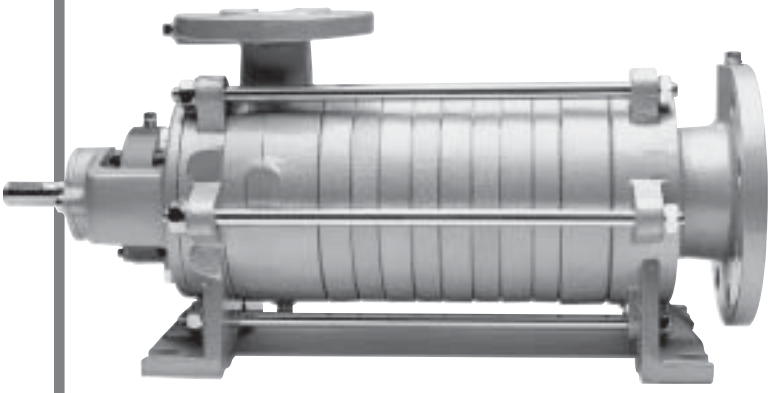
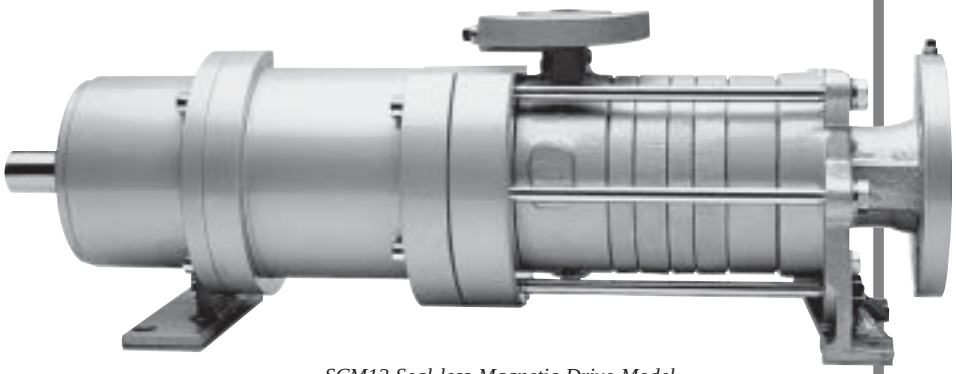
LPG Side Channel Pumps

Sales Catalog



SC24 Mechanically Sealed Model



SCM12 Seal-less Magnetic Drive Model

Solutions beyond products...

CORKEN®

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What is a Side Channel Pump?

The design of the side channel pump allows for the transfer of liquid-gas mixtures with up to 50% vapor; therefore eliminating possible air or vapor locking that can occur in other pump designs. A special suction impeller lowers the NPSH requirement for the pump.

The side-channel pump design is similar to a regenerative turbine in that the impeller makes regenerative passes through the liquid. However, the actual design of the impeller and casing as well as the principles of operation differ greatly. The side-channel pump has a channel only in the discharge stage casing (A) and a flat surface which is flush with the impeller on the suction stage casing (B). A star-shaped impeller (C) is keyed to the shaft and is axially balanced through equalization holes (D) in the hub of the impeller.

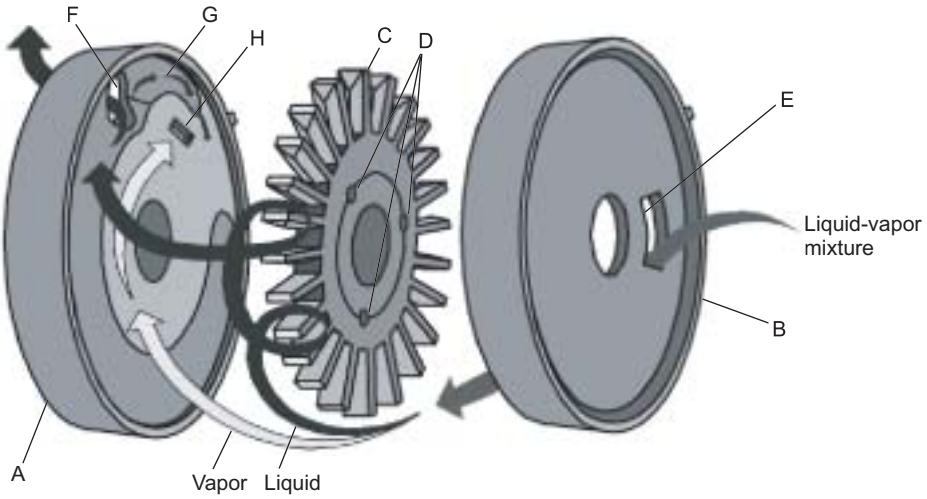
The liquid or liquid/vapor mixture enters each stage of the pump through the inlet port (E). Once the pump is initially filled with liquid, the pump will provide a siphoning effect at the inlet port. The effect is similar to what happens in water ring pumps. The water remaining in the pump casing forms a type of water ring with a free surface. A venturi effect is created by the rotation of the impeller and the free surface of the water, thus pulling the liquid into the casing.

After the liquid is pulled through the inlet port, it is forced to the outer periphery of the impeller blade by centrifugal action. It is through this centrifugal action that the liquid is accelerated and forced into the side channel. The liquid then flows along the semicircular contour of the side channel from the outermost point to the innermost point until once again it is accelerated by the impeller blade. The liquid moves several times between the impeller and the side channel. Thus the rotating impeller makes several regenerative passes until the liquid reaches the outlet port. The speed of the impeller along with the centrifugal action impart energy to the liquid through the exchange of momentum, thus allowing the pump to build pressure.

The side channel leads directly to the outlet port (F). At the outlet port, the main channel ends and a smaller mini-channel (G) begins. At the point where the mini-channel ends, there is a small secondary discharge port (H) level with the base of the impeller blades.

As the liquid is forced to the periphery through centrifugal action due to its density, the vapor within the liquid stream tends to remain at the base of the impeller blades since it has a much lower density. The main portion of liquid and possibly some vapor, depending on the mix, is discharged through the outlet port. A small portion of the liquid flow follows the mini-channel and eventually is forced into the area between the impeller blades. The remaining vapor which was not drawn through the outlet port resides at the base of the impeller blades. At the end of the mini-channel, as the liquid is forced into the area between the blades, the area between and around the impeller blade is reduced. The liquid between the blades displaces and thus compresses the remaining vapor at the base of the impeller blades. The compressed vapor is then forced through the secondary discharge port where it combines with the liquid discharged through the outlet port as it is pulled into the next stage or discharged from the pump. Thus entrained vapor is moved through each stage of the pump.

Each subsequent stage operates under the same principle. The number of stages can be varied to meet the required discharge head. When multiple stages are required, the relative positions of the stage outlet ports are radially staggered to balance shaft loads.



Item	Description
A	Discharge stage casing
B	Suction stage casing
C	Impeller
D	Equalization holes
E	Inlet port
F	Outlet port
G	Mini-channel
H	Secondary discharge port

History

The Side Channel pump was introduced into the Corken pump line in 1996. This versatile pump is also used widely in industrial applications. Several features characterize this unique pump. First of all it can handle up to 50% entrained vapor which makes it ideal for pumping liquefied gasses such as propane. It also has a special suction impeller that enables it to operate under poor suction conditions as is often seen in underground tanks or other types of unloading situations. Additionally it is a multistage regenerative turbine type which allows it to pump against the high head pressures of carousel bottle filling and other applications.

Maintaining the Corken way of building a pump, the impellers float. This feature along with heavy duty bearings and optional cooling water jackets allow this pump to operate in difficult applications with reliability and longevity. Versatility is also a key to Corken pumps and this one is designed for use both domestically and overseas with ANSI compatible or DIN flange options, and multiple material and sealing arrangements including seal-less magnetic drive models.

The side channel pump is designed for relatively low flow, high head, thin liquid and liquefied gas transfer. The most common uses for the LPG/NH_3 versions of the pump are shown at the right. More information on other applications is available in our Industrial Pumps Sales Catalog.

Primary Applications

Propane bulk transfer

Propane cylinder filling

Butane transfer

Vaporizer feed

Barge unloading

Tank/railcar unloading

Carousel cylinder filling

Agricultural ammonia

Autogas



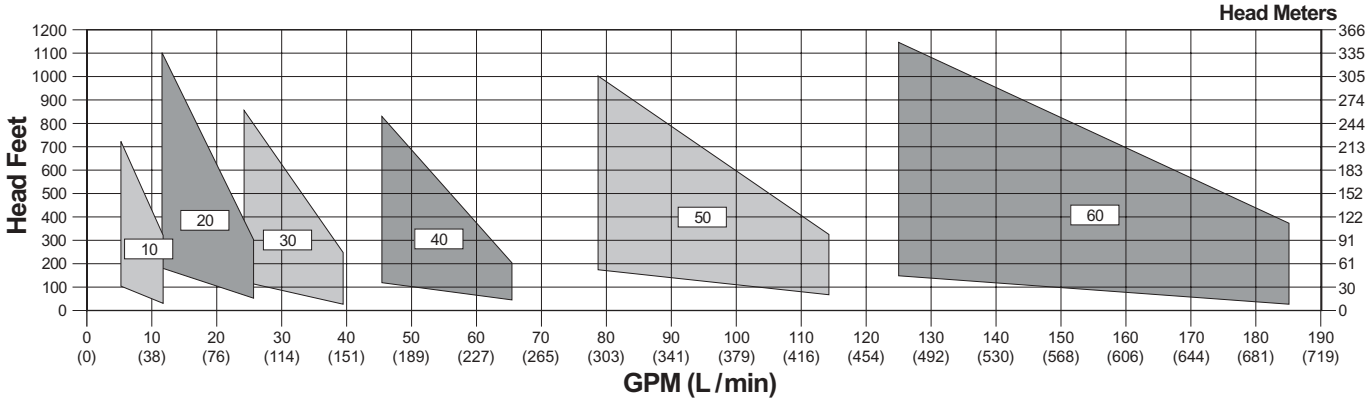
Photo is courtesy of Kosan Crisplant a/s—Denmark—www.kosancrisplant.com

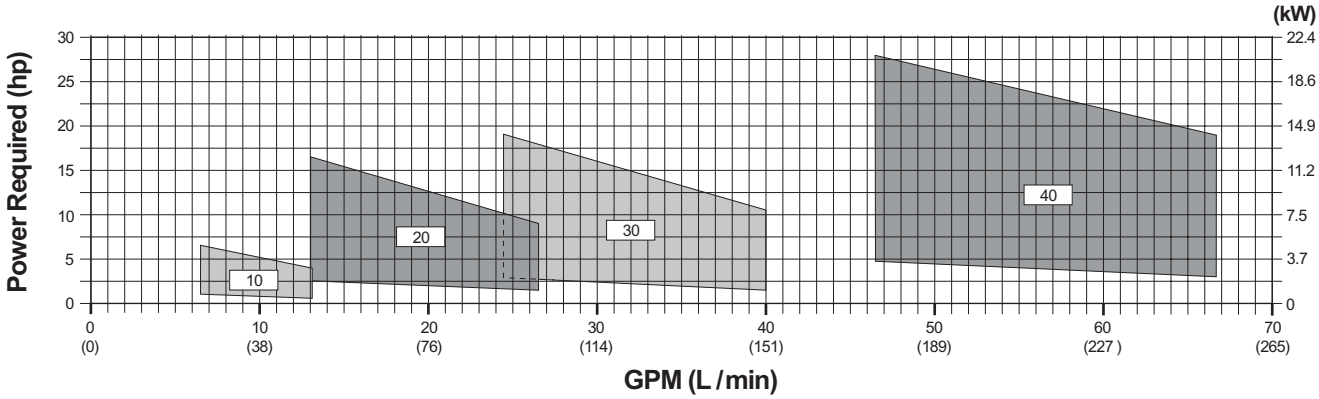


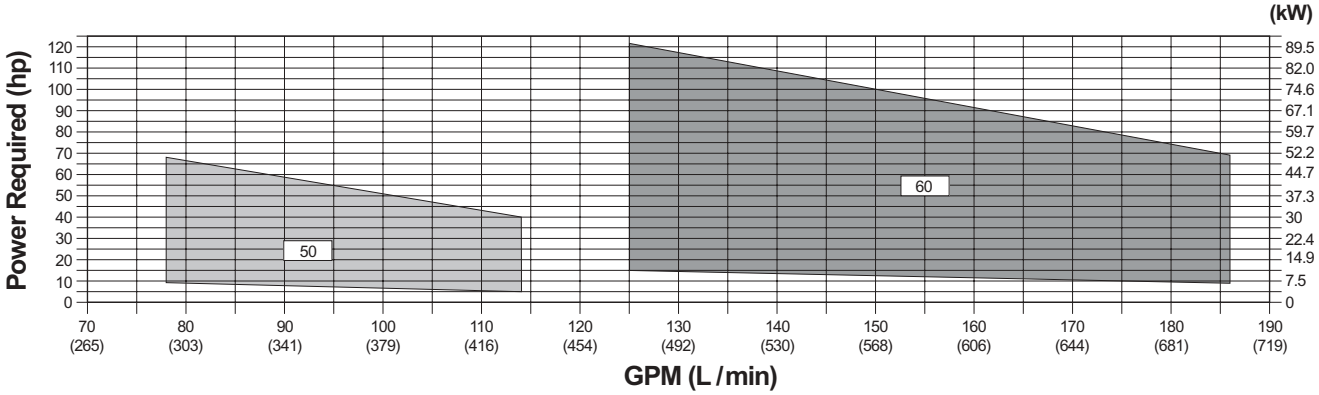
The SC58 model with direct-coupled drive is commonly used in carousel cylinder filling plants.

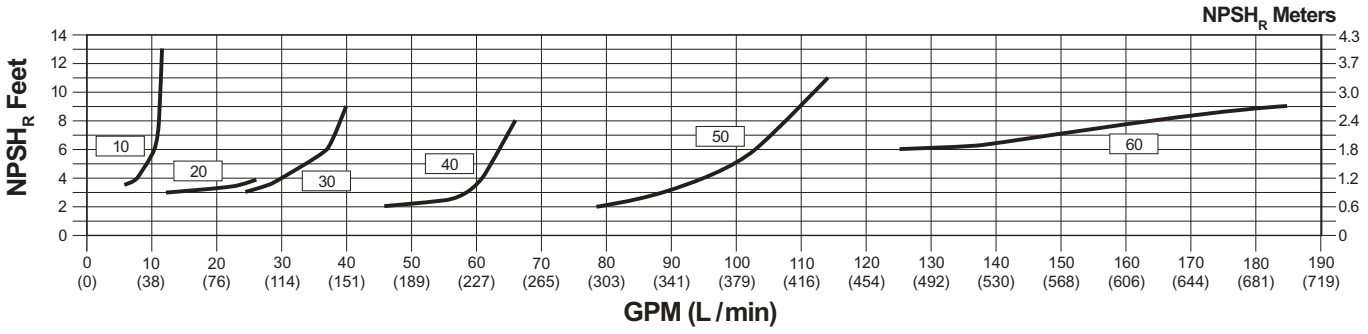
SC-/SCM-Model Series Selection Guide—1750 RPM

Use the following curves to determine the model series that most closely meets your application. Then proceed to the performance curves on pages 9–26 to select your exact model.



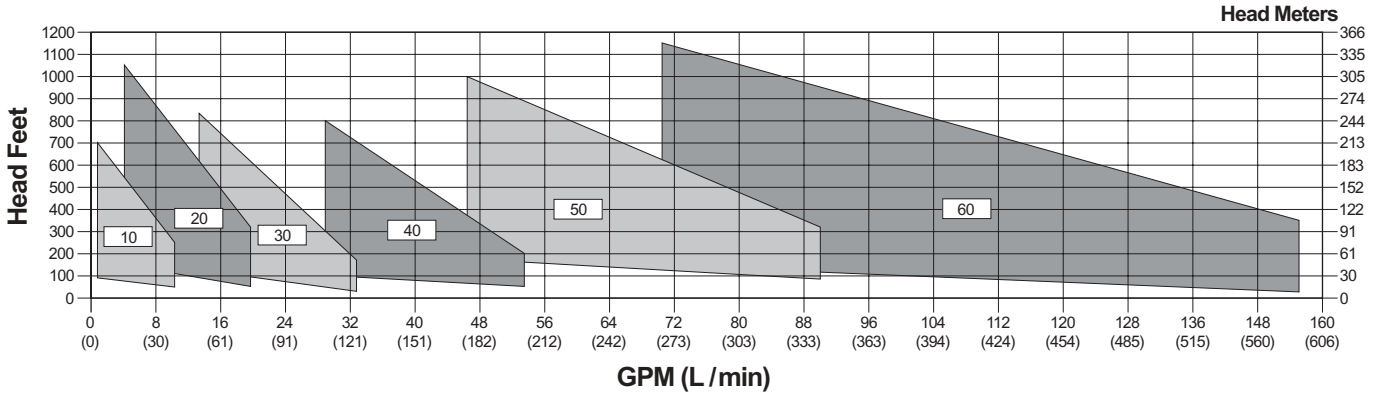


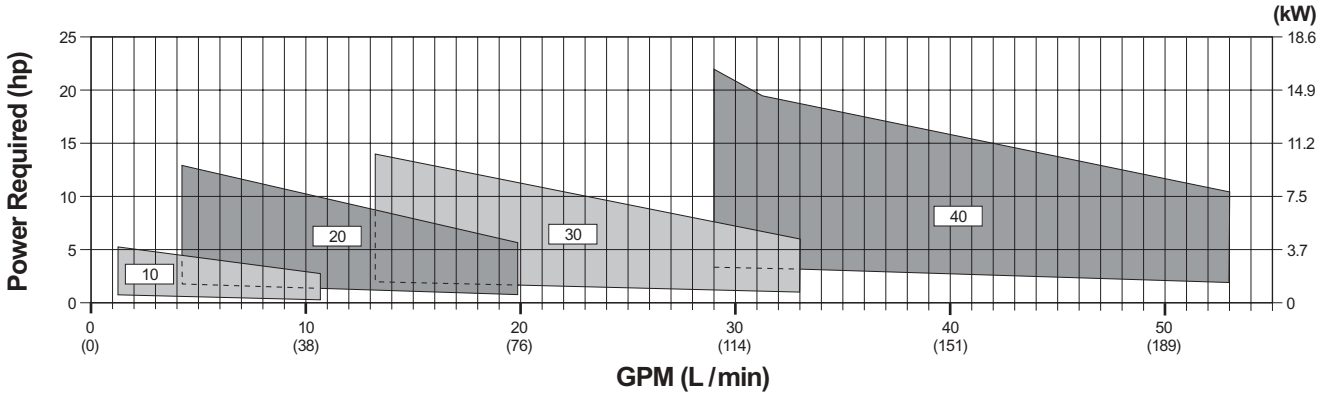


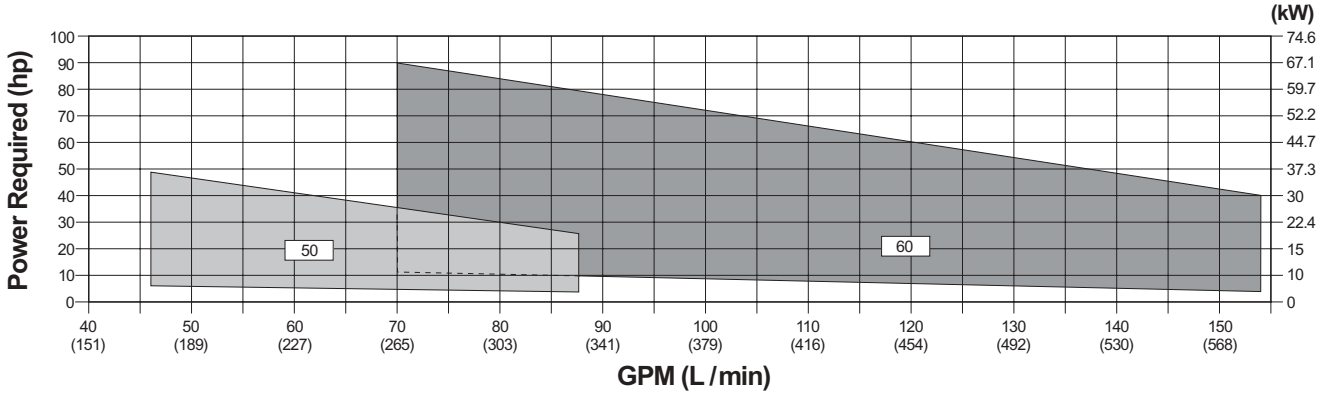


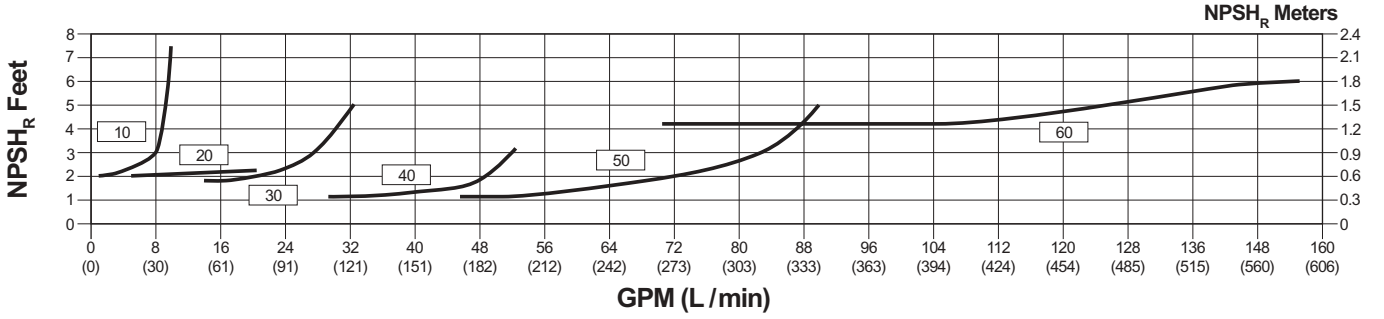
SC-/SCM-Model Series Selection Guide—1450 RPM

Use the following curves to determine the model series that most closely meets your application. Then proceed to the performance curves on pages 9–26 to select your exact model.



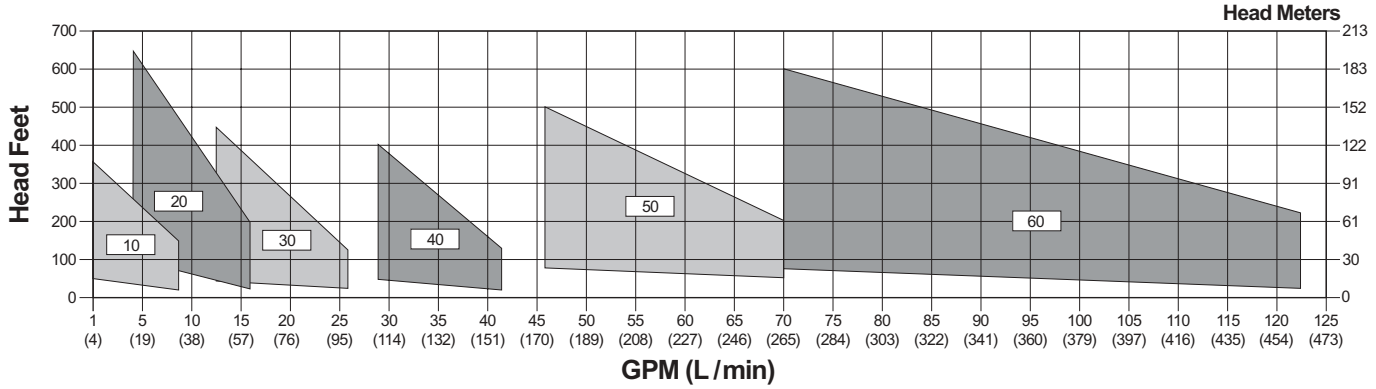


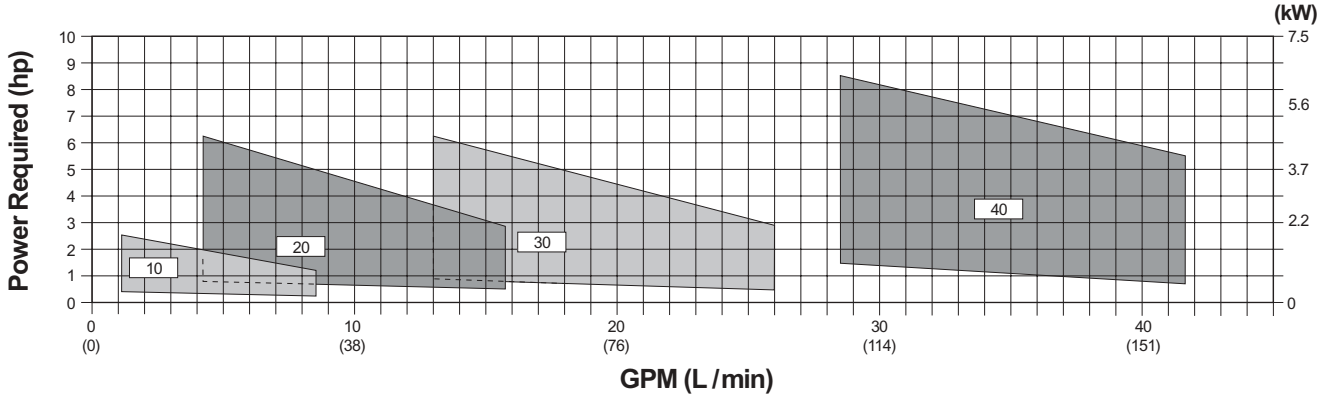


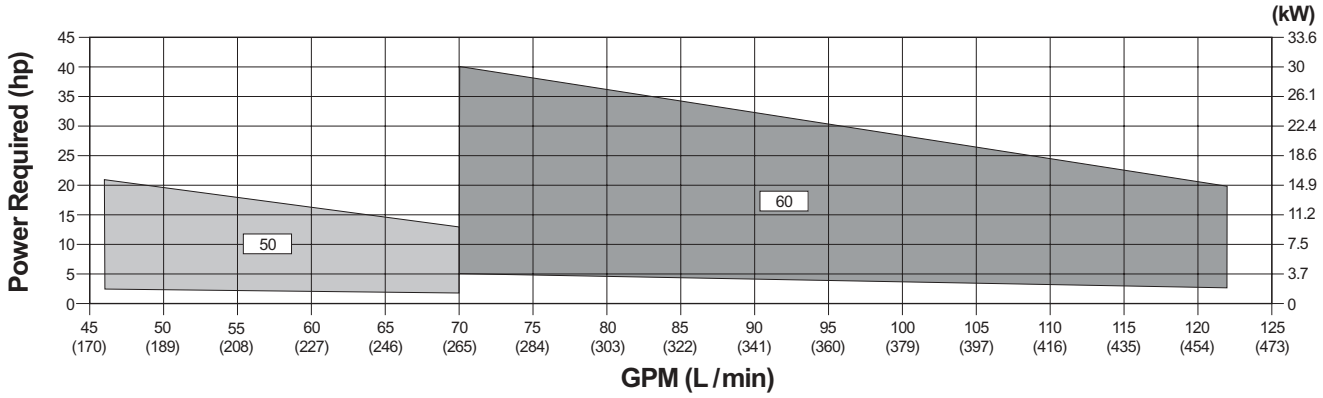


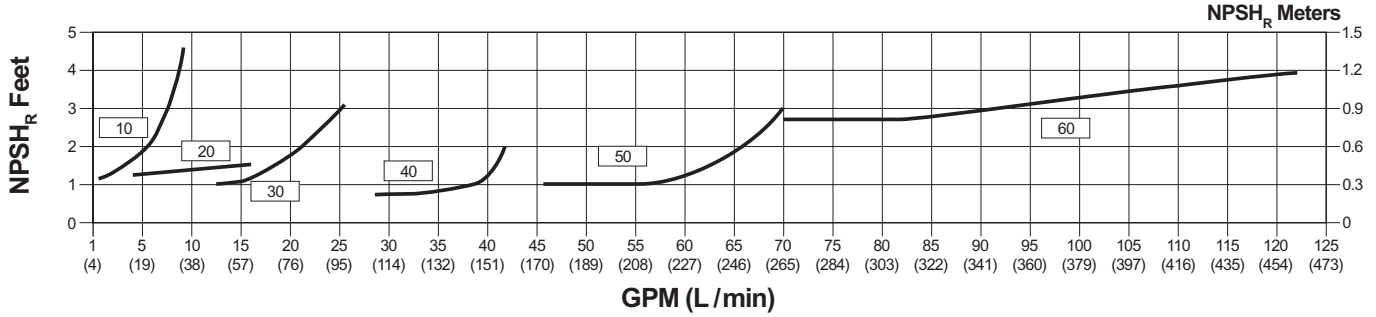
SC-/SCM-Model Series Selection Guide—1150 RPM

Use the following curves to determine the model series that most closely meets your application. Then proceed to the performance curves on pages 9–26 to select your exact model.









SC / SCM-Model—Features & Specifications

Equipment Type & Options

Multistage regenerative turbine liquid pump
300# ANSI compatible or DIN flanges
Single/double mechanical seal
Magnetic drive option

Applications

Single, multi or carousel cylinder filling
Bulk transfer
Underground tanks
Truck/tank/rail/barge loading and unloading
Vaporizer feed

Features & Benefits

Regenerative turbine pump:	Able to handle liquefied gases without flashing
Heavy duty bearings:	Long bearing life
Multiple sealing options:	Large variety of uses in LPG and industrial
Centrifugal type suction impeller:	Allows for low NPSH
Floating impeller(s):	Long impeller life, low maintenance
300# ANSI compatible or DIN flanges:	Usability for US or overseas applications
Operates at 1150, 1450 or 1750 RPM:	Usability for US or overseas applications
Modular construction:	Minimized spare parts requirements
Multistage operation:	Provides for self-priming, high differential pressures and non-pulsating flows

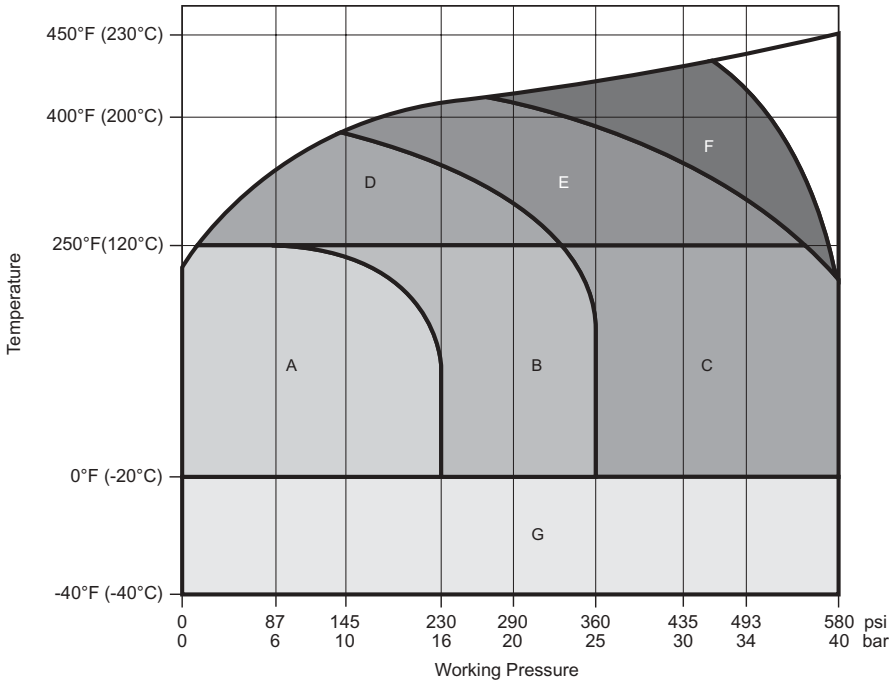
Operating Specifications

Allowable proportion of gas:	50% entrained vapor	RPM range:	900–1750
Temperature range:	-40°F–428°F (-40°C–220°C)	Flow range:	1–185 gpm (4–700 L/min)
Maximum working pressure:	580 psi (40 bar)	Differential pressure range:	30–1150 ft (10–350 m)
Maximum viscosity:	1050 SSU (230 cSt)	$NPSH_R$ range:	1.3–12ft (0.4–3.5 m)

Material & Component Selection Graph

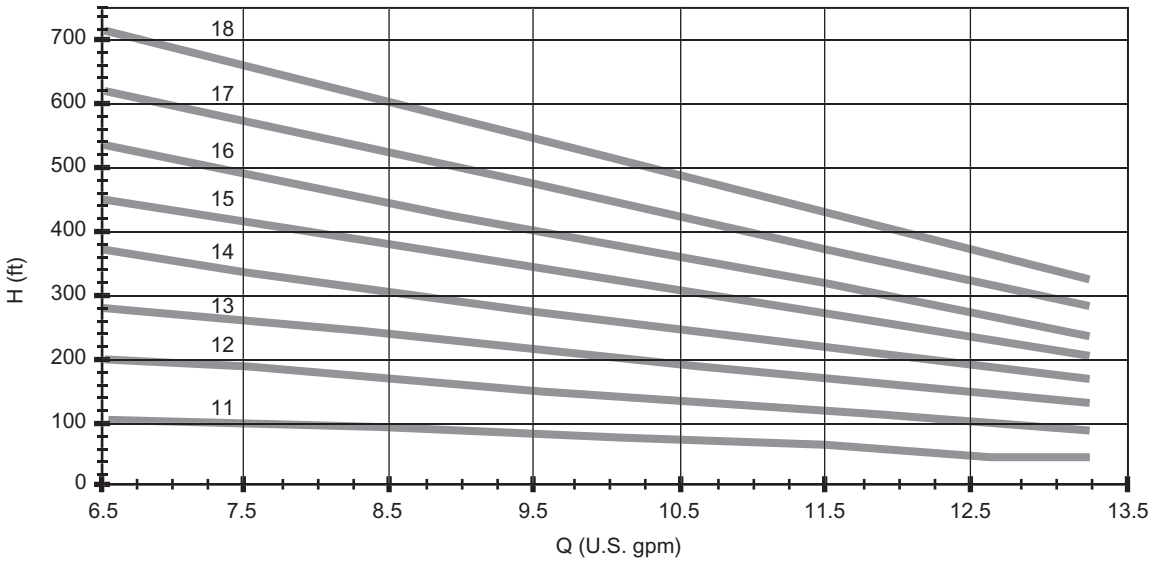
	Material[1] (Case/Impeller)	Seal Type	Cooling Option
A	Cast/Bronze	Unbalanced	No
B	Cast/Bronze	Balanced	No
C	Ductile/Bronce	Balanced	No
D	Cast/Bronze	Balanced	Yes
E	Ductile/Bronze	Balanced	Yes
F	Stainless Steel	Balanced	Yes
G	Ductile/Bronze	Balanced	No

[1]Minimum requirement.

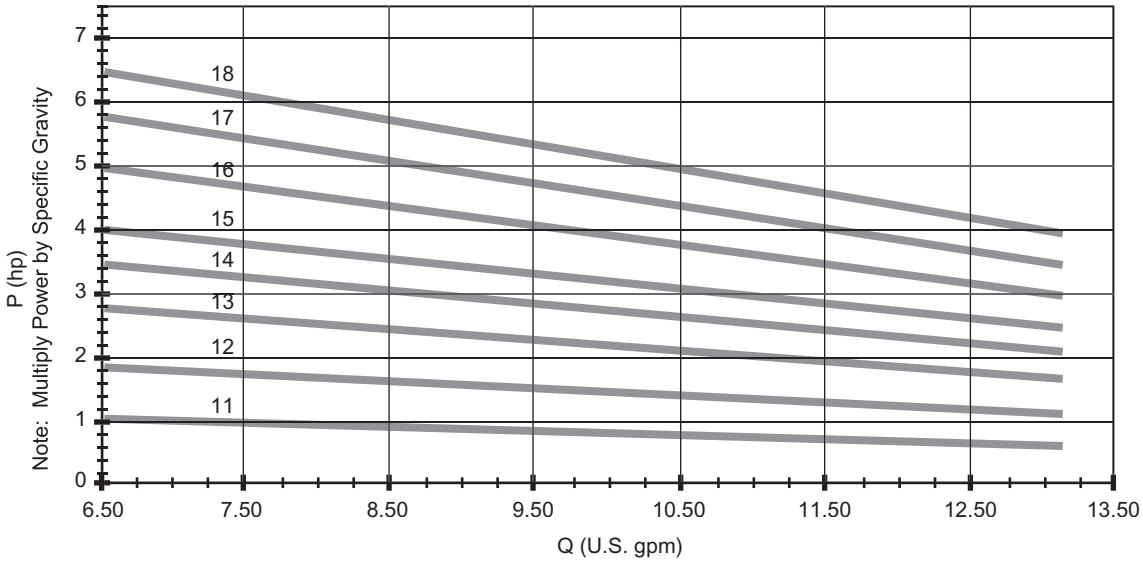


1750 RPM

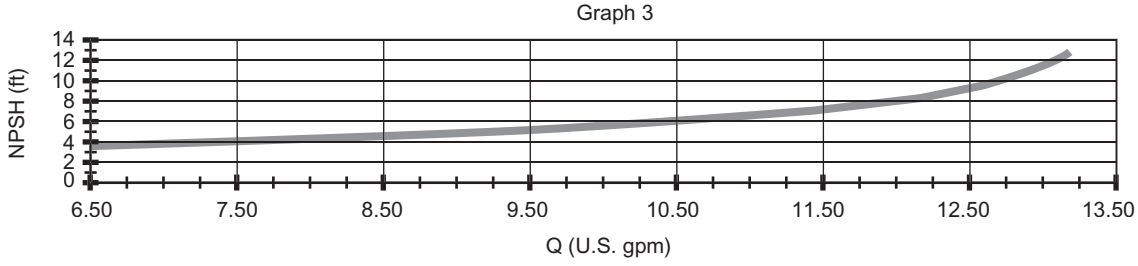
Graph 1



Graph 2

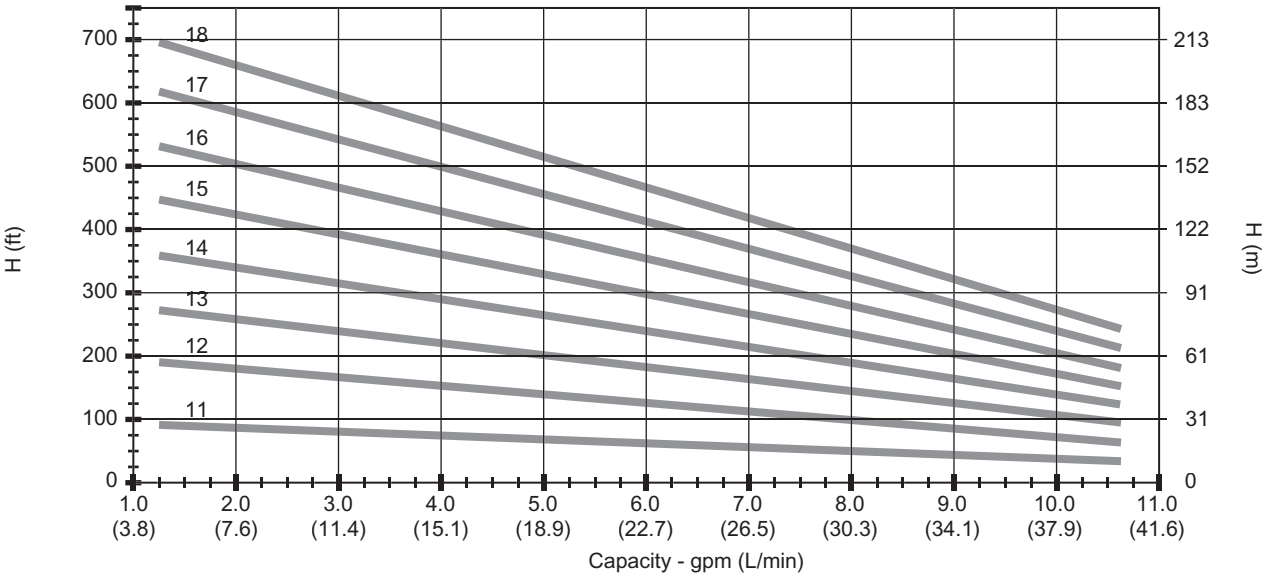


Graph 3

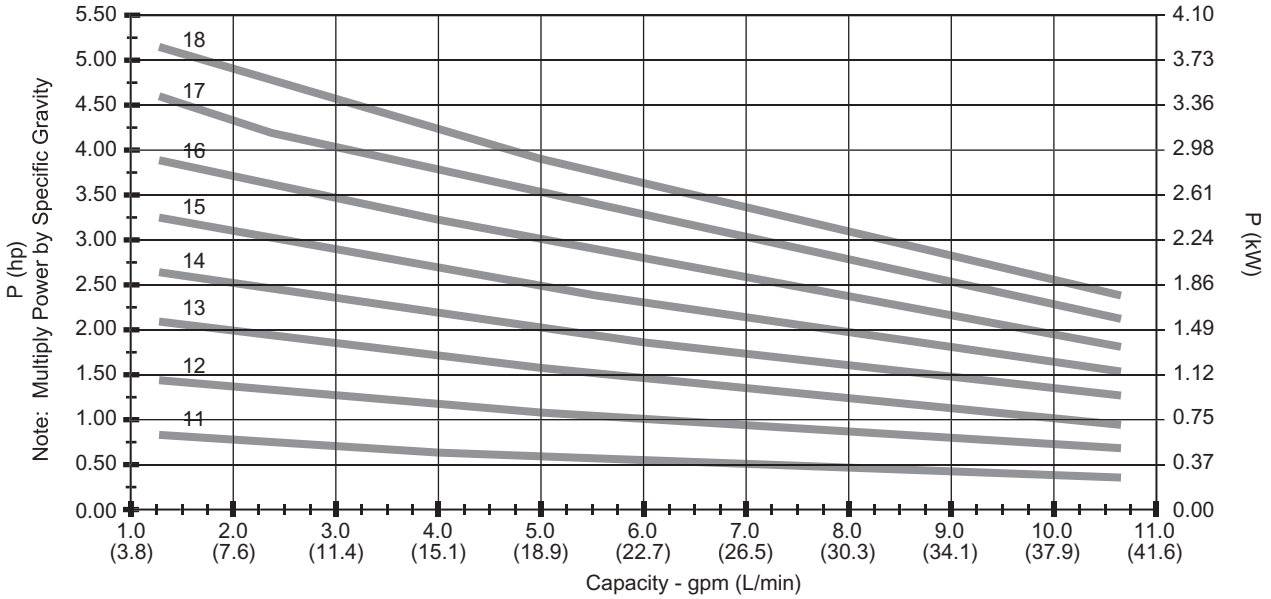


1450 RPM

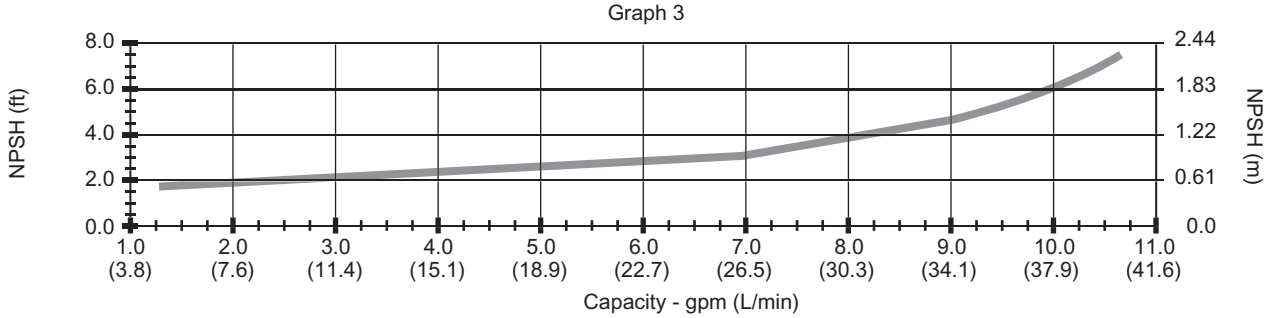
Graph 1



Graph 2

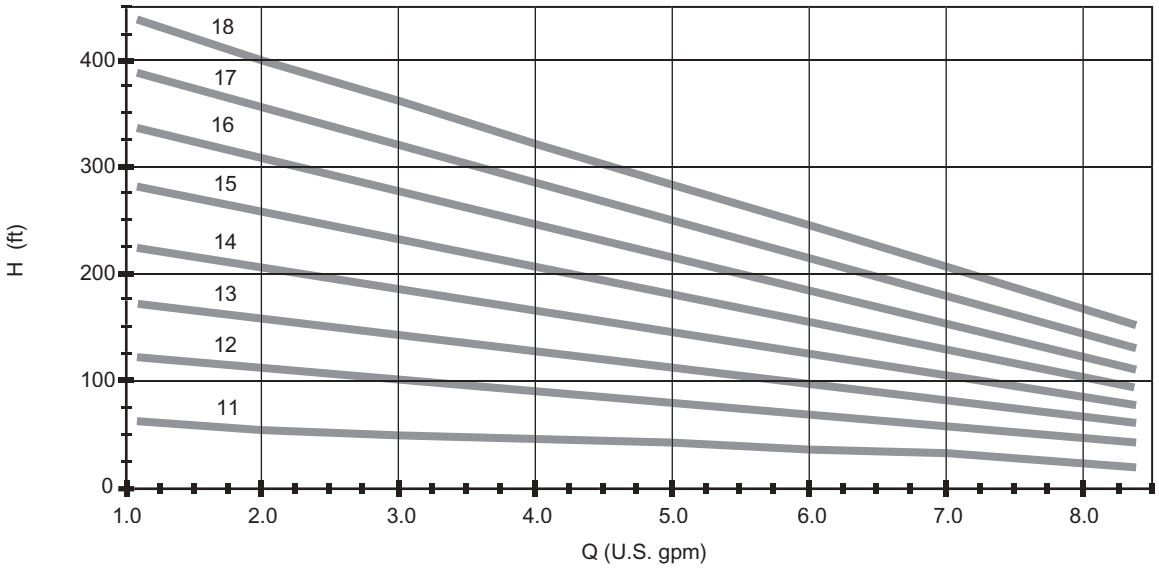


Graph 3

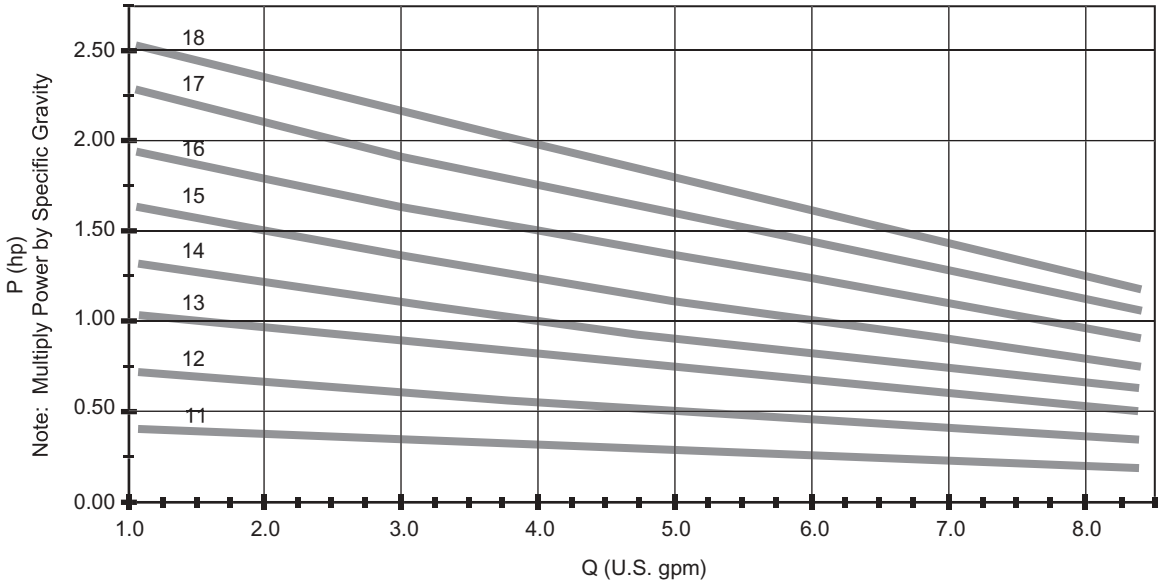


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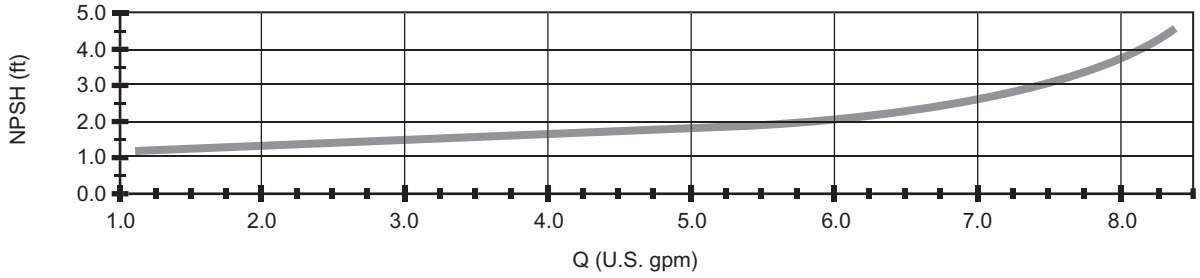
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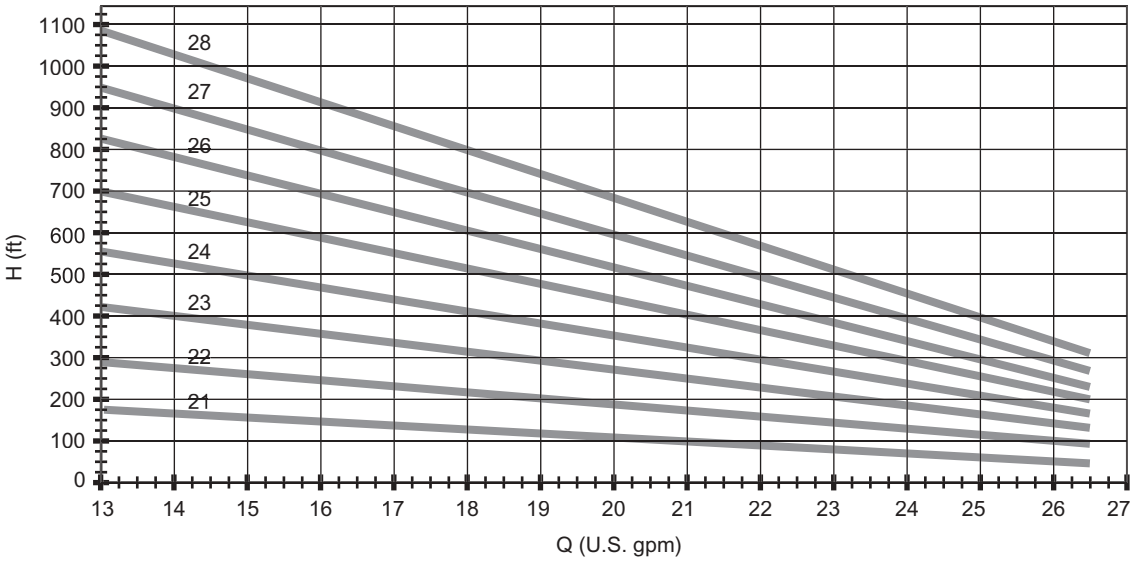


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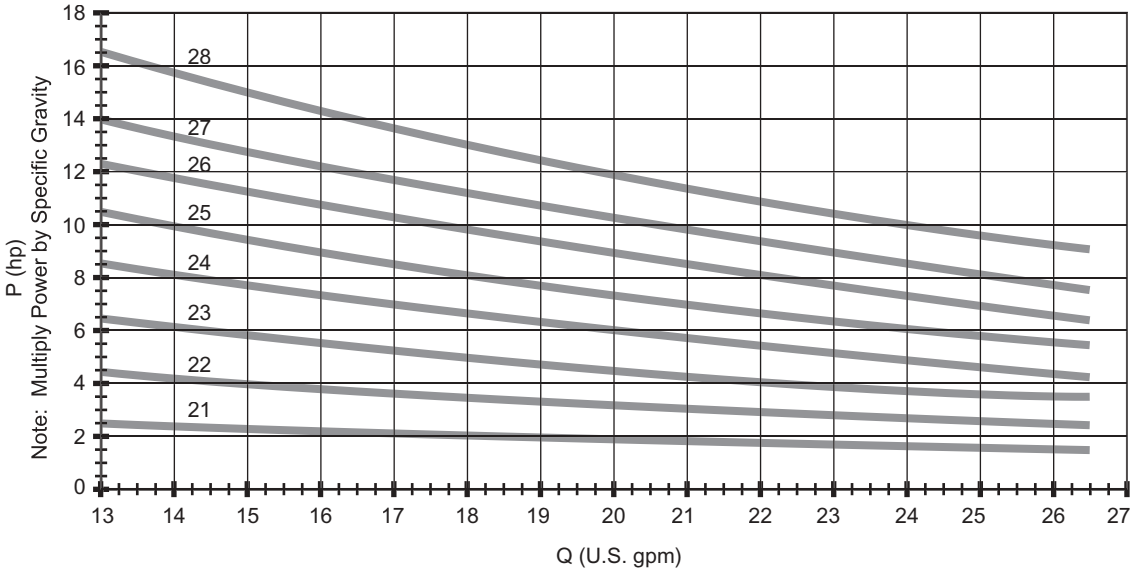


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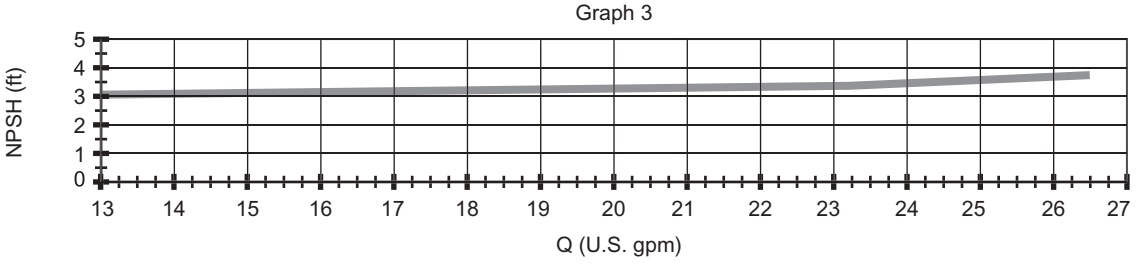
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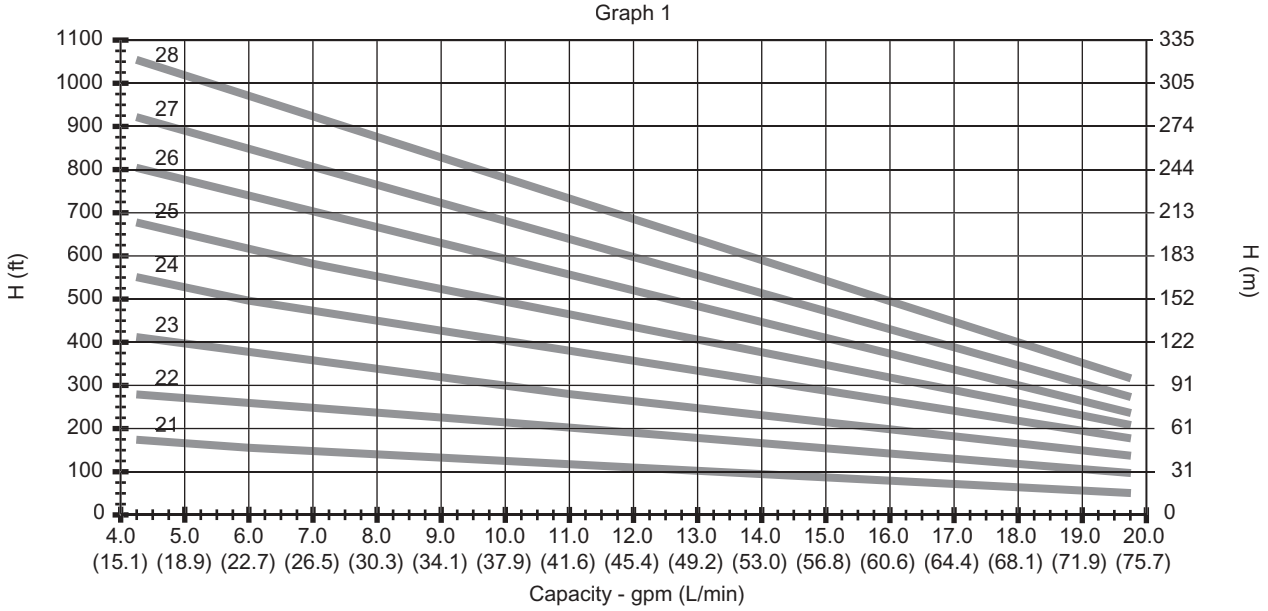


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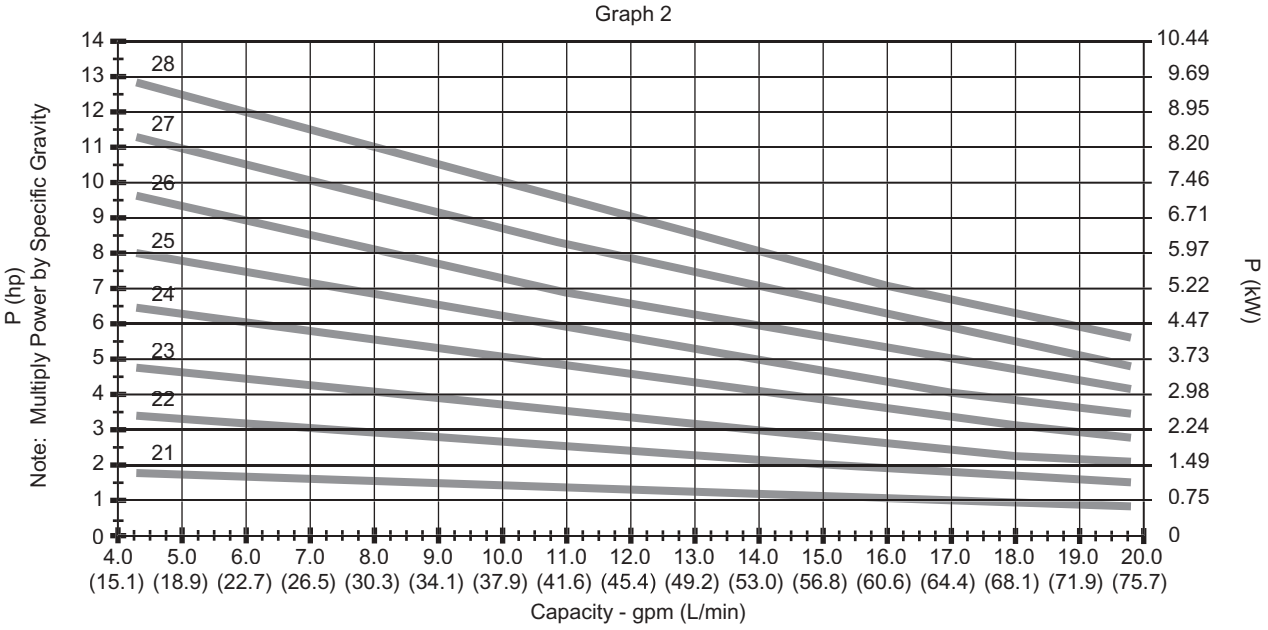


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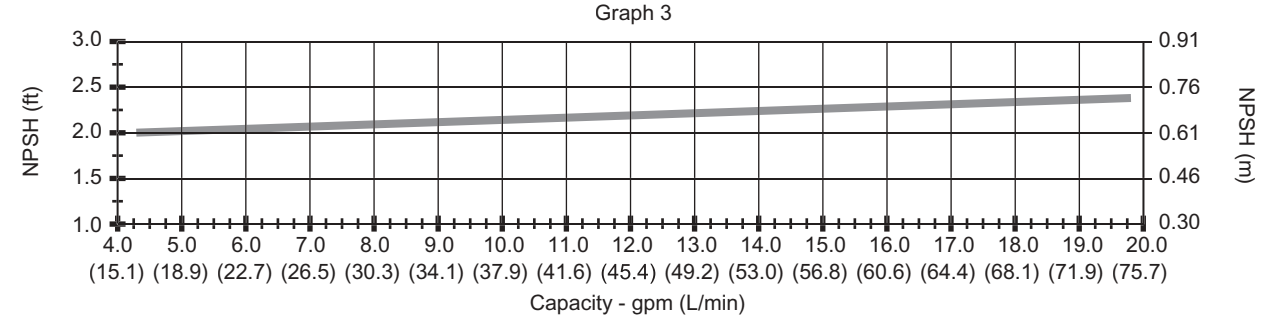
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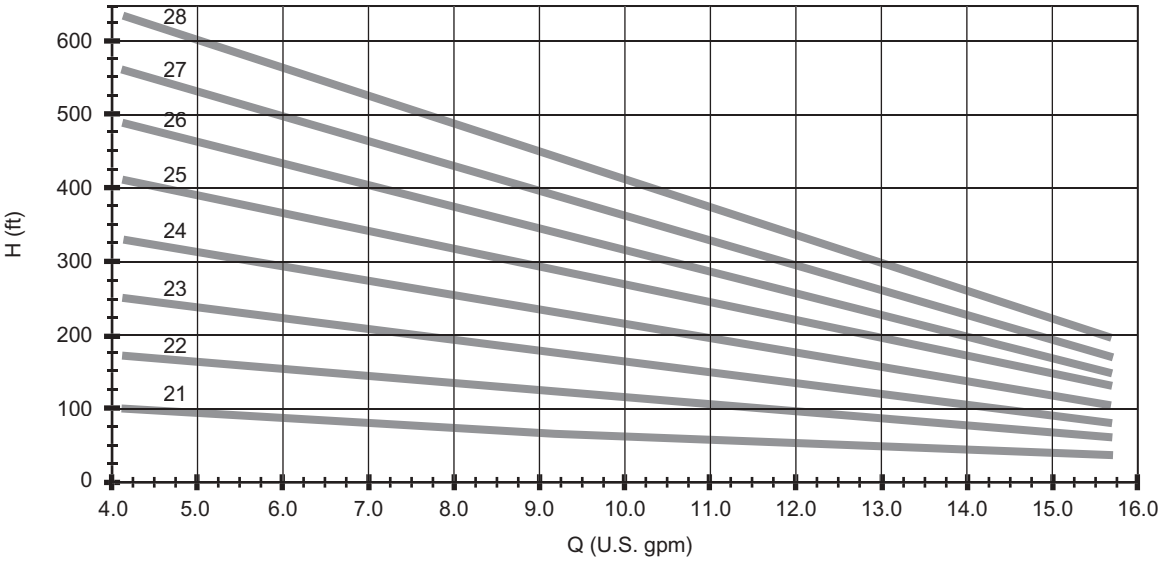


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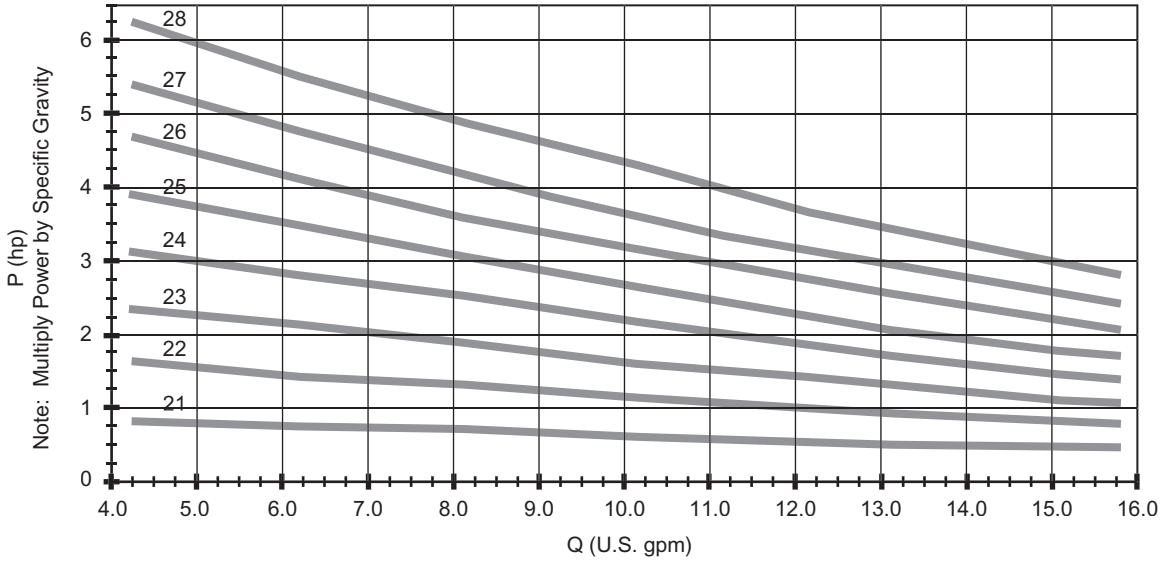


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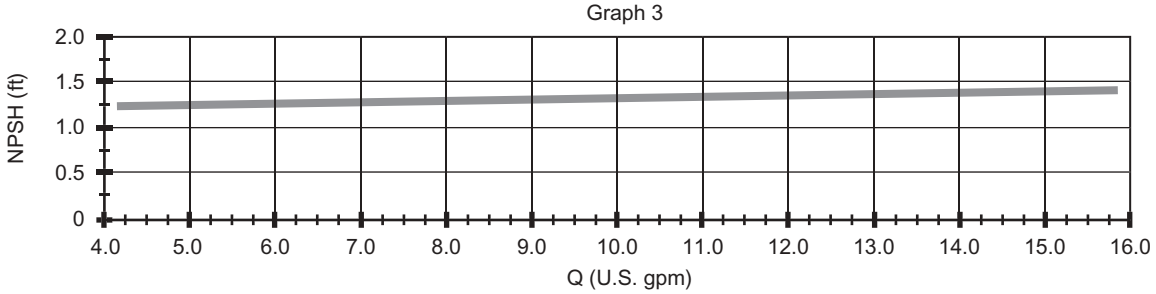
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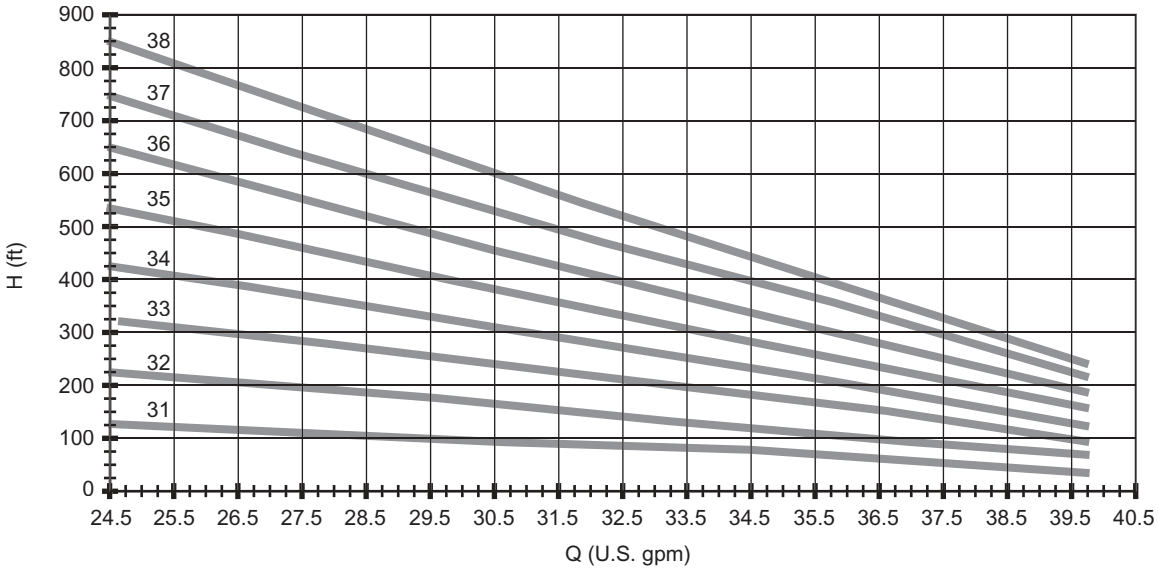


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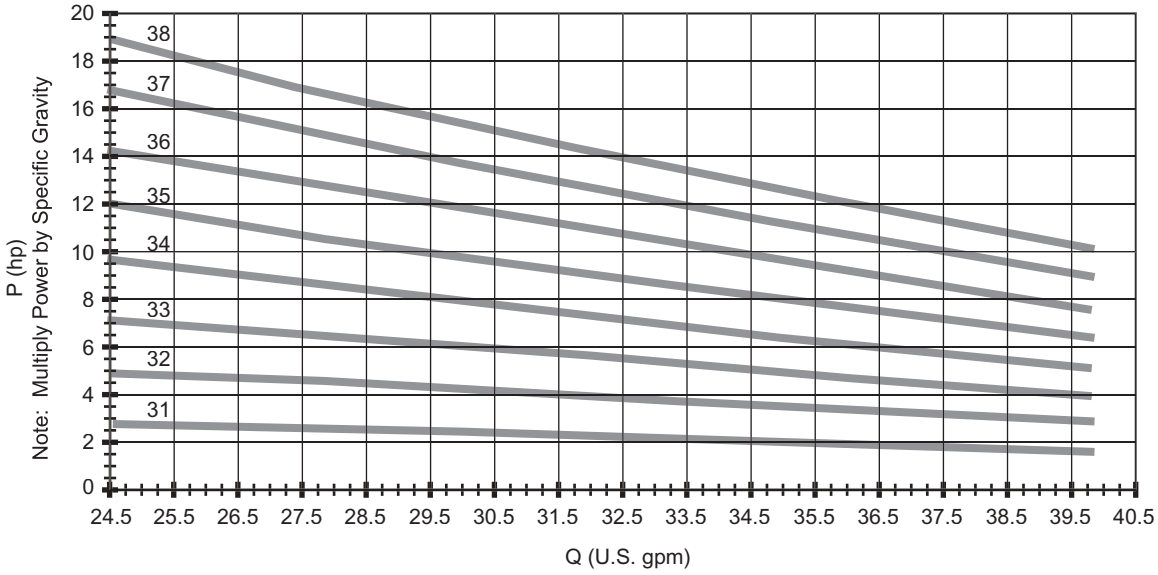


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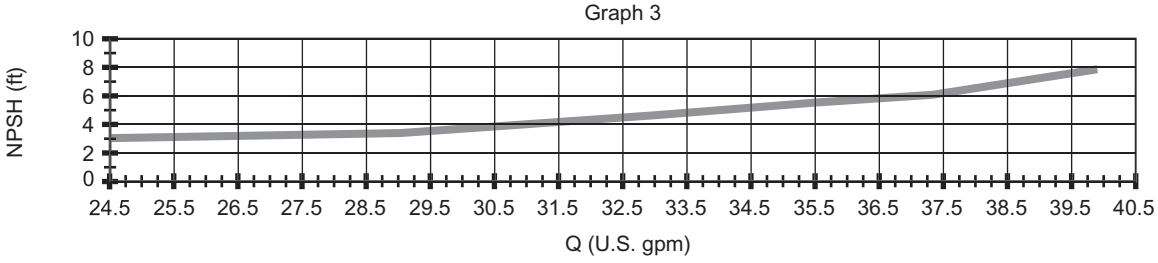
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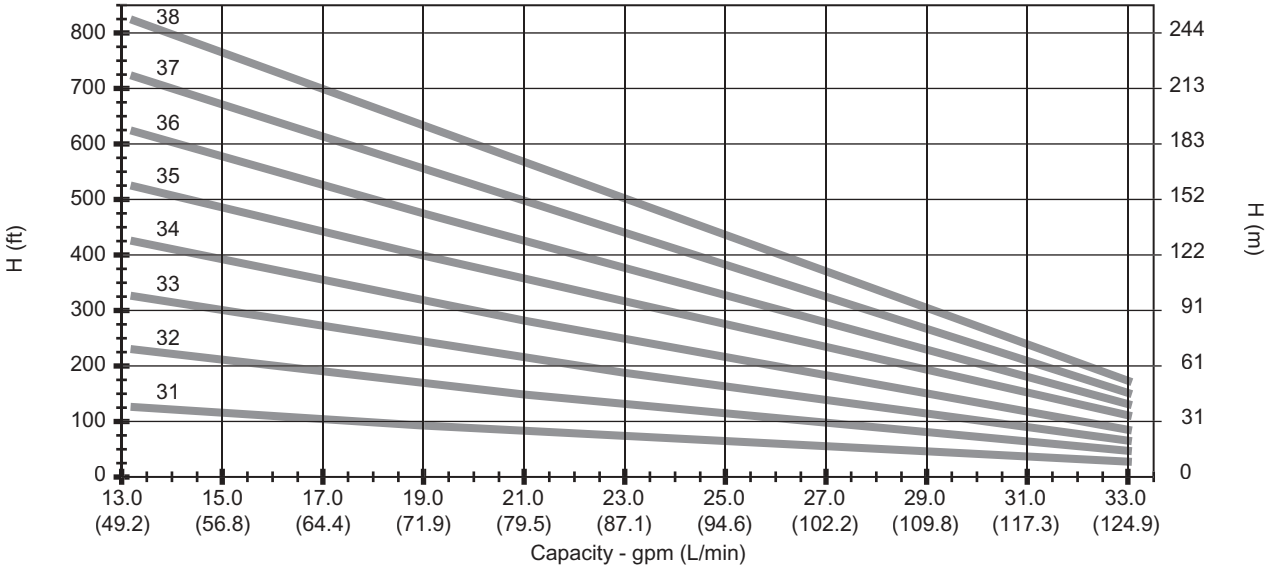


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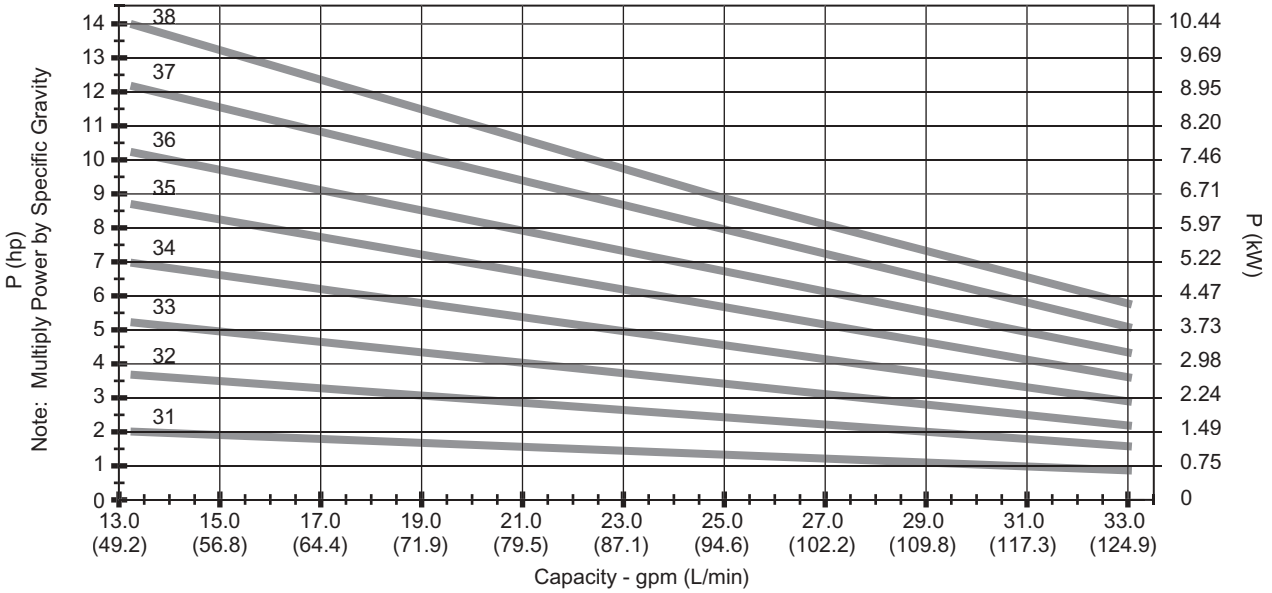


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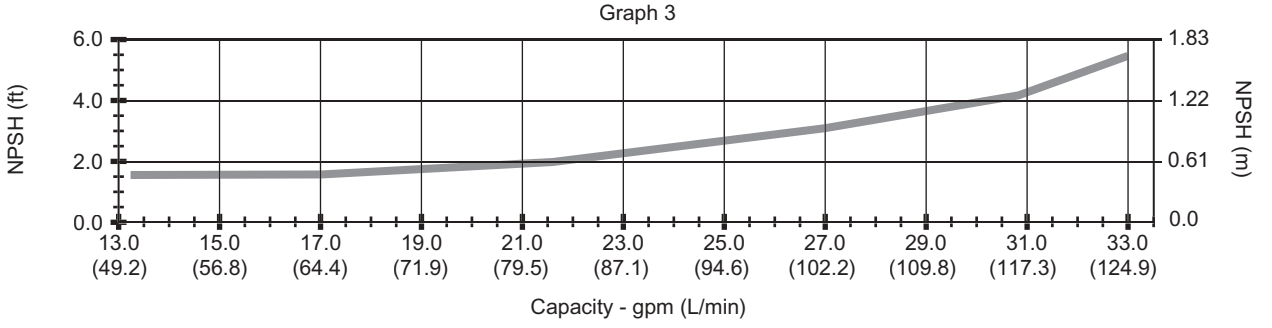
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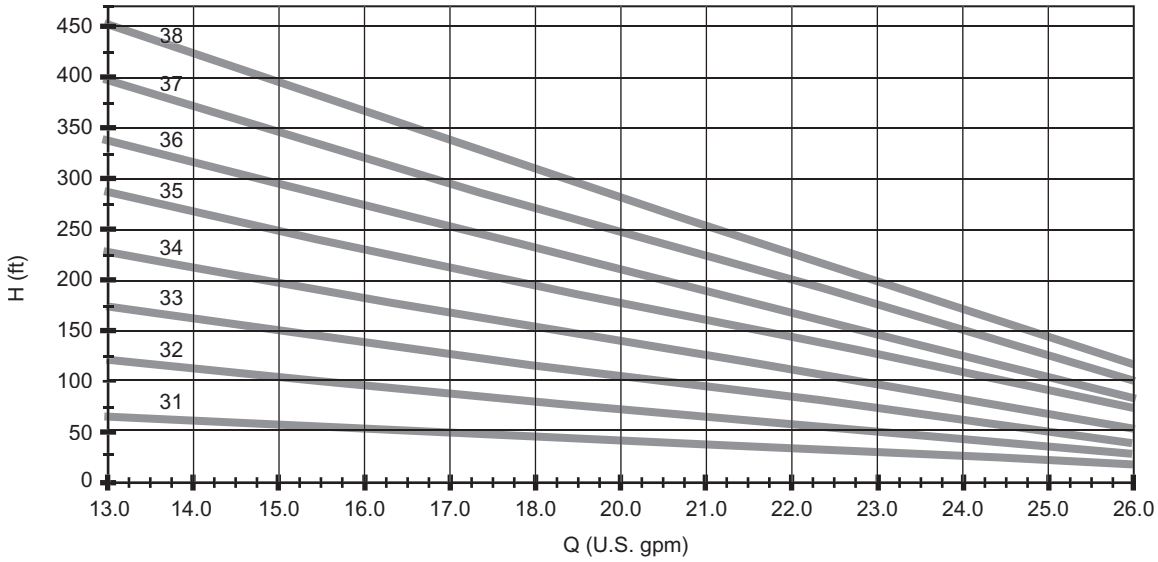


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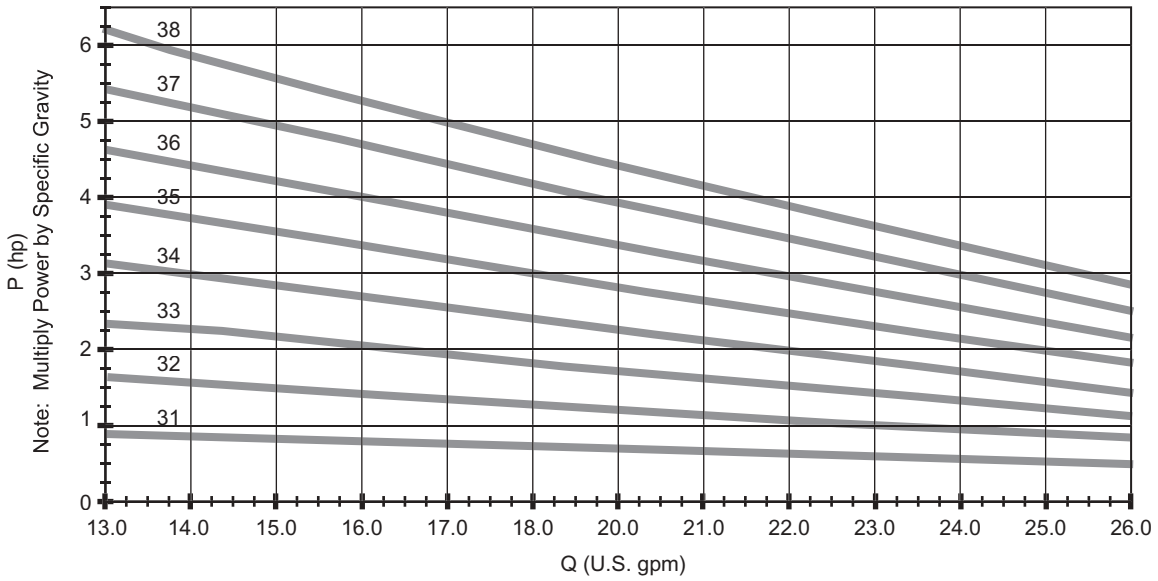


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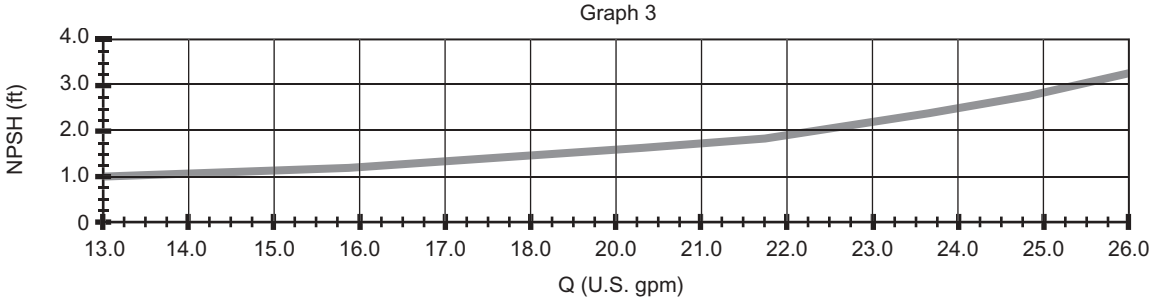
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Graph 2

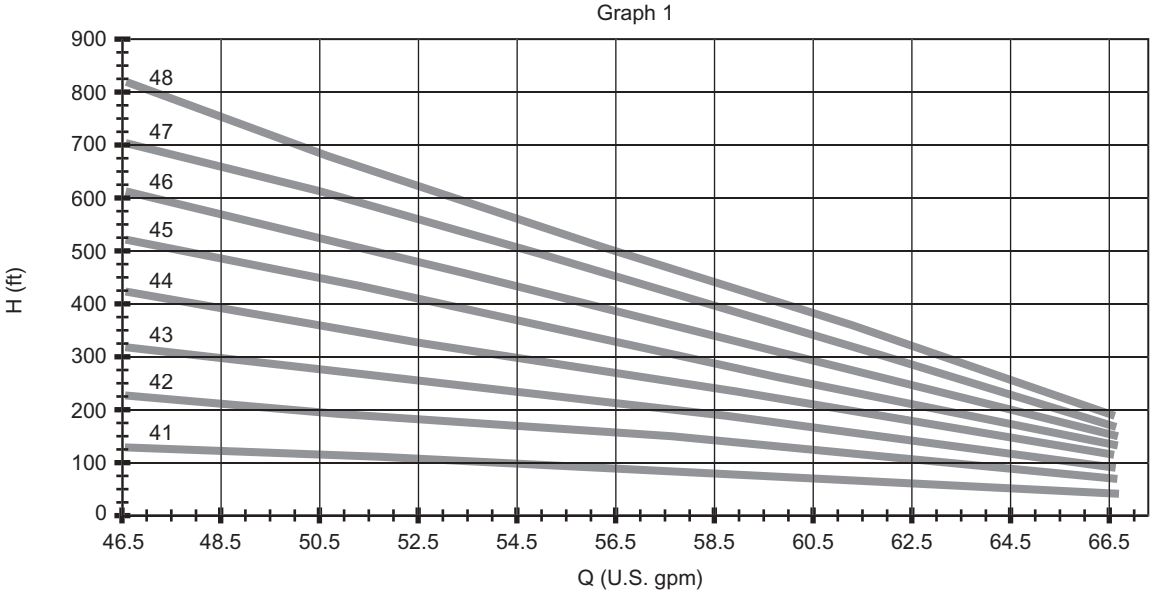


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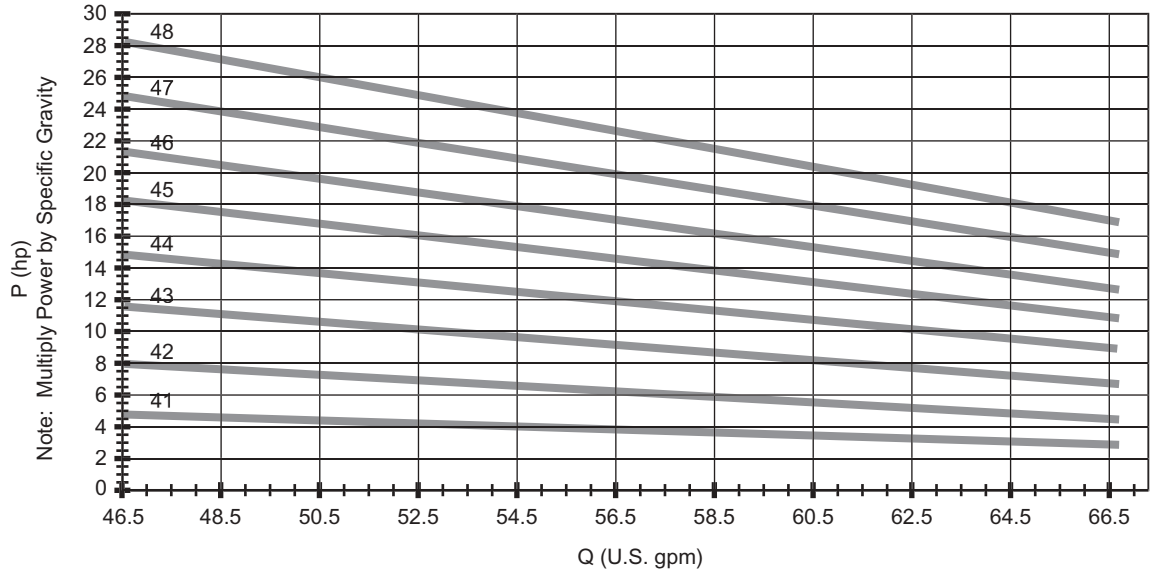


1750 RPM

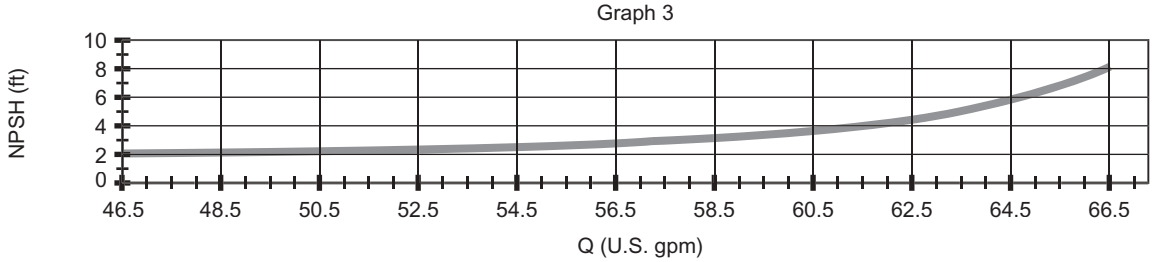
Graph 1



Graph 2

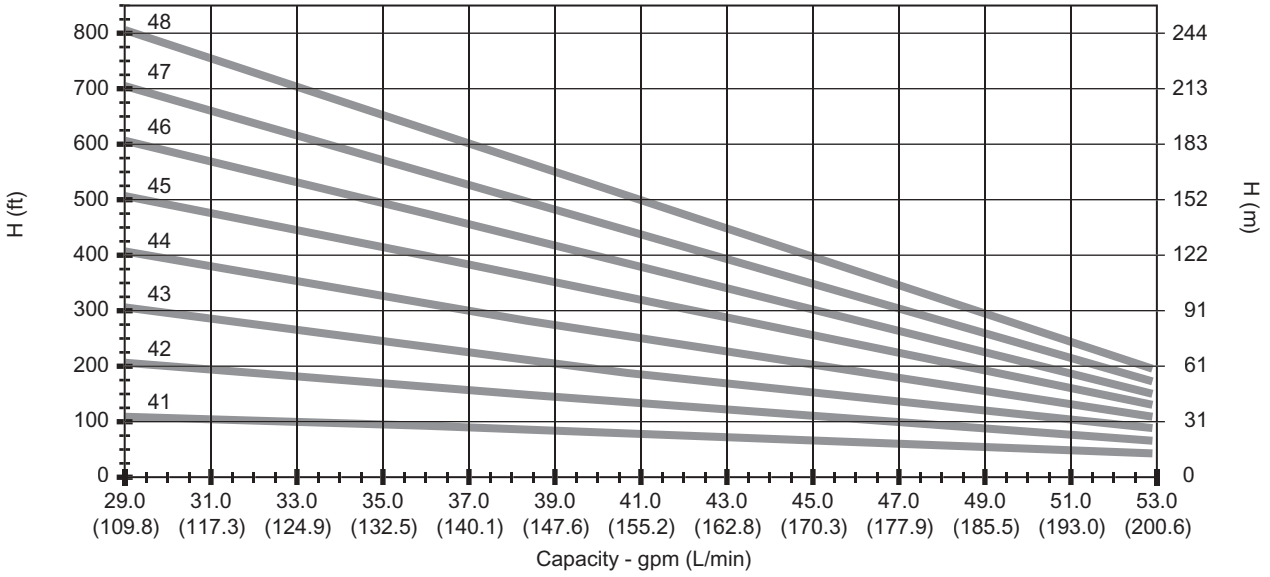


Graph 3

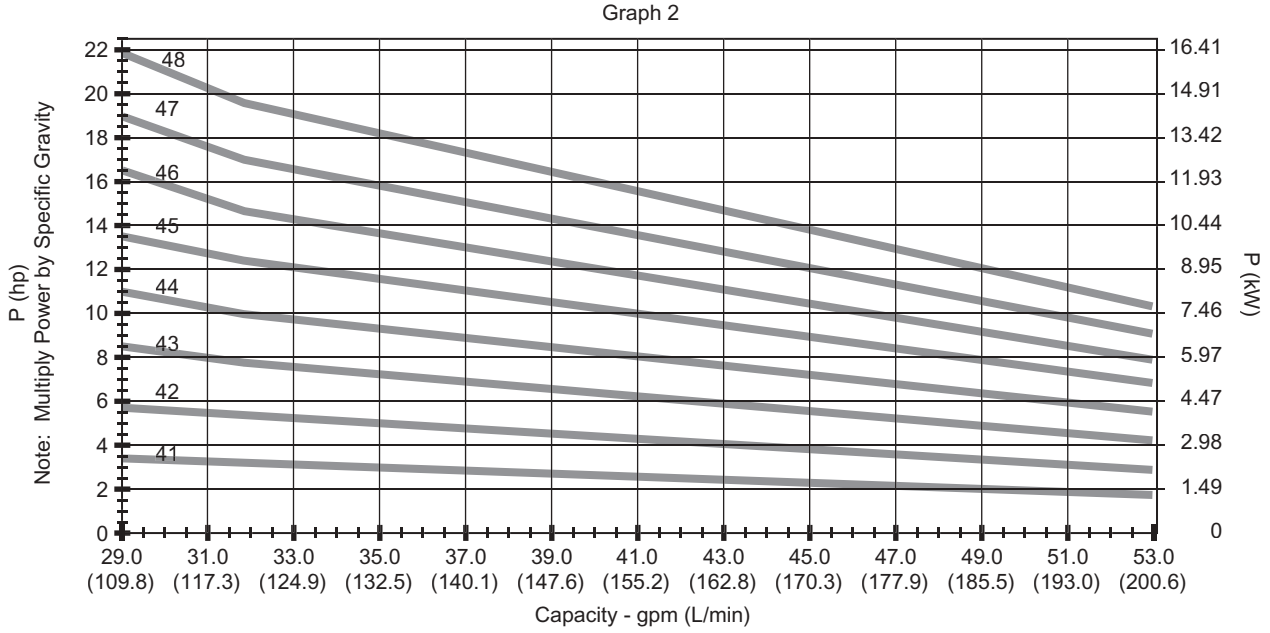


1450 RPM

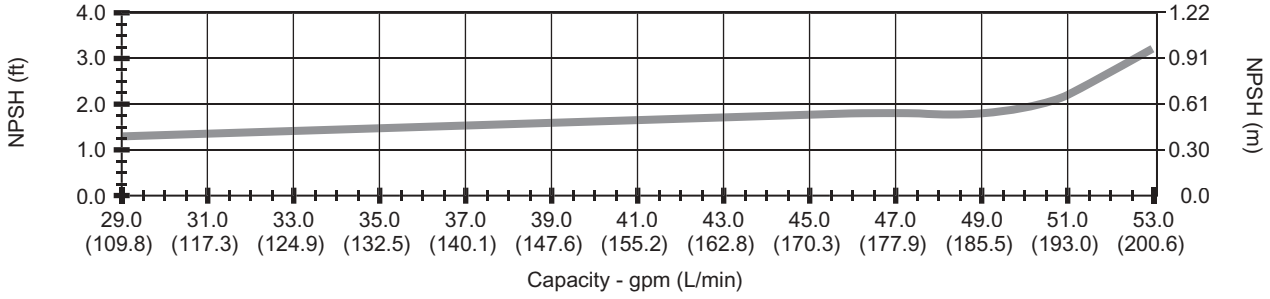
Graph 1



Graph 2

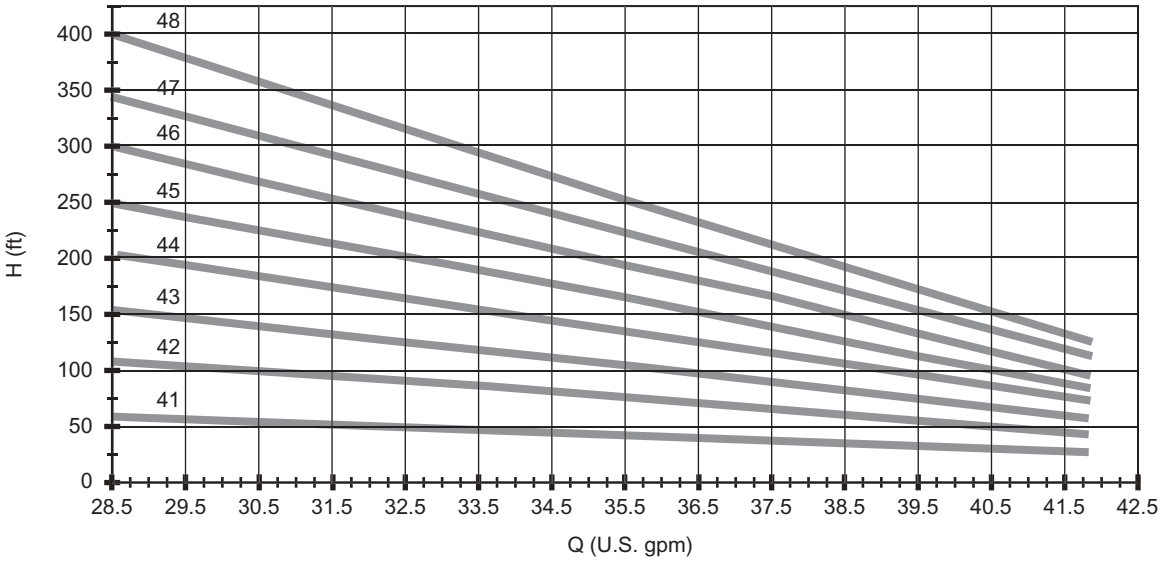


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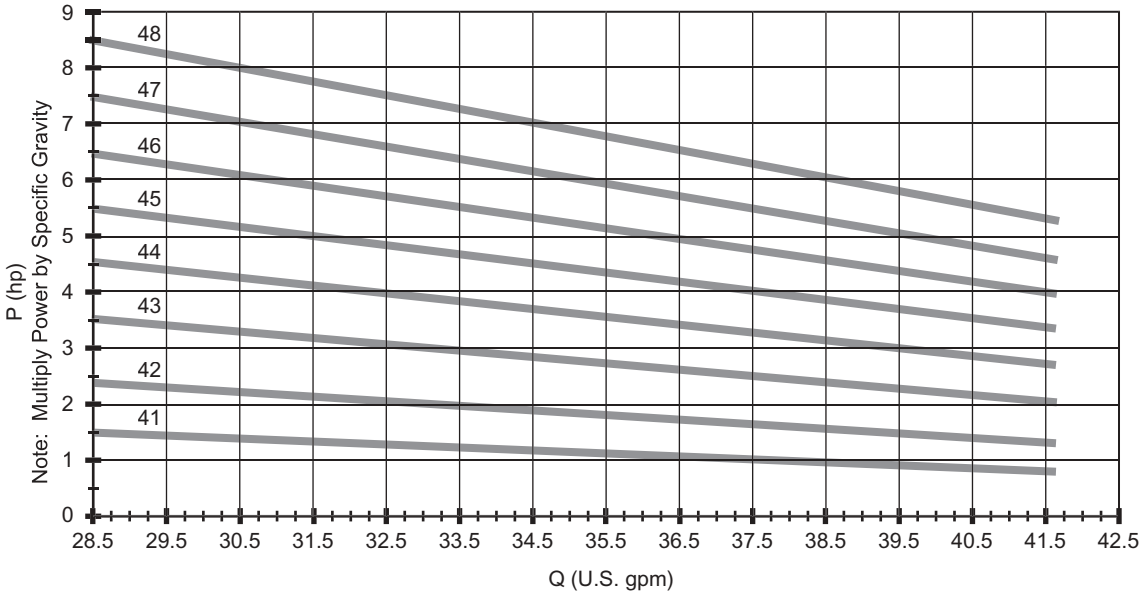


1150 RPM

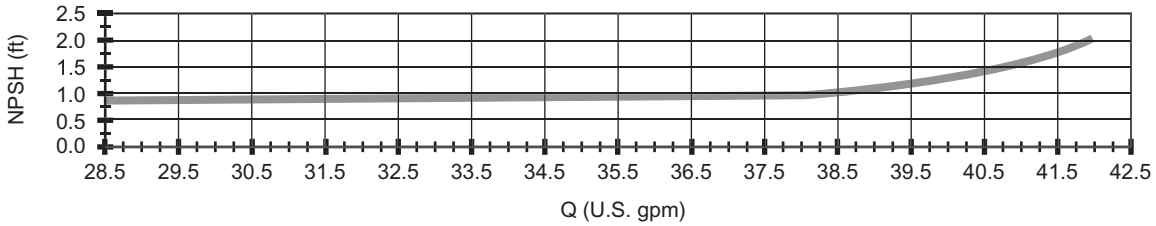
Graph 1



Graph 2

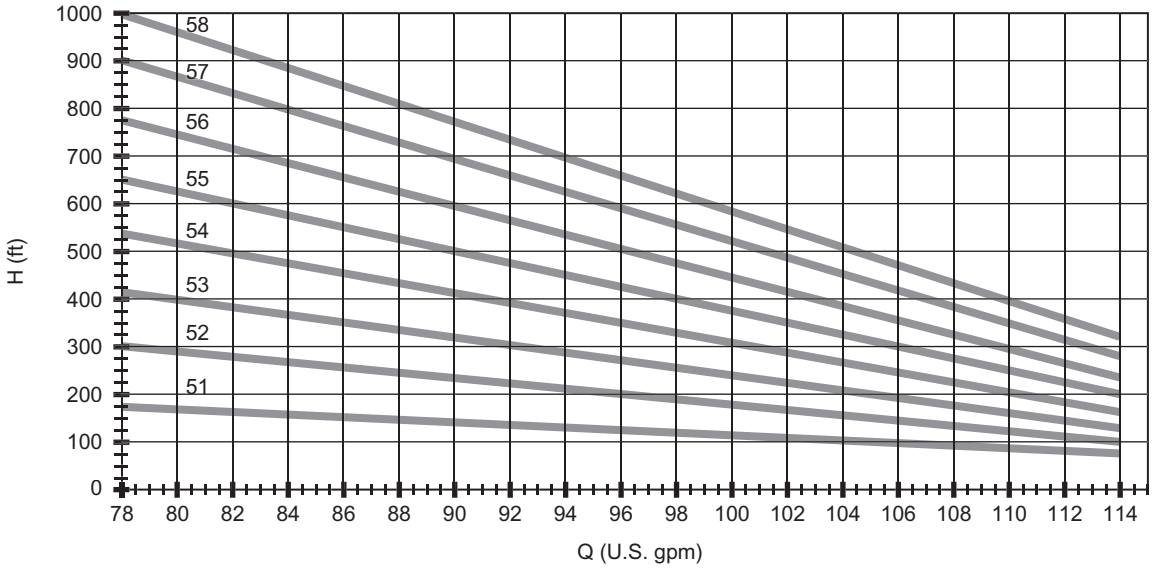


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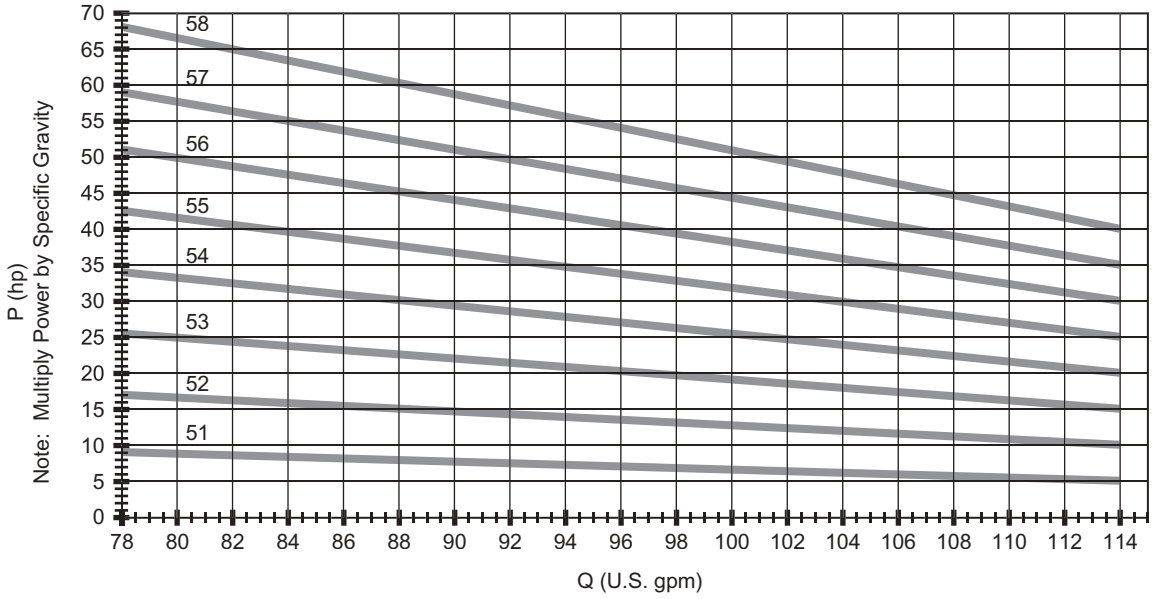


1750 RPM

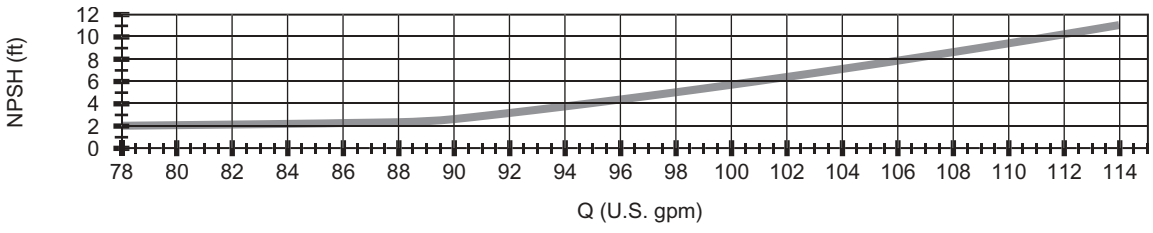
Graph 1



Graph 2

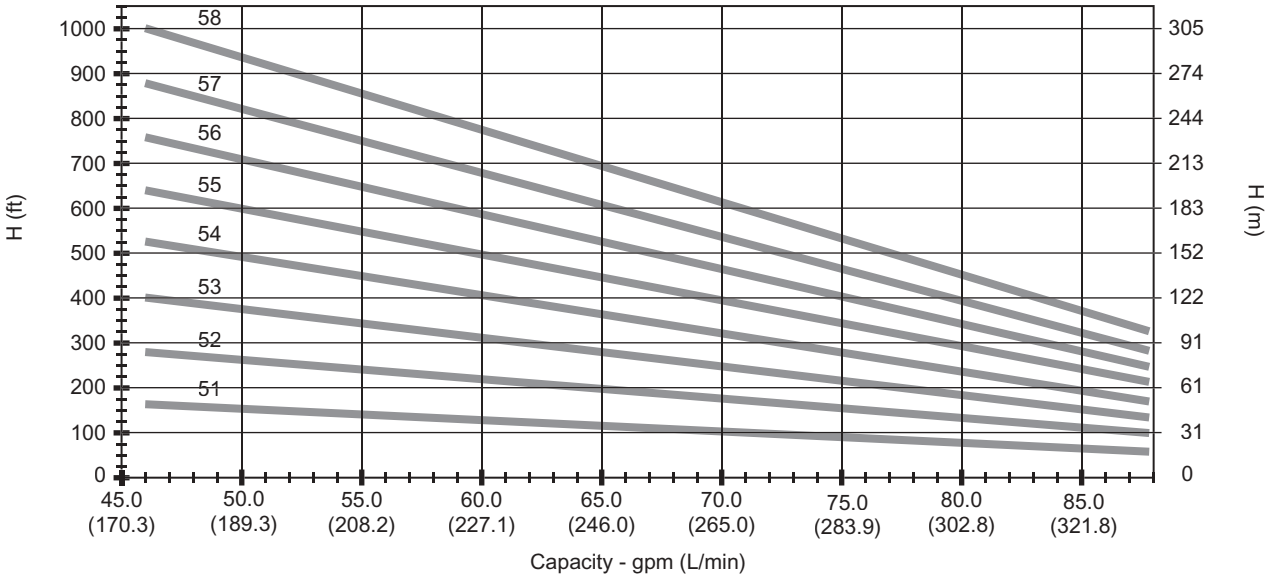


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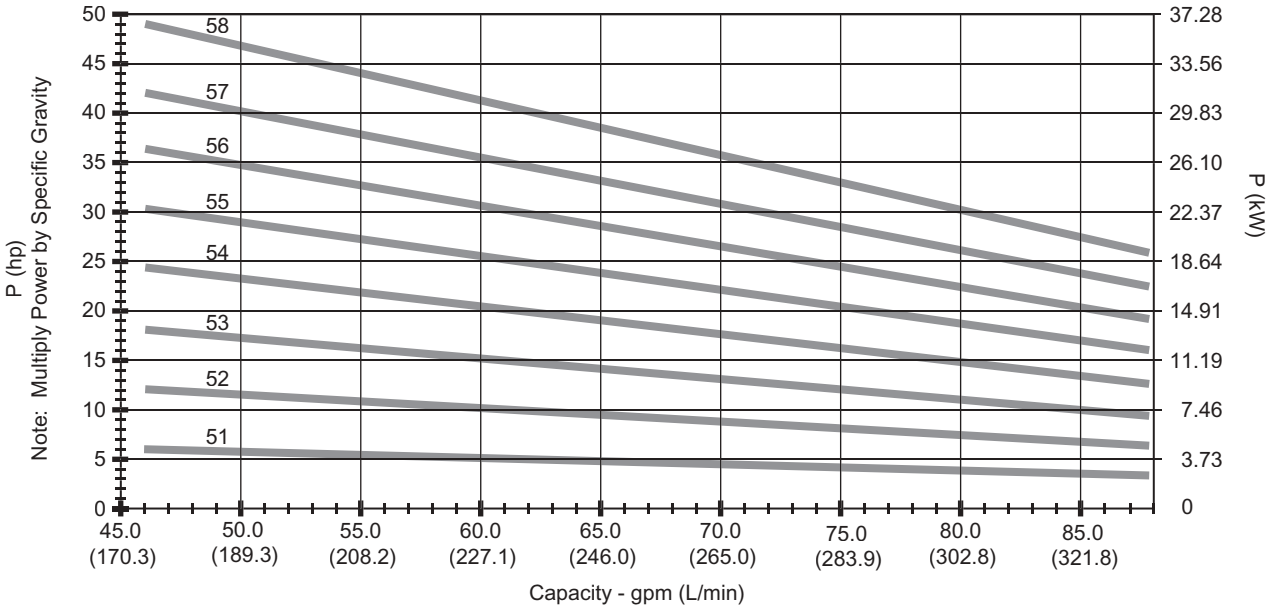


1450 RPM

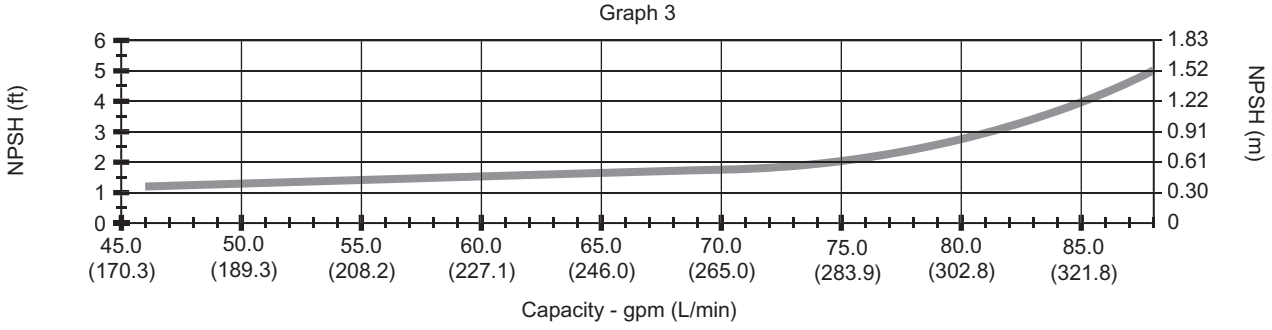
Graph 1



Graph 2

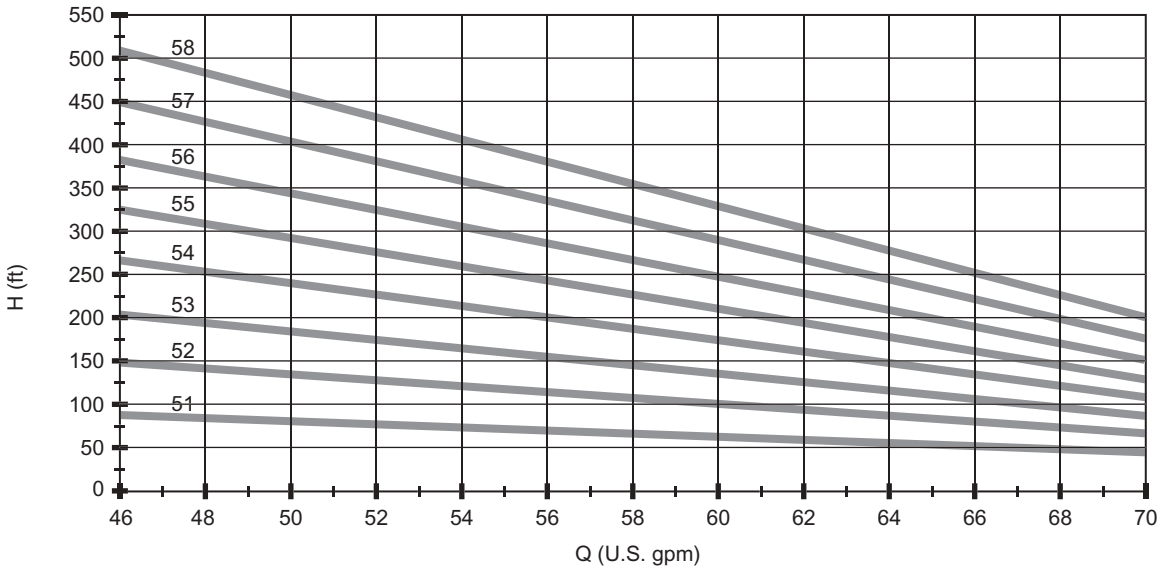


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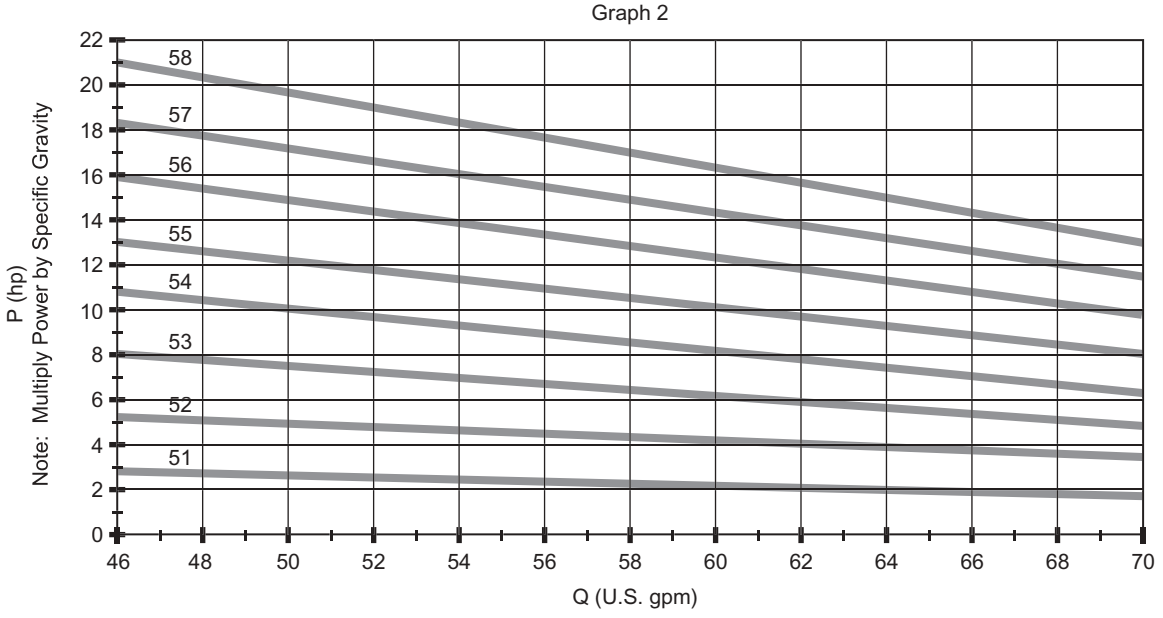


1150 RPM

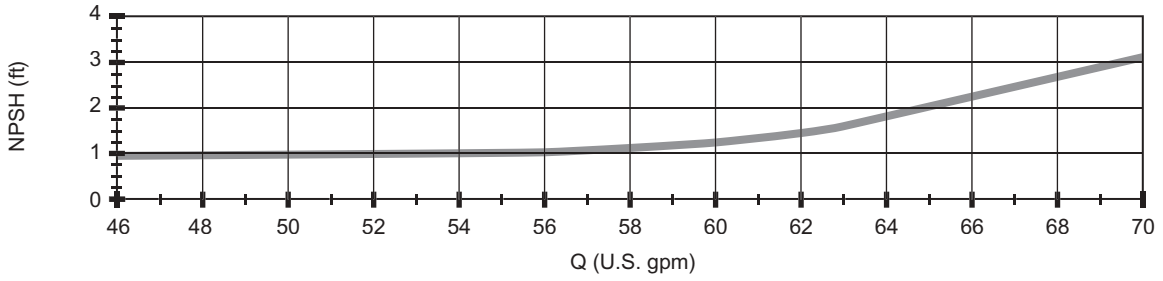
Graph 1



Graph 2

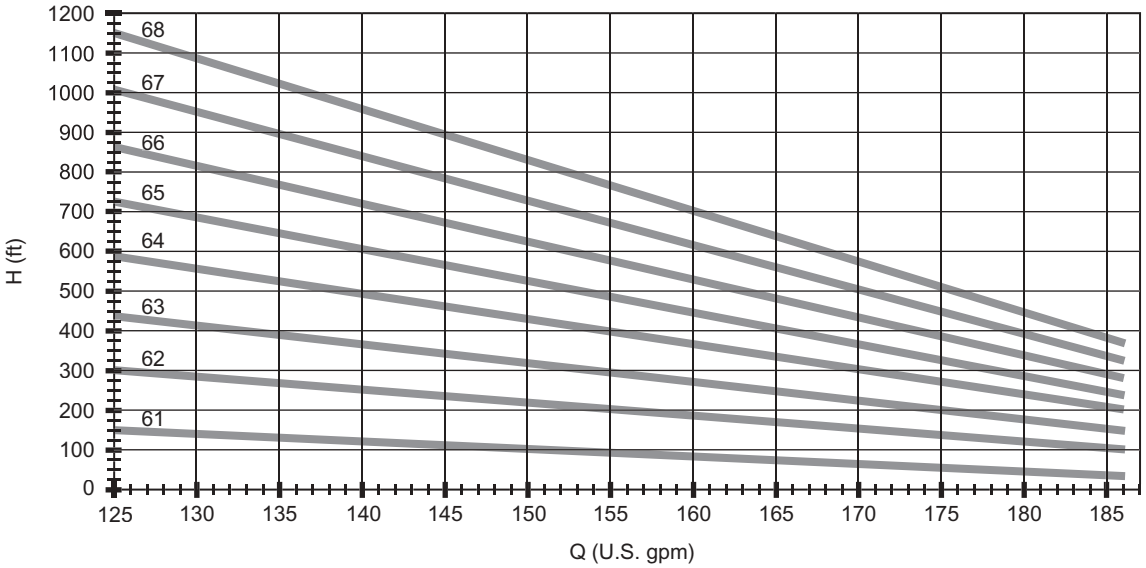


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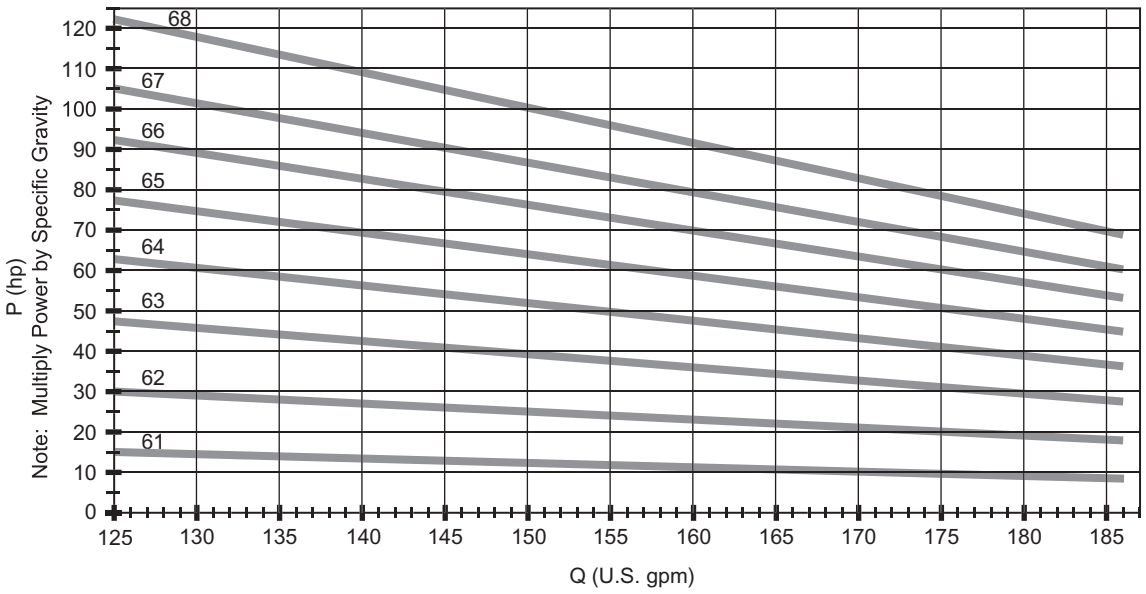


1750 RPM

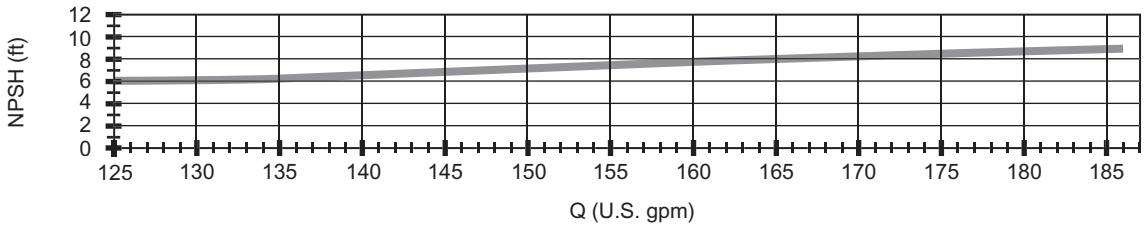
Graph 1



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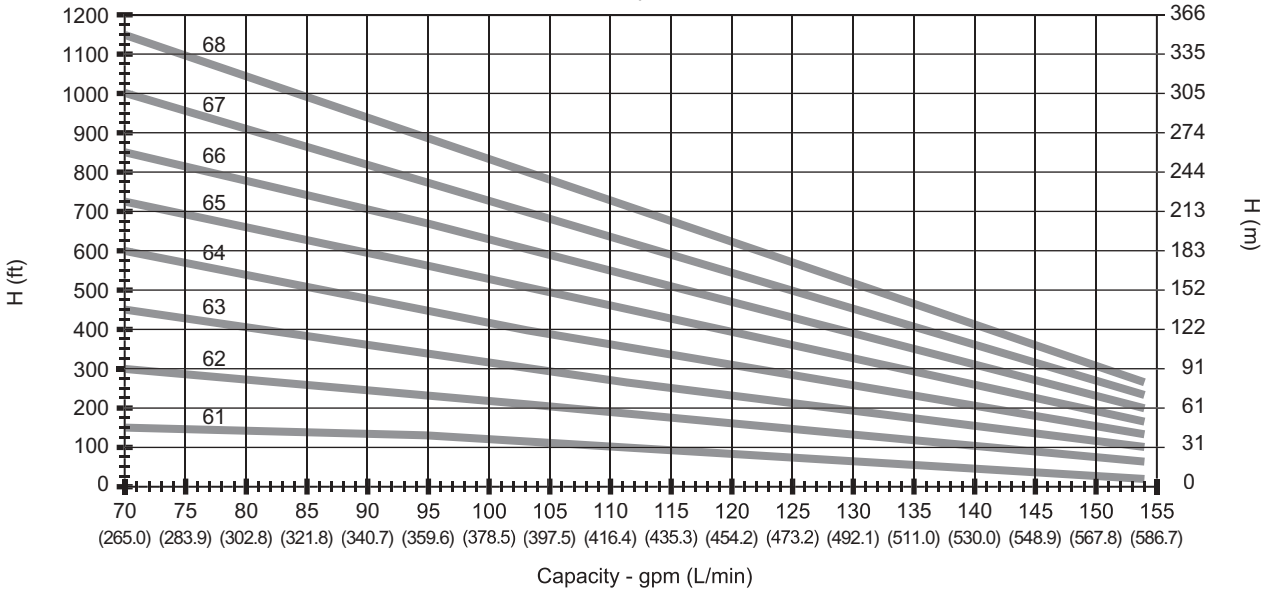


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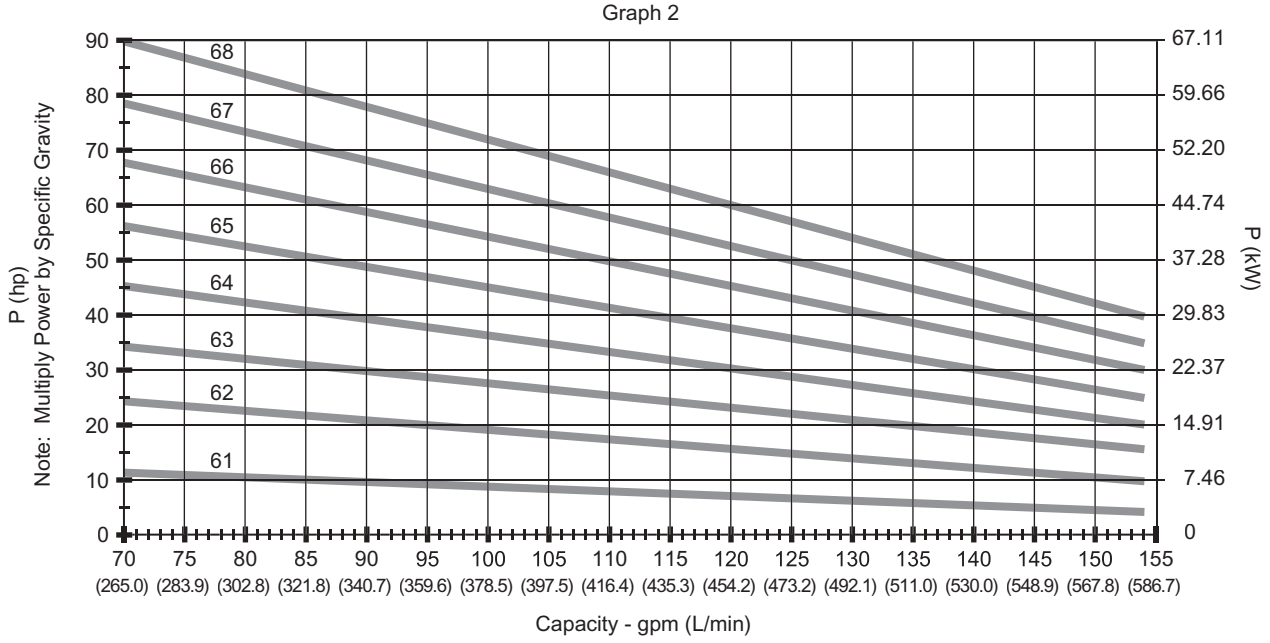


1450 RPM

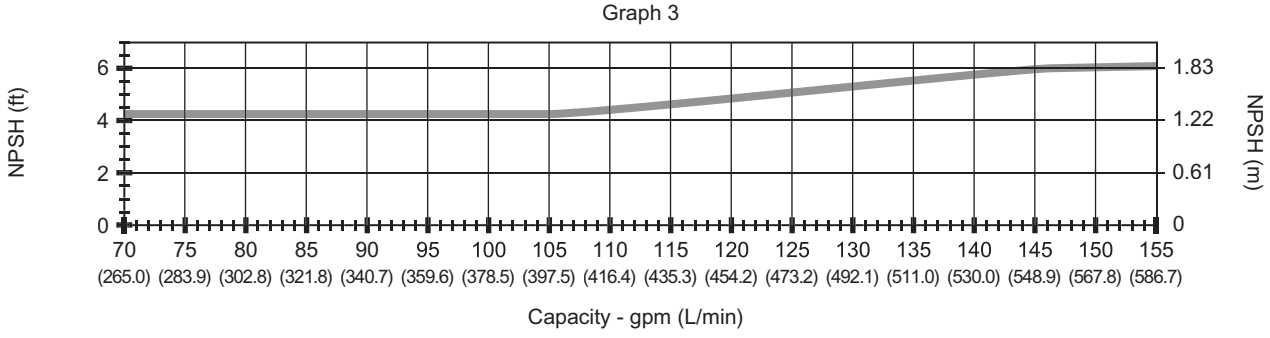
Graph 1



Graph 2

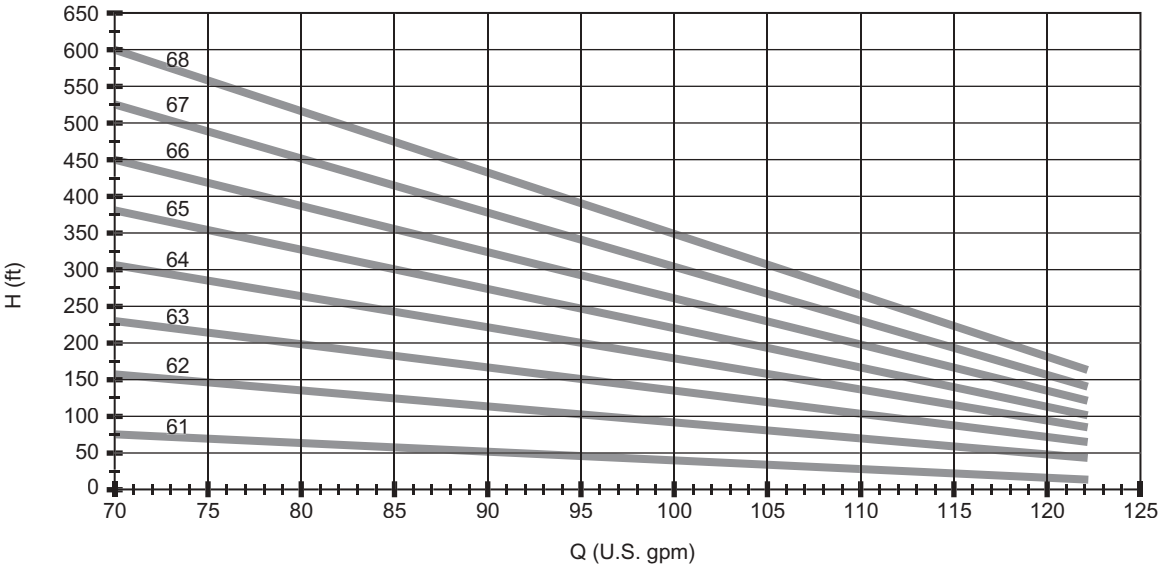


Graph 3

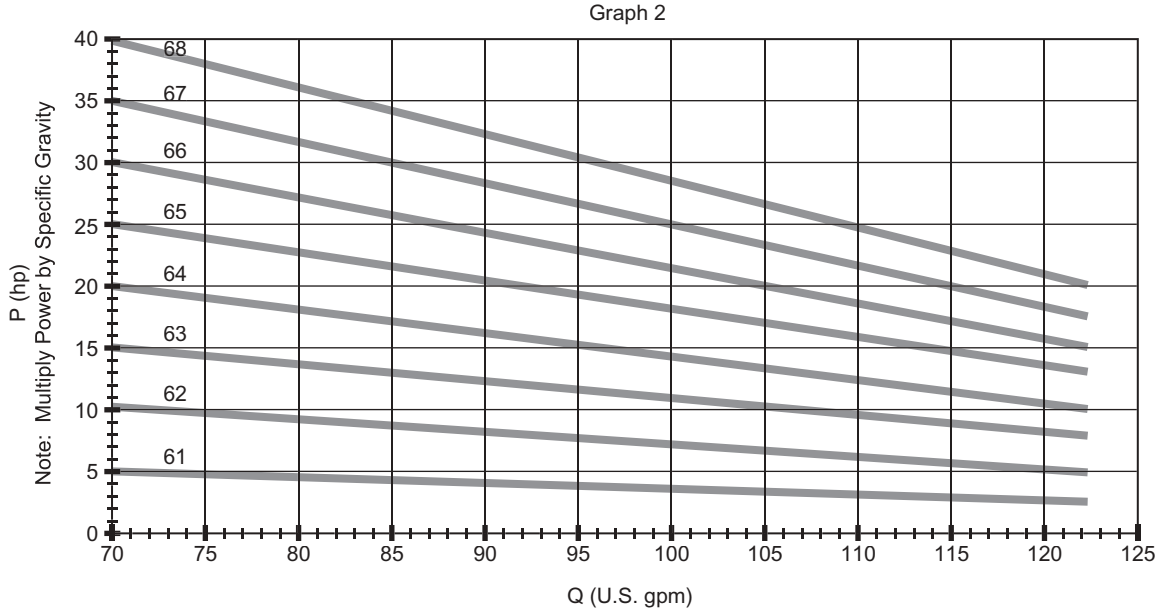


1150 RPM

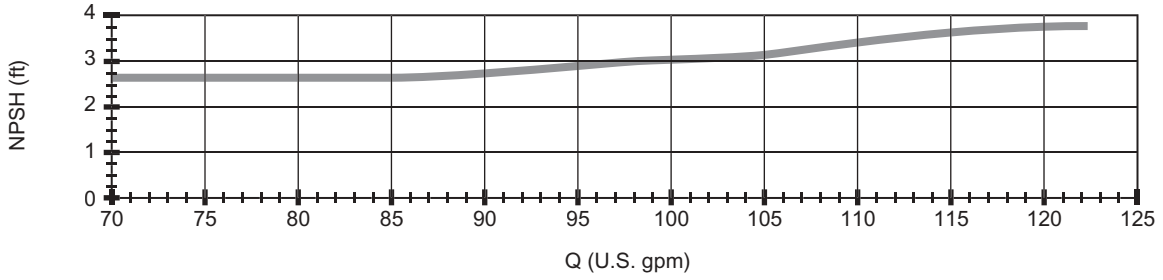
Graph 1



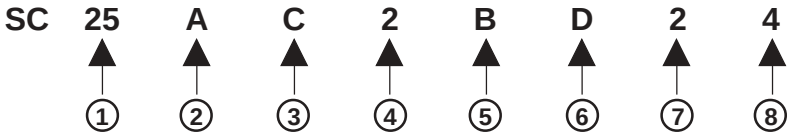
Graph 2



Graph 3



Model Number & Materials Selection Guide for Mechanically Sealed Model



① **Basic Model** (first number indicates series while second number indicates number of stages)

② **Flange and Ports**

A–300 lb ANSI compatible flanges/NPT tapped gauge and drain ports (available for all models except 10 series)

D–DIN flanges/straight thread gauge ports

W–DIN flange with weld neck compatible flanges included with the pump/NPT tapped gauge and drain ports (available for 10 series only)

③ **Sleeve Bearing Material**

B–Bronze (available for all models except 60 series) (only available in pumps with bronze impellers)

C–Carbon (all models)

④ **Temperature Option**

2–Standard for temperatures below 250°F (120°C).

3–Option for temperatures between 250°F (120°C) and 430°F (220°C). Also can be used as heating option for low temperature applications.

Note: This option requires cooling water be supplied to pump.

⑤ **Seal Type**

A–Single Unbalanced (discharge pressure from pump must be less than 230 psig, 16 bar)

B–Single Balanced (good for pressures exceeding 230 psig, 16 bar)

C–Double Unbalanced (discharge pressure from pump must be less than 230 psig, 16 bar)

D–Double Balanced (good for pressures exceeding 230 psig, 16 bar)

E–Quench Unbalanced (discharge pressure from pump must be less than 230 psig ,16 bar)

G–Quench Balanced (good for pressures exceeding 230 psig, 16 bar)

⑥ **O-ring Material**

B–Neoprene®[1]

D–Viton®[1]

E–Teflon®[1]

G–Ethylene Propylene

⑦ **Seal Face / Seal Seat**

1–Carbon Graphite/Aluminum Oxide (standard for unbalanced single seals and all double seals)

2–Aluminum Oxide/Carbon Graphite (standard for single balanced seals)

3–Silicon Carbide/Carbon Graphite (standard for high temperature option)

4–Silicon Carbide/Silicon Carbide

1L–Silicon Carbide/Carbon Graphite (unbalanced single seal—LPG only) (pressures below 230 psig, 16 bar)

2L–Carbon Graphite/Silicon Carbide (balanced single seal—LPG only) (pressures below 580 psig, 40 bar)

3L–Carbon Graphite/Silicon Carbide (balanced single seal—LPG only) (pressures below 360 psig, 24.8 bar)

⑧ **Material for Case/Impeller**

1–Ductile Iron/Bronze

2–Ductile Iron/Steel

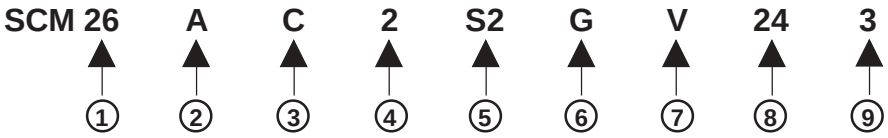
3–Stainless Steel/Stainless Steel

4–Cast Iron/Bronze

5–Cast Iron/Steel

[1]Neoprene®, Viton®, and Teflon® are registered trademarks of the Dupont Company.

Model Number & Materials Selection Guide for Magnetic Drive Model



① **Basic Model** (first number indicates series while the second number indicates number of stages)

② **Flange and Ports**

A–300 lb ANSI compatible flanges/NPT tapped gauge and drain ports (available for all models except10 series)

D–DIN flanges/straight thread gauge ports

W–DIN flange with weld neck compatible flanges included with the pump/NPT tapped gauge and drain ports (available for 10 series only)

③ **Sleeve Bearing Material**

B–Bronze (only available in pumps with bronze impellers)

C–Carbon (all models)

④ **Temperature Option**

2–Standard for temperatures below 250°F (120°C).

3–Option for temperatures between 250°F (120°C) and 390°F (200°C). Also can be used as heating option for low temperature applications.

⑤ **Bearing Material (magnetic coupling)**

S2–Silicon Carbide (pressureless sintered)

⑥ **Ball Bearing Lubrication**

O–Oil

G–Grease (standard)

⑦ **Separation Canister Material**

V–Stainless Steel

H–Hastelloy

⑧ **Magnetic Coupling Size**

12–1.1 hp (10–30 Series)

14–2.6 hp (10–30 Series)

16–3.8 hp (10–30 Series)

22–2.6 hp (20–50 Series)

24–7.6 hp (20–50 Series)

26–11.3 hp (20–50 Series)

36–16.8 hp (40–50 Series)

38–28.5 hp (40–50 Series)

⑨ **Material for Case/Impeller**

1–Ductile Iron/Bronze

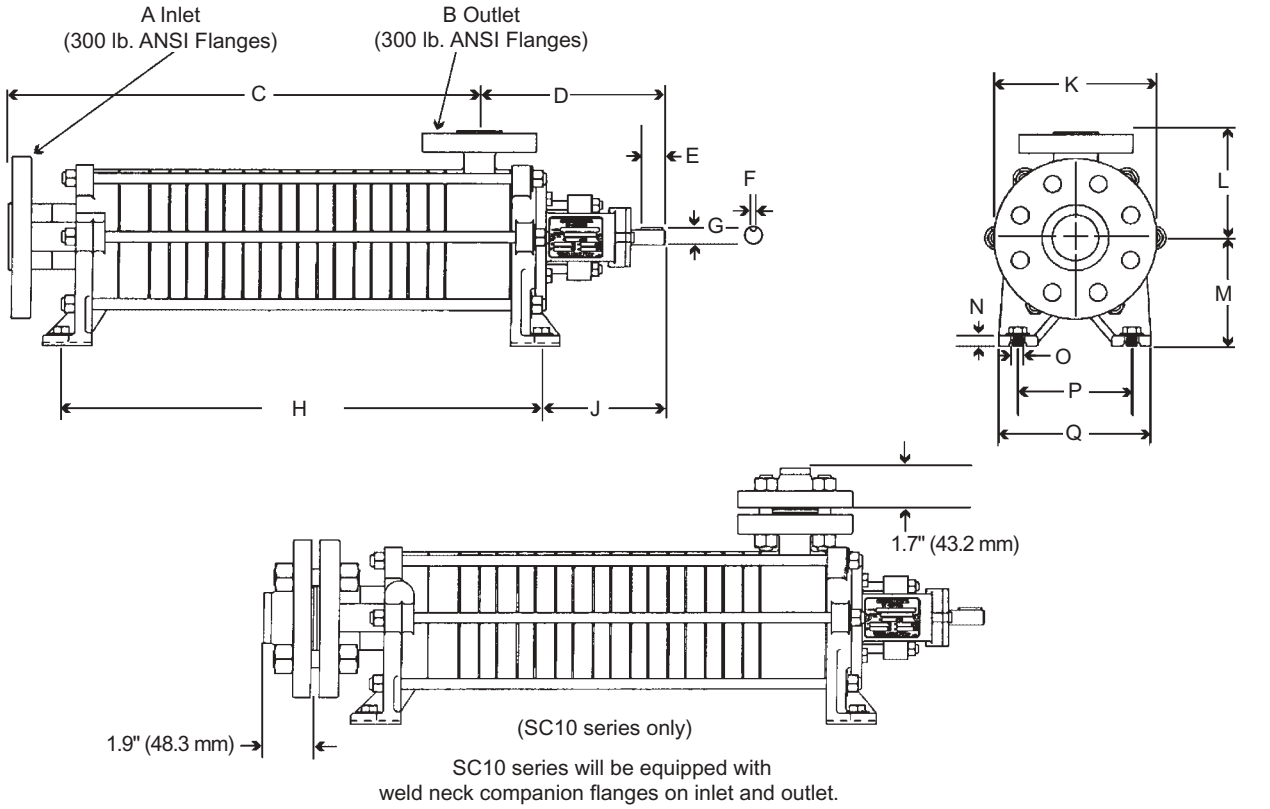
2–Ductile Iron/Steel

3–Stainless Steel/Stainless Steel

4–Cast Iron/Bronze

5–Cast Iron/Steel

SC-Model—Outline Dimensions



SC10 series will be equipped with
weld neck companion flanges on inlet and outlet.

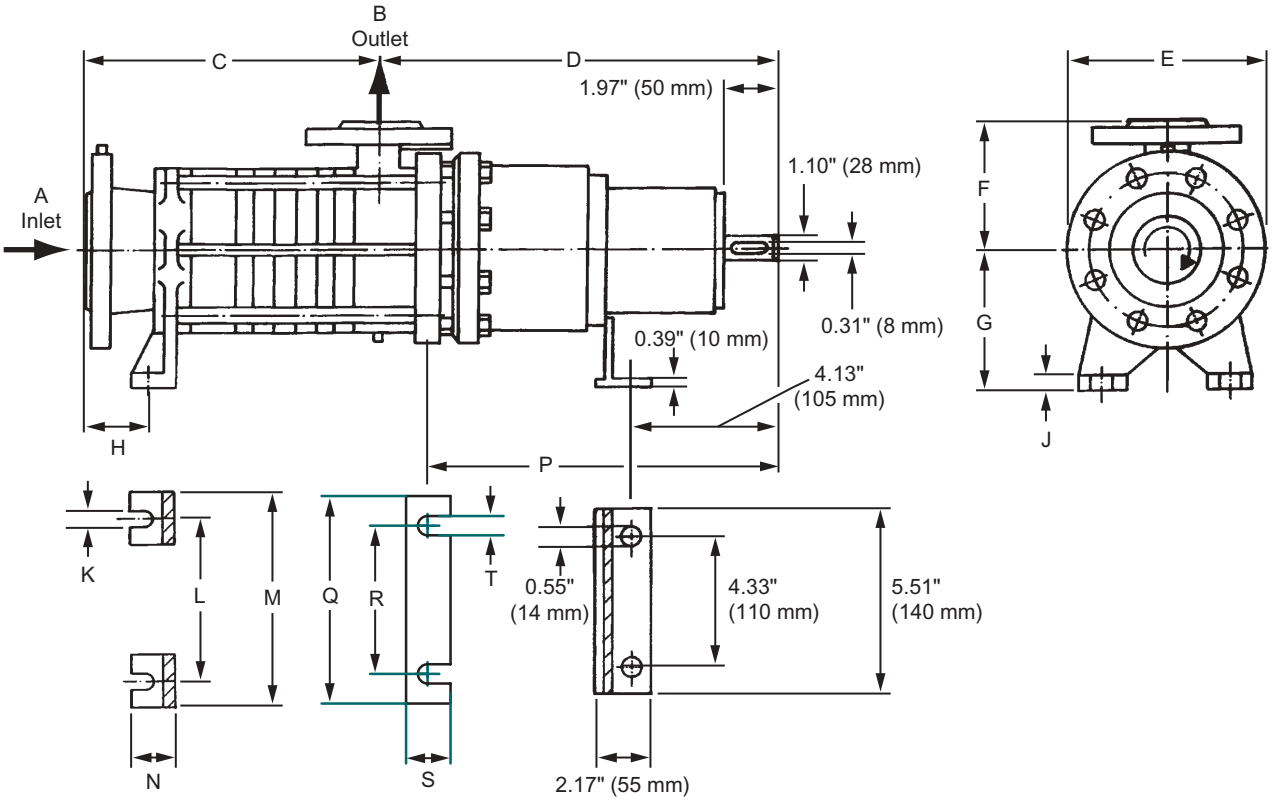
Series	Inlet A*	Outlet B*	D	E	F	G	J	K	L	M	N	O	P	Q
SC10	1-1/2	3/4	6.73	**	**	**	4.45	5.91	3.94	3.94	0.39	0.51	4.13	5.51
	40	20	171	25	5	14	113	150	100	100	10	13	105	140
SC20 and 30	2-1/2	1-1/4	7.91	**	**	**	5.28	7.28	5.20	4.41	0.51	0.55	5.31	6.69
	65	32	210	40	6	19	134	185	132	112	13	14	135	170
SC40	3	1-1/2	7.68	**	**	**	5.59	7.87	5.51	5.20	0.59	0.59	6.10	7.68
	80	40	195	45	8	24	142	200	140	132	15	15	155	195
SC50	4	2	9.33	**	**	**	6.26	9.25	6.50	6.30	0.71	0.59	6.69	8.46
	100	50	237	50	10	28	159	235	165	160	18	15	170	215
SC60	4	2-1/2	10.31	**	**	**	6.77	9.25	7.09	7.09	0.79	0.59	7.68	9.65
	100	65	262	65	10	32	172	235	180	180	20	15	195	245

** Inlet and outlet flanges are per DIN spec (PN40 DIN 2501). Flanges can be drilled per ANSI for 300 lb. flanges, except for SC10 series.*
***These dimensions are available in metric only. U.S. couplings must be machined before use.*

	1 Stage		2 Stage		3 Stage		4 Stage		5 Stage		6 Stage		7 Stage		8 Stage	
Series	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H
SC10	7.68	8.03	9.02	9.37	10.35	14.65	11.69	12.05	13.03	13.39	14.37	14.72	15.71	16.06	17.05	17.40
	195	204	229	238	263	372	297	306	331	340	365	374	399	408	433	442
SC20 and 30	8.39	8.94	9.96	10.51	11.54	12.09	13.11	13.66	14.69	15.24	16.26	16.81	17.83	18.39	19.41	19.96
	213	227	253	267	293	307	333	347	373	387	413	427	453	467	493	507
SC40	10.55	10.20	12.72	12.36	14.88	14.53	17.05	16.69	19.21	18.86	21.38	21.02	23.54	23.19	26.89	25.35
	268	259	323	314	378	369	433	424	488	479	543	534	598	589	653	644
SC50	12.01	12.32	14.96	15.28	17.91	18.23	20.87	21.18	23.82	24.13	26.77	27.09	29.72	30.04	32.68	32.99
	305	313	380	388	455	463	530	538	605	613	680	688	755	763	830	838
SC60	13.31	13.90	16.85	17.44	20.39	20.98	23.94	24.53	27.48	28.07	31.02	31.61	34.57	35.16	38.11	38.70
	338	353	428	443	518	533	608	623	698	713	788	803	878	893	968	983

Dimensions shown in grey area are millimeters while non-shaded areas are inches.

SCM-Model—Outline Dimensions



NOTE:

1) SCM10 series will be equipped with weld neck companion flanges on inlet and outlet.

2) For pumps containing four to eight stages, a middle foot is required. For dimensions see the chart on page 31.

Series	Inlet A[1]	Inlet B[1]	D[2]	E	F	G	H	J	K	L	M	N	P[2]
SCM10	1.5	0.75	14.33	5.91	3.94	3.94	1.93	0.39	0.51	4.13	5.51	1.73	11.54
SCM20 and 30	2.5	1.25	13.97 / 14.76	7.28	5.20	4.41	2.09	0.51	0.55	5.31	6.69	1.89	11.85 / 12.64
SCM40	3	15	14.09 / 15.16	7.87	5.51	5.20	2.48	0.59	0.59	6.10	7.68	2.17	11.10 / 12.17
SCM50	4	2	14.56 / 15.35	9.25	6.50	6.30	2.83	0.63	0.59	6.89	8.66	2.13	11.54 / 12.44

[1]Inlet and outlet flanges are per DIN spec (PN40 DIN 2501). Flanges can be drilled per ANSI for 300 lb flanges, except for SC10 series.
[2]Depends on the magnetic coupling selected.

Series	C Number of stages							
	1	2	3	4	5	6	7	8
SCM10	7.68	9.02	10.35	11.69	13.03	14.37	15.71	17.05
	195	229	263	297	331	365	399	433
SCM20 & 30	8.39	9.96	11.54	13.11	14.69	16.26	17.83	19.41
	213	253	293	333	373	413	453	493
SCM40	10.55	12.72	14.88	17.05	19.21	21.38	23.54	25.71
	268	323	378	433	488	543	598	653
SCM50	12.01	14.96	17.91	20.87	23.82	26.77	29.72	32.68
	305	380	455	530	605	680	755	830

Dimensions shown in grey area are millimeters while non-shaded areas are inches.

SCM-Model—Outline Dimensions (continued)

Dimensions for Extra Foot on SCM Series Pumps (for stages 4-8 only)					
Pumps	SCM10	SCM20	SCM30	SCM40	SCM50
Coupling sizes / Dimension	12,14,16	12,14,16 22,24,26	12,14,16 22,24,26	22,24,26 36,38	22,24,26 36,38
Q	6.69	7.87	7.87	7.87	7.87
	170	200	200	200	200
R	5.51	6.69	6.69	6.69	6.69
	140	170	170	170	170
S	1.81	0.79	0.79	1.81	1.81
	30	20	20	30	30
T	0.51	0.51	0.51	0.59	0.59
	13	13	13	15	15

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