



850 – 17.04.EN

850 – Filtrate Pumps

Technical Specification Pages

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1.0 Overview.

The 850 is Carver’s filtrate pump line designed for moderate to high flow rates. All 850 pumps are provided with the wet end, support column, and bearing frame as standard.

1.1 850 Ordering Code.

The following ordering code defines the 850 pump and pump/motor arrangements. When quoting or ordering a 850 pump, **this Ordering Code must be used.**

This Ordering Code enables Carver Pump Company to accept orders quickly, assuring timely and correct manufacture of the desired pump.

50 C - AE A - B A A - N G B H 145T

Pump Series:

50 – 850 – Filtrate Pump

Mounting Style:

C – Close Coupled
F – Frame Mounted

Casing Nozzle and Impeller Sizes:

AA – 2 x 1 x 7*
AB – 3 x 1 ½ x 10
AC – 3 x 2 x 10
AD – 4 x 2 ½ x 10
AE – 4 x 3 x 10
AF – 6 x 4 x 10

*not available with rubber, can operate at 3500 RPM

Material of Construction:

A – All Iron Construction
B – CD4MCu Fitted Cast Iron Construction
C – CD4MCu
D – Natural Rubber Lined/CD4MCu Impeller
E – Neoprene Rubber Lined/CD4MCu Impeller
F – Natural Rubber Lined/Natural Rubber Lined Impeller
G – Neoprene Rubber Lined/Neoprene Rubber Lined Impeller

X – Special

Sealing Arrangement:

A – Packed Box (standard)
B – JC Single Type 1 316/CI Gland**
C – JC Single Type 1 316/SS Gland**
D – JC Single Type 1 Monel/SS Gland**
E – JC Single Type 1 316/SS Gland***
F – JC Single Type 1 316/SS Gland***
X – Special

**Mechanical Seals B, C & D all include Silicon Carbide vs. Carbon Faces with Viton Elastomers

***Mechanical Seals E & F all include Ceramic vs. Carbon Faces with Viton Elastomers

Seal Flush Arrangements:

A – Plan 11 Seal Flush
X – Special
Z – No Seal Flush (Standard)

Motor Mounting and Enclosure:

NEMA		IEC	
A – ODP		A – IP54	
B – TEFC		B – IP55	
C – X-Proof		C – IP56	
D – HAZ – CL1. DIV.2			
X – Special			

Motor Speed, Voltage and Frequency:

A – 1200 RPM, 230/460 Volt, 60 Hz
B – 1800 RPM, 230/460 Volt, 60 Hz
C – 3600 RPM, 230/460 Volt, 60 Hz
E – 1000 RPM, 190/380 Volt, 50 Hz
F – 1500 RPM, 190/380 Volt, 50 Hz
G – 3000 RPM, 190/380 Volt, 50 Hz
X – Special

Motor Power Rating:

NEMA			
A – 1.5 HP	J – 25 HP		
B – 2.0 HP	K – 30 HP		
C – 3.0 HP	M – 40 HP		
D – 5.0 HP	N – 50 HP		
E – 7.5 HP	P – 60 HP		
F – 10 HP	Q – 75 HP		
G – 15 HP	R – 100 HP		
H – 20 HP	S – 125 HP		
IEC			
A – 1.1 KW	K – 18.5 KW		
B – 1.5 KW	M – 22 KW		
C – 2.2 KW	N – 30 KW		
D – 3.7 KW	P – 37 KW		
E – 4 KW	Q – 45 KW		
F – 5.5 KW	R – 55 KW		
G – 7.5 KW	S – 75 KW		
H – 11 KW	T – 90 KW		
J – 15 KW	U – 110 KW		

X - Special

Motor Type:

M – IEC
N – NEMA
Z – No Motor

Base Plate and Coupling:

B – Standard Steel Baseplate w/ Spacer Type Coupling and Guard
D – Side by Side with Belt Drive – Left Handed
E – Side by Side with Belt Drive – Right Handed
X – Special
Z – No Baseplate, Coupling or Coupling Guard (Standard w/CC Pump)

1.2 Standard Surface Treatment.

All 850 pump components handling fluids less than 230° F are painted to Carver Standard PA-001. This provides one coat of Carver Blue industrial alkyd metal enamel with a 3-5 mils dry film thickness. All paint is applied over a clean, dry, bare metal surface.

All iron castings are spot primed over any area exhibiting minor discoloration from rust or oxidation.

<i>Surface Preparation of Key Components</i>		
Component	Material	Specification
Adaptor bracket	Cast iron	Carver Standard PA-001
	316 SS	N/A
Base and Coupling Guard	Steel	Carver Standard PA-001
	316 SS	N/A
Bearing frame	Cast iron	Carver Standard PA-001
Casing	Cast iron	Carver Standard PA-001
	Stainless	N/A
Motor	Any	Mfg. Std. Coating

Pumps handling liquids above 230° F are painted with two coats modified silicone alkyd resin, aluminum colored, to a total of 2 mils dry film thickness.

Since all pumps and parts are assumed to be installed and operated soon after receipt, we do not include any special preservation for long term storage. We also assume no responsibility for storage deterioration after shipment unless explicitly stated in our quotation and purchase order acknowledgment.

Users can also provide their own protection by sealing all ports and openings and coating the pump internals with a water soluble preservative.

1.3 Material of Construction.

The standard 850 materials and material specifications are given in the table below:

<i>Key Component Materials</i>		
Component	Material	Specification
Bearing Frame	Cast Iron	ASTM A48, Class 30
Wet End	Rubber Lined C.I.	Rubber, ASTM A48, Class 30
	CD4MCuN	ASTM A890
	316 SS	ASTM A743
	Cast iron	ASTM A48, Class 30
	CD4MCu	ASTM A890
Shaft	Steel	
	316 SS	

1.4 Key 850 Data.

Many of the key 850 design parameters are specified in the table below:

<i>Key 850 Data</i>		
Item	Bearing Frame	
	10P	20P
Max power (BHP) @ 1750 RPM	20	75
@ 3500 RPM	40	150
Radial bearing type	207	210
Thrust bearing type	307	310
Thrust bearing lube (standard)	Grease	
L10 bearing life (hrs) – radial	50,000	
- thrust	25,000	
Radial to thrust bearing c/l (in.)	6.75	8.50
Shaft diameter @ coupling	1.250	1.50
@ radial bearing	1.378	1.968
@ thrust bearing	1.378	1.968
@ impeller hub	0.875	1.250
Shaft sleeve OD (in.)	1.250	1.750
Impeller – thrust bearing c/l (in.)	8.00	9.00
Rotor WR2 (lb – in.) - shaft	0.014	0.058
7" impellers	15.10	
10" impellers	56.67	

1.5 Seal Arrangement.

To successfully select an 850 pump the following information must be known:

a. Hydraulics

- fluid to be pumped
- flow rate
- tank fluid level (min, normal and max)
- discharge pressure
- viscosity (min, normal and max)
- temperature (min, normal and max)
- specific gravity (min, normal and max)
- NPSH available
- vapor pressure

b. Materials

- casing
- shafts
- impellers
- throttle bushings
- wear rings

c. Configurations / Accessories

- driver (speed, type, rating, manufacturer)
- coupling (torque, type, manufacturer)

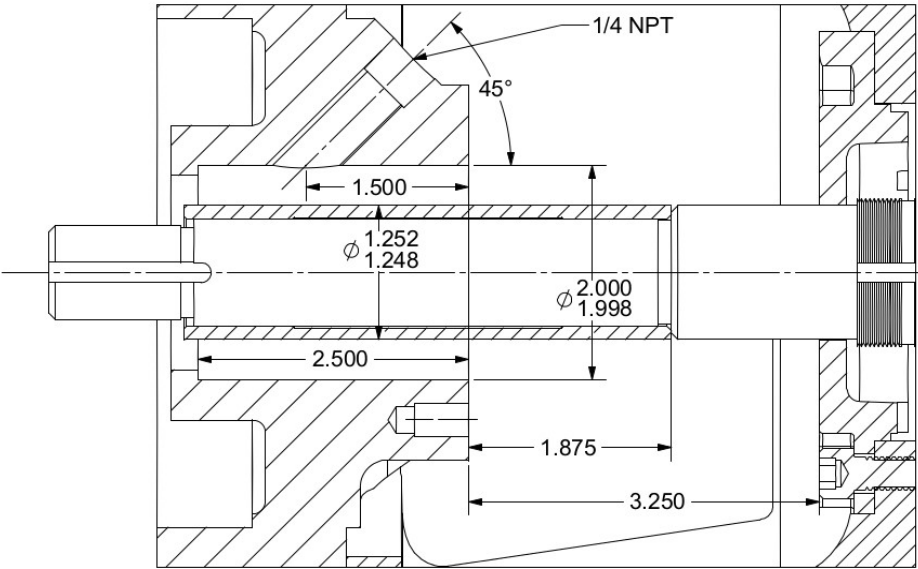


Figure 1. Stuffing Box 10P Bearing Frame, Keyed Version Shown

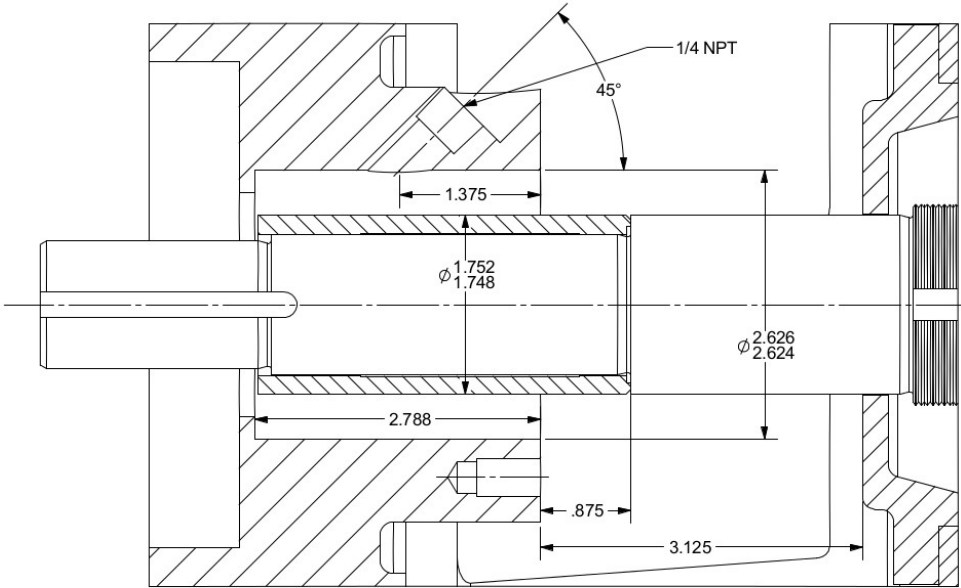


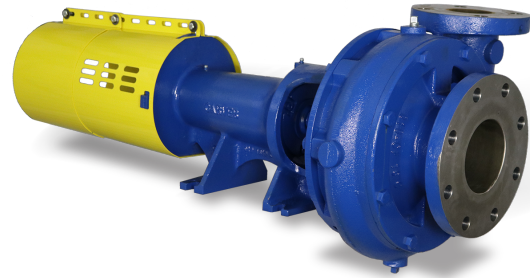
Figure 2. Stuffing Box for 20P Bearing Frame, Keyed Version Shown

1.10 A Typical 850 Series Specification (Specifier's options in parentheses)

Each pump shall be a horizontal, end suction, frame mounted centrifugal pump capable of developing up to (900) US GPM at a total head of (130) feet when pumping (water) at a temperature of (125 °F) with a fluid specific gravity of (1.00) without the use of special clearances, materials, or other internal or external modifications. In meeting these hydraulic conditions, the pump shall have an NPSH requirement of not more than (10) feet and a hydraulic operating efficiency at the normal duty point of at least (70.0%) as defined by the Hydraulic Institute Level A requirements, which includes all mechanical seal and/or bearing losses.

The pump shall include separate liquid end, mechanical seal, and bearing frame sections for ease of maintenance. The liquid end shall be cast iron (316 stainless steel), with all components fully compatible with the temperature, corrosion and abrasion properties of the pumped fluid. All pressure retaining parts of the pump shall be hydrostatically tested to 150% of its operating pressure and all piping connections shall be NPT threaded connections for discharge connections up to and including 2" nominal pipe size, and ANSI Class 150 lb flanges for all larger sizes. The entire assembly shall be secured to a mounting plate with a minimum of four steel (17-4 PH stainless steel) tie down bolts to assure complete hydraulic and structural integrity of the unit.

The bearing frame shall consist of a minimum of two matched grease-lubricated ball bearings to handle all radial and axial loads. The thrust bearing shall have a minimum L10 life of 25,000 hours and the radial bearing shall have a minimum L10 life of 50,000 hours. The bearings shall be grease lubricated and secured to the shaft with threaded locknuts, rather than snap rings, to eliminate any axial movement at the seal faces or impeller-to-casing clearances. The bearings, together with the shaft, shall be designed to provide minimum deflection throughout the entire range of pump operation.



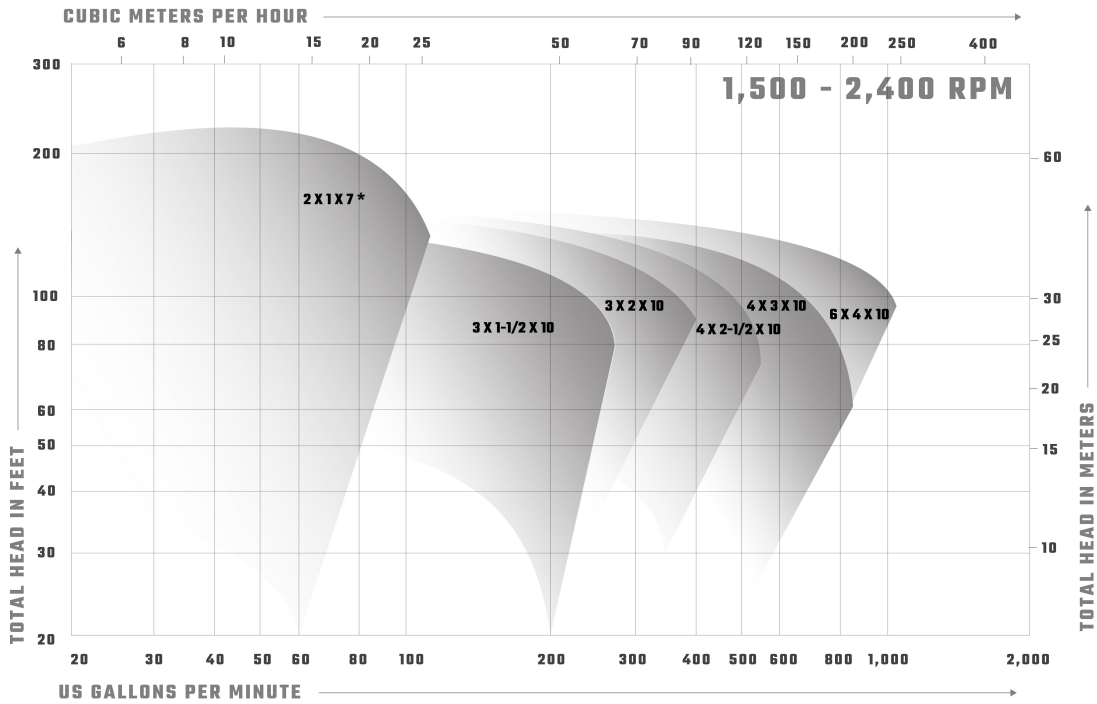
The pump shall have one mechanical seal and be capable of accepting either component or cartridge-type mechanical seals. The seals shall have Viton elastomers, 316 stainless steel metal components, carbon on ceramic (silicone carbide) faces, and capable of operating up to 230 °F without external cooling. When conditions warrant, the pump shall also be equipped with a 316 stainless steel line to facilitate flushing and cooling in the stuffing box area of the pump.

For added ease of operation, the entire pump casing shall be rotatable in 90° increments to accommodate different field piping orientations and shall be the back pull-out type to allow disassembly, inspection, and assembly without otherwise disturbing the pump mounting or system piping.

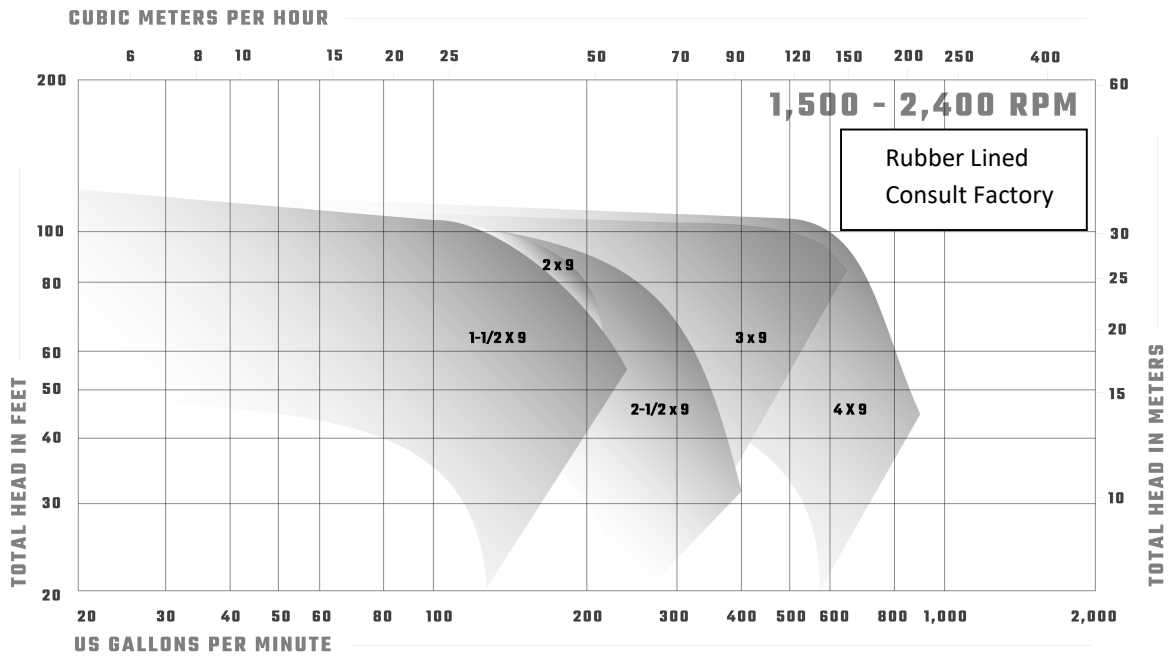
The pump shall be supplied complete with a baseplate, coupling, and coupling guard. If an electric motor is also provided, it shall be sized to operate throughout the entire range of the pump performance curve without exceeding the nameplate horsepower rating of the motor. In all cases, the pump shall be a heavy-duty industrial design, GH Series as manufactured by the Carver Pump Company of Muscatine, Iowa, or ISO-9001 certified, United States manufactured approved equal.

1.12 850 Hydraulic Coverage and Performance by Individual Size.

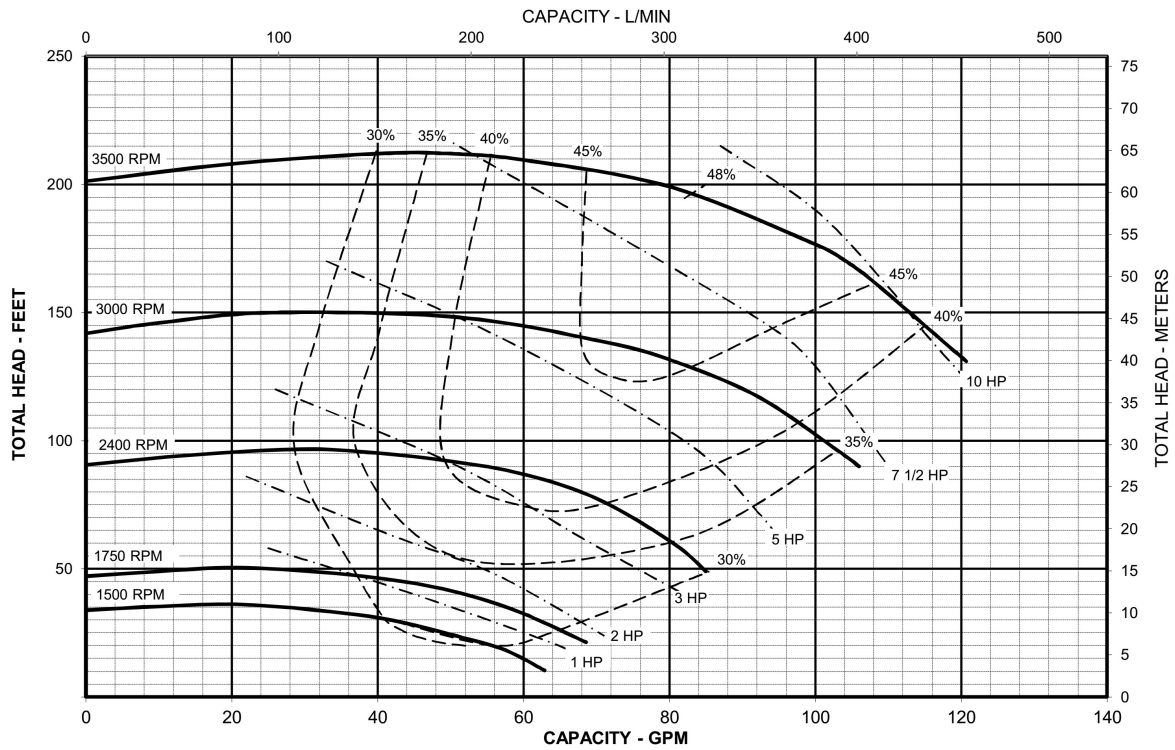
The 850 hydraulic performances extend to flows of 1000 GPM 140 feet of head. This range is covered by six sizes in cast iron, cd4mcu, and rubber lined construction.



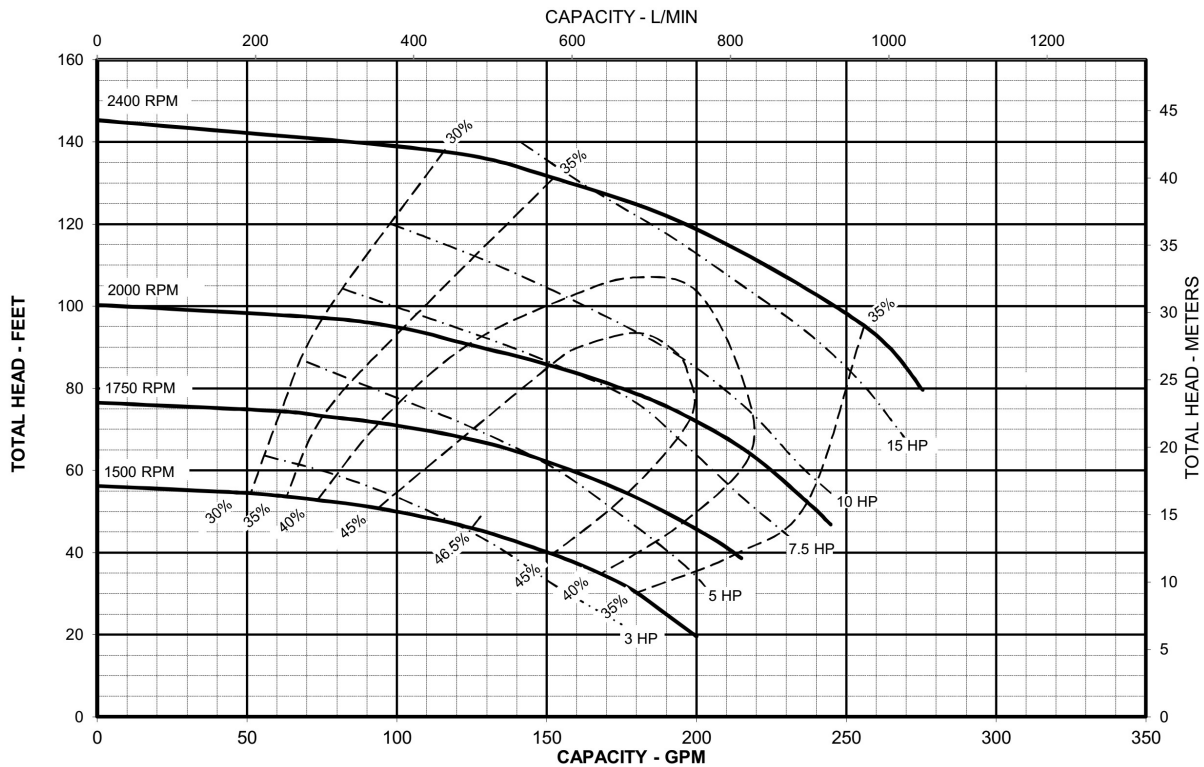
* Speed up to 3550 RPM on 2 x 1 x 7 only.



Hydraulic Performance – 2 x 1 x 7” Pump



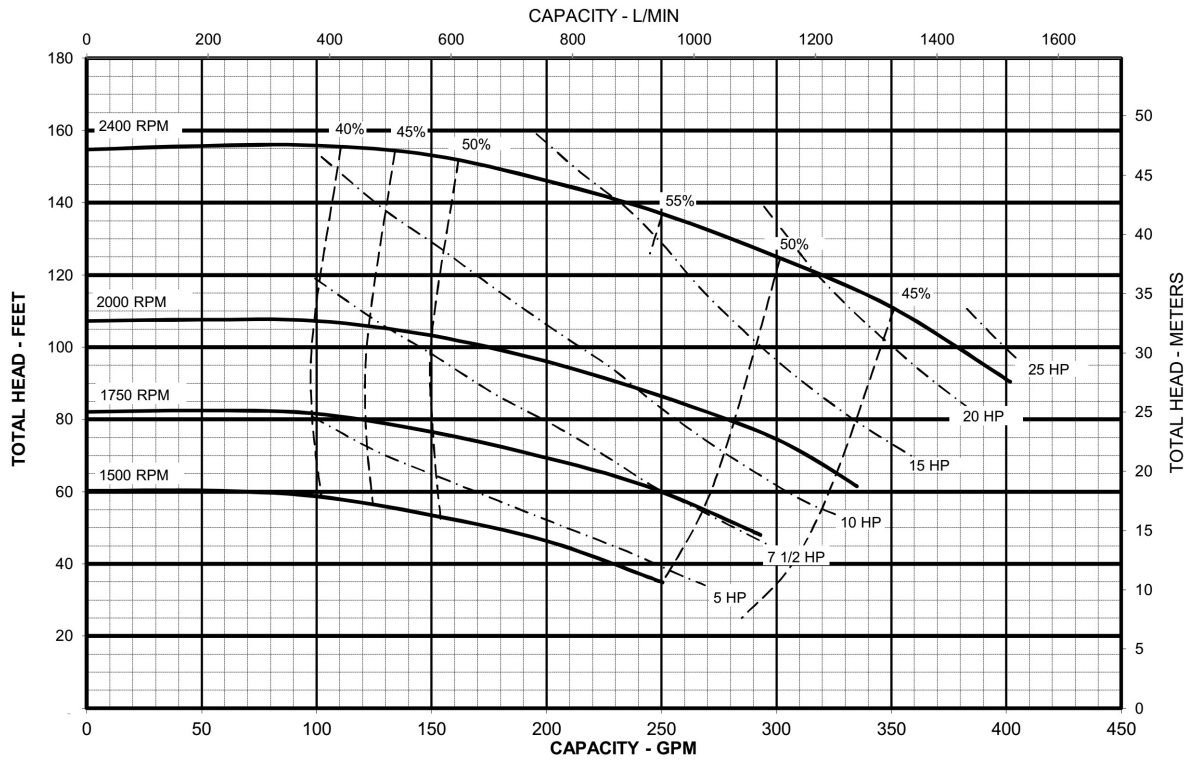
Hydraulic Performance – 3 x 1-1/2 x 10” Pump



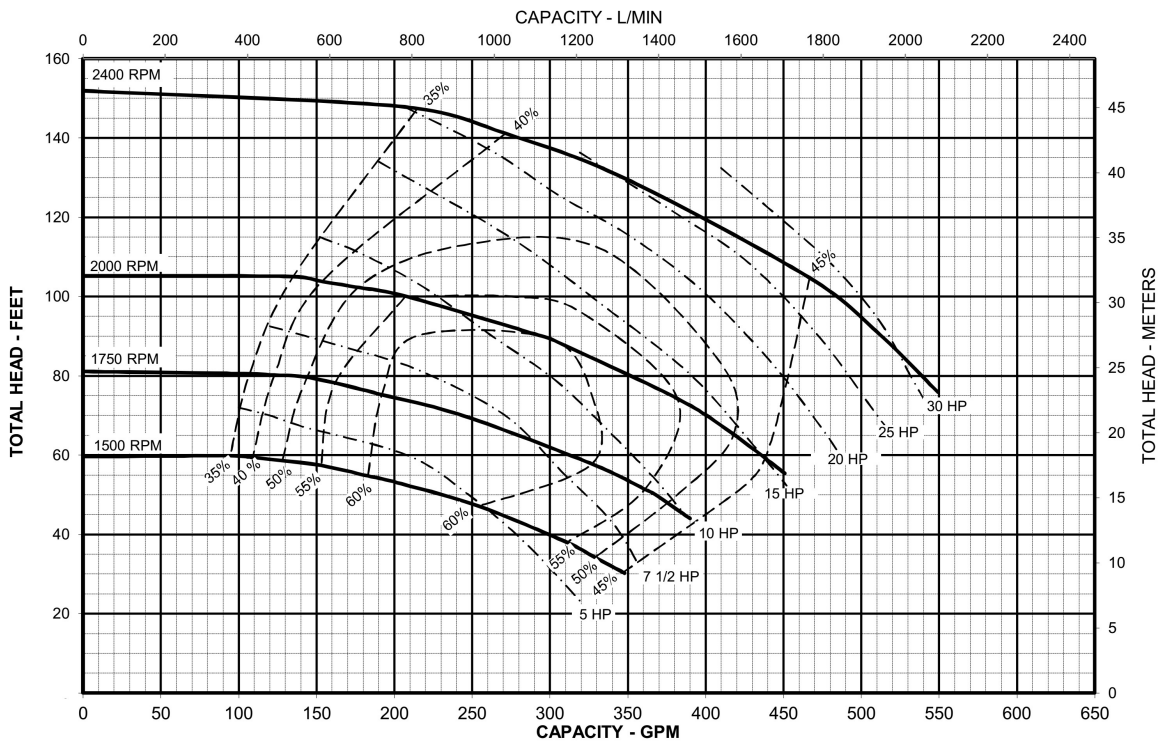
Notes:

1. Above data is based on 1.0 sp. gr. water at ambient temperature and pressure in accordance with Hydraulic Institute guidelines.

Hydraulic Performance – 3 x 2 x 10” Pump



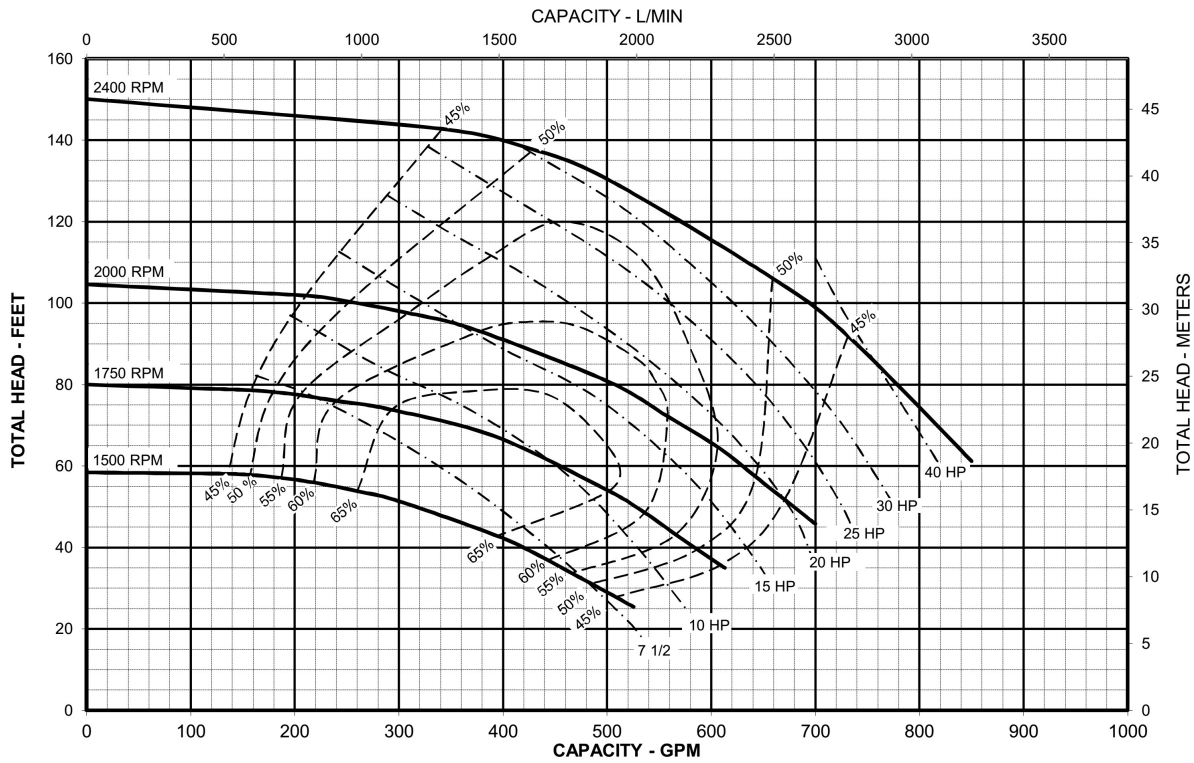
Hydraulic Performance – 4 x 2-1/2 x 10” Pump



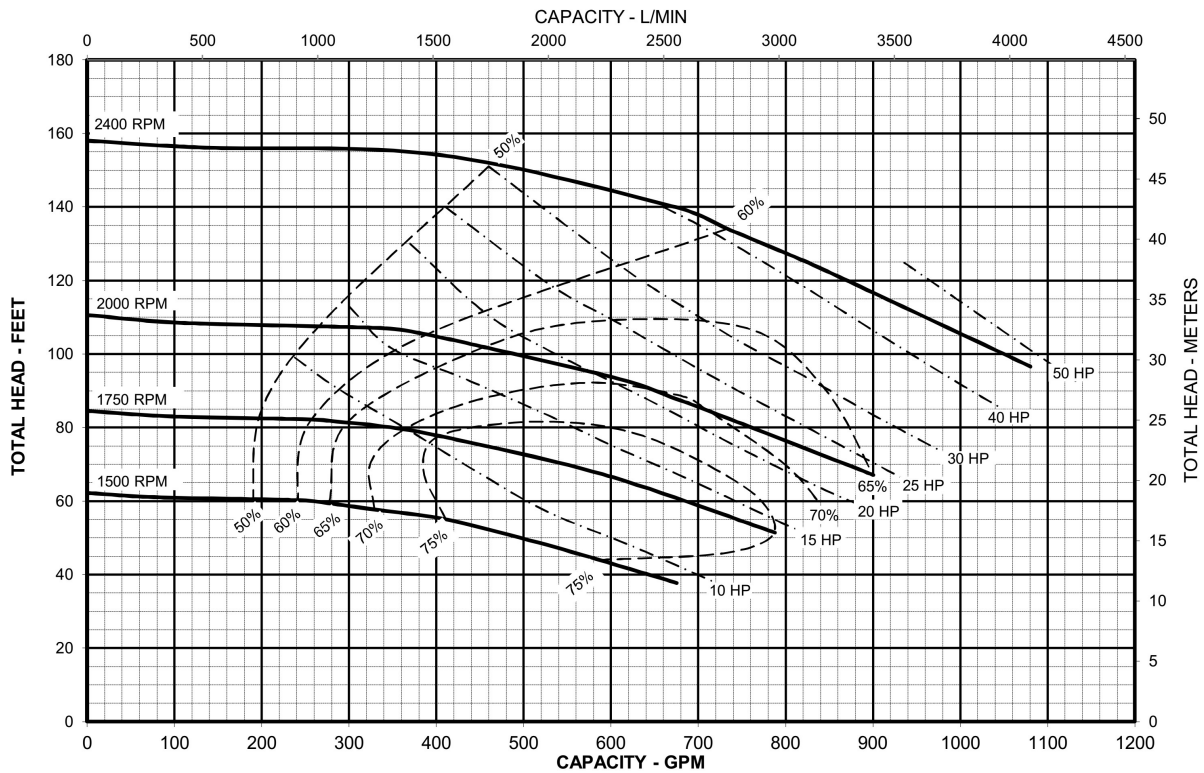
Notes:

1. Above data is based on 1.0 sp. gr. water at ambient temperature and pressure in accordance with Hydraulic Institute guidelines.

Hydraulic Performance – 4 x 3 x 10” Pump



Hydraulic Performance – 6 x 4 x 10” Pump



Notes:

1. Above data is based on 1.0 sp. gr. water at ambient temperature and pressure in accordance with Hydraulic Institute guidelines.

Hydraulic Performance – 2 x 1 x 7” Pump Rubber Lined

Note: Rubber lined pump is not available
in the 2 x 1x7” size

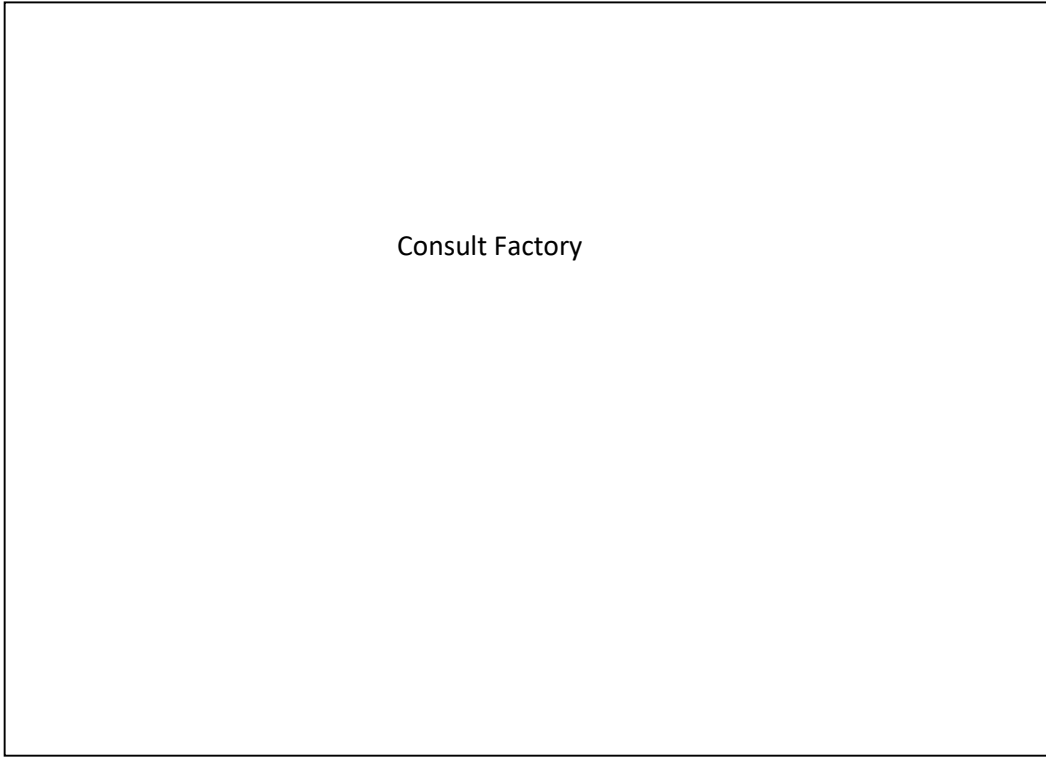
Hydraulic Performance – 3 x 1-1/2 x 10” Pump Rubber Lined

Consult Factory

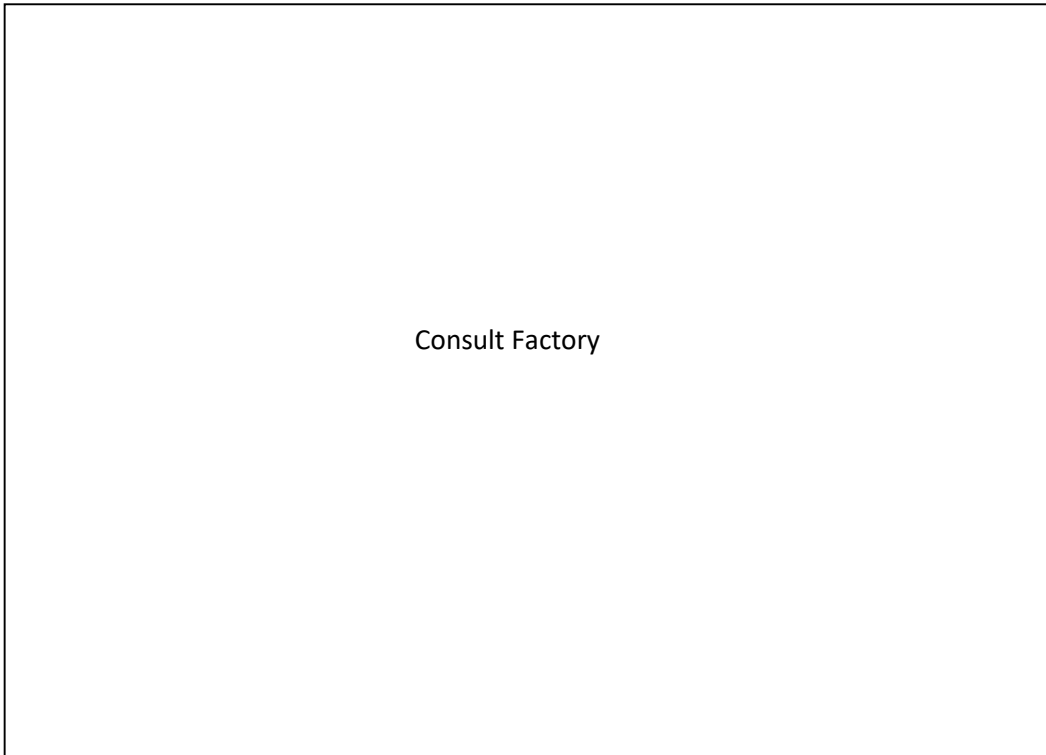
Notes:

1. Above data is based on 1.0 sp. gr. water at ambient temperature and pressure in accordance with Hydraulic Institute guidelines.

Hydraulic Performance – 3 x 2 x 10” Pump Rubber Lined



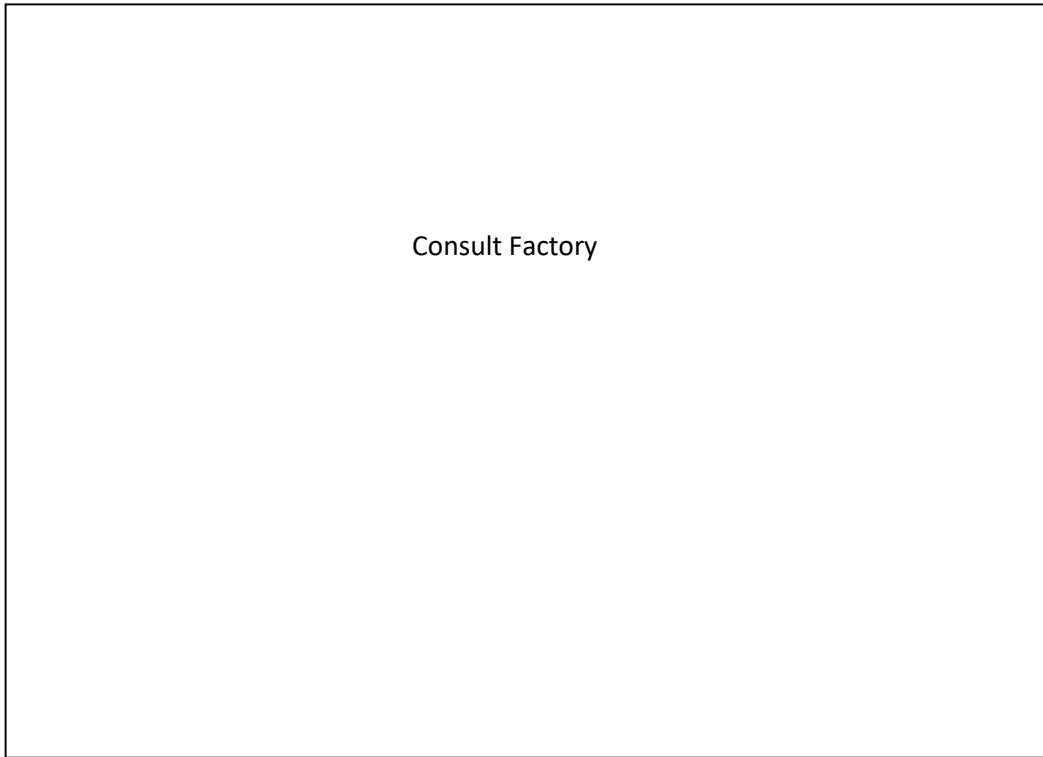
Hydraulic Performance – 4 x 2-1/2 x 10” Pump Rubber Lined



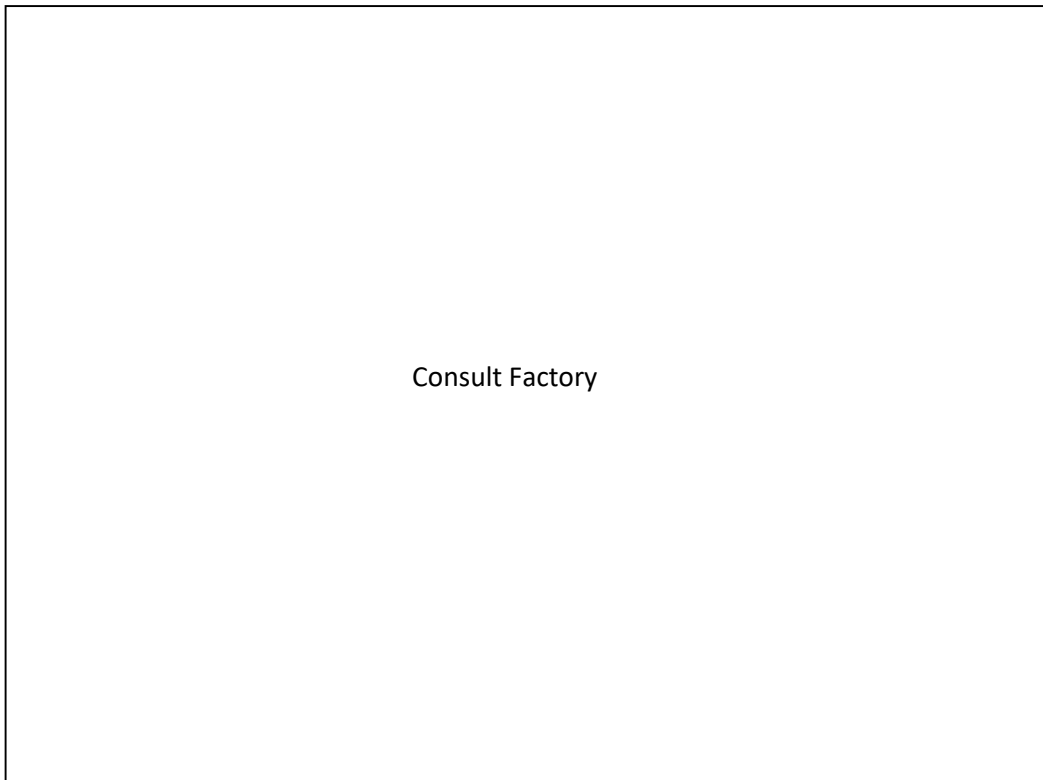
Notes:

1. Above data is based on 1.0 sp. gr. water at ambient temperature and pressure in accordance with Hydraulic Institute guidelines.

Hydraulic Performance – 4 x 3 x 10” Pump Rubber Lined



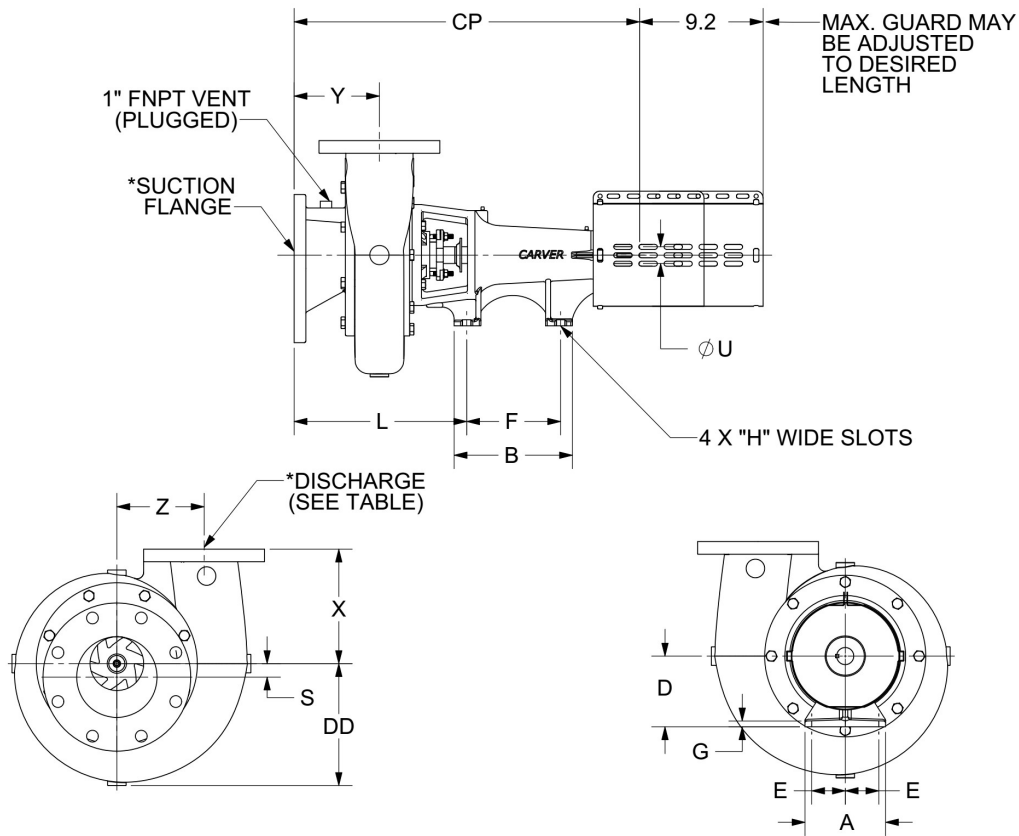
Hydraulic Performance – 6 x 4 x 10” Pump Rubber Lined



Notes:

1. Above data is based on 1.0 sp. gr. water at ambient temperature and pressure in accordance with Hydraulic Institute guidelines.


Series 850 Filtrate - 10P/20P Frame, Basic Pump



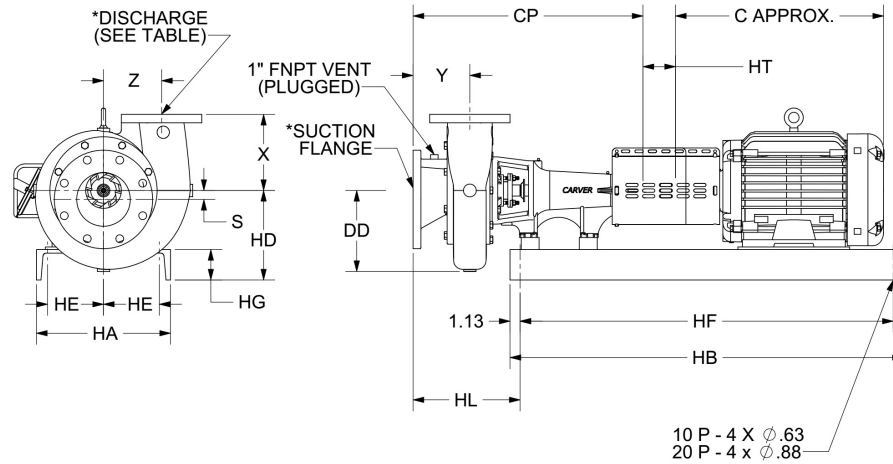
* PUMP FLANGES: FLAT FACE
 DRILLED TO ANSI B16.5 CL. 150 FLANGE.

CODE	PUMP SIZE	BEARING FRAME	*DISCHARGE	X	Y	Z	DD	CP	L	S
AA	2 x 1 x 7	10P	1" FNPT	4.25	4.44	3.81	4.75	24.23	11.34	0
AB	3x 1.5 x 10		1.5" FNPT	6	5.64	5.44	6.67	25.02	12.13	0
AC	3 x 2 x 10		2" FNPT	6.25	5.69	5.5	6.67	25.02	12.44	0
AD	4 x 2.5 x 10		2.5" FLANGE	7	5.23	5.75	7.25	24.61	11.99	0
AE	4 x 3 x 10		3" FLANGE	7	5.23	6	7.38	26.61	11.99	0
AF	6 x 4 x 10		4" FLANGE	8.5	6.35	6.5	9.05	25.78	12.85	1
AB	3x 1.5 x 10	20P	1.5" FNPT	6	5.64	5.44	6.67	28.39	12.7	0
AC	3 x 2 x 10		2" FNPT	6.25	5.69	5.5	6.67	28.43	12.75	0
AD	4 x 2.5 x 10		2.5" FLANGE	7	5.23	5.75	7.25	27.98	12.29	0
AE	4 x 3 x 10		3" FLANGE	7	5.23	6	7.38	27.98	12.29	0
AF	6 x 4 x 10		4" FLANGE	8.5	6.35	6.5	9.05	29.10	13.42	1

BEARING FRAME	BEARING FRAME DIMENSIONS								KEYWAY
	A	B	D	E	F	G	H	U	
10P	6	8.81	5.25	2.5	7	.44	.63	1.25	0.25" X 0.125" X 2.00" LONG
20P	8.75	11.25	7	3.75	9.25	.50	.75	1.50	0.375" X 0.188" X 2.13" LONG

	1. All dimensions in inches, all tolerances +/- 0.125 inch.	Dwg: SP-CF-001
	2. All motor dimensions are approximate.	
	3. Not valid for construction unless certified.	

Series 850 Filtrate Pump, Motor/Coupling/Base




* PUMP FLANGES: FLAT FACE
DRILLED TO ANSI B16.5 CL. 150 FLANGE.

* HT WITH STD SPACER COUPLING IS 3.63"-5.13"

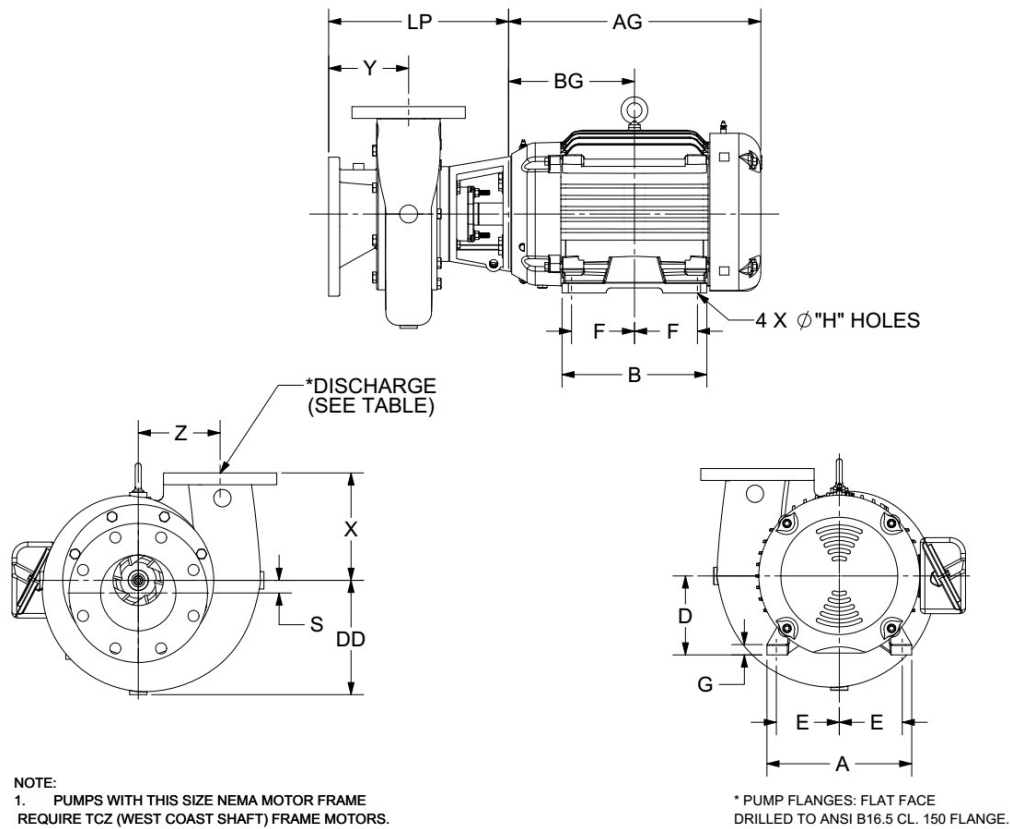
NEMA MOTOR FRAME	MOTOR AND BASE DIMENSIONS FOR 10P FRAMES						
	C	HA	HB	HD	HE	HF	HG
143T	13	12	32	8.44	4.75	29.75	3
145T	14	12	32	8.44	4.75	29.75	3
182T	15	12	34	9.63	4.75	31.75	3
184T	16	12	34	9.63	4.75	31.75	3
213T	18	12	38	9.63	4.75	35.75	3
215T	19	12	38	9.63	4.75	35.75	3
254T	23	15	44	10	6.25	41.75	3.4
256T	25	15	44	10	6.25	41.75	3.4
	MOTOR AND BASE DIMENSIONS FOR 20P FRAMES						
	C	HA	HB	HD	HE	HF	HG
254T	23	15	46	12.5	6	43.75	3.4
256T	25	15	46	12.5	6	43.75	3.4
284TS	25	18	50	12.88	7.5	47.75	4
286TS	26	18	50	12.88	7.5	47.75	4
324TS	27	18	54	12.88	7.5	51.75	4
326TS	29	18	54	12.88	7.5	51.75	4

CODE	PUMP SIZE	BEARING FRAME	*DISCHARGE	X	Y	Z	DD	CP	HL	S
AA	2 x 1 x 7	10P	1" FNPT	4.25	4.44	3.81	4.75	24.23	10.5	0
AB	3x 1.5 x 10		1.5" FNPT	6	5.64	5.44	6.67	25.02	10.8	0
AC	3 x 2 x 10		2" FNPT	6.25	5.69	5.5	6.67	25.02	11.3	0
AD	4 x 2.5 x 10		2.5" FLANGE	7	5.23	5.75	7.25	24.61	10.9	0
AE	4 x 3 x 10		3" FLANGE	7	5.23	6	7.38	26.61	10.9	0
AF	6 x 4 x 10		4" FLANGE	8.5	6.35	6.5	9.05	25.78	8.9	1
AB	3x 1.5 x 10	20P	1.5" FNPT	6	5.64	5.44	6.67	28.39	10.4	0
AC	3 x 2 x 10		2" FNPT	6.25	5.69	5.5	6.67	28.43	10.8	0
AD	4 x 2.5 x 10		2.5" FLANGE	7	5.23	5.75	7.25	27.98	10.4	0
AE	4 x 3 x 10		3" FLANGE	7	5.23	6	7.38	27.98	10.4	0
AF	6 x 4 x 10		4" FLANGE	8.5	6.35	6.5	9.05	29.10	11.5	1

*PUMP FLANGES: FLAT FACE DRILLED TO ANSI B16.5 CL. 150 FLANGE

	1. All dimensions in inches, all tolerances +/- 0.125 inch.	<p>Dwg: SP-CF-002, Rev 1</p>
	2. For motor dimensions CF and P see prior page.	
	3. Not valid for construction unless certified.	

Series 850 Filtrate Pump – Close Coupled



CODE	PUMP SIZE	*DISCHARGE	X	Y	Z	DD	S	LP	
								143-184 JP	213-326 JP
AA	2 x 1 x 7	1" FNPT	4.25	4.44	3.81	4.75	0	12.03	(1)
AB	3x 1.5 x 10	1.5" FNPT	6	5.64	5.44	6.67	0	12.82	13.57
AC	3 x 2 x 10	2" FNPT	6.25	5.69	5.5	6.67	0	12.82	13.57
AD	4 x 2.5 x 10	2.5" FLANGE	7	5.23	5.75	7.25	0	12.41	13.16
AE	4 x 3 x 10	3" FLANGE	7	5.23	6	7.38	0	12.41	13.16
AF	6 x 4 x 10	4" FLANGE	8.5	6.35	6.5	9.05	1	13.54	14.29

NEMA MOTOR FRAME	MOTOR DIMENSIONS								
	A (MAX)	AG	B (MAX)	BG	D	E	F	G	H
143JP	7	10.5	6	4.88	3.5	2.75	2	.44	.34
145JP	7	11.5	6	5.38	3.5	2.75	2.5	.44	.34
182JP	9	12.63	6.75	5.88	4.5	3.75	2.25	.56	.41
184JP	9	13.63	6.75	6.38	4.5	3.75	2.75	.56	.41
213JP	10.5	15.25	7	7.25	5.25	4.25	2.75	.63	.41
215JP	10.5	16.75	8.5	8.0	5.25	4.25	3.5	.63	.41
254JP	12.5	19.13	10.5	9.13	6.25	5	4.13	.63	.53
256JP	12.5	20.88	12.25	10	6.25	5	5	.63	.53
284JP	13.88	21	12.25	9.75	7	5.5	4.75	.75	.53
286JP	13.88	22.44	13.75	10.5	7	5.5	5.5	.75	.53
324JP	15.88	23.13	13.75	10.75	8	6.25	5.25	.81	.66
326JP	15.88	24.63	15.25	11.5	8	6.25	6	.81	.66

	1. All dimensions in inches, all tolerances +/- 0.125 inch. 2. Dimension "F" equal to values shown plus nominal column depth in increments of 12 inches (3.0 foot min, 20.0 foot max.). 3. Not valid for construction unless certified.	Dwg: SP-CF-009
	(Empty space for additional notes or specifications)	

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CARVER PUMP™
Built for purpose

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Phone: 563.263.3410 www.carverpump.com

850 TECH PAGES
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