	<b>RWAV4166</b>
<b>Direction of Rotation (Viewed from Coupling End)</b>	CW	CCW	CW	CCW
<b>Casing Thickness, Minimum</b>	5/16"	5/16"	5/16"	5/16"
<b>Corrosion Allowance</b>	1/8"	1/8"	1/8"	1/8"
<b>Impeller Balance</b>				
Standard	Single Plane	Single Plane	Single Plane	Single Plane
Optional Extra	Dynamic	Dynamic	Dynamic	Dynamic
<b>Flanges</b>				
ANSI Class	300	300	300	300
Facing	Raised Face	Raised Face	Raised Face	Raised Face
Finish	125 Ra	125 Ra	125 Ra	125 Ra
<b>Suction Pressure, Maximum</b>	100 PSIG	100 PSIG	260 PSIG	260 PSIG
<b>Horsepower Rating, Maximum</b>				
@3500 RPM	35	35	35	35
@1750 RPM	15	15	15	15
@1150 RPM	10	10	10	10
<b>Bearings</b>				
Thrust Bearing, Ball Type, Grease Lubricated	5306 2RS Double Row	7308 GB Angular Contact Pair	5306 2RS Double Row	7308 GB Angular Contact Pair
Radial Bearing, Sleeve Type, Pumpage Lubricated				
<b>Seal Chamber Dimensions</b>				
Length (Depth)	1 5/8"	2 13/16"	1 5/8"	2 13/16"
Inside Diameter (Bore Dia.)	2 1/6"	3 1/8"	2 1/6"	3 1/8"
Shaft Diameter	1 1/8"	1 3/4"	1 1/8"	1 3/4"
<b>Pump Shaft Dimensions</b>				
Span Between Bearings	8 11/16"	11 7/16"	8 11/16"	11 7/16"
Span Between Radial Bearing Centerline and Impeller Centerline	1 5/8"	2 5/16"	1 5/8"	2 5/16"
Diameter at Coupling	7/8"	1 1/8"	7/8"	1 1/8"
Diameter Between Bearings	15/16"	1 9/16"	15/16"	1 9/16"
Diameter at Impeller	3/4"	1 1/8"	3/4"	1 1/8"
<b>L<sup>3</sup>D<sup>4</sup></b>	4.3	2.1	4.3	2.1
<b>Material Class</b>	22 (Ductile Iron)	22 (Ductile Iron)	22 (Ductile Iron)	22 (Ductile Iron)
<b>Maximum Working Pressure</b>	350 PSIG	350 PSIG	450 PSIG	450 PSIG
<b>Pumping Temperature</b>				
Minimum	-20°F @ 350 PSIG	-20°F @ 350 PSIG	-20°F @ 450 PSIG	-20°F @ 450 PSIG
Maximum	650°F @ 350 PSIG	650°F @ 350 PSIG	400°F @ 450 PSIG	400°F @ 450 PSIG
<b>Maximum Ambient Temperature (temp. within 12" of pump)</b>	104°F	118°F	104°F	118°F
<b>Hydrostatic Test Pressure</b>	550 PSIG	550 PSIG	700 PSIG	700 PSIG

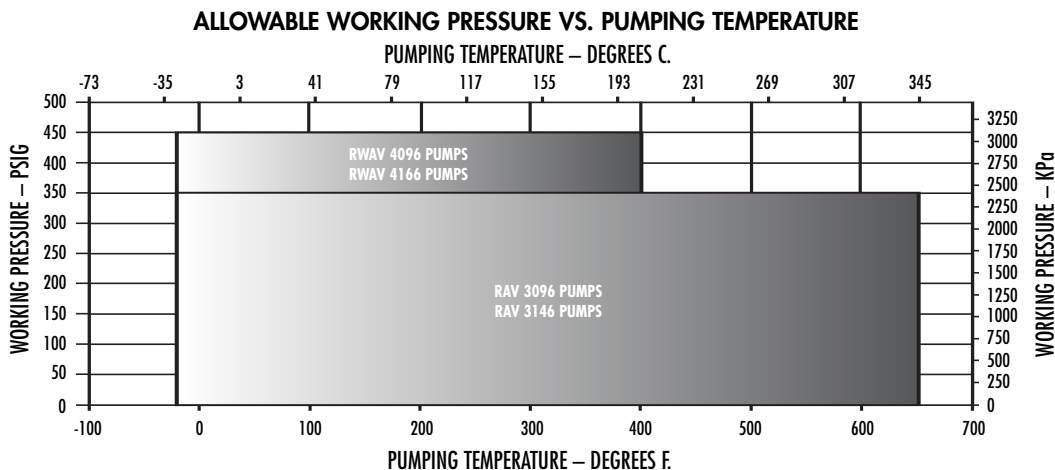
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**THESE PUMPS ARE DESIGNED SPECIFICALLY FOR USE WITH HOT OIL/HOT WATER/GLYCOL**

STANDARD MATERIALS OF CONSTRUCTION					
PART #	PART NAME	RAV3096 CLASS 22	RAV3146 CLASS 22	RWAV4096 CLASS 22	RWAV4166 CLASS 22
3	Impeller	C.I. (1)	C.I. (1)	C.I. (1)	C.I. (1)
4	Impeller Key	Steel (2)	Steel (2)	Steel (2)	Steel (2)
5	Casing	D.I. (10)	D.I. (10)	D.I. (10)	D.I. (10)
5A	Casing Drain Plug	Steel (2)	Steel (2)	Steel (2)	Steel (2)
5B	Casing Stud	Steel (4)	Steel (4)	Steel (4)	Steel (4)
5C	Casing Nut	Steel (5)	Steel (5)	Steel (5)	Steel (5)
5D	Jack Screw	Steel (2)	Steel (2)	Steel (2)	Steel (2)
7	Cradle	C.I. (1) & Steel (2)	C.I. (1) & Steel (2)	C.I. (1) & Steel (2)	C.I. (1) & Steel (2)
12	Impeller Nut/Bolt	Steel (2)	Steel (2)	Steel (2)	Steel (2)
12A	Impeller Washer	Steel (2)	Steel (2)	Steel (2)	Steel (2)
12B	Impeller Jam Nut Washer	Steel (2)	Steel (2)	NA	NA
13	Mechanical Seal Gland	Steel (2)	Steel (2)	Steel (2)	Steel (2)
25A	Thrust Bearing	Double Row	Angular Cont. Pair	Double Row	Angular Cont. Pair
26	Bearing Housing	D.I. (10)	D.I. (10)	D.I. (10)	D.I. (10)
28	Bearing Housing Cover	C.I. (1)	C.I. (1)	C.I. (1)	C.I. (1)
28A	Cover Bolt	Steel (2)	Steel (2)	Steel (2)	Steel (2)
28B	Cover Washer	Steel (2)	NA	Steel (2)	NA
29	Pump Shaft	11-13 S/S (12)	11-13 S/S (12)	11-13 S/S (12)	11-13 S/S (12)
31	Thrust Bearing Lock Nut	NA	Steel (2)	NA	Steel (2)
31A	Thrust Bearing Lock Washer	NA	Steel (2)	NA	Steel (2)
56	Casing Foot	C.I. (1)	C.I. (1)	C.I. (1)	C.I. (1)
56A	Casing Foot Bolts	Steel (2)	Steel (2)	Steel (2)	Steel (2)
75	Snap Ring	NA	Steel (2)	NA	Steel (2)
75A	Snap Ring	Steel (2)	NA	Steel (2)	NA
76	Grease Seal-Front	Viton (13)	Viton (13)	Viton (13)	Viton (13)
76A	Grease Seal-Rear	NA	BUNA (14)	NA	BUNA (14)
77	Casing Gasket	Grafoil (11)	Grafoil (11)	Teflon (15)	Teflon (15)
77A	Sleeve Gasket	NA	NA	NA	AFLAS
77B	Bearing End Cover Gasket	NA	BUNA (14)	NA	BUNA (14)
84	Barrier Fill Plug	Steel (2)	Steel (2)	Steel (2)	Steel (2)
92	Barrier Drain Plug	Steel (2)	Steel (2)	Steel (2)	Steel (2)
95A	Mechanical Seal Stationary	Silicon Carbide & Viton	Silicon Carbide & Viton	Silicon Carbide & Aflas	Silicon Carbide & Aflas
95B	Mechanical Seal Rotary	S/S, Carbon & Viton	S/S, Carbon & Viton	S/S, Carbon & Aflas	S/S, Carbon & Aflas
98	Coupling Guard	Steel (2)	Steel (2)	Steel (2)	Steel (2)
98A	Coupling Guard Bolts	Steel (2)	Steel (2)	Steel (2)	Steel (2)
120	Fan	Aluminum	Aluminum	Aluminum	Aluminum
121	Fan Collar	NA	Steel (2)	NA	Steel (2)
122	Fan Clamp Ring	Steel (2)	Steel (2)	Steel (2)	Steel (2)
180	Radial Bearing	Carbon & Steel	Carbon & Steel	Carbon & Steel	Carbon & Steel
325	Seal Gland Gasket	Viton (13)	Viton (13)	Aflas	Aflas
365	Seal Collar	Steel (2)	Steel (2)	NA	NA
370	Collar Set Screw	Steel (2)	Steel (2)	NA	NA

\*Denotes parts interchangeability in all pump sizes of a given series.

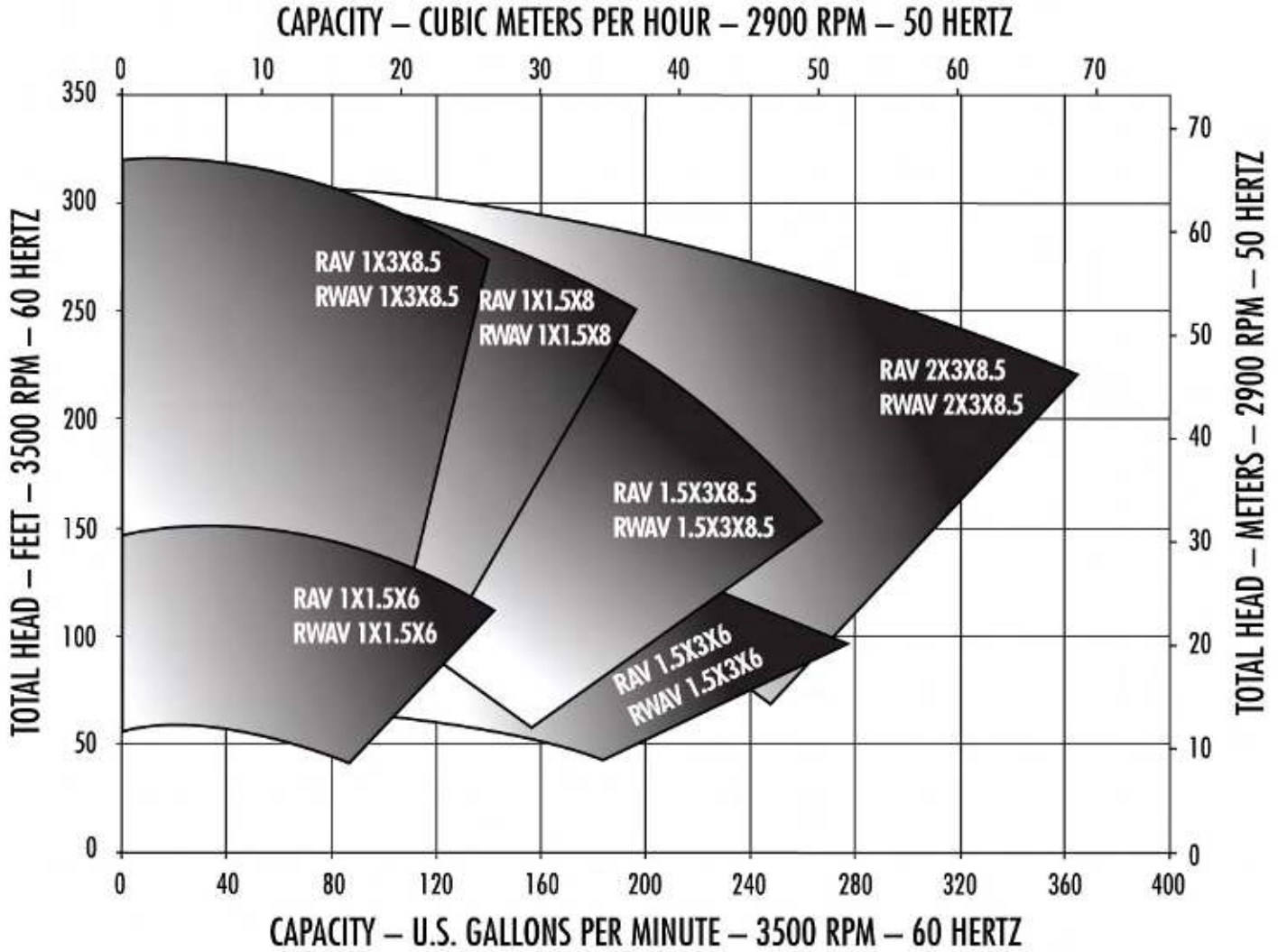
- |   |                                  |  |                       |   |
|---|----------------------------------|--|-----------------------|---|
| (1) Cast Iron                             | (4) AISI 4140 ASTM A193-B7 Steel | (8) ANSI 316 S/S with ANSI 416 S/S at the sleeve bearing | (11) Grafoil®         | (14) Buna N Rubber  |
| (2) AISI 1020                             | (5) ASTM A194 Grade 2 Steel      | (9) Ductile Iron – ASTM A536                             | (12) ANSI – 420 S/S   | Viton® is a registered Trademark of E.I. DuPont Co.       |
| (3) SAE Grade 5 or ASTM A449 Type 1 Steel | (7) Hardened Iron                | (10) Ductile Iron ASTM A395                              | (13) Viton® Elastomer | Grafoil® is a registered Trademark of Union Carbide Corp. |



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**RAV/RWAV PUMP PERFORMANCE**

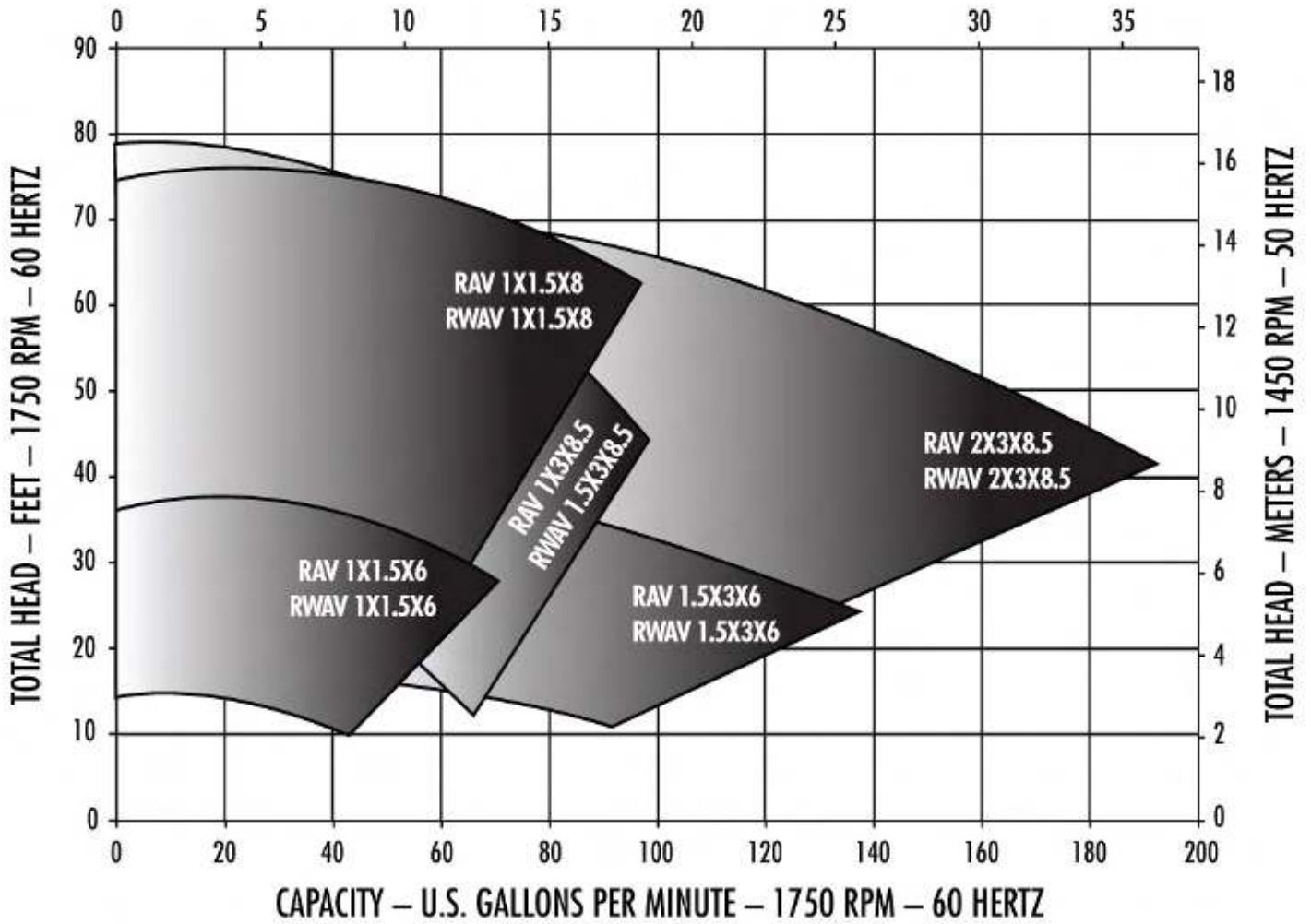
**TWO POLE MOTOR**



**RAV/RWAV PUMP PERFORMANCE**

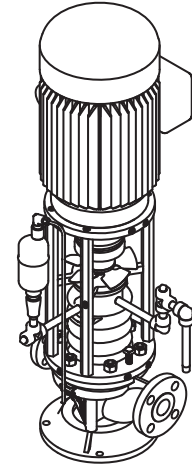
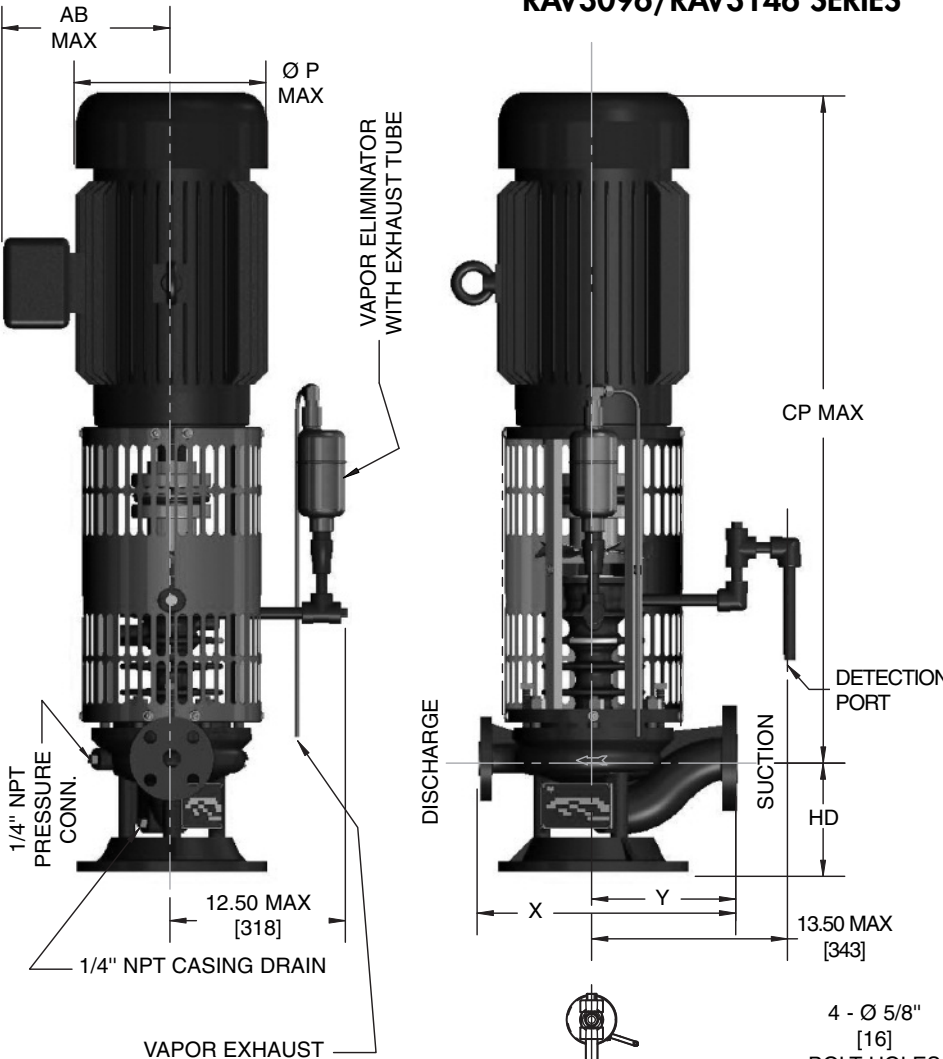
**FOUR POLE MOTOR**

**CAPACITY – CUBIC METERS PER HOUR – 1450 RPM – 50 HERTZ**



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**RAV3096/RAV3146 SERIES**



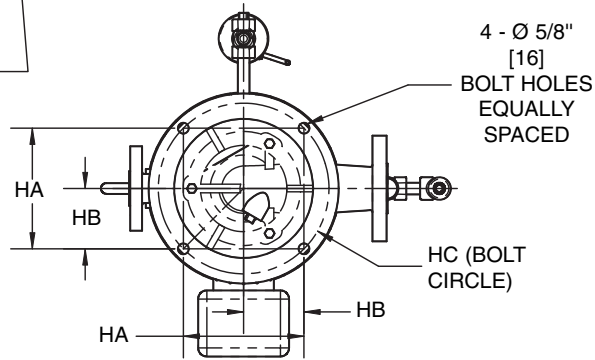
RAV3096			
MOTOR FRAME	P	CP	AB
143TC	6.69 (170)	31.27 (794)	6.92 (176)
145TC	6.69 (170)	32.41 (823)	6.92 (176)
182TC	8.03 (204)	33.91 (861)	7.81 (198)
184TC	8.03 (204)	35.21 (894)	7.81 (198)
213TC	9.69 (246)	36.24 (921)	8.69 (221)
215TC	9.69 (246)	36.56 (929)	8.69 (221)
254TC	13.44 (341)	41.28 (1049)	11.19 (284)
256TC	13.44 (341)	41.28 (1049)	11.19 (284)

RAV3146			
MOTOR FRAME	P	CP	AB
143TC	6.69 (170)	35.70 (907)	6.92 (176)
145TC	6.69 (170)	36.84 (936)	6.92 (176)
182TC	8.03 (204)	38.34 (974)	7.81 (198)
184TC	8.03 (204)	39.64 (1007)	7.81 (198)
213TC	9.69 (246)	40.67 (1033)	8.69 (221)
215TC	9.69 (246)	40.99 (1041)	8.69 (221)
254TC	13.44 (341)	45.71 (1161)	11.19 (284)
256TC	13.44 (341)	45.71 (1161)	11.19 (284)
284TC	14.63 (372)	46.76 (1188)	13.13 (334)
286TC	14.63 (372)	46.76 (1188)	13.13 (334)

All dimensions are in inches and millimeters.

FLANGES		
ANSI CLASS	FACING	FINISH
300	RAISED	125Ra

The RAV, designed specifically for use with hot oil, features six pump sizes (in ductile iron construction), capacities to 360 GPM (82 m<sup>3</sup>/hr), heads to 320 feet (98 m), maximum working pressures to 350 psig (2413 kPa), and maximum pumping temperatures to 650° F (343° C).



GENERAL TABLE																	
PUMP SERIES	PUMP SIZE	DISCHARGE					SUCTION					X	Y	HD	HA	HB	HC
		DISCHARGE SIZE	DISCHARGE O.D.	DISCHARGE THICKNESS	DISCHARGE B.C.	DISCHARGE BOLTS	SUCTION SIZE	SUCTION O.D.	SUCTION THICKNESS	SUCTION B.C.	SUCTION BOLTS						
RAV3096	1 x 1/2 x 6	1.00 (25)	4.875 (124)	.69 MIN (18)	3.50 (89)	(4) - 5/8"	1.50 (38)	6.12 (155)	.81 MIN (21)	4.50 (114)	(4) - 3/4"	14.96 (380)	8.34 (212)	6.56 (167)	6.98 (177)	3.49 (89)	9.88 (177)
RAV3096	1 x 1/2 x 8	1.00 (25)	4.875 (124)	.69 MIN (18)	3.50 (89)	(4) - 5/8"	1.50 (38)	6.12 (155)	.81 MIN (21)	4.50 (114)	(4) - 3/4"	16.93 (430)	9.81 (249)	6.75 (171)	8.25 (210)	4.125 (105)	11.67 (296)
RAV3096	1 1/2 x 3 x 6	1.50 (38)	6.12 (156)	.81 MIN (21)	4.50 (114)	(4) - 3/4"	3.00 (76)	8.25 (210)	1.12 MIN (28)	6.62 (168)	(8) - 3/4"	14.96 (380)	8.34 (212)	7.87 (200)	6.98 (177)	3.49 (89)	9.88 (177)
RAV3146	1 x 3 x 8 1/2	1.00 (25)	4.875 (124)	.69 MIN (18)	3.50 (89)	(4) - 5/8"	3.00 (76)	8.25 (210)	1.12 MIN (28)	6.62 (168)	(8) - 3/4"	18.9 (480)	11.34 (288)	7.87 (200)	8.25 (210)	4.125 (105)	11.67 (296)
RAV3146	1 1/2 x 3 x 8 1/2	1.50 (38)	6.12 (156)	.81 MIN (21)	4.50 (114)	(4) - 3/4"	3.00 (76)	8.25 (210)	1.12 MIN (28)	6.62 (168)	(8) - 3/4"	18.9 (480)	10.9 (277)	7.87 (200)	8.25 (210)	4.125 (105)	11.67 (296)
RAV3146	2 x 3 x 8 1/2	2.00 (51)	6.50 (165)	.88 MIN (22)	5.00 (127)	(8) - 5/8"	3.00 (76)	8.25 (210)	1.12 MIN (28)	6.62 (168)	(8) - 3/4"	20.08 (510)	12.08 (307)	7.87 (200)	8.25 (210)	4.125 (105)	11.67 (296)

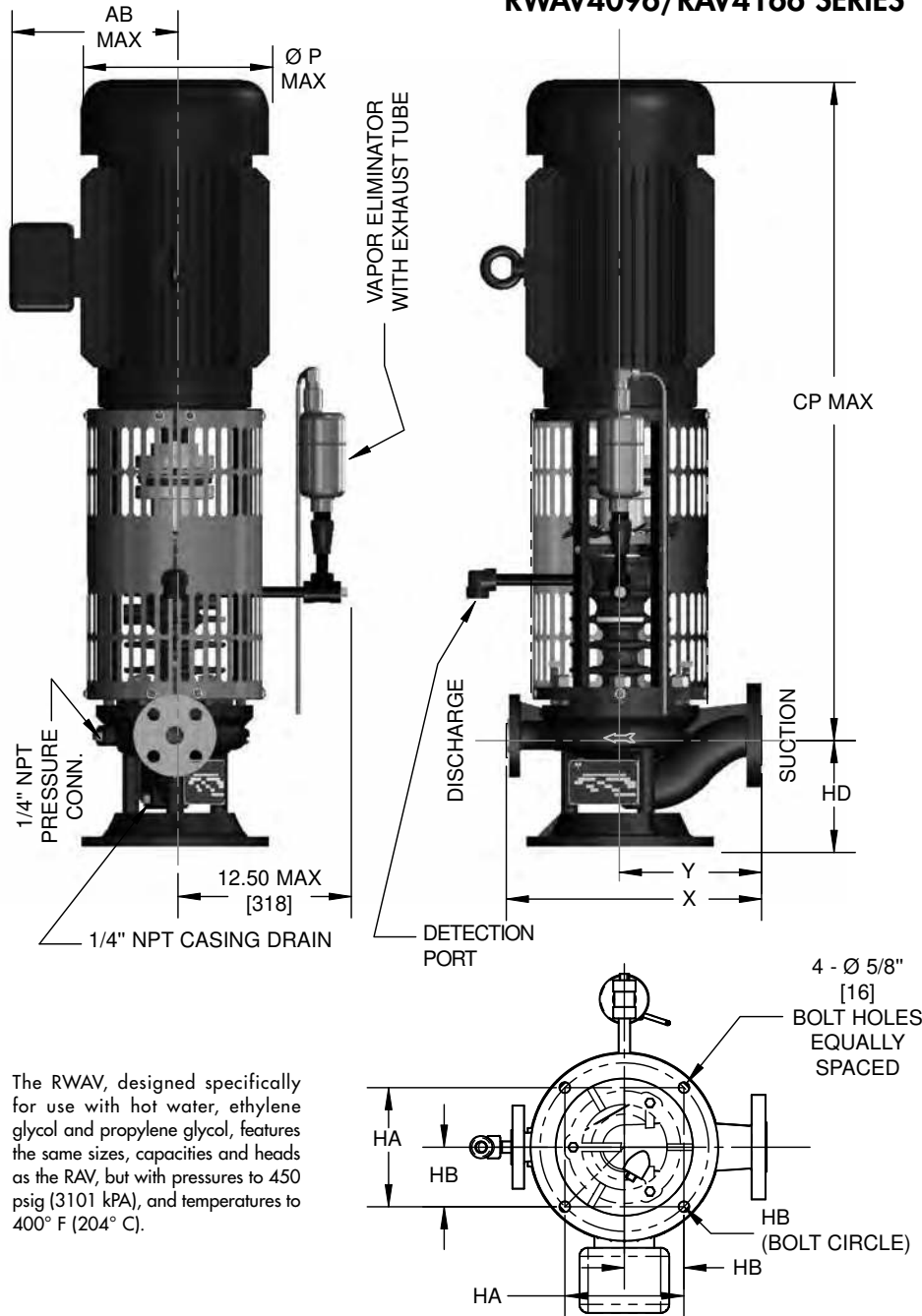
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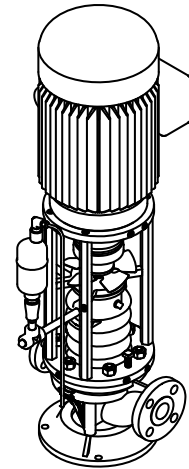
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**RWAV4096/RAV4166 SERIES**



The RWAV, designed specifically for use with hot water, ethylene glycol and propylene glycol, features the same sizes, capacities and heads as the RAV, but with pressures to 450 psig (3101 kPa), and temperatures to 400° F (204° C).



RWAV4096			
MOTOR FRAME	P	CP	AB
143TC	6.69 (170)	31.27 (794)	6.92 (176)
145TC	6.69 (170)	32.41 (823)	6.92 (176)
182TC	8.03 (204)	33.91 (861)	7.81 (198)
184TC	8.03 (204)	35.21 (894)	7.81 (198)
213TC	9.69 (246)	36.24 (929)	8.69 (221)
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254TC	13.44 (341)	41.28 (1049)	11.19 (284)
256TC	13.44 (341)	41.28 (1049)	11.19 (284)
RWAV4166			
MOTOR FRAME	P	CP	AB
143TC	6.69 (170)	35.70 (907)	6.92 (176)
145TC	6.69 (170)	36.84 (936)	6.92 (176)
182TC	8.03 (204)	38.34 (974)	7.81 (198)
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All dimensions are in inches and millimeters.

FLANGES		
ANSI CLASS	FACING	FINISH
300	RAISED	125Ra

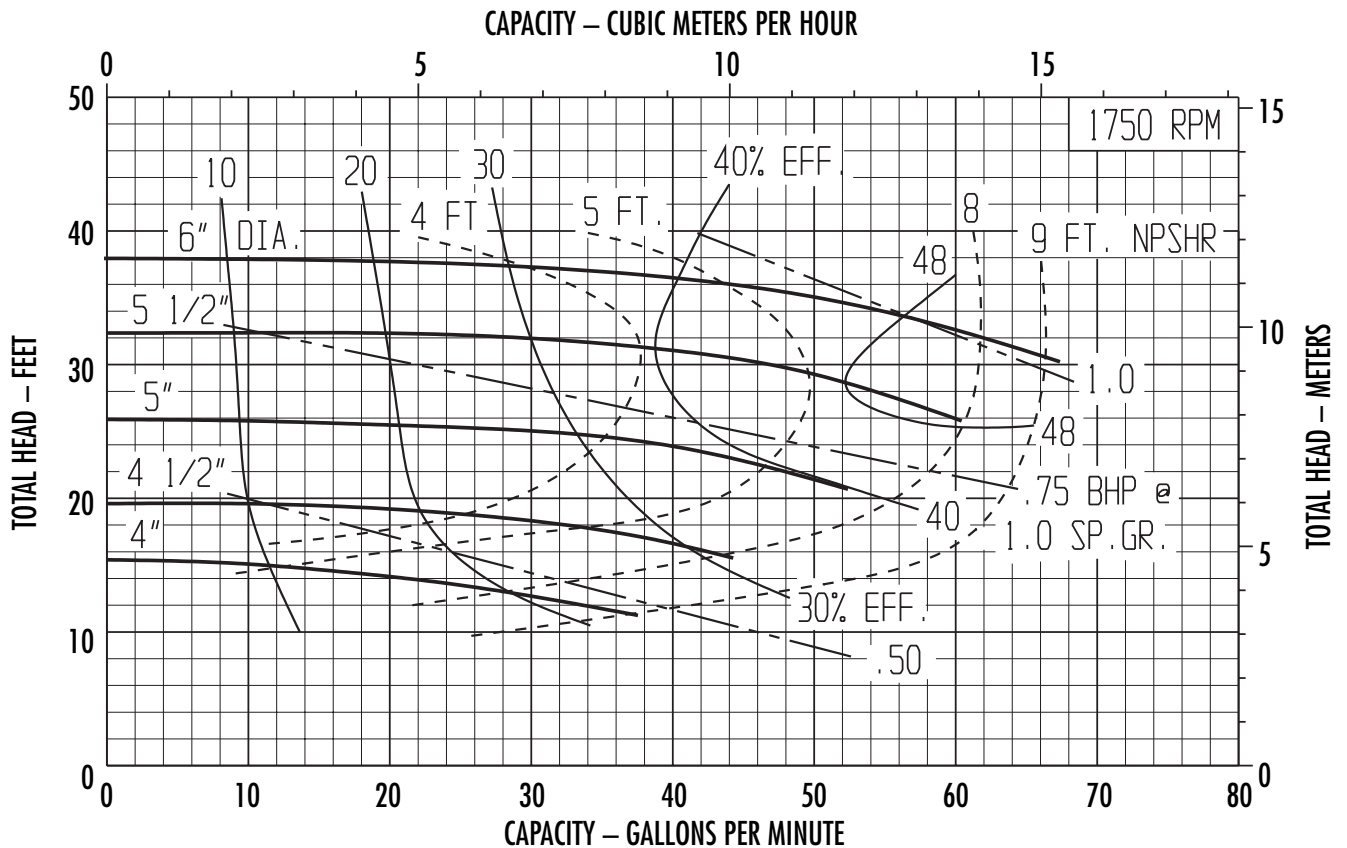
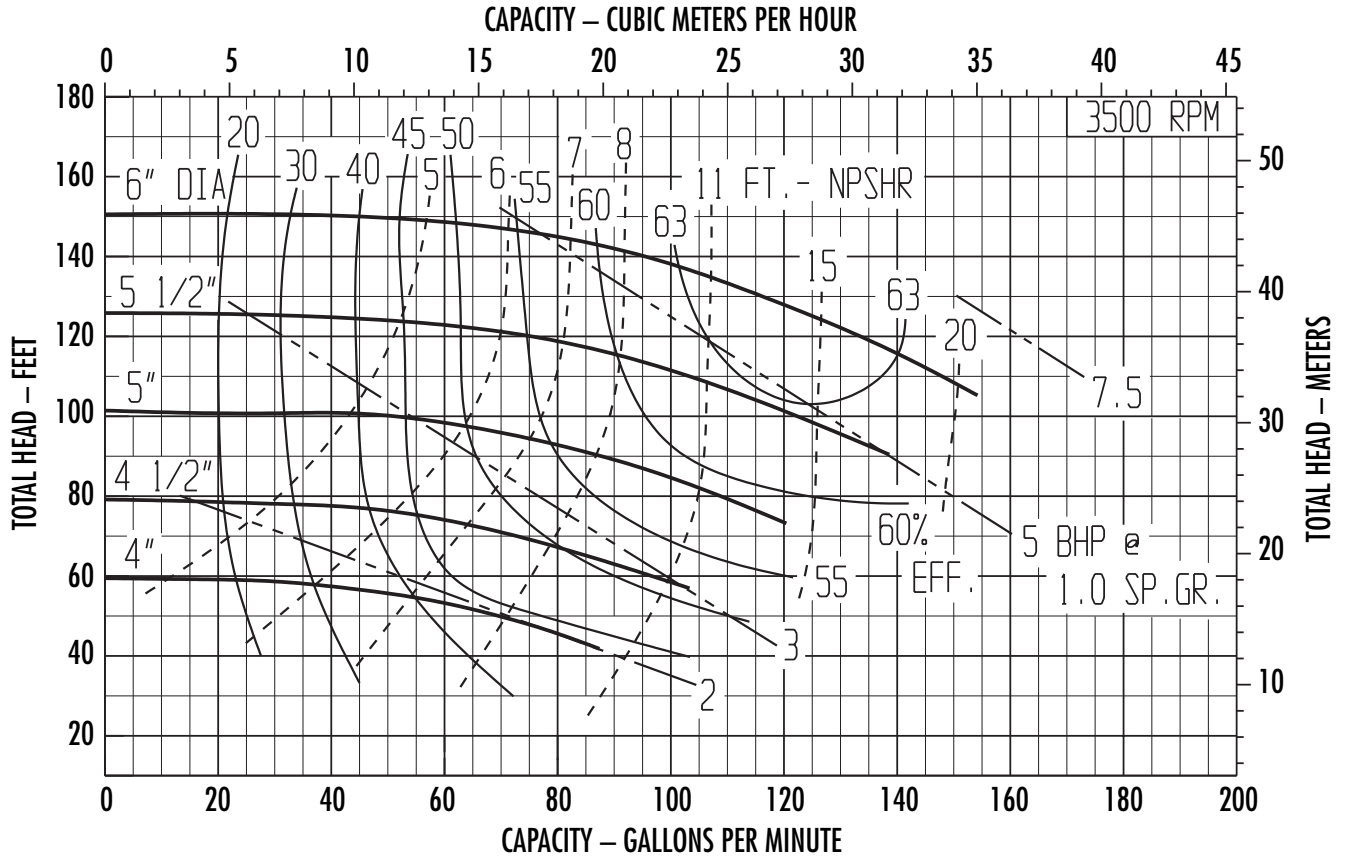
GENERAL TABLE																	
PUMP SERIES	PUMP SIZE	DISCHARGE					SUCTION					X	Y	HD	HA	HB	HC
		DISCHARGE SIZE	DISCHARGE O.D.	DISCHARGE THICKNESS	DISCHARGE B.C.	DISCHARGE BOLTS	SUCTION SIZE	SUCTION O.D.	SUCTION THICKNESS	SUCTION B.C.	SUCTION BOLTS						
RWAV4096	1 x 1/2 x 6	1.00 (25)	4.875 (124)	.69 MIN (18)	3.50 (89)	(4) - 3/8"	1.50 (38)	6.12 (155)	.81 MIN (21)	4.50 (114)	(4) - 3/4"	14.96 (380)	8.34 (212)	6.56 (167)	6.98 (177)	3.49 (89)	9.88 (177)
RWAV4096	1 x 1 1/2 x 8	1.00 (25)	4.875 (124)	.69 MIN (18)	3.50 (89)	(4) - 3/8"	1.50 (38)	6.12 (155)	.81 MIN (21)	4.50 (114)	(4) - 3/4"	16.93 (430)	9.81 (249)	6.75 (171)	8.25 (210)	4.125 (105)	11.67 (296)
RWAV4096	1 1/2 x 3 x 6	1.50 (38)	6.12 (156)	.81 MIN (21)	4.50 (114)	(4) - 3/4"	3.00 (76)	8.25 (210)	1.12 MIN (28)	6.62 (168)	(8) - 3/4"	14.96 (380)	8.34 (212)	7.87 (200)	6.98 (177)	3.49 (89)	9.88 (177)
RWAV4166	1 x 3 x 8 1/2	1.00 (25)	4.875 (124)	.69 MIN (18)	3.50 (89)	(4) - 3/8"	3.00 (76)	8.25 (210)	1.12 MIN (28)	6.62 (168)	(8) - 3/4"	18.9 (480)	11.34 (288)	7.87 (200)	8.25 (210)	4.125 (105)	11.67 (296)
RWAV4166	1 1/2 x 3 x 8 1/2	1.50 (38)	6.12 (156)	.81 MIN (21)	4.50 (114)	(4) - 3/4"	3.00 (76)	8.25 (210)	1.12 MIN (28)	6.62 (168)	(8) - 3/4"	18.9 (480)	10.9 (277)	7.87 (200)	8.25 (210)	4.125 (105)	11.67 (296)
RWAV4166	2 x 3 x 8 1/2	2.00 (51)	6.50 (165)	.88 MIN (22)	5.00 (127)	(8) - 3/8"	3.00 (76)	8.25 (210)	1.12 MIN (28)	6.62 (168)	(8) - 3/4"	20.08 (510)	12.08 (307)	7.87 (200)	8.25 (210)	4.125 (105)	11.67 (296)

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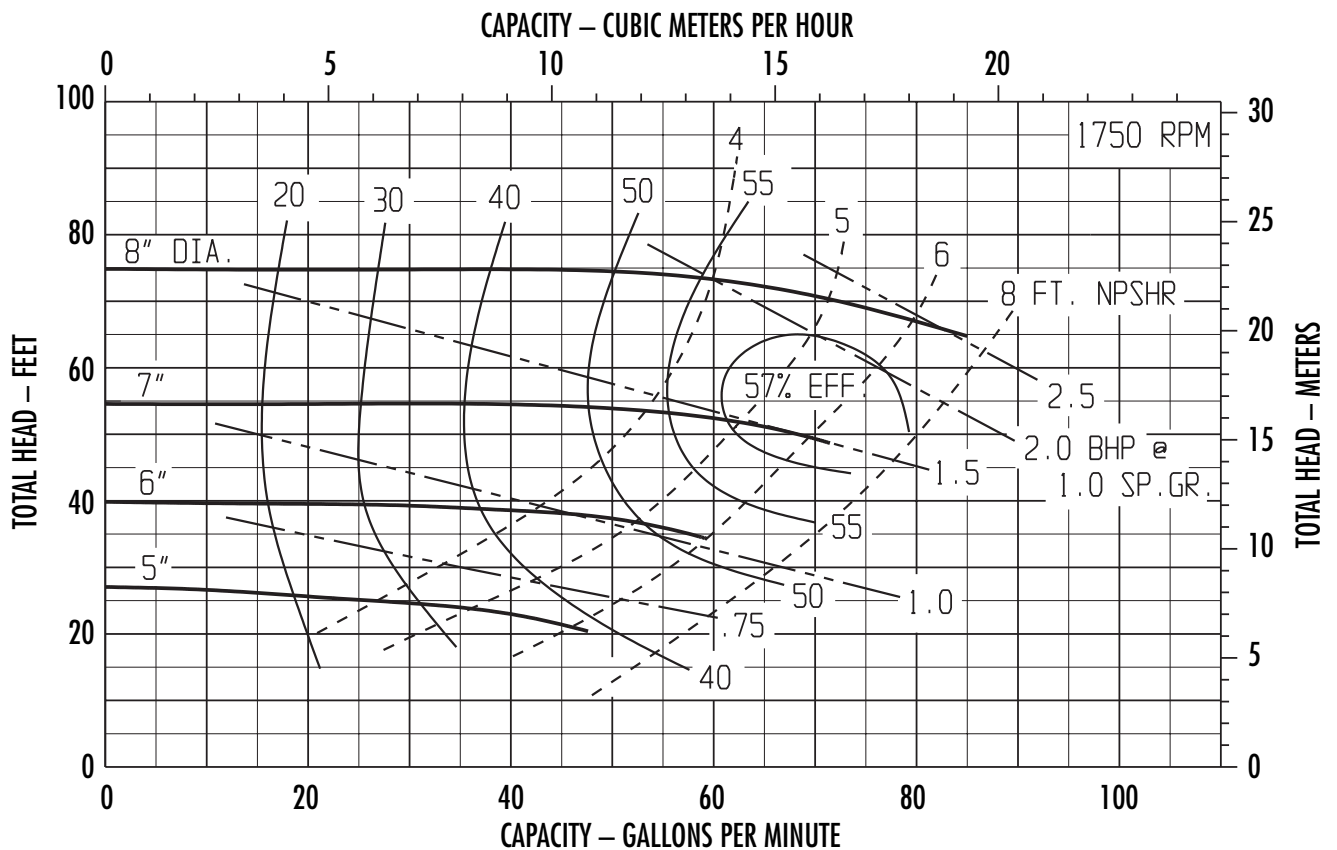
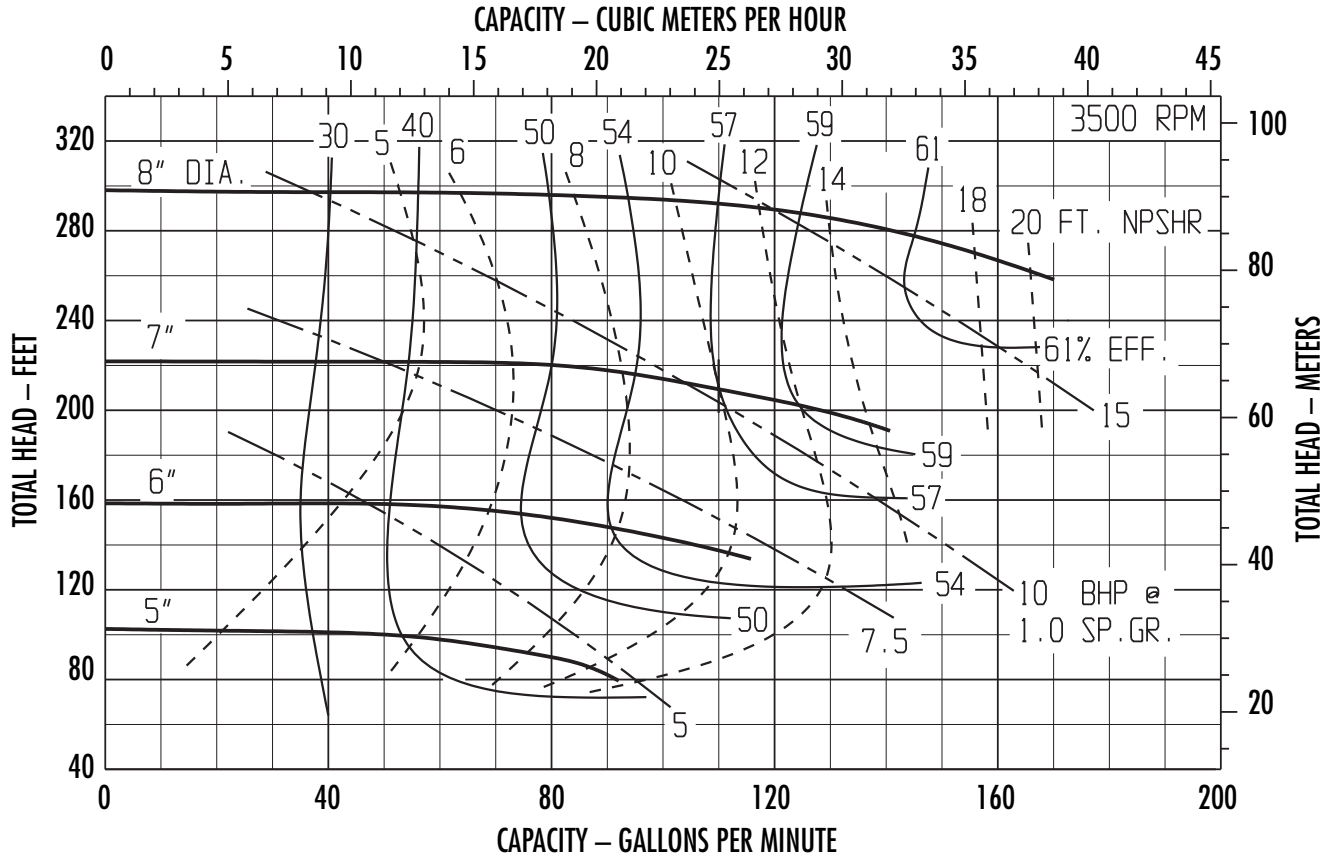
**PUMP PERFORMANCE:** This curve, based on extensive tests, defines the average performance of this pump for liquids having a viscosity of 70 SSU or less. Actual performance of individual units may differ slightly from the performance indicated on this curve. Pump applications made from the data contained herein are subject to confirmation and acceptance by our Engineering Department at our Indianapolis Office.





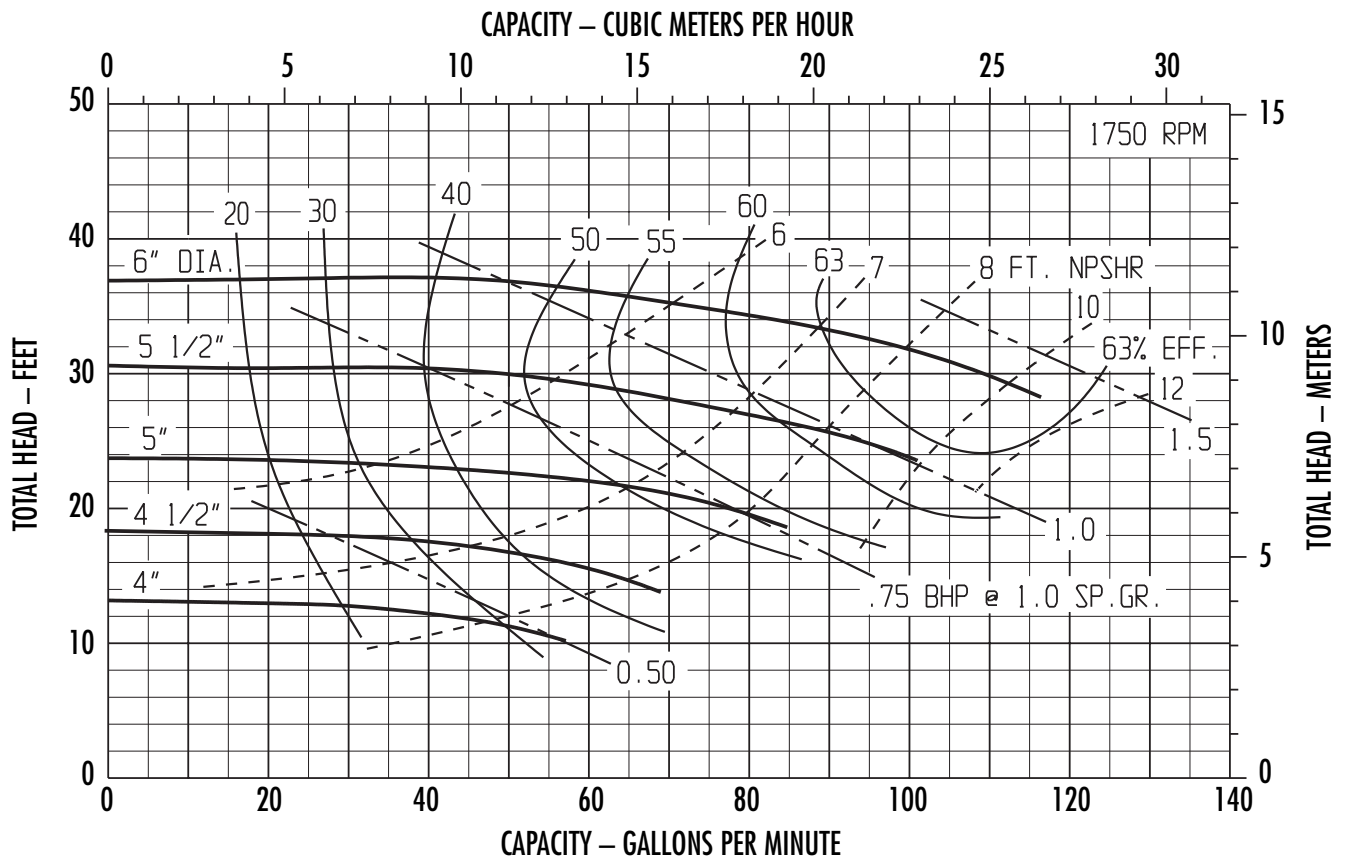
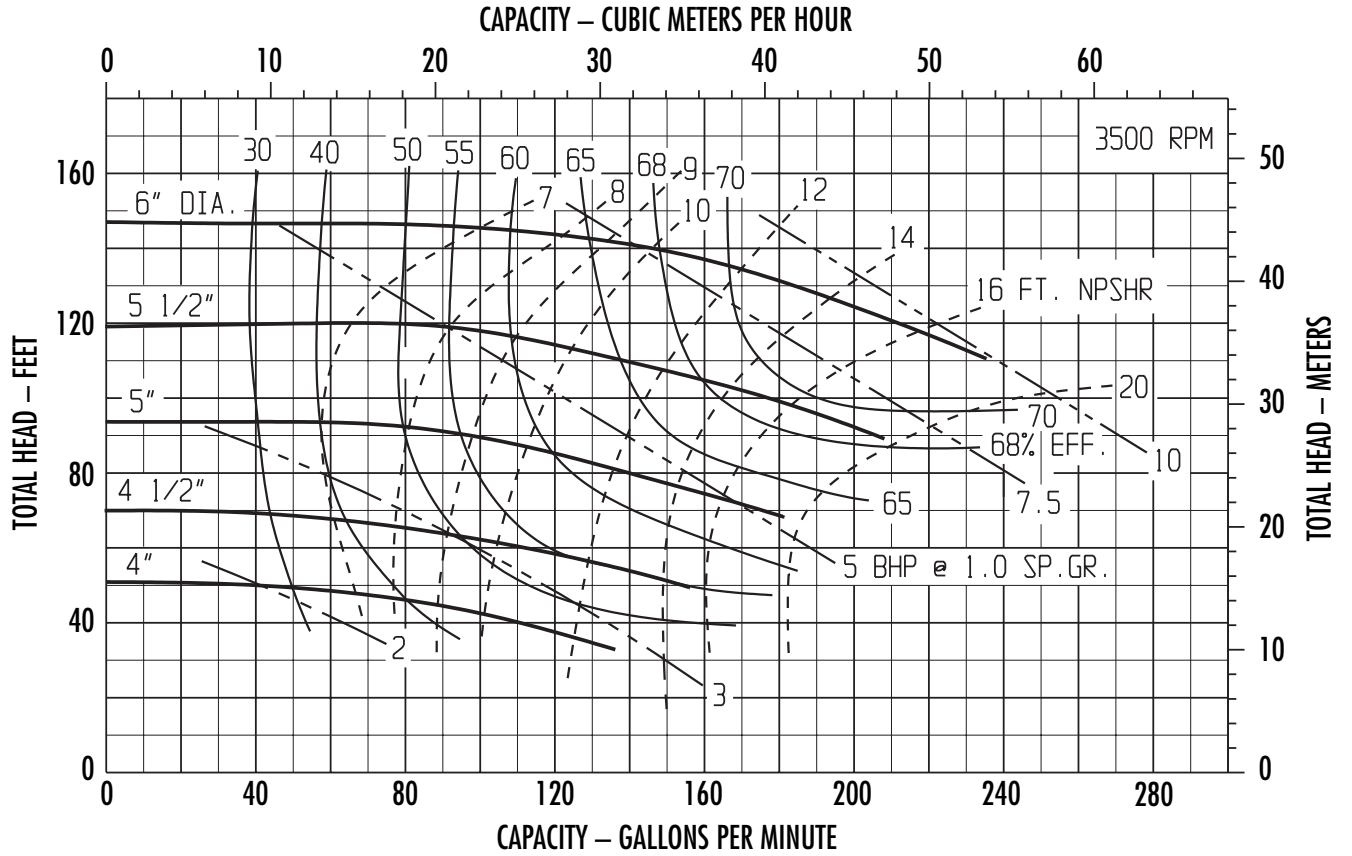
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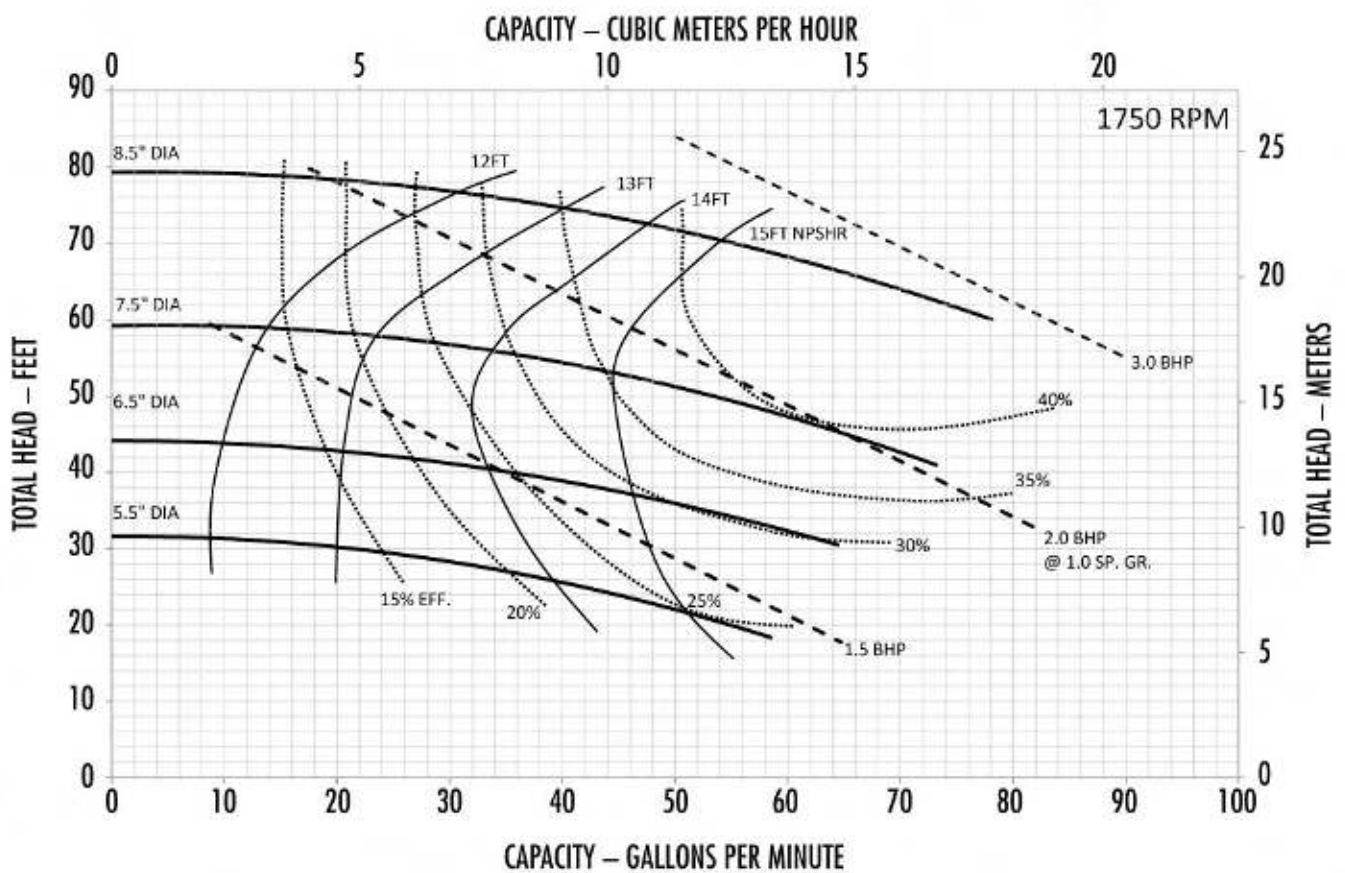
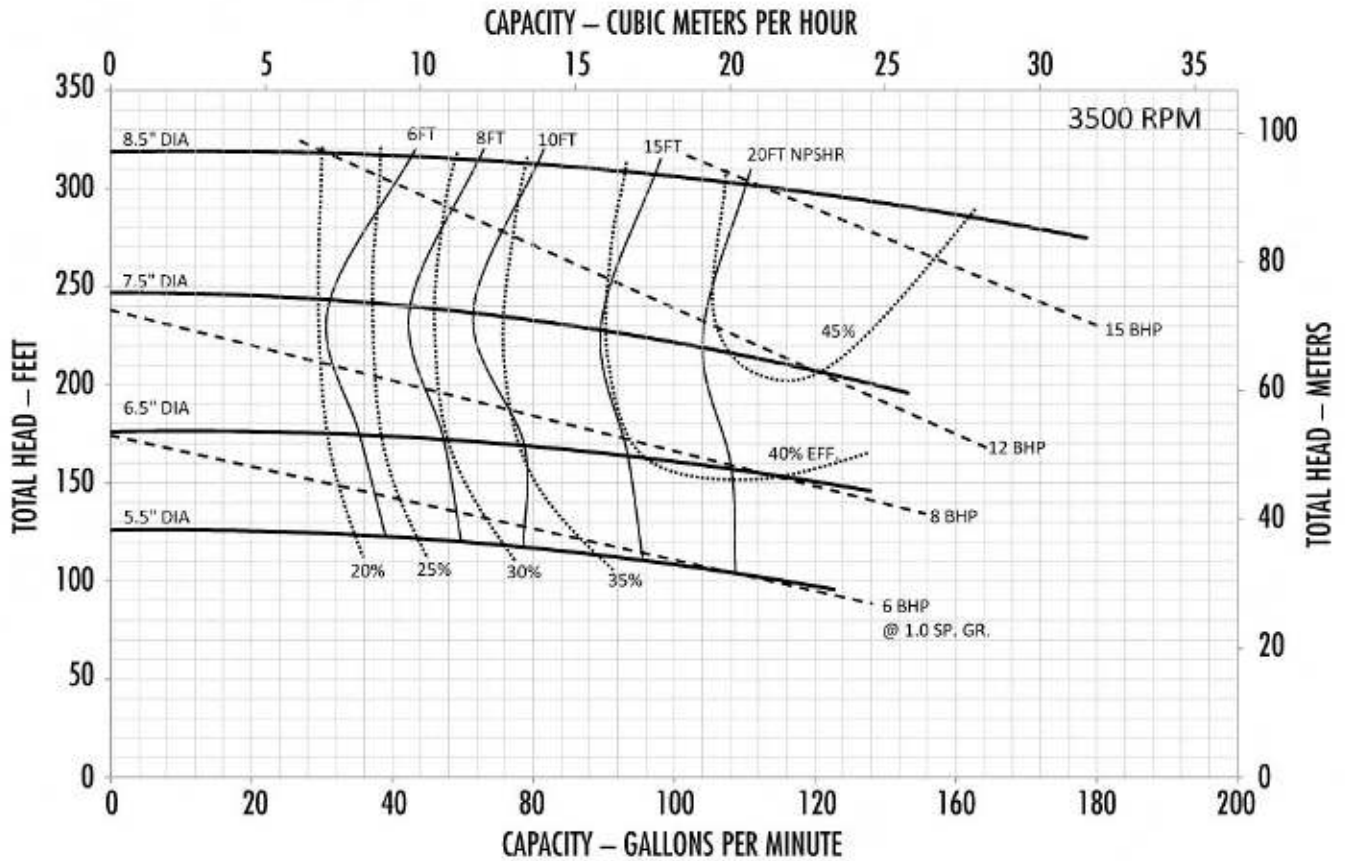
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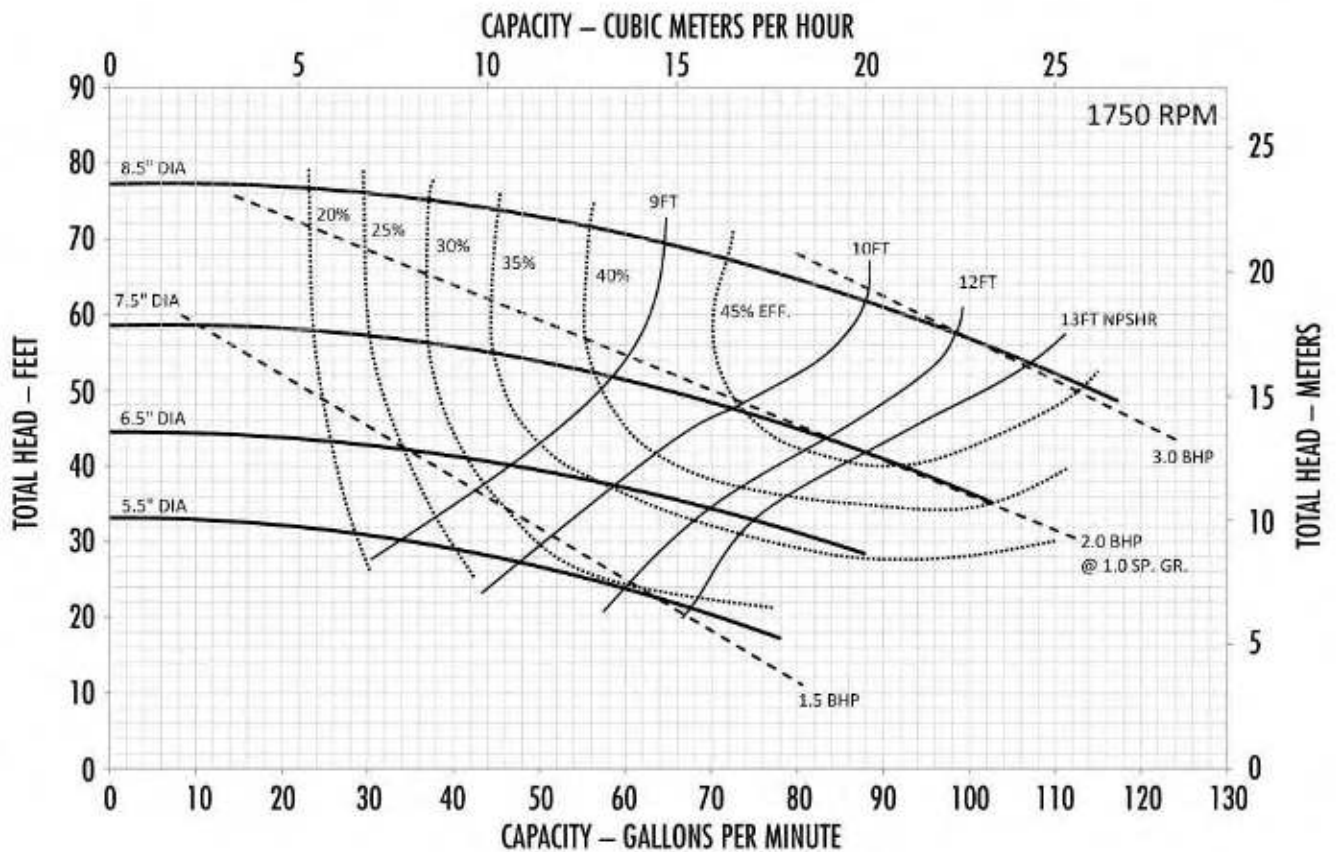
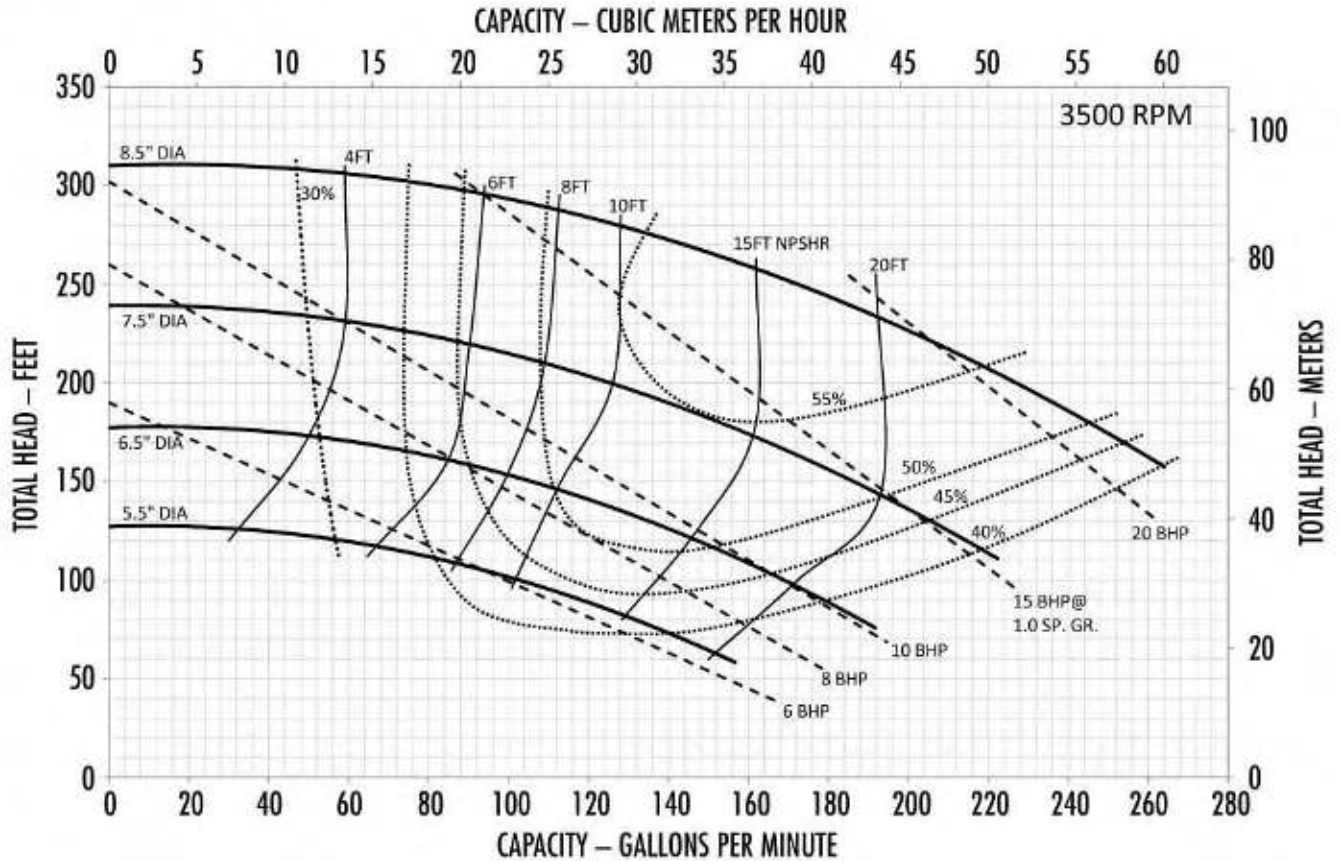
**PUMP PERFORMANCE:** This curve, based on extensive tests, defines the average performance of this pump for liquids having a viscosity of 70 SSU or less. Actual performance of individual units may differ slightly from the performance indicated on this curve. Pump applications made from the data contained herein are subject to confirmation and acceptance by our Engineering Department at our Indianapolis Office.



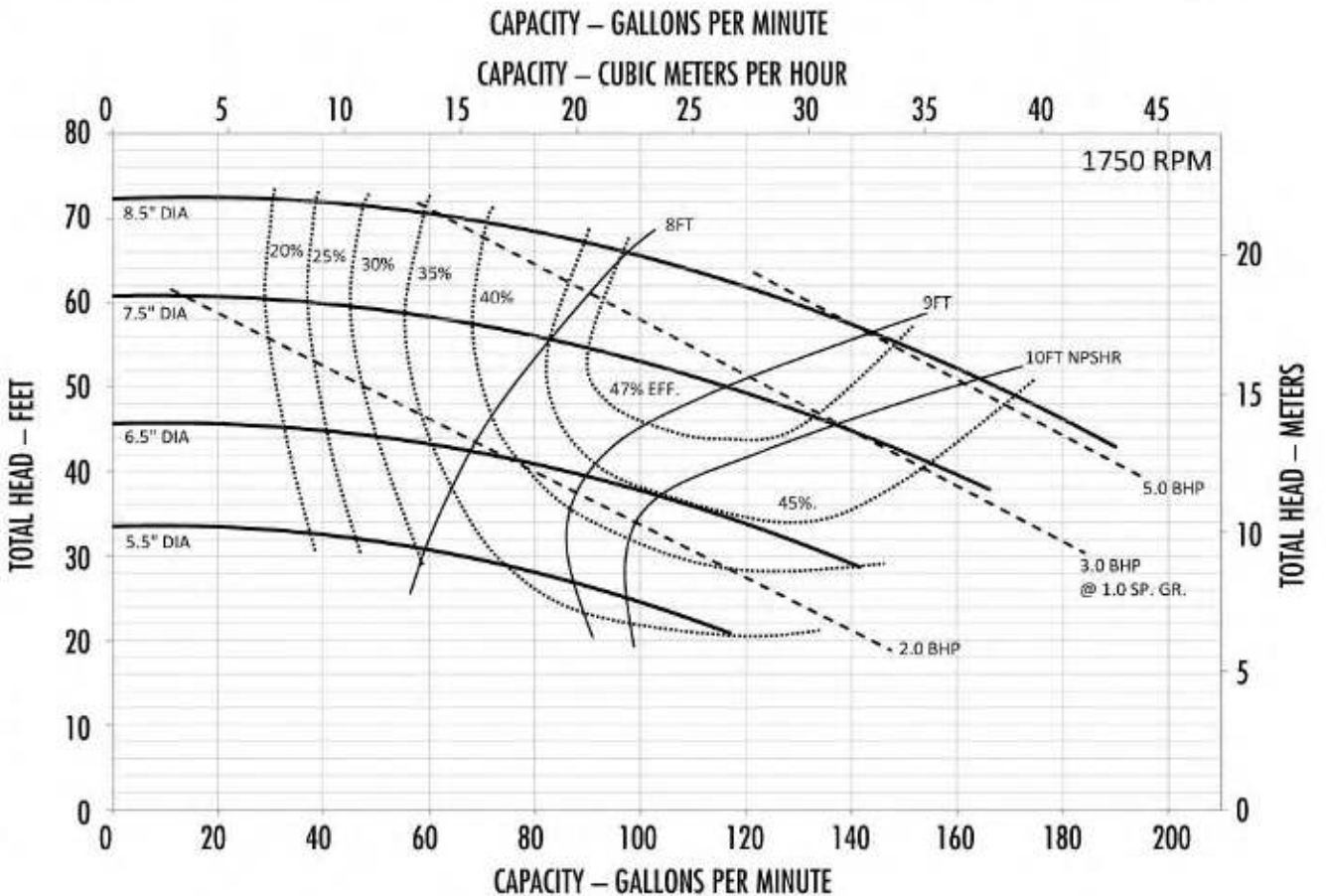
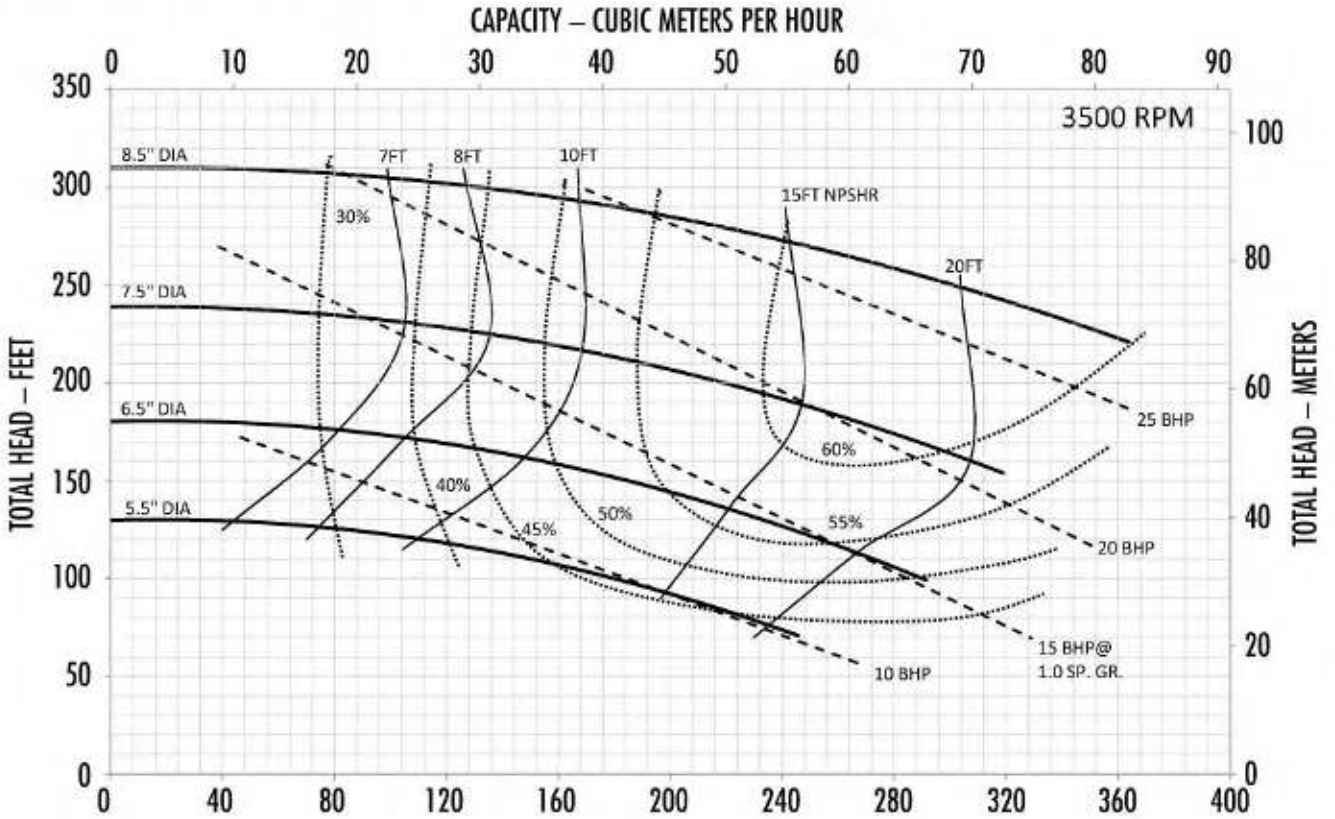
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