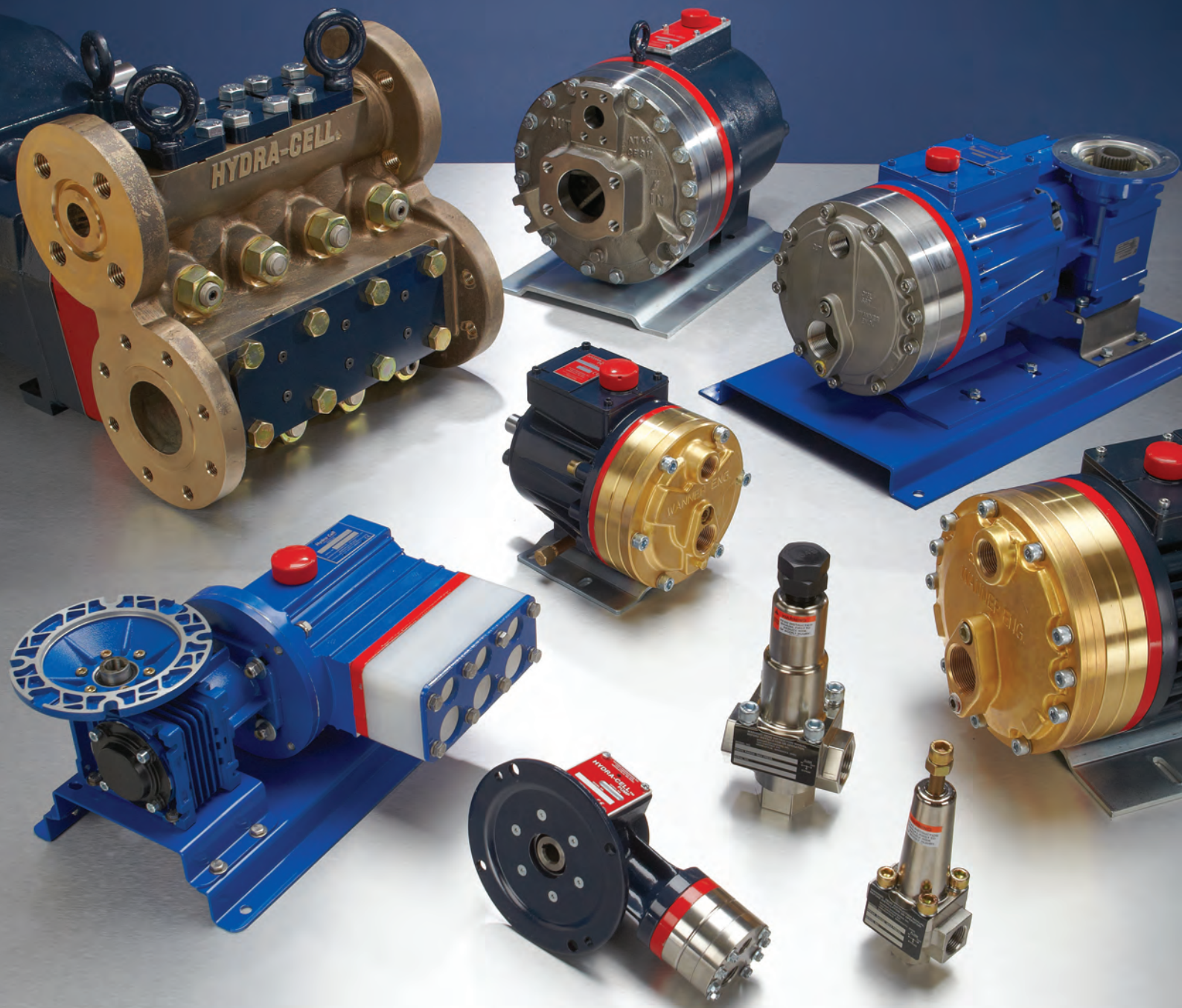


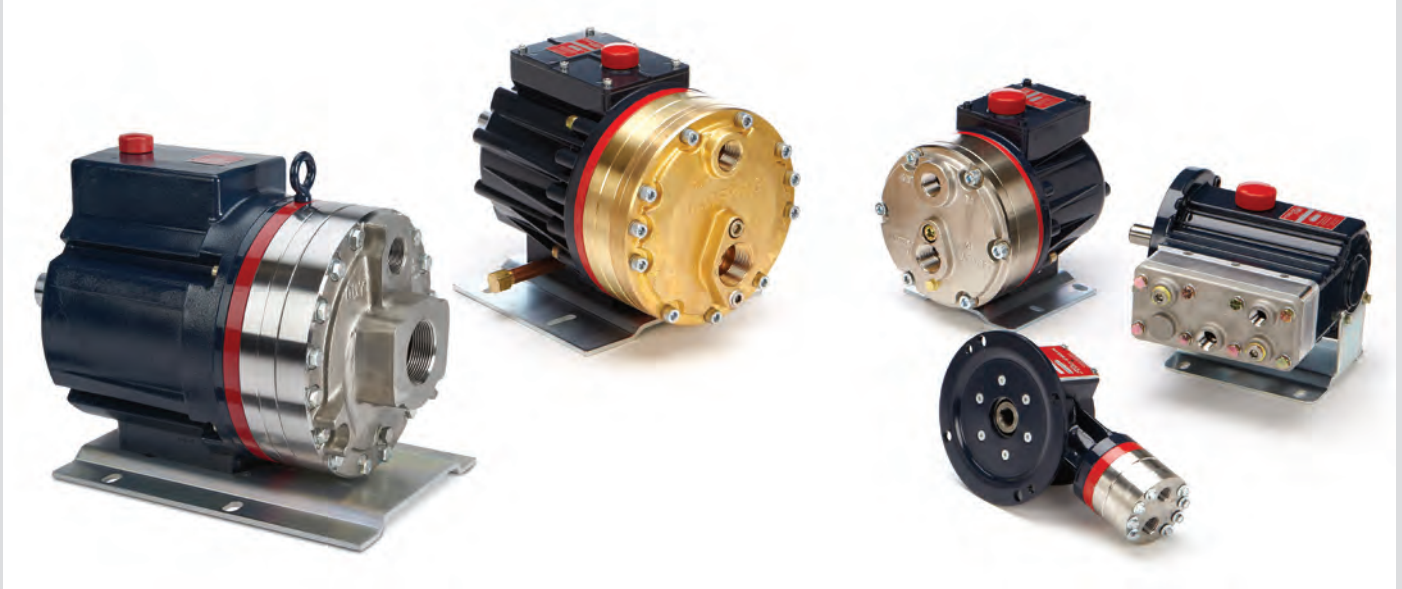
# Hydra-Cell<sup>®</sup>

Seal-less Pumps





## Hydra-Cell G Series Seal-less Pumps



## Hydra-Cell T & Q Series Seal-less Pumps



## Hydra-Cell P Series Seal-less Metering Pumps



# Hydra-Cell® Seal-less Pumps

**DESIGNED & BUILT  
IN THE USA  
SINCE 1973**



<b>Contents</b>	<b>Page</b>
Design Advantages .....	4
Markets & Industries Served .....	6
Primary Applications.....	8
Fluid Handling Capability.....	9
Principles of Operation	
Wobble Plate Design.....	10
Crank-shaft Design.....	11
Kel-Cell Diaphragm Protection.....	12
Patents & Industry Recognition .....	13
Design & Manufacturing Standards .....	14
Mass Customization .....	15
Materials of Construction.....	16
Hydra-Cell G Series Pumps	
Selection Guide .....	18
Flow Capacities & Pressure Ratings.....	19
Models, Specifications & How to Order .....	20
C Series Valves	
Selection Guides .....	82
Models, Specifications & How to Order .....	84
Accessories.....	92
Hydra-Cell T & Q Series Pumps	
T100 Selection Guide .....	112
T100 Flow Capacities & Pressure Ratings.....	113
Q155 Selection Guide .....	114
Q155 Flow Capacities & Pressure Ratings.....	115
Design Advantages .....	116
Models, Specifications & How to Order .....	118
Hydra-Cell Metering Solutions Pumps	
P Series Selection Guide .....	140
P Series Flow Capacities & Pressure Ratings.....	141
Design Advantages .....	142
API 675 Performance Standards.....	144
Models, Specifications & How to Order .....	146
Accessories .....	158
Bare Shaft Metering Pumps.....	159
MT8 Triplex Metering Pumps .....	160
S Series Solenoid Metering Pumps.....	161
Frequently Asked Questions.....	162
Design Considerations.....	163
Installation Guidelines.....	164
Materials Reference.....	166
Glossary of Terms .....	168
Additional Wanner Engineering Pumps .....	170
Limited Warranty .....	174
Worldwide Sales & Service.....	175

“If the owner of a plant wants cost-effective pumps...he will buy pumps with the lowest Life Cycle Cost. Hydra-Cell is simple in construction, less elaborate in design and physically smaller for equivalent flow/pressure performance. These differences can substantially affect both purchase and operating costs.”

Ing Friedrich-Wilhelm Hennecke, Ph.D.  
*Chemical Engineering World*

*Dr. Hennecke served on the Faculty of Chemical Engineering, Karlsruhe, and as a plant engineer, specifying pumps at BASF AG for 30 years.*

**Hydra-Cell®**  
*Seal-less Pumps*

*Due to the Wanner Engineering Continuous Improvement Program, specifications and other data in this catalog are subject to change.*

*Hydra-Cell® is a registered trademark of Wanner Engineering, Inc.*

*Kel-Cell® is a registered trademark of Wanner Engineering, Inc.*



## Hydra-Cell® Seal-less Design Advantages

*Hydra-Cell positive displacement pumps feature a seal-less pumping chamber so there are no mechanical seals, packing or cups to leak or replace. The seal-less design and check valves enable Hydra-Cell to handle abrasives and particulates that would damage other types of pumps. In addition, Hydra-Cell can run dry indefinitely without damage to the pump. The multiple-diaphragm design of Hydra-Cell provides virtually pulse-less, linear flow without the need for expensive pulsation dampeners.*

### Economical

- Can save approximately 30% to 50% on initial costs because Hydra-Cell uses lower kilowatt motors to achieve the same flow rates and pressures as other pumps.
- Compact design with smaller footprint provides more efficient use of floor space.
- Operates at 85-90% energy efficiency to reduce operating costs.
- Seal-less design reduces maintenance and repair expenditures and minimizes the cost of spare parts compared to other types of pumps.

### Versatile

- Variety of styles and models to pump a wide range of flow capacities and pressure ratings.
- Hydraulically-balanced diaphragms can pump low-to-high-viscosity liquids throughout the entire pressure range of the pump.
- Available in a variety of construction materials to meet a wide range of applications and ensure optimum pumping life even when handling aggressive fluids.
- Can be fitted with SAE, ANSI or DIN flanges as well as IEC or NEMA motor mounts.
- Can be provided with ATEX certification or other certification to adapt to specific applications or meet international standards.
- Design allows for easy interchangeability of pump head materials and can accommodate mixing different materials with one pump head.







## Capable

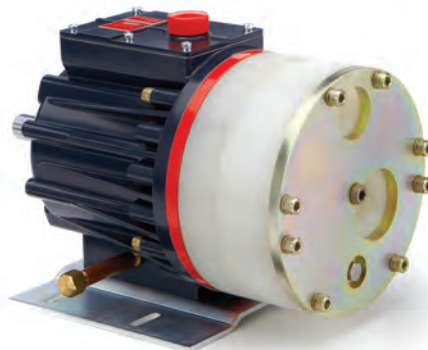
- Tolerates abrasive solids and particulate matter up to 800 microns (depending on pump model) and 9 hardness (Mohs) without the need for fine filtration.
- Multiple diaphragms provide virtually pulse-less flow that exceeds API 675 standards for accuracy, linearity, and repeatability.
- Low-shear pumping action ensures integrity of long-chain structures.

## Reliable

- Can run dry without damage to the pump.
- Robust design tolerates non-ideal operating conditions.
- No mechanical seals, packing or cups to leak or replace.
- Can operate up to 6,000 hours between lubricating oil changes.
- Can pump acids, slurries and liquids containing up to 40% of non-dissolved solids.
- Does not rely on the fluid being pumped for lubrication.
- No tight tolerances susceptible to corrosion or solid particles.

## Environmental

- Liquids are 100% sealed from the atmosphere.
- No leak path for toxic vapors or harmful gasses.
- No dynamic seals to leak any Volatile Organic Compounds (VOC).
- Lower energy costs to operate pump.

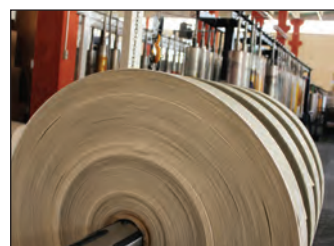
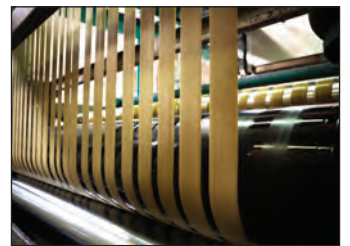




# Hydra-Cell® Application Versatility

Hydra-Cell pumps operate reliably and efficiently in commercial, institutional, industrial, and municipal facilities throughout the world. The breadth of the product line offers a wide range of flow capacities and pressure ratings to meet many different

requirements. The further capability to provide precise metering and dosing is ideal for many specialized applications. Hydra-Cell pumps can also be fitted with SAE, ANSI, DIN, or other flange connections.





## Markets and Industries Served

- Agricultural
- Automotive
- Biodiesel
- Biotechnical
- Car/Vehicle Washing
- Ceramics
- Chemical & Petrochemical
- Chip Board Manufacturing
- Cleaning & Washing
- Construction
- Electronics
- Emissions & Environmental Control
- Energy & Power Generation
- Flue Gas Emission Control
- Food & Beverage Processing
- General Industrial & Manufacturing
- Glass & Clay
- Landscaping & Lawn Care
- Marine
- Machine Tool Coolant
- Mining, Quarrying & Tunneling
- Offshore Drilling & Processing
- Oil, Gas & Petrochemical
- Paints, Coatings, Sealants & Adhesives
- Personal Care
- Pharmaceutical
- Polyurethane
- Propellant Packaging
- Pulp & Paper
- Reverse Osmosis & Filtration
- Rubber & Plastic
- Spray Drying
- Steam Generation
- Steel
- Textiles
- Tote, Tank & Barrel Washing
- Water & Wastewater Treatment



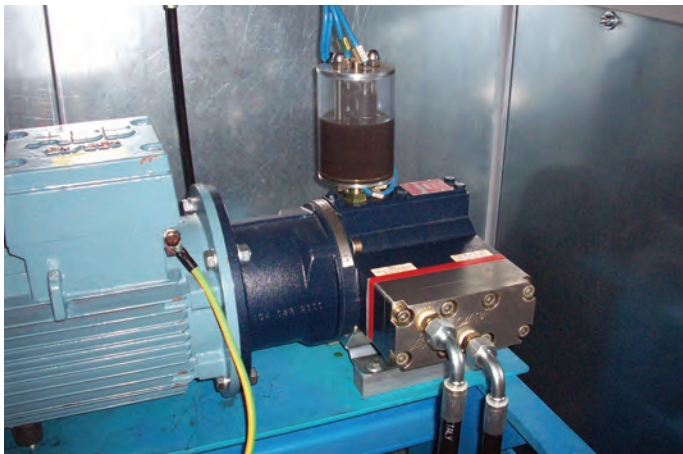


# Hydra-Cell® Primary Pumping Applications

- Blending
- Coating
- Dosing
- Filtering
- Metering
- Spraying
- Cleaning
- Cooling
- Filling
- Injecting
- Mixing
- Transferring



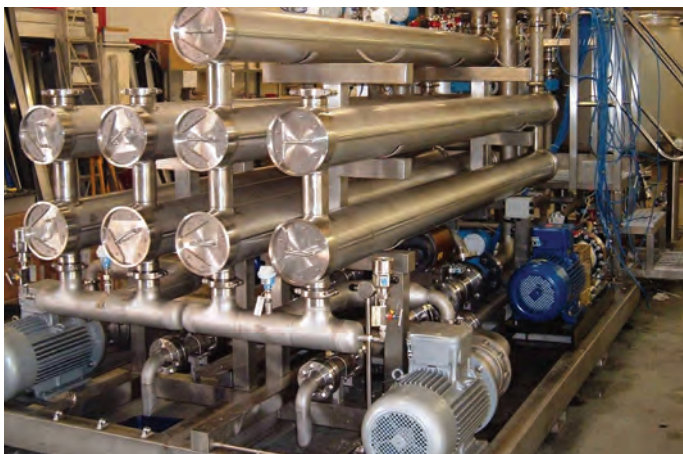
Hydra-Cell pumps deliver high-pressure, controlled flow of machine tool coolant without the need for fine filtration.



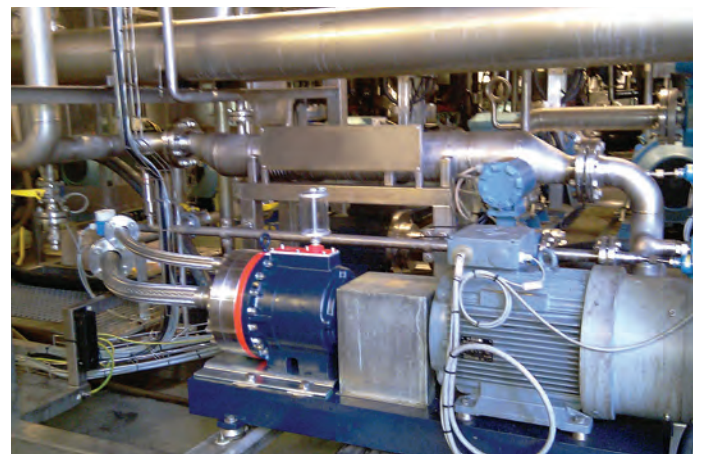
High-precision injecting at low flow rates can be achieved for specialized applications in polyurethane processing.



Hydra-Cell pumping shear-sensitive polymers for enhanced oil recovery.



Pumping for waste stream reduction and salt solution concentration at a pharmaceutical chemical plant.



Hydra-Cell pumps used for ultra-filtration by a food additive manufacturer.



# Hydra-Cell® Fluid Handling Capability

◀ **Non-Lubricating**  **Viscous Abrasives** ▶

Propane/ Freon Ammonia Polymers Fuels/ D.I.Water Glycols Chlorine Acids/ Glues/ Inks/ Resins Slurries  
Butane Additives Caustics Adhesives Paints

## Handles Abrasives and Low-to-High Viscosity Fluids

From drinking water to highly viscous cutting fluids, Hydra-Cell pumps handle the full spectrum of process fluids while maintaining high-efficiency operation. This includes non-

lubricating fluids as well as difficult fluids with abrasives that can damage or destroy other types of pumps. This makes Hydra-Cell an ideal choice in a wide range of industries and when serving multiple applications in one facility.



Pumping ceramic slurry in a spray drying application can be a problem for other types of pumps, but not Hydra-Cell.



Wastewater treatment is a difficult pumping application that Hydra-Cell routinely handles.



Pumping dirty and recycled water at a commercial car wash is an everyday function for Hydra-Cell pumps.

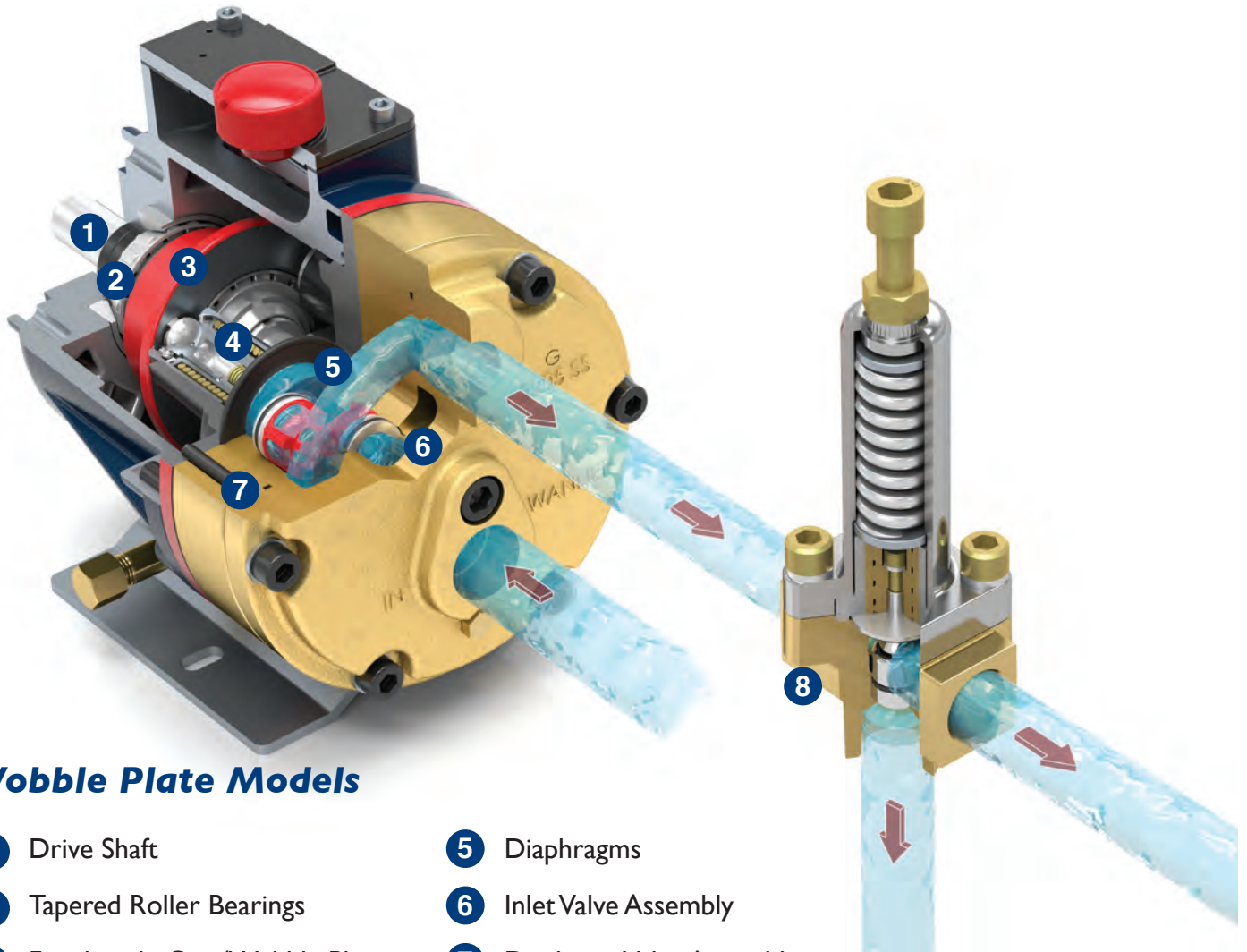


Several operational features of Hydra-Cell pumps are showcased when processing volatile crude oil.



Hydra-Cell pumping ethanol-based fluid for making jet fuel.

# Hydra-Cell® Principles of Operation



## Wobble Plate Models

- |                                |                                 |
|--------------------------------|---------------------------------|
| 1 Drive Shaft                  | 5 Diaphragms                    |
| 2 Tapered Roller Bearings      | 6 Inlet Valve Assembly          |
| 3 Fixed-angle Cam/Wobble Plate | 7 Discharge Valve Assembly      |
| 4 Hydraulic Cells (Patented)   | 8 C62 Pressure Regulating Valve |

## Reliable, Efficient Pumping Action

The drive shaft (1) is rigidly held in the pump housing by a large tapered roller bearing (2) at the rear of the shaft and a smaller bearing at the front of the shaft. Set between another pair of large bearings is a fixed-angle cam or wobble plate (3).

As the drive shaft turns, the wobble plate nutates, oscillating forward and back (converting axial motion into linear motion). The complete pumping mechanism is submerged in a lubricating oil bath.

The hydraulic cell (4) is moved sequentially by the wobble plate and filled with oil on its rearward stroke. A ball check valve in the bottom of the piston ensures that the cell remains full of oil on its forward stroke.

The oil held in the Hydra-Cell balances the back side of the diaphragms (5) and causes the diaphragms to flex forward and back as the wobble plate moves. This provides the pumping action.

To provide long trouble-free diaphragm life, Hydra-Cell hydraulically balances the diaphragm over the complete

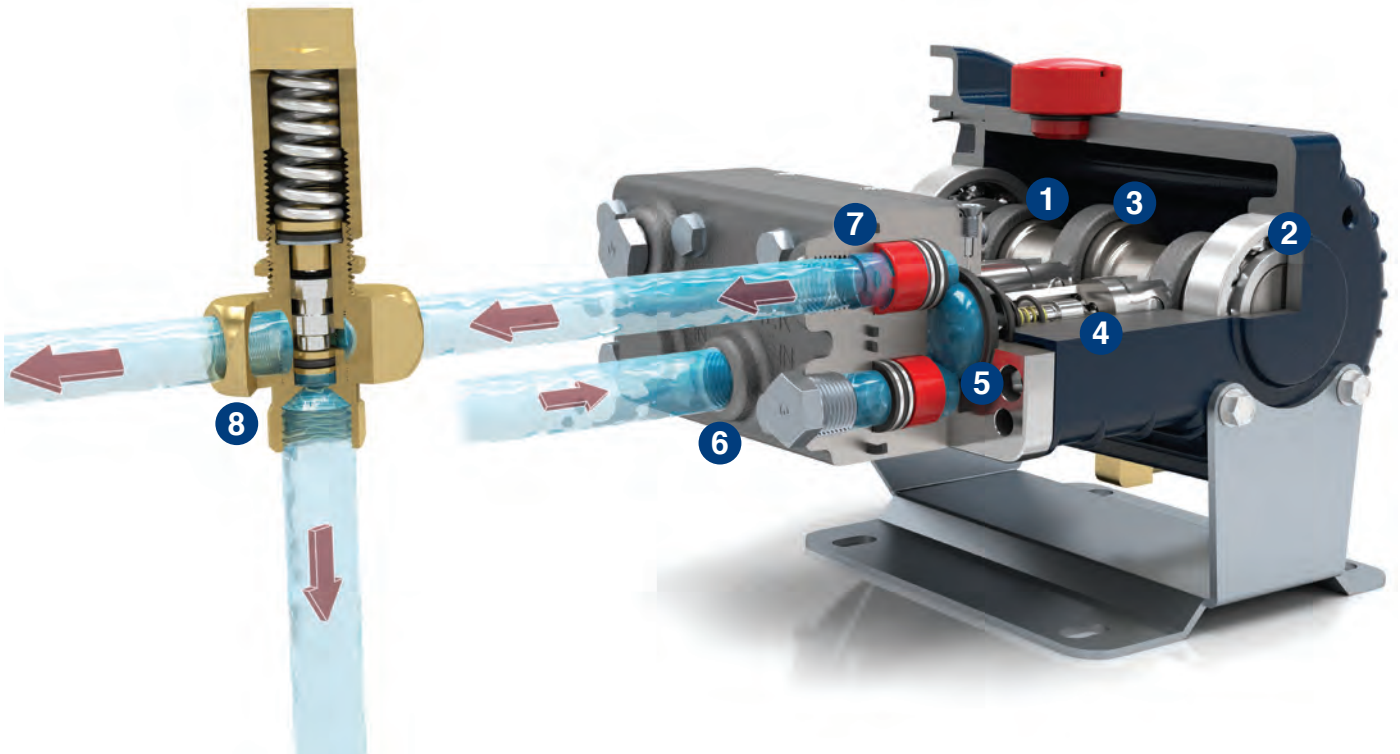
pressure range of the pump. The diaphragm faces only a 3 psi (0.21 bar) pressure differential regardless of the pressure at which fluid is being delivered - up to 2500 psi (172 bar) on standard Hydra-Cell models and Hydra-Cell metering pumps.

Hydra-Cell wobble plate pumps can have up to five diaphragms, and each diaphragm has its own pumping chamber that contains an inlet and discharge self-aligning horizontal disk check valve assembly (6). As the diaphragms move back, fluid enters the pump through a common inlet and passes through one of the inlet check valves. On the forward stroke, the diaphragm forces the fluid out the discharge check valve (7) and through the manifold common outlet. Equally spaced from one another, the diaphragms operate sequentially to provide consistent, low-pulse flow.

A Hydra-Cell C62 pressure regulating valve (8) is typically installed on the discharge side of the pump to regulate the pressure of downstream process or equipment.



# Hydra-Cell® Principles of Operation



## Crank-shaft Models

- |                              |   |
|------------------------------|---|
| 1 Drive Shaft                | 5 Diaphragms                              |
| 2 Precision Ball Bearings    | 6 Inlet Valve Assembly                    |
| 3 Connecting Rods            | 7 Discharge Valve Assembly                |
| 4 Hydraulic Cells (Patented) | 8 C46 Pressure Regulating Valve (In-line) |

## Reliable, Efficient Pumping Action

The drive shaft (1) is supported in position by two precision ball bearings (2) positioned at either end of the shaft. Located between these bearings are either one or three cam shaft lobes with connecting rods (3) that are hardened, precision ground, and polished. Maintaining a high level of quality on the cam lobes and connecting rod surfaces ensures proper lubrication and reduced operating temperatures in the hydraulic end of the pump.

As the drive shaft turns, each cam actuates the attached connecting rod that is pinned into position at the end of each hydraulic piston. This action moves the piston forward and backward, converting the axial motion into linear pumping motion. The complete pumping mechanism is submerged in a lubricating oil bath.

Each piston contains a patented hydraulic cell (4) that is moved sequentially by the crank-shaft. The innovative and proprietary Hydra-Cell maintains the precise balance of oil behind the diaphragm (5) regardless of the operating conditions of the pump. The oil in Hydra-Cell is pressurized on the forward stroke of the piston causing the diaphragm to flex, which drives

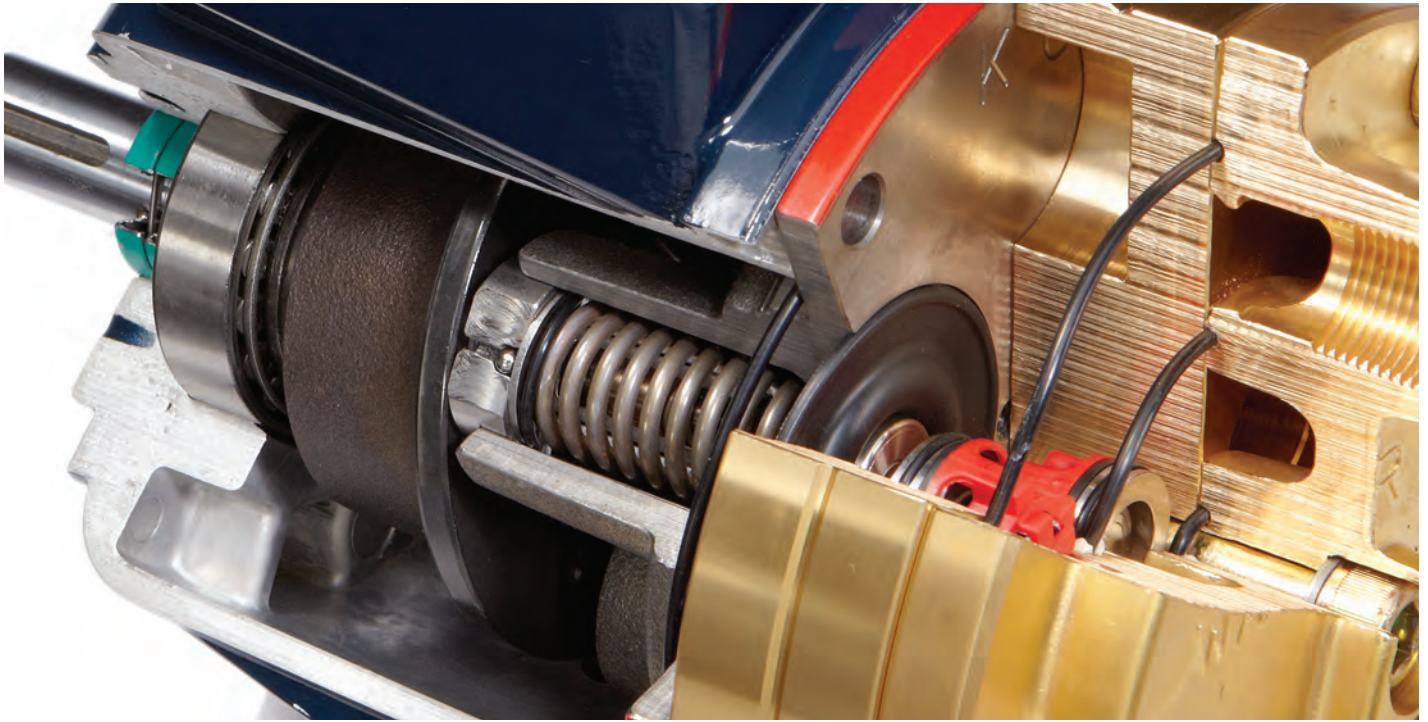
the pumping action. The oil held in the Hydra-Cell balances the diaphragm against the fluid being pumped, maintaining no more than a 3 psi (0.21 bar) differential regardless of the pressure at which the fluid is being delivered - up to 2500 psi (172 bar) on standard Hydra-Cell models and Hydra-Cell metering pumps.

Hydra-Cell crank-shaft pumps can have up to three diaphragms, and each diaphragm has its own pumping chamber that contains an inlet and discharge self-aligning horizontal disk check valve assembly (6). As the diaphragms move back, fluid enters the pump through a common inlet and passes through one of the inlet check valves. On the forward stroke, the diaphragm forces the fluid out of the discharge check valve (7) and through the manifold common outlet. Equally spaced from one another, the diaphragms operate sequentially to provide consistent, low-pulse flow.

A Hydra-Cell C46 pressure regulating valve (8) is typically installed on the discharge side of the pump to regulate the pressure of downstream process or equipment.

# Hydra-Cell® Patented Kel-Cell® Diaphragm Protection

## Diaphragm Position Control (DPC) Technology

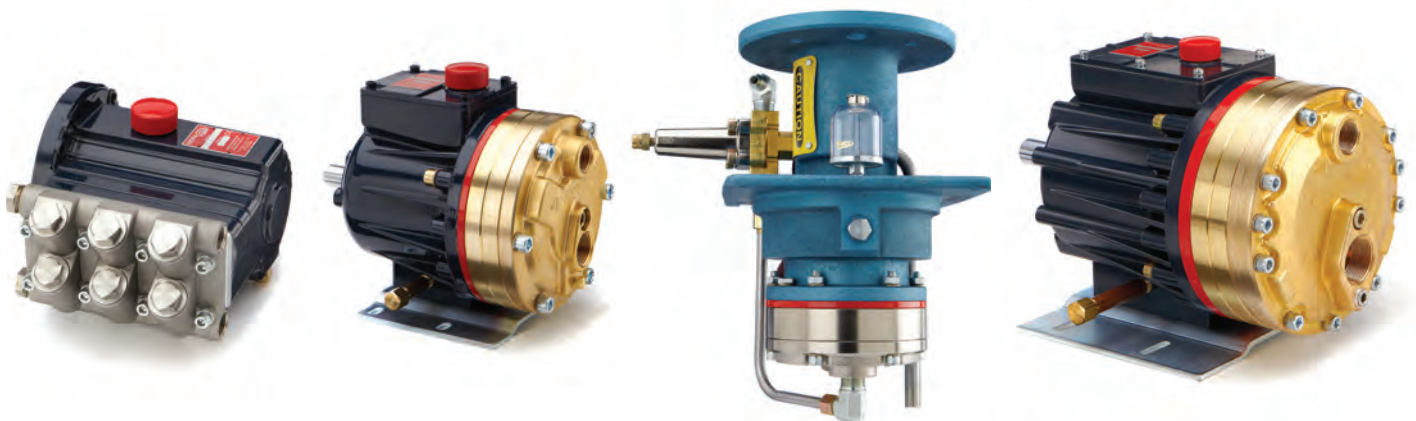


Available on many Hydra-Cell models that use the fixed-angle cam/wobble plate operating principle, Kel-Cell DPC protects Hydra-Cell pumps by safeguarding the diaphragms against abnormal or adverse conditions such as:

- Partially or completely blocked inlet pipe or inlet filter
- Partly or completely closed inlet shut-off valve
- Inadequate liquid supply
- Excessively viscous fluids
- Inadequate discharge pressure
- Other conditions that result in excessive vacuum formed at the inlet of the pump

These conditions can result from system problems, poor system design, faulty installation, an unplanned operational incident, or other situations that would cause the diaphragms to operate out of hydraulic balance and ultimately deform and rupture.

The Kel-Cell positioning system enhances Hydra-Cell pump performance. It is designed to stabilize the diaphragms in all such conditions and virtually eliminate the possibility of an incidental diaphragm failure caused by adverse system conditions.



*Kel-Cell is available with Hydra-Cell models G13/G03, G13/G03 Mono-Block, G10, G12, G25, G35 and G66.*



# Hydra-Cell® Patents and Industry Recognition

## USA Patents Held by Wanner Engineering

Patent Number	Title
5,667,143	Spray gun for spraying two fluids
5,707,219	Diaphragm pump
6,019,124	Valve assembly for use with high-pressure pumps
6,164,560	Lawn applicator module and control system therefor
6,536,466	Pressure regulator apparatus
6,568,559	Termite control system with multi-fluid proportion metering and batch signal metering
6,899,530	Diaphragm pump with a transfer chamber vent with a longitudinal notch on the piston cylinder
7,101,158	Hydraulic balancing, magnetically-driven centrifugal pump
6,941,853	Pump diaphragm rupture detection
7,467,582	Pump diaphragm rupture detection
7,090,474	Diaphragm pump with overfill limiter
7,425,120	Diaphragm position control for hydraulically driven pumps
7,665,974	Diaphragm pump position control with offset valve axis

## Awards for Hydra-Cell

Presented by the Institution of Chemical Engineers, the IChemE Awards recognize innovation and excellence in making outstanding contributions to safety, the environment, and sustainable development in the chemical and bioprocess industries. Introduced in 2006, Hydra-Cell Metering Solutions pumps earned Honourable Mention in the category for new products.



Selected by the editors and advisory board of *Pumps & Systems* magazine, the Hydra-Cell T100 High Pressure model earned recognition as a finalist in the publisher's 2010 "Product Innovation" awards. As noted by the trade journal, Hydra-Cell T100 has a patented valve system that maintains the correct volume of hydraulic fluid in the pumping chamber behind the diaphragm.



Hydra-Cell T100 Series pumps received a "Spotlight on New Technology" award at the 2010 Offshore Technology Conference in recognition of the latest and most advanced technologies that are leading the industry into the future. Winners are selected for being new, innovative, proven (in application or prototype), of broad interest to the industry, and of significant impact, including environmental benefits.



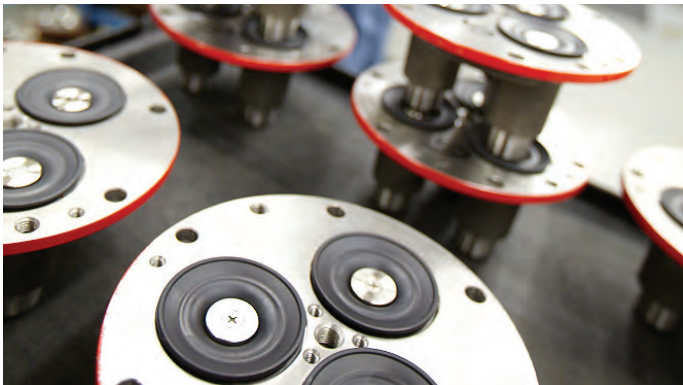
**American Chemistry Council  
Center for Polyurethanes Industry**

Associate member

**ISO 9001: 2008  
CERTIFIED**



# Hydra-Cell® Design and Manufacturing Standards



Hydra-Cell seal-less pumps are designed, built, and tested in the Wanner Engineering 80,000 square foot facility in Minneapolis, Minnesota. We have more than 40 years of experience serving manufacturers, processors, and commercial or institutional organizations, including many major global companies.

Hydra-Cell pumps are performance-proved for efficiently pumping the widest range of corrosive, high-temperature, abrasive, viscous, non-lubricating, and recycled fluids, as well as liquids containing solids. Every pump is assembled with the proper materials of construction to meet the application.

Our capability is the result of a strategic emphasis on adopting sound management principles throughout the plant combined with attention to detail for every task and procedure.

## Continuous Improvement

- High-precision machining equipment and lean production practices throughout an extensively automated manufacturing facility.
- All pumps are designed, built, and tested in the USA.
- Design engineering services available for assistance with your application.
- Extensive inventory and reliable supply chain.
- Stringent quality control systems for component-to-component and unit-to-unit quality and consistency.
- Every pump is tested (15-minute to 2-hour run cycles) for full flow at rated pressure, temperature, noise, and vibration.



## Mass Customization Means Maximum Flexibility

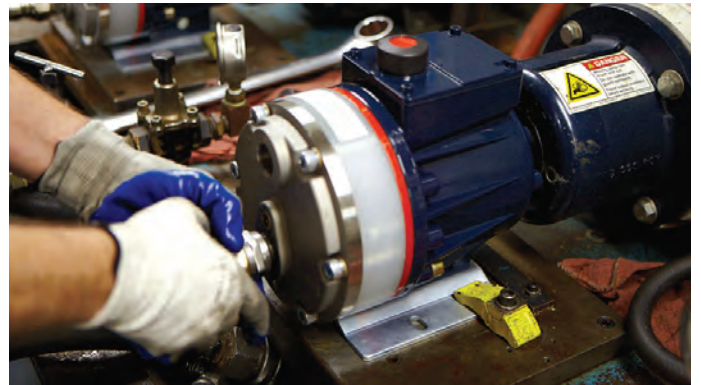
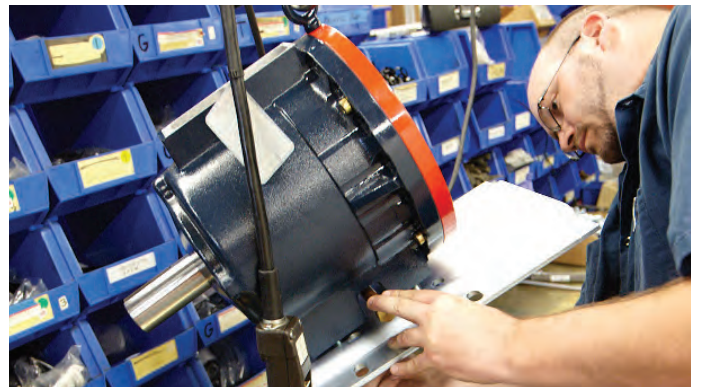
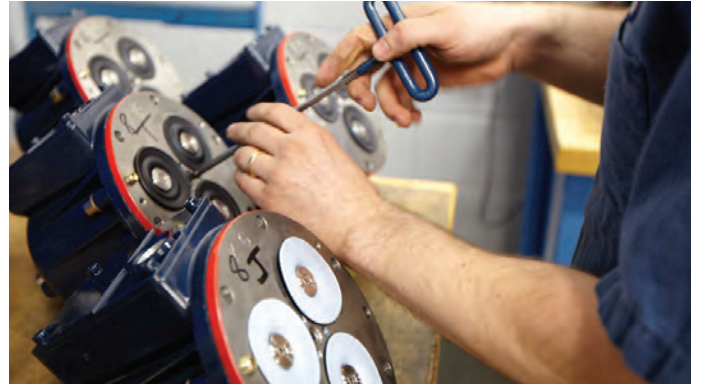
Every order is a priority at Wanner Engineering. Every pump is built to order. Our “Mass Customization” philosophy leverages the modular design of Hydra-Cell with sophisticated operational methods to:

1. Provide you with the properly configured pump for your process application;
2. At a competitive price;
3. Delivered with minimal lead time.

We can help you match your flow/pressure requirements to select the best model and materials of construction based on your process fluid and industry application. We maintain optimum inventory levels of parts and components that translate into cost efficiencies and faster turnaround time for customers.

An expert staff and attentive customer service practices enable us to achieve the goals of providing the Hydra-Cell pump engineered and configured to your specifications.

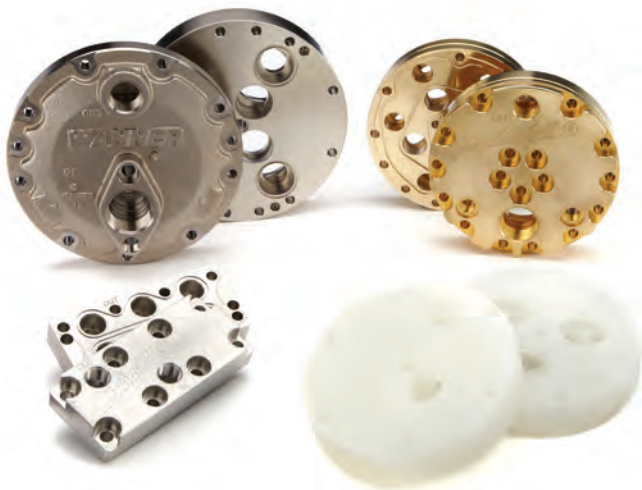
- A wide selection of metallic and non-metallic pump head materials plus diaphragm, valve and o-ring materials enable easy configuration to meet your specific needs from in-stock components.
- Base plates, couplings and coupling guards are available in several inline and parallel mounting configurations to suit your facility and operating environment.
- Custom pump head and body castings are available, as well as matching OEM paint and private labeling.
- Comprehensive assortment of accessories include regulator valves, oil coolers and filtration, oil level monitoring, couplings, guards, connectors, and tool kits.
- Options to enhance performance such as gear boxes, controllers, pulsation dampeners, and an assortment of drives.



# Hydra-Cell® Materials of Construction

As part of our “Mass Customization” philosophy, every Hydra-Cell pump is built with manifolds, elastomeric materials, and valve assemblies using construction materials specified by the customer. Hydra-Cell distributors and factory representatives are readily available to assist customers in selecting the materials best suited to the process application. (The range of material choices depends on each pump model – for example, models designed to operate at higher pressures are available with metallic pump heads only.)

## Manifolds



Manifolds for Hydra-Cell pumps are available in a variety of materials to suit your process application. They are easy to replace and interchangeable to accommodate different fluids processed by the same pump. Special manifolds with a 2:1 dosing ratio are also available. (*Consult factory.*)

## Metallic Pump Heads

Metallic pump heads can handle higher operating pressures. Hastelloy C or Stainless Steel is also selected for corrosion resistance and other properties.

- Brass
- Bronze
- Cast Iron (Nickel-plated)
- Hastelloy C
- Duplex Alloy 2205 Stainless Steel
- 304 Stainless Steel
- 316L Stainless Steel

## Non-metallic Pump Heads

Non-metallic pump heads are often used when a corrosive or aggressive fluid is being processed at lower pressures.

- Polypropylene
- PVDF

## Diaphragms and O-rings



Diaphragms and corresponding o-rings are available in several elastomeric materials. For diaphragm start-up temperatures and material markings, see page 167.

- Aflas diaphragm (used with PTFE o-ring)
- Buna-N
- EPDM (requires EPDM-compatible oil)
- Neoprene
- PTFE
- FKM





## Valve Materials



Hydra-Cell valve assemblies (seats, valves, springs, and retainers) are available in a variety of materials to suit your process application. For reference to identify metallic materials used for valves and valve seats, see page 166. For fluid temperature ranges of valve spring retainers, and reference to identify non-metallic valve spring retainers, see page 167.

### Valve Seats

- Ceramic
- Hastelloy C
- Nitronic 50\*
- Tungsten Carbide
- 17-4 Stainless Steel
- 316L Stainless Steel

### Valves

- Ceramic
- Hastelloy C
- Nitronic 50\*
- Tungsten Carbide
- 17-4 Stainless Steel

### Valve Springs

- Elgiloy\*
- Hastelloy C
- 17-7 Stainless Steel
- 316L Stainless Steel

### Valve Spring Retainers

- Celcon\*
- Hastelloy C
- Nylon
- PVDF
- Polypropylene
- 17-7 Stainless Steel

\* For properties and characteristics of these materials to aid in pump selection, see page 167.

### Registered trademarks of materials:

Aflas®	Asahi Glass Co., Ltd.
Buna®-N (Nitrile)	E.I. Du Pont de Nemours and Company, Inc.
Celcon®	Celanese Company
Elgiloy®	Elgiloy Limited Partnership
Hastelloy® C	Haynes International, Inc.
Kynar® (PVDF)	Arkema, Inc.
Mesamoll®	Lanxess Deutschland GmbH
Neoprene®	E.I. Du Pont de Nemours and Company, Inc.
Nitronic® 50	AK Steel Corporation
Teflon® (PTFE)	E.I. Du Pont de Nemours and Company, Inc.
Viton® (FKM)	DuPont Performance Elastomers, LLC
Zytel® (Nylon)	E.I. Du Pont de Nemours and Company, Inc.

# Hydra-Cell® G Series Seal-less Pumps Selection



**G20**  
Page 20



**G03 & Mono-Block**  
Pages 26 & 32



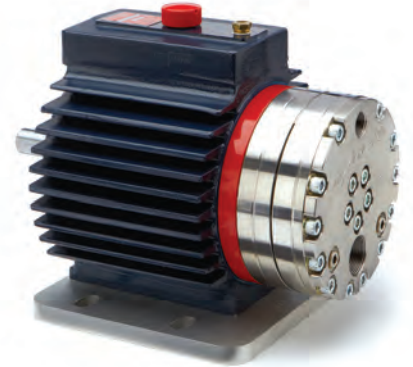
**G04**  
Page 38



**G10**  
Page 44



**G12**  
Page 50



**G15 & G17**  
Page 58



**G25**  
Page 64



**G35**  
Page 70

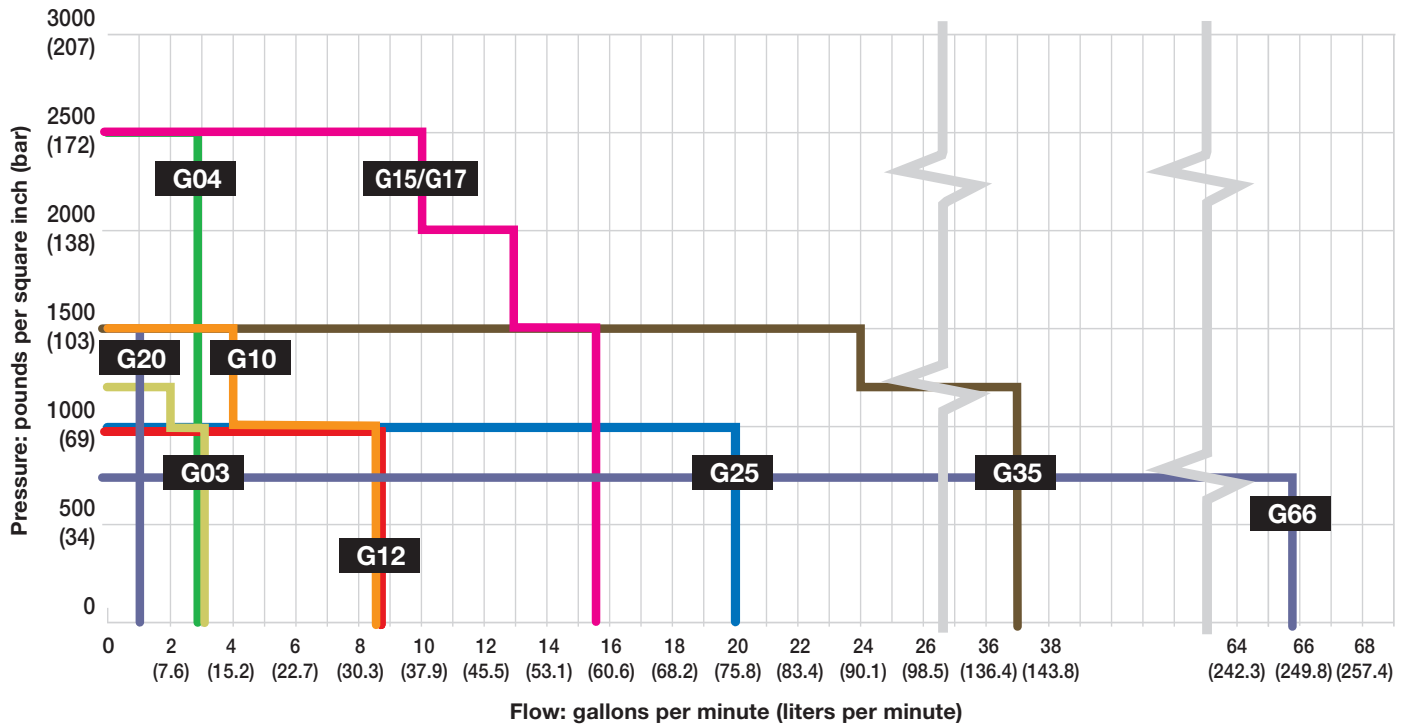


**G66**  
Page 76



# Hydra-Cell® Flow Capacities and Pressure Ratings

## G Series Seal-less Pumps



The graph above displays the maximum flow capacity at a given pressure for each model series. The table below lists the maximum flow capacity and maximum pressure capability of each model series.

*Please Note:* Some models do not achieve maximum flow at maximum pressure. Refer to the individual model specifications in this section for precise flow and pressure capabilities by specific pump configuration.

Model	Maximum Capacity gpm (l/min)	Maximum Discharge Pressure psi (bar)		Maximum Operating Temperature F (C) <sup>2</sup>		Maximum Inlet Pressure psi (bar)
		Non-metallic <sup>1</sup>	Metallic	Non-metallic	Metallic	
<b>G20</b>	1.0 (3.8)	350 (24)	1500 (103)	140° (60°)	250° (121°)	250 (17)
<b>G03</b>	3.1 (11.7)	350 (24)	1200 (83)	140° (60°)	250° (121°)	250 (17)
<b>G04</b>	2.9 (11.2)	N/A	2500 (172)	N/A	250° (121°)	500 (34)
<b>G10</b>	8.8 (33.4)	350 (24)	1500 (103)	140° (60°)	250° (121°)	250 (17)
<b>G12</b>	8.8 (33.4)	N/A	1000 (69)	N/A	250° (121°)	250 (17)
<b>G15 &amp; G17</b>	15.5 (58.7)	N/A	2500 (172)	N/A	250° (121°)	500 (34)
<b>G25</b>	20.0 (75.9)	350 (24)	1000 (69)	140° (60°)	250° (121°)	250 (17)
<b>G35</b>	36.5 (138)	N/A	1500 (103)	N/A	250° (121°)	500 (34)
<b>G66</b>	65.7 (248.7)	250 (17)	700 (48)	140° (60°)	250° (121°)	250 (17)

<sup>1</sup> 350 psi (24 bar) maximum with PVDF liquid end; 250 psi (17 bar) maximum with Polypropylene liquid end.

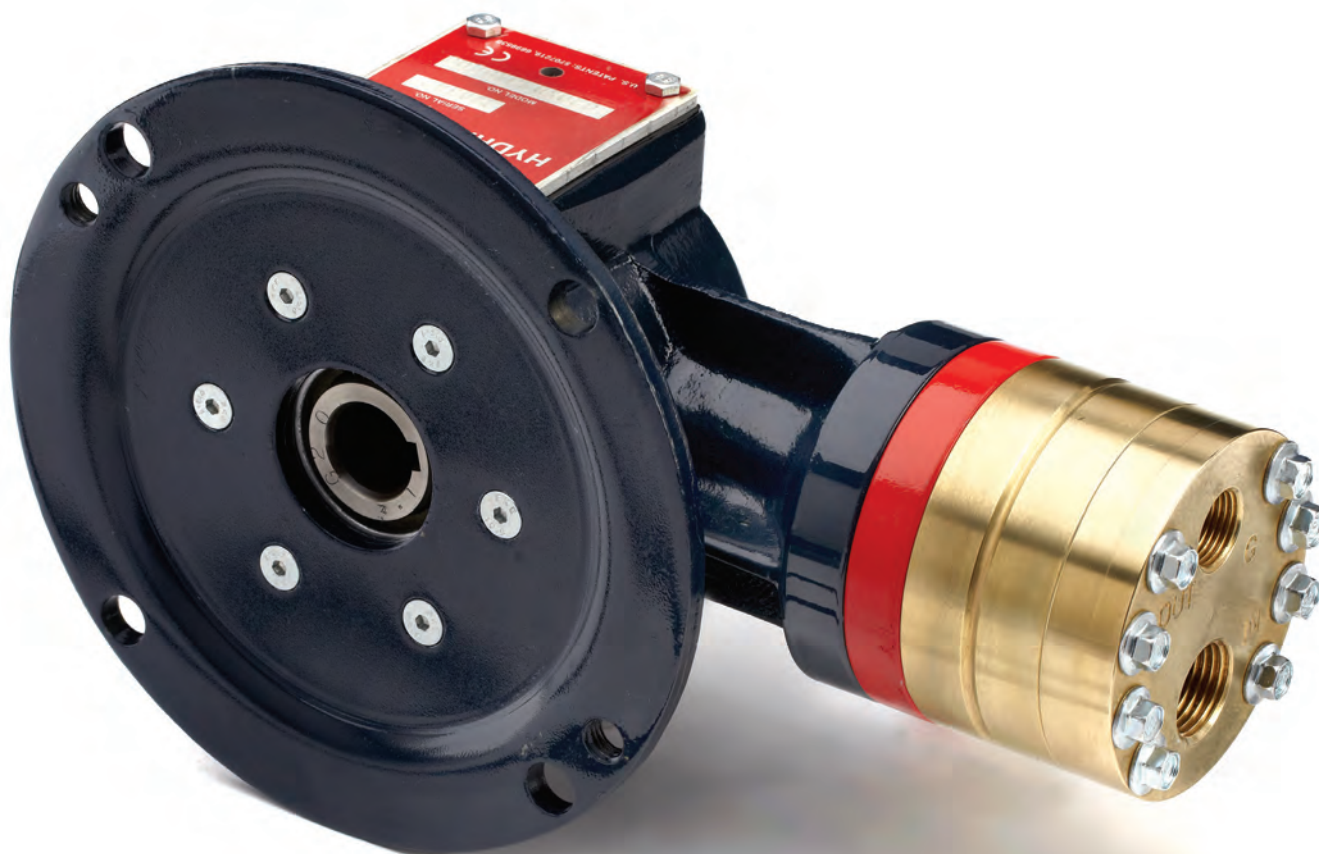
<sup>2</sup> Consult factory for correct component selection for temperatures from 160°F (71°C) to 250°F (121°C).

## G20 Series

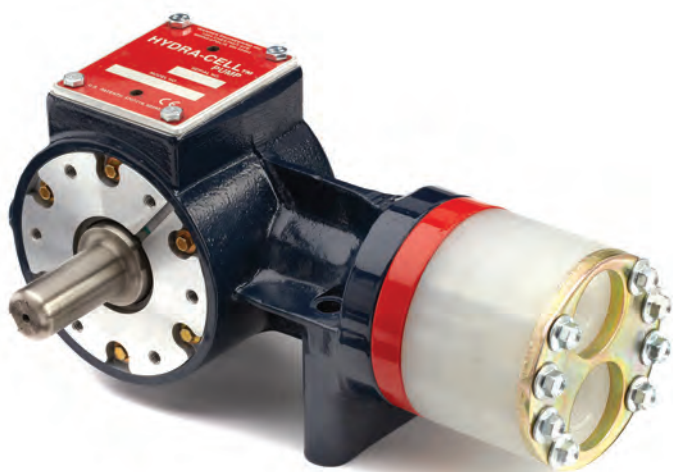
---

Maximum Flow Rate: 1.0 gpm (3.8 l/min)

Maximum Pressure: 1500 psi (103 bar) for Metallic Pump Heads  
350 psi (24 bar) for Non-metallic Pump Heads



*G20 Close-coupled with Brass pump head*



*G21 Shaft-driven with Polypropylene pump head*



*G22 Flexible-coupled with Stainless Steel pump head*



# G20 Series Performance

## Capacities

### Flow

Model	Max. Input rpm	Max. Flow	
		@ 1000 psi (69 bar) gpm	l/min
G20-X	1750	1.01	3.82
G20-E	1750	0.71	2.69
G20-S	1750	0.56	2.12
G20-B	1750	0.31	1.17
G20-G	1750	0.20	0.76

### Pressure

**Maximum Inlet Pressure**  
250 psi (17 bar)

#### Maximum Discharge Pressure

Metallic Pump Heads:

G20 to 1000 psi (69 bar)

G21 to 1500 psi (103 bar)

G22 to 1500 psi (103 bar)

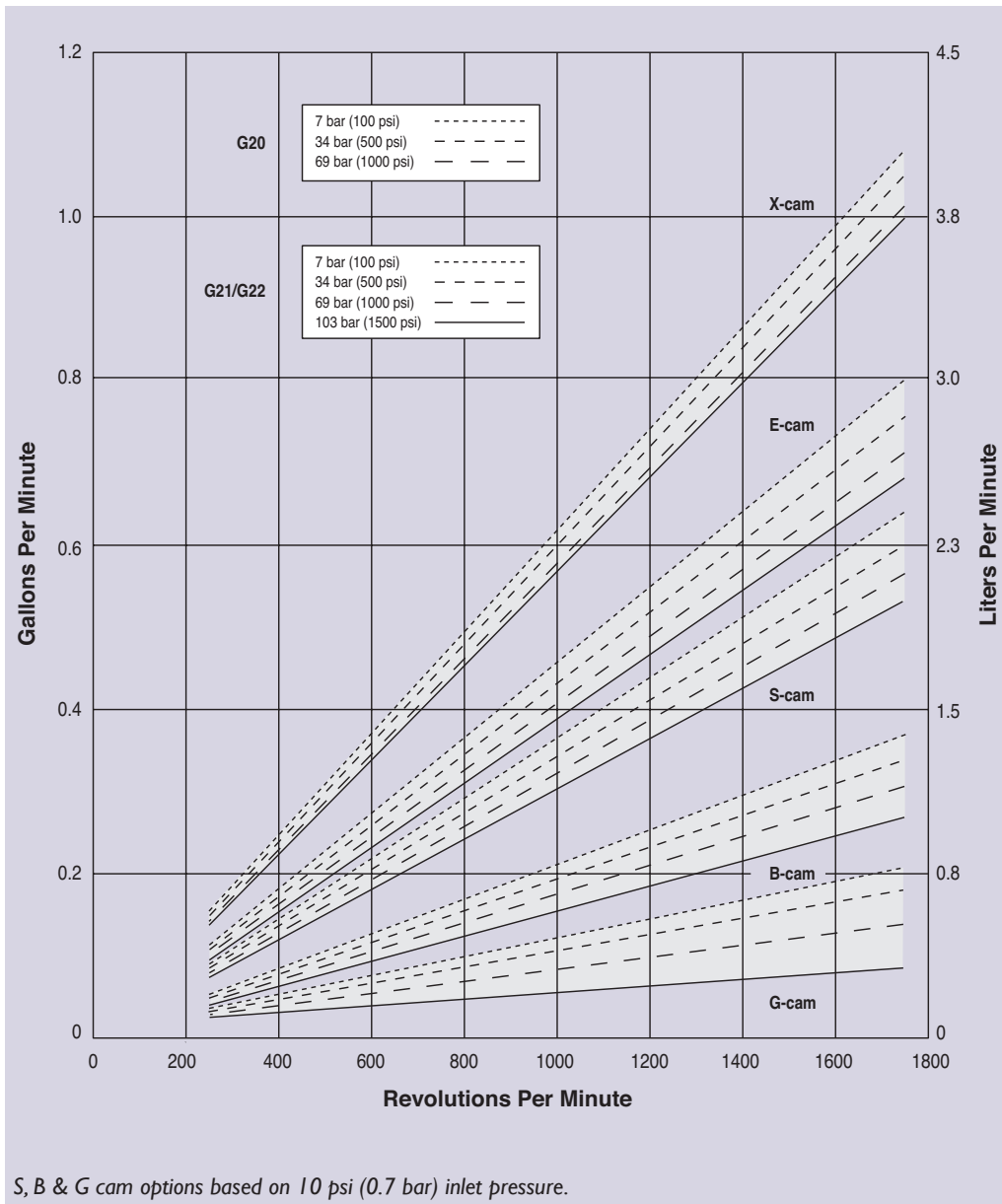
Non-metallic Pump Heads:

250 psi (17 bar) Polypropylene

350 psi (24 bar) PVDF

Performance and specification ratings apply to G20, G21 and G22 configurations unless specifically noted otherwise.

## Maximum Flow at Designated Pressure



# G20 Series Specifications

## Flow Capacities @ 69 bar (1000 psi) 4-pole Motor @ 50 Hz

Model	rpm	gpm	l/min
G20-X	1450	0.83	3.14
G20-E	1450	0.60	2.29
G20-S	1450	0.45	1.72
G20-B	1450	0.27	1.03
G20-G	1450	0.16	0.63

## Flow Capacities @ 69 bar (1000 psi) 6-pole Motor @ 50 Hz

Model	rpm	gpm	l/min
G20-X	960	0.55	2.08
G20-E	960	0.40	1.51
G20-S	960	0.30	1.14
G20-B	960	0.18	0.68
G20-G	960	0.10	0.41

## Delivery @ 69 bar (1000 psi)

Model	gal/rev	liters/rev
G20-X	0.0006	0.0022
G20-E	0.0004	0.0015
G20-S	0.0003	0.0012
G20-B	0.0002	0.0007
G20-G	0.0001	0.0004

## Maximum Discharge Pressure

Metallic Heads:	G20 to 69 bar (1000 psi)
	G21 to 103 bar (1500 psi)
	G22 to 103 bar (1500 psi)
Non-metallic Heads:	17 bar (250 psi) Polypropylene
	24 bar (350 psi) PVDF

## Maximum Inlet Pressure 17 bar (250 psi)

## Maximum Operating Temperature

Metallic Heads:	121 °C (250 °F) - Consult factory for correct component selection for temperatures from 71 °C (160 °F) to 121 °C (250 °F).
Non-metallic Heads:	60 °C (140 °F)

## Maximum Solids Size 200 microns

## Inlet Port 1/2 inch BSPT

1/2 inch NPT

## Discharge Port 3/8 inch BSPT

3/8 inch NPT

## Shaft Diameter G20: 19 mm hollow shaft G21 & G22: 19 mm (3/4 inch)

## Shaft Rotation Reverse (bi-directional)

## Bearings Precision ball bearings

## Oil Capacity 0.12 liters (0.125 US quart) - See pages 96 and 97 for oil selection and specification.

## Weight

Metallic Heads:	5.5 kg (12 lbs.)
Non-metallic Heads:	4.1 kg (9 lbs.)

## Calculating Required Power

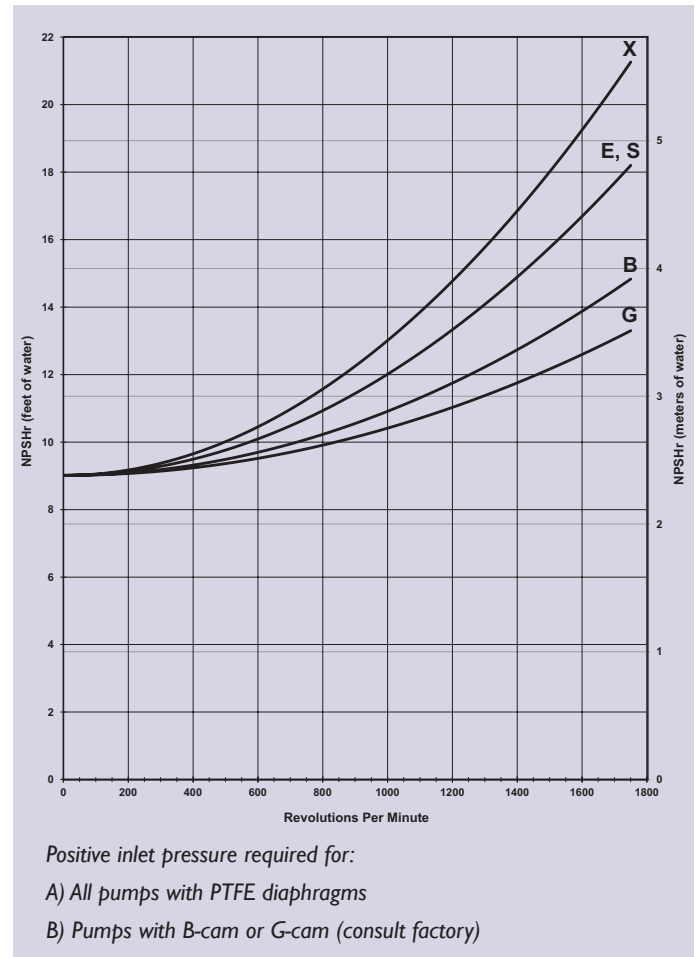
$$\frac{\text{rpm} + 1000}{7000} + \frac{\text{gpm} \times \text{psi}}{1,460} = \text{electric motor hp}$$

$$\frac{\text{rpm} + 1000}{9383} + \frac{\text{l/min} \times \text{bar}}{511} = \text{electric motor kW}$$

See page 164 for calculating pulley size.

When using a variable frequency drive (VFD) calculate the hp or kW at minimum and maximum pump speed to ensure the correct hp or kW motor is selected. Note that motor manufacturers typically de-rate the service factor to 1.0 when operating with a VFD.

## Net Positive Suction Head (NPSHr)



## Self-priming:

Each Hydra-Cell pump has different lift capability depending on model size, cam angle, speed, and fluid characteristics. To ensure that your specific lift characteristics are met, refer to the inlet calculations regarding friction, and acceleration head losses in your Hydra-Cell Installation & Service Manual. Compare those calculations to the NPSHr curves above.

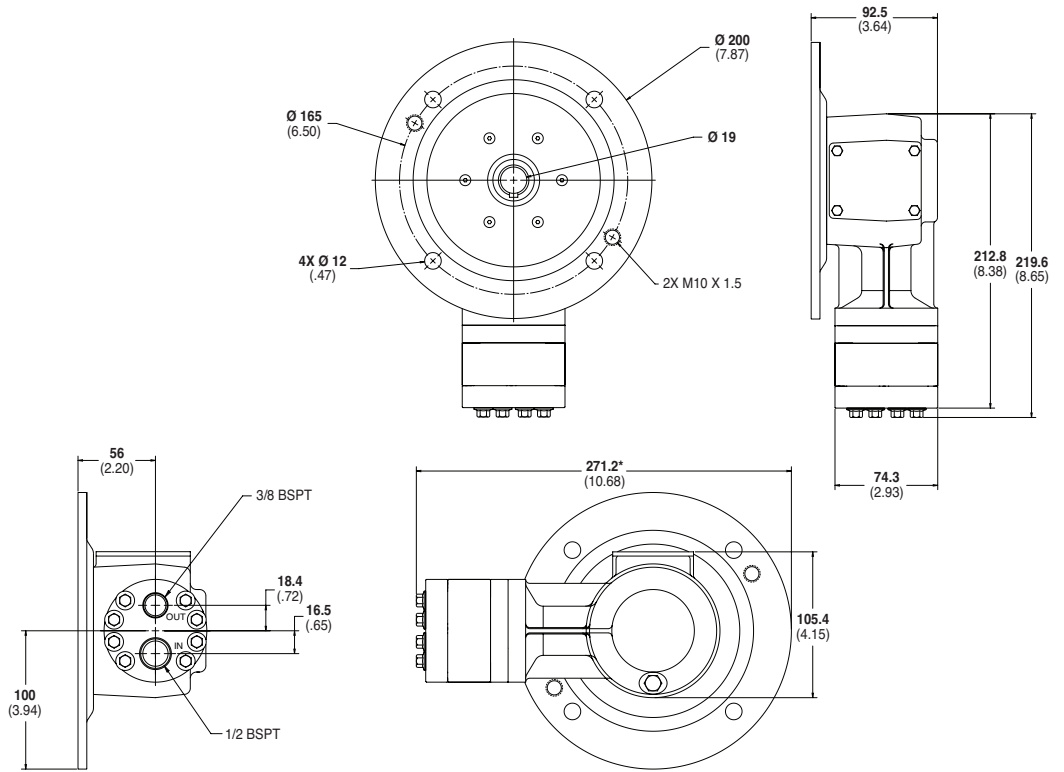
For technical assistance in pump selection, see *Frequently Asked Questions* on page 162, *Design Considerations* on page 163, and *Installation Guidelines* on pages 164-165.



# G20 Series Representative Drawings

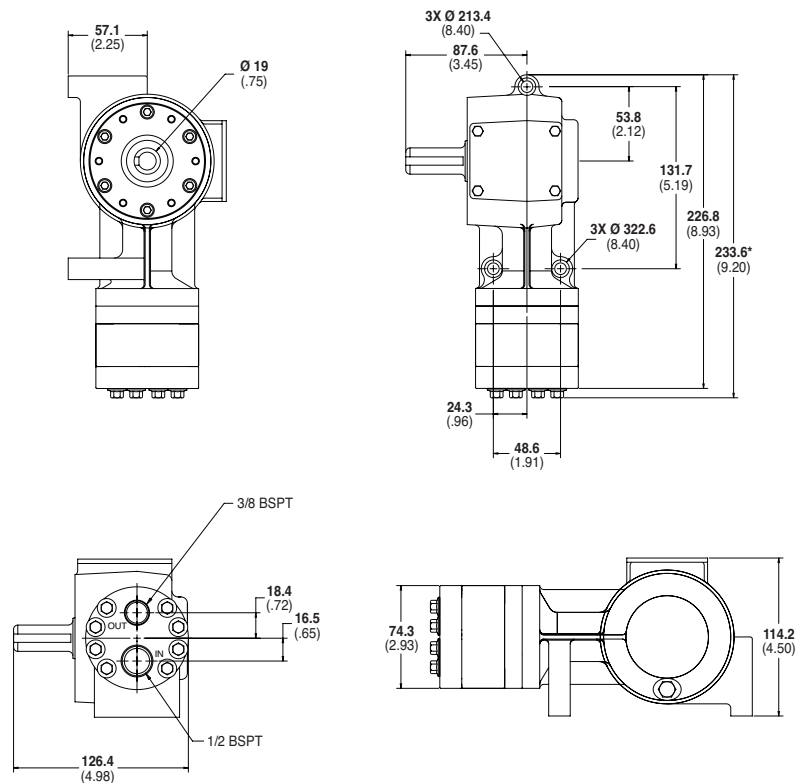
## G20 Models with Metallic Pump Head mm (Inches)

\* Add 6.35mm (0.25") where shown for manifold cover plate on non-metallic models.



## G21 Models with Metallic Pump Head mm (Inches)

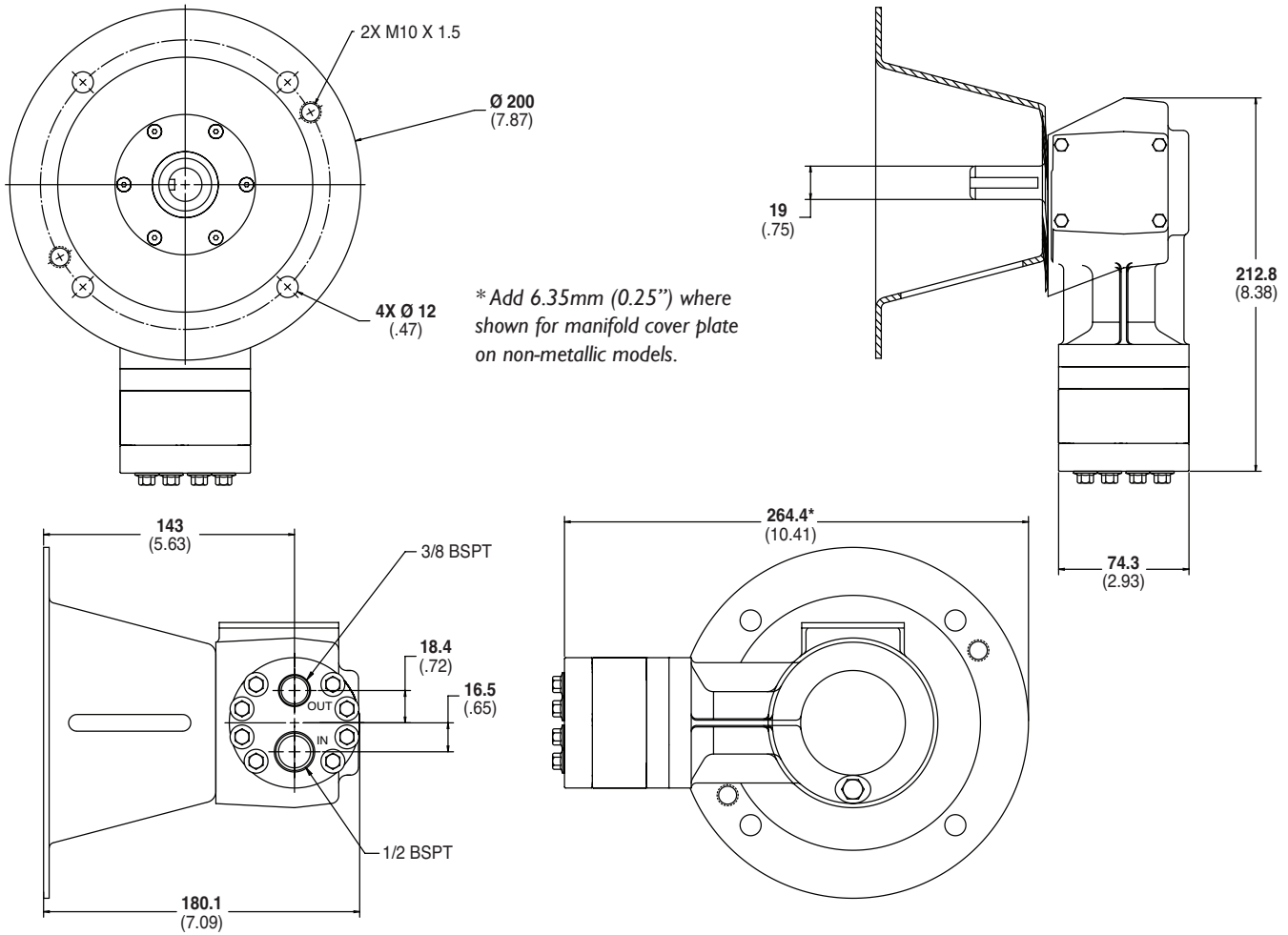
\* Add 6.35mm (0.25") where shown for manifold cover plate on non-metallic models.



**Note:** Contact factory for additional drawings of specific models and configurations.

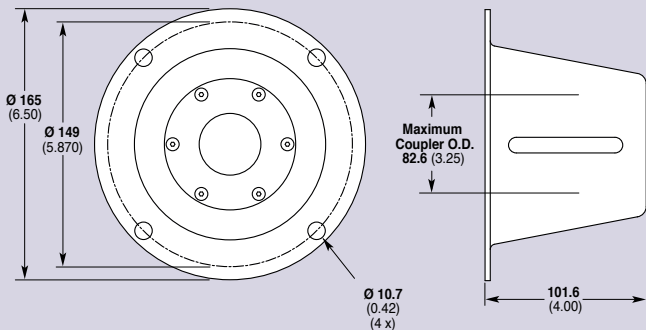
# G20 Series Drawings/Adapters/Valves

## G22 Models with Metallic Pump Head mm (Inches)



**Note:** Contact factory for additional drawings of specific models and configurations.

### Pump/Motor Adapter Inches (mm)



#### Part Number: A04-006-1200

Must be ordered separately for G22 models (optional for G21 models) for use with IEC 80 - 90 frame motors, B5 flange.

NEMA adapter available - consult factory.

### Valve Selection

A Hydra-Cell G20, G21 or G22 pumping system uses a C46 Pressure Regulating Valve.

See page 86 for more information.





# G20 Series How to Order

## Ordering Information



A complete G20 Series Model Number contains 12 digits including 9 customer-specified design and materials options, for example: G20GAPGHFECCG.

Digit	Order Code	Description
<b>1-3</b>		<b>Pump Configuration</b>
	<b>G20</b>	Close-coupled to IEC 80 footed motor (BSPT Ports)
	<b>G21</b>	Shaft-driven (BSPT Ports)*
	<b>G22</b>	For use with pump/motor adapter (BSPT Ports)* *Pump/motor adapters ordered separately. See previous page.
<b>4</b>		<b>Hydraulic End Cam</b>
	<b>X</b>	Max 3.1 l/min (0.8 gpm) @ 1450 rpm
	<b>E</b>	Max 2.3 l/min (0.6 gpm) @ 1450 rpm
	<b>S</b>	Max 1.7 l/min (0.4 gpm) @ 1450 rpm
	<b>B</b>	Max 1.0 l/min (0.3 gpm) @ 1450 rpm
	<b>G</b>	Max 0.6 l/min (0.2 gpm) @ 1450 rpm
<b>5</b>		<b>Pump Head Version</b>
	<b>D</b>	BSPT Ports (for all G20, G21 & G22 pumps)
	<b>X</b>	ATEX <i>(Note: ATEX 94/9/EC Certified, Category 2, Zone 1. Includes certificate and oil level monitor.)</i>
<b>6</b>		<b>Pump Head Material</b>
	<b>B</b>	Brass
	<b>M</b>	PVDF
	<b>P</b>	Polypropylene
	<b>S</b>	316L Stainless Steel
	<b>T</b>	Hastelloy C
<b>7</b>		<b>Diaphragm &amp; O-ring Material</b>
	<b>A</b>	Aflas diaphragm/PTFE o-ring
	<b>E</b>	EPDM (requires EPDM-compatible oil - Digit 12 oil code J)
	<b>G</b>	FKM
	<b>J</b>	PTFE (available with X and E cams only)
	<b>P</b>	Neoprene
	<b>T</b>	Buna-N
<b>8</b>		<b>Valve Seat Material</b>
	<b>C</b>	Ceramic
	<b>D</b>	Tungsten Carbide
	<b>H</b>	17-4 Stainless Steel
	<b>S</b>	316L Stainless Steel
	<b>T</b>	Hastelloy C

Digit	Order Code	Description
<b>9</b>		<b>Valve Material</b>
	<b>C</b>	Ceramic
	<b>D</b>	Tungsten Carbide
	<b>F</b>	17-4 Stainless Steel
	<b>N</b>	Nitronic 50
	<b>T</b>	Hastelloy C
<b>10</b>		<b>Valve Springs</b>
	<b>E</b>	Elgiloy
	<b>T</b>	Hastelloy C
<b>11</b>		<b>Valve Spring Retainers</b>
	<b>C</b>	Celcon
	<b>H</b>	17-7 Stainless Steel
	<b>M</b>	PVDF
	<b>P</b>	Polypropylene
	<b>T</b>	Hastelloy C
	<b>Y</b>	Nylon
<b>12</b>		<b>Hydra-Oil</b>
	<b>G</b>	5W30 cold-temp severe-duty synthetic oil
	<b>J</b>	EPDM-compatible oil
	<b>K</b>	Food-contact oil

**Note:** For motors, bases, couplings and other pump accessories, refer to the Accessories section beginning on page 92.

# G03 Series

Maximum Flow Rate: 3.1 gpm (11.7 l/min)  
Maximum Pressure: 1200 psi (83 bar) for Metallic Pump Heads  
350 psi (24 bar) for Non-metallic Pump Heads



*G13 Close-coupled with Brass pump head*



*G13 Close-coupled with Polypropylene pump head*



*G03 Shaft-driven with Stainless Steel pump head*



# G03 Series Performance

## Capacities

### Flow

Model	Max. Input rpm	Max. Flow @ 1000 psi (69 bar)	
		gpm	l/min
G03-X	1750	3.1	11.7
G03-E	1750	2.2	8.3
G03-S	1750	1.7	6.4
G03-B	1750	1.0	3.6
G03-G	1750	0.6	2.3
<b>@ 1200 psi (83 bar)</b>			
G03-E	1750	2.1	8.1
G03-S	1750	1.6	6.3
G03-B	1750	0.9	3.5
G03-G	1750	0.6	2.2

### Pressure

**Maximum Inlet Pressure**  
250 psi (17 bar)

**Maximum Discharge Pressure**

Metallic Pump Heads:

G03-X to 1000 psi (69 bar)

G03-S, E, B, G to 1200 psi (83 bar)

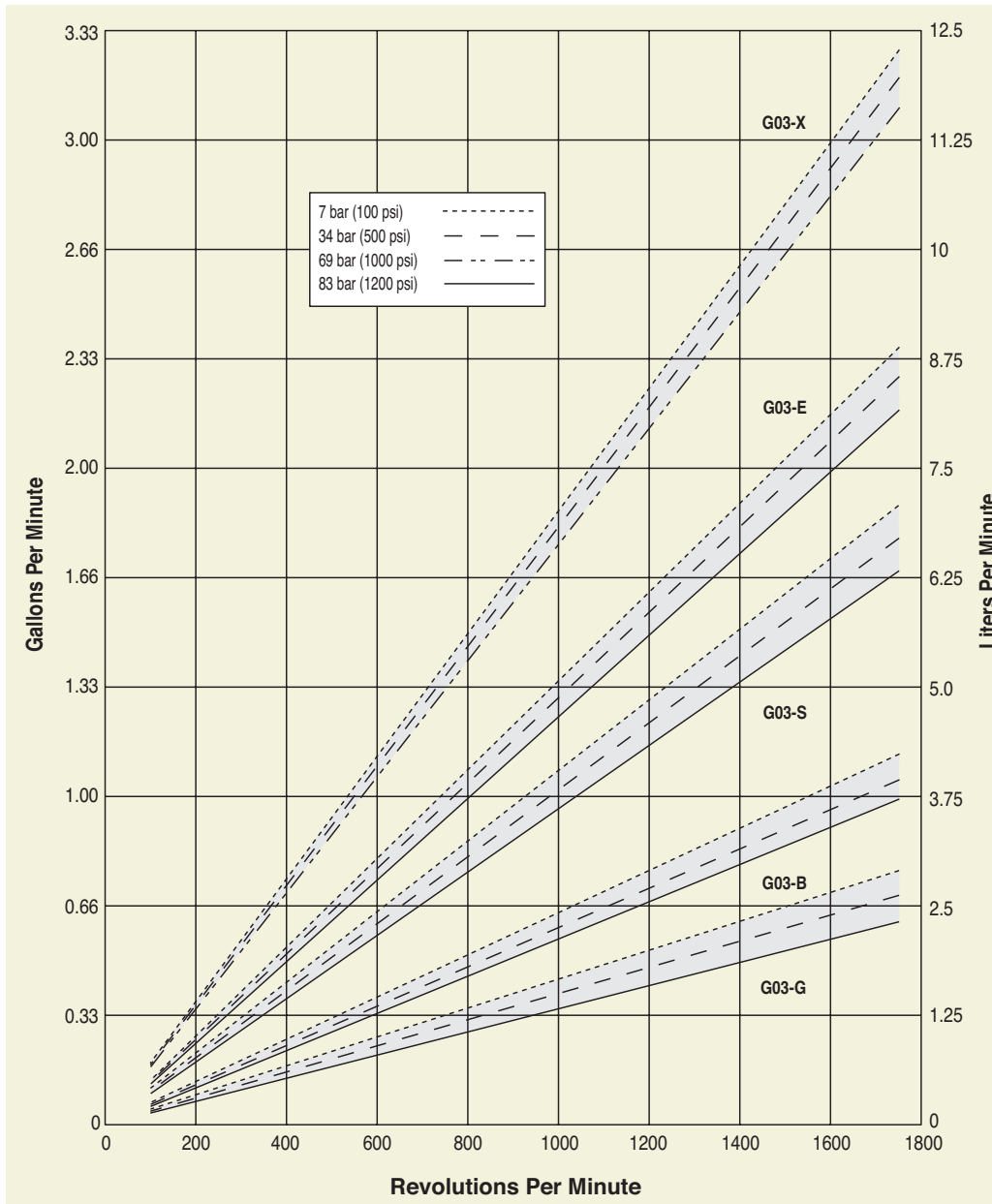
Non-metallic Pump Heads:

250 psi (17 bar) Polypropylene

350 psi (24 bar) PVDF

Performance and specification ratings apply to G03 Kel-Cell and G03 Shaft-driven configurations unless specifically noted otherwise.

## Maximum Flow at Designated Pressure



# G03 Series Specifications

## Flow Capacities @ 69 bar (1000 psi) 4-pole Motor @ 50 Hz

Model	rpm	gpm	l/min
G03-X	1450	2.45	9.3
G03-E	1450	1.80	6.8
G03-S	1450	1.48	5.6
G03-B	1450	0.92	3.5
G03-G	1450	0.40	1.5

## Flow Capacities @ 69 bar (1000 psi) 6-pole Motor @ 50 Hz

Model	rpm	gpm	l/min
G03-X	960	1.64	6.2
G03-E	960	1.18	4.5
G03-S	960	0.98	3.7
G03-B	960	0.60	2.3
G03-G	960	0.26	1.0

## Delivery @ 83 bar (1200 psi)

Model	gal/rev	liters/rev
G03-E	0.0012	0.0046
G03-S	0.0009	0.0036
G03-B	0.0005	0.0020
G03-G	0.0003	0.0013

## Delivery @ 69 bar (1000 psi)

Model	gal/rev	liters/rev
G03-X	0.0018	0.0067
G03-E	0.0013	0.0047
G03-S	0.0010	0.0037
G03-B	0.0005	0.0021
G03-G	0.0004	0.0013

## Maximum Discharge Pressure

Metallc Heads:	G03-X to 69 bar (1000 psi) G03-S, E, B to 83 bar (1200 psi)
Non-metallc Heads:	17 bar (250 psi) Polypropylene 24 bar (350 psi) PVDF

## Maximum Inlet Pressure 17 bar (250 psi)

## Maximum Operating Temperature

Metallc Heads:	121 °C (250 °F) - Consult factory for correct component selection for temperatures from 71 °C (160 °F) to 121 °C (250 °F).
Non-metallc Heads:	60 °C (140 °F)

## Maximum Solids Size 200 microns

## Inlet Port 1/2 inch BSPT 1/2 inch NPT

## Discharge Port 3/8 inch BSPT 3/8 inch NPT

## Shaft Diameter G13: 24 mm hollow shaft G03: 22.2 mm (7/8 inch)

## Shaft Rotation Reverse (bi-directional)

## Bearings Precision ball bearings

## Oil Capacity 0.95 liters (1.0 US quart) - See pages 96 and 97 for oil selection and specification.

## Weight

Metallc Heads:	12.7 kg (28 lbs.)
Non-metallc Heads:	8.6 kg (19 lbs.)

## Calculating Required Power

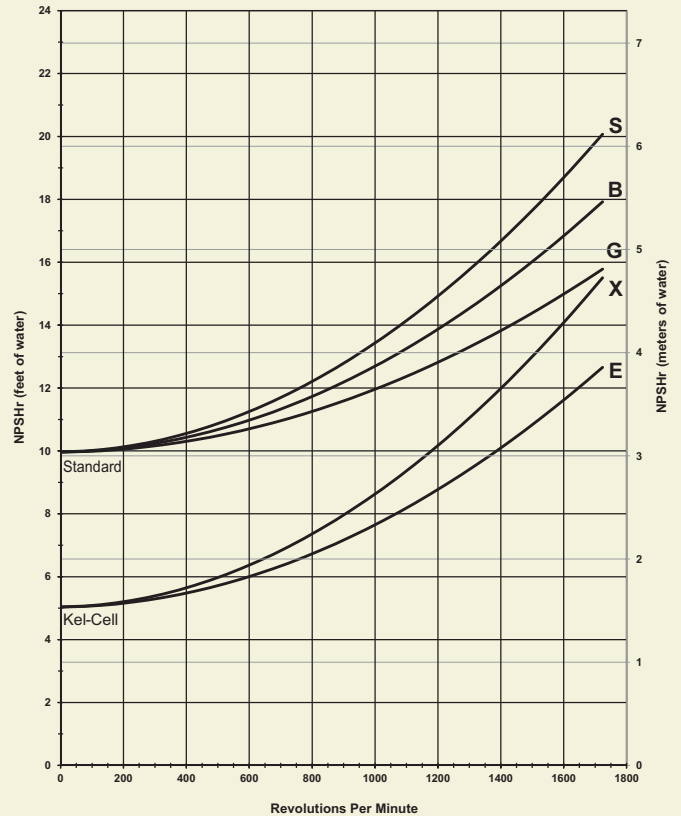
$$\frac{6 \times \text{rpm}}{63,000} + \frac{\text{gpm} \times \text{psi}}{1,460} = \text{electric motor hp}$$

$$\frac{6 \times \text{rpm}}{84,428} + \frac{\text{l/min} \times \text{bar}}{511} = \text{electric motor kW}$$

See page 164 for calculating pulley size.

When using a variable frequency drive (VFD) calculate the hp or kW at minimum and maximum pump speed to ensure the correct hp or kW motor is selected. Note that motor manufacturers typically de-rate the service factor to 1.0 when operating with a VFD.

## Net Positive Suction Head (NPSHr)



Note: Positive inlet pressure required with PTFE diaphragms.

## Self-priming:

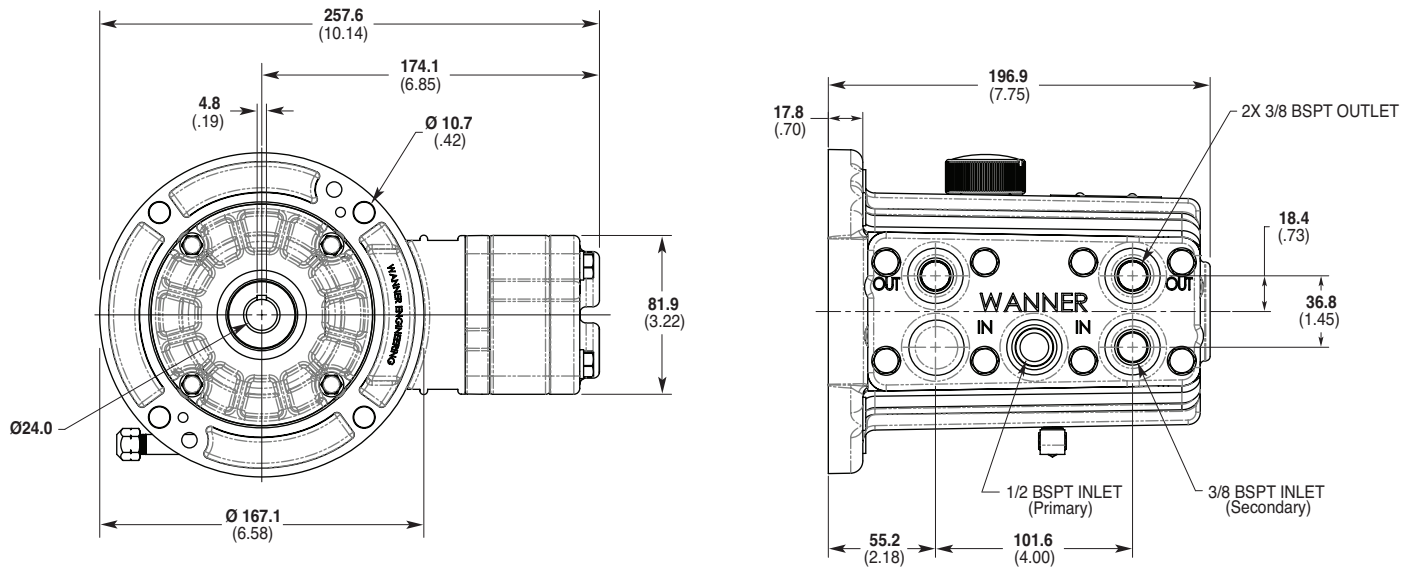
Each Hydra-Cell pump has different lift capability depending on model size, cam angle, speed, and fluid characteristics. To ensure that your specific lift characteristics are met, refer to the inlet calculations regarding friction, and acceleration head losses in your Hydra-Cell Installation & Service Manual. Compare those calculations to the NPSHr curves above.

For technical assistance in pump selection, see Frequently Asked Questions on page 162, Design Considerations on page 163, and Installation Guidelines on pages 164-165.

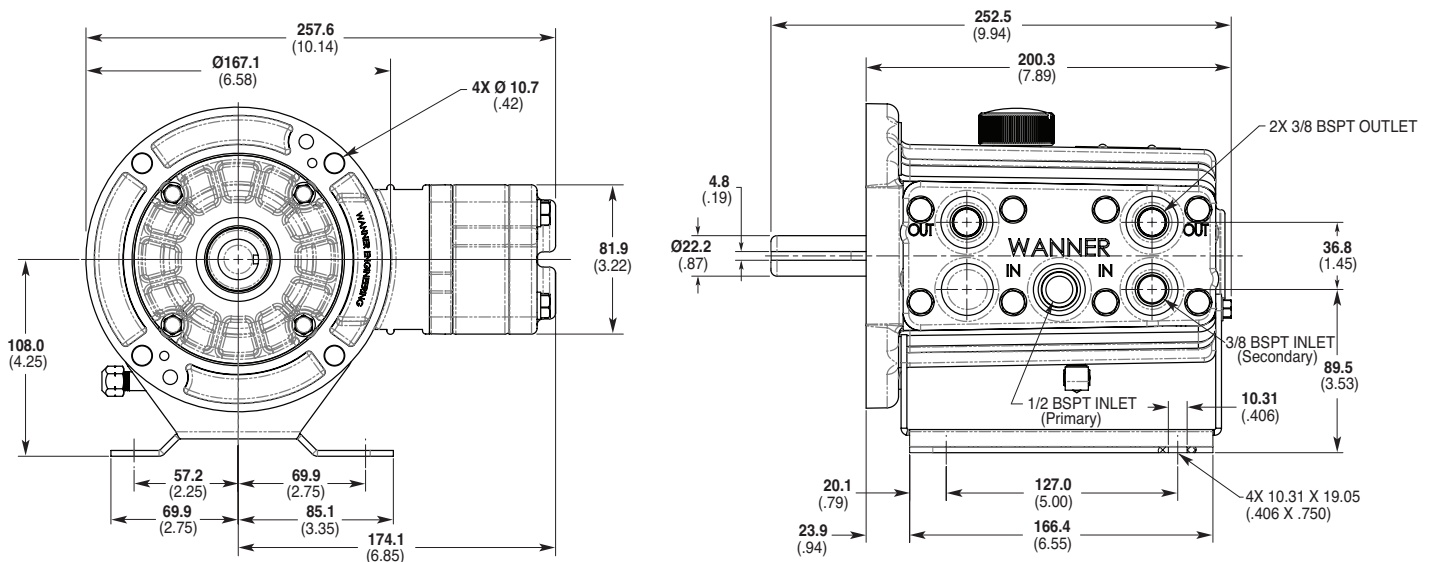


# G03 Series Representative Drawings

## G13 Models with Metallic Pump Head mm (Inches)



## G03 Models with Metallic Pump Head mm (Inches)



**Note:** Contact factory for additional drawings of specific models and configurations.

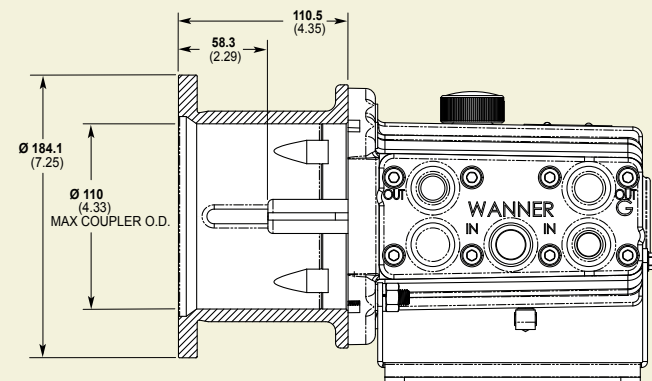
# G03 Series **Adapters/Valves**

## Pump/Motor Adapter mm (Inches)

### Part Number: **A04-003-1202**

Must be ordered separately for G03 models for use with IEC 80 - 90 frame motors, B5 flange.

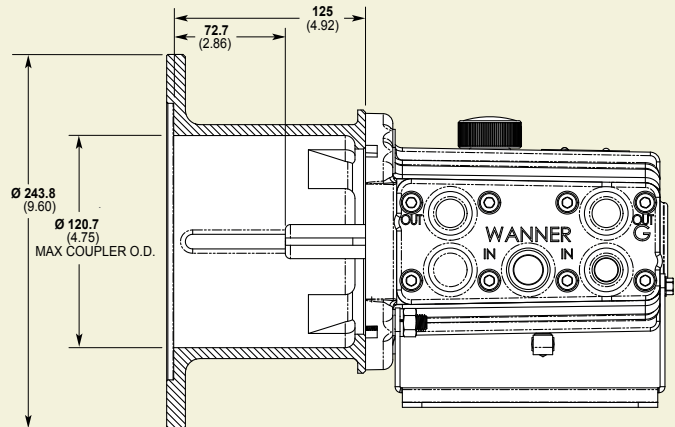
*NEMA adapter available - consult factory.*



### Part Number: **A04-004-1202**

Must be ordered separately for G03 models for use with IEC 100 - 112 frame motors, B5 flange.

*NEMA adapter available - consult factory.*



## Valve Selection

A Hydra-Cell G03 pumping system uses a C46 Pressure Regulating Valve.

See page 86 for more information.





# G03 Series **How to Order**

## Ordering Information

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

A complete G03 Series Model Number contains 12 digits including 9 customer-specified design and materials options, for example: G03XKSTHFCA.

Digit	Order Code	Description
<b>1-3</b>	<b>G03</b>	<b>Pump Configuration</b> Shaft-driven (BSPT Ports)*
	<b>G13</b>	Close-coupled to IEC 90 footed motor (BSPT Ports) *Pump/motor adapters ordered separately. See previous page.
<b>4</b>	<b>X</b>	<b>Hydraulic End Cam</b> Max 9.9 l/min (2.6 gpm) @ 1450 rpm
	<b>E</b>	Max 6.8 l/min (1.8 gpm) @ 1450 rpm
	<b>S</b>	Max 5.6 l/min (1.5 gpm) @ 1450 rpm
	<b>B</b>	Max 3.5 l/min (0.9 gpm) @ 1450 rpm
	<b>G</b>	Max 1.5 l/min (0.4 gpm) @ 1450 rpm
<b>5</b>		<b>Pump Head Version</b>
	<b>D</b>	Standard BSPT Ports (S, B & G cams)
	<b>K</b>	Kel-Cell BSPT Ports (X & E cams)
	<b>X</b>	ATEX (Note: ATEX 94/9/EC Certified, Category 2, Zone 1. Includes certificate and oil level monitor.)
<b>6</b>		<b>Pump Head Material</b>
	<b>B</b>	Brass
	<b>M</b>	PVDF
	<b>P</b>	Polypropylene
	<b>S</b>	316L Stainless Steel
	<b>T</b>	Hastelloy CW12MW
<b>7</b>		<b>Diaphragm &amp; O-ring Material</b>
	<b>A</b>	Aflas diaphragm/PTFE O-ring
	<b>E</b>	EPDM (requires EPDM-compatible oil - Digit 12 oil code J)
	<b>G</b>	FKM
	<b>J</b>	PTFE (available with X and E cams, Kel-Cell version only)
	<b>P</b>	Neoprene
	<b>T</b>	Buna-N
<b>8</b>		<b>Valve Seat Material</b>
	<b>C</b>	Ceramic
	<b>D</b>	Tungsten Carbide
	<b>H</b>	17-4 Stainless Steel
	<b>S</b>	316L Stainless Steel
	<b>T</b>	Hastelloy C

Digit	Order Code	Description
<b>9</b>		<b>Valve Material</b>
	<b>C</b>	Ceramic
	<b>D</b>	Tungsten Carbide
	<b>F</b>	17-4 Stainless Steel
	<b>N</b>	Nitronic 50
	<b>T</b>	Hastelloy C
<b>10</b>		<b>Valve Springs</b>
	<b>E</b>	Elgiloy
	<b>S</b>	316L Stainless Steel
	<b>T</b>	Hastelloy C
<b>11</b>		<b>Valve Spring Retainers</b>
	<b>C</b>	Celcon
	<b>H</b>	17-7 Stainless Steel
	<b>M</b>	PVDF
	<b>P</b>	Polypropylene
	<b>T</b>	Hastelloy C
	<b>Y</b>	Nylon
<b>12</b>		<b>Hydra-Oil</b>
	<b>A</b>	10W30 standard-duty oil
	<b>G</b>	5W30 cold-temp severe-duty synthetic oil
	<b>J</b>	EPDM-compatible oil
	<b>K</b>	Food-contact oil

**Note:** For motors, bases, couplings and other pump accessories, refer to the Accessories section beginning on page 92.

# G03 Mono-Block Series

Maximum Flow Rate: 3.1 gpm (11.7 l/min)

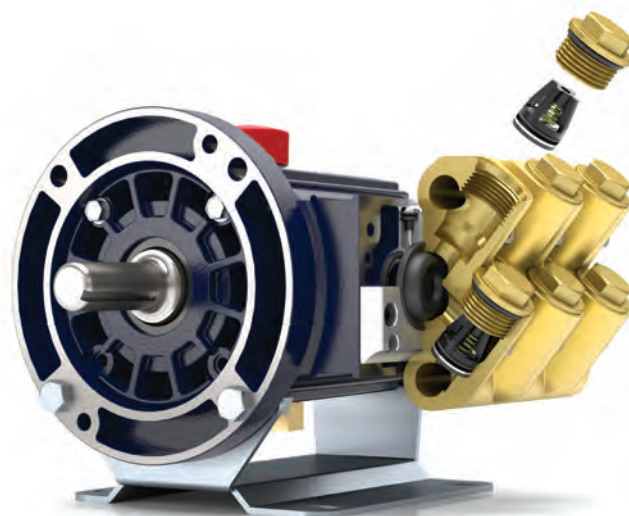
Maximum Pressure: 1000 psi (69 bar) for Metallic Pump Heads



*Mono-Block (G13) Close-coupled with Stainless Steel pump head*



*Mono-Block (G03) Shaft-driven with Brass pump head*



The Mono-Block pump head combines the valve plate and manifold into one component for servicing without disassembly or removal of plumbing.



# G03 Mono-Block Series Performance

## Capacities

### Flow

Model	Max. Input rpm	Max. Flow @ 1000 psi (69 bar)	
		gpm	l/min
G03-X	1750	3.1	11.7
G03-E	1750	2.2	8.3

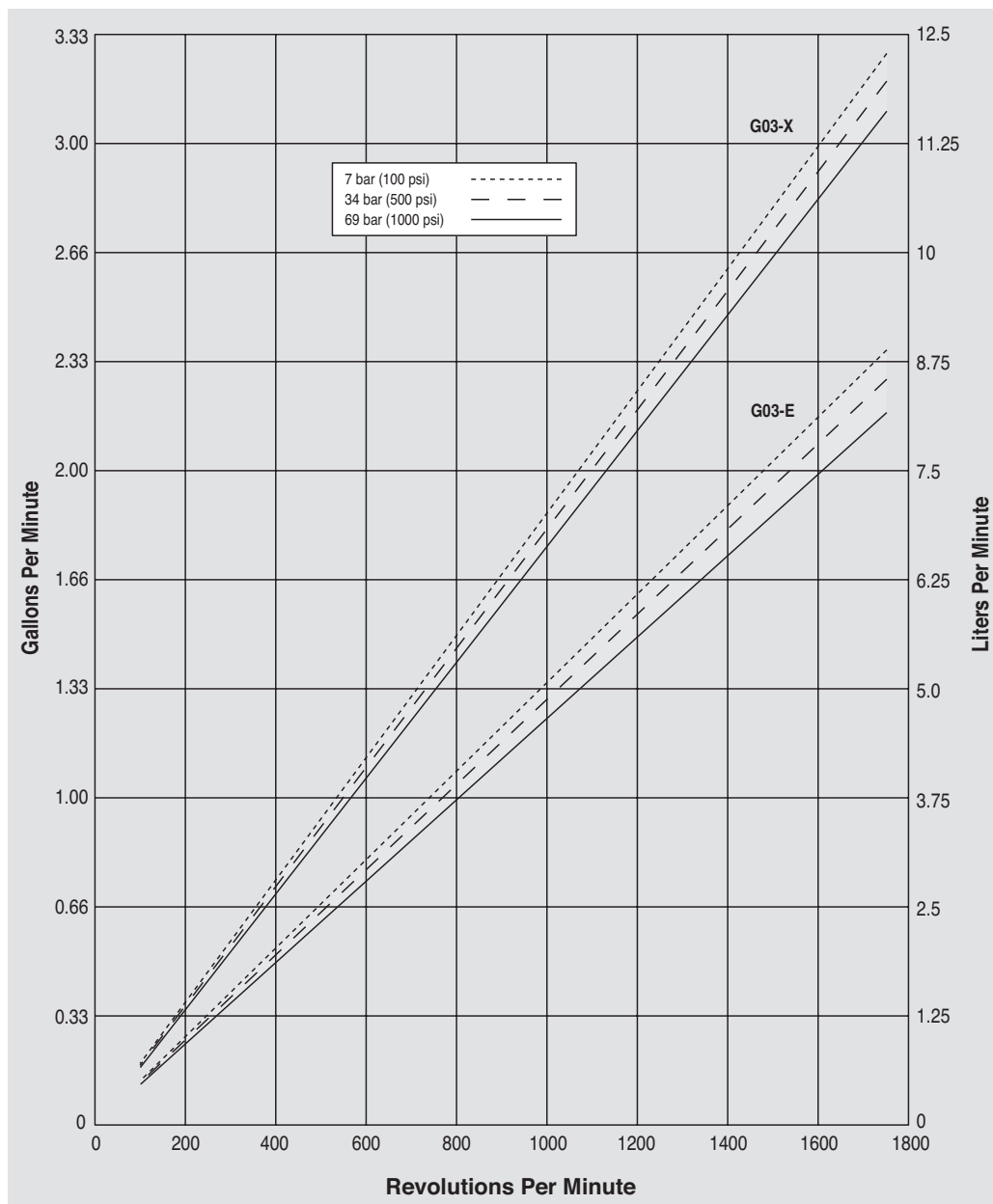
### Pressure

**Maximum Inlet Pressure**  
250 psi (17 bar)

**Maximum Discharge Pressure**  
1000 psi (69 bar)

Performance and specification ratings apply to G03 Mono-Block configurations unless specifically noted otherwise.

## Maximum Flow at Designated Pressure



# G03 Mono-Block Series Specifications

## Flow Capacities @ 69 bar (1000 psi) 4-pole Motor @ 50 Hz

Model	rpm	gpm	l/min
G03-X	1450	2.45	9.3
G03-E	1450	1.80	6.8

## Flow Capacities @ 69 bar (1000 psi) 6-pole Motor @ 50 Hz

Model	rpm	gpm	l/min
G03-X	960	1.64	6.2
G03-E	960	1.18	4.5

## Delivery @ 69 bar (1000 psi)

Model	gal/rev	liters/rev
G03-X	0.0018	0.0067
G03-E	0.0013	0.0047

## Maximum Discharge Pressure

Metallic Heads: G03-X, E to 69 bar (1000 psi)

## Maximum Inlet Pressure 17 bar (250 psi)

## Maximum Operating Temperature

Metallic Heads: 121 °C (250 °F) - Consult factory for correct component selection for temperatures from 71 °C (160 °F) to 121 °C (250 °F).

## Maximum Solids Size 200 microns

## Inlet Port 1/2 inch BSPT

1/2 inch NPT

## Discharge Port 1/2 inch BSPT

1/2 inch NPT

## Shaft Diameter G03: 22.2 mm (7/8 inch)

G13: 24 mm hollow shaft

## Shaft Rotation Reverse (bi-directional)

## Bearings Precision ball bearings

## Oil Capacity 0.95 liters (1.0 US quart) - See pages 96 and 97 for oil selection and specification.

## Weight

Metallic Heads: 12.7 kg (28 lbs.)

## Calculating Required Power

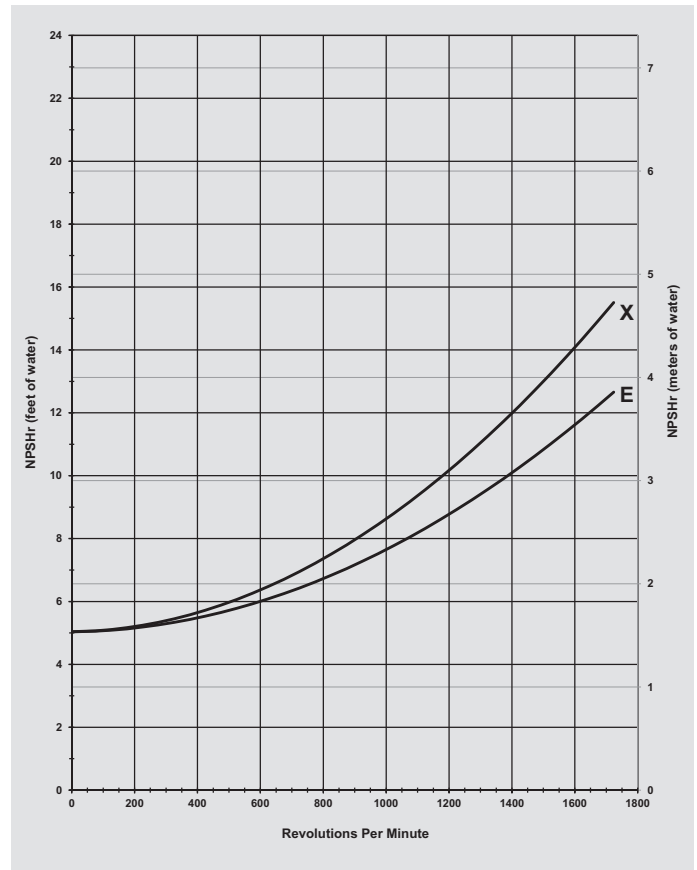
$$\frac{6 \times \text{rpm}}{63,000} + \frac{\text{gpm} \times \text{psi}}{1,460} = \text{electric motor hp}$$

$$\frac{6 \times \text{rpm}}{84,428} + \frac{\text{l/min} \times \text{bar}}{511} = \text{electric motor kW}$$

See page 164 for calculating pulley size.

When using a variable frequency drive (VFD) calculate the hp or kW at minimum and maximum pump speed to ensure the correct hp or kW motor is selected. Note that motor manufacturers typically de-rate the service factor to 1.0 when operating with a VFD.

## Net Positive Suction Head (NPSHr)



## Self-priming:

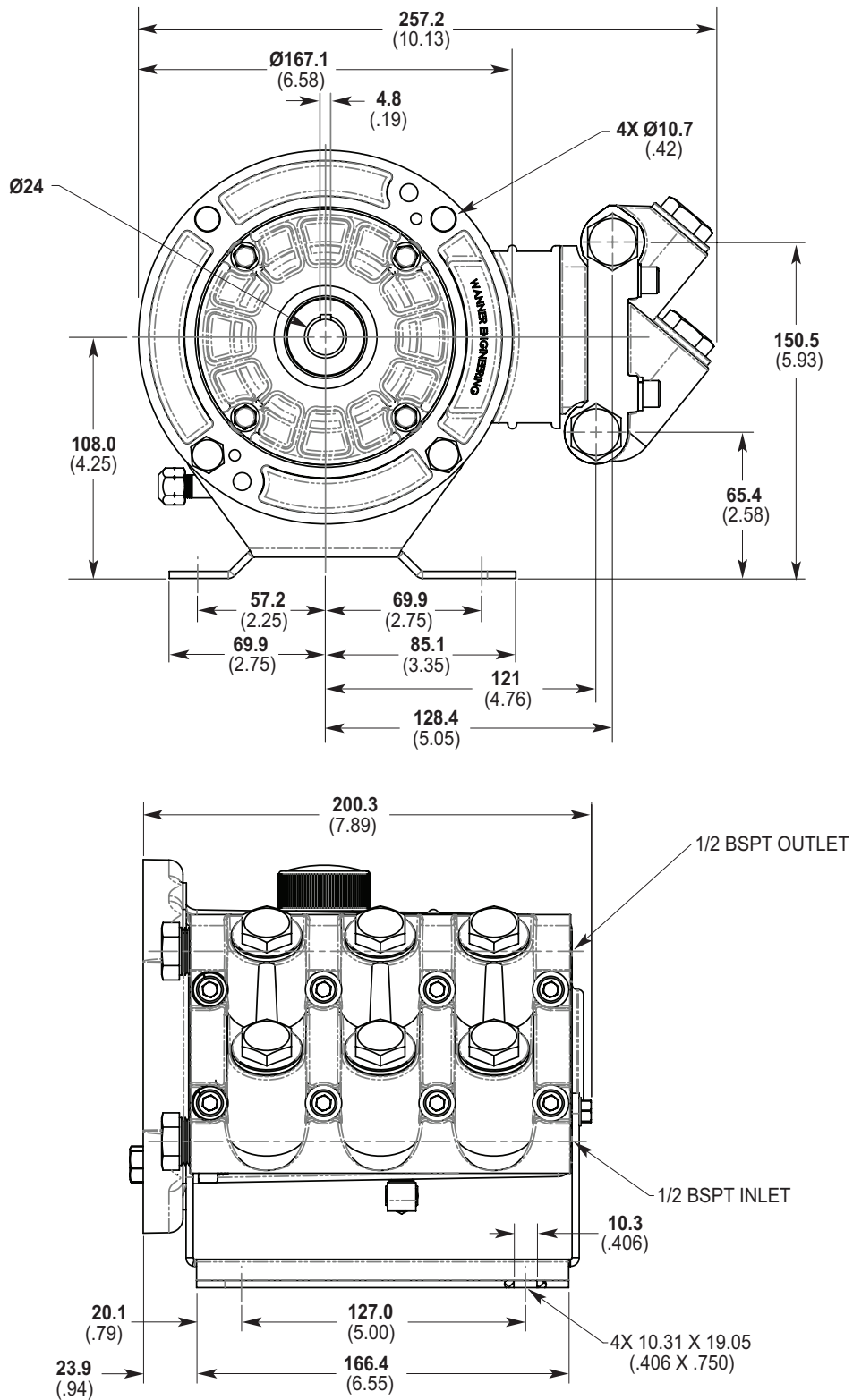
Each Hydra-Cell pump has different lift capability depending on model size, cam angle, speed, and fluid characteristics. To ensure that your specific lift characteristics are met, refer to the inlet calculations regarding friction, and acceleration head losses in your Hydra-Cell Installation & Service Manual. Compare those calculations to the NPSHr curves above.

For technical assistance in pump selection, see Frequently Asked Questions on page 162, Design Considerations on page 163, and Installation Guidelines on pages 164-165.



# G03 Mono-Block Series Representative Drawings

## G13 Models with Metallic Pump Head mm (Inches)



**Note:** Contact factory for additional drawings of specific models and configurations.

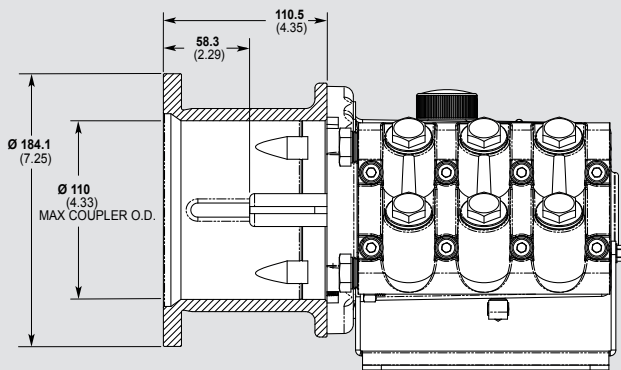
# G03 Mono-Block Series Adapters/Valves

## Pump/Motor Adapter mm (Inches)

### Part Number: A04-003-I202

Must be ordered separately for G03 Mono-Block models for use with IEC 80 - 90 frame motors, B5 flange.

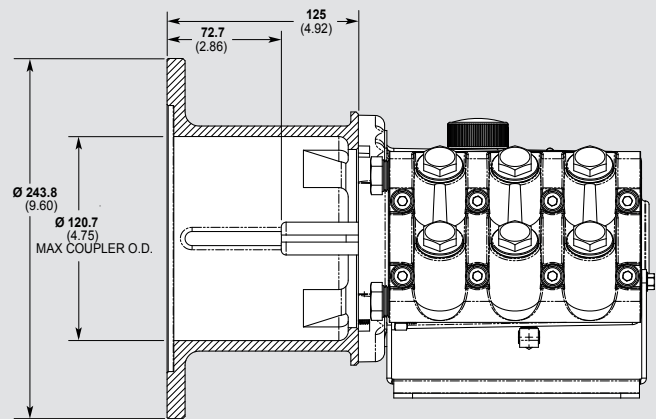
*NEMA adapter available - consult factory.*



### Part Number: A04-004-I202

Must be ordered separately for G03 Mono-Block models for use with IEC 100 - 112 frame motors, B5 flange.

*NEMA adapter available - consult factory.*



## Valve Selection

A Hydra-Cell G03 Mono-Block Series pumping system uses a C46 Pressure Regulating Valve.

See page 86 for more information.





# G03 Mono-Block Series How to Order

## Ordering Information

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

A complete G03 Mono-Block Series Model Number contains 12 digits including 9 customer-specified design and materials options, for example: G03EMBPSFEPG.

Digit	Order Code	Description
1-3	<b>G03</b>	<b>Pump Configuration</b> Shaft-driven (BSPT Ports)*
	<b>G13</b>	Close-coupled to IEC 90 footed motor (BSPT Ports) *Pump/motor adapters ordered separately. See previous page.
4	<b>X</b>	<b>Hydraulic End Cam</b> Max 9.9 l/min (2.6 gpm) @ 1450 rpm
	<b>E</b>	Max 6.8 l/min (1.8 gpm) @ 1450 rpm
5	<b>M</b>	<b>Pump Head Version</b> Mono-Block, Kel-Cell BSPT Ports
	<b>X</b>	ATEX (Note: ATEX 94/9/EC Certified, Category 2, Zone 1. Includes certificate and oil level monitor.)
6	<b>B</b>	<b>Pump Head Material</b> Brass
	<b>S</b>	316L Stainless Steel
7	<b>E</b>	<b>Diaphragm &amp; O-ring Material</b> EPDM (requires EPDM-compatible oil - Digit 12 oil code J)
	<b>G</b>	FKM
	<b>P</b>	Neoprene
	<b>T</b>	Buna-N
8	<b>H</b>	<b>Valve Seat Material</b> 17-4 Stainless Steel
	<b>S</b>	316L Stainless Steel
9	<b>F</b>	<b>Valve Material</b> 17-4 Stainless Steel
	<b>N</b>	Nitronic 50
10	<b>E</b>	<b>Valve Springs</b> Elgiloy
	<b>S</b>	316L Stainless Steel

Digit	Order Code	Description
11	<b>M</b>	<b>Valve Spring Retainers</b> PVDF
	<b>P</b>	Polypropylene
12	<b>A</b>	<b>Hydra-Oil</b> 10W30 standard-duty oil
	<b>G</b>	5W30 cold-temp severe-duty synthetic oil
	<b>J</b>	EPDM-compatible oil
	<b>K</b>	Food-contact oil

**Note:** For motors, bases, couplings and other pump accessories, refer to the Accessories section beginning on page 92.

## G04 Series

---

Maximum Flow Rate: 2.9 gpm (11.2 l/min)

Maximum Pressure: 2500 psi (172 bar) for Metallic Pump Heads



*G04 Shaft-driven with Stainless Steel pump head*



*G04 Shaft-driven with Brass pump head*



# G04 Series Performance

## Capacities

### Flow

Model	Max. Input rpm	Max. Flow @ 2500 psi (172 bar)	
		gpm	l/min
G04-X	1750	2.9	11.2
G04-E	1750	2.0	7.7
G04-S	1750	1.6	6.2

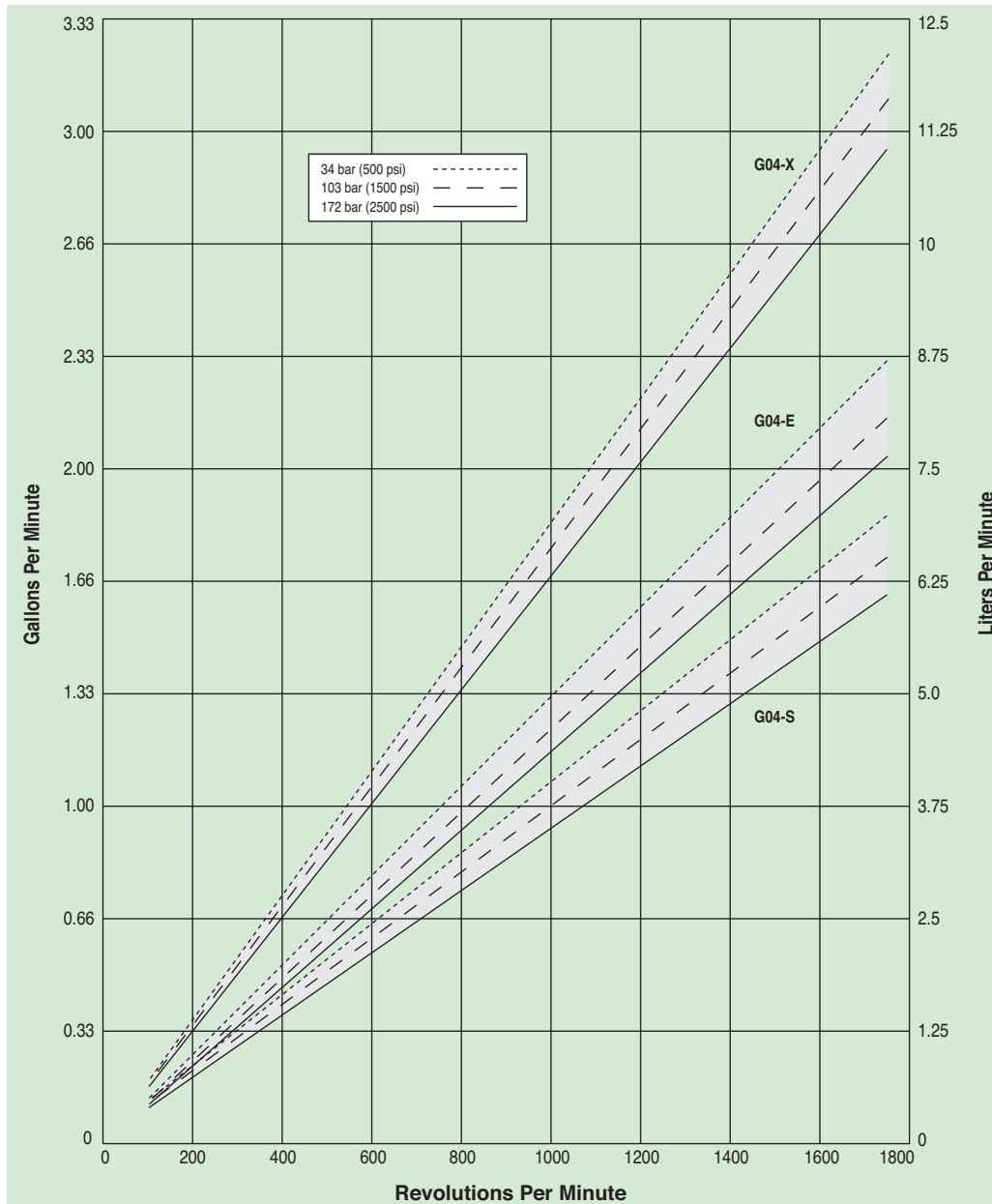
### Pressure

**Maximum Inlet Pressure**  
500 psi (34 bar)

**Maximum Discharge Pressure**  
2500 psi (172 bar)

Performance and specification ratings apply to G04 configurations unless specifically noted otherwise.

## Maximum Flow at Designated Pressure



# G04 Series Specifications

## Flow Capacities @ 172 bar (2500 psi) 4-pole Motor @ 50 Hz

Model	rpm	gpm	l/min
G04-X	1450	2.40	9.1
G04-E	1450	1.74	6.6
G04-S	1450	1.35	5.1

## Flow Capacities @ 172 bar (2500 psi) 6-pole Motor @ 50 Hz

Model	rpm	gpm	l/min
G04-X	960	1.58	6.0
G04-E	960	1.16	4.4
G04-S	960	0.87	3.3

## Delivery

Model	gal/rev		
	@34 bar (500 psi)	@103 bar (1500 psi)	@172 bar (2500 psi)
G04-X	0.0019	0.0018	0.0017
G04-E	0.0013	0.0012	0.0012
G04-S	0.0011	0.0010	0.0009

Model	liters/rev		
	@34 bar (500 psi)	@103 bar (1500 psi)	@172 bar (2500 psi)
G04-X	0.0070	0.0067	0.0064
G04-E	0.0050	0.0047	0.0044
G04-S	0.0041	0.0039	0.0035

## Maximum Discharge Pressure

Metallic Heads: 172 bar (2500 psi)

## Maximum Inlet Pressure 34 bar (500 psi)

## Maximum Operating Temperature

Metallic Heads: 121 °C (250 °F) - Consult factory for correct component selection for temperatures from 71 °C (160 °F) to 121 °C (250 °F).

## Maximum Solids Size 200 microns

**Inlet Port**  
1/2 inch BSPT  
1/2 inch NPT  
600lb ANSI RF flange

**Discharge Port**  
1/2 inch BSPT  
1/2 inch NPT  
2500lb ANSI RF flange

**Shaft Diameter** 22.2 mm (7/8 inch)

**Shaft Rotation** Reverse (bi-directional)

**Bearings** Precision ball bearings

**Oil Capacity** 1.05 liters (1.1 US quarts) - See pages 96 and 97 for oil selection and specification.

**Weight** 16.8 kg (37 lbs.)

## Calculating Required Power

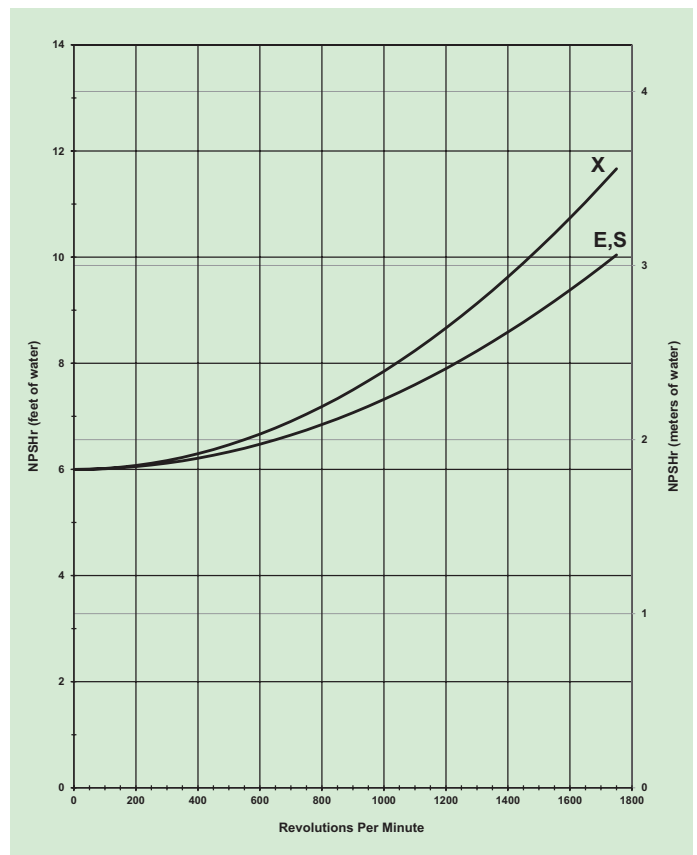
$$\frac{6 \times \text{rpm}}{63,000} + \frac{\text{gpm} \times \text{psi}}{1,460} = \text{electric motor hp}$$

$$\frac{6 \times \text{rpm}}{84,428} + \frac{\text{l/min} \times \text{bar}}{511} = \text{electric motor kW}$$

See page 164 for calculating pulley size.

When using a variable frequency drive (VFD) calculate the hp or kW at minimum and maximum pump speed to ensure the correct hp or kW motor is selected. Note that motor manufacturers typically de-rate the service factor to 1.0 when operating with a VFD.

## Net Positive Suction Head (NPSHr)



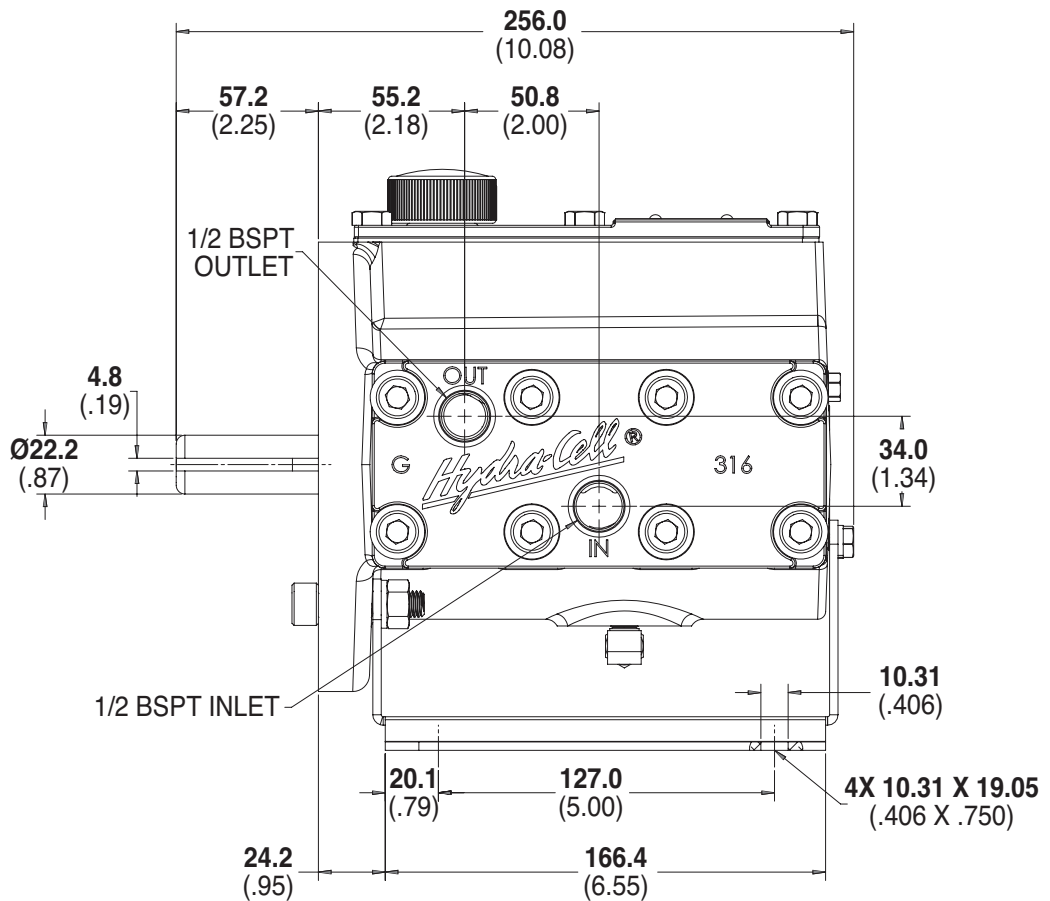
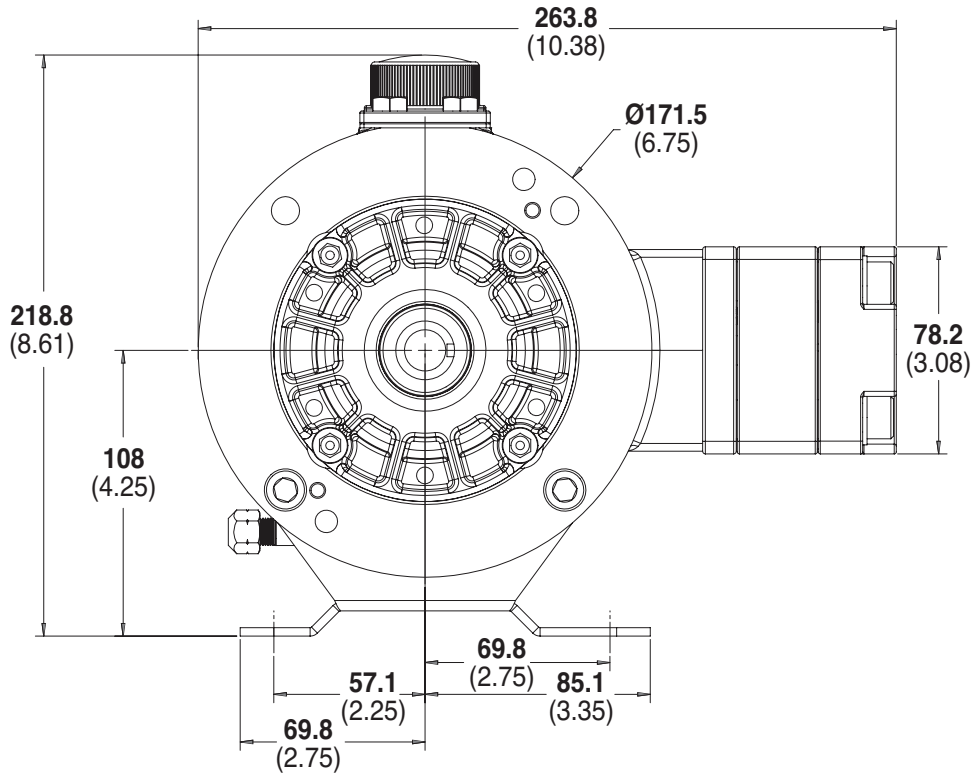
## Self-priming:

Each Hydra-Cell pump has different lift capability depending on model size, cam angle, speed, and fluid characteristics. To ensure that your specific lift characteristics are met, refer to the inlet calculations regarding friction, and acceleration head losses in your Hydra-Cell Installation & Service Manual. Compare those calculations to the NPSHr curves above.

For technical assistance in pump selection, see Frequently Asked Questions on page 162, Design Considerations on page 163, and Installation Guidelines on pages 164-165.

# G04 Series Representative Drawings

## G04 Models with Metallic Pump Head mm (Inches)



**Note:** Contact factory for additional drawings of specific models and configurations.



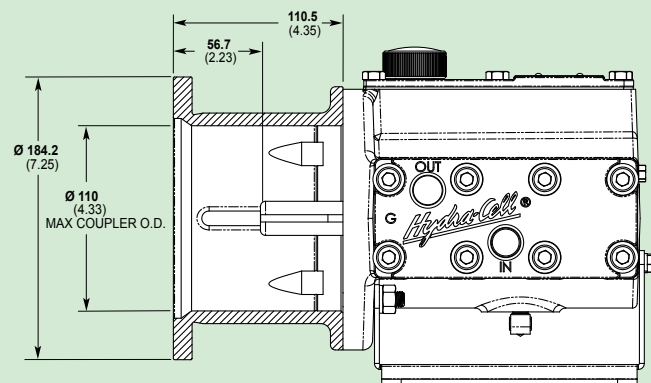
# G04 Series **Adapters/Valves**

## Pump/Motor Adapter mm (Inches)

### Part Number: A04-003-I202

Must be ordered separately for G04 models for use with IEC 80 - 90 frame motors, B5 flange.

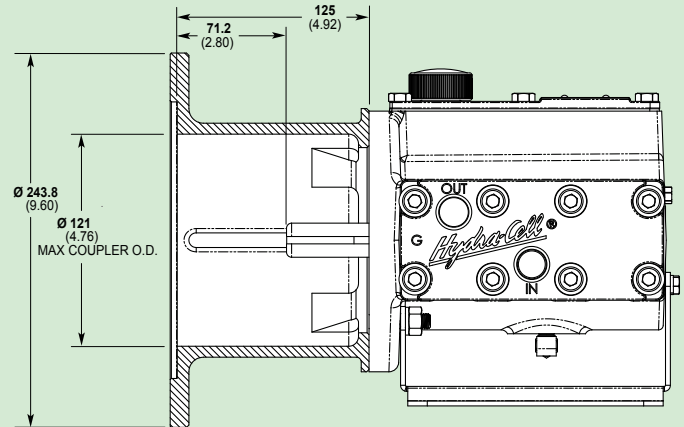
*NEMA adapter available - consult factory.*



### Part Number: A04-004-I202

Must be ordered separately for G04 models for use with IEC 100 - 112 frame motors, B5 flange.

*NEMA adapter available - consult factory.*



## Valve Selection

A seal-less C62 Pressure Regulating Valve is recommended for Hydra-Cell G04 pumping systems, especially for high-pressure requirements or when handling dirty fluids.

See page 88 for more information.



# G04 Series **How to Order**

## Ordering Information

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

A complete G04 Series Model Number contains 12 digits including 9 customer-specified design and materials options, for example: G04SABTHFECG.

Digit	Order Code	Description
<b>1-3</b>	<b>G04</b>	<b>Pump Configuration</b> Shaft-driven (BSPT Ports)* *Pump/motor adapters ordered separately. See previous page.
<b>4</b>	<b>X</b>	<b>Hydraulic End Cam</b> Max 9.1 l/min (2.4 gpm) @ 1450 rpm
	<b>E</b>	Max 6.6 l/min (1.7 gpm) @ 1450 rpm
	<b>S</b>	Max 5.1 l/min (1.3 gpm) @ 1450 rpm
<b>5</b>	<b>D</b>	<b>Pump Head Version</b> BSPT Ports
	<b>X</b>	ATEX <i>(Note: ATEX 94/9/EC Certified, Category 2, Zone 1. Includes certificate and oil level monitor.)</i>
<b>6</b>	<b>B</b>	<b>Pump Head Material</b> Brass
	<b>R</b>	304 Stainless Steel
	<b>S</b>	316L Stainless Steel
	<b>T</b>	Hastelloy C
<b>7</b>	<b>E</b>	<b>Diaphragm &amp; O-ring Material</b> EPDM (requires EPDM-compatible oil - Digit 12 oil code J)
	<b>G</b>	FKM
	<b>J</b>	PTFE
	<b>P</b>	Neoprene
	<b>T</b>	Buna-N
<b>8</b>	<b>D</b>	<b>Valve Seat Material</b> Tungsten Carbide
	<b>H</b>	17-4 Stainless Steel
	<b>N</b>	Nitronic 50
	<b>T</b>	Hastelloy C
<b>9</b>	<b>D</b>	<b>Valve Material</b> Tungsten Carbide
	<b>F</b>	17-4 Stainless Steel
	<b>N</b>	Nitronic 50
	<b>T</b>	Hastelloy C
<b>10</b>	<b>E</b>	<b>Valve Springs</b> Elgiloy
	<b>S</b>	316L Stainless Steel
	<b>T</b>	Hastelloy C

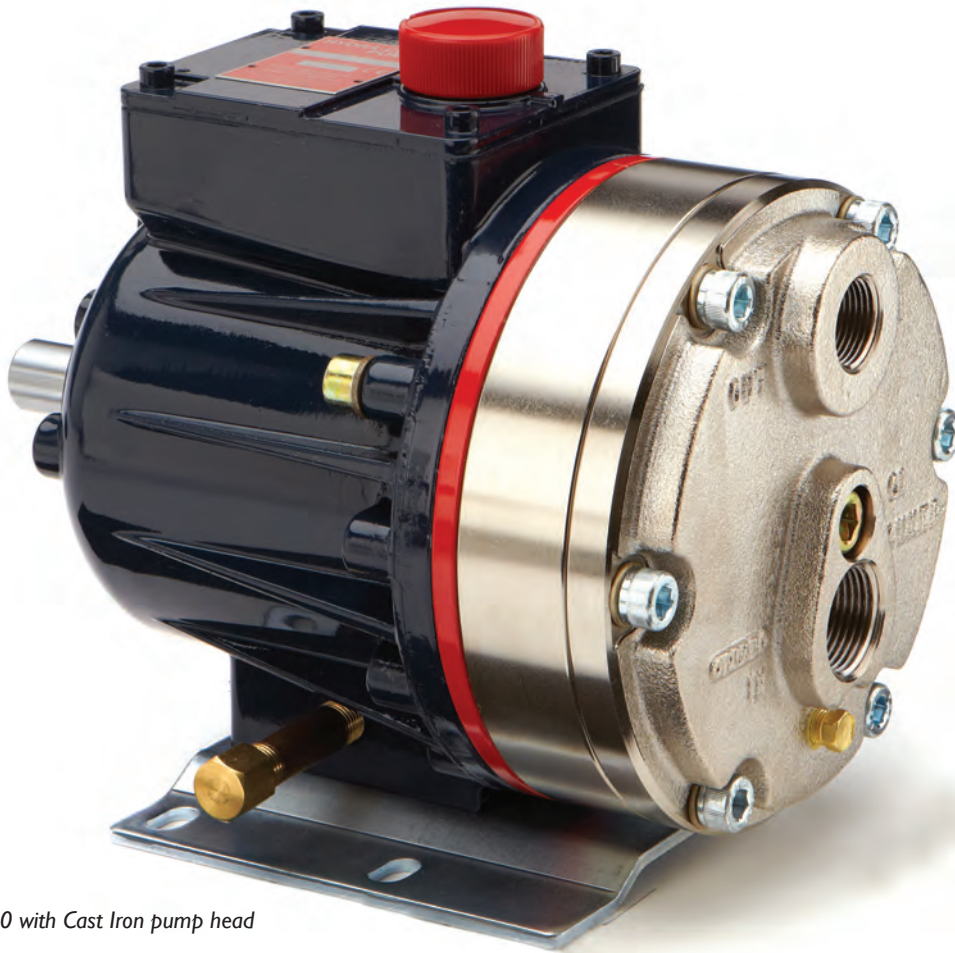
Digit	Order Code	Description
<b>11</b>		<b>Valve Spring Retainers</b>
	<b>C</b>	Celcon
	<b>H</b>	17-7 Stainless Steel
	<b>M</b>	PVDF
	<b>P</b>	Polypropylene
	<b>T</b>	Hastelloy C
	<b>Y</b>	Nylon
<b>12</b>		<b>Hydra-Oil</b>
	<b>G</b>	5W30 cold-temp severe-duty synthetic oil
	<b>J</b>	EPDM-compatible oil
	<b>K</b>	Food-contact oil

**Note:** For motors, bases, couplings and other pump accessories, refer to the Accessories section beginning on page 92.

# G10 Series

Maximum Flow Rate: 8.8 gpm (33.4 l/min)

Maximum Pressure: 1500 psi (103 bar) for Metallic Pump Heads  
350 psi (24 bar) for Non-metallic Pump Heads



*G10 with Cast Iron pump head*



*G10 with Brass pump head*



*G10 with Polypropylene pump head*



*G10 with Stainless Steel pump head and ANSI flanges*



# G10 Series Performance

## Capacities

### Flow

Model	Max. Input rpm	Max. Flow	
		@ 1000 psi (69 bar) gpm	@ 1000 psi (69 bar) l/min
G10-X	1450	8.1	30.6
G10-E	1750	8.8	33.4
G10-S	1750	6.0	22.7
G10-I	1750	4.0	15.0
@ 1500 psi (103 bar)			
G10-X	790	4.26	15.1
G10-E	790	3.87	14.7

### Pressure

**Maximum Inlet Pressure**  
250 psi (17 bar)

**Maximum Discharge Pressure**

Metallic Pump Heads:

G10-X, E, S, I to 1000 psi (69 bar)

G10-X to 1500 psi (103 bar) @ 790 rpm max.

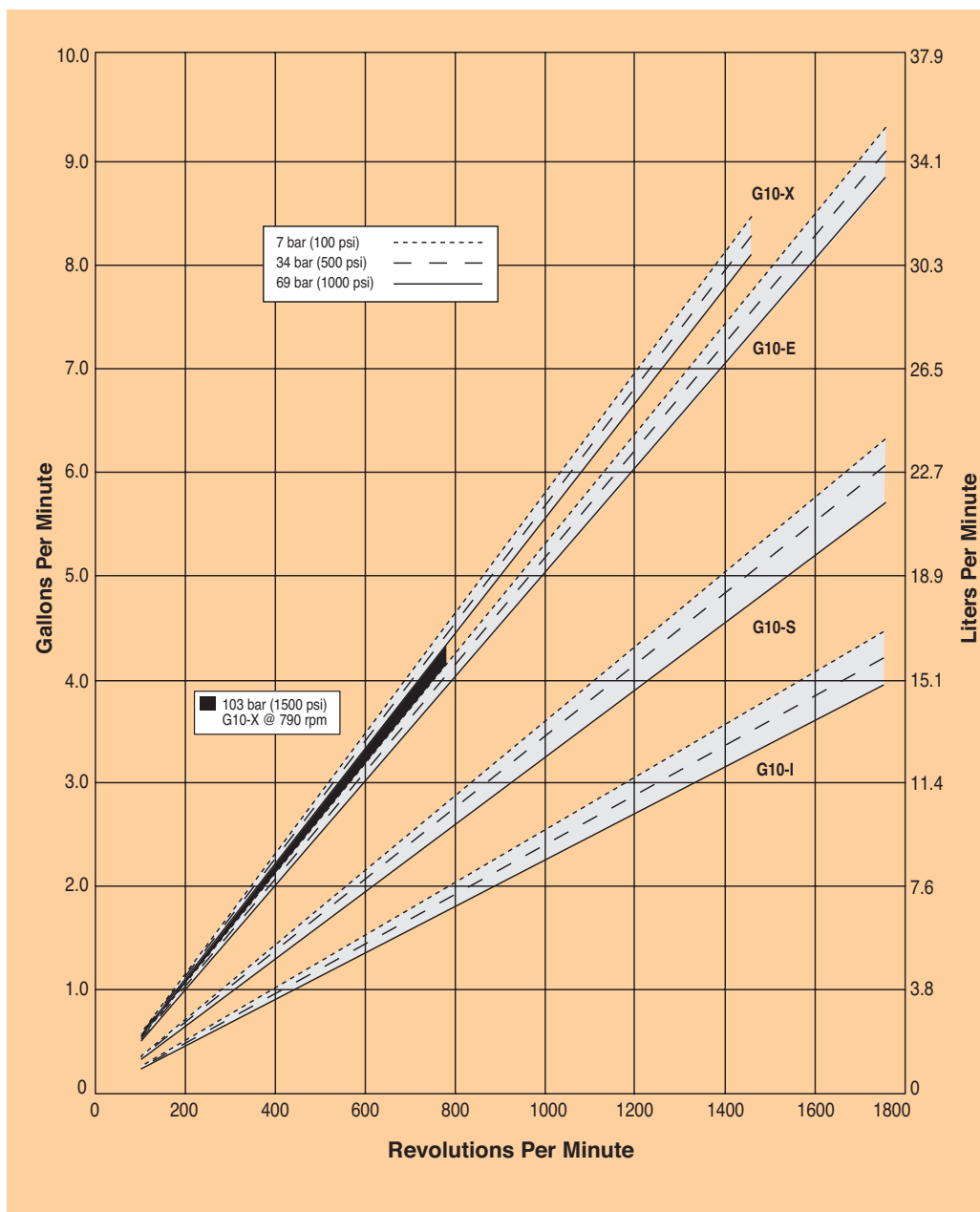
Non-metallic Pump Heads:

250 psi (17 bar) Polypropylene

350 psi (24 bar) PVDF

Performance and specification ratings apply to G10 configurations unless specifically noted otherwise.

## Maximum Flow at Designated Pressure



# G10 Series Specifications

## Flow Capacities @ 69 bar (1000 psi) 4-pole Motor @ 50 Hz

Model	rpm	gpm	l/min
G10-X	1450	8.10	30.6
G10-E	1450	6.63	25.1
G10-S	1450	4.96	18.8
G10-I	1450	3.30	12.5

## Flow Capacities @ 69 bar (1000 psi) 6-pole Motor @ 50 Hz

Model	rpm	gpm	l/min
G10-X	960	5.19	19.6
G10-E	960	4.39	16.6
G10-S	960	3.28	12.4
G10-I	960	2.19	8.3

## Delivery @ 103 bar (1500 psi)

Model	gal/rev	liters/rev
G10-X	0.0054	0.0205
G10-E	0.0049	0.0186

## Delivery @ 69 bar (1000 psi)

Model	gal/rev	liters/rev
G10-X	0.0056	0.0211
G10-E	0.0051	0.0191
G10-S	0.0034	0.0130
G10-I	0.0023	0.0086

## Maximum Discharge Pressure

Metallic Heads:	69 bar (1000 psi) @ 1450 rpm (G10-X)
	69 bar (1000 psi) @ 1750 rpm (G10-E, S, I)
	103 bar (1500 psi) @ 790 rpm (G10-X)
Non-metallic Heads:	17 bar (250 psi) Polypropylene
	24 bar (350 psi) PVDF

## Maximum Inlet Pressure 17 bar (250 psi)

## Maximum Operating Temperature

Metallic Heads:	121 °C (250 °F) - Consult factory for correct component selection for temperatures from 71 °C (160 °F) to 121 °C (250 °F).
Non-metallic Heads:	60 °C (140 °F)

## Maximum Solids Size 500 microns

Inlet Port	1 inch BSPT
	1 inch NPT
	150lb ANSI RF flange

Discharge Port	3/4 inch BSPT
	3/4 inch NPT
	600lb ANSI RF flange

## Shaft Diameter 22.2 mm (7/8 inch)

## Shaft Rotation Reverse (bi-directional)

## Bearings Tapered roller bearings

## Oil Capacity 1.05 liters (1.1 US quarts) - See pages 96 and 97 for oil selection and specification.

## Weight

Metallic Heads:	21.8 kg (48 lbs.)
Non-metallic Heads:	15.9 kg (35 lbs.)

## Calculating Required Power

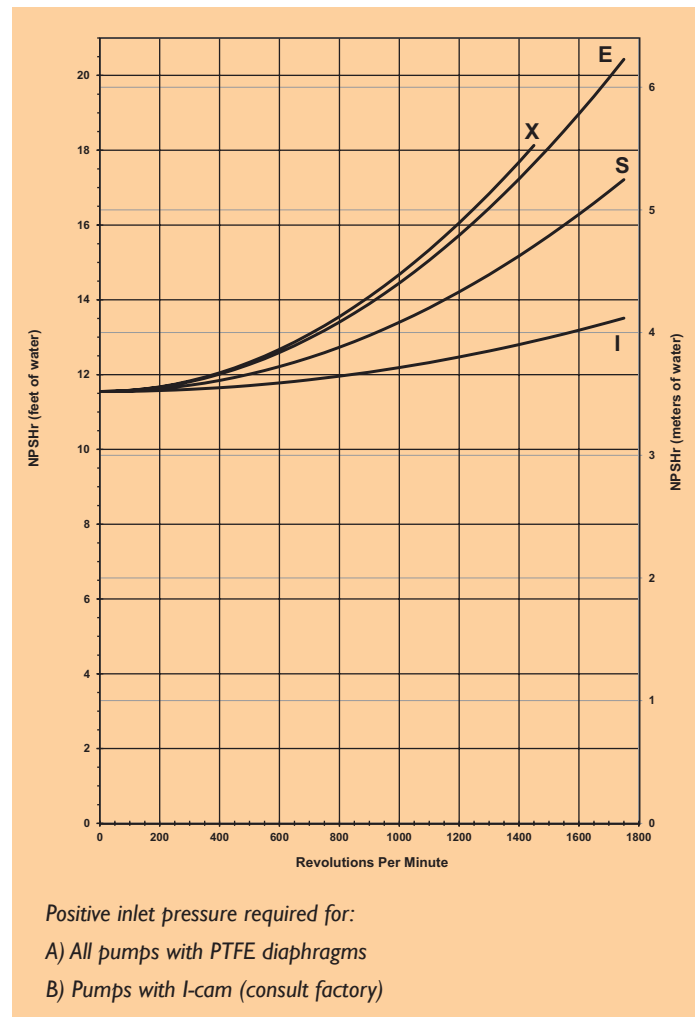
$$\frac{15 \times \text{rpm}}{63,000} + \frac{\text{gpm} \times \text{psi}}{1,460} = \text{electric motor hp}$$

$$\frac{15 \times \text{rpm}}{84,428} + \frac{\text{l/min} \times \text{bar}}{511} = \text{electric motor kW}$$

See page 164 for calculating pulley size.

When using a variable frequency drive (VFD) calculate the hp or kW at minimum and maximum pump speed to ensure the correct hp or kW motor is selected. Note that motor manufacturers typically de-rate the service factor to 1.0 when operating with a VFD.

## Net Positive Suction Head (NPSHr)



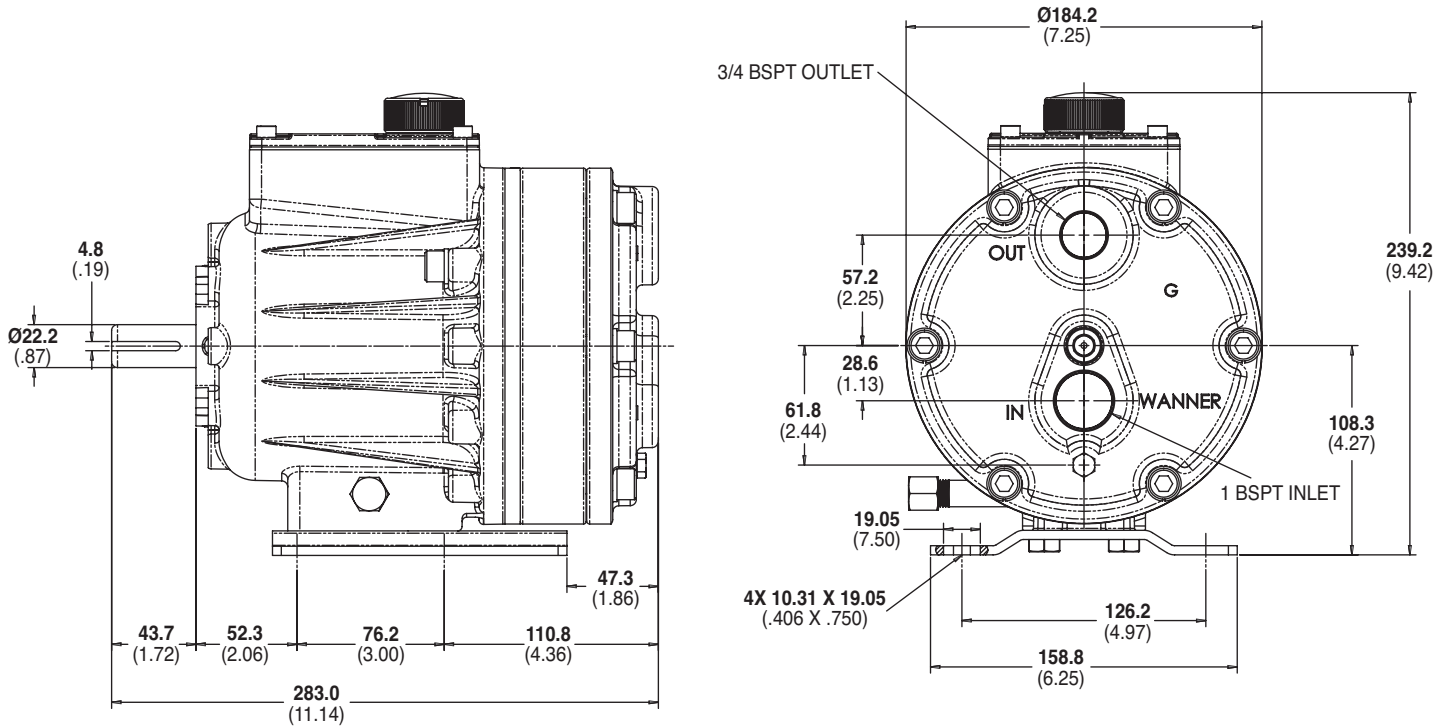
## Self-priming:

Each Hydra-Cell pump has different lift capability depending on model size, cam angle, speed, and fluid characteristics. To ensure that your specific lift characteristics are met, refer to the inlet calculations regarding friction, and acceleration head losses in your Hydra-Cell Installation & Service Manual. Compare those calculations to the NPSHr curves above.

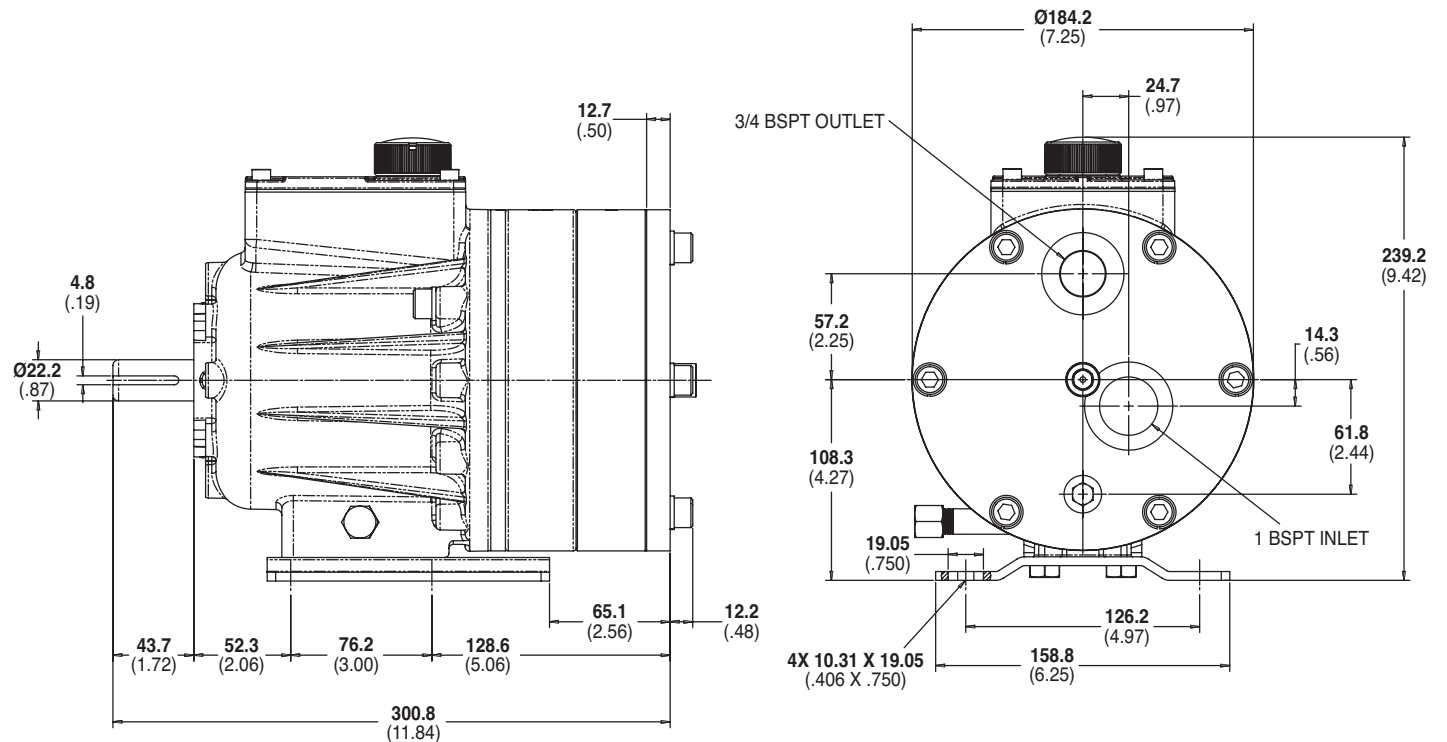
For technical assistance in pump selection, see Frequently Asked Questions on page 162, Design Considerations on page 163, and Installation Guidelines on pages 164-165.

# G10 Series Representative Drawings

## G10 Models with Metallic Pump Head mm (Inches)



## G10 Models with Non-metallic Pump Head mm (Inches)



**Note:** Contact factory for additional drawings of specific models and configurations.



# G10 Series **Adapters/Valves/Skids**

## Pump/Motor Adapter mm (Inches)

### Part Number: A04-003-I200

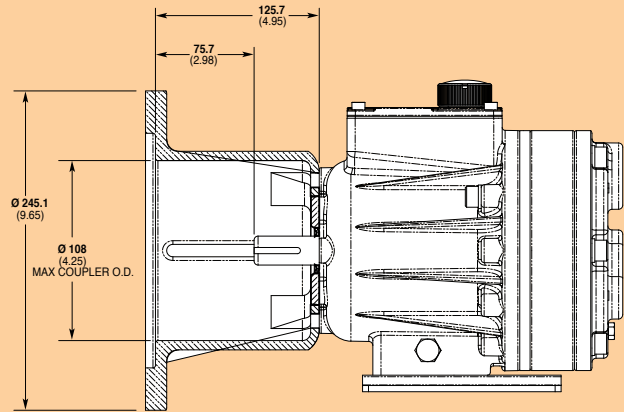
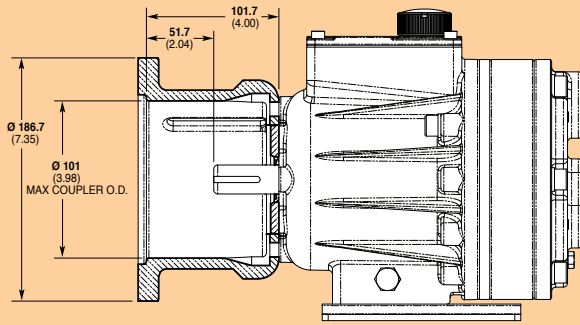
Must be ordered separately for G10 models for use with IEC 80 - 90 frame motors, B5 flange.

*NEMA adapter available - consult factory.*

### Part Number: A04-004-I200

Must be ordered separately for G10 models for use with IEC 100 - 112 frame motors, B5 flange.

*NEMA adapter available - consult factory.*



## Valve Selection

A seal-less C62 Pressure Regulating Valve is recommended for Hydra-Cell G10 pumping systems, especially for high-pressure requirements or when handling dirty fluids.

See page 88 for more information.



A C22 Pressure Regulating Valve provides a capable, lower-cost alternative to C62 valves for Hydra-Cell G10 pumping systems.

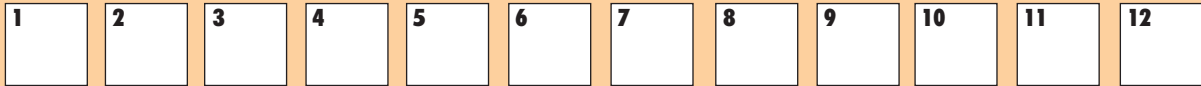
See page 84 for more information.



*Skid-mounted G10 with 3hp, 3-phase motor.*

# G10 Series **How to Order**

## Ordering Information



A complete G10 Series Model Number contains 12 digits including 9 customer-specified design and materials options, for example: G10XKBTHFECA.

Digit	Order Code	Description
<b>1-3</b>	<b>G10</b>	<b>Pump Configuration</b> Shaft-driven (BSPT Ports or ANSI Flanges)* *Pump/motor adapters ordered separately. See previous page.
<b>4</b>	<b>X</b>	<b>Hydraulic End Cam</b> Max 30.6 l/min (8.1 gpm) @ 1450 rpm
	<b>E</b>	Max 25.1 l/min (6.6 gpm) @ 1450 rpm
	<b>S</b>	Max 18.8 l/min (5.0 gpm) @ 1450 rpm
	<b>I</b>	Max 12.5 l/min (3.3 gpm) @ 1450 rpm
<b>5</b>	<b>K</b>	<b>Pump Head Version</b> Kel-Cell BSPT Ports
	<b>R</b>	Kel-Cell Reduced Pocket
	<b>X</b>	ATEX <i>(Note: ATEX 94/9/EC Certified, Category 2, Zone 1. Includes certificate and oil level monitor.)</i>
<b>6</b>	<b>B</b>	<b>Pump Head Material</b> Brass
	<b>C</b>	Cast Iron (Nickel-plated)
	<b>G</b>	Duplex Alloy 2205 (with Hastelloy C followers & follower screws)
	<b>M</b>	PVDF (with Hastelloy C followers & follower screws)
	<b>N</b>	Polypropylene (with Hastelloy C followers & follower screws)
	<b>P</b>	Polypropylene (with 316L Stainless Steel followers & follower screws)
	<b>R</b>	316L Stainless Steel ANSI flange class 150 x 600
	<b>S</b>	316L Stainless Steel
	<b>T</b>	Hastelloy CW12MW
<b>7</b>	<b>A</b>	<b>Diaphragm &amp; O-ring Material</b> Aflas diaphragm / PTFE o-ring
	<b>E</b>	EPDM (requires EPDM-compatible oil - Digit 12 oil code C)
	<b>G</b>	FKM
	<b>J</b>	PTFE (available with E and S cams only; 1200 rpm max.)
	<b>P</b>	Neoprene
	<b>T</b>	Buna-N

Digit	Order Code	Description
<b>8</b>		<b>Valve Seat Material</b>
	<b>C</b>	Ceramic
	<b>D</b>	Tungsten Carbide
	<b>H</b>	17-4 Stainless Steel
	<b>S</b>	316L Stainless Steel
	<b>T</b>	Hastelloy C
<b>9</b>		<b>Valve Material</b>
	<b>C</b>	Ceramic
	<b>D</b>	Tungsten Carbide
	<b>F</b>	17-4 Stainless Steel
	<b>N</b>	Nitronic 50
	<b>T</b>	Hastelloy C
<b>10</b>		<b>Valve Springs</b>
	<b>E</b>	Elgiloy
	<b>H</b>	17-7 Stainless Steel
	<b>T</b>	Hastelloy C
<b>11</b>		<b>Valve Spring Retainers</b>
	<b>C</b>	Celcon
	<b>H</b>	17-7 Stainless Steel
	<b>M</b>	PVDF
	<b>P</b>	Polypropylene
	<b>T</b>	Hastelloy C
	<b>Y</b>	Nylon (Zytel)
<b>12</b>		<b>Hydra-Oil</b>
	<b>A</b>	10W30 standard-duty oil
	<b>B</b>	40-wt for continuous-duty oil (use with 316L SST or Hastelloy CW12MW pump head - standard)
	<b>C</b>	EPDM-compatible oil
	<b>E</b>	Food-contact oil
	<b>G</b>	5W30 cold-temp severe-duty synthetic oil
	<b>H</b>	15W50 high-temp severe-duty synthetic oil

**G10 Pump Housing is standard as Cast Aluminum. Upgrade to Ductile Iron available.**

**Note:** For motors, bases, couplings and other pump accessories, refer to the Accessories section beginning on page 92.

# G12 Series

---

Maximum Flow Rate: 8.8 gpm (33.4 l/min)

Maximum Pressure: 1000 psi (69 bar) for Metallic Pump Heads



*G12 equipped with Model C62 Pressure Regulator Valve and Tube Accessory*



# G12 Series Performance

## Capacities

### Flow

model	Max. Input rpm	Max. Flow @ 1000 psi (69 bar)	
		gpm	l/min
G12-X	1450	8.1	30.6
G12-E	1750	8.8	33.4
G12-S	1750	6.0	22.7
G12-I	1750	4.0	15.0

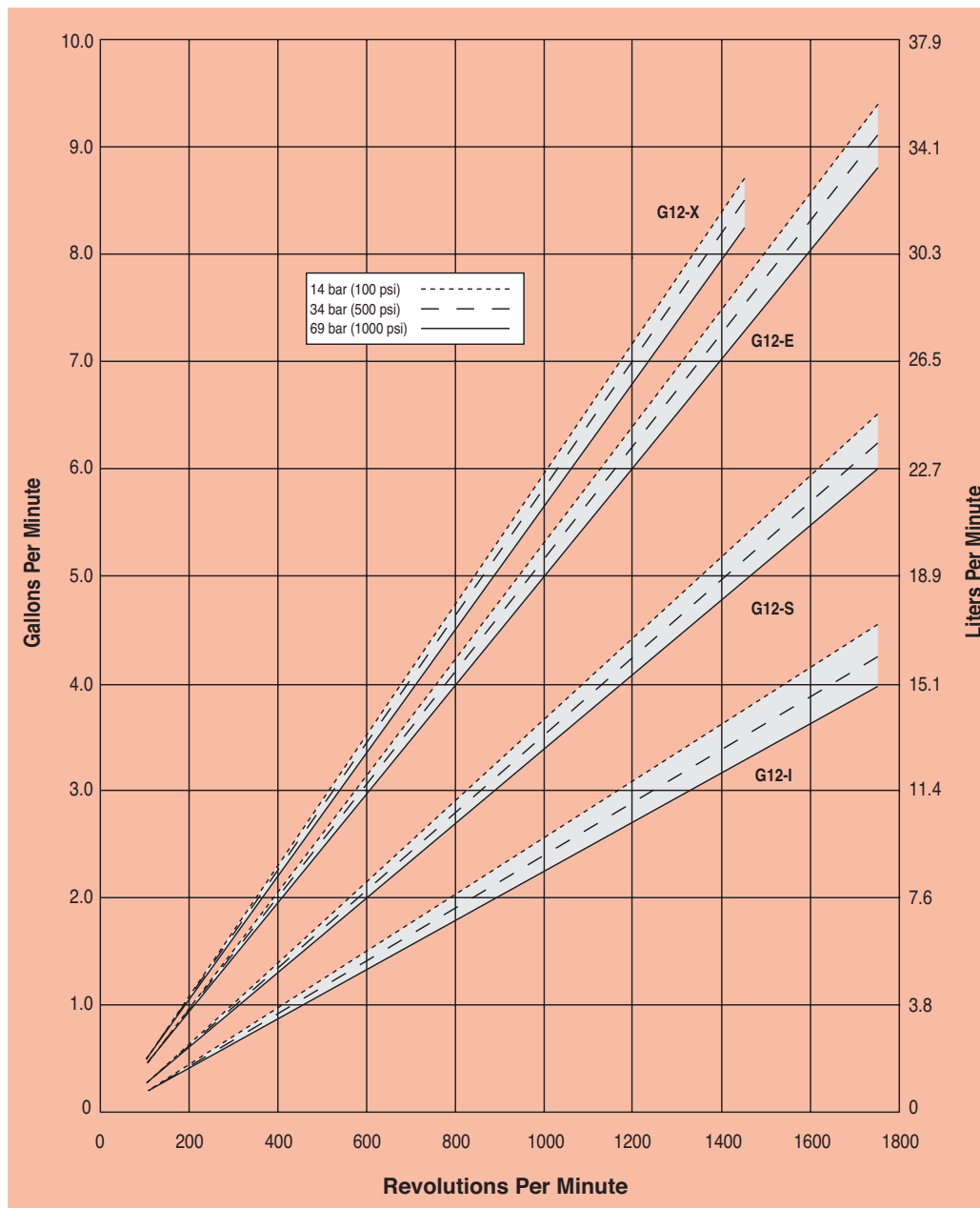
### Pressure

**Maximum Inlet Pressure**  
250 psi (17 bar)

**Maximum Discharge Pressure**  
1000 psi (69 bar)

Performance and specification ratings apply to G12 configurations unless specifically noted otherwise.

## Maximum Flow at Designated Pressure



# G12 Series Specifications

## Flow Capacities @ 69 bar (1000 psi) 4-pole Motor @ 50 Hz

Model	rpm	gpm	l/min
G12-X	1450	8.10	30.6
G12-E	1450	6.63	25.1
G12-S	1450	4.96	18.8
G12-I	1450	3.30	12.5

## Flow Capacities @ 69 bar (1000 psi) 6-pole Motor @ 50 Hz

Model	rpm	gpm	l/min
G12-X	960	5.19	19.6
G12-E	960	4.39	16.6
G12-S	960	3.28	12.4
G12-I	960	2.19	8.3

## Delivery @ 69 bar (1000 psi)

Model	gal/rev	liters/rev
G12-X	0.0056	0.0211
G12-E	0.0051	0.0191
G12-S	0.0034	0.0130
G12-I	0.0023	0.0086

## Maximum Discharge Pressure

Metallic Heads: 69 bar (1000 psi)

## Maximum Inlet Pressure 17 bar (250 psi)

## Maximum Operating Temperature

Metallic Heads: 121 °C (250 °F) - Consult factory for correct component selection for temperatures from 71 °C (160 °F) to 121 °C (250 °F).

## Maximum Solids Size 500 microns

**Inlet Port**  
1 inch BSPT  
1 inch NPT

**Discharge Port**  
3/4 inch BSPT  
3/4 inch NPT

**Shaft Diameter** 22.2 mm (7/8 inch)

**Shaft Rotation** Reverse (bi-directional)

**Bearings** Tapered roller bearings

**Oil Capacity** 1.4 liters (1.5 US quarts) - See pages 96 and 97 for oil selection and specification.

## Weight

Metallic Heads: 28.6 kg (63 lbs.)

## Calculating Required Power

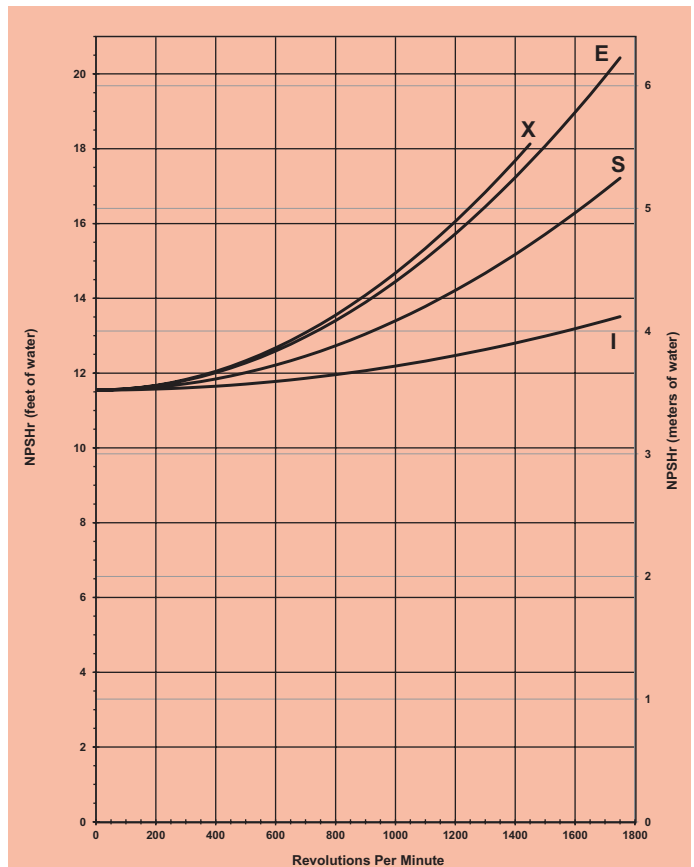
$$\frac{15 \times \text{rpm}}{63,000} + \frac{\text{gpm} \times \text{psi}}{1,460} = \text{electric motor hp}$$

$$\frac{15 \times \text{rpm}}{84,428} + \frac{\text{l/min} \times \text{bar}}{511} = \text{electric motor kW}$$

See page 164 for calculating pulley size.

When using a variable frequency drive (VFD) calculate the hp or kW at minimum and maximum pump speed to ensure the correct hp or kW motor is selected. Note that motor manufacturers typically de-rate the service factor to 1.0 when operating with a VFD.

## Net Positive Suction Head (NPSHr)



Positive inlet pressure required for:

- A) All pumps with PTFE diaphragms
- B) Pumps with I-cam (consult factory)

## Self-priming:

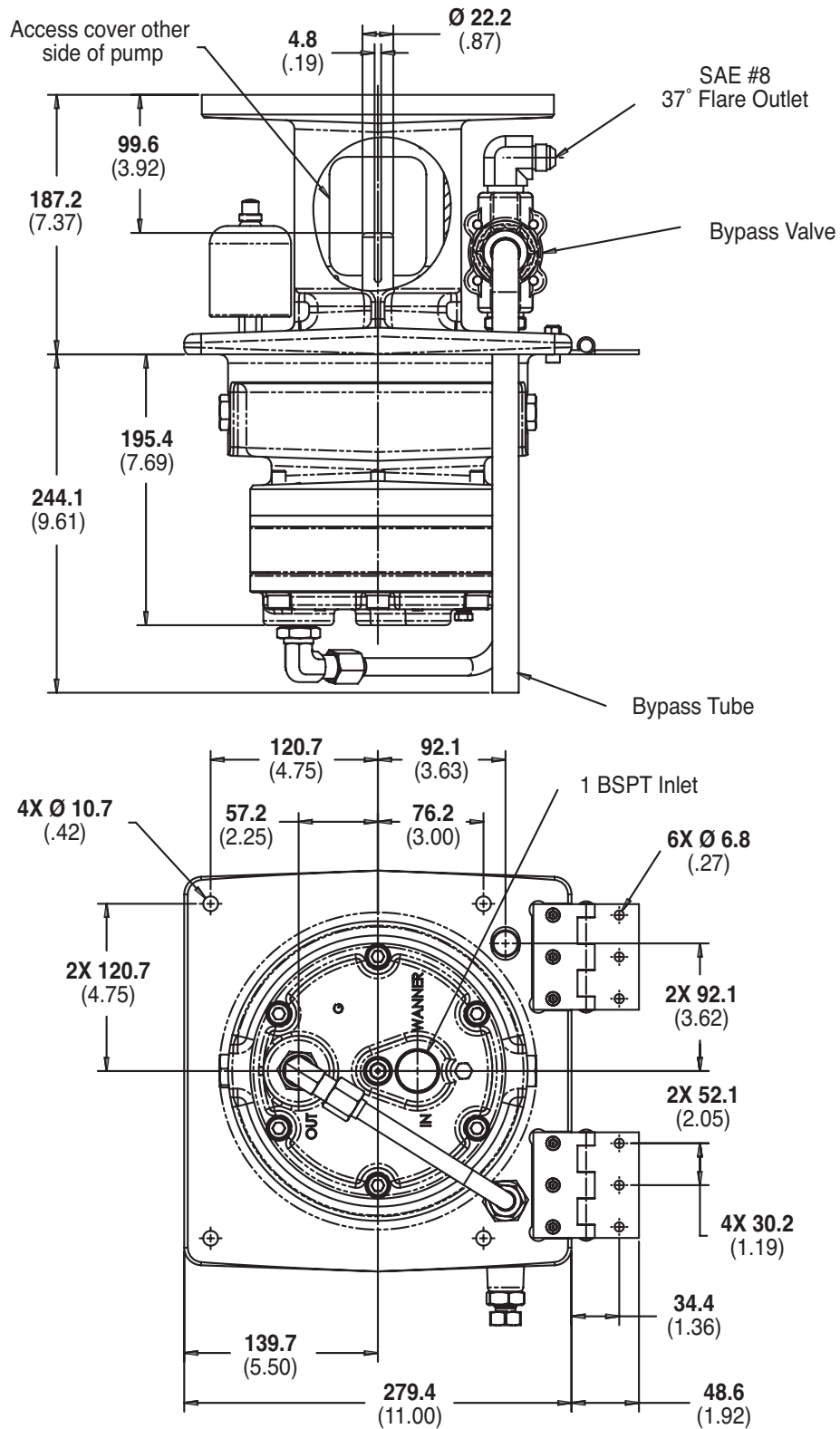
Each Hydra-Cell pump has different lift capability depending on model size, cam angle, speed, and fluid characteristics. To ensure that your specific lift characteristics are met, refer to the inlet calculations regarding friction, and acceleration head losses in your Hydra-Cell Installation & Service Manual. Compare those calculations to the NPSHr curves above.

For technical assistance in pump selection, see Frequently Asked Questions on page 162, Design Considerations on page 163, and Installation Guidelines on pages 164-165.

# G12 Series Representative Drawings

## G12 Standard Configuration (Metallic Pump Heads)

mm (Inches)

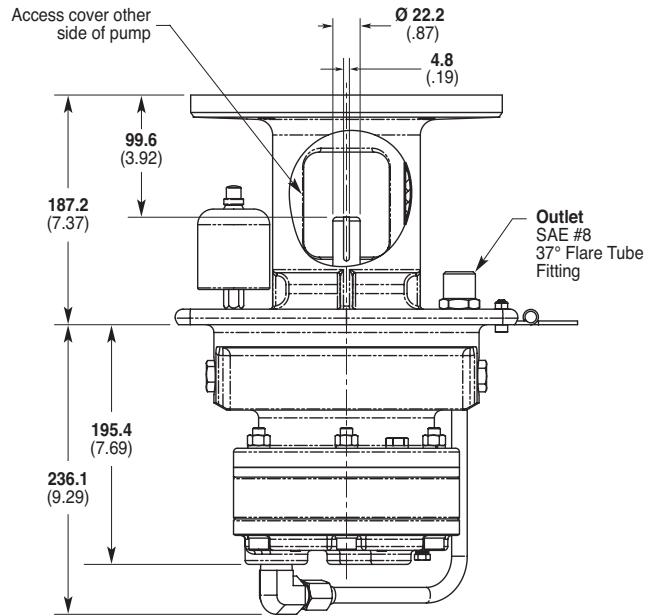


**Note:** Contact factory for additional drawings of specific models and configurations.

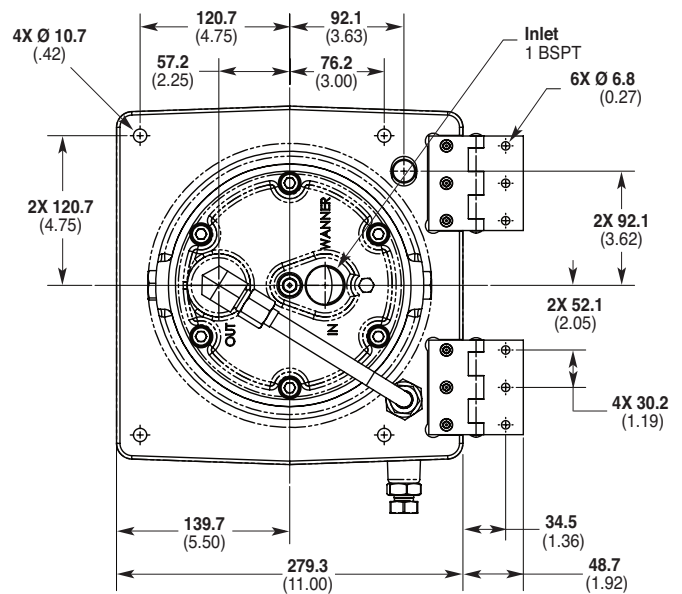
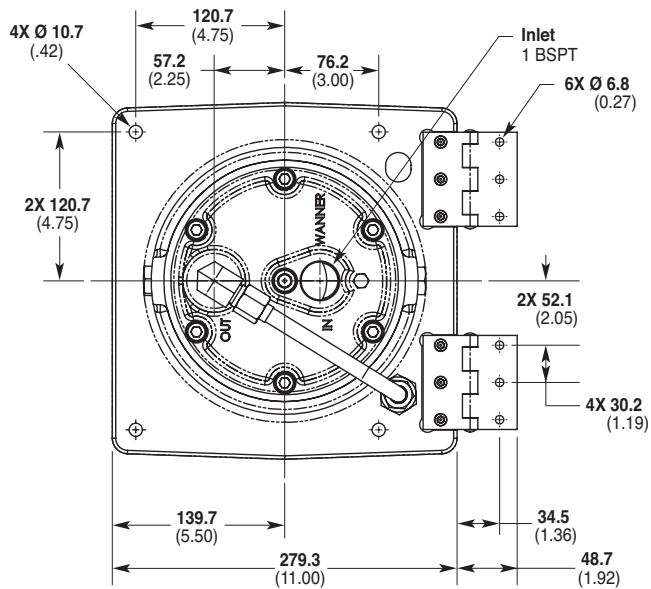
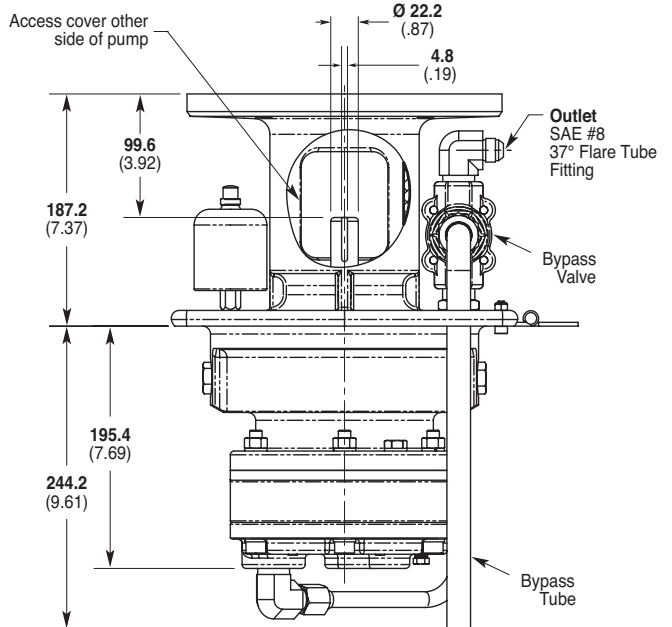


# GI2 Series Representative Drawings

## GI2 with Tube Accessory mm (Inches)



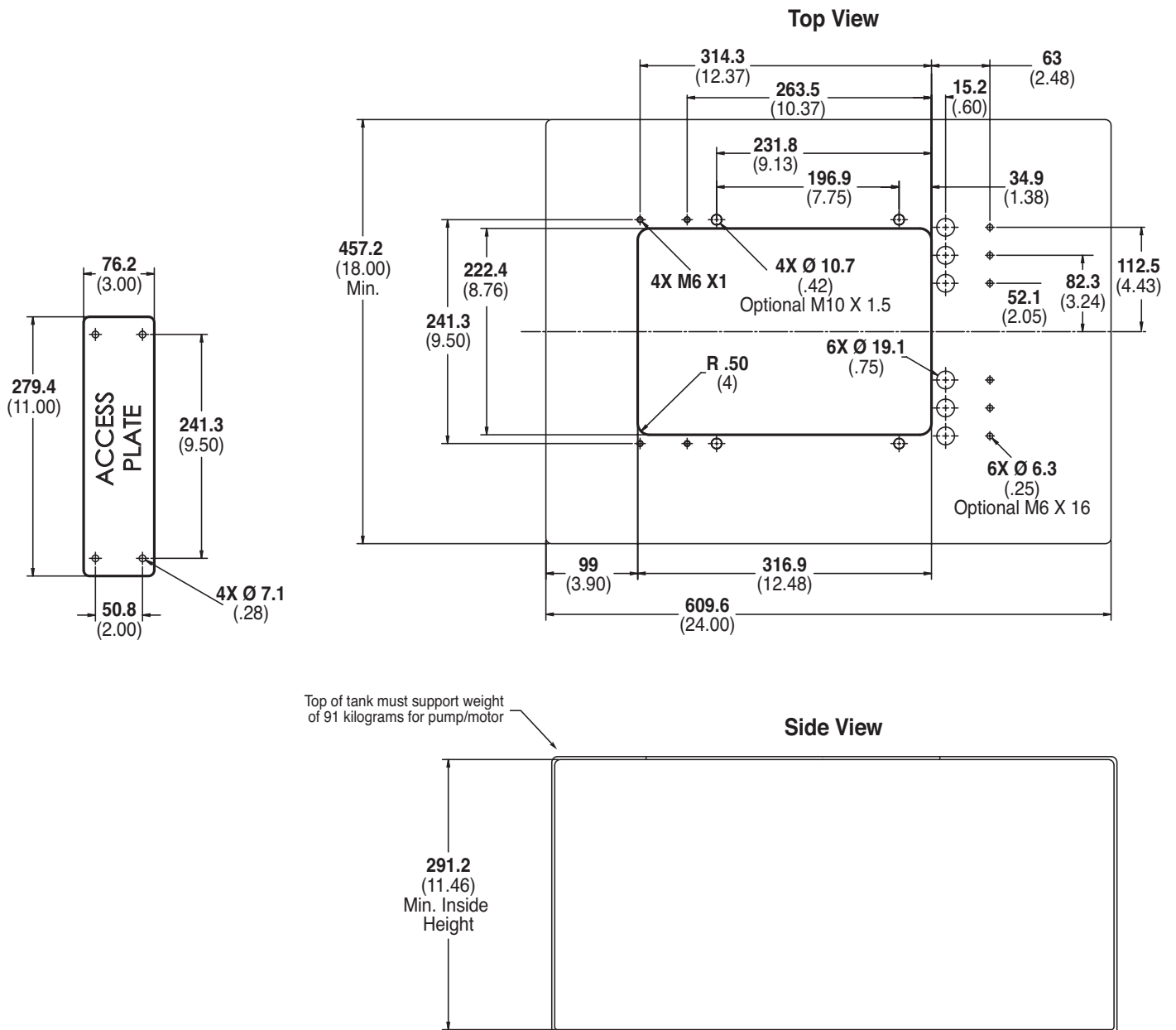
## GI2 with Valve/Tube Accessory mm (Inches)



**Note:** Contact factory for additional drawings of specific models and configurations.

# G12 Series Representative Drawings

## G12 Models with Minimum Tank Size and Critical Installation Dimensions mm (Inches)



**Note:** Contact factory for additional drawings of specific models and configurations.

# G12 Series Valve/Tube Accessories

The Hydra-Cell G12 Tube and Valve/Tube Accessories provide a pre-fabricated plumbing package for simplified installation. (See page 54 for dimensions.)

## Ordering Information

**Tube Accessory Part Number: A04-009-1200**

**Valve/Tube Accessory Part Number: A04-010-1200**



## Valve Selection

A seal-less C62 Pressure Regulating Valve is recommended for Hydra-Cell G12 pumping systems, especially for high-pressure requirements or when handling dirty fluids. See page 88 for more information.



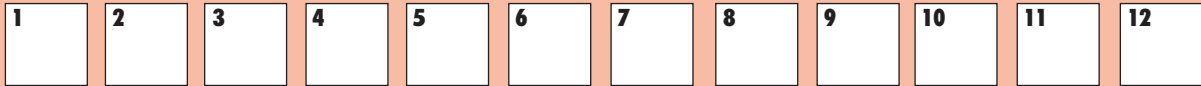
A C22 Pressure Regulating Valve provides a capable, lower-cost alternative to C62 valves for Hydra-Cell G12 pumping systems. See page 84 for more information.





# G12 Series **How to Order**

## Ordering Information



A complete G12 Series Model Number contains 12 digits including 9 customer-specified design and materials options, for example: G12XKCGHFECA.

Digit	Order Code	Description
<b>1-3</b>	<b>G12</b>	<b>Pump Configuration</b> Flanged for IEC 100 - 112, B5 (BSPT Ports)* <i>*Tube Accessory Kits ordered separately. See previous page.</i>
<b>4</b>	<b>X</b>	<b>Hydraulic End Cam</b> Max 29.0 l/min (7.7 gpm) @ 1450 rpm
	<b>E</b>	Max 25.1 l/min (6.6 gpm) @ 1450 rpm
	<b>S</b>	Max 22.7 l/min (6.0 gpm) @ 1750 rpm
	<b>I</b>	Max 15.0 l/min (4.0 gpm) @ 1750 rpm
<b>5</b>	<b>K</b>	<b>Pump Head Version</b> Kel-Cell BSPT Ports
	<b>R</b>	Kel-Cell Reduced Pocket
	<b>X</b>	ATEX <i>(Note: ATEX 94/9/EC Certified, Category 2, Zone 1. Includes certificate and oil level monitor.)</i>
<b>6</b>	<b>B</b>	<b>Pump Head Material</b> Brass
	<b>C</b>	Cast Iron (Nickel-plated)
	<b>S</b>	316L Stainless Steel
<b>7</b>	<b>E</b>	<b>Diaphragm &amp; O-ring Material</b> EPDM (requires EPDM-compatible oil - Digit 12 oil code C)
	<b>G</b>	FKM
	<b>J</b>	PTFE (available with E and S cams only; 1200 rpm max.)
	<b>P</b>	Neoprene
	<b>T</b>	Buna-N
<b>8</b>	<b>C</b>	<b>Valve Seat Material</b> Ceramic
	<b>D</b>	Tungsten Carbide
	<b>H</b>	17-4 Stainless Steel
	<b>S</b>	316L Stainless Steel
<b>9</b>	<b>C</b>	<b>Valve Material</b> Ceramic
	<b>D</b>	Tungsten Carbide
	<b>F</b>	17-4 Stainless Steel
	<b>N</b>	Nitronic 50

Digit	Order Code	Description
<b>10</b>	<b>E</b>	<b>Valve Springs</b> Elgiloy
<b>11</b>	<b>C</b>	<b>Valve Spring Retainers</b> Celcon
	<b>H</b>	17-7 Stainless Steel
	<b>M</b>	PVDF
	<b>P</b>	Polypropylene
	<b>Y</b>	Nylon (Zytel)
<b>12</b>	<b>A</b>	<b>Hydra-Oil</b> 10W30 standard-duty oil
	<b>B</b>	40-wt for continuous-duty (use with 316L SST pump head - standard)
	<b>C</b>	EPDM-compatible oil
	<b>E</b>	Food-contact oil
	<b>G</b>	5W30 cold-temp severe-duty synthetic oil

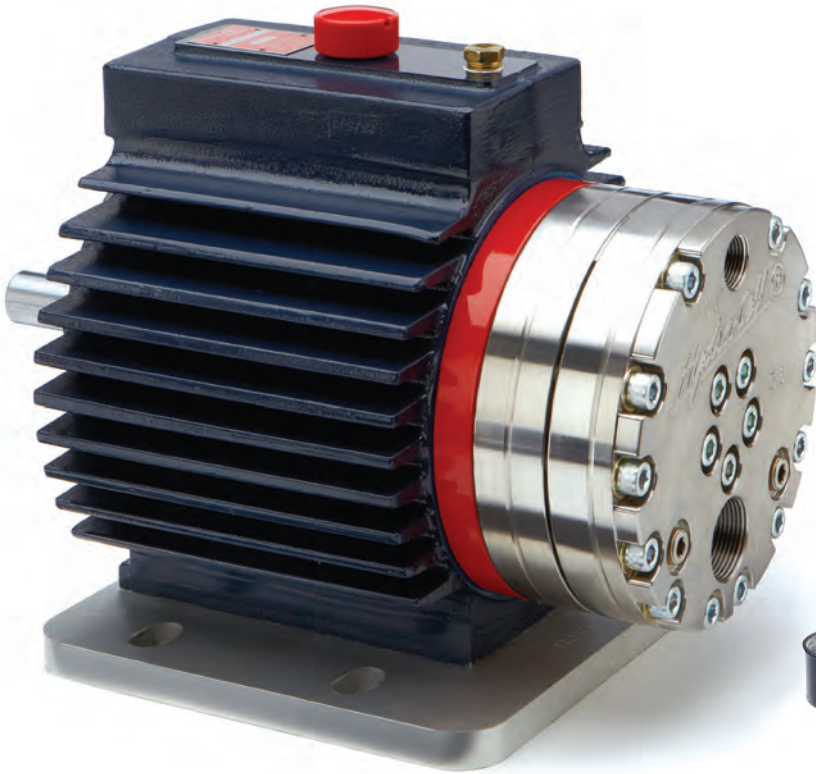
**Note:** For motors, bases, couplings and other pump accessories, refer to the Accessories section beginning on page 92.

## **G15/G17 Series**

---

Maximum Flow Rate: 15.5 gpm (58.7 l/min)

Maximum Pressure: 2500 psi (172 bar) for Metallic Pump Heads



*G15 for horizontal installations shown with Stainless Steel pump head.*



*G17 for vertical mounting (including motor adapter, base plate and oil reservoir) shown with Brass pump head.*

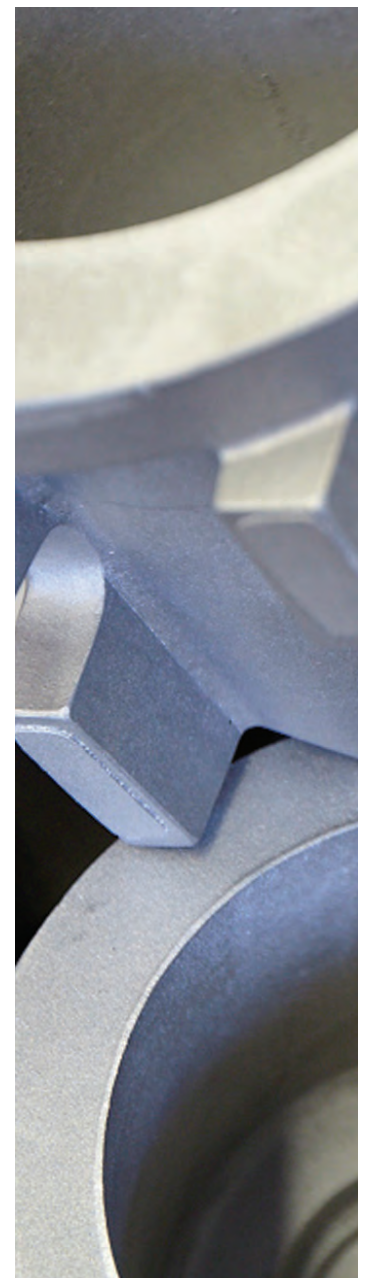
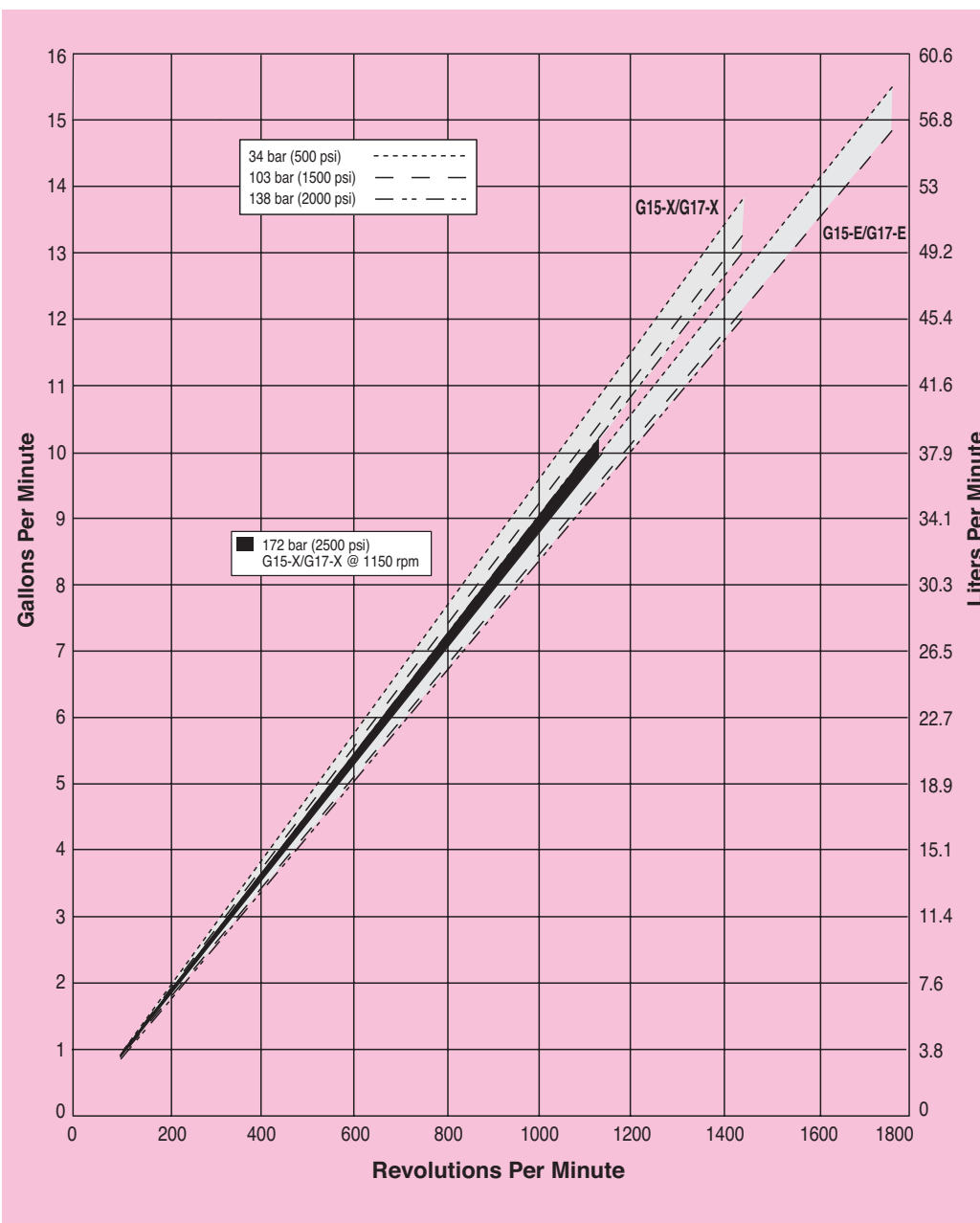
# G15/G17 Series Performance

## Capacities

Model	Max. Input rpm	Flow		Pressure	
		gpm	l/min	Max. Inlet Pressure	Max. Discharge Pressure
G15-X/G17-X	1450	13.8	52.3	500 psi (34 bar)	500 psi (34 bar)
	1450	13.3	50.2	500 psi (34 bar)	1500 psi (103 bar)
	1450	13.0	49.2	500 psi (34 bar)	2000 psi (138 bar)
	1150	10.1	38.1	500 psi (34 bar)	2500 psi (172 bar)
G15-E/G17-E	1750	15.5	58.7	500 psi (34 bar)	500 psi (34 bar)
	1750	14.8	56.2	500 psi (34 bar)	1500 psi (103 bar)
	1450	12.0	45.5	500 psi (34 bar)	2000 psi (138 bar)

*Performance and specification ratings apply to G15/G17 configurations unless specifically noted otherwise.*

## Maximum Flow at Designated Pressure





# G15/G17 Series Specifications

## Flow Capacities (4-pole Motor @ 50 Hz)

Model	@ max rpm	psi	bar	gpm	l/min
G15-X/G17-X	1450	500	34	13.8	52.3
	1450	1500	103	13.3	50.2
	1450	2000	138	13.0	49.2
	1150	2500	172	10.1	38.1
G15-E/G17-E	1750	500	34	15.5	58.7
	1750	1500	103	14.8	56.2
	1450	2000	138	12.0	45.5

## Delivery

Model	psi	bar	gal/rev	liters/rev
G15-X/G17-X	500	34	0.0095	0.0360
	1500	103	0.0092	0.0346
	2000	138	0.0090	0.0339
	2500	172	0.0088	0.0331
G15-E/G17-E	500	34	0.0089	0.0335
	1500	103	0.0085	0.0321
	2000	138	0.0083	0.0314

## Maximum Discharge Pressure

Metallc Heads:	103 bar (1500 psi) @1750 rpm (G15-E & G17-E only)
	138 bar (2000 psi) @1450 rpm
	172 bar (2500 psi) @1150 rpm

## Maximum Inlet Pressure

500 psi (34 bar)

## Maximum Operating Temperature

Metallc Heads:	121 °C (250 °F) - Consult factory for correct component selection for temperatures from 71 °C (160 °F) to 121 °C (250 °F).
----------------	--

## Maximum Solids Size

500 microns

## Inlet Port

1-1/4 inch BSPT

1-1/4 inch NPT

## Discharge Port

3/4 inch BSPT

3/4 inch NPT

## Shaft Diameter

28.6 mm (1-1/8 inch)

## Shaft Rotation

Reverse (bi-directional)

## Bearings

Tapered roller bearings

## Oil Capacity

2.1 liters (2.2 US quarts) - See pages 96 and 97 for oil selection and specification.

## Weight

Metallc Heads:	66 kg (145 lbs.)
----------------	------------------

## Calculating Required Power

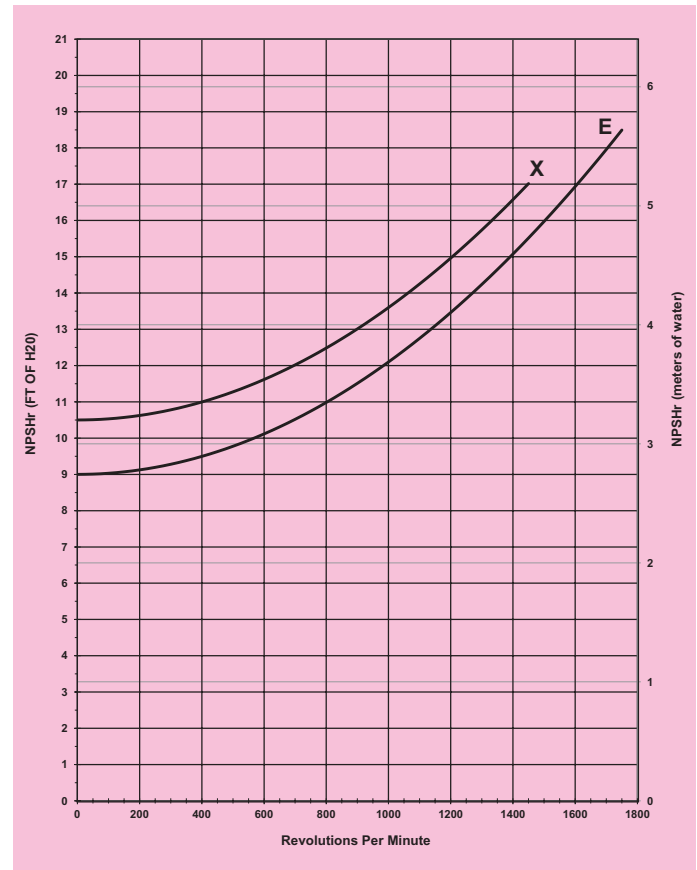
$$\frac{80 \times \text{rpm}}{63,000} + \frac{\text{gpm} \times \text{psi}}{1,460 - \left(\frac{\text{psi} - 500}{20}\right)} = \text{electric motor hp}$$

$$\frac{80 \times \text{rpm}}{84,428} + \frac{\text{l/min} \times \text{bar}}{511 - \left(\frac{\text{bar} - 35}{4}\right)} = \text{electric motor kW}$$

See page 164 for calculating pulley size.

When using a variable frequency drive (VFD) calculate the hp or kW at minimum and maximum pump speed to ensure the correct hp or kW motor is selected. Note that motor manufacturers typically de-rate the service factor to 1.0 when operating with a VFD.

## Net Positive Suction Head (NPSHr)



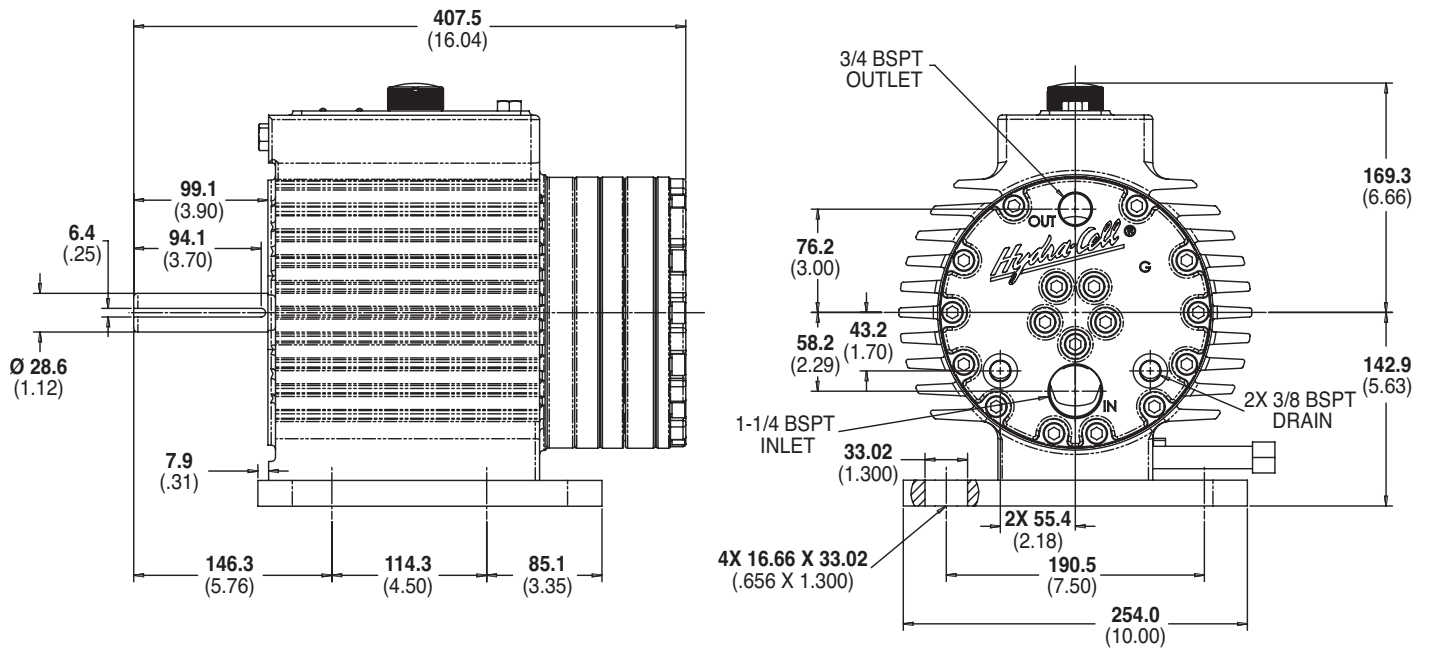
## Self-priming:

Each Hydra-Cell pump has different lift capability depending on model size, cam angle, speed, and fluid characteristics. To ensure that your specific lift characteristics are met, refer to the inlet calculations regarding friction, and acceleration head losses in your Hydra-Cell Installation & Service Manual. Compare those calculations to the NPSHr curves above.

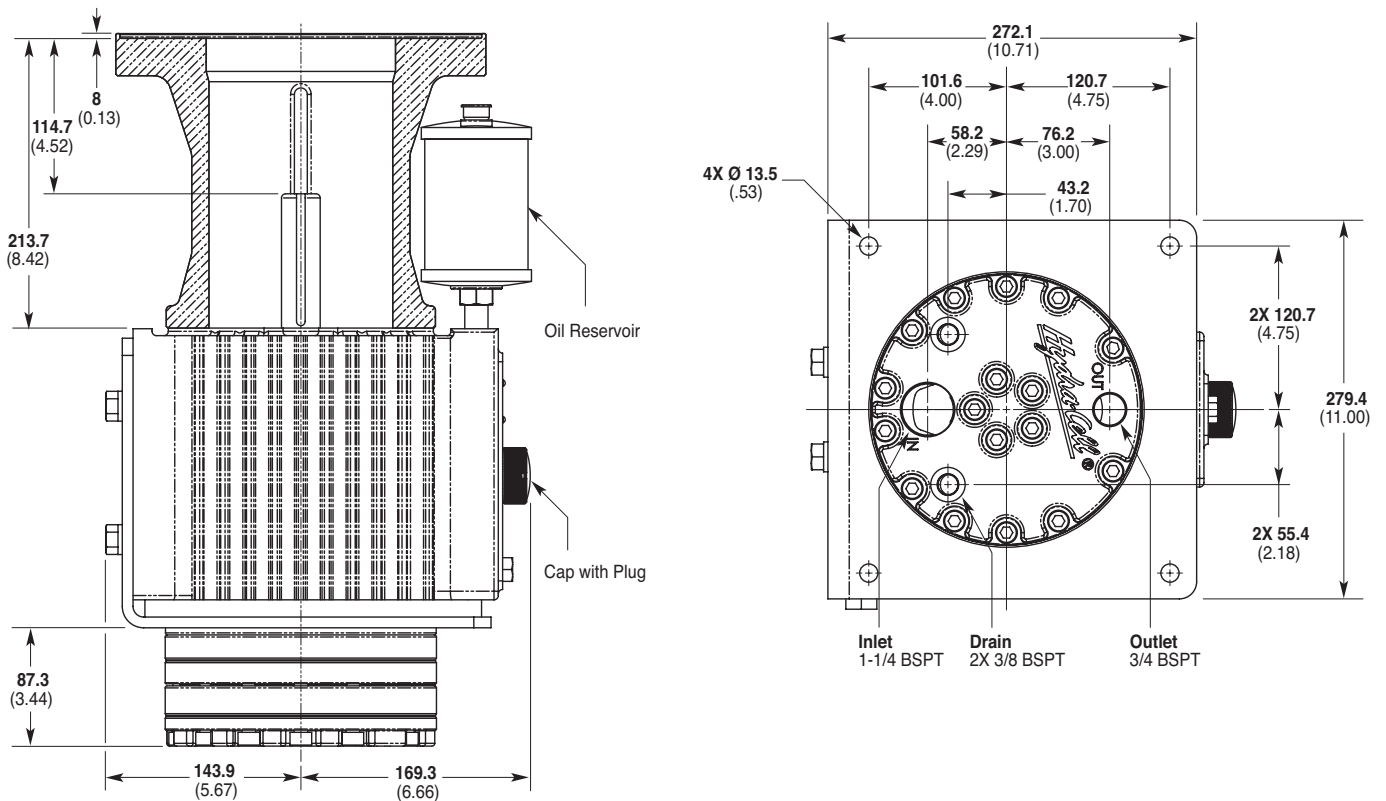
For technical assistance in pump selection, see *Frequently Asked Questions* on page 162, *Design Considerations* on page 163, and *Installation Guidelines* on pages 164-165.

# GI5/GI7 Series Representative Drawings

## GI5 Models for Horizontal Mounting (Metallic Pump Heads) mm (Inches)



## GI7 Models for Vertical Mounting (Metallic Pump Heads) mm (Inches)

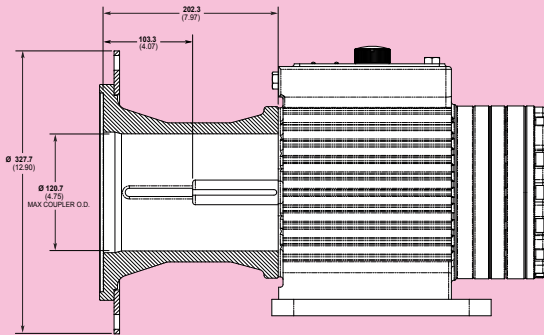


**Note:** Contact factory for additional drawings of specific models and configurations.

# G15/G17 Series Adapters/Valves

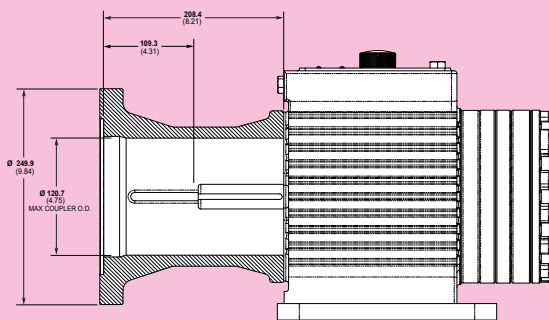
## Pump/Motor Adapter mm (Inches)

### G15 (Horizontal) Models



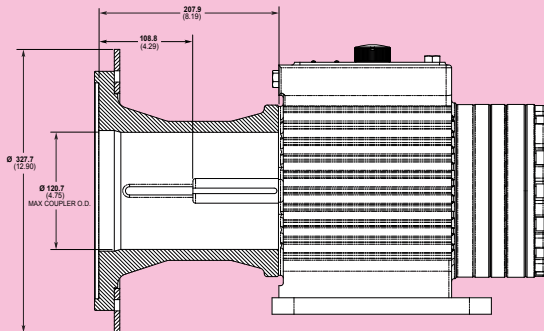
**Part Number: A01-041-1201**

Must be ordered separately for use with IEC 132 frame motors, B5 flange.



**Part Number: A01-041-1203**

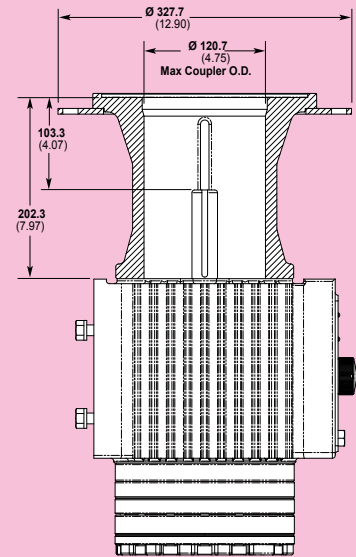
Must be ordered separately for use with IEC 160 frame motors, B14 flange.



**Part Number: A01-041-1205**

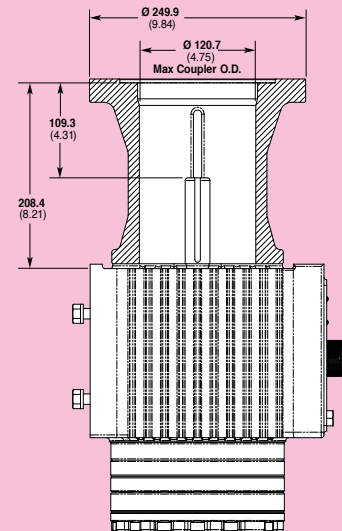
Must be ordered separately for use with IEC 160 - 180 frame motors, B5 flange.

### G17 (Vertical) Models



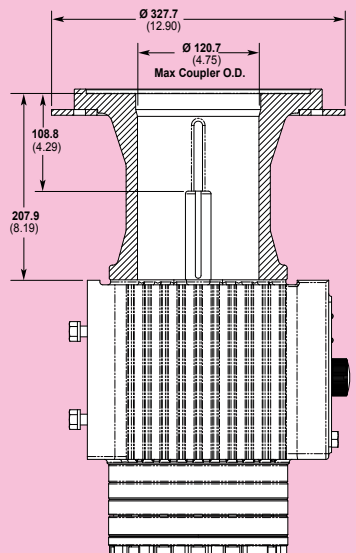
**Part Number: A01-041-1201**

Must be ordered separately for use with IEC 132 frame motors, B5 flange.



**Part Number: A01-041-1203**

Must be ordered separately for use with IEC 160 frame motors, B14 flange.



**Part Number: A01-041-1205**

Must be ordered separately for use with IEC 160 - 180 frame motors, B5 flange.

## Valve Selection

A Hydra-Cell G15/G17 Series pumping system uses a seal-less C62 Pressure Regulating Valve.

See page 88 for more information.



NEMA adapters available - consult factory.



# G15/G17 Series **How to Order**

## Ordering Information

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

A complete G15/G17 Series Model Number contains 12 digits including 9 customer-specified design and materials options, for example: G15XABTHFECG.

Digit	Order Code	Description
1-3		<b>Pump Configuration</b>
	G15	Horizontal shaft-driven (BSPT Ports)
	G17	Vertical shaft-driven (BSPT Ports) *Pump/motor adapters ordered separately. See previous page.
4		<b>Hydraulic End Cam</b>
	X	Max 48.0 l/min (12.7 gpm) @ 1450 rpm
	E	Max 43.5 l/min (11.5 gpm) @ 1450 rpm
5		<b>Pump Head Version</b>
	D	BSPT Ports
	X	ATEX (Note: ATEX 94/9/EC Certified, Category 2, Zone 1. Includes certificate and oil level monitor.)
6		<b>Pump Head Material</b>
	B	Brass
	S	316L Stainless Steel
7		<b>Diaphragm &amp; O-ring Material</b>
	A	Aflas diaphragm/PTFE o-ring
	G	FKM
	T	Buna-N
8		<b>Valve Seat Material</b>
	D	Tungsten Carbide
	H	17-4 Stainless Steel
	N	Nitronic 50
9		<b>Valve Material</b>
	D	Tungsten Carbide
	F	17-4 Stainless Steel
	N	Nitronic 50
10		<b>Valve Springs</b>
	E	Elgiloy
	H	17-7 Stainless Steel
	T	Hastelloy C
11		<b>Valve Spring Retainers</b>
	C	Celcon
	H	17-7 Stainless Steel
	M	PVDF
	P	Polypropylene
	Y	Nylon (Zytel)

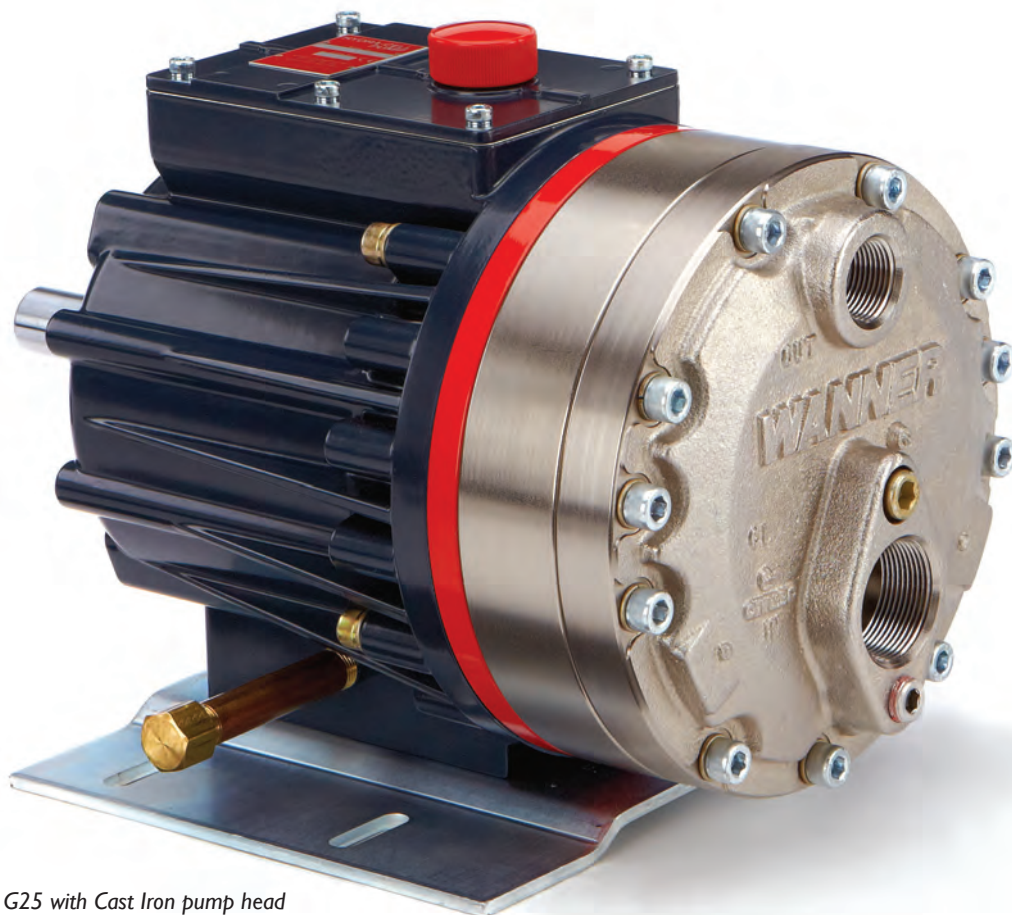
Digit	Order Code	Description
12		<b>Hydra-Oil</b>
	A	10W30 standard-duty oil
	B	40-wt for continuous-duty (use with 316L SST pump head - standard)
	E	Food-contact oil
	G	5W30 cold-temp severe-duty synthetic oil
	H	15W50 high-temp severe-duty synthetic oil

**Note:** For motors, bases, couplings and other pump accessories, refer to the Accessories section beginning on page 92.

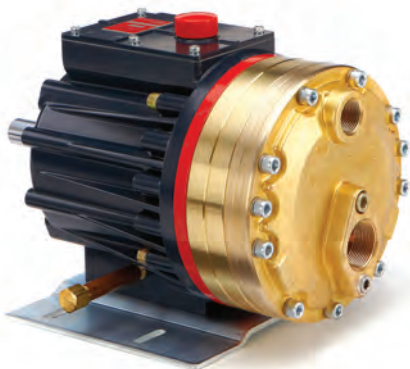
## G25 Series

Maximum Flow Rate: 20.0 gpm (75.9 l/min)

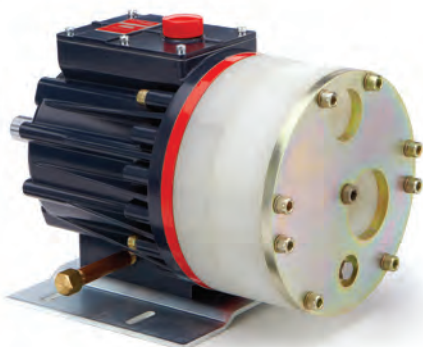
Maximum Pressure: 1000 psi (69 bar) for Metallic Pump Heads  
350 psi (24 bar) for Non-metallic Pump Heads



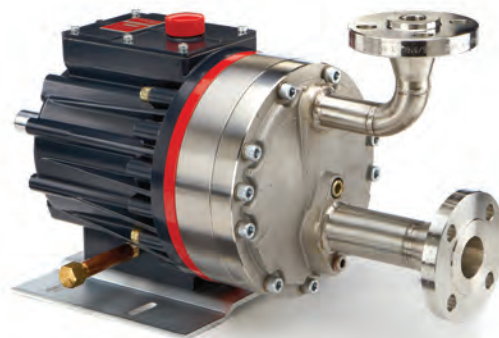
*G25 with Cast Iron pump head*



*G25 with Brass pump head*



*G25 with Polypropylene pump head*



*G25 with Stainless Steel pump head and ANSI flanges*

# G25 Series Performance

## Capacities

### Flow

Model	Max. Input rpm	Max. Flow @ 1000 psi (69 bar)	
		gpm	l/min
G25-X	1050	20.0	75.7
G25-E	1150	20.0	75.9
G25-S	1150	16.2	61.5
G25-I	1150	11.8	44.7

### Pressure

**Maximum Inlet Pressure**  
250 psi (17 bar)

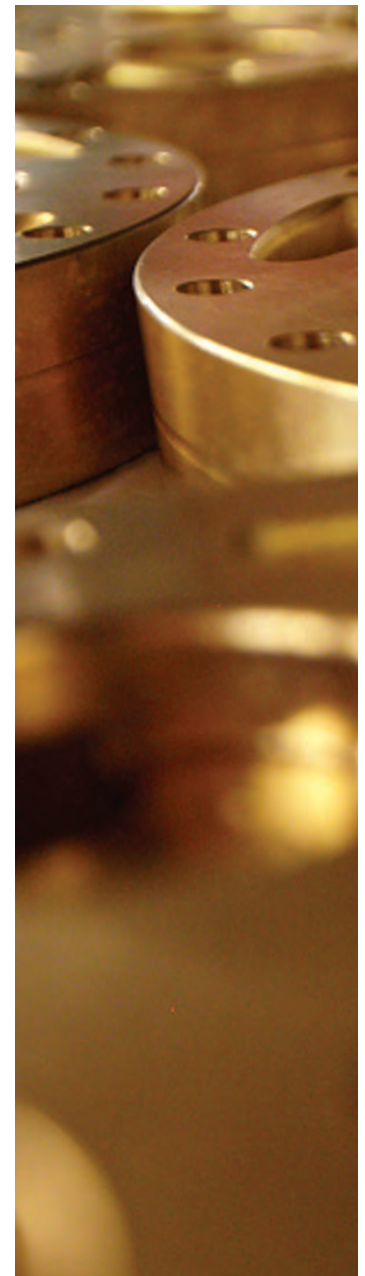
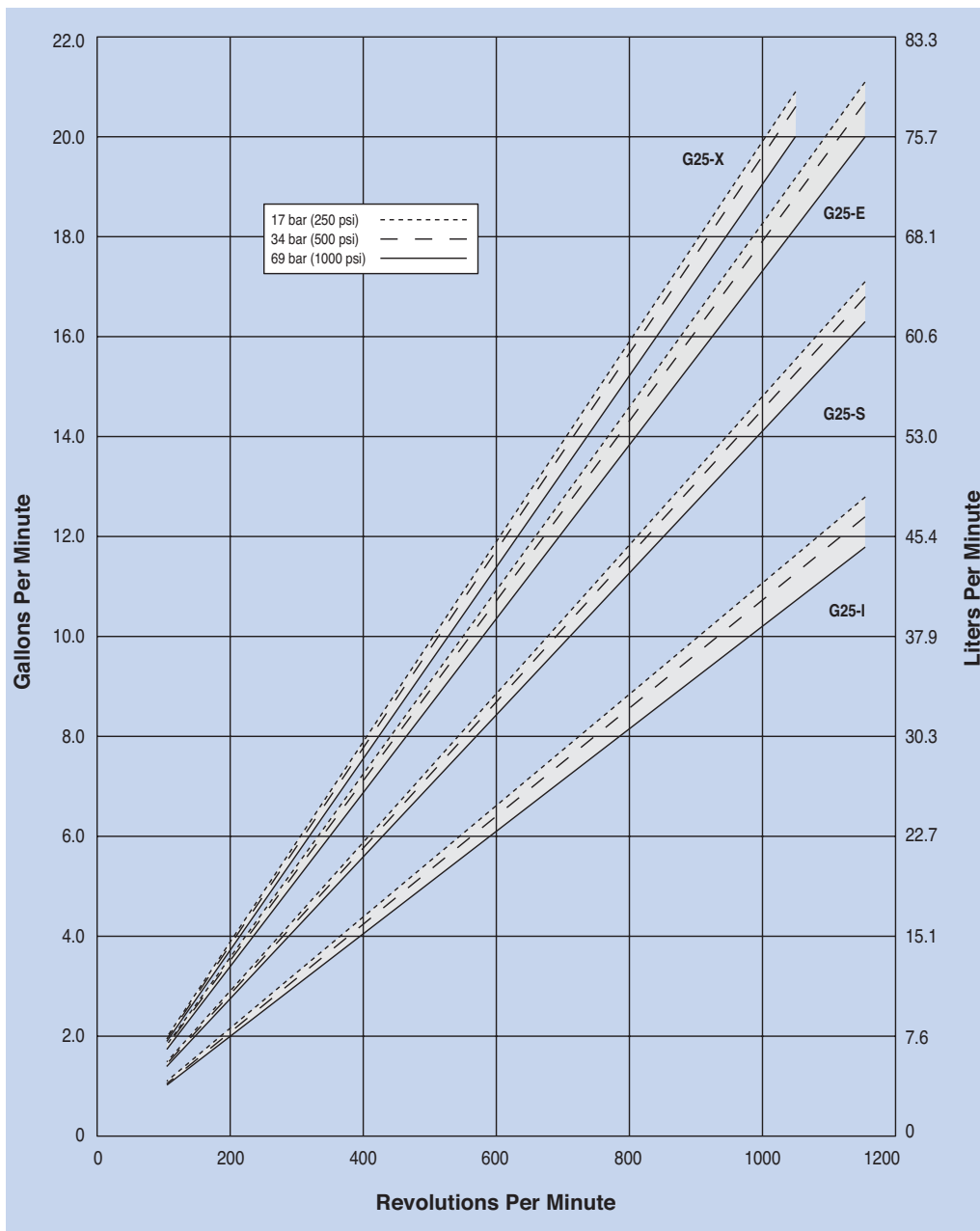
**Maximum Discharge Pressure**

Metallic Pump Heads:  
1000 psi (69 bar)

Non-metallic Pump Heads:  
250 psi (17 bar) Polypropylene  
350 psi (24 bar) PVDF

Performance and specification ratings apply to G25 configurations unless specifically noted otherwise.

## Maximum Flow at Designated Pressure





# G25 Series Specifications

## Flow Capacities @ 69 bar (1000 psi) 6-pole Motor @ 50 Hz

Model	rpm	gpm	l/min
G25-X	960	18.2	69.0
G25-E	960	16.6	63.0
G25-S	960	13.2	50.0
G25-I	960	9.5	36.0

## Flow Capacities @ 69 bar (1000 psi) 8-pole Motor @ 50 Hz

Model	rpm	gpm	l/min
G25-X	730	13.9	52.8
G25-E	730	12.9	48.8
G25-S	730	10.3	39.1
G25-I	730	7.9	29.9

## Delivery @ 69 bar (1000 psi)

Model	gal/rev	liters/rev
G25-X	0.0190	0.0721
G25-E	0.0174	0.0660
G25-S	0.0141	0.0535
G25-I	0.0103	0.0389

## Maximum Discharge Pressure

Metallic Heads:	69 bar (1000 psi)
Non-metallic Heads:	17 bar (250 psi) Polypropylene 24 bar (350 psi) PVDF

## Maximum Inlet Pressure 17 bar (250 psi)

## Maximum Operating Temperature

Metallic Heads:	121 °C (250 °F) - Consult factory for correct component selection for temperatures from 71 °C (160 °F) to 121 °C (250 °F).
Non-metallic Heads:	60 °C (140 °F)

## Maximum Solids Size 800 microns

<b>Inlet Port</b>	1-1/2 inch BSPT 1-1/2 inch NPT 150lb ANSI RF flange
-------------------	---

<b>Discharge Port</b>	1 inch BSPT 1 inch NPT 600lb ANSI RF flange
-----------------------	---

<b>Shaft Diameter</b>	28.6 mm (1-1/8 inch)
-----------------------	----------------------

<b>Shaft Rotation</b>	Reverse (bi-directional)
-----------------------	--------------------------

<b>Bearings</b>	Tapered roller bearings
-----------------	-------------------------

<b>Oil Capacity</b>	3.1 liters (3.3 US quarts) - See pages 96 and 97 for oil selection and specification.
---------------------	---

## Weight

Metallic Heads:	56.8 kg (125 lbs.)
Non-metallic Heads:	40.9 kg (90 lbs.)

## Calculating Required Power

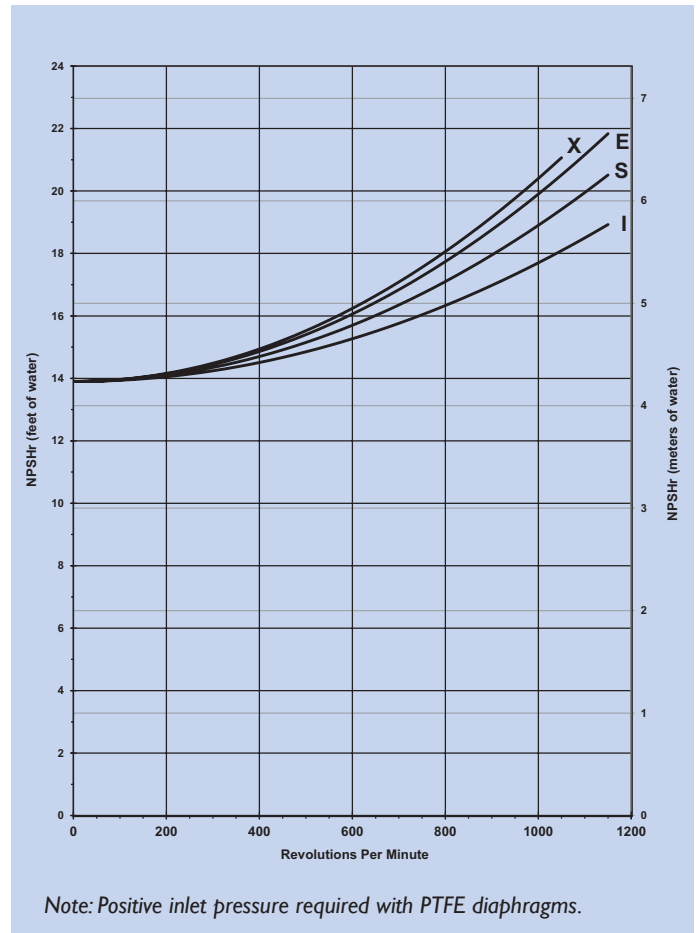
$$\frac{50 \times \text{rpm}}{63,000} + \frac{\text{gpm} \times \text{psi}}{1,460} = \text{electric motor hp}$$

$$\frac{50 \times \text{rpm}}{84,428} + \frac{\text{l/min} \times \text{bar}}{511} = \text{electric motor kW}$$

See page 164 for calculating pulley size.

When using a variable frequency drive (VFD) calculate the hp or kW at minimum and maximum pump speed to ensure the correct hp or kW motor is selected. Note that motor manufacturers typically de-rate the service factor to 1.0 when operating with a VFD.

## Net Positive Suction Head (NPSHr)



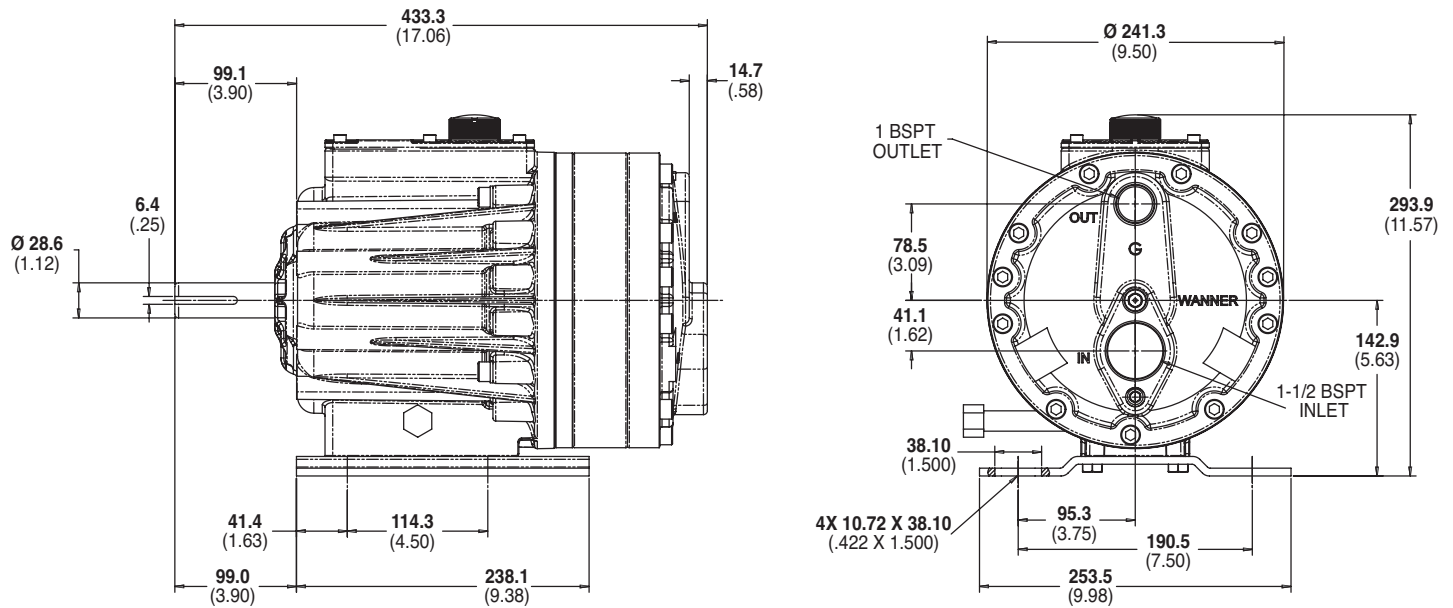
## Self-priming:

Each Hydra-Cell pump has different lift capability depending on model size, cam angle, speed, and fluid characteristics. To ensure that your specific lift characteristics are met, refer to the inlet calculations regarding friction, and acceleration head losses in your Hydra-Cell Installation & Service Manual. Compare those calculations to the NPSHr curves above.

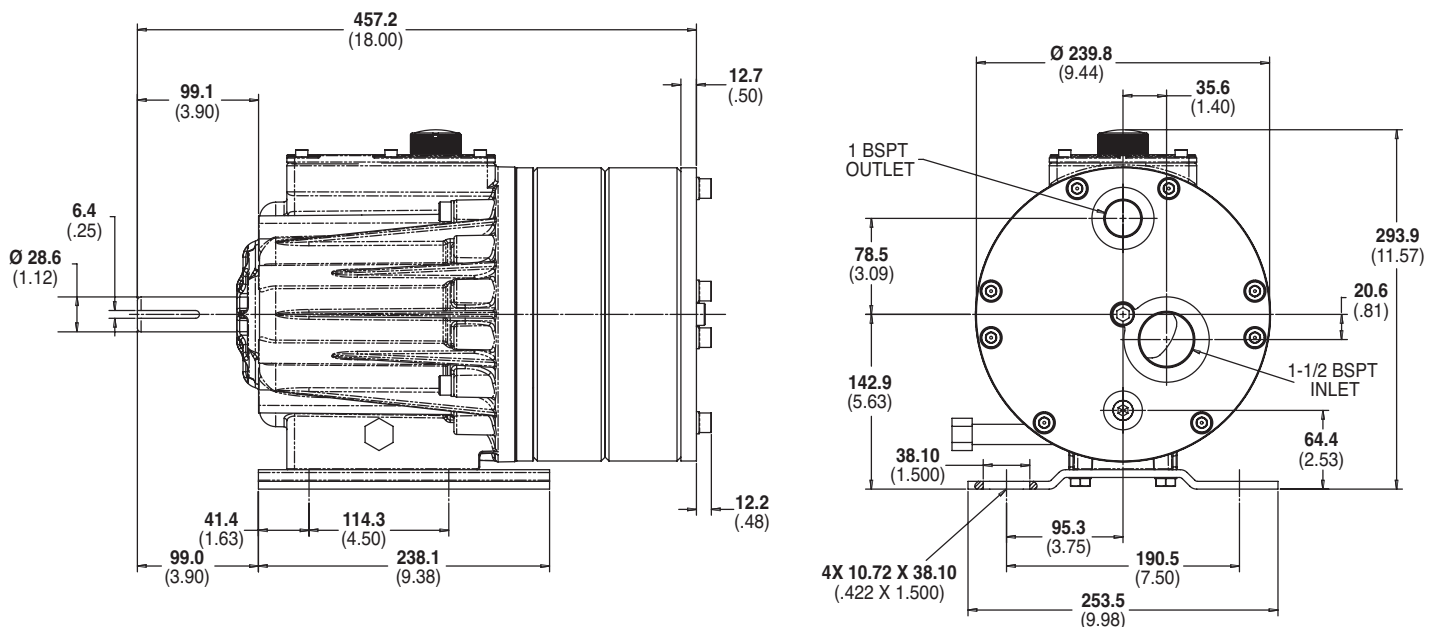
For technical assistance in pump selection, see *Frequently Asked Questions* on page 162, *Design Considerations* on page 163, and *Installation Guidelines* on pages 164-165.

# G25 Series Representative Drawings

## G25 Models with Metallic Pump Head mm (Inches)



## G25 Models with Non-metallic Pump Head mm (Inches)



**Note:** Contact factory for additional drawings of specific models and configurations.

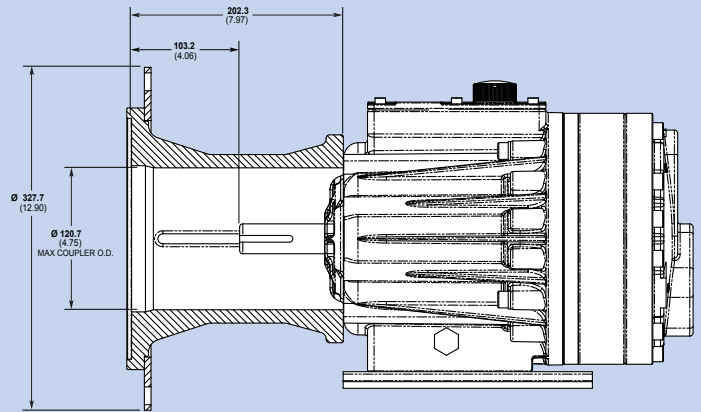
# G25 Series Adapters/Valves

## Pump/Motor Adapter mm (Inches)

### Part Number: A04-041-1201

Must be ordered separately for G25 models for use with IEC 132 frame motors, B5 flange.

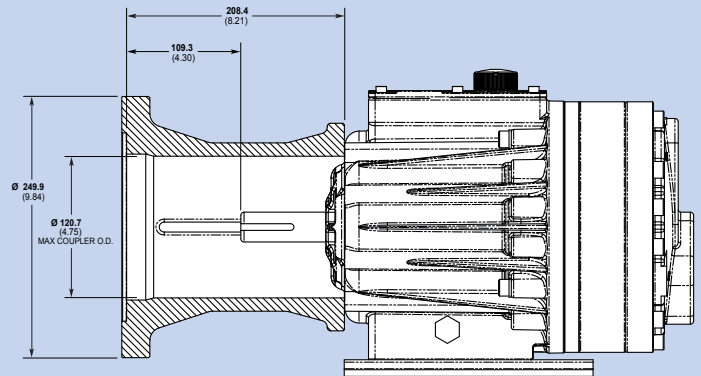
*NEMA adapter available - consult factory.*



### Part Number: A04-041-1203

Must be ordered separately for G25 models for use with IEC 160 frame motors, B14 flange.

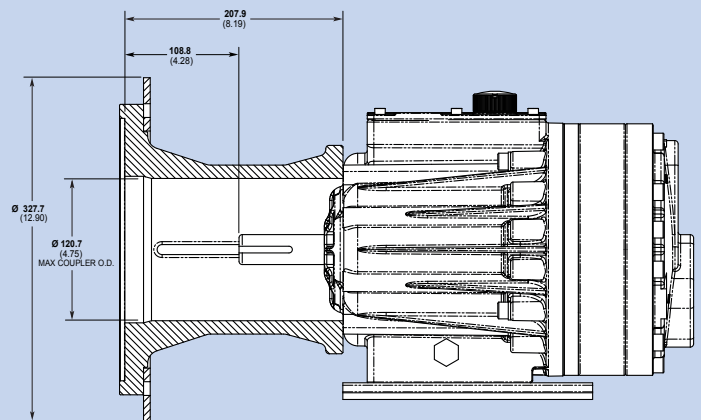
*NEMA adapter available - consult factory.*



### Part Number: A04-041-1205

Must be ordered separately for G25 models for use with IEC 160 - 180 frame motors, B5 flange.

*NEMA adapter available - consult factory.*



## Valve Selection

A seal-less C63 Pressure Regulating Valve is recommended for Hydra-Cell G25 pumping systems, especially for high-pressure requirements or when handling dirty fluids.

See page 88 for more information.



A C23 Pressure Regulating Valve provides a capable, lower-cost alternative to C63 valves for Hydra-Cell G25 pumping systems.

See page 84 for more information.





# G25 Series **How to Order**

## Ordering Information



A complete G25 Series Model Number contains 12 digits including 9 customer-specified design and materials options, for example: G25XKCGNNECA.

Digit	Order Code	Description
<b>1-3</b>	<b>G25</b>	<b>Pump Configuration</b> Shaft-driven (BSPT Ports or ANSI Flanges) *Pump/motor adapters ordered separately. See previous page.
<b>4</b>	<b>X</b>	<b>Hydraulic End Cam</b> Max 69.0 l/min (18.2 gpm) @ 960 rpm
	<b>E</b>	Max 63.0 l/min (16.6 gpm) @ 960 rpm
	<b>S</b>	Max 50.0 l/min (13.2 gpm) @ 960 rpm
	<b>I</b>	Max 36.0 l/min (9.5 gpm) @ 960 rpm
<b>5</b>		<b>Pump Head Version</b>
	<b>K</b>	Kel-Cell BSPT Ports
	<b>M</b>	Machined housing to accept C-face adapter/gearbox
	<b>X</b>	ATEX <i>(Note: ATEX 94/9/EC Certified, Category 2, Zone 1. Includes certificate and oil level monitor.)</i>
<b>6</b>		<b>Pump Head Material</b>
	<b>B</b>	Brass
	<b>C</b>	Cast Iron (Nickel-plated)
	<b>G</b>	Duplex Alloy 2205 (with Hastelloy C followers & follower screws)
	<b>M</b>	PVDF (with Hastelloy C followers & follower screws)
	<b>N</b>	Polypropylene (with Hastelloy C followers & follower screws)
	<b>P</b>	Polypropylene (with 316L Stainless Steel followers & follower screws)
	<b>R</b>	316L Stainless Steel ANSI flange class 150 x 600
	<b>S</b>	316L Stainless Steel
	<b>T</b>	Hastelloy CW12MW
<b>7</b>		<b>Diaphragm &amp; O-ring Material</b>
	<b>A</b>	Aflas diaphragm / PTFE o-ring
	<b>E</b>	EPDM (requires EPDM-compatible oil - Digit 12 oil code C)
	<b>G</b>	FKM
	<b>J</b>	PTFE (available with E and S cams only; 1050 rpm max.)
	<b>P</b>	Neoprene
	<b>T</b>	Buna-N
<b>8</b>		<b>Valve Seat Material</b>
	<b>C</b>	Ceramic
	<b>D</b>	Tungsten Carbide
	<b>H</b>	17-4 Stainless Steel
	<b>N</b>	Nitronic 50
	<b>T</b>	Hastelloy C

Digit	Order Code	Description
<b>9</b>		<b>Valve Material</b>
	<b>C</b>	Ceramic
	<b>D</b>	Tungsten Carbide
	<b>F</b>	17-4 Stainless Steel
	<b>N</b>	Nitronic 50
	<b>T</b>	Hastelloy C
<b>10</b>		<b>Valve Springs</b>
	<b>E</b>	Elgiloy
	<b>H</b>	17-7 Stainless Steel
	<b>T</b>	Hastelloy C
<b>11</b>		<b>Valve Spring Retainers</b>
	<b>C</b>	Celcon
	<b>H</b>	17-7 Stainless Steel
	<b>M</b>	PVDF
	<b>P</b>	Polypropylene
	<b>T</b>	Hastelloy C
	<b>Y</b>	Nylon (Zytel)
<b>12</b>		<b>Hydra-Oil</b>
	<b>A</b>	10W30 standard-duty oil
	<b>B</b>	40-wt for continuous-duty oil (use with 316L SST or Hastelloy CW12MW pump head - standard)
	<b>C</b>	EPDM-compatible oil
	<b>E</b>	Food-contact oil
	<b>G</b>	5W30 cold-temp severe-duty synthetic oil
	<b>H</b>	15W50 high-temp severe-duty synthetic oil

**G25 Pump Housing is standard as Cast Aluminum. Upgrade to Ductile Iron available.**

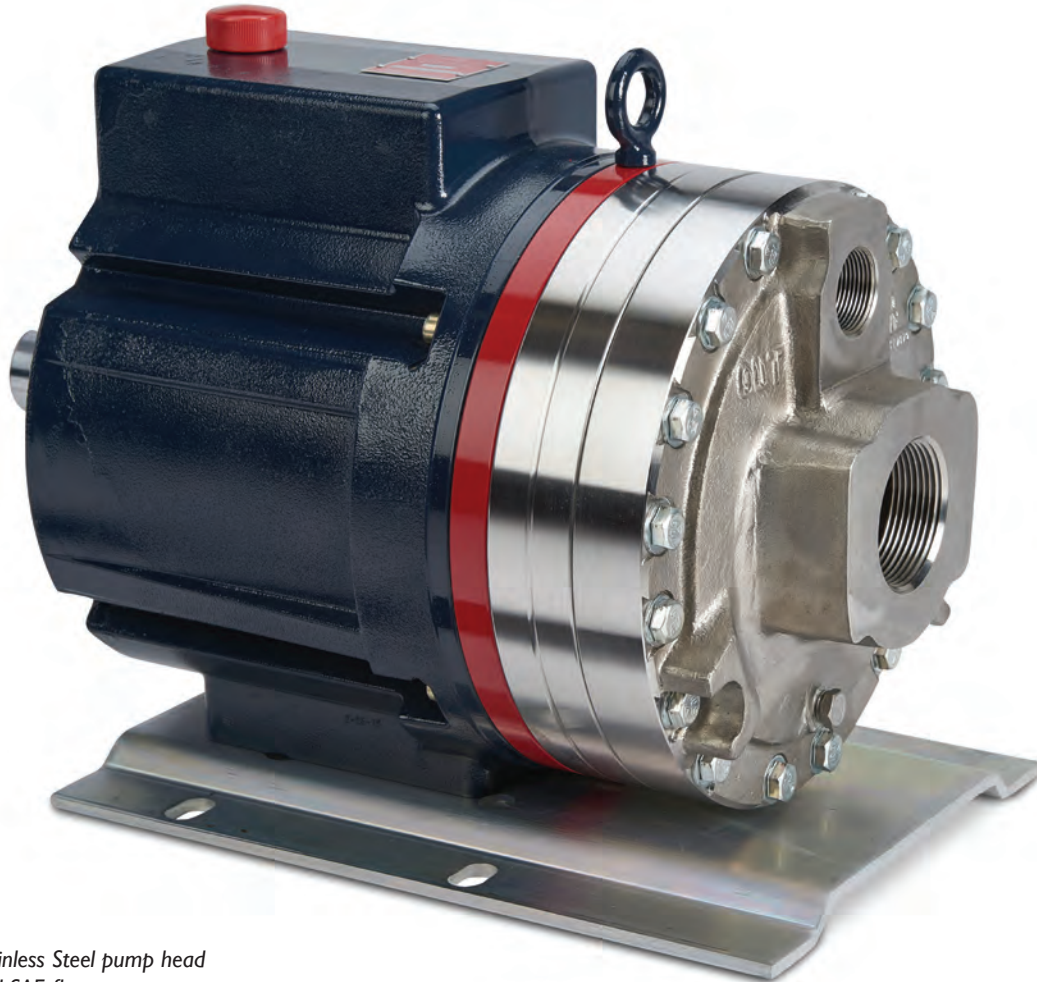
**Note:** For motors, bases, couplings and other pump accessories, refer to the Accessories section beginning on page 92.

## G35 Series

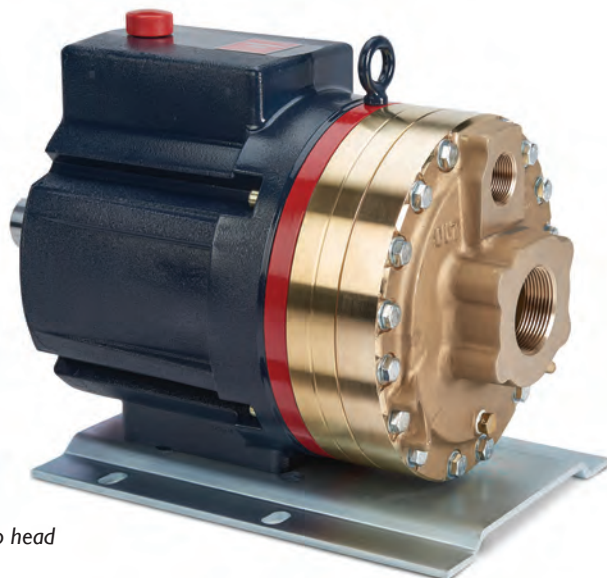
---

Maximum Flow Rate: 36.5 gpm (138 l/min)

Maximum Pressure: 1500 psi (103 bar) for Metallic Pump Heads



*G35 with Stainless Steel pump head  
and SAE flanges*



*G35 with Brass pump head*

# G35 Series Performance

## Capacities

### Flow

Model	Max. Input rpm	Max. Flow	
		@ 1200 psi (83 bar) gpm	l/min
G35-X	1050	36.5	138
G35-E	1150	34.0	129
<b>@ 1500 psi (103 bar)</b>			
G35-X	700	23.1	87.5

### Pressure

#### Maximum Inlet Pressure

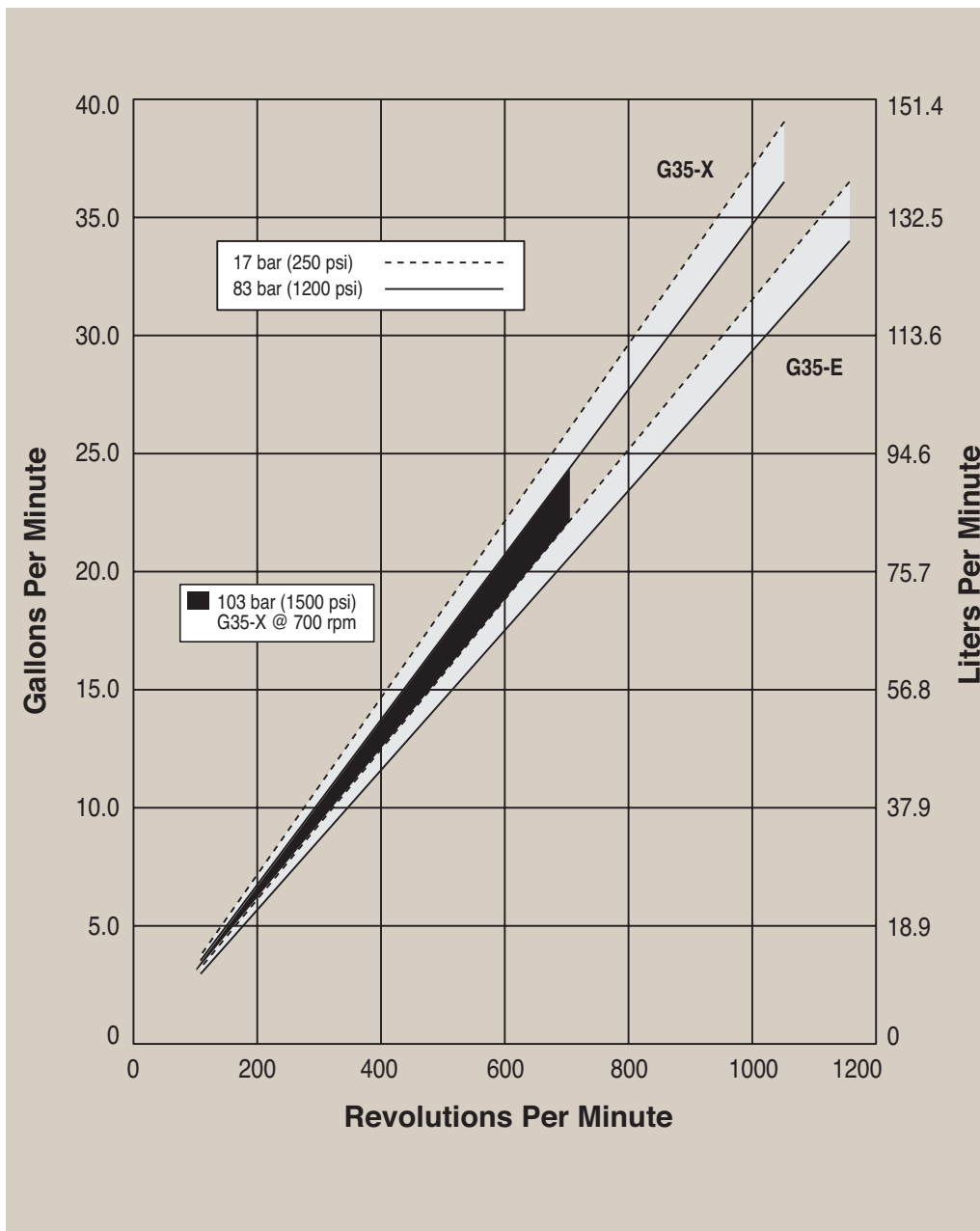
250 psi (17 bar) with 1500 psi (103 bar) maximum discharge pressure  
 500 psi (34 bar) with 1200 psi (83 bar) maximum discharge pressure

#### Maximum Discharge Pressure

1200 psi (83 bar) @ 1150 rpm max.  
 1500 psi (103 bar) @ 700 rpm max.

Performance and specification ratings apply to G35 configurations unless specifically noted otherwise.

## Maximum Flow at Designated Pressure



# G35 Series Specifications

## Flow Capacities @ 83 bar (1200 psi) 6-pole Motor @ 50 Hz

Model	rpm	gpm	l/min
G35-X	960	33.50	127.00
G35-E	960	29.00	110.00

## Flow Capacities @ 83 bar (1200 psi) 8-pole Motor @ 50 Hz

Model	rpm	gpm	l/min
G35-X	730	25.50	96.60
G35-E	730	22.10	83.60

## Delivery @ 83 bar (1200 psi)

Model	gal/rev	liters/rev
G35-X	0.0347	0.1314
G35-E	0.0296	0.1120

## Delivery @ 103 bar 1500 psi)

Model	gal/rev	liters/rev
G35-X	0.0330	0.1250

## Maximum Discharge Pressure

Metallic Heads: 103 bar (1500 psi) @ 700 rpm

**Maximum Inlet Pressure** 17 bar (250 psi) with 103 bar (1500 psi) maximum discharge pressure  
34 bar (500 psi) with 83 bar (1200 psi) maximum discharge pressure

## Maximum Operating Temperature

Metallic Heads: 121 °C (250 °F) - Consult factory for correct component selection for temperatures from 71 °C (160 °F) to 121 °C (250 °F).

**Maximum Solids Size** 800 microns

**Inlet Port** 2-1/2 inch BSPT  
2-1/2 inch NPT  
150lb or 600lb ANSI RF flange  
3 inch SAE flange

**Discharge Port** 1-1/4 inch BSPT  
1-1/4 inch NPT  
600lb or 1500lb ANSI RF flange  
1-1/4 inch SAE flange

**Shaft Diameter** 50.8 mm (2 inch)

**Shaft Rotation** Reverse (bi-directional)

**Bearings** Tapered roller bearings

**Oil Capacity** 7.3 liters (7.75 US quarts) - See pages 96 and 97 for oil selection and specification.

## Weight

Metallic Heads: 116.6 kg (257 lbs.)

## Calculating Required Power

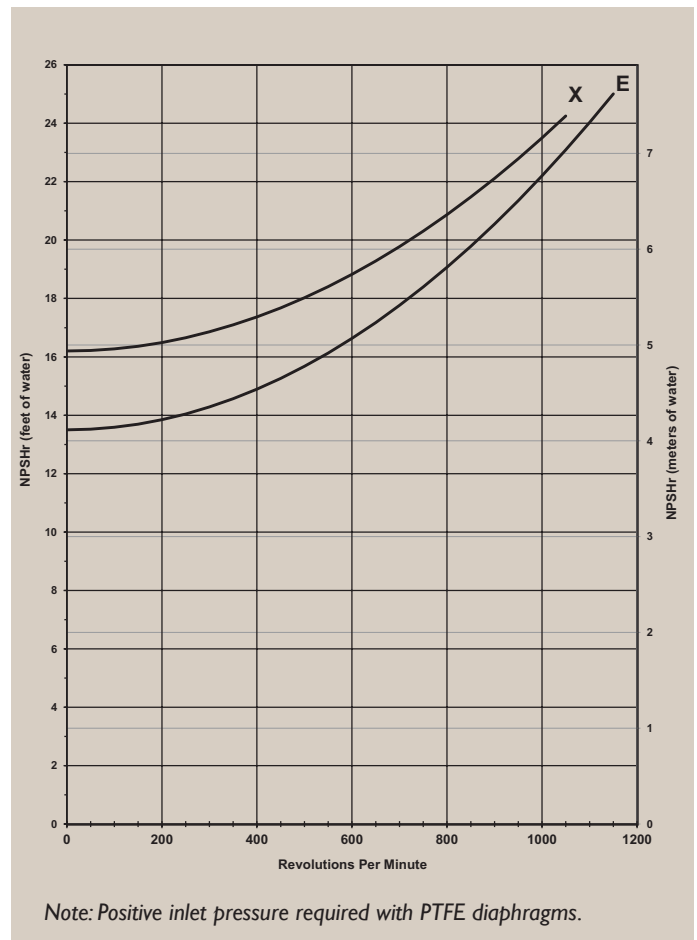
$$\frac{100 \times \text{rpm}}{63,000} + \frac{\text{gpm} \times \text{psi}}{1,460} = \text{electric motor hp}$$

$$\frac{100 \times \text{rpm}}{84,428} + \frac{\text{l/min} \times \text{bar}}{511} = \text{electric motor kW}$$

See page 164 for calculating pulley size.

When using a variable frequency drive (VFD) calculate the hp or kW at minimum and maximum pump speed to ensure the correct hp or kW motor is selected. Note that motor manufacturers typically de-rate the service factor to 1.0 when operating with a VFD.

## Net Positive Suction Head (NPSHr)



## Self-priming:

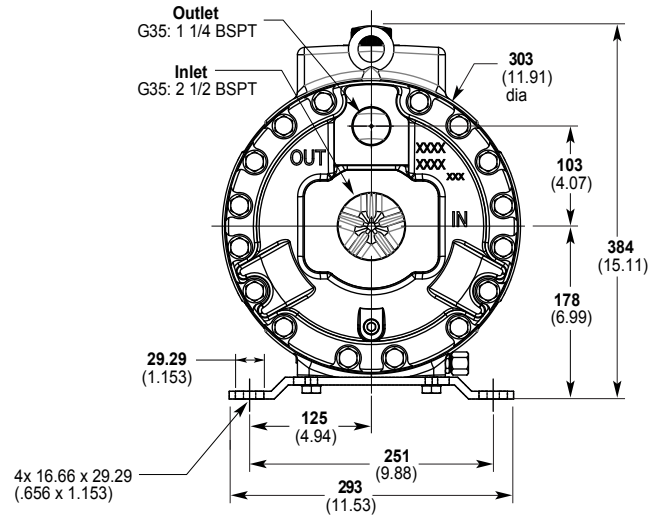
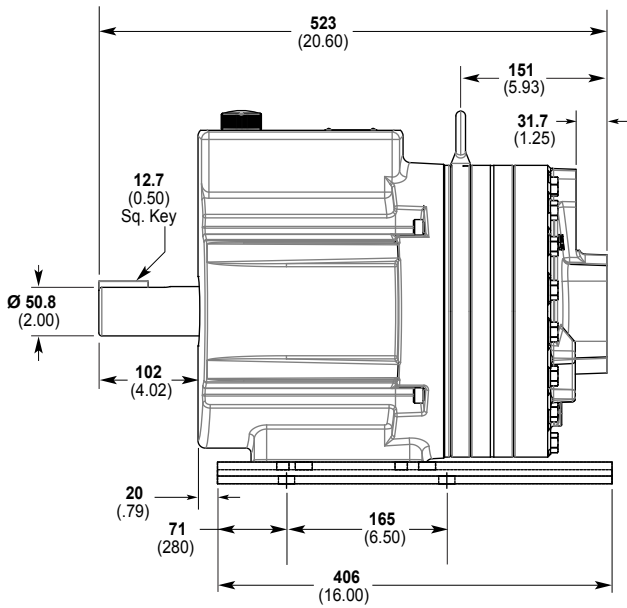
Each Hydra-Cell pump has different lift capability depending on model size, cam angle, speed, and fluid characteristics. To ensure that your specific lift characteristics are met, refer to the inlet calculations regarding friction, and acceleration head losses in your Hydra-Cell Installation & Service Manual. Compare those calculations to the NPSHr curves above.

For technical assistance in pump selection, see Frequently Asked Questions on page 162, Design Considerations on page 163, and Installation Guidelines on pages 164-165.

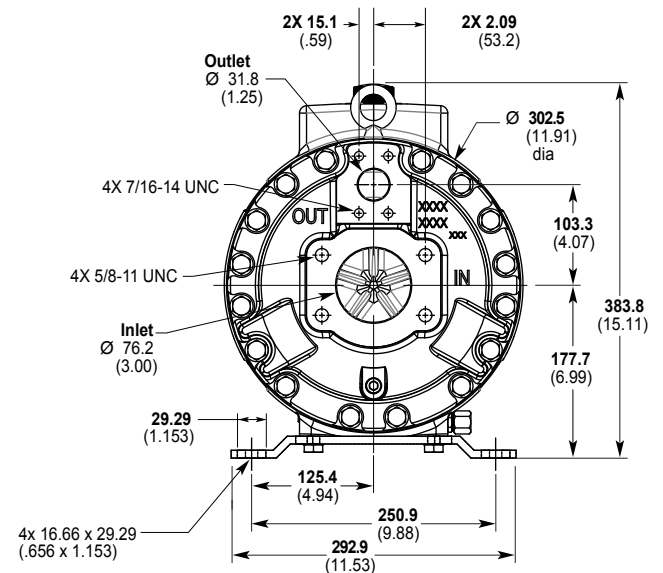
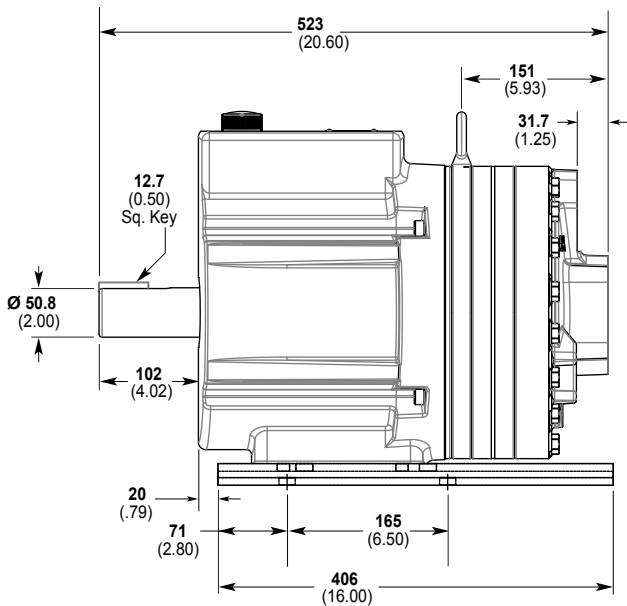


# G35 Series Representative Drawings

## G35 Models with BSPT Inlet/Outlet Ports mm (Inches)



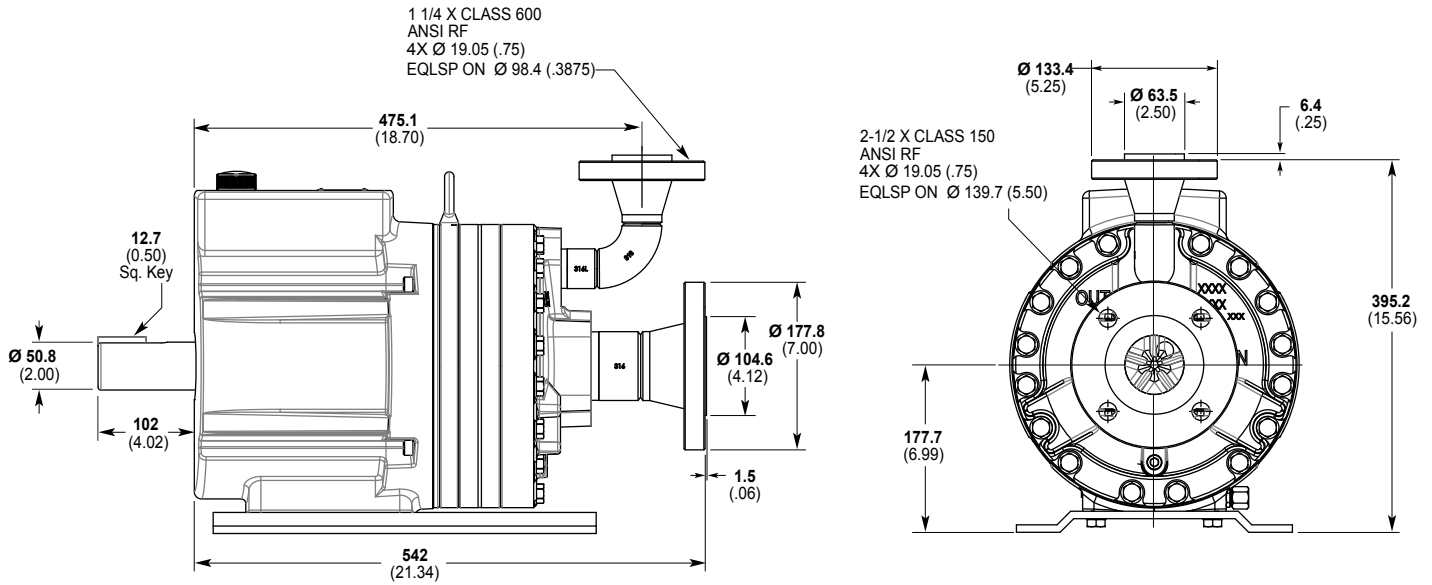
## G35 Models with SAE Flange Inlet/Outlet Ports mm (Inches)



**Note:** Contact factory for additional drawings of specific models and configurations.

# G35 Series Representative Drawings/Valves/Skids

## G35 Models with ANSI Flange Inlet/Outlet Ports mm (Inches)



### Valve Selection

A seal-less C64 Pressure Regulating Valve is recommended for Hydra-Cell G35 pumping systems, especially for high-pressure requirements or when handling dirty fluids. See page 88 for more information.



A C24 Pressure Regulating Valve provides a capable, lower-cost alternative to C64 valves for Hydra-Cell G35 pumping systems. See page 84 for more information.



Skid-mounted G35 with 20hp, 3-phase motor.



# G35 Series How to Order

## Ordering Information

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

A complete G35 Series Model Number contains 12 digits including 9 customer-specified design and materials options, for example: G35XKBTHFECA.

Digit	Order Code	Description
<b>1-3</b>	<b>G35</b>	<b>Pump Configuration</b> Shaft-driven (BSPT Ports or SAE or ANSI Flanges)
<b>4</b>	<b>X</b>	<b>Hydraulic End Cam</b> Max 127.0 l/min (33.5 gpm) @ 960 rpm
	<b>E</b>	Max 110.0 l/min (29.1 gpm) @ 960 rpm
<b>5</b>	<b>K</b>	<b>Pump Head Version</b> Kel-Cell BSPT Ports or ANSI Flanges
	<b>E</b>	Kel-Cell SAE Flanges
	<b>X</b>	ATEX <i>(Note: ATEX 94/9/EC Certified, Category 2, Zone 1. Includes certificate and oil level monitor.)</i>
<b>6</b>	<b>B</b>	<b>Pump Head Material</b> Brass
	<b>C</b>	Cast Iron (Nickel-plated)
	<b>G</b>	Duplex Alloy 2205 (with Hastelloy C followers & follower screws)
	<b>Q</b>	316L Stainless Steel ANSI flange class 600 x 1500
	<b>R</b>	316L Stainless Steel ANSI flange class 150 x 600
	<b>S</b>	316L Stainless Steel - threaded or SAE ports
	<b>T</b>	Hastelloy CW12MW
<b>7</b>	<b>A</b>	<b>Diaphragm &amp; O-ring Material</b> Aflas diaphragm / PTFE o-ring
	<b>E</b>	EPDM (requires EPDM-compatible oil - Digit 12 oil code D)
	<b>G</b>	FKM
	<b>J</b>	PTFE (available with E cam only; 1050 rpm max.)
	<b>P</b>	Neoprene
	<b>T</b>	Buna-N
<b>8</b>	<b>C</b>	<b>Valve Seat Material</b> Ceramic
	<b>D</b>	Tungsten Carbide
	<b>H</b>	17-4 Stainless Steel
	<b>N</b>	Nitronic 50
	<b>T</b>	Hastelloy C
<b>9</b>	<b>C</b>	<b>Valve Material</b> Ceramic
	<b>D</b>	Tungsten Carbide
	<b>F</b>	17-4 Stainless Steel
	<b>N</b>	Nitronic 50
	<b>T</b>	Hastelloy C

Digit	Order Code	Description
<b>10</b>	<b>E</b>	<b>Valve Springs</b> Elgiloy
	<b>H</b>	17-7 Stainless Steel
	<b>T</b>	Hastelloy C
<b>11</b>	<b>C</b>	<b>Valve Spring Retainers</b> Celcon
	<b>H</b>	17-7 Stainless Steel
	<b>M</b>	PVDF
	<b>P</b>	Polypropylene
	<b>T</b>	Hastelloy C
	<b>Y</b>	Nylon (Zytel)
<b>12</b>	<b>A</b>	<b>Hydra-Oil</b> 10W30 standard-duty oil
	<b>B</b>	40-wt for continuous-duty oil (use with 316L SST or Hastelloy CW12MW pump head - standard)
	<b>D</b>	EPDM-compatible oil
	<b>F</b>	Food-contact oil
	<b>G</b>	5W30 cold-temp severe-duty synthetic oil
	<b>H</b>	15W50 high-temp severe-duty synthetic oil

**G35 Pump Housing is standard as Cast Aluminum. Upgrade to Ductile Iron available.**

**Note:** For motors, bases, couplings and other pump accessories, refer to the Accessories section beginning on page 92.

## G66 Series

---

Maximum Flow Rate: 65.7 gpm (248.7 l/min)

Maximum Pressure: 700 psi (48 bar) for Metallic Pump Heads  
250 psi (17 bar) for Non-metallic Pump Heads



*G66 with Cast Iron pump head*



*G66 with Polyurethane pump head*



# G66 Series Performance

## Capacities

### Flow

Model	Max. Input rpm	Max. Flow @ 700 psi (48 bar)	
		gpm	l/min
G66-X	1000	65.7	248.7

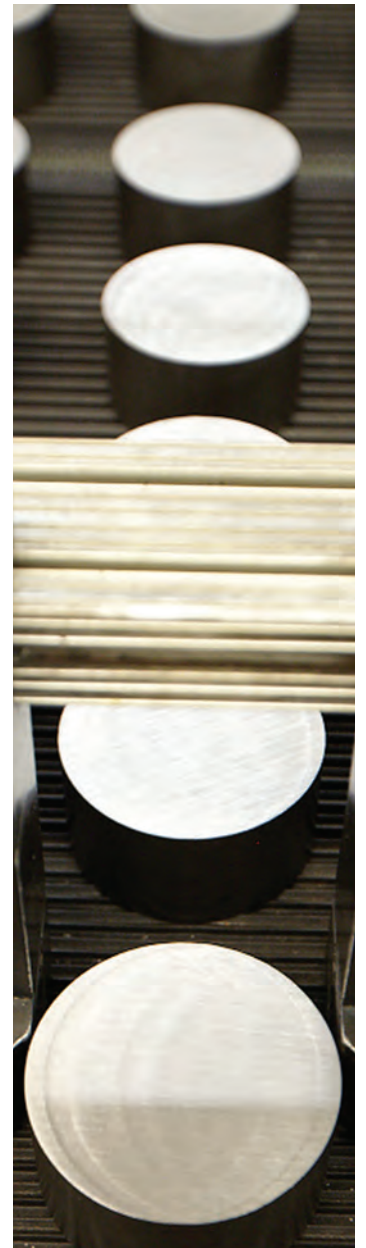
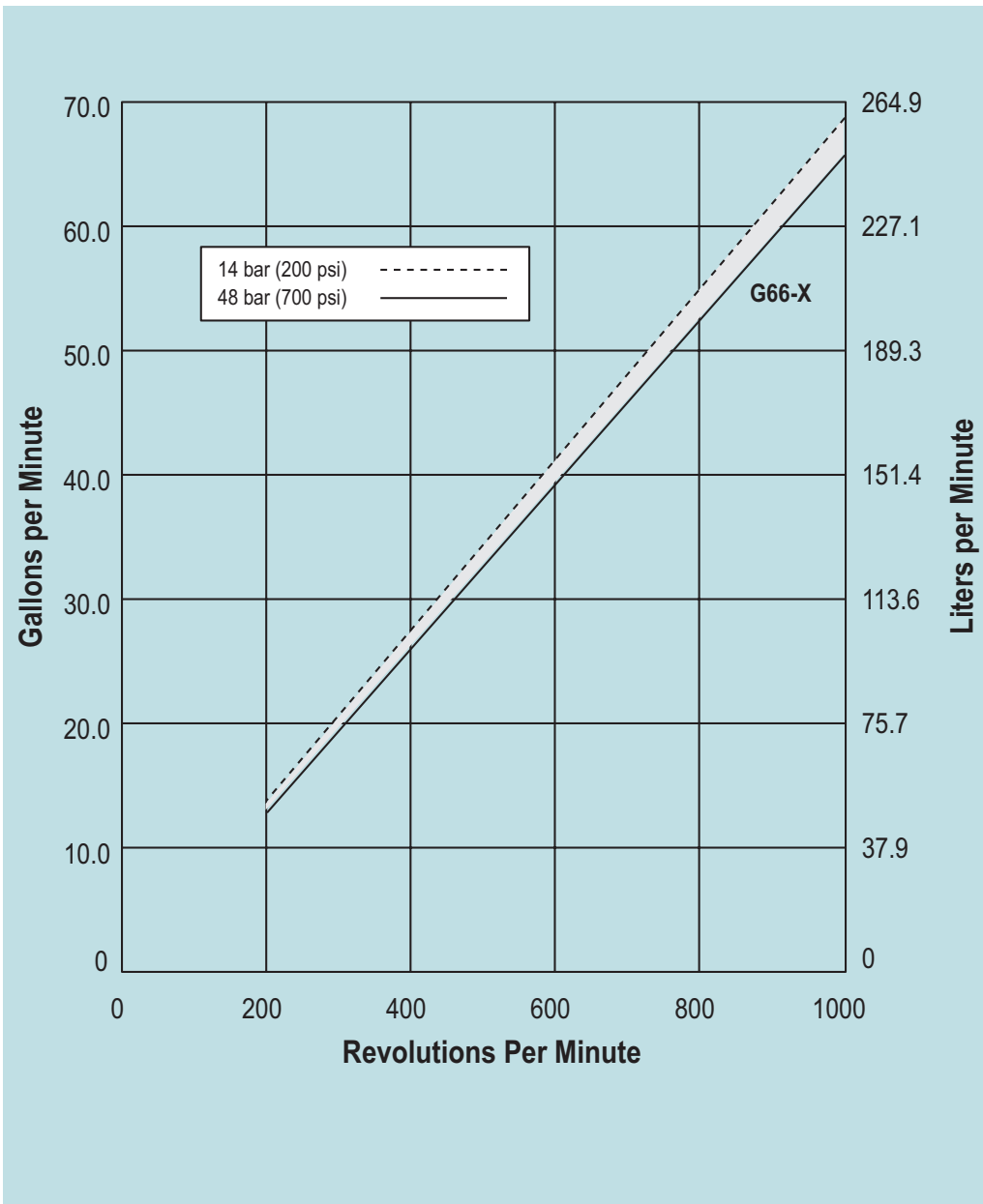
### Pressure

**Maximum Inlet Pressure**  
250 psi (17 bar)

**Maximum Discharge Pressure**  
Metallic Pump Heads:  
700 psi (48 bar)  
Non-metallic Pump Heads:  
250 psi (17 bar) Polypropylene

Performance and specification ratings apply to D66 configurations unless specifically noted otherwise.

## Maximum Flow at Designated Pressure



# G66 Series Specifications

## Flow Capacities @ 14 bar (200 psi)

Model	rpm	gpm	l/min
G66-X (Metallic)	1000	67.8	256

## Flow Capacities @ 17 bar (250 psi)

Model	rpm	gpm	l/min
G66-X (Non-metallic)	1000	67.5	255

## Flow Capacities @ 48 bar (700 psi)

Model	rpm	gpm	l/min
G66-X (Metallic)	1000	65.7	248

## Delivery @ 14 bar (200 psi)

Model	gal/rev	liters/rev
G66-X (Metallic)	0.0678	0.256

## Delivery @ 17 bar (250 psi)

Model	gal/rev	liters/rev
G66-X (Non-metallic)	0.675	0.255

## Delivery @ 48 bar (700 psi)

Model	gal/rev	liters/rev
G66-X (Metallic)	0.657	0.248

## Maximum Discharge Pressure

Metallic Heads:	48 bar (700 psi) @1000 rpm
Non-metallic Heads:	17 bar (250 psi) Polypropylene

## Maximum Inlet Pressure

Metallic Heads:	17 bar (250 psi)
Non-metallic Heads:	3.5 bar (50 psi)

## Maximum Operating Temperature

Metallic Heads:	121 °C (250 °F) - Consult factory for correct component selection for temperatures from 71 °C (160 °F) to 121 °C (250 °F).
Non-metallic Heads:	49 °C (120 °F) - Consult factory for temperatures above 49 °C (120 °F).

## Maximum Solids Size

800 microns

## Inlet Port

3 inch BSPT  
3 inch NPT  
2-1/2 inch SAE J518 Flange (Non-metallic)  
3 inch SAE J518 Flange (Metallic)

## Discharge Port

1-1/2 inch BSPT  
1-1/2 inch NPT  
1-1/2 inch SAE

## Shaft Diameter

50.8 mm (2 inch)

## Shaft Rotation

Reverse (bi-directional)

## Bearings

Tapered roller bearings

## Oil Capacity

7.5 liters (8 US quarts)

## Weight

Metallic Heads:	226 kg (500 lbs.)
Non-metallic Heads:	133 kg (295 lbs.)

## Calculating Required Power

$$\frac{100 \times \text{rpm}}{63,000} + \frac{\text{gpm} \times \text{psi}}{1,460} = \text{electric motor hp}$$

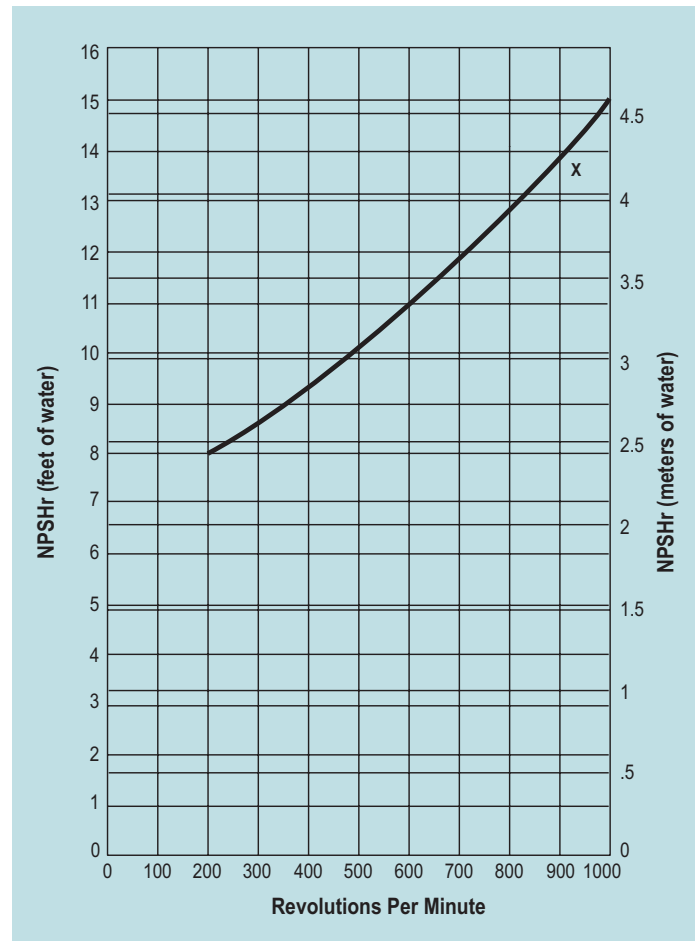
$$\frac{100 \times \text{rpm}}{84,428} + \frac{\text{l/min} \times \text{bar}}{511} = \text{electric motor kW}$$

## Calculating Pulley Size

$$\frac{\text{motor pulley OD}}{\text{pump rpm}} = \frac{\text{pump pulley OD}}{\text{motor rpm}}$$

When using a variable frequency controller (VFD) calculate the hp or kW at minimum and maximum pump speed to ensure the correct hp or kW motor is selected. Note that motor manufacturers typically de-rate the service factor to 1.0 when operating with a VFD.

## Net Positive Suction Head (NPSHr)



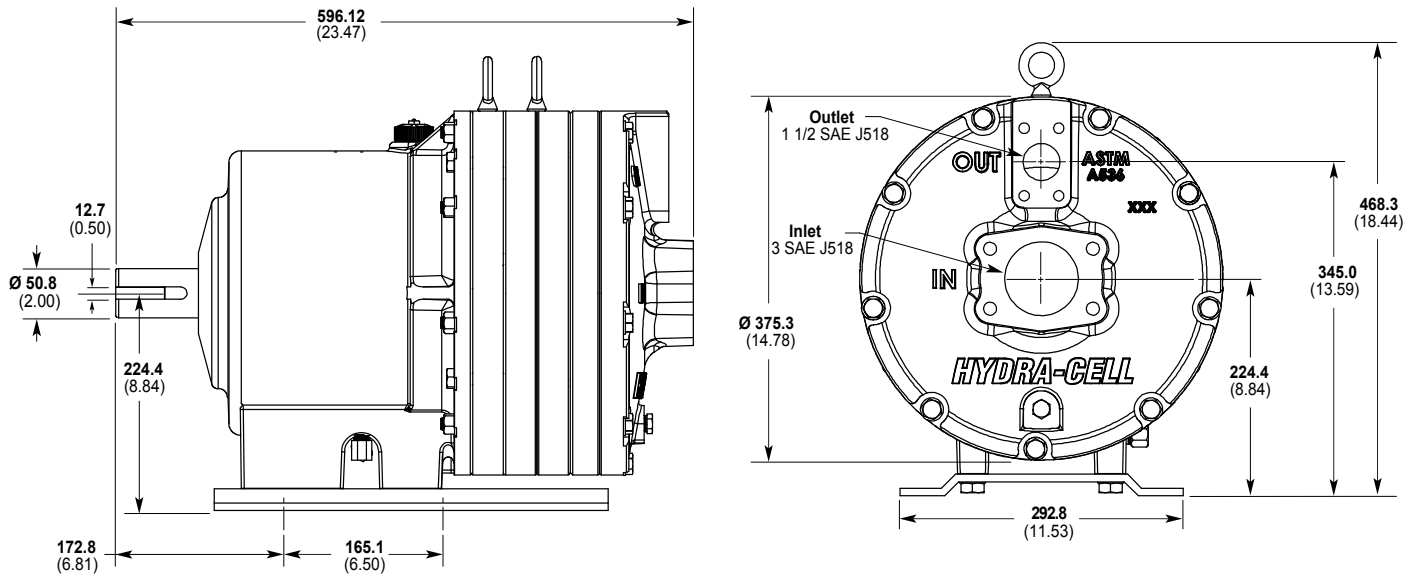
## Self-priming:

Each Hydra-Cell pump has different lift capability depending on model size, cam angle, speed, and fluid characteristics. To ensure that your specific lift characteristics are met, refer to the inlet calculations regarding friction, and acceleration head losses in your Hydra-Cell Installation & Service Manual. Compare those calculations to the NPSHr curves above.

For technical assistance in pump selection, see *Frequently Asked Questions* on page 162, *Design Considerations* on page 163, and *Installation Guidelines* on pages 164-165.

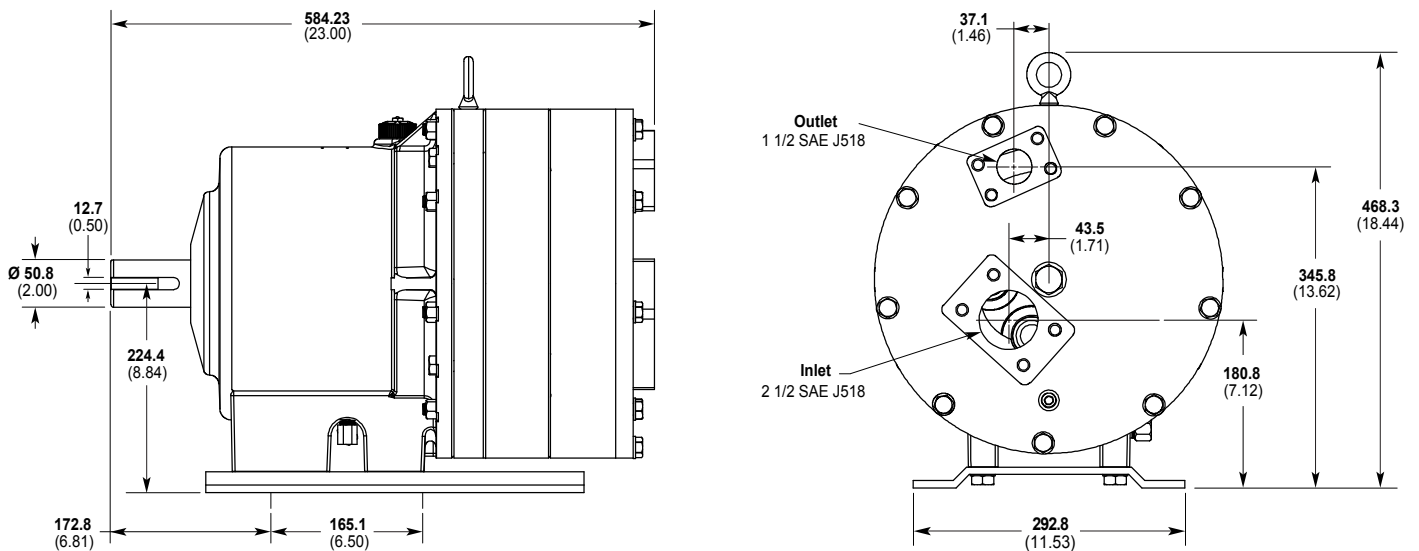
# G66 Series Representative Drawings

## G66 Models with SAE Flange Inlet/Outlet Ports mm (Inches)



*Metallic pump head models shown.*

## G66 Models with SAE Flange Inlet/Outlet Ports mm (Inches)

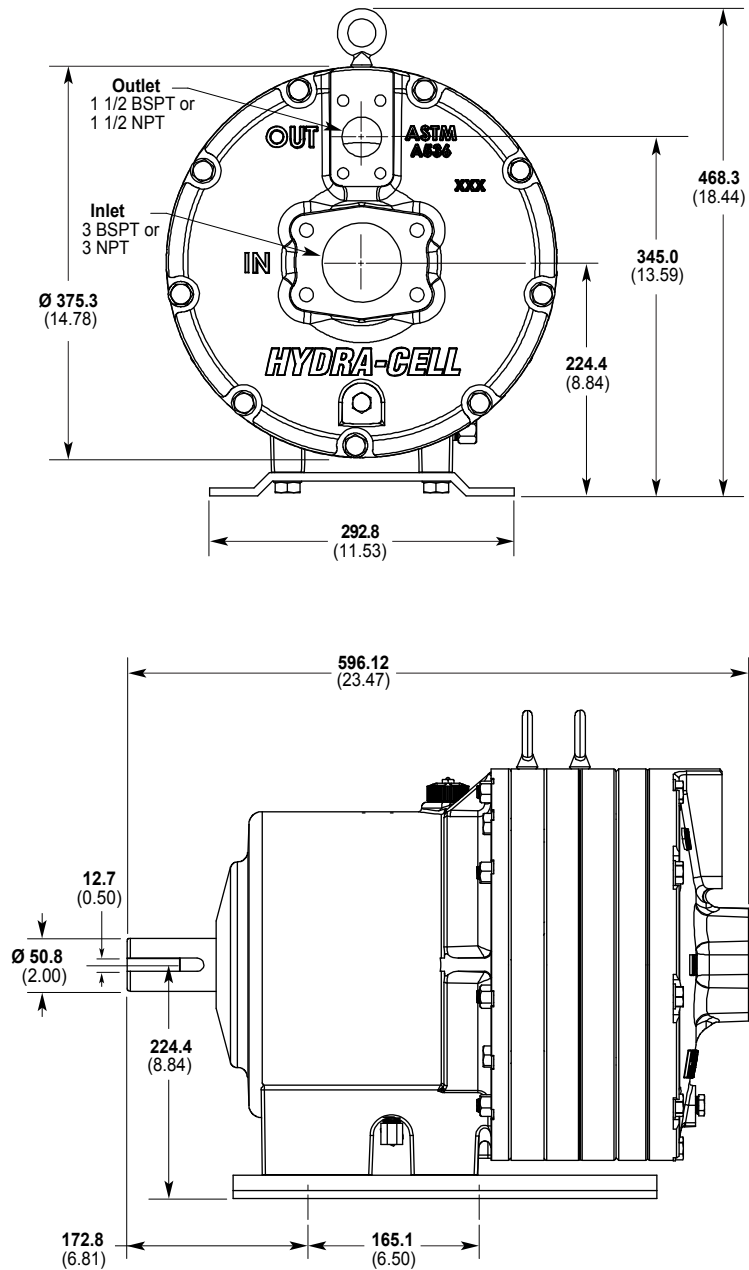


*Non-metallic pump head models shown.*

**Note:** Contact factory for additional drawings of specific models and configurations.

# G66 Series Representative Drawings

## G66 Models with BSPT Inlet/Outlet Ports mm (Inches)



*Metallic pump head models shown.*

**Note:** Contact factory for additional drawings of specific models and configurations.



# G66 Series **How to Order**

## Ordering Information

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

A complete G66 Series Model Number contains 12 digits including 9 customer-specified design and materials options, for example: G66XKDGHFPA.

Digit	Order Code	Description
<b>1-3</b>	<b>G66</b>	<b>Pump Configuration</b> Shaft-driven
<b>4</b>	<b>X</b>	<b>Hydraulic End Cam</b> Max 248.7 l/min (65.7 gpm) @ 1000 rpm
<b>5</b>	<b>K</b>	<b>Pump Head Version</b> Kel-Cell BSPT Ports or SAE Flanges
<b>6</b>	<b>B</b>	<b>Pump Head Material</b> Brass
	<b>D</b>	Ductile Iron
	<b>N</b>	Polypropylene (with Hastelloy C followers and follower screws)
	<b>P</b>	Polypropylene (with 316 SST followers and follower screws)
	<b>S</b>	Stainless Steel
<b>7</b>	<b>G</b>	<b>Diaphragm &amp; O-ring Material</b> FKM
	<b>T</b>	Buna-N
<b>8</b>	<b>H</b>	<b>Valve Seat Material</b> 17-4 Stainless Steel
	<b>N</b>	Nitronic 50
	<b>T</b>	Hastelloy C
<b>9</b>	<b>F</b>	<b>Valve Material</b> 17-4 Stainless Steel
	<b>N</b>	Nitronic 50
	<b>T</b>	Hastelloy C
<b>10</b>	<b>E</b>	<b>Valve Springs</b> Elgiloy
	<b>H</b>	17-7 Stainless Steel
<b>11</b>	<b>C</b>	<b>Valve Spring Retainers</b> Celcon
	<b>M</b>	PVDF
	<b>P</b>	Polypropylene
<b>12</b>	<b>A</b>	<b>Hydra-Oil</b> 10W30 standard-duty oil
	<b>H</b>	15W50 high-temp severe-duty synthetic oil

**Note:** For motors, bases, couplings and other pump accessories, refer to the Accessories section beginning on page 92.

# C Series Valves Selection Guide

## Pressure Regulating Valves



### C20 Series

Page 78



### C46 Series

Page 80



### C60 Series (Seal-less Valves)

Page 82

## Air Bleed Priming Valves



### C80 Series

Page 84

# C Series Pressure Regulating Valves

## Versatile Application for Positive Displacement Pumps

Designed for use with any positive displacement pump, Hydra-Cell C Series pressure regulating valves bypass system fluid to prevent excess system pressure. They can also be used as pressure relief valves.

When a system discharge is completely closed (e.g. closed spray gun, closed valve, plugged nozzle) the Hydra-Cell valve bypasses the total system fluid flow. The valves also balance system pressure for multiple-gun operations.

## Seal-less Diaphragm



*C60 Series valves feature a seal-less diaphragm with a tapered plunger, making the valves ideal for high-pressure requirements and handling dirty fluids.*

## Design Advantages



*Tapered design of the C20 Series valves plunger.*

The valve design is based on using a simple tapered plunger with a valve seat. When excess pressure overcomes the adjustable spring pressure on the plunger, the plunger lifts off the seat, allowing fluid to bypass and reduce system pressure. When the valve is mounted in the discharge line, its modified flow-through design reduces wear on the plunger and seat. Baffles on either side of the plunger and seat extend valve life by directing flow around these critical components.

## Performance Advantages

- Accurate and repeatable
- Adjustable
- Immediate response
- Smooth, chatter-free bypass
- No external springs or moving parts
- Flow-through design with minimal pressure surge
- Heavy-duty construction

## Easy to Service

Hydra-Cell C Series valves can be serviced in place without removing any fittings or plumbing. Simply remove the top of the body and replace any worn internal components.



*The model C62 seal-less valve is the most frequently specified pressure regulating valve in a Hydra-Cell pumping system.*

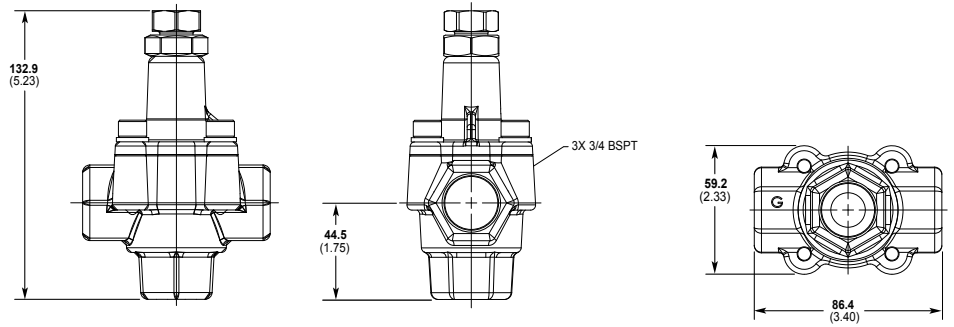
# C20 Series Valves

## Dimensions

### C22 with 3/4" BSPT Ports mm (Inches)



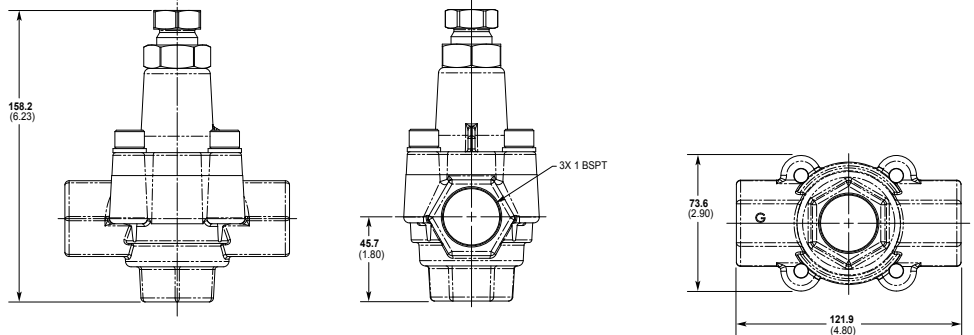
C22 valve with Brass body



### C23 with 1" BSPT Ports mm (Inches)



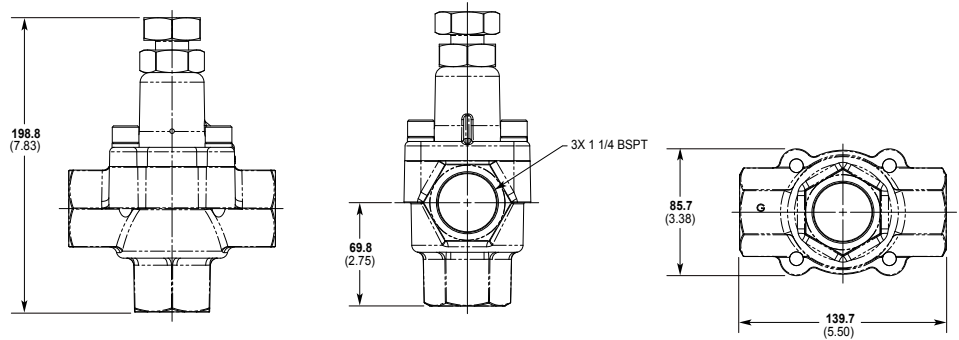
C23 valve with Stainless Steel body



### C24 with 1-1/4" BSPT Ports mm (Inches)



C24 valve with Brass body





# C20 Series Valves How to Order

## Ordering Information



A complete C22, C23 or C24 Model Number contains 11 digits of customer-specified design options, for example: C22AABNSSEF.

Digit	Order Code	Description
<b>1-4</b>		<b>Valve Configuration &amp; Capacities</b>
	<b>C22A</b>	3-10 gpm (11.3-37.8 l/min) BSPT Ports
	<b>C23A</b>	3-20 gpm (11.3-75.7 l/min) BSPT Ports
	<b>C24A</b>	5-40 gpm (18.9-151.4 l/min) BSPT Ports
<b>5</b>		<b>Pressure Range (Spring Selection)</b>
	<b>A</b>	75-500 psi (5-34 bar)
	<b>B</b>	500-1000 psi (34-69 bar)
	<b>C</b>	1000-1500 psi (69-103 bar)
<b>6</b>		<b>Body/Top Material</b>
	<b>B</b>	Brass/Plated Steel
	<b>H</b>	Hastelloy C/Plated Steel
	<b>S</b>	316L Stainless Steel/Plated Steel
<b>7</b>		<b>Seals/Back-up Seals</b>
	<b>A</b>	Urethane/UHMW Polyethylene
	<b>B</b>	FKM/UHMW Polyethylene
	<b>E</b>	EPDM/PTFE
	<b>N</b>	Buna-N/Buna-N
	<b>V</b>	FKM/PTFE
<b>8</b>		<b>Valve Seats</b>
	<b>H</b>	Hastelloy C
	<b>R</b>	316L Stainless Steel
	<b>S</b>	17-4 Stainless Steel
	<b>T</b>	Tungsten Carbide
<b>9</b>		<b>Plungers</b>
	<b>H</b>	Hastelloy C
	<b>R</b>	316L Stainless Steel
	<b>S</b>	17-4 Stainless Steel
	<b>T</b>	Tungsten Carbide
<b>10</b>		<b>Seat Size</b>
	<b>E</b>	For C22 Models
	<b>J</b>	For C23 Models
<b>11</b>		<b>Port Size</b>
	<b>E</b>	For C22 Models (3/4")
	<b>G</b>	For C23 Models (1")
	<b>H</b>	For C24 Models (1-1/4")

For reference on identifying metallic components of C20 Series plungers and plunger valve seats, see page 144.

## Ratings and Specifications

Flow Capacity Model	Maximum		Minimum	
	gpm	l/min	gpm	l/min
C22	10.0	37.8	3.0	11.3
C23	20.0	75.7	3.0	11.3
C24	40.0	151.4	5.0	18.9

Pressure Range (All Models)	Model Configuration		
	AA	AB	AC
psi	75-500	500-1000	1000-1500
bar	5-34	34-69	69-103

Max. Temperature	200 °F (93 °C)
------------------	----------------

Inlet & Outlet Ports	
C22	3/4" BSPT
C23	1" BSPT
C24	1-1/4" BSPT

Weight	
C22	3 lbs. (1.3 kg)
C23	6 lbs. (2.7 kg)
C24	10 lbs. (4.5 kg)

C20 Series valves can be used as a lower-cost alternative to C60 Series seal-less valves when higher discharge pressures are not required.

C22 valves are used with Hydra-Cell models G10 and G12.

C23 valves are used with Hydra-Cell model G25.

C24 valves are used with Hydra-Cell model G35.

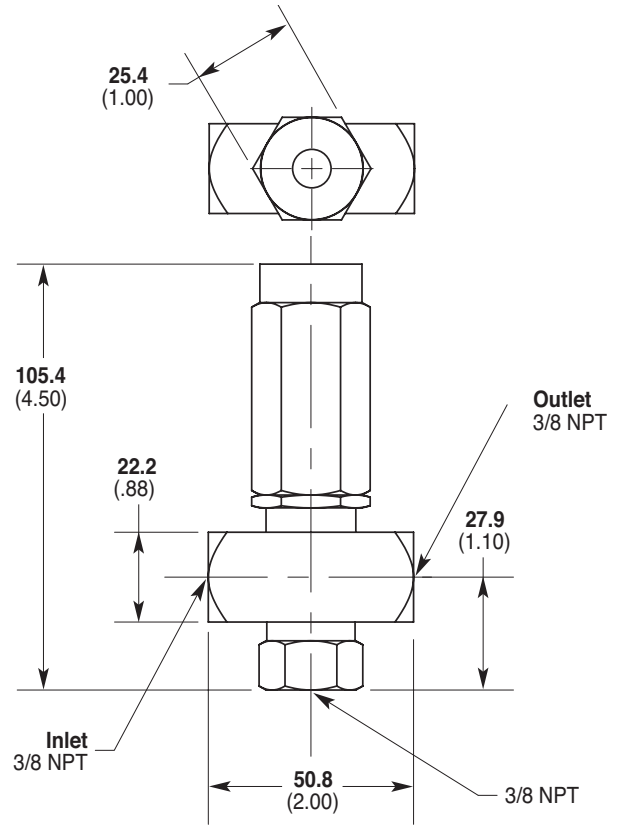
# C46 Series Valves

## Dimensions

### C46 for In-Line Mount with 3/8" NPT Ports mm (Inches)



C46 In-line with Brass body

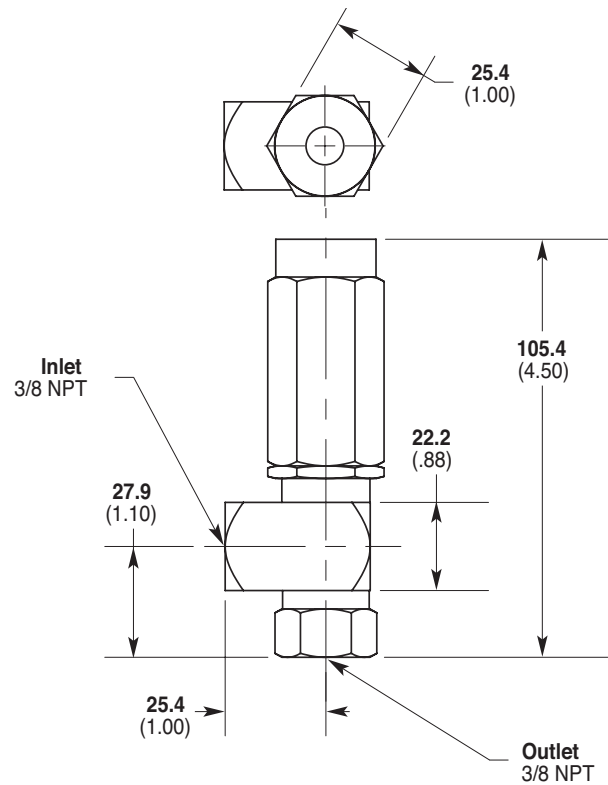


C46 Off-line with Stainless Steel body

### C46 for Off-Line Mount with 3/8" NPT Ports mm (Inches)



C46 Off-line with Brass body



# C46 Series Valves How to Order

## Ordering Information

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

A complete C46 Model Number contains 11 digits of customer-specified design options, for example: C46AABESSEE.

Digit	Order Code	Description
<b>1-3</b>		<b>Valve Configuration &amp; Capacities</b>
	<b>C46</b>	0.2-10 gpm (1-37.8 l/min) NPT Ports
<b>4</b>		<b>Mounting Design</b>
	<b>A</b>	In-line (Brass only)
	<b>B</b>	Off-line (Brass or Stainless Steel)
<b>5</b>		<b>Pressure Range (Spring Selection)</b>
	<b>A</b>	Low Spring: 50-500 psi (3-34 bar)
	<b>B</b>	Medium Spring: 100-900 psi (7-62 bar)
	<b>C</b>	Standard Spring: 200-1500 psi (13-103 bar)
<b>6</b>		<b>Body Material</b>
	<b>B</b>	Brass
	<b>S</b>	316L Stainless Steel (Off-line models only)
<b>7</b>		<b>O-rings</b>
	<b>E</b>	EPDM
	<b>N</b>	Buna-N
	<b>V</b>	FKM
<b>8</b>		<b>Piston</b>
	<b>S</b>	316L Stainless Steel
<b>9</b>		<b>Seat</b>
	<b>S</b>	316L Stainless Steel
<b>10</b>		<b>Seat Size</b>
	<b>E</b>	For C46 Models
<b>11</b>		<b>Port Size</b>
	<b>E</b>	For C46 Models (3/8" NPT)

## Ratings and Specifications

Flow Capacity Model	Maximum		Minimum	
	gpm	l/min	gpm	l/min
C46 In-line	7.0	26.5	0.2	1.0
C46 Off-line	10.0	37.8	0.2	1.0

Pressure Range	
Low Spring	50-500 psi (3-34 bar)
Medium Spring	100-900 psi (7-62 bar)
Standard Spring	200-1500 psi (13-103 bar)

<b>Max. Temperature</b>	200° F (93° C)
-------------------------	----------------

<b>Inlet &amp; Outlet Ports</b>	3/8" NPT
---------------------------------	----------

<b>Weight</b>	12 oz. (0.33 kg)
---------------	------------------

C46 Series valves are used with Hydra-Cell models G20, G21, G22, G03, G13, and G03 Mono-Block.

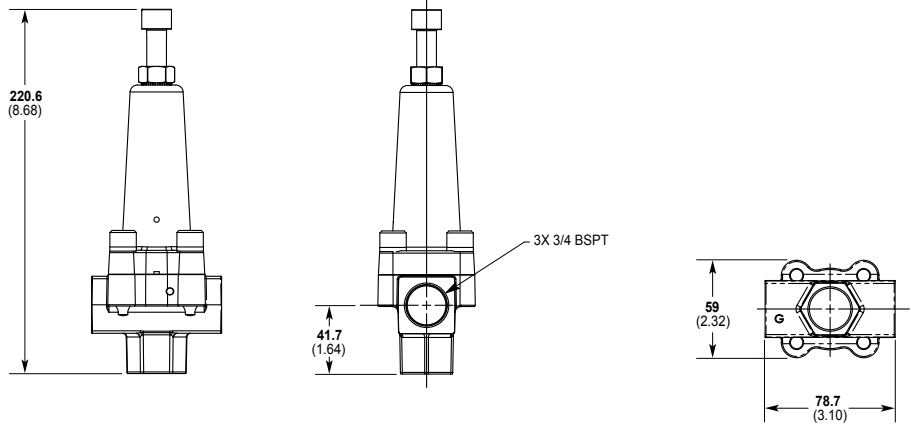
# C60 Series Valves

## Dimensions



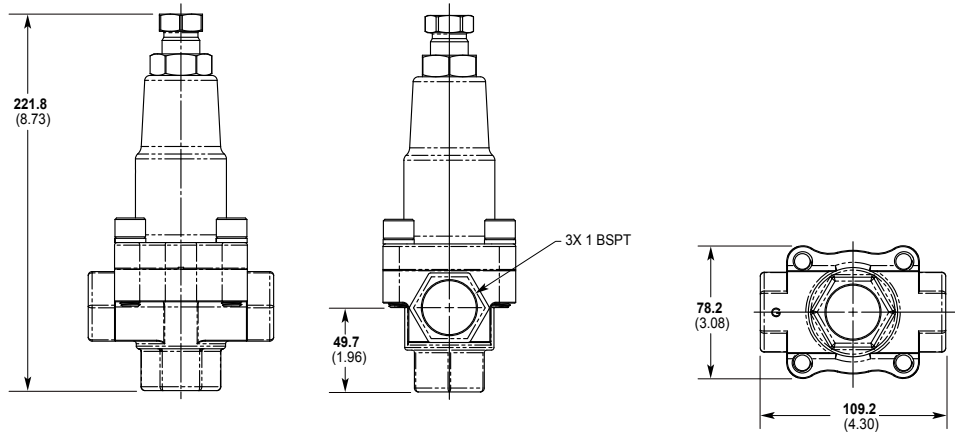
C62 valve with Stainless Steel body

### C62 with 3/4" BSPT Ports mm (Inches)



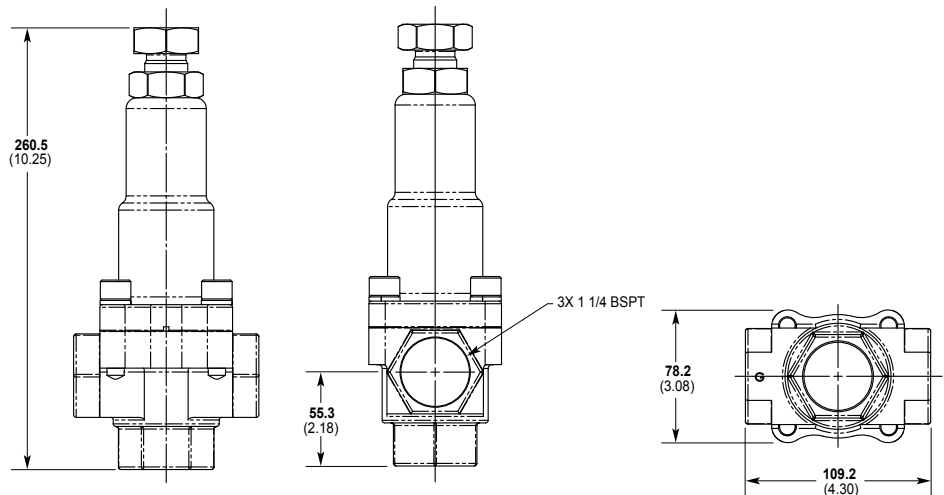
C63 valve with Brass body

### C63 with 1" BSPT Ports mm (Inches)



C64 valve with Stainless Steel body

### C64 with 1-1/4" BSPT Ports mm (Inches)





# C60 Series Valves How to Order

## Ordering Information

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

A complete C62, C63 or C64 Model Number contains 11 digits of customer-specified design options, for example: C62ABBSSEF.

Digit	Order Code	Description
<b>1-3</b>		<b>Valve Configuration &amp; Capacities</b>
	<b>C62</b>	1-14 gpm (3-53.0 l/min) BSPT Ports
	<b>C63</b>	1-25 gpm (3-94.6 l/min) BSPT Ports
	<b>C64</b>	1-40 gpm (3-151.4 l/min) BSPT Ports
<b>4</b>		<b>Inlet/Outlet Ports</b>
	<b>D</b>	BSPT Threaded Ports
<b>5</b>		<b>Pressure Range (Spring Selection)</b>
	<b>A</b>	C62: 75-500 psi (5-34 bar)
		C63: 75-1000 psi (5-69 bar)
		C64: 75-1000 psi (5-69 bar)
	<b>B</b>	C62: 500-2500 psi (34-172 bar)
		C63: 1000-2500 psi (69-172 bar)
C64: 1000-2500 psi (69-172 bar)		
<b>6</b>		<b>Body/Top Material</b>
	<b>B</b>	Brass/Plated Steel
	<b>H</b>	Hastelloy C/Plated Steel
	<b>S</b>	316L Stainless Steel/Plated Steel
<b>7</b>		<b>O-rings/Diaphragm</b>
	<b>J</b>	PTFE/PTFE
	<b>V</b>	FKM/PTFE
<b>8</b>		<b>Valve Seats</b>
	<b>H</b>	Hastelloy C
	<b>R</b>	316L Stainless Steel
	<b>S</b>	17-4 Stainless Steel
	<b>T</b>	Tungsten Carbide
<b>9</b>		<b>Plungers</b>
	<b>H</b>	Hastelloy C
	<b>R</b>	316L Stainless Steel
	<b>S</b>	17-4 Stainless Steel
	<b>T</b>	Tungsten Carbide
<b>10</b>		<b>Seat Size</b>
	<b>E</b>	For C62 Models
	<b>J</b>	For C63 Models
	<b>N</b>	For C64 Models
<b>11</b>		<b>Port Size</b>
	<b>F</b>	For C62 Models (3/4")
	<b>G</b>	For C63 Models (1")
	<b>H</b>	For C64 Models (1-1/4")

## Ratings and Specifications

Flow Capacity Model	Maximum		Minimum	
	gpm	l/min	gpm	l/min
C62	14.0	53.0	1.0	3.8
C63	25.0	94.6	1.0	3.8
C64	40.0	151.4	1.0	3.8

Pressure Range		Model Configuration	
		AA	AB
C62	<b>psi</b>	75-500	500-2500
	<b>bar</b>	5-34	34-172
C63	<b>psi</b>	75-1000	1000-2500
	<b>bar</b>	5-69	69-172
C64	<b>psi</b>	75-1000	1000-2500
	<b>bar</b>	5-69	69-172

<b>Max. Temperature</b>	200 °F (93 °C)
-------------------------	----------------

Inlet & Outlet Ports	
C62	3/4" BSPT
C63	1" BSPT
C64	1-1/4" BSPT

Weight	
C62	4.0 lbs. (1.8 kg)
C63	6.2 lbs. (2.8 kg)
C64	7.2 lbs. (3.3 kg)

C62 valves are recommended for Hydra-Cell models G04, G10, G12, and G15/G17.

C63 valves are recommended for Hydra-Cell model G25.

C64 valves are recommended for Hydra-Cell model G35.

### Notes:

C62 valves fitted with Tungsten Carbide rated to 1800 psi (124 bar) maximum.

Hastelloy C Body and Tungsten Carbide Plunger/Seat options available only for C62 models.

# C80 Series Valves

## Air Bleed Priming Valves

C80 Series valves provide an effective air/vapor release mechanism for diaphragm pump systems.

The valve automatically creates an open port to atmosphere for the pumping system. This allows the pump to clear air or vapors from the pump head and discharge plumbing rather than compressing the gas and reducing flow. The valve then closes to develop full system pressure immediately.



C80 with Brass body



C80 with Stainless Steel body



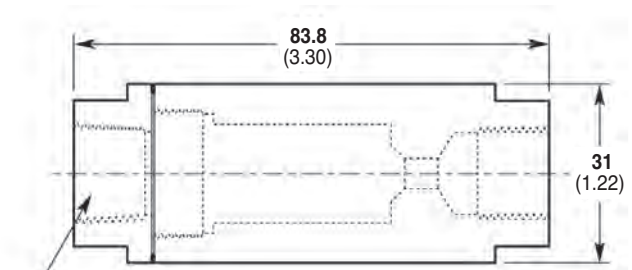
C80 with PVDF body

- Design is simple and reliable
- Easy to install and maintain
- Mounts vertically or horizontally
- Heavy-duty construction
- Available in a choice of materials and flow ranges to suit your application



Detail of valve components. The C80 Series Air Bleed valves are used with Hydra-Cell models G20, G03, G10 and G12.

## Dimensions mm (Inches)



3/8 BSPT Inlet and Outlet

# C80 Series Valves How to Order

## Ordering Information

1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---

A complete C80 Series Model Number contains 9 digits of customer-specified design options, for example: C80AAHBEB.

Digit	Order Code	Description
<b>1-3</b>		<b>Valve Configuration &amp; Capacities</b>
	<b>C80</b>	1.4-10 gpm (5.3-37.8 l/min) BSPT Ports
<b>4</b>		<b>Mounting Design</b>
	<b>D</b>	3/8" BSPT Thread
<b>5-6</b>		<b>Flow Range (Spring Selection)</b>
	<b>A-H</b>	1.4-3 gpm (5.3-11.4 l/min) / Hastelloy spring
	<b>B-H</b>	2.4-5 gpm (9.1-18.3 l/min) / Hastelloy spring
	<b>C-H</b>	4.6-7 gpm (17.4-26.5 l/min) / Hastelloy spring
	<b>D-H</b>	6.5-10 gpm (24.6-37.8 l/min) / Hastelloy spring
	<b>D-E</b>	6.5-10 gpm (24.6-37.8 l/min) / Elgiloy spring
<b>7</b>		<b>Body Material</b>
	<b>B</b>	Brass
	<b>H</b>	Hastelloy C
	<b>M</b>	PVDF (250 psi; 17 bar maximum pressure)
	<b>S</b>	316L Stainless Steel
<b>8</b>		<b>O-rings</b>
	<b>E</b>	EPDM
	<b>N</b>	Buna-N
	<b>P</b>	Neoprene
	<b>V</b>	FKM
<b>9</b>		<b>Poppet</b>
	<b>B</b>	Brass
	<b>H</b>	Hastelloy C276
	<b>S</b>	17-4 Stainless Steel

## Ratings and Specifications

Flow Capacity Configuration	Maximum		Minimum	
	gpm	l/min	gpm	l/min
A-H	3.0	11.4	1.4	5.3
B-H	5.0	18.3	2.4	9.1
C-H	7.0	26.5	4.6	17.4
D-H	10.0	37.8	6.5	24.6
D-E	10.0	37.8	6.5	24.6

### Pressure Range

Metallic Units	75-2500 psi	(5-172 bar)
Non-metallic Units	75-250 psi	(5-17 bar)

### Max. Discharge

Pressure Required	75 psi (5 bar)
-------------------	----------------

Max. Temperature	200 °F (93 °C)
------------------	----------------

Inlet & Outlet Ports	3/8" BSPT
----------------------	-----------

### Weight

Brass	1.0 lbs.	(0.45 kg)
Stainless Steel	1.0 lbs.	(0.45 kg)
PVDF	0.3 lbs.	(0.14 kg)

# Hydra-Cell® Pumps Accessories and Options



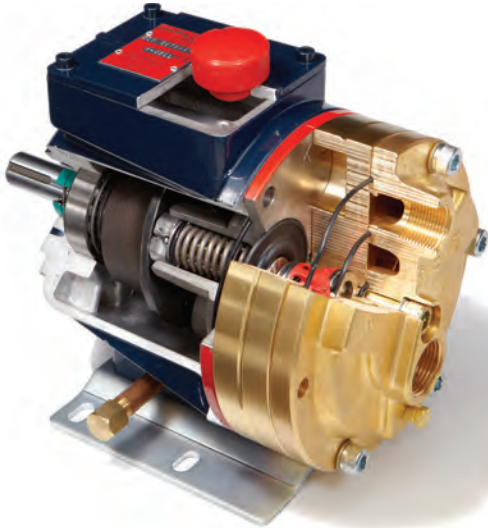
As part of our “Mass Customization” approach, Hydra-Cell pumps are available with a variety of in-stock accessories and options to provide a pumping system ideally suited to your installation and application.

*Note: Accessories in this section apply to Hydra-Cell G Series pumps as well as Hydra-Cell P Series metering pumps. Additional information about metering pump accessories can be found on page 158.*

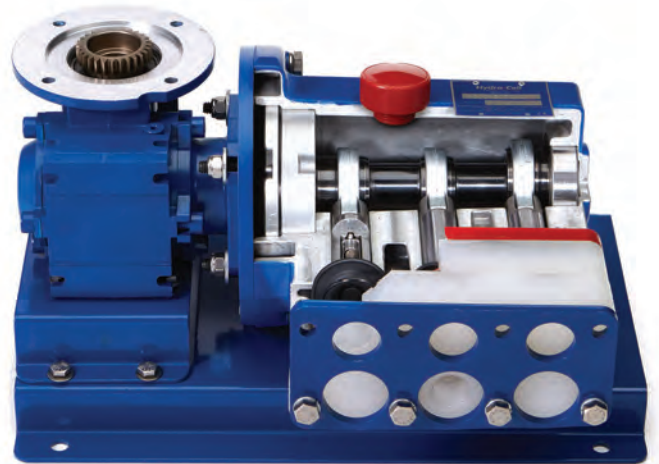
Accessory/Option	Page
Demonstration (Cutaway) Units .....	93
Testing.....	93
Motor Adapters.....	94
Motor Baseplates & Guards .....	94
Couplings .....	95
Hydra-Oil Lubricants.....	96
Oil Cooler & Filter System.....	98
Oil Level Monitoring Mounting Kits .....	99
Oil Reservoir Sight Bottles .....	100
Vacuum Priming Kit.....	100
Priming Plugs .....	100
Tool Kits.....	101
Touch-screen Metering Controller .....	102
Calibration Cylinders .....	104
Back Pressure & Pressure Relief Valves.....	105
Pulsation Dampeners .....	108
Replacement Parts Kits .....	111
Replacement Hydraulic Ends.....	111



# Demonstration (Cutaway) Units



G10 models demonstrate the wobble plate principle of operation.



P200 models demonstrate the crank-shaft principle of operation.

Demonstration units of Hydra-Cell G10 and P200 (metering) pumps are available with or without a rolling carry case (furnished with the appropriate sticker). The units are “cut away” to show both the wobble plate (G10) and crank-shaft (P200) operating principles as well as other features including the multiple diaphragm design that provides virtually pulse-free flow, and spring-loaded, horizontal check valves which, combined with the seal-less design, enable Hydra-Cell to handle abrasives and particulates that would damage other types of pumps.

Part Number	Description
CUTAWAY-G10WCASE	G10 Cutaway Demo with Rolling Carry Case
CUTAWAY-G10	G10 Cutaway Demo without Case
CUTAWAY-P200WCASE	P200 Cutaway Demo with Rolling Carry Case
CUTAWAY-P200	P200 Cutaway Demo without Case
CUTAWAY-CASE	Cutaway Demo Rolling Case Only (for G10 or P200)

## Testing

Wanner Engineering has a fully-equipped testing facility to perform a variety of witnessed and non-witnessed tests with certification for Hydra-Cell pumps.



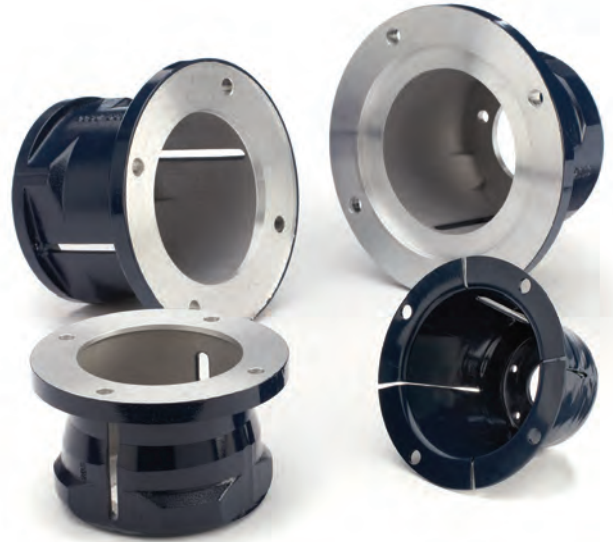
Part Number	Description	Notes
TEST-STDPROD	Standard Production Tests	Rated Flow, Rated Pressure, & Steady State Accuracy
TEST-STDPRODWIT	Witnessed Standard Production Tests	Rated Flow, Rated Pressure, & Steady State Accuracy
TEST-HYDRO	Hydrostatic Test & Certificate	Includes Standard Production Tests
TEST-HYDROWIT	Witnessed Hydrostatic Test & Certificate	Includes Standard Production Tests
TEST-STDLIN	API Linearity Test - 5-point curve	Includes Standard Production Tests
TEST-STDLINWIT	Witnessed API Linearity Test - 5-point curve	Includes Standard Production Tests
TEST-STDLINREP	API Repeatability Test - 10-point curve	Includes Standard Production Tests & API Linearity Test
TEST-STDLINREPWIT	Witnessed API Repeatability Test - 10-point curve	Includes Standard Production Tests & API Linearity Test
TEST-STDHYDAPI	API Test Package	Standard Production Tests, Linearity, Repeatability, & Hydrostatic
TEST-STDHYDAPIWIT	Witnessed API Test Package	Standard Production Tests, Linearity, Repeatability, & Hydrostatic

# Pump Motor Adapters

## Pump/Motor Adapters, IEC

Part Number	Pump Model	Motor Size/Flange
A04-006-1200	G21 & G22	80-90/B5
A04-003-1202	G03 & G04	80-90/B5
A04-004-1202	G03 & G04	100-112/B5
A04-003-1200	G10	80-90/B5
A04-004-1200	G10	100-112/B5
A01-041-1201	G15/G17 & G25	132/B5
A01-041-1203	G15/G17 & G25	160/B14
A01-041-1205	G15/G17 & G25	160-180/B5

**Note:** Dimensional drawings are shown in each pump model section.



## Pump Motor Baseplates and Guards

IEC Motor adapters are available with a variety of baseplates to fit Hydra-Cell G Series pumps. They feature heavy-gauge 304 Stainless Steel construction and are offered for size 90 through 225 IEC motor frames.

Description	IEC Motor Size	Models
Baseplate assembly with motor adapter	90	G03 / G10
	100	G10
	132	G10 / G15 / G25
	160	G15 / G25
	180	G15 / G25
Baseplate assembly with motor adapter and ATEX coupling	90	G03 / G10
	100	G10
	132	G10 / G15 / G25
	160	G15 / G25
	180	G15 / G25
Baseplate assembly long-coupled	90	G10
	100	G10
	132	G10 / G15 / G25
	160	G15 / G25 / G35
	180	G15 / G25 / G35
	200	G35
Baseplate assembly long-coupled with ATEX coupling	225	G35
	90	G10
	100	G10
	132	G10 / G15 / G25
	160	G15 / G25 / G35
	180	G15 / G25 / G35
	200	G35
	225	G35

### Examples of Drives for NEMA Motors



Horizontal direct drive with orange coupling guard (HDD Series) for models G10, G15, G25 and G35. (G10 shown)



Horizontal direct drive with flanged adapter (HFD Series) for models G10, G15 and G25. (G10 shown)



Horizontal belt drive with belt pulley guard (HBD Series) for models G10, G15, G25 and G35. (G35 shown)

# Couplings



Couplings with sleeves are available in a wide range of motor sizes for Hydra-Cell pumping systems.

## Coupling Selection Guide

When selecting a coupling, note that kilowatt (kW) values are for reference only under normal pump operation within rated specification. Please consult factory for critical performance or harsh-duty applications.

Coupling Series	Bore Ø (in.)	Maximum kW @ Designated Speed (rpm)		Part Number
		1750	1150	
<b>M24</b>	5/8 x 5/8	3.0	1.9	A04-024-1201
	5/8 x 7/8			A04-024-1202
	5/8 x 24 mm			A04-024-1203
	7/8 x 24 mm			A04-024-1204
	7/8 x 7/8			A04-024-1205
<b>M28</b>	5/8 x 5/8	6.8	4.3	A04-028-1201
	5/8 x 7/8			A04-028-1202
	5/8 x 1-1/8			A04-028-1203
	7/8 x 7/8			A04-028-1204
	7/8 x 1-1/8			A04-028-1205
	7/8 x 24 mm			A04-028-1206
	7/8 x 28 mm			A04-028-1208
<b>M38</b>	7/8 x 1-1/8	12.0	7.7	A04-038-1202
	7/8 x 1-3/8			A04-038-1203
	1-1/8 x 1-1/8			A04-038-1204
	1-1/8 x 1-3/8			A04-038-1205
<b>M42</b>	1-1/8 x 1-1/8	15.2	9.9	A04-042-1201
	1-1/8 x 1-3/8			A04-042-1202
	1-1/8 x 1-5/8			A04-042-1203
<b>M48</b>	1-1/8 x 1-1/8	21.1	15.0	A04-048-1201
	1-1/8 x 1-3/8			A04-048-1202
	1-1/8 x 1-5/8			A04-048-1203
	1-1/8 x 1-7/8			A04-048-1204
<b>M65</b>	1-1/8 x 2-1/8	63.0	37.2	A04-065-1201
	1-5/8 x 2			A04-065-1202
	1-7/8 x 2			A04-065-1203
	2 x 2-1/8			A04-065-1204
	1-3/8 x 2			A04-065-1205

## Motor & Pump Size Reference

Pump Model	Pump Shaft Ø	
	mm	Inches
<b>G20</b>	19 hollow shaft	-
<b>G21</b>	19	3/4
<b>G22</b>	19	3/4
<b>G03*</b>	22.2	7/8
<b>G13*</b>	24 hollow shaft	-
<b>G04</b>	22.2	7/8
<b>G10</b>	22.2	7/8
<b>G12</b>	22.2	7/8
<b>G15</b>	28.6	1-1/8
<b>G17</b>	28.6	1-1/8
<b>G25</b>	28.6	1-1/8
<b>G35</b>	50.8	2
<b>G66</b>	50.8	2

\* Includes Mono-Block



# Hydra-Oil Lubricants

**Hydra-Oil is specially formulated to maximize performance of Hydra-Cell pumps.**

- Reduce wear
- Withstand extreme temperature changes
- Improve pump performance
- Extend pump life
- Maintain consistent viscosity
- Withstand extreme pressures

## Standard Grades

### 10W30-weight (Order Code A)

For lower temperatures and lighter loads; maintains viscosity over a wide temperature range and with repeated startups.

### 40-weight (Order Code B)

For continuous use at higher loads and temperatures; provides exceptional wear resistance and film thickness.

## Synthetic Grades

Hydra-Oil synthetic grades are a blend of synthesized hydrocarbon fluids that provide pure chemicals and a heavier, more protective oil film for bearings and pistons.

### 5W30 (Order Code G)

For stable protection in cold temperatures or severe duty.

### 15W50 (Order Code H)

For stable protection in high temperatures or severe duty.

## Food-contact Grade

The Hydra-Oil food contact grade is specially formulated for food service industry applications. Hydra-Oil SFGO grade 100 is USDA H-1 authorized, certified OU Kosher, and complies with the requirements of FDA 21 CFR 178.3570 and FDA 21 CFR 172.882. This lubricant is a polyalphaolephin based synthetic (PAO) and is suggested for use on equipment in which there may be incidental contact with an edible product.

## EPDM-compatible Grades

Hydra-Oil EPDM-compatible grades must be used in all Hydra-Cell pumps containing EPDM diaphragms. These CP-100/150 F lubricants are a custom blend of polyalkylene glycols with additives for oxidation stability, corrosion protection, and high-viscosity index. Low solubility with many different hydrocarbons provides for excellent lubricity. Hydra-Oil EPDM-compatible grades are available in 20-weight (Order Code J) and 30/40-weight (Order Code C or D) and comply with FDA 21 CFR 178.3510 (Lubricants with Incidental Food Contact).



Hydra-Oil Characteristics	Standard Grade		Synthetic Grade		Food Grade	EPDM Compatible
	10W30	40W	5W30	15W50	SFGO-100	20W
Order Code Letter	A	B	G	H	E/F or K	J/C/D
Gravity, API @60°F (16°C)	31.1	28.7	30.4	30.2	36.9	N/A
Flash Point °F (°C)	400 (204)	430 (221)	445 (229)	470 (243)	450 (232)	500 (260)
Fire Point °F (°C)	440 (227)	470 (243)	N/A	N/A	500 (260)	530 (277)
Pour Point °F (°C)	-30 (-34)	10 (-12)	-65 (-54)	-55 (-48)	-45 (-43)	-40 (-40)
Viscosity: SUS @ 100°F (38°C)	360	811	265	556	570	464
	SUS @ 210°F	63	85	60	90	71
Viscosity Index (99°)	148	107	165	170	120	223
Specific Gravity	0.88	0.89	N/A	N/A	N/A	0.992



# Hydra-Oil Selection Guide

## How to Order with Pump Selection

Hydra-Cell pumps are shipped with the oil reservoir filled with the appropriate Hydra-Oil selected by the customer.

1. Use the Hydra-Cell Characteristics chart on page 90 to select the Hydra-Oil best suited to your application requirements.
2. Use the chart below to select the appropriate oil letter code which corresponds to the 12th digit of the pump model ordering number. (Refer to the How to Order page in the appropriate pump product section.)
3. NOTE: All pumps equipped with EPDM diaphragms must use EPDM-compatible oil.

## Oil Recommendation

Pump Model	G20 <sup>1</sup>	G03 <sup>2</sup>	G04	G10	G12	G15/G17	G25	G35	G66
<b>Oil Reservoir Capacity</b>									
US Quarts	0.125	1.00	1.10	1.10	1.5	2.2	3.3	7.75	8.0
Liters	0.120	0.95	1.05	1.05	1.4	2.1	3.1	7.3	7.5
<b>Metallic Pump Head Material</b>									
Standard-duty	G	A	G	A	A	A	A	A	A
Continuous-duty	G	G	G	B	B	B	B	B	-
Cold-temperature/Severe-duty	G	G	G	G	G	G	G	G	-
High-temperature/Severe-duty	G	G	G	H	G	H	H	H	H
Food-contact	K	K	K	E	E	E	E	F	-
EPDM-compatible	J	J	J	C	C	-	C	D	-
<b>Non-metallic Pump Head Material</b>									
Standard-duty	G	A	-	A	-	-	A	-	A
Continuous-duty	G	G	-	B	-	-	B	-	-
Cold-temperature/Severe-duty	G	G	-	G	-	-	G	-	-
High-temperature/Severe-duty	G	G	-	H	-	-	G	-	H
Food-contact	K	K	-	E	-	-	E	-	-
EPDM-compatible	J	J	-	C	-	-	C	-	-

<sup>1</sup> Includes all G20, G21 and G22 models

<sup>2</sup> Includes all G03 Mono-Block models

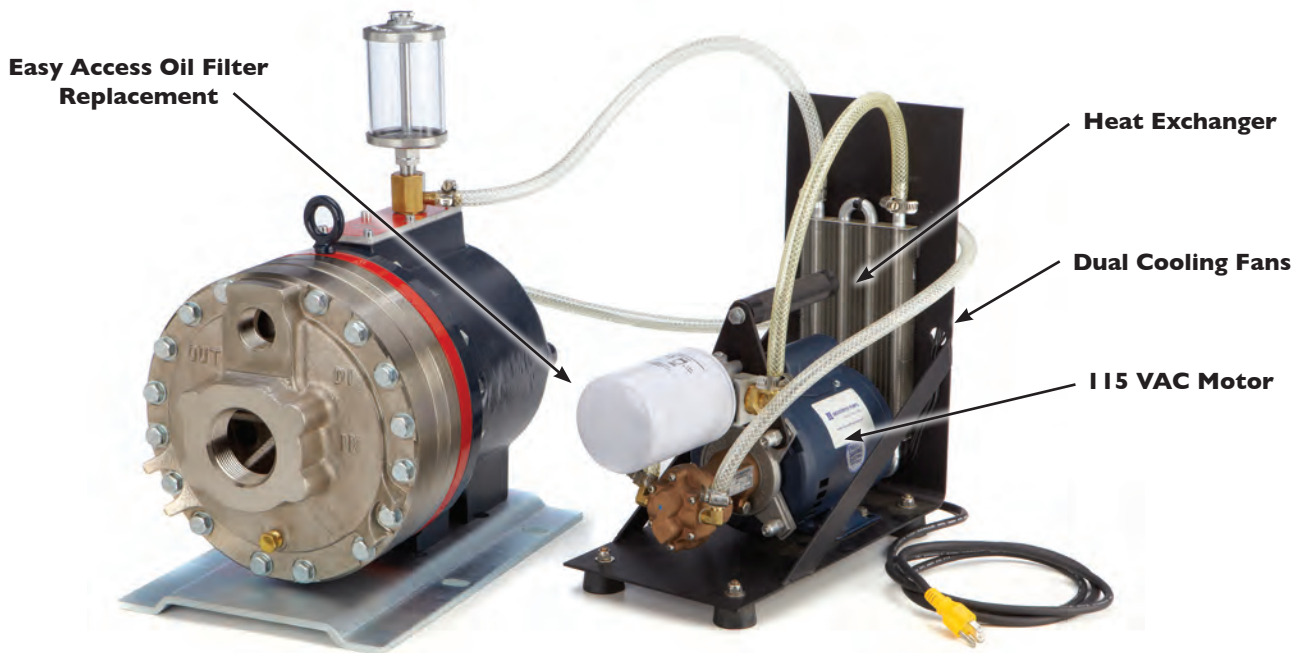
## How to Order Separately

Replacement Hydra-Oil is available in quart and 2-1/2 gallon packages.

1. Consult your Hydra-Cell Pump Installation/Service Manual for oil change interval specifications.
2. Use the part numbers in the chart below.

Code Letter	Oil Description	Quart		2-1/2 Gallon	
		Single	6-Pack	Single	Twin-Pack
A	10W30 for standard-duty	A01-114-3430	A01-114-3431	A01-114-3432	A01-114-3433
B	40-wt for continuous-duty	A01-114-3440	A01-114-3441	A01-114-3442	A01-114-3443
C	EPDM-compatible oil	A01-114-3407	-	A01-114-3408	-
D	EPDM-compatible oil	A01-114-3407	-	A01-114-3408	-
E	Food-contact oil	A01-114-3410	-	A01-114-3411	-
F	Food-contact oil	A01-114-3410	-	A01-114-3411	-
G	5W30 cold-temperature severe-duty synthetic oil	A01-114-3415	-	A01-114-3420	-
H	15W50 high-temp severe-duty synthetic oil	A01-114-3416	-	A01-114-3421	-
J	EPDM-compatible oil	A01-114-3407	-	A01-114-3408	-
K	Food-contact oil	A01-114-3410	-	A01-114-3411	-

# Oil Cooler and Filter System



Hydra-Cell Oil Cooler and Filter Systems enable Hydra-Cell pumps to operate cooler in order to extend oil life and reduce bearing wear. This helps maximize performance and reliability in some of the toughest industrial and process applications. They are easy to install and available with all Hydra-Cell models except the G20, PI00, TI00 and QI55 Series models. (G35 shown)

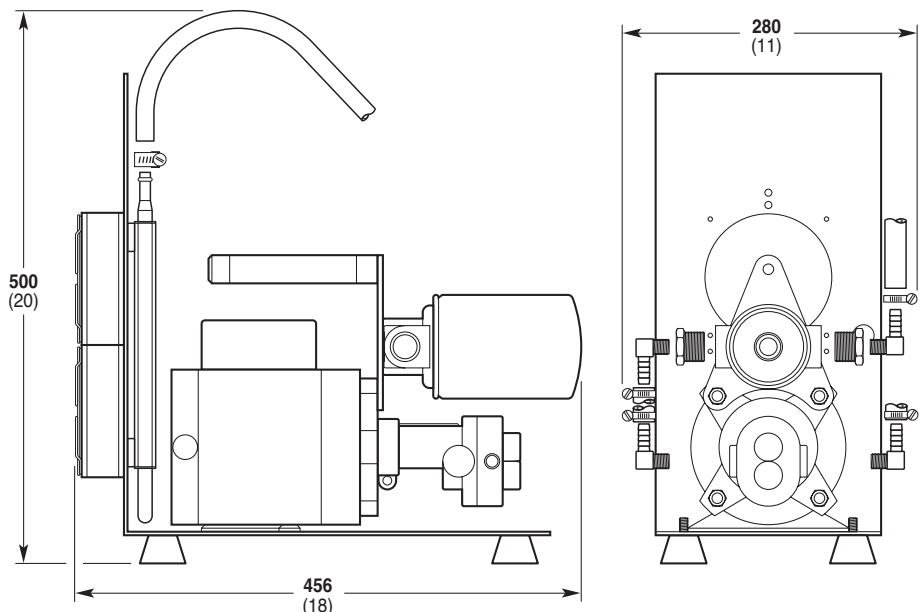
- Reduces the typical oil operating temperature by up to 30°F (16°C)
- Lessens the impact of pumping high-temperature fluids
- Offers greater longevity for pump components when combined with a filtration system built into the cooling loop
- Extends oil life, reducing the need for oil changes
- Packaged system includes all necessary fittings, hoses, adapters, hardware and mounting materials for installation

## Oil Cooler & Filter System

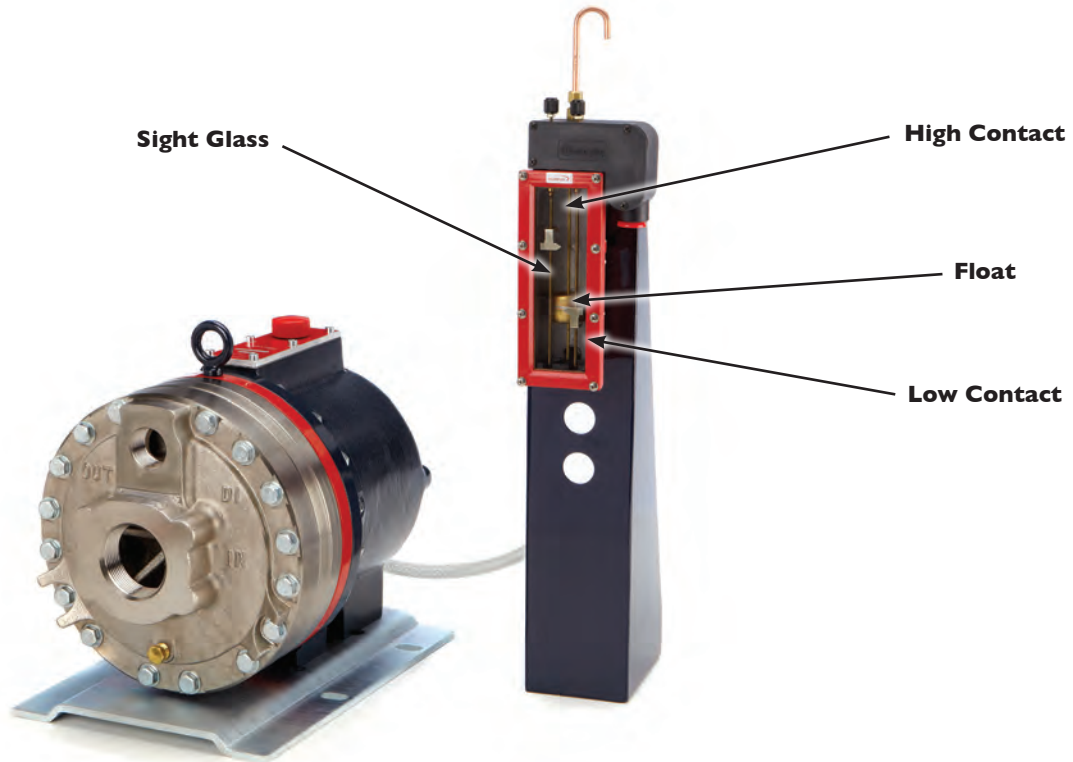
Power	Part Number
60 Hz, 115 VAC	103-100
50 Hz, 230 VAC	103-150

Specify pump when ordering.

### Dimensions mm (Inches)



# Oil Level Monitoring Mounting Kits



The Hydra-Cell Oil Level Monitoring Kit uses a Murphy SWICHGAGE Model L129CK1, which is field-proven to detect the crank case oil levels and is well-suited to detect oil levels for Hydra-Cell pumps except the G20 and P100 Series models. (G35 shown)

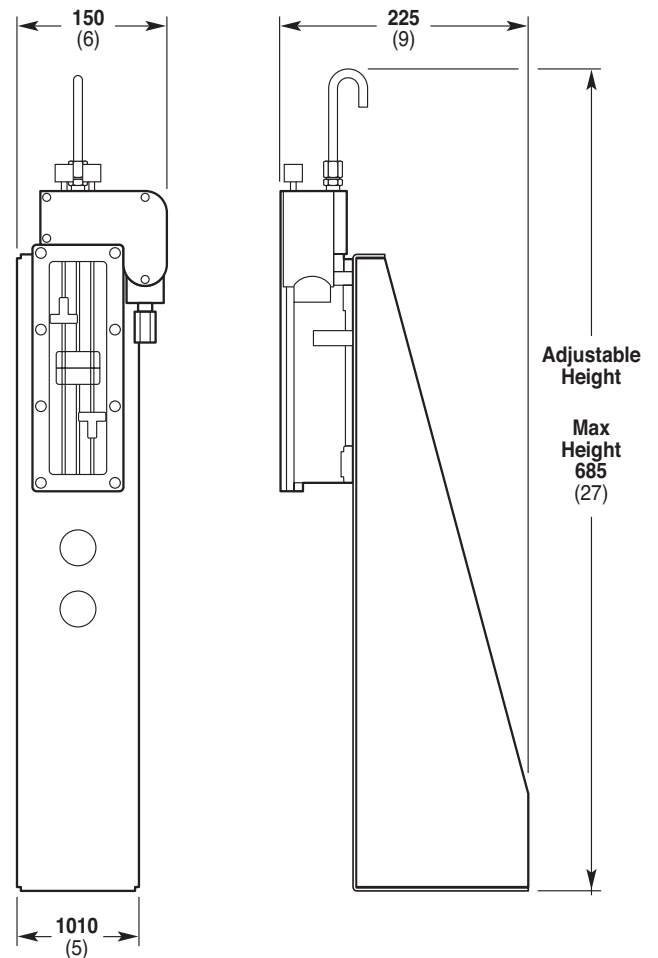
- Detects changes to the oil level in the pump to minimize costly interruptions in the process and avoid potential pump damage
- Ideal for remote or critical industrial applications, such as oil fields, paper mills and automotive plants
- Compact, rugged, and ready to use when supplied with a Murphy SWICHGAGE (ordered separately)
- Adjustable height to accommodate installation options

## Oil Level Monitoring Mounting Kit

Description	Part Number
Mounting Kit	103-000
Murphy SWICHGAGE®	103-010

SWICHGAGE® is a registered trademark of Frank W. Murphy MFR.

### Dimensions mm (Inches)



# Oil Reservoir Sight Bottles

Oil reservoir assemblies screw in easily where the oil fill cap is located on all Hydra-Cell pumps models except the F20, P100, T100, and Q155 Series models.

Hydra-Cell pumps equipped with an oil reservoir provide additional volume for oil expansion and allow for quick visual monitoring of the oil level and its condition.

Three different bottles are available, including a 474 ml (12-oz) bottle with a low-level float switch that outputs a low voltage signal if the oil level in the pump housing drops.

## Bottle Assemblies

Description	Part Number
12-oz (474 ml) volume sight bottle	A01-116-3400
12-oz (474 ml) volume sight bottle with low-level float switch	A01-116-3410
4-oz (119 ml) volume sight bottle	A01-116-3500



# Vacuum Priming Kit

The Hydra-Cell Vacuum Priming Kit provides for a quick and easy way to prime the hydraulic pistons after diaphragm replacement. The tool assembly is attached to the hydraulic end housing through the oil cap and pulls a vacuum, removing air from behind the diaphragms. Priming can be accomplished while the pump remains in place.

Description	Part Number
Vacuum Priming Kit	A03-130-1200



# Priming Plugs

PVC priming plugs are used to assist in priming the hydraulic cells in Hydra-Cell pumps equipped with Kel-Cell technology. They are available in a variety of sizes with and without air valves.

Description	Part Number
NPT, solid 3/4"	A03-100-0000
NPT, solid 1"	A03-100-0001
NPT, solid 1-1/4"	A03-100-0002
NPT, solid 1-1/2"	A03-100-0003
NPT, solid 2-1/2"	A03-100-0004
NPT, solid 3/4", with air valve	A03-100-0040
NPT, solid 1", with air valve	A03-100-0041
NPT, solid 1-1/4", with air valve	A03-100-0042
NPT, solid 1-1/2", with air valve	A03-100-0043
NPT, solid 2-1/2", with air valve	A03-100-0044
BSPT, solid 2-1/2", with air valve	A03-100-0144





# Tool Kits



## Complete Tool Kits

Customized for your specific pump model, Hydra-Cell Tool Kits provide specialty tools to facilitate maintenance and servicing of your Hydra-Cell pump. Each kit is packaged in a durable plastic case and includes a shaft rotator, valve seat remover, plunger guide lifter, plunger holder, protector seal, seal inserter, and assembly studs.

Pump Model	Tool Kit Part Number
Master Tool Kit for all Pump Models	A03-175-1107
G20, G21, G22	A03-175-1105
G03, G04	A03-175-1106
G10, G12	A03-175-1101
G15/G17	A03-175-1103
G25	A03-175-1102
G35	A03-200-1100

**Note:** Since Mono-Block pumps feature the valve plate and manifold combined into one component for servicing, consult factory regarding tool kit needs.

## Specialty Tools

For your convenience individual specialty tools are available for all Hydra-Cell pumps.

Ref #	Part Number	Description
1	A03-126-1500	Toolbox
2	A03-159-1200	Insertor/Rotator (G10)
	A03-160-1200	Insertor/Rotator (G15/G17, G25)
	A03-185-1200	Insertor/Rotator (G35)
3	A03-124-1200	Lever Assembly
4	A03-117-1000	Seat Puller (G03, G04)
	A03-118-1000	Seat Puller (G10, G12)
	A03-119-1000	Seat Puller (G25, G35)
5	A03-157-1000	Seal Protector (G10, G12)
	A03-158-1002	Seal Protector (G15/G17)
	A03-158-1001	Seal Protector (G25)
6	A03-125-1020	Plunger Holder (G20, G03, G04)
	A03-125-1010	Plunger Holder (G10, G12, G15/G17)
	A03-125-1000	Plunger Holder (G25, G35)
7	A03-195-1200	Shaft Rotator (G20, G03, G04)
8	A03-196-1000	Plunger Guide Lifter (G20, G03, G04)
9	A03-162-1200	Plunger Guide Lifter (G10, G12)
	A03-162-1201	Plunger Guide Lifter (G25, G35)
10	A03-156-1200	Assembly Studs (G10, G12, G15/G17, G25, G35)

# Control Freak™ Touch-screen Metering Controller



Start-up menu options.

“Control Freak” is an exclusive new electronic controller that provides motor speed control for Hydra-Cell Metering Solutions pumps (or Hydra-Cell bare shaft pumps) with an easy-to use touch-screen display and built-in programming.

The user can enter the desired flow rate or volume in gallons or liters and system pressure in psi or bar, and the controller automatically runs the pump manually at the desired flow rate or volume total/time, or in pre-set batches.

Versatile electronic controller allows programming for the flow rate or for totalization of the recent process application as well as the life of the pump.



Opening screen - touch to activate.



Sample menu for batch operation.

## Performance Features

- Features 0.37kW Variable Frequency Drive (VFD)
- Pre-set (with password protection) for Hydra-Cell pump performance algorithms - can also be field-calibrated for greater accuracy
- 7” color graphic touch-screen user interface in a NEMA-4X or IP enclosure - easy to operate and visible in low-light areas.
- Safety features for emergency stop, loss of power and fault monitoring
- Pump-drive information screen
- Four configurable on-off relays
- Ten separate batch set-up screens
- Two user-configurable analog input displays
- Analog and digital I/O for interfacing with external devices
- One analog input dedicated to a pre-programmed closed loop feedback
- Includes real-time clock
- Versatile - enables programming for flow rate or totalization
- Can control up to six (6) pumps with one Hydra-Cell Control Freak screen - requires additional VFDs and I/O modules

## Options

- Ball-mount assembly for touch screen
- VFD enclosure
- Additional cables
- Oil temperature probe kit

## Control Freak Selection Process

Control Freak enables control of up to six pumps from one touch-screen. A complete Control Freak unit is comprised of Touch-screen Kit (Number 150-150) plus one or more VFD kits.

### Touch-screen Kit (required)

Kit Number	Contents
150-150	7" Touch-screen Assembly Cable, CAT5e, 7-ft.

### VFD Kits (order one VFD kit for each pump operated by the Control Freak)

Kit Number	Power	Voltage	Phase
150-250	1/2 hp (0.37 kW)	115V	1 Phase VFD
150-251	1/2 hp (0.37 kW)	230V	1 Phase VFD
150-252	1 hp (0.75 kW)	115V	1 Phase VFD
150-253	1 hp (0.75 kW)	230V	1 Phase VFD
150-254	2 hp (1.5 kW)	230V	1 Phase VFD
150-255	3 hp (2.2 kW)	230V	1 Phase VFD
150-256	1/2 hp (0.37 kW)	230V	3 Phase VFD
150-257	1 hp (0.75 kW)	230V	3 Phase VFD
150-258	2 hp (1.5 kW)	230V	3 Phase VFD
150-259	3 hp (2.2 kW)	230V	3 Phase VFD
150-264	1 hp (0.75 kW)	460V	3 Phase VFD
150-265	2 hp (1.5 kW)	460V	3 Phase VFD
150-266	3 hp (2.2 kW)	460V	3 Phase VFD

*For higher hp or kW, please consult factory.*

### Control Freak Accessories

Accessory	Description	Part Number
Enclosure (1)	VFD Enclosure for up to 1 hp (0.75 kW)	150-005
Probe Kit	Oil Temperature Sensor Probe with Oil Cap	150-006
Ball Mount Assembly	Bracket Ball, Ball Mount Hinge, Screw, Nut	150-030
Cabling	1-ft. CAT5e Cable	150-401
Cabling	3-ft. CAT5e Cable	150-403
Cabling	7-ft. CAT5e Cable	150-407
Cabling	10-ft. CAT5e Cable	150-410
Cabling	30-ft. CAT5e Cable	150-430

*(1) Consult Factory for larger VFDs and for pricing on equipment mounting in enclosure.*



#### Each VFD kit includes:

- Appropriate VFD model in chart to left
- I/O Module, Single Pump
- Wiring, I/O Module
- Wiring, Motor, 22 ga., 1-ft., Red
- Wiring, Motor, 22 ga., 1-ft., White
- Cable, CAT5e, 1-ft.



# Calibration Cylinders

Calibration cylinders verify the flow rate of a Hydra-Cell P Series metering pump, providing a visual indicator that the system is operating within the required parameters of performance and accuracy.

(Note: Can be used with corresponding Hydra-Cell pump models shown in parentheses below as long as rpm are the same.)

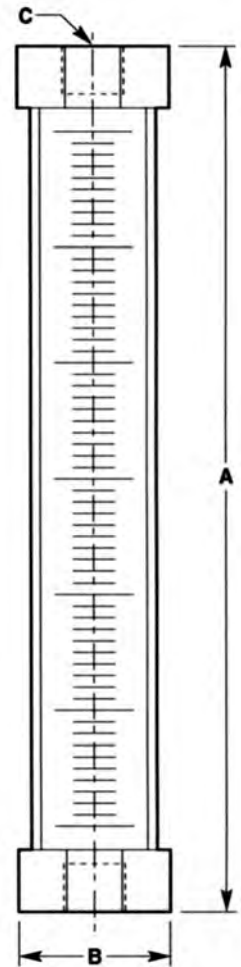
## Selection Process

1. Size the appropriate P Series pump to the application.  
(Refer to the metering pump section starting on page 120 for more information.)
2. Use the application rpm to select the appropriate cylinder from the chart below.



Cylinder Size mL	30	200	1000	2000	10000
Capacity gph (lph)	0.95 (3.6)	6.4 (24)	32 (120)	64 (240)	320 (1200)
<b>Maximum Pump Shaft (rpm)</b>					
P100 (G20)	36	200	1000	1750	-
P200 (G03)	-	75	300	600	1750
P300 (G04)	-	75	300	600	1750
P400 (G10)	-	30	110	210	1000
P500 (G15/G17)	-	-	60	115	600
P600 (G25)	-	-	30	60	275

Port C	Cylinder Size (mL)	Part Number		Dimensions - in (mm)	
		NPT Ports	BSPT Ports	A	B
<b>PVC Cylinders</b>					
1/2"	200	111-001	111-001-B	19.0 (482.6)	1.5 (38.1)
3/4"	1000	111-003	111-003-B	22.0 (558.8)	2.5 (63.5)
1"	2000	111-004	111-004-B	20.0 (508.0)	3.7 (94.0)
2"	10000	111-006	111-006-B	25.0 (635.0)	6.95 (176.5)
<b>Glass Cylinders</b>					
1/4"	30	111-010	111-010-B	14.0 (355.6)	1.4 (35.6)
1/2"	200	111-011	111-011-B	21.0 (533.4)	2.5 (63.5)
3/4"	1000	111-013	111-013-B	27.0 (685.8)	3.5 (88.9)
1"	2000	111-014	111-014-B	27.0 (685.8)	5.0 (127.0)



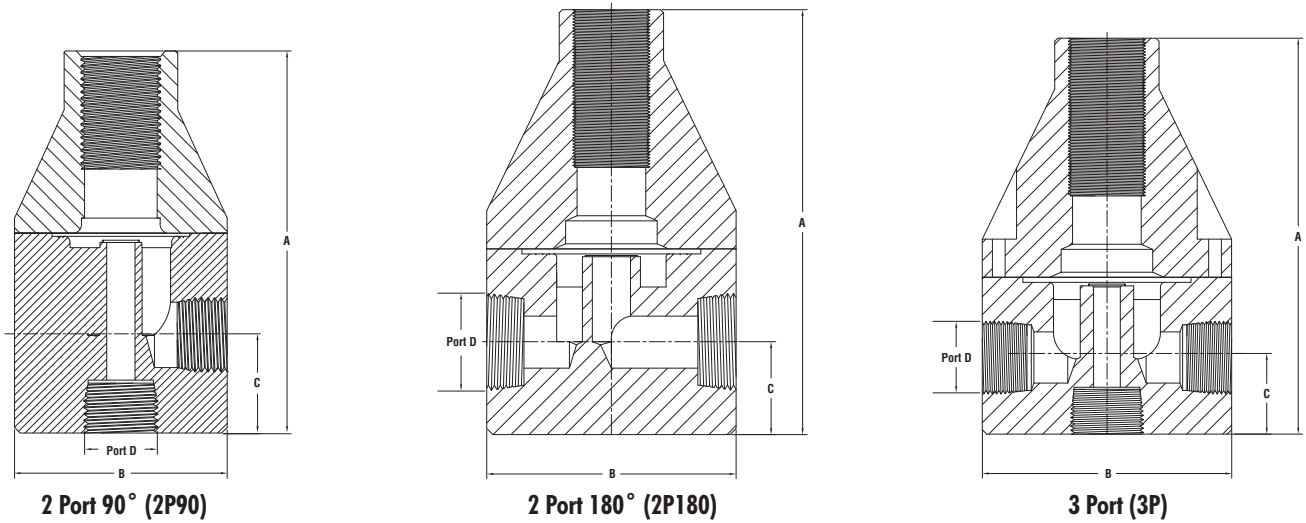


# Back Pressure and Pressure Relief Valves

Back pressure valves help ensure that your Hydra-Cell pump provides accurate and predictable flow. Pressure relief valves protect your pump and system from over-pressure situations.



## Dimensions and Port Configurations



Material	Port D	A		B		C	
		in	mm	in	mm	in	mm
Polypropylene/PVDF	3/8" (DN 10)	3.55	90.2	2.35	59.7	0.75	19.1
	1/2" (DN 15)	4.25	108.0	2.35	59.7	1.10	27.9
	3/4" (DN 20)	5.56	141.2	3.50	88.9	1.125	28.6
	1" StdFlo (DN 25)	5.86	148.8	3.50	88.9	1.25	31.8
	1" HiFlo (DN 25)	7.25	184.2	4.90	124.5	1.25	31.8
	2" (DN 50)	8.90	226.1	4.90	124.5	2.15	54.6
316 SST	1/4" High Pressure (DN 8)	4.25	108.0	2.35	59.7	1.10	27.9
	3/8" (DN 10)	3.55	90.2	2.35	59.7	0.75	19.1
	3/8" High Pressure (DN 10)	4.25	108.0	2.35	59.7	1.10	27.9
	1/2" (DN 15)	4.25	108.0	2.35	59.7	1.10	27.9
	1/2" High Pressure (DN 15)	4.25	108.0	2.35	59.7	1.10	27.9
	3/4" (DN 20)	5.56	141.2	3.50	149.9	1.125	28.6
	1" StdFlo (DN 25)	5.86	148.8	3.50	88.9	1.25	31.8
	1" HiFlo (DN 25)	7.25	184.2	4.90	124.5	1.25	31.8
	1" High Pressure (DN 25)	5.90	149.9	3.50	88.9	1.25	31.8
	2" (DN 50)	8.90	226.1	4.90	124.5	2.15	54.6
Hastelloy C	1/4" High Pressure (DN 8)	4.25	108.0	2.35	59.7	1.10	27.9
	3/8" (DN 10)	3.55	90.2	2.35	59.7	0.75	19.1
	3/8" High Pressure (DN 10)	4.25	108.0	2.35	59.7	1.10	27.9
	1/2" (DN 15)	4.25	108.0	2.35	59.7	1.10	27.9
	1/2" High Pressure (DN 15)	4.25	108.0	2.35	59.7	1.10	27.9
	3/4" (DN 20)	5.56	141.2	3.50	88.9	1.125	28.6
	1" StdFlo (DN 25)	5.86	148.8	3.50	88.9	1.25	31.8
	1" HiFlo (DN 25)	7.25	184.2	4.90	124.5	1.25	31.8
	1" High Pressure (DN 25)	5.90	149.9	3.50	88.9	1.25	31.8
	2" (DN 50)	8.90	226.1	4.90	124.5	2.15	54.6

# Back Pressure Valves

## Selection Process

1. Use the Valve Port Size “D” chart below to determine the valve port size with the appropriate maximum flow rate to match the Hydra-Cell pump selected: gpm and l/min are Continuous Flow; gph and lph are Pulsating Flow.
  2. For Back Pressure Valves, use the chart on this page to select the appropriate valve. For Pressure Relief Valves, use the chart on the following page.
- (Note: The maximum flow rates are guidelines. Consult factory for specific recommendations.)

### Valve Port Size “D”

		LoFlo		StdFlo			HiFlo		High Pressure	
		3/8"	1/2"	3/4"	1"	2"	3/4"	1"	1/4"-3/8"-1/2"	1"
Maximum Flow		(DN 10)	(DN 15)	(DN 20)	(DN 25)	(DN 50)	(DN 20)	(DN 25)	(DN 8 - DN 10 - DN 15)	(DN 25)
Pulsating	gph	200	260	300	500	2350	600	1000	700	1200
	lph	757	984	1135	1890	8892	2271	3785	2650	4542
Continuous	gpm	10	15	21	26	120	30	54	35	60
	l/min	37	57	80	98	454	114	204	132	227

Port “D”	Wetted Materials*	Pressure Adjustment Range		Maximum Temperature		Port Configuration	Model Number	
		psi	bar	°F	°C		NPT Ports	BSPT Ports
3/8" (DN 10)	Polypropylene	10 - 150	0.7 - 10.3	195	90	2P180	111-101	111-101-B
	PVDF	10 - 150	0.7 - 10.3	195	90	2P180	111-103	111-103-B
	316 SST	10 - 150	0.7 - 10.3	300	149	2P180	111-106	111-106-B
	Hastelloy C	10 - 150	0.7 - 10.3	300	149	2P180	111-110	111-110-B
	316 SST	50 - 350	3.5 - 24	300	149	2P180	111-107	111-107-B
1/2" (DN 15)	Hastelloy C	50 - 350	3.5 - 24	300	149	2P180	111-111	111-111-B
	Polypropylene	10 - 150	0.7 - 10.3	195	90	2P180	111-121	111-121-B
	PVDF	10 - 150	0.7 - 10.3	195	90	2P180	111-123	111-123-B
	316 SST	10 - 150	0.7 - 10.3	300	149	2P180	111-126	111-126-B
	Hastelloy C	10 - 150	0.7 - 10.3	300	149	2P180	111-130	111-130-B
3/4" (DN 20)	316 SST	50 - 350	3.5 - 24	300	149	2P180	111-127	111-127-B
	Hastelloy C	50 - 350	3.5 - 24	300	149	2P180	111-131	111-131-B
	Polypropylene	10 - 150	0.7 - 10.3	195	90	2P180	111-341	111-341-B
	PVDF	10 - 150	0.7 - 10.3	195	90	2P180	111-343	111-343-B
	316 SST	10 - 150	0.7 - 10.3	300	149	2P180	111-346	111-346-B
1" StdFlo (DN 25)	Hastelloy C	10 - 150	0.7 - 10.3	300	149	2P180	111-350	111-350-B
	Polypropylene	10 - 150	0.7 - 10.3	195	90	2P180	111-261	111-261-B
	PVDF	10 - 150	0.7 - 10.3	195	90	2P180	111-263	111-263-B
	316 SST	10 - 150	0.7 - 10.3	300	149	2P180	111-266	111-266-B
	Hastelloy C	10 - 150	0.7 - 10.3	300	149	2P180	111-270	111-270-B
1" HiFlo (DN 25)	316 SST	50 - 350	3.5 - 24	300	149	2P180	111-267	111-267-B
	Hastelloy C	50 - 350	3.5 - 24	300	149	2P180	111-271	111-271-B
	Polypropylene	10 - 150	0.7 - 10.3	195	90	2P180	111-361	111-361-B
	PVDF	10 - 150	0.7 - 10.3	195	90	2P180	111-363	111-363-B
	316 SST	10 - 150	0.7 - 10.3	300	149	2P180	111-366	111-366-B
2" (DN 50)	Hastelloy C	10 - 150	0.7 - 10.3	300	149	2P180	111-370	111-370-B
	Polypropylene	10 - 150	0.7 - 10.3	195	90	2P180	111-281	111-281-B
	PVDF	10 - 150	0.7 - 10.3	195	90	2P180	111-283	111-283-B
	316 SST	10 - 150	0.7 - 10.3	300	149	2P180	111-286	111-286-B
	Hastelloy C	10 - 150	0.7 - 10.3	300	149	2P180	111-290	111-290-B
1" StdFlo (DN 25)	316 SST	50 - 350	3.5 - 24	300	149	2P180	111-287	111-287-B
	Hastelloy C	50 - 350	3.5 - 24	300	149	2P180	111-291	111-291-B

\* Diaphragm material is PTFE on all models. Other materials available on request.

# Pressure Relief Valves

Port "D"	Wetted Materials*	Pressure Adjustment Range		Maximum Temperature		Port Configuration	Part Number	
		psi	bar	°F	°C		NPT Ports	BSPT Ports
1/4" High Pressure (DN 8)	316 SST	350 - 2500	24 - 172	300	149	2P90	111-800	111-800-B
	Hastelloy C	350 - 2500	24 - 172	300	149	2P90	111-804	111-804-B
3/8" (DN 10)	Polypropylene	10 - 150	0.7 - 10.3	195	90	3P	111-401	111-401-B
	PVDF	10 - 150	0.7 - 10.3	195	90	3P	111-403	111-403-B
	316 SST	10 - 150	0.7 - 10.3	300	149	3P	111-406	111-406-B
	Hastelloy C	10 - 150	0.7 - 10.3	300	149	3P	111-410	111-410-B
	316 SST	50 - 350	3.5 - 24	300	149	3P	111-407	111-407-B
	Hastelloy C	50 - 350	3.5 - 24	300	149	3P	111-411	111-411-B
3/8" High Pressure (DN 10)	316 SST	350 - 2500	24 - 172	300	149	2P90	111-706	111-706-B
	Hastelloy C	350 - 2500	24 - 172	300	149	2P90	111-710	111-710-B
1/2" (DN 15)	Polypropylene	10 - 150	0.7 - 10.3	195	90	3P	111-421	111-421-B
	PVDF	10 - 150	0.7 - 10.3	195	90	3P	111-423	111-423-B
	316 SST	10 - 150	0.7 - 10.3	300	149	3P	111-426	111-426-B
	Hastelloy C	10 - 150	0.7 - 10.3	300	149	3P	111-430	111-430-B
	316 SST	50 - 350	3.5 - 24	300	149	3P	111-427	111-427-B
	Hastelloy C	50 - 350	3.5 - 24	300	149	3P	111-431	111-431-B
1/2" High Pressure (DN 15)	316 SST	350 - 2500	24 - 172	300	149	2P90	111-726	111-726-B
	Hastelloy C	350 - 2500	24 - 172	300	149	2P90	111-730	111-730-B
3/4" StdFlo (DN 20)	Polypropylene	10 - 150	0.7 - 10.3	195	90	3P	111-541	111-541-B
	PVDF	10 - 150	0.7 - 10.3	195	90	3P	111-543	111-543-B
	316 SST	10 - 150	0.7 - 10.3	300	149	3P	111-546	111-546-B
	Hastelloy C	10 - 150	0.7 - 10.3	300	149	2P180	111-550	111-550-B
3/4" HiFlo (DN 20)	Polypropylene	10 - 150	0.7 - 10.3	195	90	2P180	111-641	111-641-B
	PVDF	10 - 150	0.7 - 10.3	195	90	2P180	111-643	111-643-B
	316 SST	10 - 150	0.7 - 10.3	300	149	2P180	111-646	111-646-B
	Hastelloy C	10 - 150	0.7 - 10.3	300	149	2P180	111-650	111-650-B
3/4" High Pressure (DN 20)	316 SST	350 - 2500	24 - 172	300	149	2P90	111-746	111-746-B
	Hastelloy C	350 - 2500	24 - 172	300	149	2P90	111-750	111-750-B
1" StdFlo (DN 25)	Polypropylene	10 - 150	0.7 - 10.3	195	90	3P	111-561	111-561-B
	PVDF	10 - 150	0.7 - 10.3	195	90	3P	111-563	111-563-B
	316 SST	10 - 150	0.7 - 10.3	300	149	3P	111-566	111-566-B
	Hastelloy C	10 - 150	0.7 - 10.3	300	149	2P180	111-570	111-570-B
	316 SST	50 - 350	3.5 - 24	300	149	3P	111-567	111-567-B
	Hastelloy C	50 - 350	3.5 - 24	300	149	2P180	111-571	111-571-B
1" HiFlo (DN 25)	Polypropylene	10 - 150	0.7 - 10.3	195	90	2P180	111-661	111-661-B
	PVDF	10 - 150	0.7 - 10.3	195	90	2P180	111-663	111-663-B
	316 SST	10 - 150	0.7 - 10.3	300	149	2P180	111-666	111-666-B
	Hastelloy C	10 - 150	0.7 - 10.3	300	149	2P180	111-670	111-670-B
1" High Pressure (DN 25)	316 SST	350 - 2500	24 - 172	300	149	2P180	111-766	111-766-B
	Hastelloy C	350 - 2500	24 - 172	300	149	2P90	111-770	111-770-B
2" (DN 50)	Polypropylene	10 - 150	0.7 - 10.3	195	90	2P90	111-581	111-581-B
	PVDF	10 - 150	0.7 - 10.3	195	90	2P180	111-583	111-583-B
	316 SST	10 - 150	0.7 - 10.3	300	149	2P180	111-586	111-586-B
	Hastelloy C	10 - 150	0.7 - 10.3	300	149	2P180	111-590	111-590-B
	316 SST	50 - 350	3.5 - 24	300	149	2P180	111-587	111-587-B
	Hastelloy C	50 - 350	3.5 - 24	300	149	2P180	111-591	111-591-B

\* Diaphragm material is PTFE on all models. Other materials available on request.

# Pulsation Dampeners



Pulsation dampeners protect your pumping system and its components by removing virtually all hydraulic shock and vibration resulting from the reciprocating stroking action of a positive displacement pump.

They control pulsations by allowing fluid to enter a wetted chamber of the dampener during the discharge stroke. This displaces a flexible bladder, which compresses gas in an air chamber, thus absorbing the shock. During the inlet stroke, liquid pressure decreases as the dampener gas expands, allowing fluid to re-enter the process line.

Bladders are available in Neoprene, Buna-N, EPDM, FKM, and PTFE (except where noted) to match Hydra-Cell pump diaphragm materials.

- Produces steady fluid flow up to 99% pulsation- and vibration-free
- Protects pipes, valves, fittings, meters, and in-line instrumentation from destructive pulsations, cavitation, and water hammer
- Creates steady and continuous flow when dosing, blending, or proportioning additives
- Ensures accuracy, longevity, and repeatability of in-line meters
- Enables uniform application of material in spraying and coating systems
- Reduces product agitation, foaming, splashing, and degradation of product

**Since Hydra-Cell multiple-diaphragm model pumps provide smooth, virtually pulse-less linear flow, pulsation dampeners are recommended for G20 and P100 models, but are optional for all other models.**

## Selection Process

1. Determine discharge pulsation (<69 bar or > 69 bar).
2. Determine inlet stabilization: high inlet pressure (>2 bar) or low inlet pressure (suction lift/ <2 bar positive pressure).
3. Select dampener size based on cubic inches (volume).
4. Consult price list or selection guide for specific model based on choice of wetted end and diaphragm materials.

Air Control Pump Model	Application			
	Discharge Pulsation		Inlet Stabilization	
	Chargeable <69 bar	Chargeable >69 bar	Chargeable >2 bar	"J" Style <2 bar
<b>G20 (P100)</b>	4 cu. in.	12 cu. in.	4 cu. in.	10 cu. in.
<b>G03 (P200)</b>	4 cu. in.	12 cu. in.	4 cu. in.	10 cu. in.
<b>G04 (P300)</b>	4 cu. in.	12 cu. in.	4 cu. in.	10 cu. in.
<b>G10 (P400)</b>	4 cu. in.	12 cu. in.	4 cu. in.	10 cu. in.
<b>G12</b>	4 cu. in.	N/A	4 cu. in.	10 cu. in.
<b>G15 (P500)</b>	4 cu. in.	12 cu. in.	10 cu. in.	10 cu. in.
<b>G17</b>	4 cu. in.	12 cu. in.	10 cu. in.	10 cu. in.
<b>P600</b>	10 cu. in.	N/A	10 cu. in.	10 cu. in.
<b>G25</b>	36 cu. in.	N/A	36 cu. in.	85 cu. in.
<b>G35</b>	36 cu. in.	12 cu. in.	36 cu. in.	85 cu. in.

**Note:** These are minimum size recommendations. A larger size can always be used.

## Pulsation Dampener Charging Kits

Part Number	Description
110-900	Charging kit to 999 psi (68.9 bar)
110-901	Charging kit from 1000 to 5000 psi (69 to 345 bar)



# Pulsation Dampeners

## 4 Cubic Inch Dampeners: Inlet 1/2" (female)

Wetted	Bladder	Volume (Inch <sup>3</sup> )	Max Pressure		Part Number	
			psi	bar	NPT Ports	BSPT Ports
SST	Buna-N	4	1000	69	110-060	110-060-B
SST	Neoprene	4	1000	69	110-062	110-062-B
SST	EPDM	4	1000	69	110-063	110-063-B
SST	FKM	4	1000	69	110-065	110-065-B
SST	PTFE	4	1000	69	110-068	110-068-B
Hastelloy C	Buna-N	4	1000	69	110-090	110-090-B
Hastelloy C	Neoprene	4	600	41.4	110-092	110-092-B
Hastelloy C	EPDM	4	1000	69	110-093	110-093-B
Hastelloy C	FKM	4	600	41.4	110-095	110-095-B
Hastelloy C	PTFE	4	600	41.4	110-098	110-098-B
Polypropylene	Buna-N	4	150	10.3	110-999	110-999-B
Polypropylene	Neoprene	4	150	10.3	110-101	110-101-B
Polypropylene	EPDM	4	150	10.3	110-104	110-104-B
Polypropylene	FKM	4	150	10.3	110-106	110-106-B
Polypropylene	PTFE	4	150	10.3	110-109	110-109-B
PVDF	Buna-N	4	150	10.3	110-020	110-020-B
PVDF	Neoprene	4	150	10.3	110-022	110-022-B
PVDF	EPDM	4	150	10.3	110-023	110-023-B
PVDF	FKM	4	150	10.3	110-026	110-026-B
PVDF	PTFE	4	150	10.3	110-028	110-028-B

## 10 Cubic Inch Dampeners: Inlet 1/2" (female)

Wetted	Bladder	Volume (Inch <sup>3</sup> )	Max Pressure		Part Number	
			psi	bar	NPT Ports	BSPT Ports
SST	Buna-N	10	1000	69	110-260	110-260-B
SST	Neoprene	10	1000	69	110-262	110-262-B
SST	EPDM	10	1000	69	110-263	110-263-B
SST	FKM	10	1000	69	110-265	110-265-B
SST	PTFE	10	150	10.3	110-268	110-268-B
Hastelloy C	Buna-N	10	1000	69	110-290	110-290-B
Hastelloy C	Neoprene	10	1000	69	110-292	110-292-B
Hastelloy C	EPDM	10	1000	69	110-293	110-293-B
Hastelloy C	FKM	10	1000	69	110-295	110-295-B
Hastelloy C	PTFE	10	150	10.3	110-298	110-298-B
Polypropylene	Buna-N	10	150	10.3	110-100	110-100-B
Polypropylene	Neoprene	10	150	10.3	110-232	110-232-B
Polypropylene	EPDM	10	150	10.3	110-233	110-233-B
Polypropylene	FKM	10	150	10.3	110-105	110-105-B
Polypropylene	PTFE	10	150	10.3	110-108	110-108-B
PVDF	Buna-N	10	150	10.3	110-220	110-220-B
PVDF	Neoprene	10	150	10.3	110-222	110-222-B
PVDF	EPDM	10	150	10.3	110-223	110-223-B
PVDF	FKM	10	150	10.3	110-225	110-225-B
PVDF	PTFE	10	150	10.3	110-228	110-228-B

## 10 Cubic Inch Inlet Stabilizers with J-Style Control: Inlet 1/2" (female)

Wetted	Bladder	Volume (Inch <sup>3</sup> )	Max Pressure		Part Number	
			psi	bar	NPT Ports	BSPT Ports
CPVC	Buna-N	10	30	2	110-210-J	110-210-J-B
CPVC	Neoprene	10	30	2	110-212-J	110-212-J-B
CPVC	EPDM	10	30	2	110-213-J	110-213-J-B
CPVC	FKM	10	30	2	110-215-J	110-215-J-B
CPVC	PTFE	10	30	2	110-218-J	110-218-J-B

# Pulsation Dampeners

## 12 Cubic Inch Dampeners: Inlet 1/2" (female)

Wetted	Bladder	Volume (Inch <sup>3</sup> )	Max Pressure		Part Number	
			psi	bar	NPT Ports	BSPT Ports
SST	Buna-N	12	4000	276	110-370	110-370-B
SST	EPDM	12	4000	276	110-373	110-373-B
SST	FKM	12	4000	276	110-375	110-375-B
SST	PTFE	12	2000	138	110-368	110-368-B

## 36 Cubic Inch Dampeners: Inlet 1/2" (female)

Wetted	Bladder	Volume (Inch <sup>3</sup> )	Max Pressure		Part Number	
			psi	bar	NPT Ports	BSPT Ports
SST	Buna-N	36	1000	69	110-660	110-660-B
SST	Neoprene	36	1000	69	110-662	110-662-B
SST	EPDM	36	1000	69	110-663	110-663-B
SST	FKM	36	1000	69	110-665	110-665-B
SST	PTFE	36	600	41.4	110-668	110-668-B
CS	Buna-N	36	1000	69	110-640	110-640-B
CS	Neoprene	36	1000	69	110-642	110-642-B
CS	EPDM	36	1000	69	110-643	110-643-B
CS	FKM	36	1000	69	110-645	110-645-B
CS	PTFE	36	600	41.4	110-648	110-648-B
Hastelloy C	Buna-N	36	1000	69	110-690	110-690-B
Hastelloy C	Neoprene	36	1000	69	110-692	110-692-B
Hastelloy C	EPDM	36	1000	69	110-693	110-693-B
Hastelloy C	FKM	36	1000	69	110-695	110-695-B
Hastelloy C	PTFE	36	600	41.4	110-698	110-698-B
Polypropylene	Buna-N	36	150	10.3	110-600	110-600-B
Polypropylene	Neoprene	36	150	10.3	110-602	110-602-B
Polypropylene	EPDM	36	150	10.3	110-603	110-603-B
Polypropylene	FKM	36	150	10.3	110-605	110-605-B
Polypropylene	PTFE	36	150	10.3	110-608	110-608-B
PVDF	Buna-N	36	150	10.3	110-620	110-620-B
PVDF	Neoprene	36	150	10.3	110-622	110-622-B
PVDF	EPDM	36	150	10.3	110-623	110-623-B
PVDF	FKM	36	150	10.3	110-625	110-625-B
PVDF	PTFE	36	150	10.3	110-628	110-628-B

## 85 Cubic Inch Dampeners with J-Style Control: Inlet 1" (female)

Wetted	Bladder	Volume (Inch <sup>3</sup> )	Max Pressure		Part Number	
			psi	bar	NPT Ports	BSPT Ports
PVC	Buna-N	10	30	2	110-710-J	110-710-J-B
PVC	Neoprene	10	30	2	110-712-J	110-712-J-B
PVC	EPDM	10	30	2	110-713-J	110-713-J-B
PVC	FKM	10	30	2	110-715-J	110-715-J-B
PVC	PTFE	10	30	2	110-718-J	110-718-J-B

## 1155 Cubic Inch Dampeners (5 gallon): Inlet (ANSI flange) 3.0" 150 lbs.

Wetted	Bladder	Volume (Inch <sup>3</sup> )	Max Pressure		Part Number
			psi	bar	
CS	Buna	1155	30	2	110-1155-B
CS	FKM	1155	30	2	110-1155-V

# Replacement Parts Kits

Convenient replacement part kits for all models of Hydra-Cell pumps are prepackaged with all necessary components to make pump service quick and easy.

Three types of kits are available depending on the level of replacement service required:

- Diaphragm Kit
- Valve Kit
- Complete Fluid-end Kit

Every kit has the correct components matching your specific pump configuration and materials (based on your original model number designed in Order Code Digits 7, 8, 9, 10 & 11). Contact us or your Hydra-Cell distributor to select your correct kit.



# Replacement Hydraulic Ends

Complete hydraulic end assemblies are available as replacement items. The hydraulic end contains all drive end components from the drive shaft up to and including the diaphragms. All hydraulic ends are factory-tested and shipped with oil. To order a replacement hydraulic end, refer to the appropriate pump ordering page and specify the desired cam, diaphragm and o-ring material, and Hydra-Oil.



# Hydra-Cell® T100 Series Seal-less Pump Selection

## T100 Low Pressure

Page 118



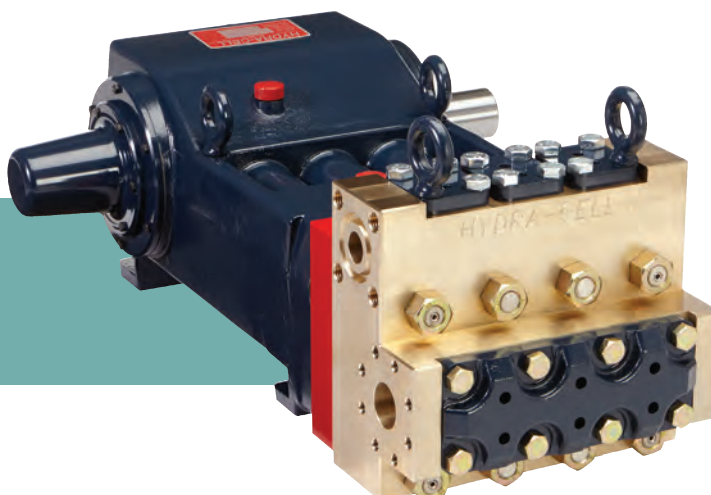
## T100 Medium Pressure

Page 122



## T100 High Pressure

Page 127

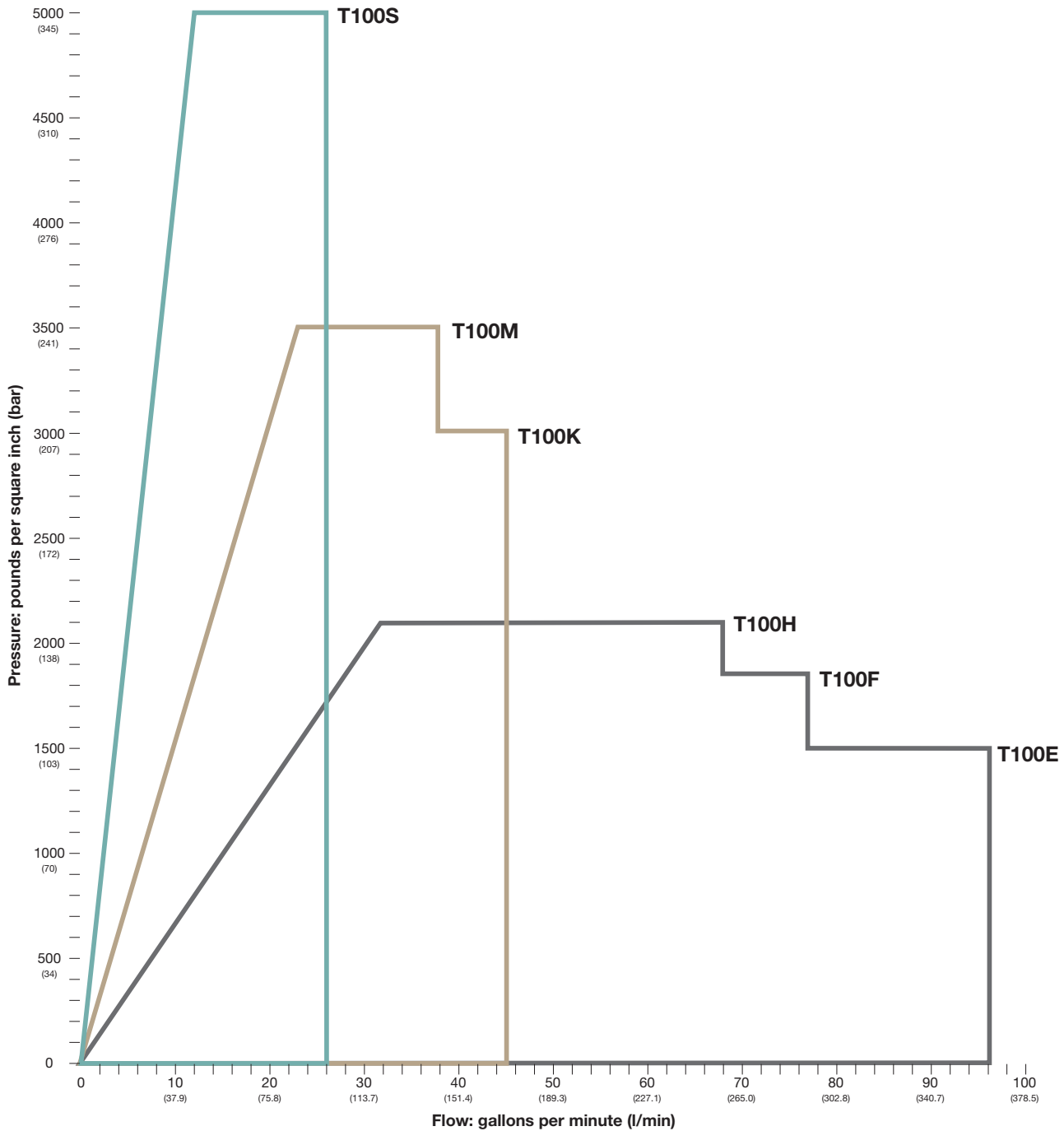


**Hydra-Cell**  
Seal-less Pumps



# Hydra-Cell® Flow Capacities and Pressure Ratings

## T100 Series High-horsepower Pumps



Model	Maximum Capacity		Maximum Discharge Pressure		Maximum Inlet Pressure		Maximum Operating Temperature	
	(gpm)	(l/min)	(psi)	(bar)	(psi)	(bar)	(F)*	(C)*
<b>T 100S</b>	26.0	98.4	5000	345	500	34	180°	82°
<b>T 100M</b>	38.0	143.8	3500	241	500	34	180°	82°
<b>T 100K</b>	45.0	170.4	3000	207	500	34	180°	82°
<b>T 100H</b>	68.0	257.8	2100	145	500	34	180°	82°
<b>T 100F</b>	76.5	289.6	1850	128	500	34	180°	82°
<b>T 100E</b>	96.0	366.1	1500	103	500	34	180°	82°

\* Consult factory for correct component selection for temperatures above 180°F (82°C) or below 40°F (4°C)

# Hydra-Cell® QI55 Series Seal-less Pump Selection

## QI55 Low Pressure

Page 132

## QI55 Medium Pressure

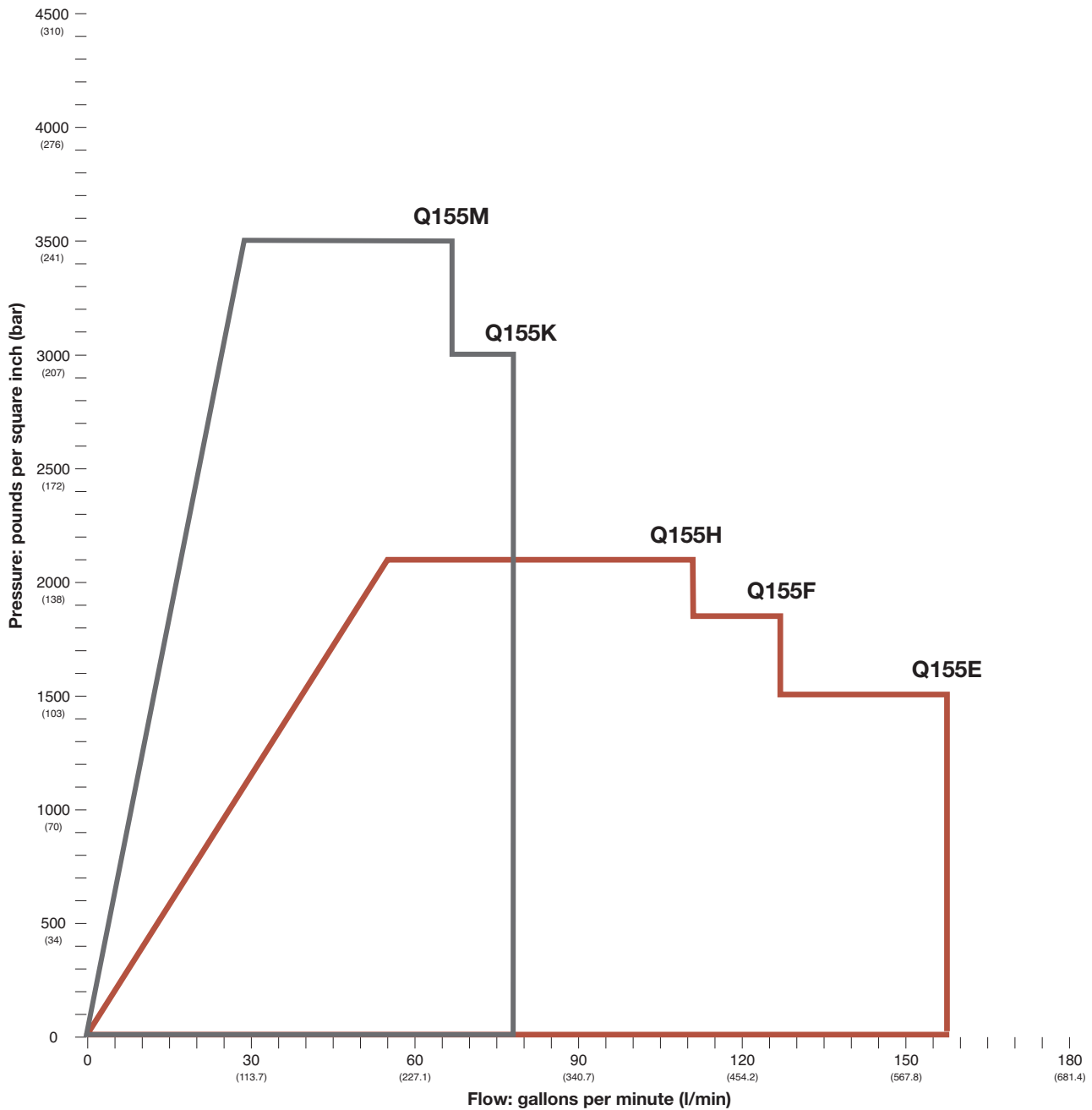
Page 136



*QI55 Quintuplex pump with Nickel Aluminum Bronze pump head. Also available in Stainless Steel.*

# Hydra-Cell® Flow Capacities and Pressure Ratings

## Q155 Series Quintuplex Pumps



Model	Maximum Capacity		Maximum Discharge Pressure		Maximum Inlet Pressure		Maximum Operating Temperature	
	(gpm)	(l/min)	(psi)	(bar)	(psi)	(bar)	(F)*	(C)*
<b>Q155M</b>	67	252	3500	241	500	34	180°	82°
<b>Q155K</b>	78	295	3000	207	500	34	180°	82°
<b>Q155H</b>	111	421	2100	144	500	34	180°	82°
<b>Q155F</b>	127	490	1850	127	500	34	180°	82°
<b>Q155E</b>	157	595	1500	103	500	34	180°	82°

\* Consult factory for correct component selection for temperatures above 180°F (82°C) or below 40°F (4°C)

# Hydra-Cell® T & Q Series Design Advantages

## An Economical and Environmental Choice

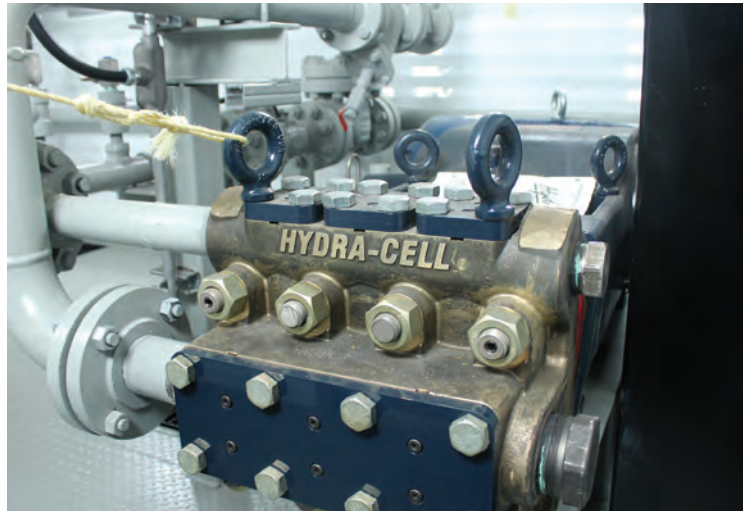
Hydra-Cell is a positive displacement, multiple-diaphragm pump featuring a seal-less design that provides full containment of the pumping chamber.

This means there are no VOC emissions when operating Hydra-Cell and no need for expensive “vapor-less” options to control VOC emissions as there are with other pump designs.

In addition there are no packing or dynamic seals that pose environmental issues from leakage, which contributes to costly downtime, maintenance, and wear.

## Ideal for a Variety of Applications

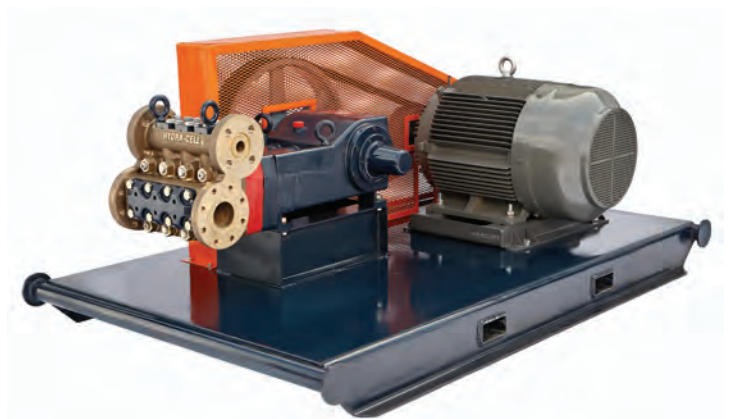
- Jet Lift
- Produced Water / Brine Transfer or Disposal
- Crude Oil Transfer
- Methanol & Glycol Injection
- Natural Gas Liquids (NGL)
- Chemical Metering
- Amine Injection
- Boiler Feed Condensate



Designed for higher pressures, T and Q Series pumps provide reliable, low-maintenance service in a variety of field production and transport applications (T100 shown).



T and Q Series pumps feature the Hydra-Cell seal-less design, eliminating clean-up costs from leaking seals or packing and protecting operators from dangerous fluids such as those containing hydrogen sulfide (Q155 shown).



Skid-mounted T100 Medium Pressure pump with ANSI flanges and belt-driven, 100hp 3-phase motor.



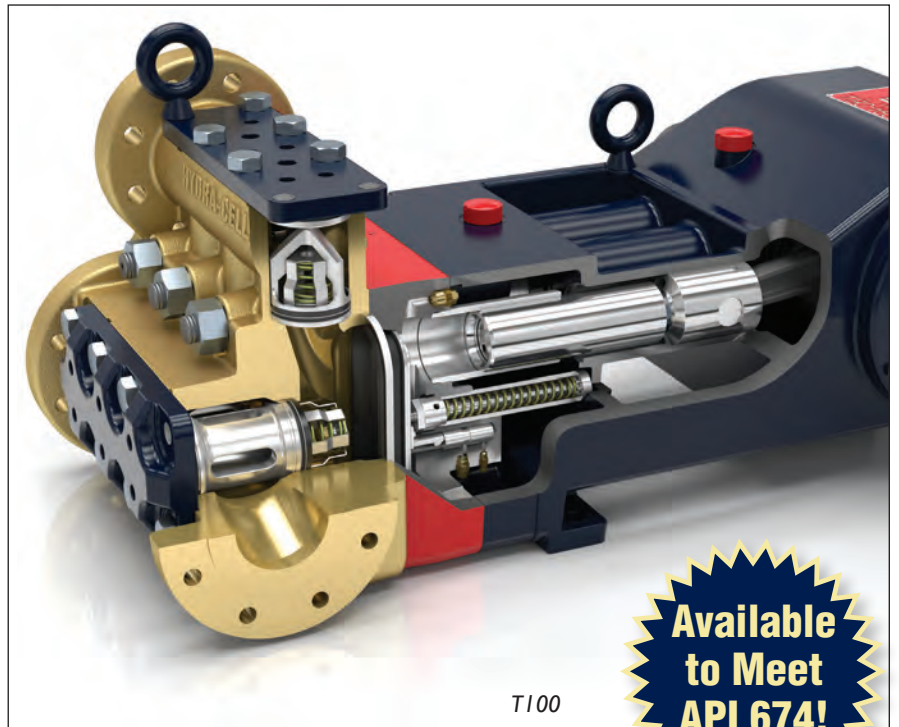
The Hydra-Cell High Pressure model was a finalist in the Pumps & Systems “Product Innovation” awards, and the T100 Series earned a “Spotlight on New Technology” from the Offshore Technology Conference.



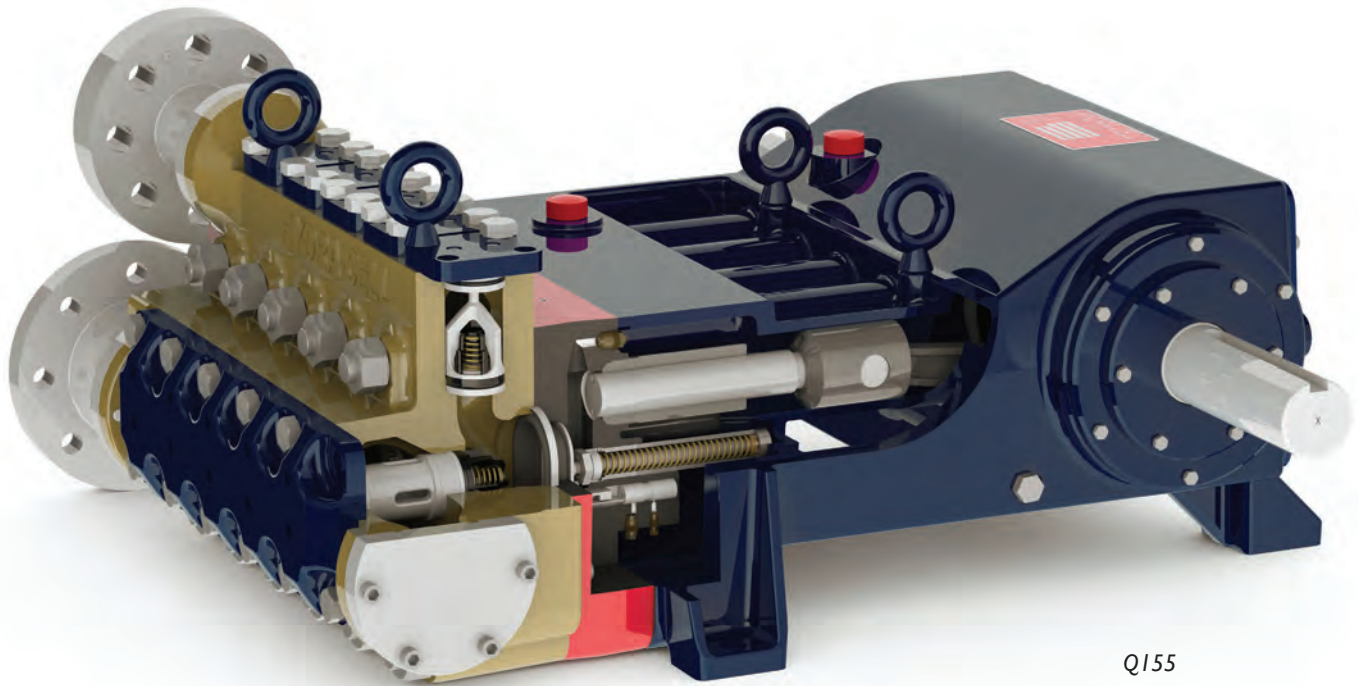
# Hydra-Cell® T & Q Series Design Advantages

## Exclusive Seal-less Diaphragm Design

- Seal-less design separates the power end from the process fluid end, eliminating leaks, hazards, and the expense associated with seals and packing
- Low NPSH requirements allow for operation with a vacuum condition on the suction - positive inlet pressure is not necessary
- Can operate with a closed or blocked suction line and run dry indefinitely without damage, eliminating downtime and repair costs
- Unique diaphragm design handles more abrasives with less wear than gear, screw or plunger pumps
- Hydraulically balanced diaphragms to handle high pressures with low stress
- Provides low-pulse, linear flow due to its multiple diaphragm design
- Lower energy costs than centrifugal pumps and other pump technologies
- Rugged construction for long life with minimal maintenance
- Compact design and double-ended shaft provides a variety of installation options



**Available  
to Meet  
API 674!**



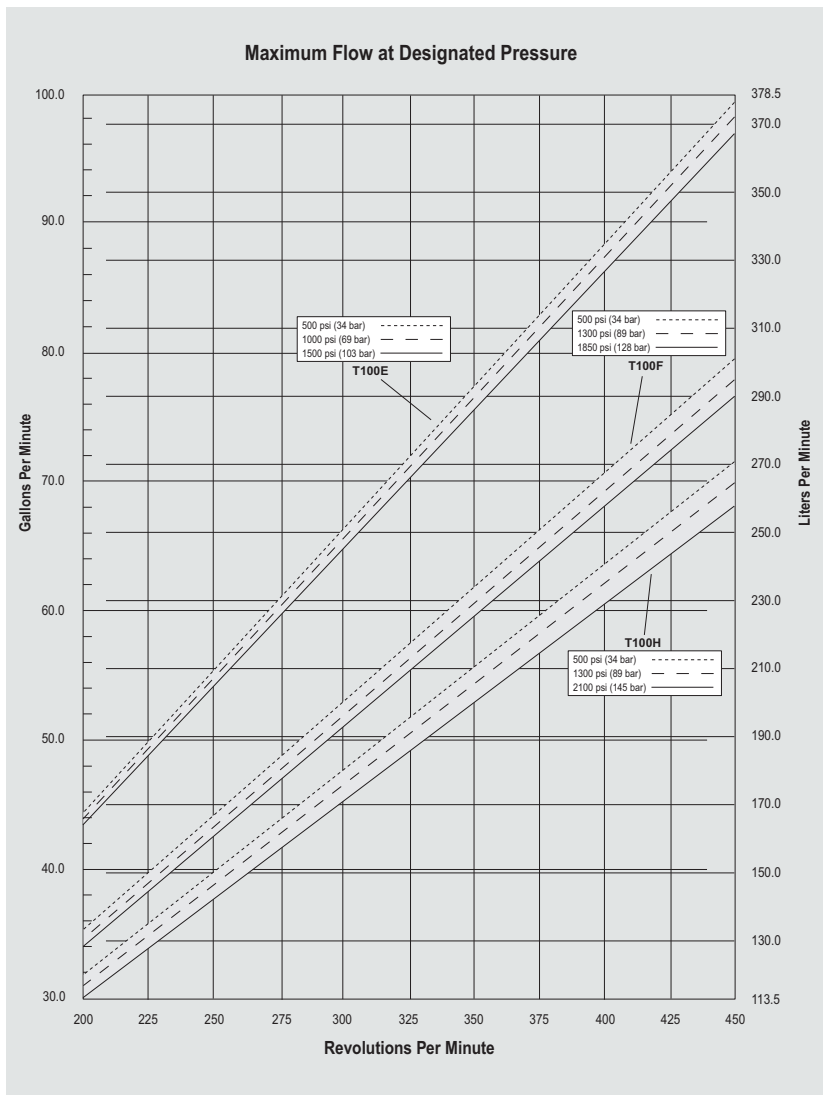
# T100 Series Low Pressure Performance

## Capacities

Flow				Pressure	
Model	Max. Input rpm	Max. Flow		Maximum Inlet Pressure	
		@ 1500 psi (103 bar)		500 psi (34 bar)	
		gpm	l/min		
T100E	450	96.0	366.4	<b>Maximum Discharge Pressure</b>	
		<b>@ 1850 psi (128 bar)</b>		T100E	1500 psi (103 bar)
T100F	450	76.5 gpm	289.6 l/min	T100F	1850 psi (128 bar)
		<b>@ 2100 psi (145 bar)</b>		T100H	2100 psi (145 bar)
T100H	450	68.0 gpm	257.8 l/min		

Consult factory when operating below 44 gpm (166.6 l/min).

## Maximum Flow at Designated Pressure



T100 low pressure model shown with Nickel Aluminum Bronze (NAB) manifold. (Also available with Stainless Steel manifold.)

# T100 Series Low Pressure Specifications

## Flow Capacities

	Pressure psi (bar)	rpm	gpm	l/min
T100E	1500 (103)	450	96.0	366.4
T100F	1850 (128)	450	76.5	289.6
T100H	2100 (145)	450	68.0	257.8

## Delivery

Pressure psi (bar)	gal/rev	liters/rev
500 (34)	0.221	0.835
1000 (69)	0.218	0.825
1500 (103)	0.215	0.814

## rpm

Maximum:	450
Minimum:	200 Consult factory for speeds less than 200 rpm

## Maximum Discharge Pressure

Metallic Heads:	T100E	1500 psi (103 bar)
	T100F	1850 psi (128 bar)
	T100H	2100 psi (145 bar)

## Maximum Inlet Pressure

## Operating Temperature

Maximum:	180 °F (82.2 °C)
Minimum:	40 °F (4.4 °C)
Consult factory for temperatures outside this range	

## Maximum Solids Size

## Input Shaft

## Inlet Ports

## Discharge Ports

## Shaft Diameter

## Shaft Rotation

## Oil Capacity

## Weight

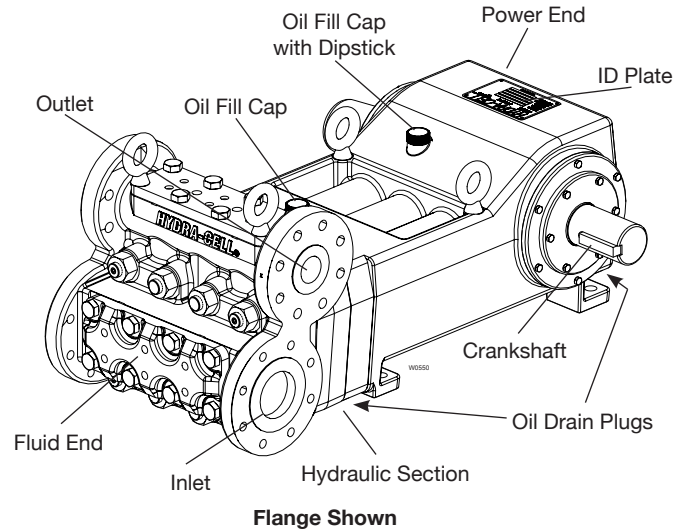
Metallic Heads:	1100 lbs. (499 kg)
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## Fluid End Materials

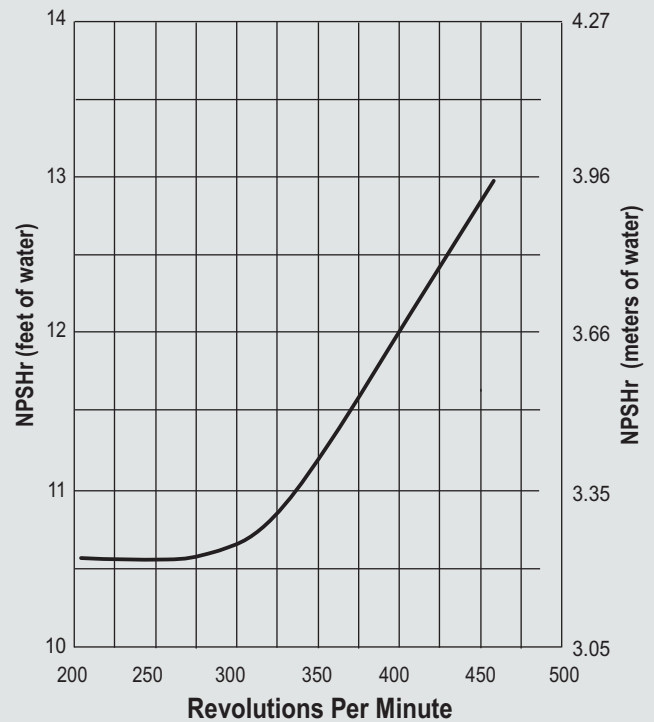
Manifold:	Nickel Aluminum Bronze (NAB)
	316L Stainless Steel
Diaphragm/Elastomers:	FKM
	Buna-N
Diaphragm Follower Screw:	316 Stainless Steel
Valve Spring Retainer:	17-7 PH Stainless Steel
	316 SST
	Hastelloy C
Check Valve Spring:	Elgiloy
Valve Disc/Seat :	Tungsten Carbide
	17-4 PH Stainless Steel
	Hastelloy C
Outlet Valve Retainer:	316 Stainless Steel
Plug-Outlet Valve Port:	316 Stainless Steel
Inlet Valve Retainer:	316 Stainless Steel

## Power End Materials

Crankshaft:	Forged Q&T Alloy Steel
Connecting Rods:	Ductile Iron
Crossheads:	12L14 Steel
Crankcase:	Ductile Iron
Bearings:	Spherical Roller/Journal (main)
	Steel Backed Babbitt (crankpin)
	Bronze (wristpin)



## Net Positive Suction Head (NPSHr)



## Calculating Required Horsepower (kW)\*

$$\frac{\text{gpm} \times \text{psi}}{1,460} = \text{electric motor hp}^*$$

$$\frac{\text{lpm} \times \text{bar}}{511} = \text{electric motor kW}^*$$

\* hp (kW) is required application power.

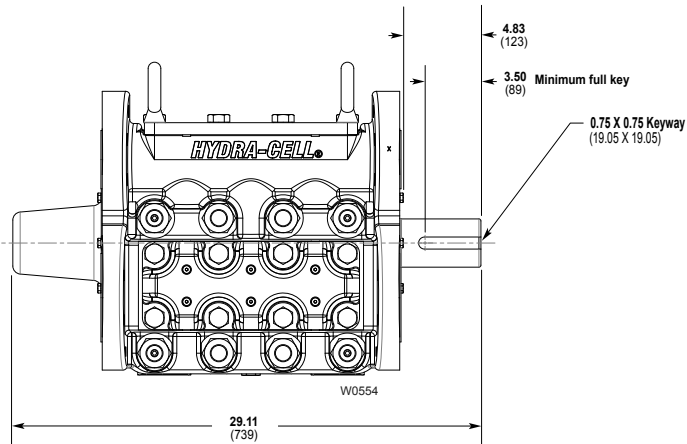
## Attention!

When sizing motors with variable speed drives (VFD): It is very important to select a motor and a VFD rated for constant torque inverter duty service and that the motor is rated to meet the torque requirements of the pump throughout desired speed range.

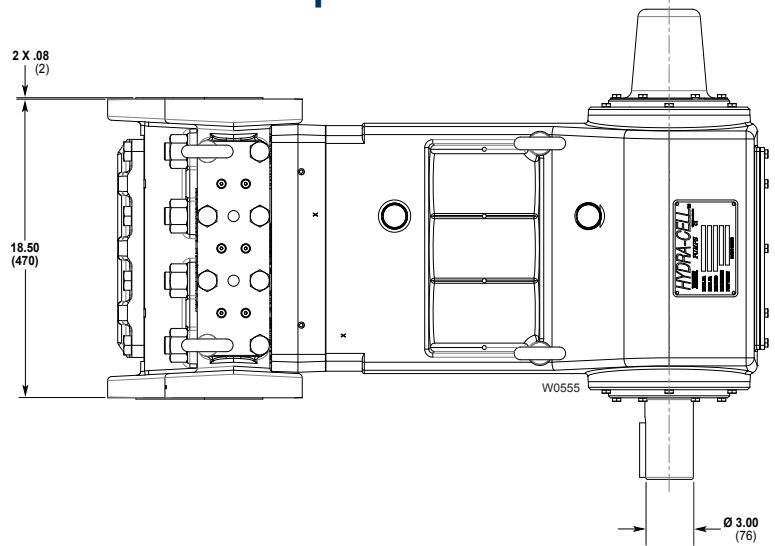
# T100 Series Low Pressure Representative Drawings

Flanged Version inches (mm)

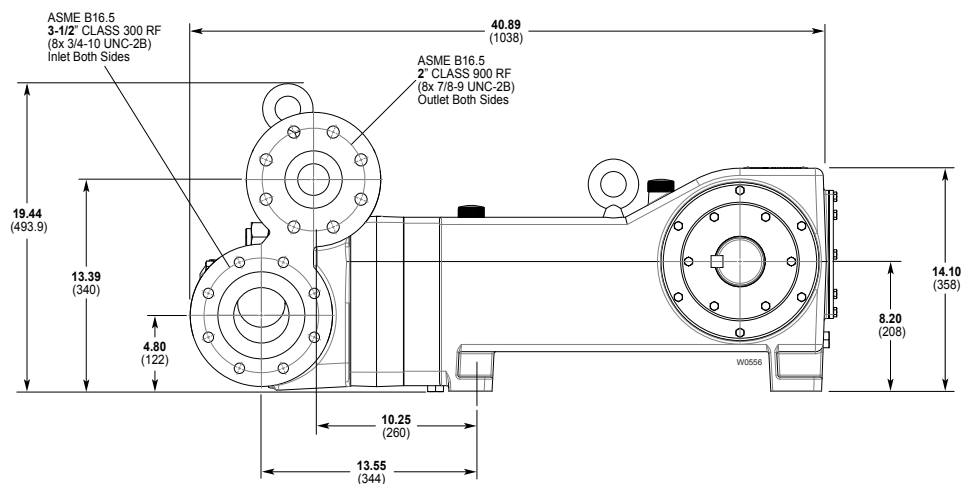
**Front View**



**Top View**



**Side View**





# T100 Series Low Pressure How to Order

## Ordering Information



A complete T100 Series Low Pressure Model Number contains 13 digits including 9 customer-specified design and materials options, for example: T100ERDGHFEHA.

## Low Pressure

Digit	Order Code	Description
<b>1-4</b>	<b>T100</b>	<b>Pump Configuration</b> Shaft-driven
<b>5</b>	<b>E</b> <b>F</b> <b>H</b>	<b>Performance</b> Max 96.0 gpm (366.1 l/min) @ 1500 psi (103 bar) Max 76.5 gpm (289.6 l/min) @ 1850 psi (128 bar) Max 68.0 gpm (257.8 l/min) @ 2100 psi (145 bar)
<b>6</b>	<b>R</b>	<b>Pump Head Version</b> ANSI Flange Ports (RF)
<b>7</b>	<b>D</b> <b>S</b>	<b>Pump Head Material</b> Nickel Aluminum Bronze (NAB) 316L Stainless Steel
<b>8</b>	<b>G</b> <b>T</b>	<b>Diaphragm &amp; O-ring Material</b> FKM Buna-N
<b>9</b>	<b>D</b> <b>H</b> <b>T</b>	<b>Valve Seat Material</b> Tungsten Carbide* 17-4 PH Stainless Steel Hastelloy C
<b>10</b>	<b>D</b> <b>F</b> <b>T</b>	<b>Valve Material</b> Tungsten Carbide* 17-4 PH Stainless Steel Hastelloy C
<b>11</b>	<b>E</b>	<b>Valve Springs</b> Elgiloy
<b>12</b>	<b>H</b> <b>S</b> <b>T</b>	<b>Valve Spring Retainers</b> 17-7 Stainless Steel 316 SST Hastelloy C
<b>13</b>	<b>A</b>	<b>Hydra-Oil</b> 10W30 standard-duty oil

\*Tungsten Carbide valve seat and disc are a matched set and must be purchased together.

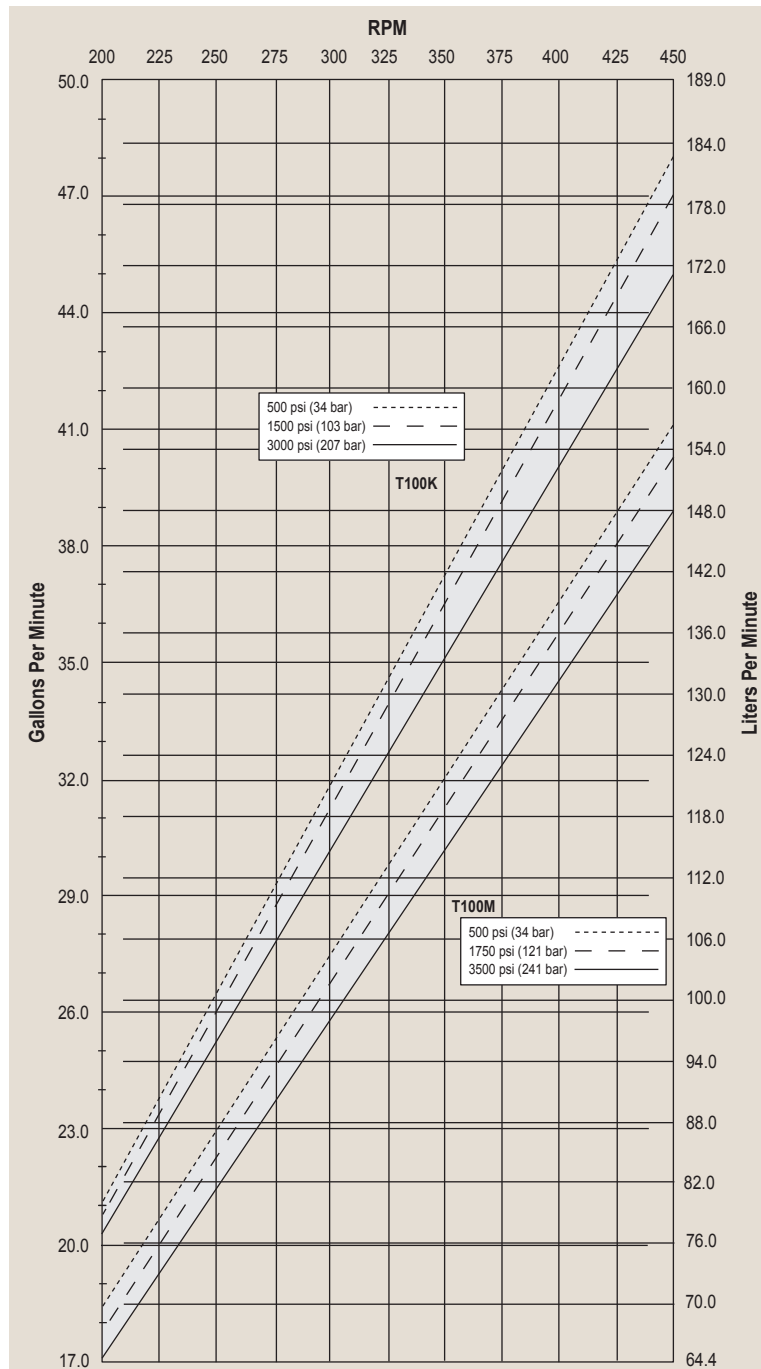
# T100 Series Medium Pressure Performance

## Capacities

Flow				Pressure	
Model	Max. Input rpm	Maximum Flow gpm	Maximum Flow l/min	Maximum Inlet Pressure	Maximum Discharge Pressure
T100K	450	45.0	170.4	500 psi (34 bar)	T100K 3000 psi (207 bar)
T100M	450	38.0	143.8		T100M 3500 psi (241 bar)

Consult factory when operating below 20 gpm (75.7 l/min).

## Maximum Flow at Designated Pressure



T100 medium pressure model shown with Stainless Steel manifold. (Also available with Nickel Aluminum Bronze/NAB manifold.)

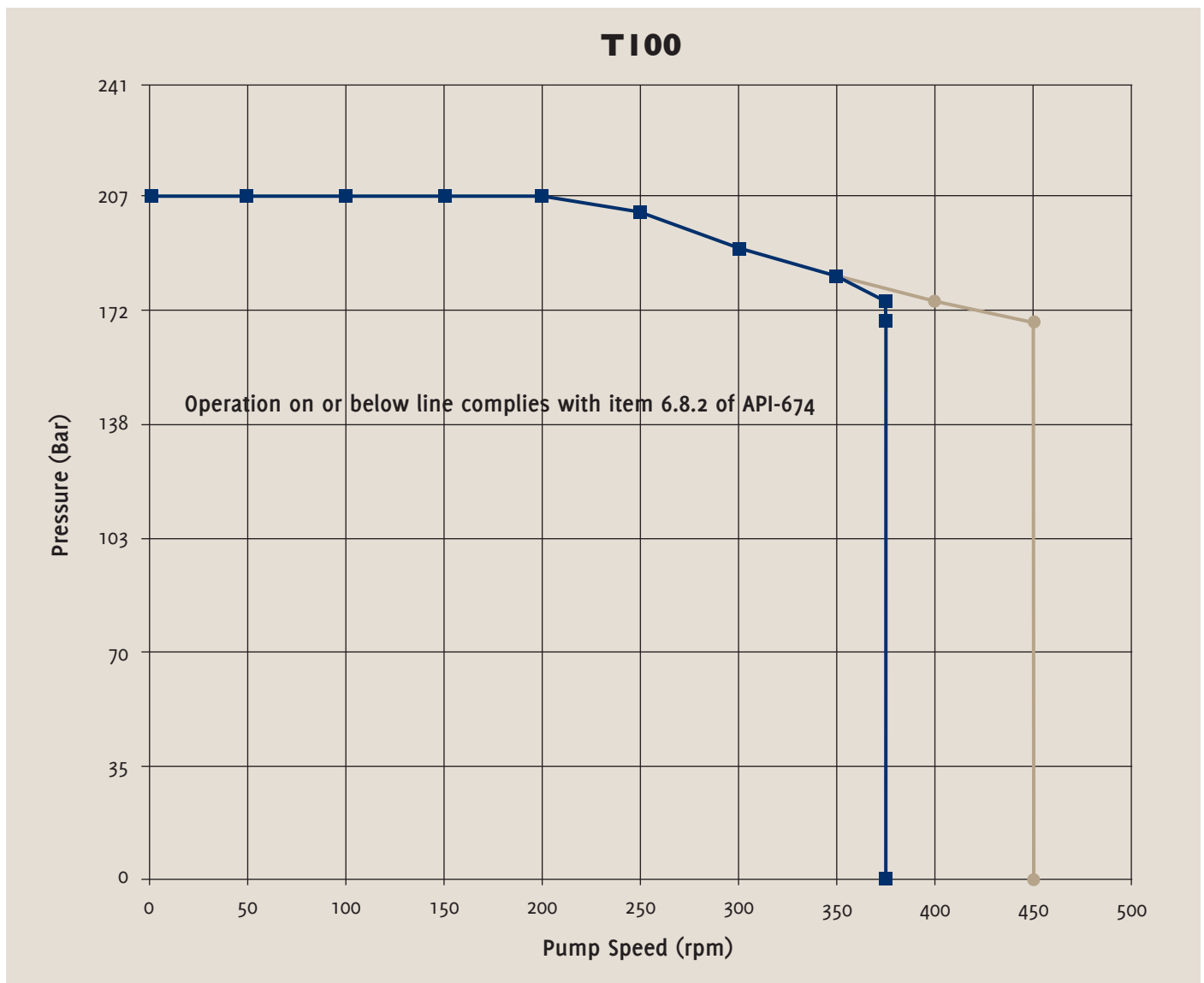
# T100 Series Medium Pressure API 674 Performance

## Capacities

Flow					Pressure	
Model	Max. Input rpm	Duty	Max. Flow @ 3000 psi (207 bar)		Maximum Inlet Pressure	Maximum Discharge Pressure
			gpm	l/min		
T100	450	Intermittent	45.3	171.7	500 psi (34 bar)	3000 psi (207 bar)
	375	Continuous	37.8	148.3		

Consult factory when operating below 12 gpm (45.4 l/min).

## Maximum RPM at Designated Pressure



—●— Intermittent duty 1.75" plunger  
Defined as up to 24/7 365 days pa

—■— Continuous duty 1.75" plunger  
Defined as 24/7 365 days pa

# T100 Series Medium Pressure Specifications

## Flow Capacities

	Pressure psi (bar)	rpm	gpm	l/min
T100K	3000 (207)	450	45.0	170.4
T100M	3500 (241)	450	38.0	143.8

## Delivery

	Pressure psi (bar)	gal/rev	liters/rev
T100K	500 (34)	0.107	0.406
	1500 (103)	0.105	0.397
	3000 (207)	0.101	0.384
T100M	500 (34)	0.091	0.345
	1750 (121)	0.089	0.338
	3500 (241)	0.086	0.327

## rpm

Maximum:	450
Minimum:	200 (Consult factory for speeds less than 200 rpm)

## Maximum Discharge Pressure

Metallic Heads:	T100K	3000 psi (207 bar)
	T100M	3500 psi (241 bar)

## Maximum Inlet Pressure 500 psi (34 bar)

## Operating Temperature

Maximum:	180 °F (82.2 °C)
Minimum:	40 °F (4.4 °C)
Consult factory for temperatures outside this range	

## Maximum Solids Size 800 microns

## Input Shaft Left or Right Side

## Inlet Ports 3-1/2 inch Class 300 RF ANSI Flange or 2-1/2 inch NPT

## Discharge Ports 1-1/2 inch Class 2500 RTJ ANSI Flange or 1-1/2 inch NPT

## Shaft Diameter 3 inch (76.2 mm)

## Shaft Rotation Reverse (bi-directional)

## Oil Capacity 18 US quarts (17 liters) 10W30 standard-duty oil

## Weight

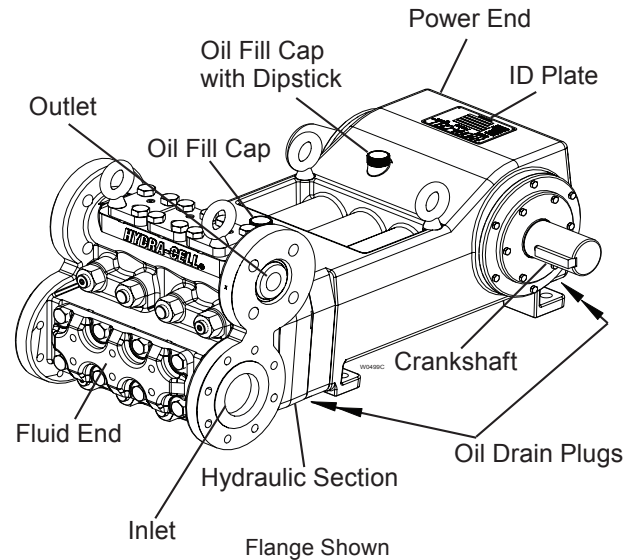
Metallic Heads:	1100 lbs. (499 kg)
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## Fluid End Materials

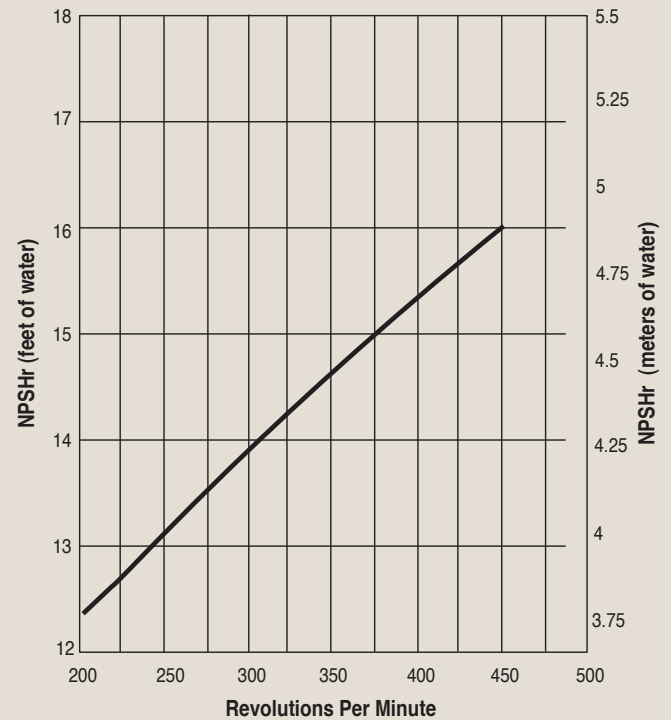
Manifold:	Nickel Aluminum Bronze (NAB)	
	316L Stainless Steel	
Diaphragm/Elastomers:	FKM	
	Buna-N	
	Valve Spring Retainer:	17-7 Stainless Steel
	PVDF	
	Polypropylene	
Check Valve Spring:	316 SST	
	Hastelloy C	
	Elgiloy	
Valve Disc/Seat :	Tungsten Carbide	
	17-4 Stainless Steel	
	Hastelloy C	

## Power End Materials

Crankshaft:	Forged Q&T Alloy Steel
Crankcase:	Ductile Iron
Bearings:	Spherical Roller/Journal (main)



## Net Positive Suction Head (NPSHr)



## Calculating Required Horsepower (kW)\*

$$\frac{\text{gpm} \times \text{psi}}{1,460} = \text{electric motor hp}^*$$

$$\frac{\text{lpm} \times \text{bar}}{511} = \text{electric motor kW}^*$$

\* hp (kW) is required application power.

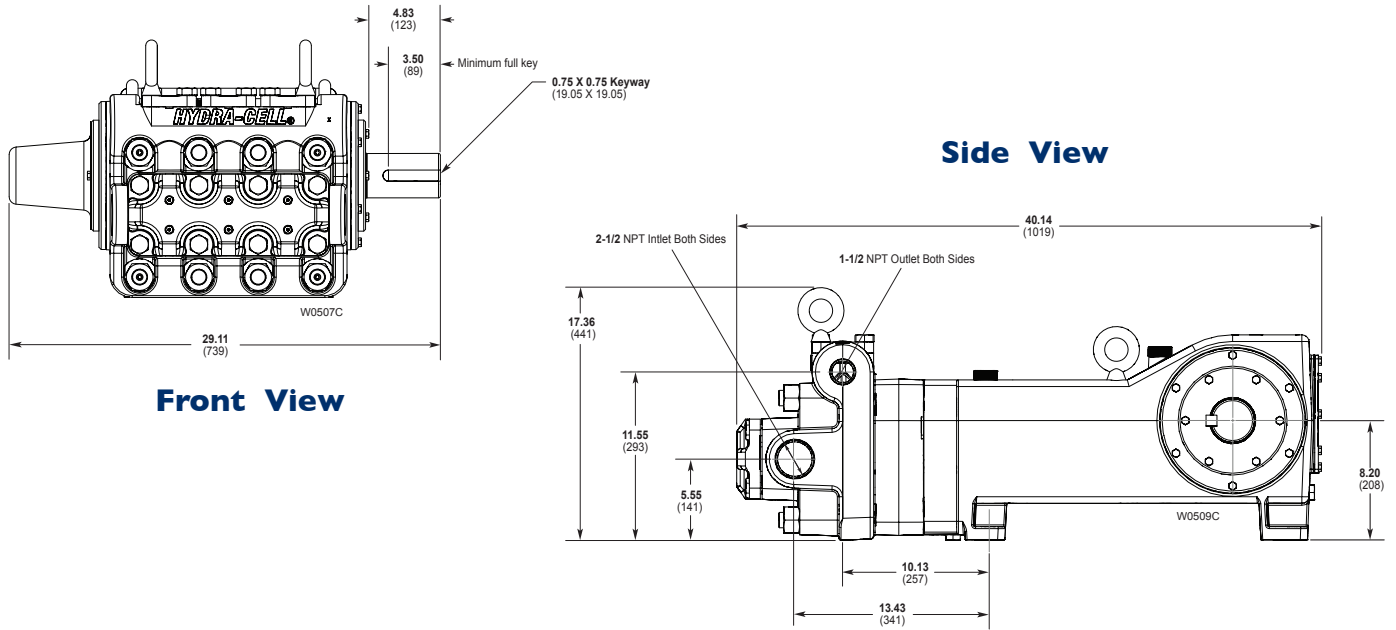
## Attention!

When sizing motors with variable speed drives (VFD): It is very important to select a motor and a VFD rated for constant torque inverter duty service and that the motor is rated to meet the torque requirements of the pump throughout desired speed range.

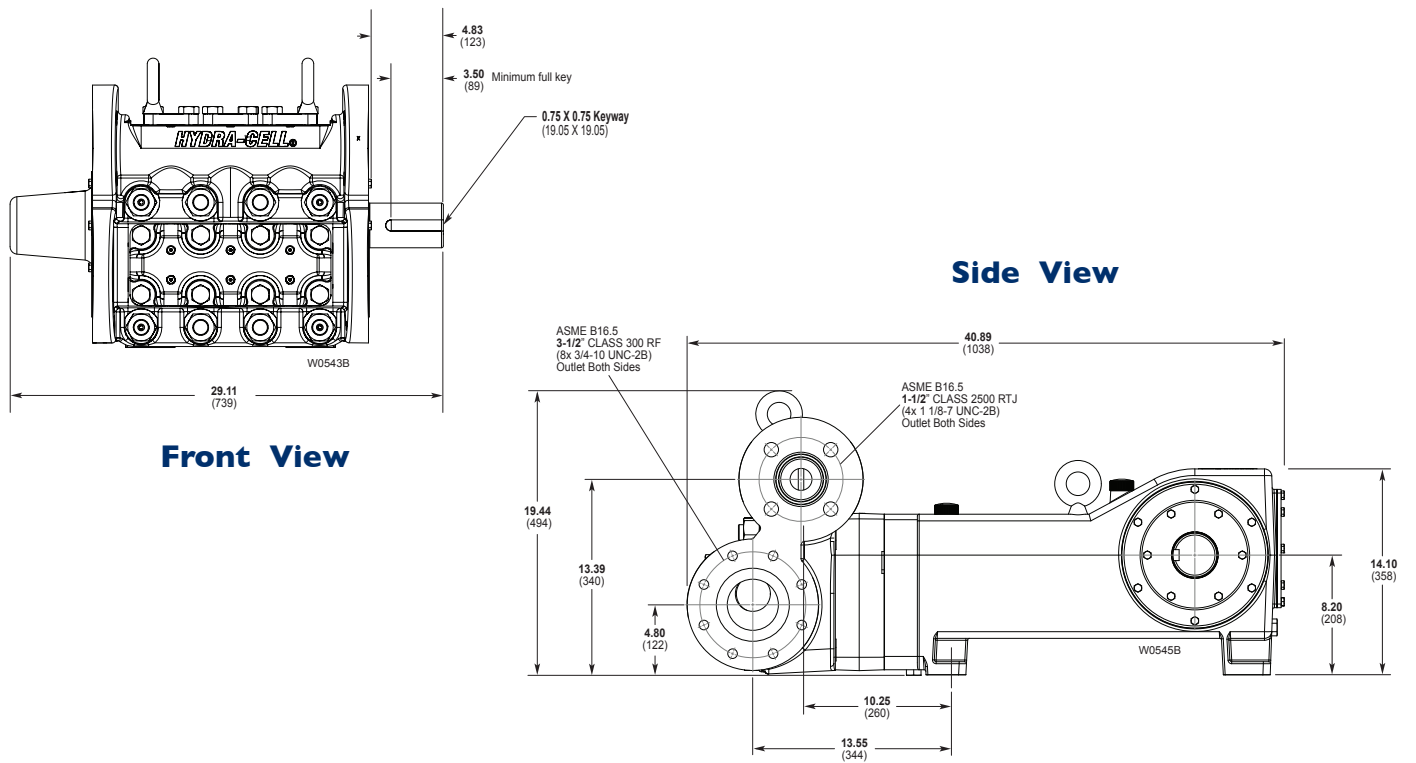


# T100 Series Medium Pressure Representative Drawings

## Threaded Version Inches (mm)



## Flanged Version Inches (mm)



# T100 Series Medium Pressure **How to Order**

## Ordering Information

<b>1</b> T	<b>2</b> 1	<b>3</b> 0	<b>4</b> 0	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>
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A complete T100 Series Medium Pressure Model Number contains 13 digits including 9 customer-specified design and materials options, for example: T100KADGDDEPA.

## Medium Pressure

Digit	Order Code	Description
<b>1-4</b>	T100	<b>Pump Configuration</b> Shaft-driven
<b>5</b>	K M	<b>Performance</b> Max 45 gpm (170 l/min) @ 3000 psi (207 bar) Max 38 gpm (143.8 l/min) @ 3500 psi (241 bar)
<b>6</b>	A R	<b>Pump Head Version</b> NPT Ports (for NAB only) ANSI Flange Ports (RF on Inlet / RTJ on Discharge)
<b>7</b>	D S	<b>Pump Head Material</b> Nickel Aluminum Bronze (NAB) 316L Stainless Steel
<b>8</b>	G T	<b>Diaphragm &amp; O-ring Material</b> FKM Buna-N
<b>9</b>	D H T	<b>Valve Seat Material</b> Tungsten Carbide* 17-4 Stainless Steel Hastelloy C
<b>10</b>	D F T	<b>Valve Material</b> Tungsten Carbide* 17-4 Stainless Steel Hastelloy C
<b>11</b>	E	<b>Valve Springs</b> Elgiloy
<b>12</b>	H M P S T	<b>Valve Spring Retainers</b> 17-7 Stainless Steel PVDF Polypropylene 316 SST Hastelloy C
<b>13</b>	A	<b>Hydra-Oil</b> 10W30 standard-duty oil

\*Tungsten Carbide valve seat and disc are a matched set and must be purchased together.

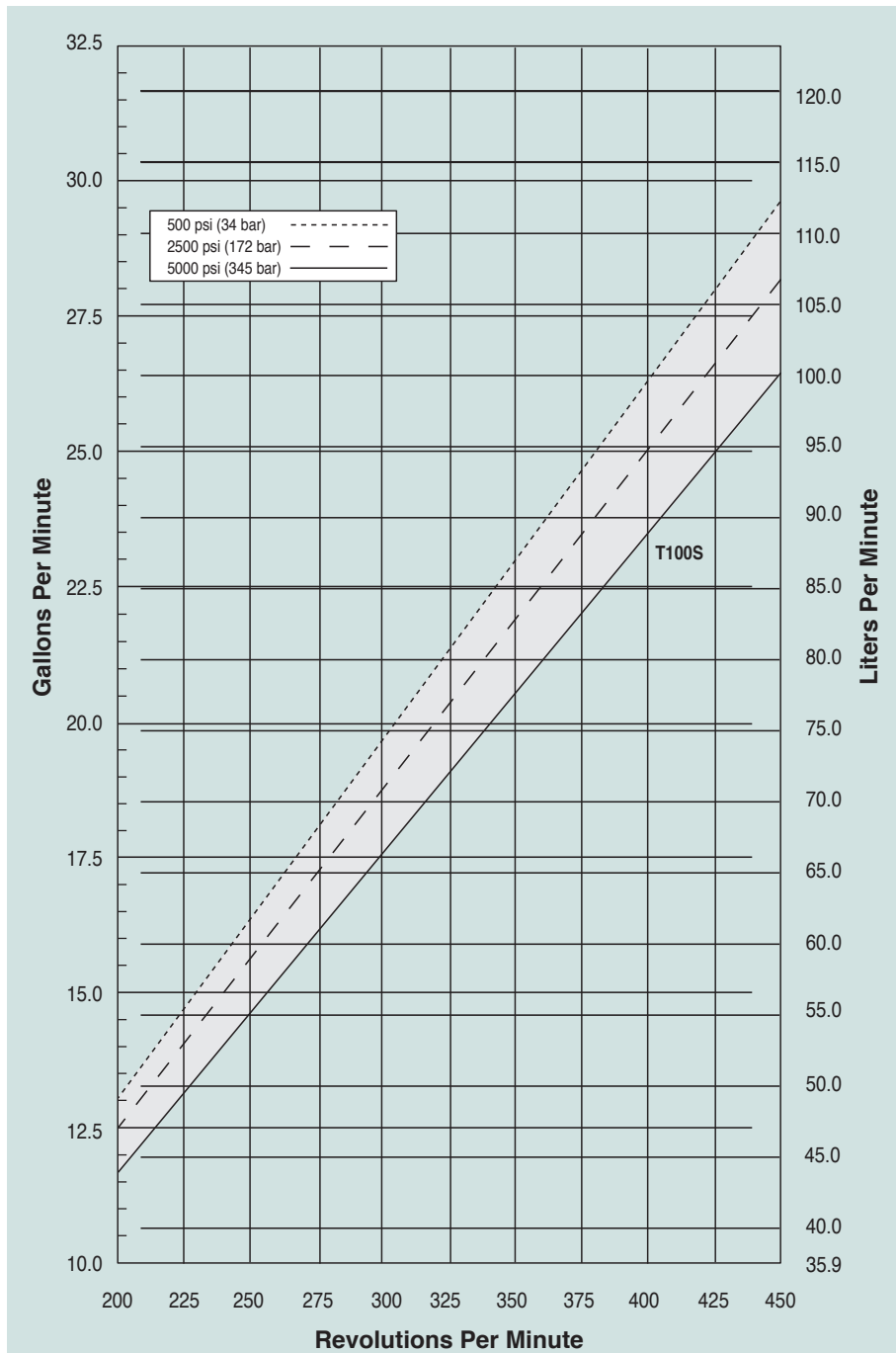
# T100 Series High Pressure Performance

## Capacities

Flow				Pressure	
Model	Max. Input rpm	Max. Flow @ 5000 psi (345 bar)		Maximum Inlet Pressure	Maximum Discharge Pressure
		gpm	l/min		
T100S	450	26.0	98.4	500 psi (34 bar)	5000 psi (345 bar)

Consult factory when operating below 12 gpm (45.4 l/min).

## Maximum Flow at Designated Pressure



T100 high pressure model shown with Nickel Aluminum Bronze (NAB) manifold. (Also available with Stainless Steel manifold.)

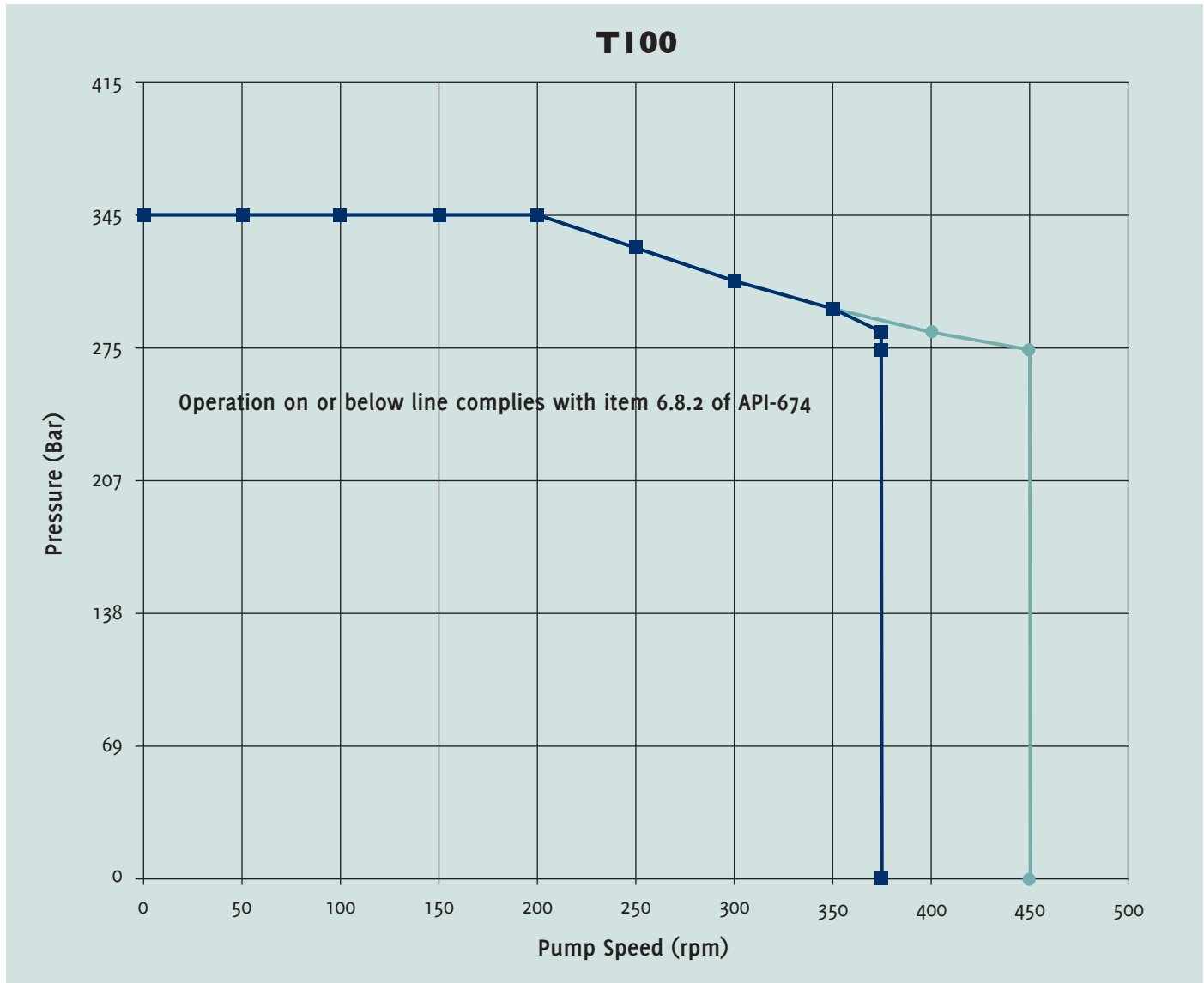
# T100 Series High Pressure API 674 Performance

## Capacities

Flow					Pressure	
Model	Max. Input rpm	Duty	Max. Flow @ 5000 psi (345 bar)		Maximum Inlet Pressure	Maximum Discharge Pressure
			gpm	l/min		
T100	450	Intermittent	26.0	98.4	500 psi (34 bar)	5000 psi (345 bar)
	375	Continuous	22.0	83.3		

Consult factory when operating below 12 gpm (45.4 l/min).

## Maximum RPM at Designated Pressure



● Intermittent duty 1.375" plunger  
Defined as up to 24/7 365 days pa

■ Continuous duty 1.375" plunger  
Defined as 24/7 365 days pa



# T100 Series High Pressure Specifications

## Flow Capacities @5000 psi (345 bar)

Model	rpm	gpm	l/min
T100S	450	26.0	98.4

## Delivery

Pressure psi (bar)	gal/rev	liters/rev
500 (34)	0.066	0.249
2500 (172)	0.063	0.237
5000 (343)	0.059	0.222

## rpm

Maximum:	450
Minimum:	200 (Consult factory for speeds less than 200 rpm)

## Maximum Discharge Pressure

Metallic Heads:	5000 psi (345 bar)
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## Maximum Inlet Pressure

	500 psi (34 bar)
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## Operating Temperature

Maximum:	180 °F (82.2 °C)
Minimum:	40 °F (4.4 °C)

Consult factory for temperatures outside this range

## Maximum Solids Size

	800 microns
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## Input Shaft

	Left or Right Side
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## Inlet Ports

	2 inch Class 300 FF ANSI Flange
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## Discharge Ports

	1-1/4 inch Class 2500 RTJ ANSI Flange
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## Shaft Diameter

	3 inch (76.2 mm)
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## Shaft Rotation

	Reverse (bi-directional)
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## Oil Capacity

	18 US quarts (17 liters)
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	10W30 standard-duty oil
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## Weight

Metallic Heads:	1100 lbs. (499 kg)
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## Fluid End Materials

Manifold:	Nickel Aluminum Bronze (NAB) 316L Stainless Steel
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Diaphragm/Elastomers:	FKM Buna-N
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Diaphragm Follower Screw:	316 Stainless Steel
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Valve Spring Retainer:	17-7 Stainless Steel
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	PVDF
--	------

	Polypropylene
--	---------------

	316 SST
--	---------

	Hastelloy C
--	-------------

Check Valve Spring:	Elgiloy
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Valve Disc/Seat:	Tungsten Carbide
------------------	------------------

	17-4 Stainless Steel
--	----------------------

	Hastelloy C
--	-------------

Outlet Valve Retainer:	316 Stainless Steel
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Plug-Outlet Valve Port:	316 Stainless Steel
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Inlet Valve Retainer:	316 Stainless Steel
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## Power End Materials

Crankshaft:	Forged Q&T Alloy Steel
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Connecting Rods:	Ductile Iron
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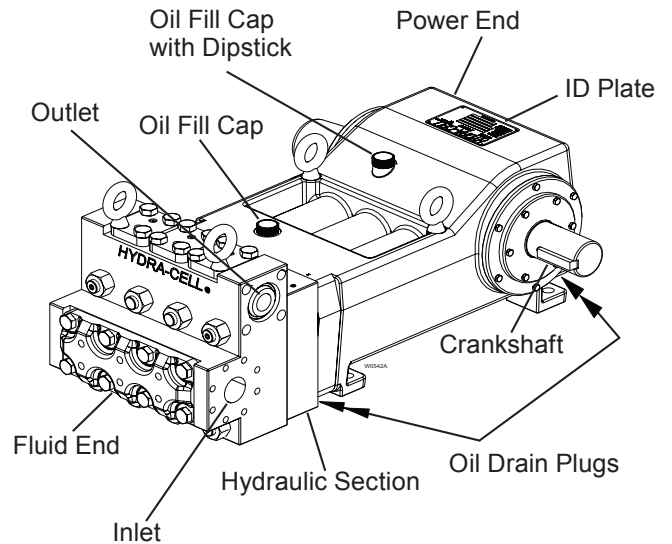
Crossheads:	12L14 Steel
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Crankcase:	Ductile Iron
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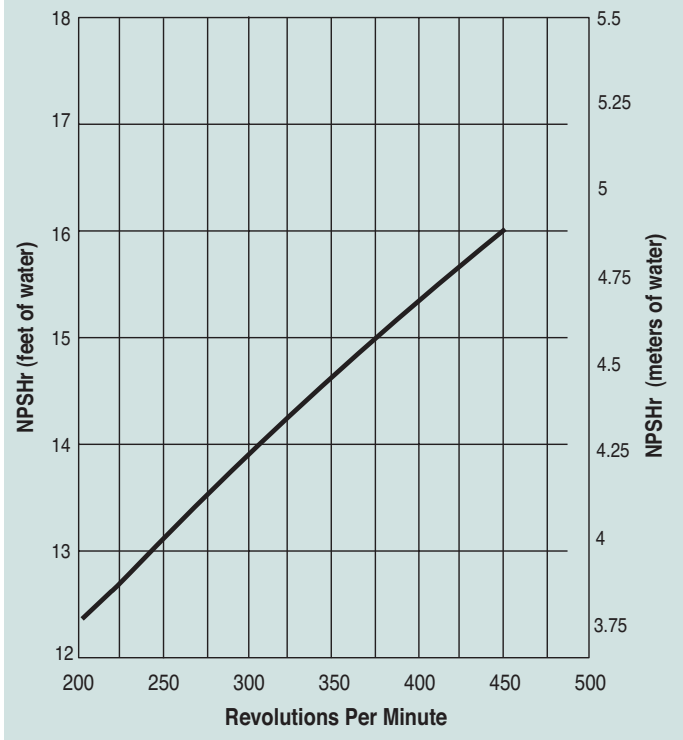
Bearings:	Spherical Roller/Journal (main)
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	Steel Backed Babbitt (crankpin)
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	Bronze (wristpin)
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## Net Positive Suction Head (NPSHr)



## Calculating Required Horsepower (kW)\*

$$\frac{\text{gpm} \times \text{psi}}{1,460} = \text{electric motor hp}^*$$

$$\frac{\text{lpm} \times \text{bar}}{511} = \text{electric motor kW}^*$$

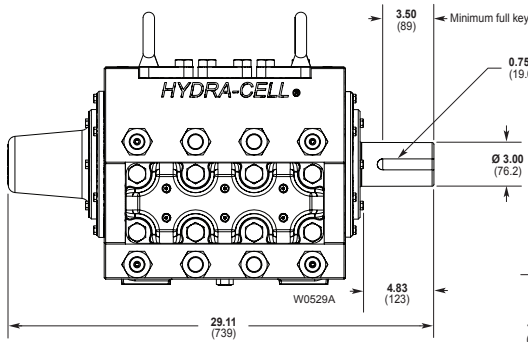
\* hp (kW) is required application power.

## Attention!

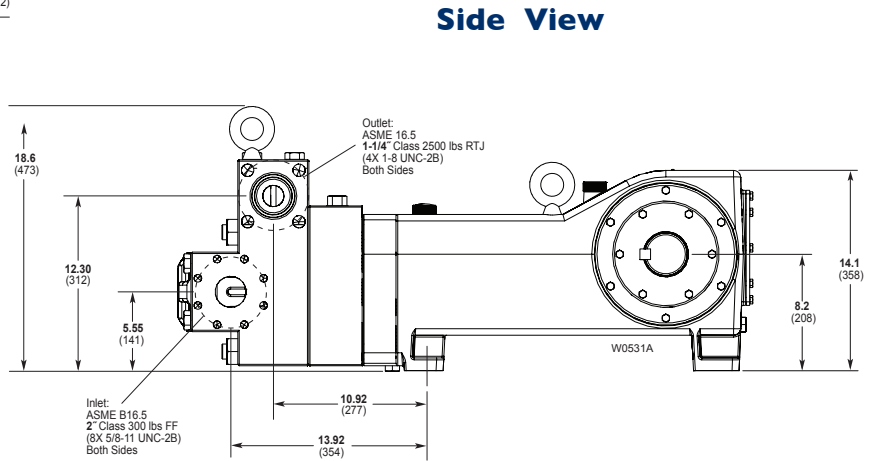
When sizing motors with variable speed drives (VFD): It is very important to select a motor and a VFD rated for constant torque inverter duty service and that the motor is rated to meet the torque requirements of the pump throughout desired speed range.

# T100 Series High Pressure Representative Drawings

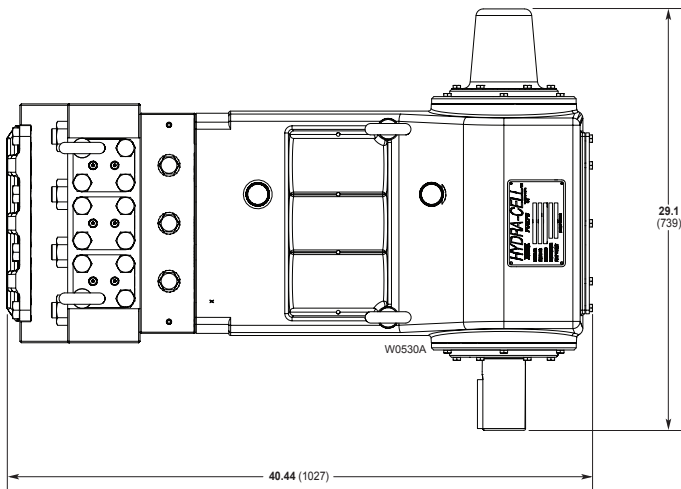
## Threaded Version Inches (mm)



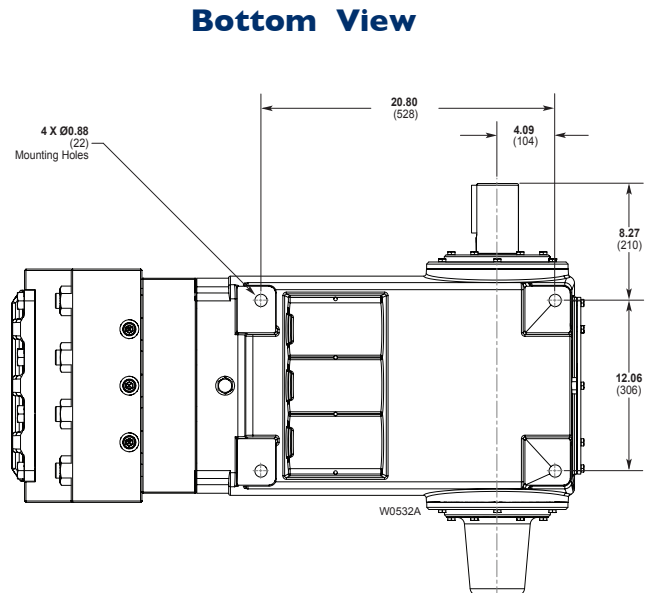
**Front View**



**Side View**



**Top View**



**Bottom View**

**Note:** Contact factory for additional drawings of specific models and configurations.

# T100 Series High Pressure **How to Order**

## Ordering Information



A complete T100 Series High Pressure Model Number contains 13 digits including 9 customer-specified design and materials options, for example: T100SRDTHFEPA.

## High Pressure

Digit	Order Code	Description
<b>1-4</b>	T100	<b>Pump Configuration</b> Shaft-driven
<b>5</b>	S	<b>Performance</b> Max 26 gpm (98 l/min) @ 5000 psi (345 bar)
<b>6</b>	R	<b>Pump Head Version</b> ANSI Flange Ports (FF on Inlet / RTJ on Discharge)
<b>7</b>	D S	<b>Pump Head Material</b> Nickel Aluminum Bronze (NAB) 316L Stainless Steel
<b>8</b>	G T	<b>Diaphragm &amp; O-ring Material</b> FKM Buna-N
<b>9</b>	D H T	<b>Valve Seat Material</b> Tungsten Carbide* 17-4 Stainless Steel Hastelloy C
<b>10</b>	D F T	<b>Valve Material</b> Tungsten Carbide* 17-4 Stainless Steel Hastelloy C
<b>11</b>	E	<b>Valve Springs</b> Elgiloy
<b>12</b>	H M P S T	<b>Valve Spring Retainers</b> 17-7 Stainless Steel PVDF Polypropylene 316 SST Hastelloy C
<b>13</b>	A	<b>Hydra-Oil</b> 10W30 standard-duty oil

\*Tungsten Carbide valve seat and disc are a matched set and must be purchased together.

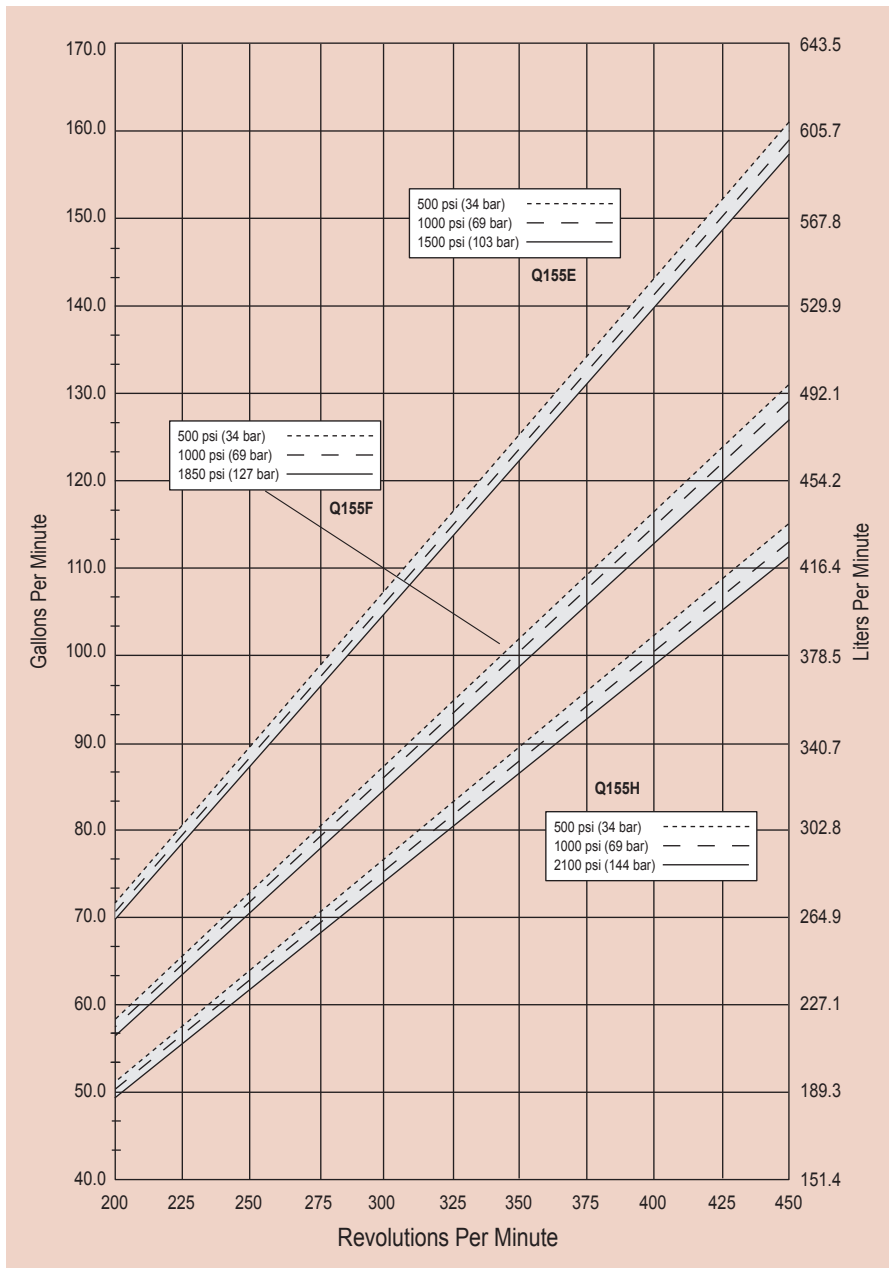
# Q155 Low Pressure Performance

## Capacities

Flow				Pressure	
Model	Max. Input rpm	Maximum Flow gpm	Maximum Flow l/min	Maximum Inlet Pressure 500 psi (34 bar)	
Q155E	450	157	595	Maximum Discharge Pressure	
Q155F	450	127	490	Q155E	1500 psi (103 bar)
Q155H	450	111	421	Q155F	1850 psi (127 bar)
				Q155H	2100 psi (144 bar)

Consult factory when operating below 200 rpm.

## Maximum Flow at Designated Pressure





# Q155 Low Pressure Specifications

## Flow Capacities

	Pressure psi (bar)	rpm	gpm	l/min
Q155E	1500 (103)	450	157	595
Q155F	1850 (127)	450	127	490
Q155H	2100 (144)	450	111	421

## Delivery

	Pressure psi (bar)	gal/rev	liters/rev
Q155E	500 (34)	0.358	1.354
	1000 (69)	0.353	1.338
	1500 (104)	0.350	1.323
Q155F	500 (34)	0.291	1.102
	1000 (69)	0.287	1.085
	1850 (127)	0.282	1.068
Q155H	500 (34)	0.256	0.967
	100 (69)	0.251	0.951
	2100 (144)	0.247	0.936

## rpm

Maximum:	450
Minimum:	200 (Consult factory for speeds less than 200 rpm)

## Maximum Discharge Pressure

Metallic Heads:	Q155E	1500 psi (103 bar)
	Q155M	1850 psi (127 bar)
	Q155H	2100 psi (144 bar)

## Maximum Inlet Pressure

500 psi (34 bar)

## Operating Temperature

Maximum:	180° F (82.2° C)
Minimum:	40° F (4.4° C)

Consult factory for temperatures outside this range

## Maximum Solids Size

800 microns

## Input Shaft

Left or Right Side

## Inlet Ports

Weld-On: 4" / SCH. 40

4" NPT

## Discharge Ports

Weld-On: 3" / SCH. 80

3" NPT

## Shaft Diameter

3 inch (76.2 mm)

## Shaft Rotation

Uni-directional (see rotation arrows)

## Oil Capacity

32 US quarts (30.3 liters)

10W30 standard-duty oil

## Weight

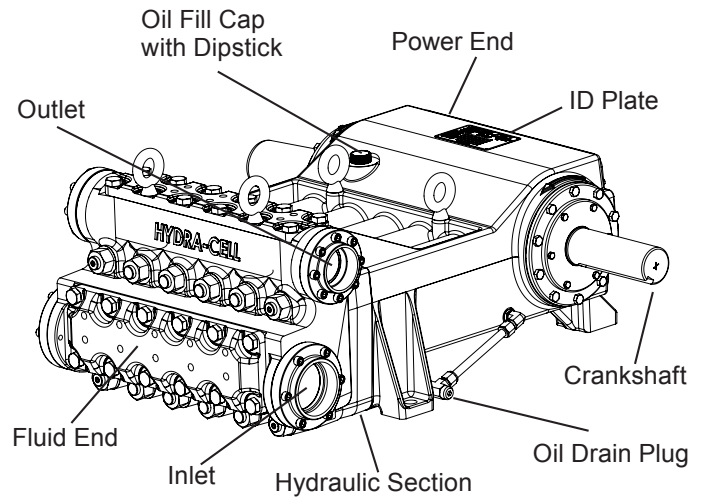
Metallic Heads: 1700 lbs. (771 kg)

## Fluid End Materials

Manifold:	Nickel Aluminum Bronze (NAB)
	316 Stainless Steel
Diaphragm/Elastomers:	FKM, Buna-N
Diaphragm Follower Screw:	316 Stainless Steel
Valve Spring Retainer:	17-7 PH Stainless Steel, 316 SST,
	Hastelloy C
Check Valve Spring:	Elgiloy
Valve Disc/Seat:	Tungsten Carbide
	17-4 Stainless Steel
Outlet Valve Retainer:	Hastelloy C
	316 Stainless Steel
Plug-Outlet Valve Port:	316 Stainless Steel
Inlet Valve Retainer:	316 Stainless Steel

## Power End Materials

Crankshaft:	Forged Q&T Alloy Steel
Connecting Rods:	Ductile Iron
Crossheads:	12L14 Steel
Crankcase:	Ductile Iron
Bearings:	Spherical Roller/Journal (outer mains)
	Steel Backed Babbitt (crankpin)
	Bronze (wrist pin, center mains)



## Calculating Required Horsepower (kW)\*

$$\frac{\text{gpm} \times \text{psi}}{1,460} = \text{electric motor hp}^*$$

$$\frac{\text{lpm} \times \text{bar}}{511} = \text{electric motor kW}^*$$

\* hp (kW) is required application power.

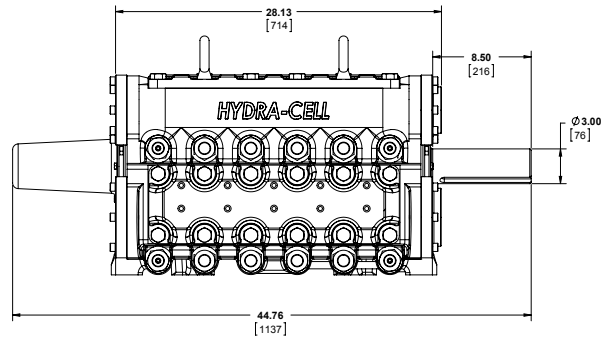
## Attention!

When sizing motors with variable speed drives (VFD): It is very important to select a motor and a VFD rated for constant torque inverter duty service and that the motor is rated to meet the torque requirements of the pump throughout desired speed range.

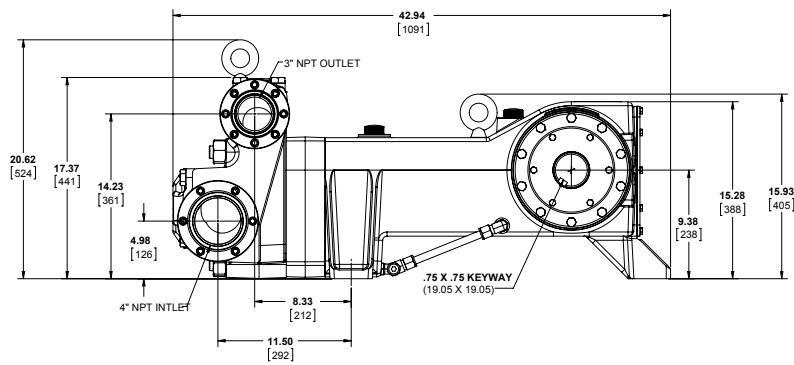
# QI55 Low Pressure Representative Drawings

Threaded Version Inches (mm)

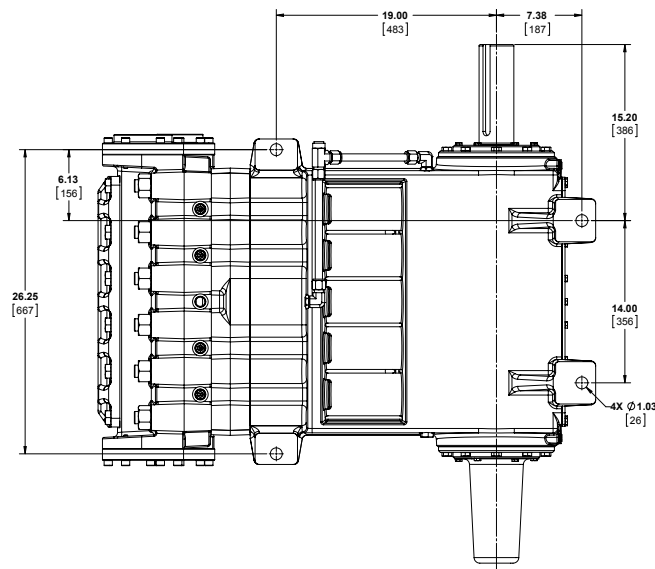
## Front View



## Side View



## Bottom View



# Q155 Low Pressure **How to Order**

## Ordering Information



A complete Q155 Series Low Pressure Model contains 13 digits including 9 customer-specified design and materials options, for example: (TBP)

## Low Pressure

Digit	Order Code	Description
<b>1-4</b>	Q155	<b>Pump Configuration</b> Shaft-driven
<b>5</b>	E F H	<b>Performance</b> Max. 157 gpm (595 l/min) @ 1500 psi (103 bar) Max. 127 gpm (490 l/min) @ 1850 psi (127 bar) Max. 111 gpm (421 l/min) @ 2100 psi (144 bar)
<b>6</b>	A R	<b>Pump Head Version</b> NPT Threaded Ports ANSI Flange Ports
<b>7</b>	D S	<b>Pump Head Material</b> Nickel Aluminum Bronze (NAB) 316 Stainless Steel
<b>8</b>	G T	<b>Diaphragm &amp; O-ring Material</b> FKM Buna-N
<b>9</b>	D H T	<b>Valve Seat Material</b> Tungsten Carbide 17-4 Stainless Steel Hastelloy C
<b>10</b>	D F T	<b>Valve Material</b> Tungsten Carbide 17-4 Stainless Steel Hastelloy C
<b>11</b>	E	<b>Valve Springs</b> Elgiloy
<b>12</b>	H S T	<b>Valve Spring Retainers</b> 17-7 PH Stainless Steel 316 SST Hastelloy C
<b>13</b>	A	<b>Hydra-Oil</b> 10W30 standard-duty oil

\*Tungsten Carbide valve seat and disc are a matched set and must be purchased together.

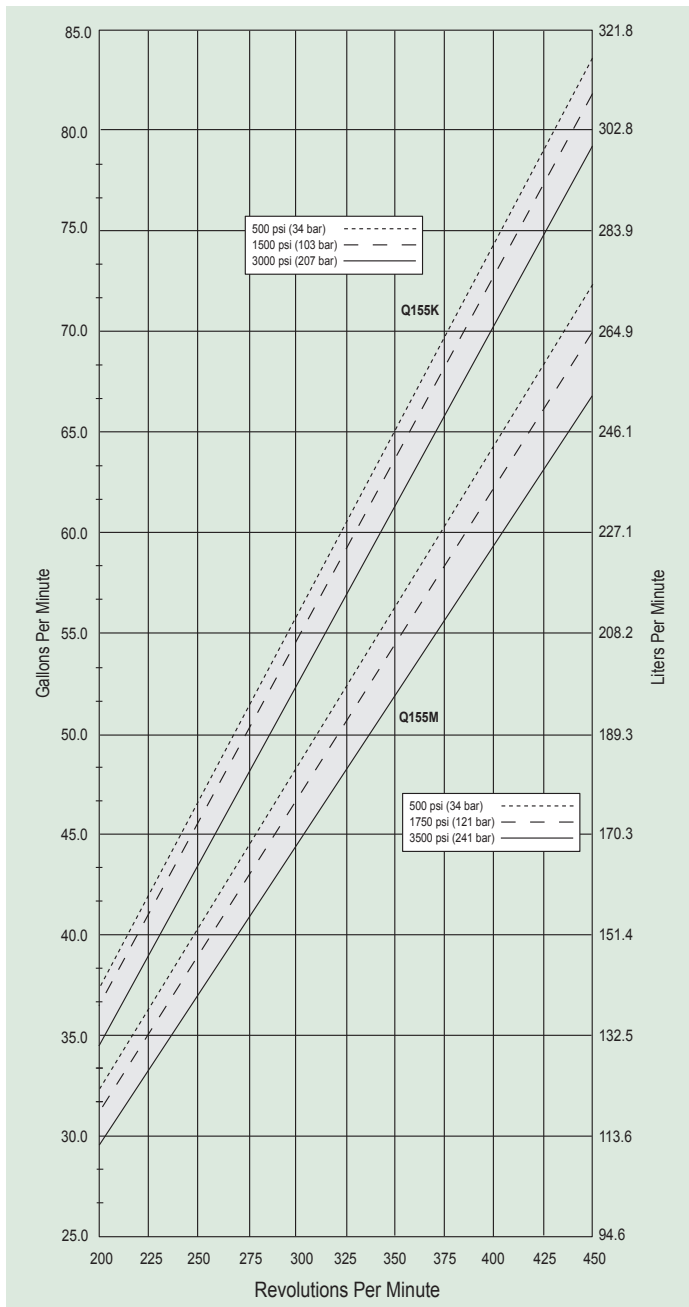
# Q155 Medium Pressure Performance

## Capacities

Flow				Pressure	
Model	Max. Input rpm	Maximum Flow gpm	Maximum Flow l/min	Maximum Inlet Pressure	
Q155K	450	78.0	295.3	500 psi (34 bar)	
Q155M	450	66.8	252.9	Maximum Discharge Pressure	
				Q155K	3000 psi (207 bar)
				Q155M	3500 psi (241 bar)

Consult factory when operating below 200 rpm.

## Maximum Flow at Designated Pressure





# Q155 Medium Pressure Specifications

## Flow Capacities

	Pressure psi (bar)	rpm	gpm	l/min
Q155K	3000 (207)	450	78.0	295.3
Q155M	3500 (241)	450	66.8	252.9

## Delivery

	Pressure psi (bar)	gal/rev	liters/rev
Q155K	500 (34)	0.185	0.700
	1500 (103)	0.181	0.685
	3000 (207)	0.173	0.654
Q155M	500 (34)	0.201	0.760
	1750 (121)	0.197	0.747
	3500 (241)	0.193	0.731

## rpm

Maximum:	450
Minimum:	200 (Consult factory for speeds less than 200 rpm)

## Maximum Discharge Pressure

Metallic Heads:	Q155K	3000 psi (207 bar)
	Q155M	3500 psi (241 bar)

## Maximum Inlet Pressure

500 psi (34 bar)
------------------

## Operating Temperature

Maximum:	180 °F (82.2 °C)
Minimum:	40 °F (4.4 °C)
Consult factory for temperatures outside this range	

## Maximum Solids Size

800 microns
-------------

## Input Shaft

Left or Right Side
--------------------

## Inlet Ports

Weld-On: 4" / SCH. 40
-----------------------

## Discharge Ports

4" NPT
--------

## Shaft Diameter

Weld-On: 2" / SCH. 160
------------------------

## Shaft Rotation

2" NPT
--------

## Oil Capacity

3 inch (76.2 mm)
------------------

## Shaft Rotation

Uni-directional (see rotation arrows)
---------------------------------------

## Oil Capacity

32 US quarts (30.3 liters)
----------------------------

## Weight

10W30 standard-duty oil
-------------------------

## Weight

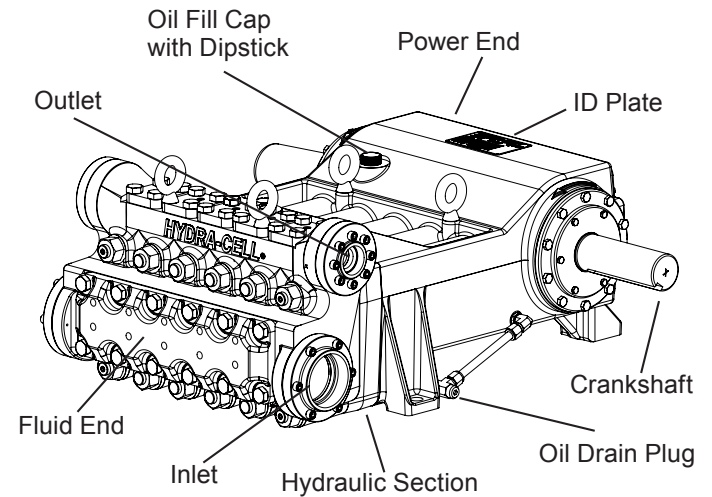
Metallic Heads: 1700 lbs. (771 kg)
------------------------------------

## Fluid End Materials

Manifold:	Nickel Aluminum Bronze (NAB) 316 Stainless Steel
Diaphragm/Elastomers:	FKM, Buna-N
Diaphragm Follower Screw:	316 Stainless Steel
Valve Spring Retainer:	17-7 PH Stainless Steel Polypropylene PVDF 316 SST Hastelloy C
Check Valve Spring:	Elgiloy
Valve Disc/Seat:	Tungsten Carbide 17-4 Stainless Steel Hastelloy C
Outlet Valve Retainer:	316 Stainless Steel
Plug-Outlet Valve Port:	316 Stainless Steel
Inlet Valve Retainer:	316 Stainless Steel

## Power End Materials

Crankshaft:	Forged Q&T Alloy Steel
Connecting Rods:	Ductile Iron
Crossheads:	12L14 Steel
Crankcase:	Ductile Iron
Bearings:	Spherical Roller/Journal (outer mains) Steel Backed Babbitt (crankpin) Bronze (wrist pin, center mains)



## Calculating Required Horsepower (kW)\*

$$\frac{\text{gpm} \times \text{psi}}{1,460} = \text{electric motor hp}^*$$

$$\frac{\text{lpm} \times \text{bar}}{511} = \text{electric motor kW}^*$$

\* hp (kW) is required application power.

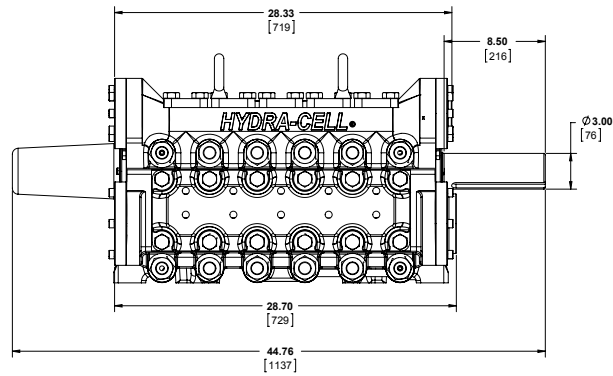
## Attention!

When sizing motors with variable speed drives (VFD): It is very important to select a motor and a VFD rated for constant torque inverter duty service and that the motor is rated to meet the torque requirements of the pump throughout desired speed range.

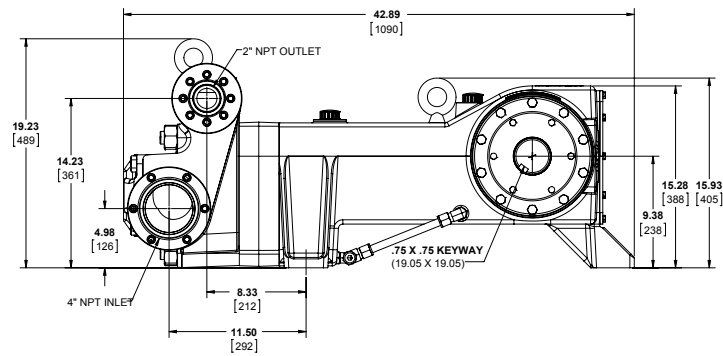
# QI55 Medium Pressure Representative Drawings

Threaded Version Inches (mm)

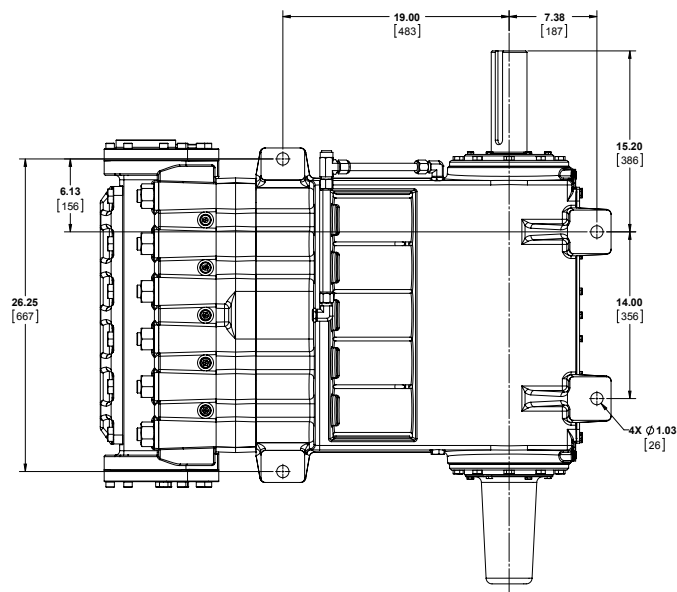
## Front View



## Side View



## Bottom View



# Q155 Medium Pressure **How to Order**

## Ordering Information



A complete Q155 Series Medium Pressure Model contains 13 digits including 9 customer-specified design and materials options, for example: (TBP)

## Medium Pressure

Digit	Order Code	Description
<b>1-4</b>	Q155	<b>Pump Configuration</b> Shaft-driven
<b>5</b>	K M	<b>Performance</b> Max. 78.0 gpm (295.3 l/min) @ 3000 psi (207 bar) Max. 66.8 gpm (252.9 l/min) @ 3500 psi (241 bar)
<b>6</b>	A R	<b>Pump Head Version</b> NPT Threaded Ports (NAB only) ANSI Flange Ports
<b>7</b>	D S	<b>Pump Head Material</b> Nickel Aluminum Bronze (NAB) 316 Stainless Steel
<b>8</b>	G T	<b>Diaphragm &amp; O-ring Material</b> FKM Buna-N
<b>9</b>	D H T	<b>Valve Seat Material</b> Tungsten Carbide 17-4 Stainless Steel Hastelloy C
<b>10</b>	D F T	<b>Valve Material</b> Tungsten Carbide 17-4 Stainless Steel Hastelloy C
<b>11</b>	E	<b>Valve Springs</b> Elgiloy
<b>12</b>	H M P S T	<b>Valve Spring Retainers</b> 17-7 PH Stainless Steel Polypropylene PVDF 316 SST Hastelloy C
<b>13</b>	A	<b>Hydra-Oil</b> 10W30 standard-duty oil

\*Tungsten Carbide valve seat and disc are a matched set and must be purchased together.

# Hydra-Cell® P Series Metering Pump Selection

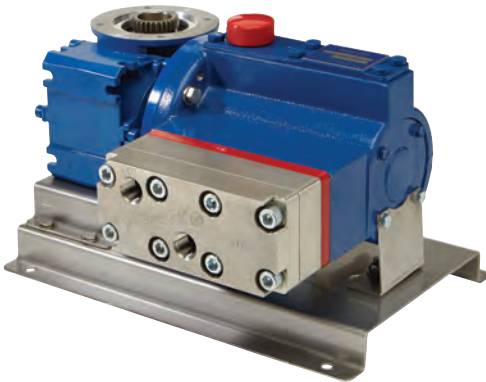
**Hydra-Cell®**  
METERING SOLUTIONS™



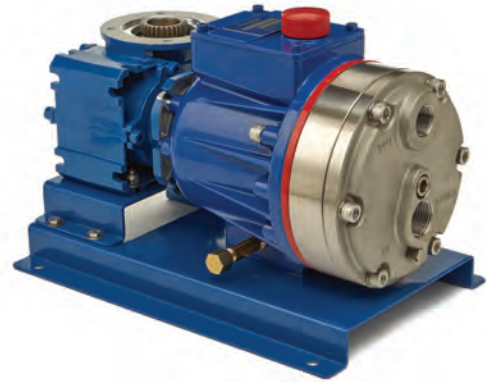
**P100**  
Page 146



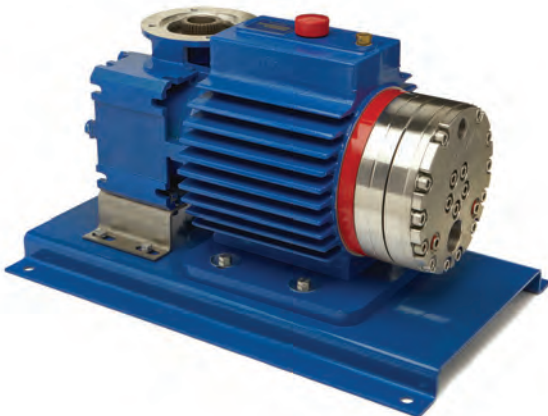
**P200**  
Page 148



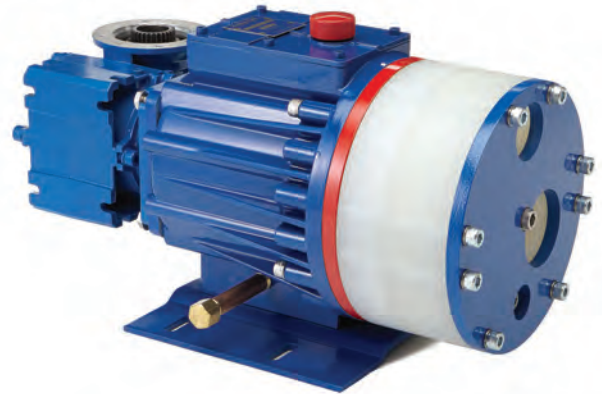
**P300**  
Page 150



**P400**  
Page 152



**P500**  
Page 154

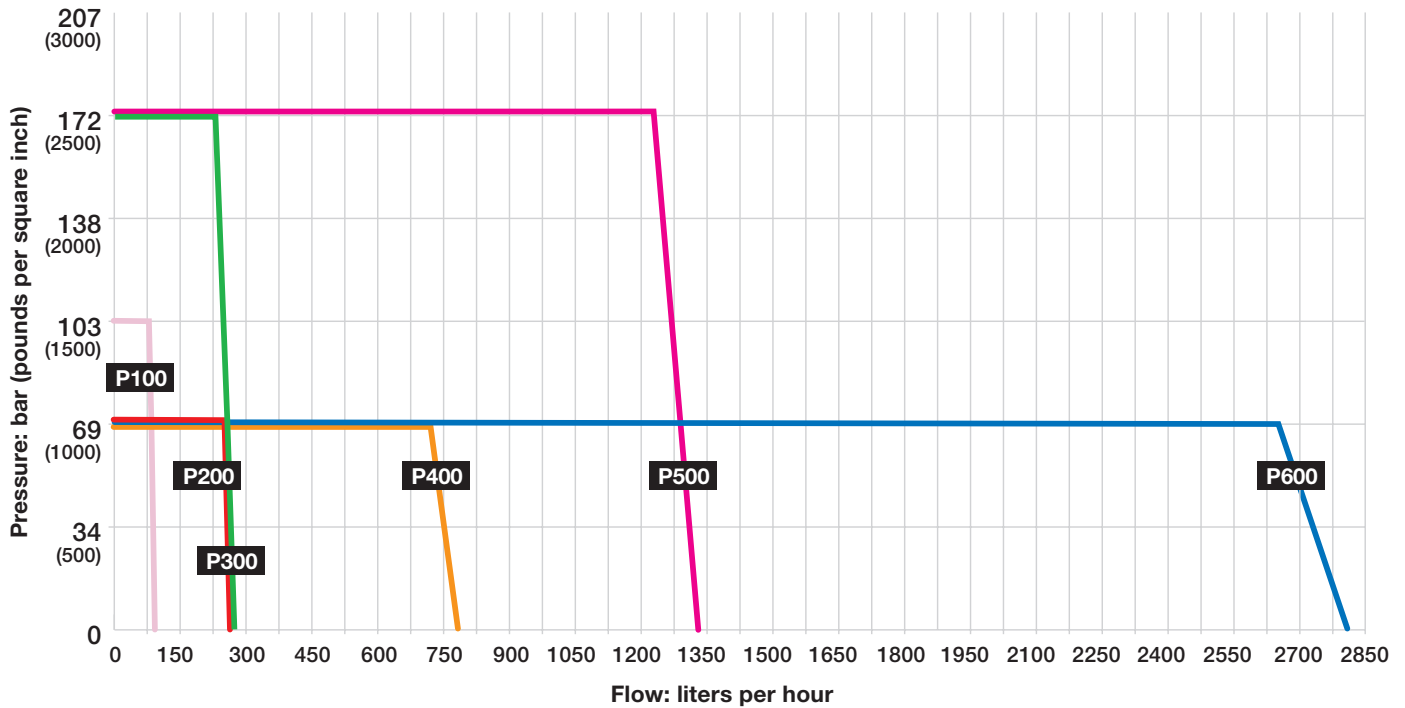


**P600**  
Page 156



# Hydra-Cell® Flow Capacities and Pressure Ratings

## P Series Electronic Precision Metering Pumps



Model <sup>1</sup>	Maximum Capacity lph	Maximum Discharge Pressure psi (bar)		Maximum Operating Temperature F (C) <sup>3</sup>		Maximum Inlet Pressure psi (bar)
		Non-metallic <sup>2</sup>	Metallic	Non-metallic <sup>2</sup>	Metallic	
<b>P100</b>	85.0	350 (24)	1500 (103)	140° (60°)	250° (121°)	250 (17)
<b>P200</b>	255.4	350 (24)	1000 (69)	140° (60°)	250° (121°)	250 (17)
<b>P300</b>	256.8	N/A	2500 (172)	N/A	250° (121°)	500 (34)
<b>P400</b>	765.9	350 (24)	1000 (69)	140° (60°)	250° (121°)	250 (17)
<b>P500</b>	1343.5	N/A	2500 (172)	N/A	250° (121°)	500 (34)
<b>P600</b>	2808.0	350 (24)	1000 (69)	140° (60°)	250° (121°)	250 (17)

<sup>1</sup> Ratings are for X-cam design.

<sup>2</sup> 350 psi (24 bar) maximum with PVDF liquid end; 250 psi (17 bar) maximum with Polypropylene liquid end.

<sup>3</sup> Consult factory for correct component selection for temperatures from 160°F (71°C) to 250°F (121°C).

# Hydra-Cell® Metering Pumps Design Advantages

## Accurate, Reliable Electronic Flow Control

Unlike metering pumps that use manual stroke adjusters, Hydra-Cell P Series metering pumps use Variable Frequency Drive (VFD) electronic flow adjustment to maintain greater accuracy over the entire turndown range. This reduces the possibility of operator error, pumping inaccuracies, lost motion, and chance of leakage.

- Solid-state electronics are unlikely to fail.
- Metering is linear over the entire range.
- Volume per stroke is constant and a known value.
- Easy calibration of the desired feed rate.
- Rate of change is virtually instantaneous (0 to maximum rpm in 0.3 seconds) with AC motor.

## Greater Choice of Materials Enhances Capability



Some metering pump manufacturers offer only PTFE diaphragms, which require more frequent and costly replacement due to stress and low processing temperatures. Hydra-Cell metering pumps can be equipped with a variety of diaphragm materials (FKM, Buna-N, EPDM, Neoprene, Aflas, and PTFE). This enables Hydra-Cell metering pumps to operate over a wider range of processing applications.

In addition, several Hydra-Cell metering pump packages are available with special materials such as Hastelloy C and PVDF. Other metering pumps apply substantial price adders for exotic liquid end materials.

## Mesamoll Oil

Mesamoll oil offers outstanding gelling capacity and high saponification resistance along with good dielectric properties and resistance to weathering and light. It is ideal for use with many types of polymers and in instances where it will come into contact with water or an alkali. For information about ordering Hydra-Cell pumps with Mesamoll Oil, contact the factory.



## Achieve Economy through Technology

- Smaller footprint with the same capability as larger pumps lowers acquisition costs and saves valuable space in the facility.
- Each model covers an extensive range of pressures and flows - no need for different plunger and liquid end sizes to accommodate increases.
- Inherent simplicity of the Hydra-Cell design allows versatile application compared to complex metering pumps that may require expensive construction changes to meet specific needs.
- A replenishment valve in every piston assembly ensures optimum actuating oil on every stroke for continuous accuracy.
- Lower parts and maintenance costs.
- Separate gearbox makes it easy to change applications while preventing cross-contamination of actuating oil.
- Multiplexing capability enables mixing ratios of multiple fluids in flexible, economical ways.

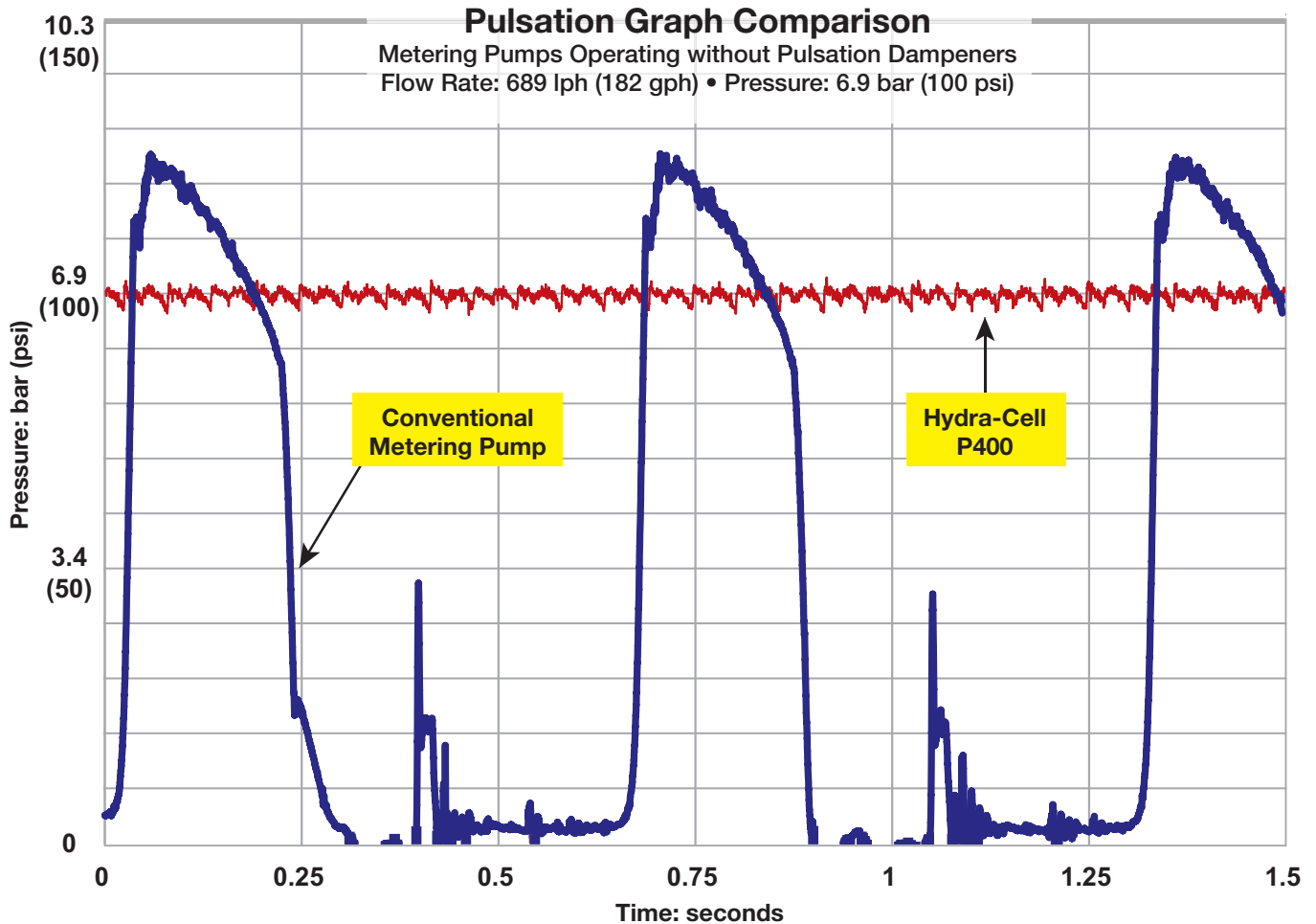


### Pumps Shown to Scale

Both the Hydra-Cell pump and triplex metering pump shown are rated for 1500 lph (396 gph) @ 80 bar (1160 psi).

# Hydra-Cell® Metering Pumps Design Advantages

## Accurate Metering and Dosing with Virtually Pulse-less Flow



Compared to conventional metering pumps operating under the same conditions at the same flow and pressure, Hydra-Cell metering pumps provide smooth, almost pulse-less performance.

This allows for the design of a safer, less expensive metering pump system that can be used in more accurate applications, such as spraying, which cannot tolerate pulsing flow.

## Reduced Pulsations Improve Operation

Pulsing, surging flow from traditional metering pumps can produce greater strain on the system and more wear and tear on the pump. Hydra-Cell features a multiple-diaphragm design (except model PI100) that practically eliminates pulsations.

- Reduces pipe strain
- Enhances operating safety
- Minimizes maintenance
- Reduces friction and acceleration losses in the suction line
- Eliminates the need for pulsation dampeners
- Provides accurate metering with linear, constant flow
- Lowers system acquisition costs



The multiple-diaphragm design of Hydra-Cell metering pumps provides virtually pulse-less, linear flow without the need for expensive pulsation dampeners.

# Hydra-Cell® Metering Performance Standards

## P Series Pumps Exceed API 675 Performance Standards

In 1994, the American Petroleum Institute (API) adapted its Standard 675 to stipulate performance characteristics for controlled-volume, positive displacement pumps. Although revised in 2010, and again in 2012, API 675 primarily defined metering pumps using mechanical stroke adjustment.

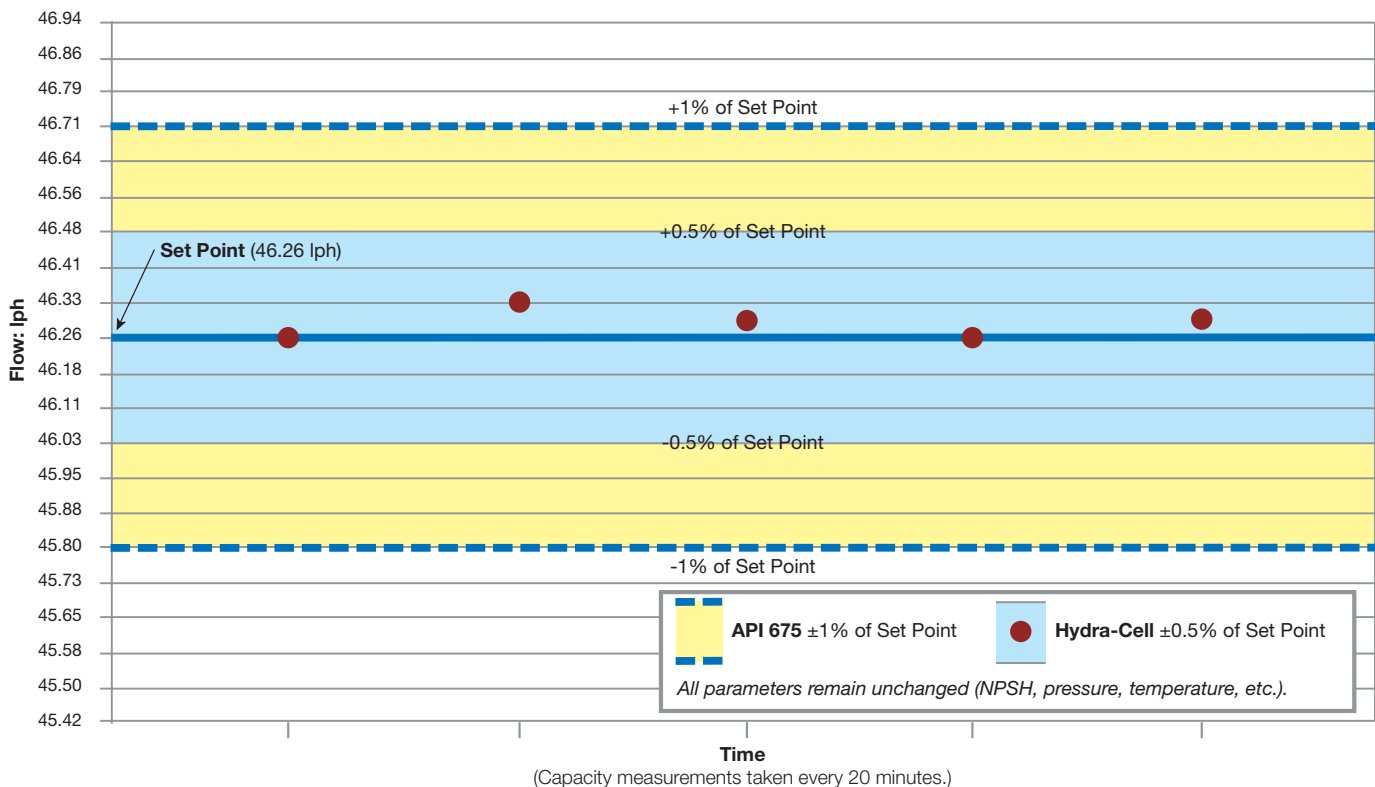
Hydra-Cell Metering Solutions meet or exceed API 675 performance standards by using electronic flow control to improve accuracy and a multiple-diaphragm design to reduce pulsations. A replenishment valve in every piston assembly ensures optimal actuating oil for continuous accuracy and greater repeatability. Used in precise metering, dosing, injection, and mixing applications, Hydra-Cell pumps provide an economical alternative to conventional metering pumps.

## Operational Data for Testing

Pump Configuration:	P300MRGSS010S
Reducer:	10:1
Pressure:	103 bar (1500 psi)
Actuating Oil:	10W-30 Hydra-Oil
Ambient Temperature:	21.9°C (71.5°F)
Pumped Fluid:	Water @ 22.2°C (72°F)
Gravity Feed:	0.3-to-0.91 Meters (1-to-3 Feet) Positive Head
Franklin IMDS Motor:	240-2400 rpm 1 hp (0.75kW)

### Accuracy - Performance at a Set Point

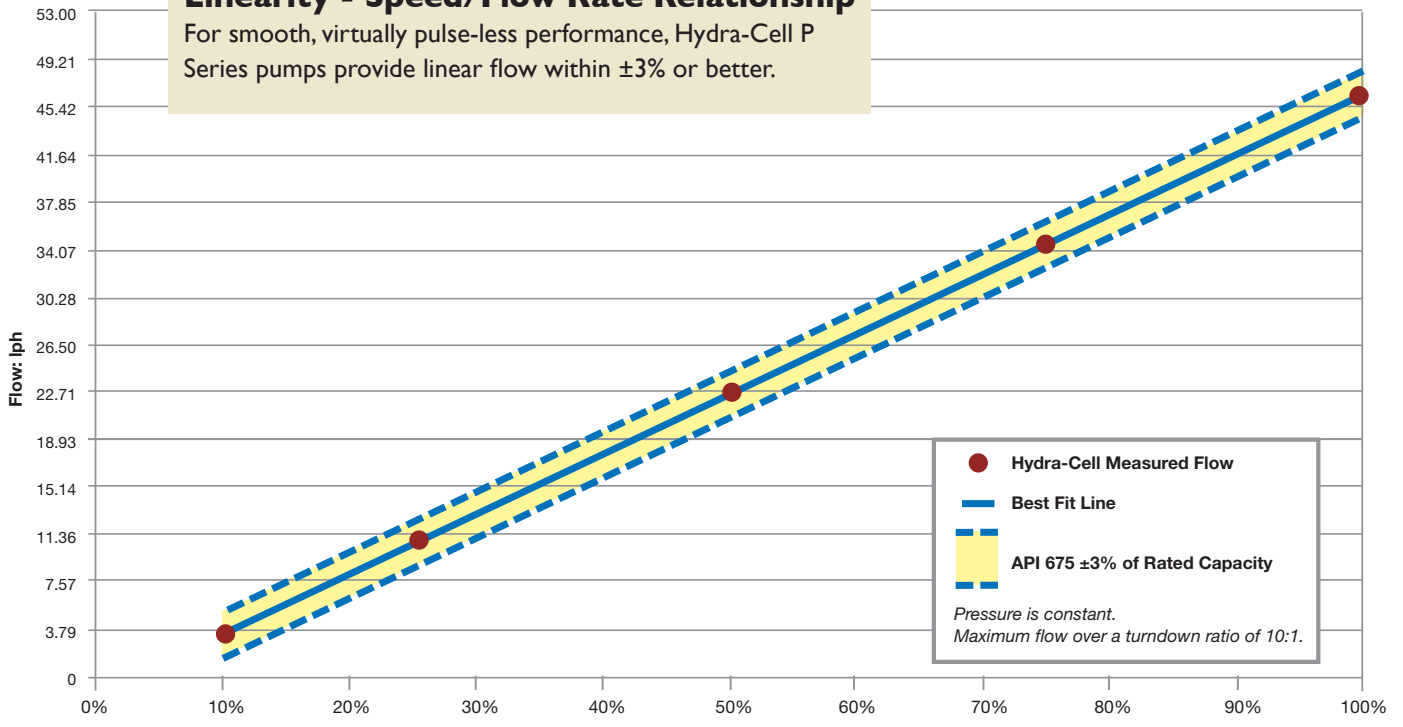
For continuous metering applications, Hydra-Cell P Series pumps provide precise steady-state accuracy of  $\pm 1\%$  or better.





### Linearity - Speed/Flow Rate Relationship

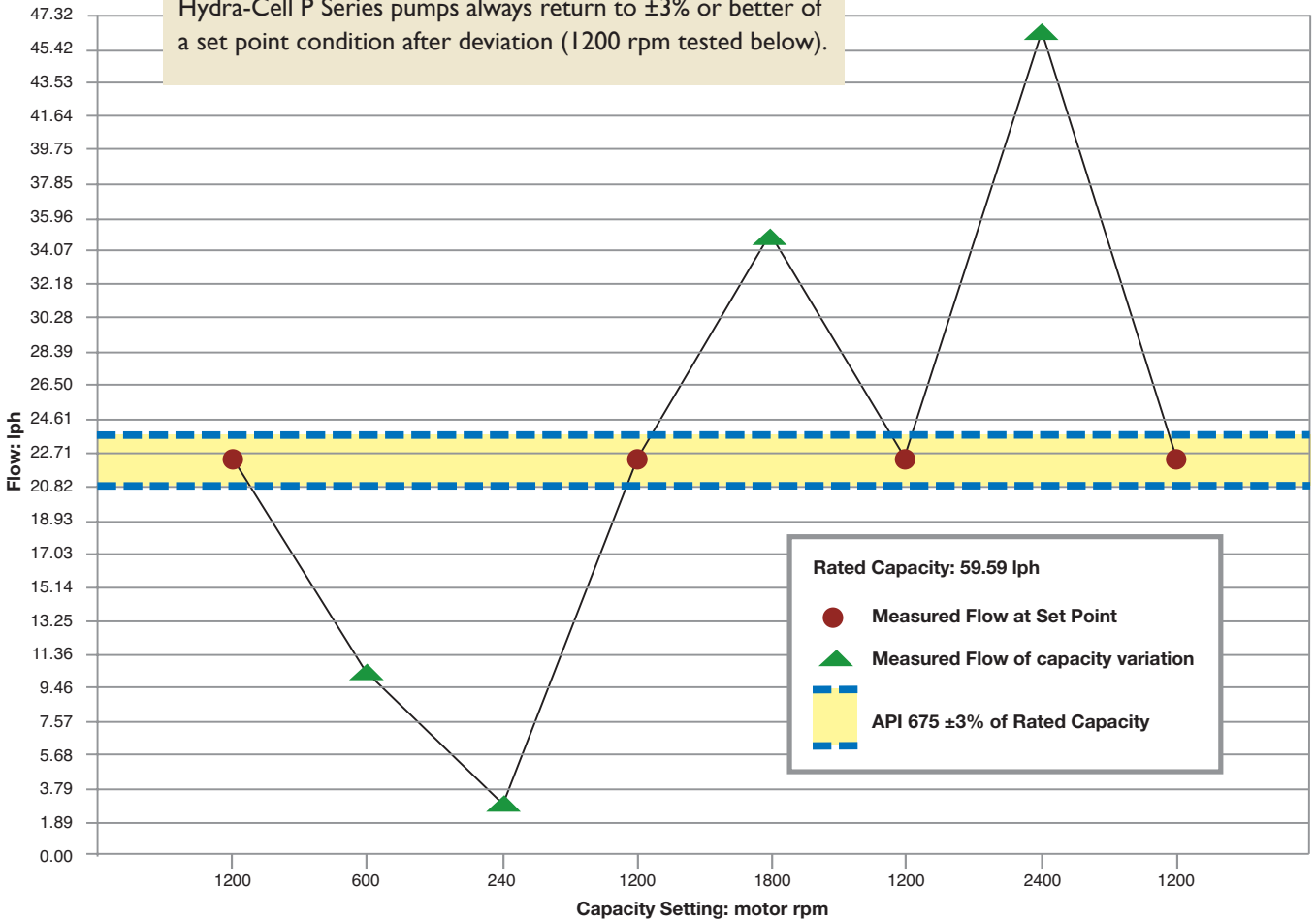
For smooth, virtually pulse-less performance, Hydra-Cell P Series pumps provide linear flow within  $\pm 3\%$  or better.



Best Fit Line is drawn through the Measured Flow data points, taken at 100%, 75%, 50%, 25%, and 10% of Rated Capacity (46.37 lph).

### Repeatability - Return to Set Conditions

Hydra-Cell P Series pumps always return to  $\pm 3\%$  or better of a set point condition after deviation (1200 rpm tested below).



# PI00 Series

Maximum Flow Rate: 85.0 lph  
 Maximum Pressure: 1500 psi (103 bar) for Metallic Pump Heads  
 350 psi (24 bar) for Non-metallic Pump Heads



PI00 with Stainless Steel pump head

## Performance\* Maximum Estimated Flow at Designated Pressure

All Pumps (lph)		Metallic Pump Heads Only (lph)			Pump rpm	Gear Ratio	Motor rpm
7 bar	17 bar	34 bar	69 bar	103 bar			
3.425	3.396	3.337	3.203	3.095	25	60:1	1500
4.150	4.102	4.016	3.850	3.735	30	50:1	
5.140	5.135	5.068	4.841	4.708	37.5	40:1	
6.916	6.884	6.777	6.486	6.307	50	30:1	
8.336	8.283	8.145	7.801	7.587	60	25:1	
10.47	10.38	10.20	9.774	9.507	75	20:1	
14.02	13.88	13.61	13.06	12.71	100	15:1	
21.12	20.88	20.45	19.64	19.11	150	10:1	
28.22	27.87	27.29	26.22	25.50	200	7.5:1	
42.43	41.87	40.96	39.37	38.30	300	5:1	
56.63	55.86	54.64	52.53	51.10	400	7.5:1	3000
85.04	83.85	81.98	78.84	76.70	600	5:1	

\* Capacity data is shown for pumps with elastomeric diaphragms. Consult factory for performance characteristics of pumps with PTFE diaphragms.

## Required Motor kW

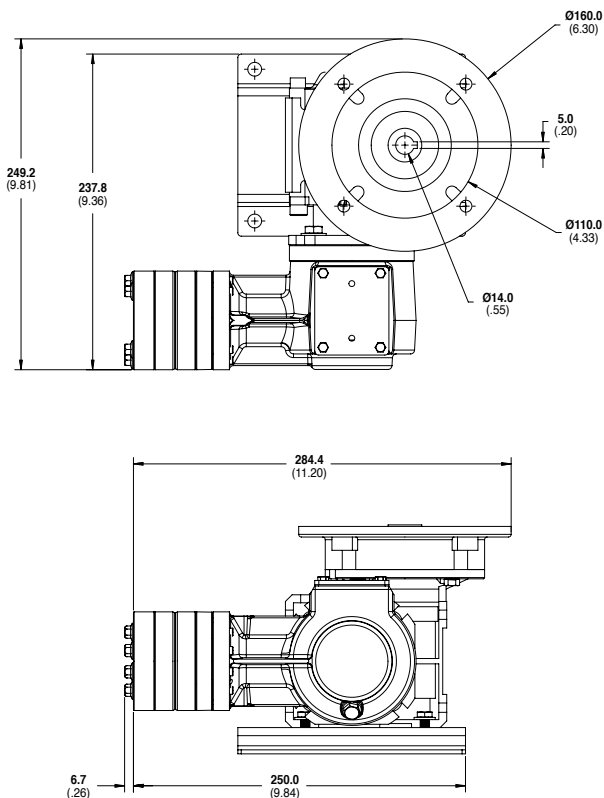
0.18	0.25	0.37	0.55
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## Pump Data

Diaphragms per Liquid End	1
Flow Control	Electronic variable speed drive
Maximum Discharge Pressure	
Metallic Heads:	1500 psi (103 bar)
Non-metallic Heads:	PVDF- 350 psi (24 bar) Polypropylene- 250 psi (17 bar)
Maximum Inlet Pressure	250 psi (17 bar)
Maximum Operating Temperature	
Metallic Heads:	250 °F (121 °C)*
Non-metallic Heads:	140 °F (60 °C)
Inlet Port	1/2 inch NPT or BSPT
Discharge Port	3/8 inch NPT or BSPT
Weight (less motor)	
Metallic Heads:	21.3 lbs (9.7 kg)
Non-metallic Heads:	19.2 lbs (8.7 kg)
Dimensions (less motor)	
Metallic Heads:	9.93" W x 11.58" D x 6.92" H (252.2 mm W x 297.1 mm D x 175.8 mm H)
Non-metallic Heads:	9.93" W x 11.61" D x 6.92" H (252.2 mm W x 294.9 mm D x 175.8 mm H)

\* Consult factory for correct component selection for temperatures from 160 °F (71 °C) to 250 °F (121 °C).

## Representative Drawings mm (Inches)

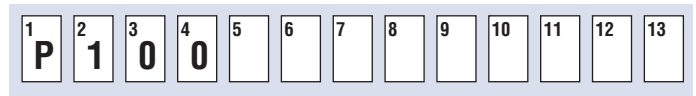


**Metallic Pump Heads**

For accessories, options, and a system installation example, see page 158.

## How to Order

A complete pump order number contains 13 digits based on the specified pump materials listed below.



### Pump Model Size (Digits 1-4)

**P100** For all P100 Pumps (Non Kel-Cell)

### Pump Version (Digit 5)

**N** NPT Ports (NEMA motors only)  
**M** BSPT Ports (IEC motors only)  
**X** ATEX BSPT Ports (IEC motors only)

### Pump Head / Retainer Material (Digit 6)

**B** Brass / Hastelloy C  
**M** PVDF / PVDF  
**P** Polypropylene / Polypropylene  
**S** 316L Stainless Steel / Hastelloy C  
**T** Hastelloy C / Hastelloy C

### Diaphragm & O-ring Material / Oil (Digit 7)<sup>▲</sup>

**A** Aflas / PTFE O-rings (Synthetic oil)  
**E** EPDM (EPDM-compatible oil)  
**X** FKM (Synthetic oil)  
**J** PTFE (Food-contact oil)  
**P** Neoprene (Synthetic oil)  
**T** Buna-N (Synthetic oil)

<sup>▲</sup> See price list for different actuating oils available with these materials.

### Check Valve Material (Digits 8-9)

#### (Valve Spring / Valve Seat / Valve)

**SS** Elgiloy / 316L SST / Nitronic 50  
**TT** Hastelloy C / Hastelloy C / Hastelloy C  
**SC** Elgiloy / Ceramic / Ceramic  
**TC** Hastelloy C / Ceramic / Ceramic

### Gearbox Ratio (Digits 10-12) IEC Motors

**060** 60:1 (63 B5 Motor Frame)  
**050** 50:1 (63 B5 Motor Frame)  
**A40** 40:1 (71 B5 Motor Frame)  
**A30** 30:1 (71 B5 Motor Frame)  
**A25** 25:1 (71 B5 Motor Frame)  
**A20** 20:1 (71 B5 Motor Frame)  
**A15** 15:1 (71 B5 Motor Frame)  
**A10** 10:1 (71 B5 Motor Frame)  
**A07** 7.5:1 (71 B5 Motor Frame)  
**A05** 5:1 (71 B5 Motor Frame)

### Base Plate (Digit 13)

**C** Carbon Steel (Epoxy painted)  
**S** 316L Stainless Steel

# P200 Series

Maximum Flow Rate: 255.4 lph  
 Maximum Pressure: 1000 psi (69 bar) for Metallic Pump Heads  
 350 psi (24 bar) for Non-metallic Pump Heads



P100 with Brass pump head

## Performance Maximum Estimated Flow at Designated Pressure

All Pumps (lph)		Metallic Pump Heads Only (lph)		Pump rpm	Gear Ratio	Motor rpm
7 bar	17 bar	34 bar	69 bar			
10.65	10.48	10.25	9.868	25	60:1	1500
12.81	12.60	12.34	11.91	30	50:1	
16.00	15.82	15.48	14.98	37.5	40:1	
21.32	21.09	20.68	20.04	50	30:1	
25.57	25.31	24.83	24.09	60	25:1	
31.96	31.63	31.07	30.17	75	20:1	
42.59	42.17	41.46	40.29	100	15:1	
63.87	63.25	62.23	60.55	150	10:1	
85.15	84.34	83.01	80.80	200	7.5:1	
127.7	126.5	124.6	121.3	300	5:1	
170.3	168.7	166.1	161.8	400	7.5:1	
255.4	253.0	249.2	242.8	600	5:1	

## Required Motor kW

0.18	0.25	0.37	0.55	0.75
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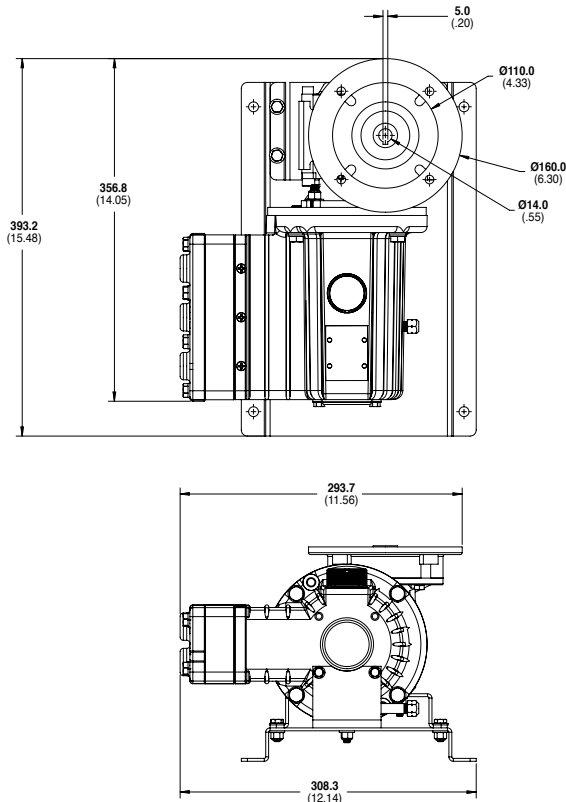


## Pump Data

Diaphragms per Liquid End	3
Flow Control	Electronic variable speed drive
Maximum Discharge Pressure	
Metallic Heads:	1000 psi (69 bar)
Non-metallic Heads:	PVDF- 350 psi (24 bar) Polypropylene- 250 psi (17 bar)
Maximum Inlet Pressure	250 psi (17 bar)
Maximum Operating Temperature	
Metallic Heads:	250 °F (121 °C)*
Non-metallic Heads:	140 °F (60 °C)
Inlet Port	1/2 inch NPT or BSPT
Discharge Port	3/8 inch NPT or BSPT
Weight (less motor)	
Metallic Heads:	41.8 lbs (19.0 kg)
Non-metallic Heads:	32.8 lbs (14.9 kg)
Dimensions (less motor)	
Metallic Heads:	15.59" W x 11.68" D x 8.97" H (396.1 mm W x 296.7 mm D x 227.8 mm H)
Non-metallic Heads:	15.59" W x 12.06" D x 8.97" H (396.1 mm W x 306.3 mm D x 227.8 mm H)

\* Consult factory for correct component selection for temperatures from 160°F (71°C) to 250°F (121°C).

## Representative Drawings mm (Inches)



**Metallic Pump Heads**

For accessories, options, and a system installation example, see page 158.

## How to Order

A complete pump order number contains 13 digits based on the specified pump materials listed below.



### Pump Model Size (Digits 1-4)

**P200** For all P200 Pumps (Non Kel-Cell)

### Pump Version (Digit 5)

**N** NPT Ports (NEMA motors only)  
**M** BSPT Ports (IEC motors only)  
**X** ATEX BSPT Ports (IEC motors only)

### Pump Head / Retainer Material (Digit 6)

**B** Brass / Hastelloy C  
**M** PVDF / PVDF  
**P** Polypropylene / Polypropylene  
**S** 316L Stainless Steel / Hastelloy C  
**T** Hastelloy C / Hastelloy C

### Diaphragm & O-ring Material / Oil (Digit 7)▲

**A** Aflas / PTFE O-rings (Synthetic oil)  
**M** Aflas / PTFE O-rings & FKM drive case elastomers (Mesamoll oil)  
**E** EPDM (EPDM-compatible oil)  
**X** FKM (Synthetic oil)  
**J** PTFE (Food-contact oil)  
**P** Neoprene (Synthetic oil)  
**T** Buna-N (Synthetic oil)

▲ See price list for different actuating oils available with these materials.

### Check Valve Material (Digits 8-9)

#### (Valve Spring / Valve Seat / Valve)

**SS** Elgiloy / 316L SST / Nitronic 50  
**TT** Hastelloy C / Hastelloy C / Hastelloy C  
**SC** Elgiloy / Ceramic / Ceramic  
**TC** Hastelloy C / Ceramic / Ceramic

### Gearbox Ratio (Digits 10-12) IEC Motors

**060** 60:1 (63 B5 Motor Frame)  
**050** 50:1 (63 B5 Motor Frame)  
**040** 40:1 (63 B5 Motor Frame)  
**030** 30:1 (63 B5 Motor Frame)  
**025** 25:1 (63 B5 Motor Frame)  
**020** 20:1 (63 B5 Motor Frame)  
**015** 15:1 (63 B5 Motor Frame)  
**A15** 15:1 (71 B5 Motor Frame)  
**010** 10:1 (63 B5 Motor Frame)  
**A10** 10:1 (71 B5 Motor Frame)  
**B10** 10:1 (80 B5 Motor Frame)  
**007** 7.5:1 (63 B5 Motor Frame)  
**A07** 7.5:1 (71 B5 Motor Frame)  
**B07** 7.5:1 (80 B5 Motor Frame)  
**005** 5:1 (63 B5 Motor Frame)  
**A05** 5:1 (71 B5 Motor Frame)  
**B05** 5:1 (80 B5 Motor Frame)

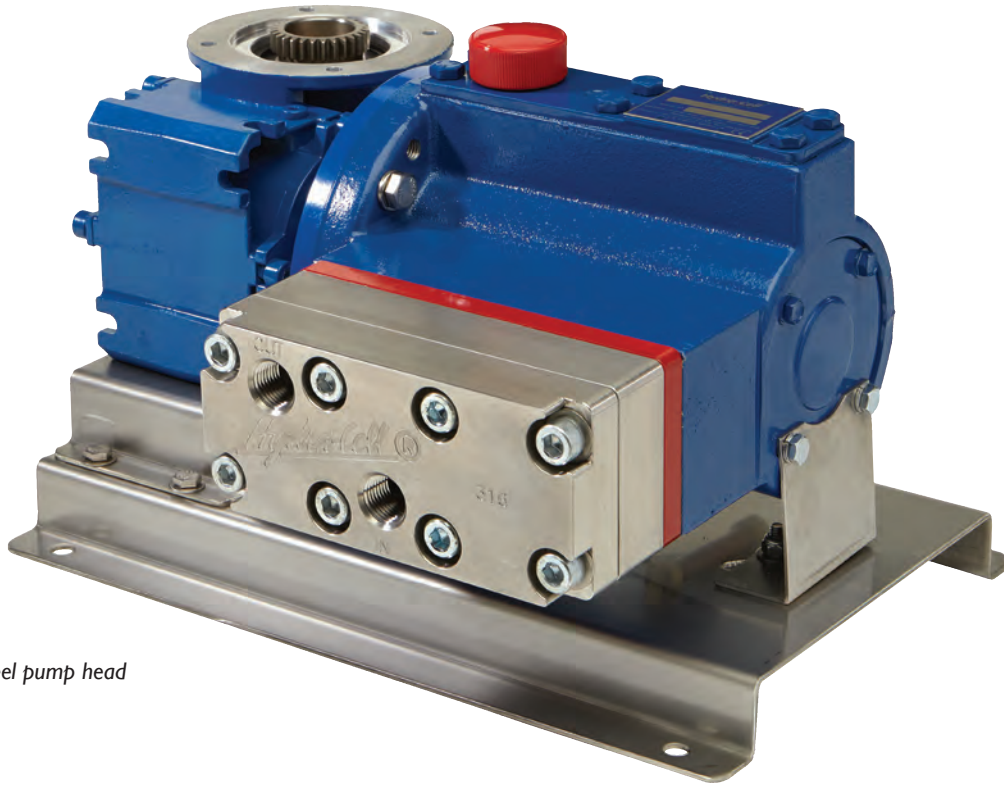
### Base Plate (Digit 13)

**C** Carbon Steel (Epoxy painted)  
**S** 316L Stainless Steel

# P300 Series

Maximum Flow Rate: 256.8 lph

Maximum Pressure: 2500 psi (172 bar) for Metallic Pump Heads



P300 with Stainless Steel pump head

## Performance Maximum Estimated Flow at Designated Pressure

Metallic Pump Heads Only (lph)				Pump rpm	Gear Ratio	Motor rpm
7 bar	34 bar	103 bar	172 bar			
10.16	10.04	9.51	8.648	25	60:1	1500
12.29	12.14	11.53	10.57	30	50:1	
15.58	15.40	14.53	13.47	37.5	40:1	
20.94	20.66	19.54	18.25	50	30:1	
25.23	24.86	23.54	22.07	60	25:1	
31.66	31.17	29.55	27.81	75	20:1	
42.39	41.68	39.56	37.36	100	15:1	
63.83	62.70	59.59	56.47	150	10:1	
85.28	83.72	79.61	75.58	200	7.5:1	
128.2	125.8	119.7	113.8	300	5:1	
171.1	167.8	159.7	152.0	400	7.5:1	3000
256.8	251.9	239.8	228.5	600	5:1	

## Required Motor kW

0.18	0.25	0.37	0.55	0.75	1.1	1.5
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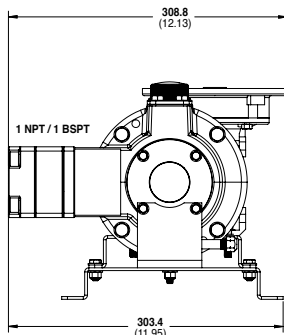
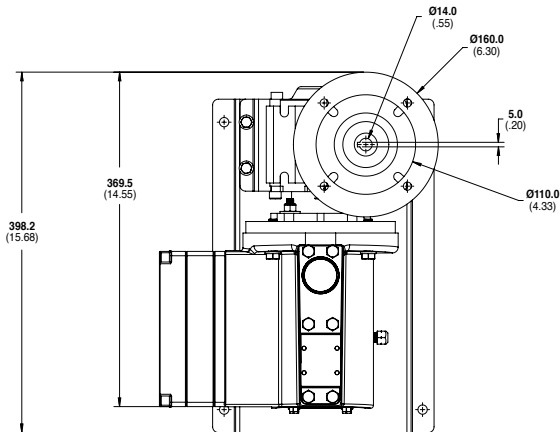
## Pump Data

Diaphragms per Liquid End	3
Flow Control	Electronic variable speed drive
Maximum Discharge Pressure	
Metallic Heads:	2500 psi (172 bar)
Maximum Inlet Pressure	500 psi (34 bar)
Maximum Operating Temperature	
Metallic Heads:	250 °F (121 °C)*
Inlet Port	1/2 inch NPT or BSPT
Discharge Port	1/2 inch NPT or BSPT
Weight (less motor)**	
Metallic Heads:	54.5 lbs (24.7 kg)
Dimensions (less motor)**	
Metallic Heads:	15.79" W x 12.25" D x 9.46" H (401.2 mm W x 311.0 mm D x 240.2 mm H)

\* Consult factory for correct component selection for temperatures from 160°F (71°C) to 250°F (121°C).

\*\* For 63 B5 motor frame only. Consult factory for other motor frame sizes.

## Representative Drawings mm (Inches)

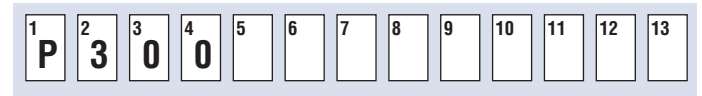


**Metallic Pump Heads**

For accessories, options, and a system installation example, see page 158.

## How to Order

A complete pump order number contains 13 digits based on the specified pump materials listed below.



### Pump Model Size (Digits 1-4)

**P300** For all P300 Pumps (Non Kel-Cell)

### Pump Version (Digit 5)

**N** NPT Ports (NEMA motors only)  
**M** BSPT Ports (IEC motors only)  
**X** ATEX BSPT Ports (IEC motors only)

### Pump Head / Retainer Material (Digit 6)

**B** Brass / Hastelloy C  
**R** 304 Stainless Steel / Hastelloy C  
**S** 316L Stainless Steel / Hastelloy C  
**T** Hastelloy C / Hastelloy C

### Diaphragm & O-ring Material / Oil (Digit 7)<sup>▲</sup>

**E** EPDM (EPDM-compatible oil)  
**X** FKM (Synthetic oil)  
**J** PTFE (Food-contact oil)  
**T** Buna-N (Synthetic oil)

<sup>▲</sup> See price list for different actuating oils available with these materials.

### Check Valve Material (Digits 8-9)

#### (Valve Spring / Valve Seat / Valve)

**SS** Elgiloy / Nitronic 50 / Nitronic 50  
**TT** Hastelloy C / Hastelloy C / Hastelloy C  
**SD** Elgiloy / Tungsten Carbide / Tungsten Carbide  
**TD** Hastelloy C / Tungsten Carbide / Tungsten Carbide

### Gearbox Ratio (Digits 10-12) IEC Motors

**060** 60:1 (63 B5 Motor Frame)  
**050** 50:1 (63 B5 Motor Frame)  
**040** 40:1 (63 B5 Motor Frame)  
**A30** 30:1 (71 B5 Motor Frame)  
**A25** 25:1 (71 B5 Motor Frame)  
**A20** 20:1 (71 B5 Motor Frame)  
**A15** 15:1 (71 B5 Motor Frame)  
**A10** 10:1 (71 B5 Motor Frame)  
**B10** 10:1 (80 B5 Motor Frame)  
**C10** 10:1 (90 B5 Motor Frame)  
**A07** 7.5:1 (71 B5 Motor Frame)  
**B07** 7.5:1 (80 B5 Motor Frame)  
**C07** 7.5:1 (90 B5 Motor Frame)  
**B05** 5:1 (80 B5 Motor Frame)  
**C05** 5:1 (90 B5 Motor Frame)

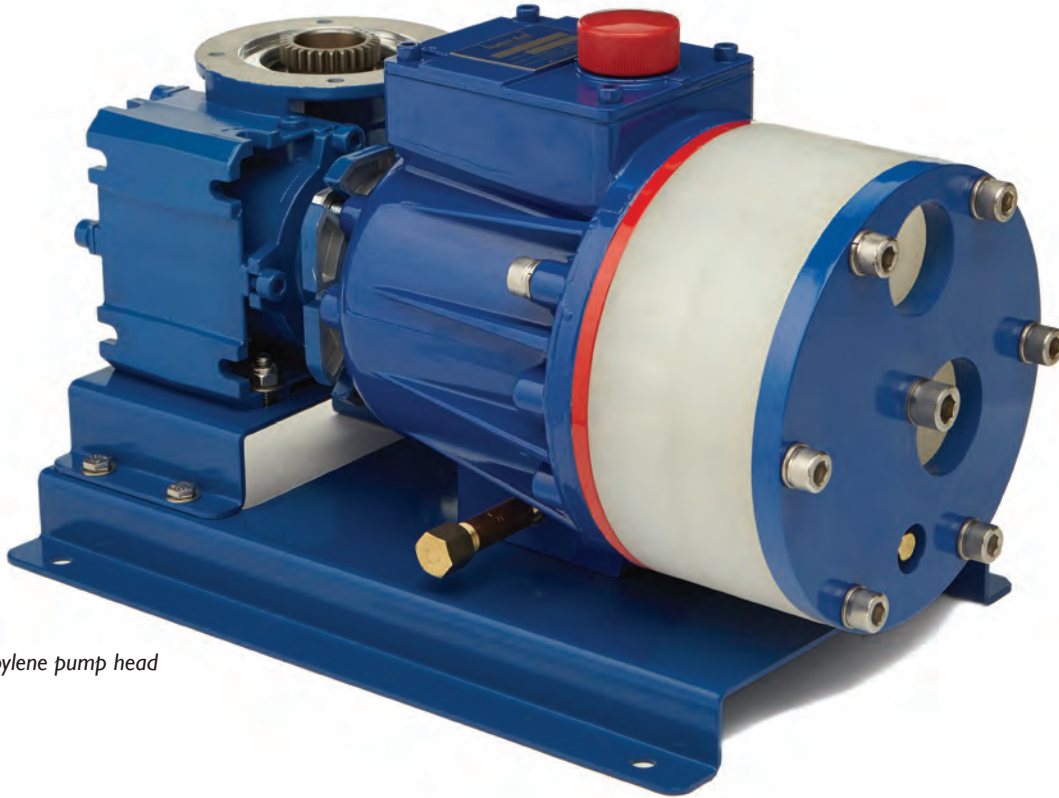
### Base Plate (Digit 13)

**C** Carbon Steel (Epoxy painted)  
**S** 316L Stainless Steel

# P400 Series

Maximum Flow Rate: 765.9 lph

Maximum Pressure: 1000 psi (69 bar) for Metallic Pump Heads  
350 psi (24 bar) for Non-metallic Pump Heads



P400 with Polypropylene pump head

## Performance\* Maximum Estimated Flow at Designated Pressure

All Pumps (lph)		Metallic Pump Heads Only (lph)		Pump rpm	Gear Ratio	Motor rpm
7 bar	17 bar	34 bar	69 bar			
30.40	29.27	26.78	20.391	25	60:1	1500
36.76	35.59	32.97	26.09	30	50:1	
46.25	45.10	42.18	35.36	37.5	40:1	
62.24	60.92	57.72	50.33	50	30:1	
75.04	73.58	70.15	62.31	60	25:1	
94.23	92.56	88.80	80.27	75	20:1	
126.21	124.21	119.87	110.21	100	15:1	
190.19	187.50	182.03	170.09	150	10:1	
254.16	250.79	244.18	229.98	200	7.5:1	
382.1	377.4	368.5	349.7	300	5:1	
510.0	503.9	492.8	469.5	400	7.5:1	3000
765.9	757.1	741.4	709.0	600	5:1	

\* Capacity data is shown for pumps with elastomeric diaphragms. Consult factory for performance characteristics of pumps with PTFE diaphragms.

## Required Motor kW

0.18	0.25	0.37	0.55	0.75	1.1	1.5	2.2
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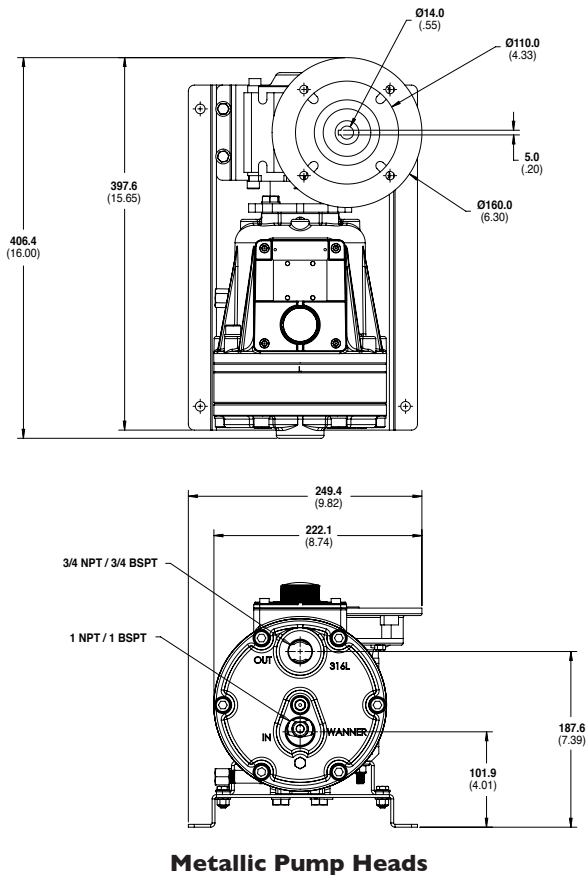
## Pump Data

Diaphragms per Liquid End	3
Flow Control	Electronic variable speed drive
Maximum Discharge Pressure	
Metallic Heads:	1000 psi (69 bar)
Non-metallic Heads:	PVDF- 350 psi (24 bar) Polypropylene- 250 psi (17 bar)
Maximum Inlet Pressure	250 psi (17 bar)
Maximum Operating Temperature	
Metallic Heads:	250 °F (121 °C)*
Non-metallic Heads:	140 °F (60 °C)
Inlet Port	1 inch NPT or BSPT
Discharge Port	3/4 inch NPT or BSPT
Weight (less motor)**	
Metallic Heads:	65.5 lbs (29.7 kg)
Non-metallic Heads:	52.5 lbs (23.8 kg)
Dimensions (less motor)**	
Metallic Heads:	9.94" W x 16.12" D x 10.29" H (252.4 mm W x 409.4 mm D x 261.3 mm H)
Non-metallic Heads:	9.94" W x 17.29" D x 10.29" H (252.4 mm W x 439.2 mm D x 261.3 mm H)

\* Consult factory for correct component selection for temperatures from 160°F (71°C) to 250°F (121°C).

\*\* For 63 B5 motor frame only. Consult factory for other motor frame sizes.

## Representative Drawings mm (Inches)



**Metallic Pump Heads**

For accessories, options, and a system installation example, see page 158.

## How to Order

A complete pump order number contains 13 digits based on the specified pump materials listed below.

1	2	3	4	5	6	7	8	9	10	11	12	13
P	4	0	0									

### Pump Model Size (Digits 1-4)

**P400** For all P400 Pumps (Kel-Cell)

### Pump Version (Digit 5)

**N** NPT or ANSI Ports (NEMA motors only)

**M** BSPT or ANSI Ports (IEC motors only)

**X** ATEX BSPT Ports (IEC motors only)

### Pump Head / Retainer Material (Digit 6)

**B** Brass / Hastelloy C

**C** Cast Iron / Hastelloy C

**M** PVDF / PVDF

**P** Polypropylene / Polypropylene

**R** 316L Stainless Steel (ANSI flange weldment) / Hastelloy C

**S** 316L Stainless Steel (NPT or BSPT) / Hastelloy C

**T** Hastelloy C / Hastelloy C

### Diaphragm & O-ring Material / Oil (Digit 7)▲

**A** Atlas / PTFE O-rings (Synthetic oil)

**E** EPDM (EPDM-compatible oil)

**X** FKM (Synthetic oil)

**J** PTFE (Food-contact oil)

**P** Neoprene (Synthetic oil)

**T** Buna-N (Synthetic oil)

▲ See price list for different actuating oils available with these materials.

### Check Valve Material (Digits 8-9)

#### (Valve Spring / Valve Seat / Valve)

**SS** Elgiloy / 316L SST / Nitronic 50

**TT** Hastelloy C / Hastelloy C / Hastelloy C

**SC** Elgiloy / Ceramic / Ceramic

**TC** Hastelloy C / Ceramic / Ceramic

**SD** Elgiloy / Tungsten Carbide / Tungsten Carbide

**TD** Hastelloy C / Tungsten Carbide / Tungsten Carbide

### Gearbox Ratio (Digits 10-12) IEC Motors

**060** 60:1 (63 B5 Motor Frame)

**050** 50:1 (63 B5 Motor Frame)

**040** 40:1 (63 B5 Motor Frame)

**A30** 30:1 (71 B5 Motor Frame)

**A25** 25:1 (71 B5 Motor Frame)

**A20** 20:1 (71 B5 Motor Frame)

**A15** 15:1 (71 B5 Motor Frame)

**A10** 10:1 (71 B5 Motor Frame)

**B10** 10:1 (80 B5 Motor Frame)

**C10** 10:1 (90 B5 Motor Frame)

**A07** 7.5:1 (71 B5 Motor Frame)

**B07** 7.5:1 (80 B5 Motor Frame)

**C07** 7.5:1 (90 B5 Motor Frame)

**B05** 5:1 (80 B5 Motor Frame)

**C05** 5:1 (90 B5 Motor Frame)

### Base Plate (Digit 13)

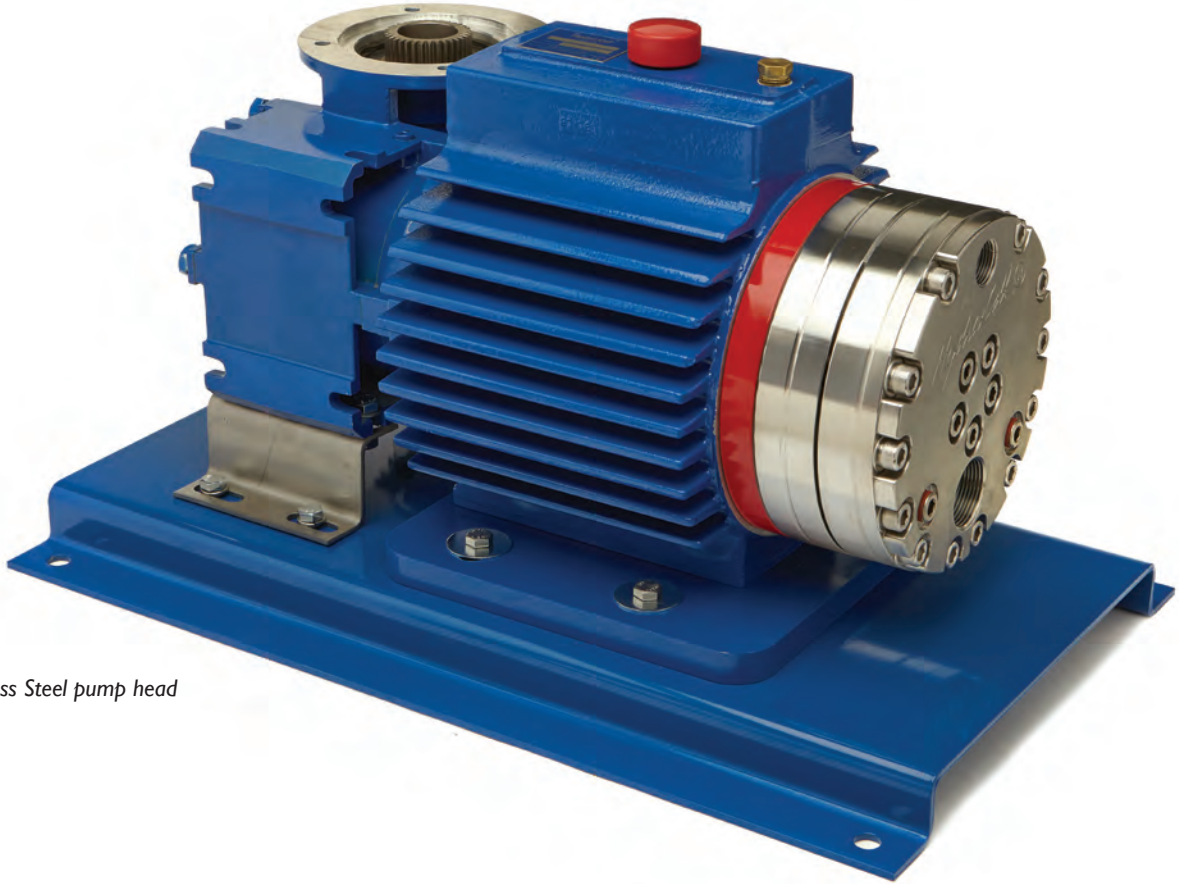
**C** Carbon Steel (Epoxy painted)

**S** 316L Stainless Steel

# P500 Series

Maximum Flow Rate: 1343.5 lph

Maximum Pressure: 2500 psi (172 bar) for Metallic Pump Heads



P500 with Stainless Steel pump head

## Performance Maximum Estimated Flow at Designated Pressure

Metallic Pump Heads Only (lph)				Pump rpm	Gear Ratio	Motor rpm
7 bar	34 bar	103 bar	172 bar			
55.14	53.50	49.66	45.641	25	60:1	1500
66.16	64.44	60.28	55.85	30	50:1	
83.25	81.16	76.32	71.50	37.5	40:1	
111.26	108.75	102.92	97.16	50	30:1	
133.66	130.82	124.19	117.69	60	25:1	
167.27	163.93	156.11	148.49	75	20:1	
223.28	219.11	209.29	199.81	100	15:1	
335.31	329.47	315.67	302.45	150	10:1	
447.33	439.83	422.05	405.10	200	7.5:1	
671.4	660.6	634.8	610.4	300	5:1	
895.4	881.3	847.6	815.7	400	7.5:1	3000
1343.5	1322.7	1273.1	1226.3	600	5:1	

## Required Motor kW

0.37	0.55	0.75	1.1	1.5	2.2
3	3.7	4	5.5	7.5	11

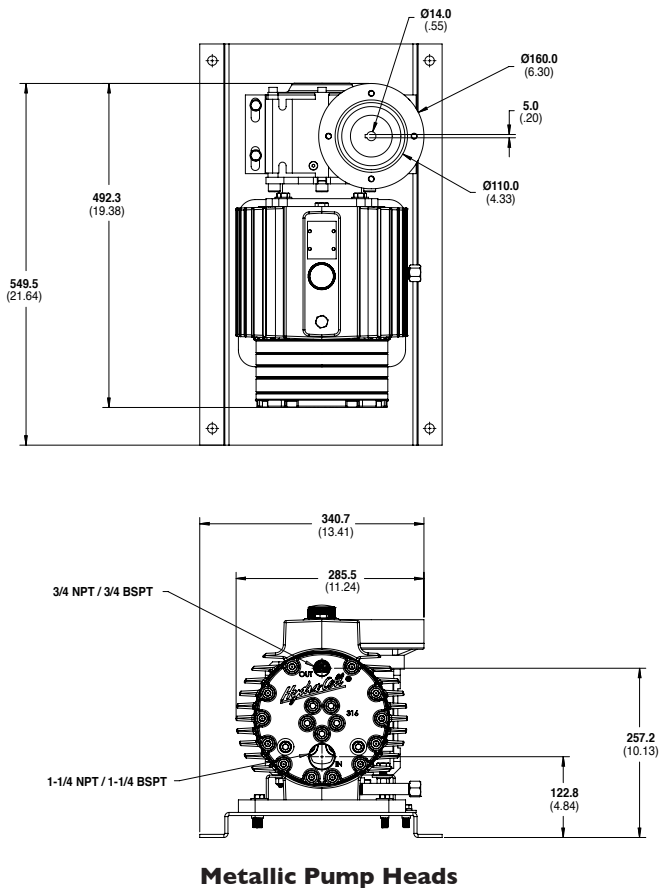
## Pump Data

Diaphragms per Liquid End	5
Flow Control	Electronic variable speed drive
Maximum Discharge Pressure	
Metallic Heads:	2500 psi (172 bar)
Maximum Inlet Pressure	500 psi (34 bar)
Maximum Operating Temperature	
Metallic Heads:	250 °F (121 °C)*
Inlet Port	1-1/4 inch NPT or BSPT
Discharge Port	3/4 inch NPT or BSPT
Weight (less motor)**	
Metallic Heads:	192.1 lbs (88.5 kg)
Dimensions (less motor)**	
Metallic Heads:	14.5" W x 24.0" D x 13.9" H (368.3 mm W x 609.6 mm D x 353.1 mm H)

\* Consult factory for correct component selection for temperatures from 160°F (71°C) to 250°F (121°C).

\*\* For 71 B5 motor frame only. Consult factory for other motor frame sizes.

## Representative Drawings mm (Inches)



For accessories, options, and a system installation example, see page 158.

## How to Order

A complete pump order number contains 13 digits based on the specified pump materials listed below.

1	2	3	4	5	6	7	8	9	10	11	12	13
P	5	0	0									

### Pump Model Size (Digits 1-4)

**P500** For all P500 Pumps (Non Kel-Cell)

### Pump Version (Digit 5)

**N** NPT Ports (NEMA motors only)  
**M** BSPT Ports (IEC motors only)  
**X** ATEX BSPT Ports (IEC motors only)

### Pump Head / Retainer Material (Digit 6)

**B** Brass / Hastelloy C  
**S** 316L Stainless Steel / Hastelloy C  
**T** Hastelloy C / Hastelloy C

### Diaphragm & O-ring Material / Oil (Digit 7)<sup>▲</sup>

**A** Aflas / PTFE O-rings (Synthetic oil)  
**X** FKM (Synthetic oil)  
**T** Buna-N (Synthetic oil)

<sup>▲</sup> See price list for different actuating oils available with these materials.

### Check Valve Material (Digits 8-9)

#### (Valve Spring / Valve Seat / Valve)

**SS** Elgiloy / Nitronic 50 / Nitronic 50  
**TT** Hastelloy C / Hastelloy C / Hastelloy C  
**SD** Elgiloy / Tungsten Carbide / Tungsten Carbide  
**TD** Hastelloy C / Tungsten Carbide / Tungsten Carbide

### Gearbox Ratio (Digits 10-12) IEC Motors

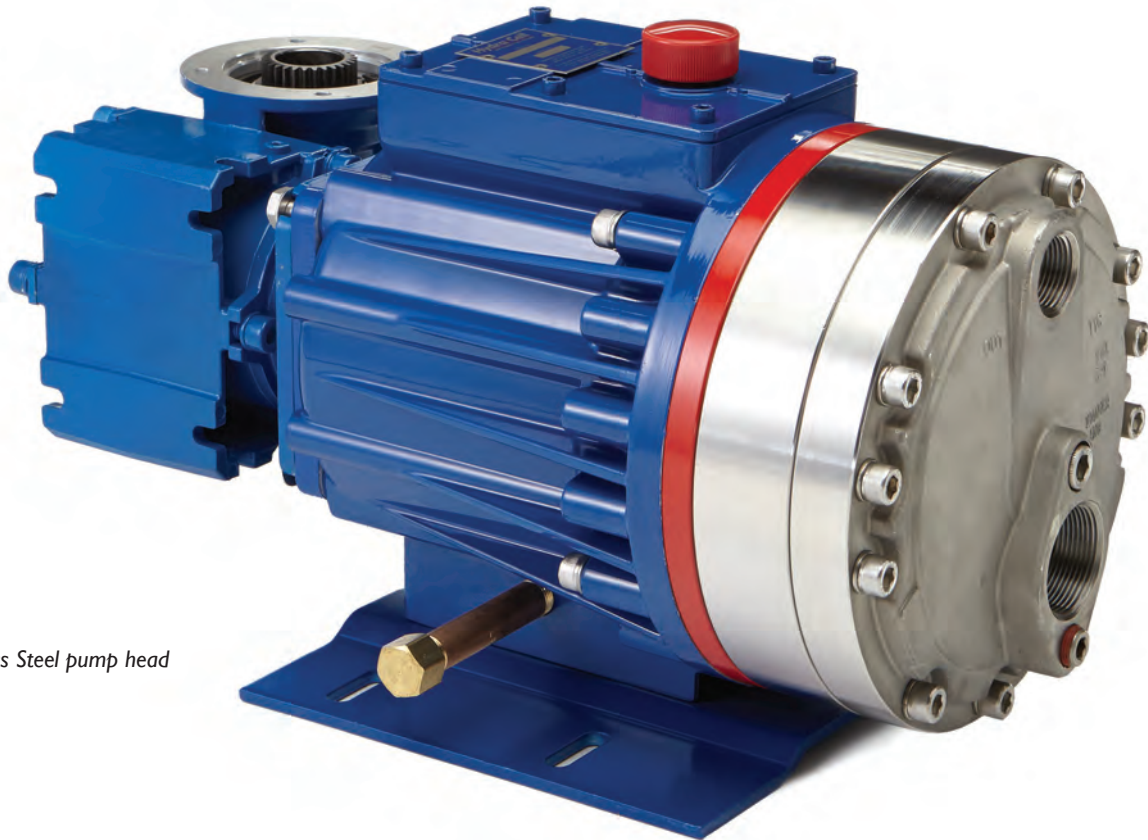
<b>A60</b>	60:1	(71 B5 Motor Frame)
<b>B60</b>	60:1	(80 B5 Motor Frame)
<b>A50</b>	50:1	(71 B5 Motor Frame)
<b>B50</b>	50:1	(80 B5 Motor Frame)
<b>A40</b>	40:1	(71 B5 Motor Frame)
<b>B40</b>	40:1	(80 B5 Motor Frame)
<b>A30</b>	30:1	(71 B5 Motor Frame)
<b>B30</b>	30:1	(80 B5 Motor Frame)
<b>B25</b>	25:1	(80 B5 Motor Frame)
<b>C25</b>	25:1	(90 B5 Motor Frame)
<b>B20</b>	20:1	(80 B5 Motor Frame)
<b>C20</b>	20:1	(90 B5 Motor Frame)
<b>B15</b>	15:1	(80 B5 Motor Frame)
<b>C15</b>	15:1	(90 B5 Motor Frame)
<b>B10</b>	10:1	(80 B5 Motor Frame)
<b>C10</b>	10:1	(90 B5 Motor Frame)
<b>D10</b>	10:1	(110/112 B14 Motor Frame)
<b>B07</b>	7.5:1	(80 B5 Motor Frame)
<b>C07</b>	7.5:1	(90 B5 Motor Frame)
<b>D07</b>	7.5:1	(110/112 B14 Motor Frame)
<b>B05</b>	5:1	(80 B5 Motor Frame)
<b>C05</b>	5:1	(90 B5 Motor Frame)
<b>D05</b>	5:1	(110/112 B14 Motor Frame)

### Base Plate (Digit 13)

**H** Carbon Steel (Epoxy painted) size 75

# P600 Series

Maximum Flow Rate: 2808 lph  
 Maximum Pressure: 1000 psi (69 bar) for Metallic Pump Heads  
 350 psi (24 bar) for Non-metallic Pump Heads



P600 with Stainless Steel pump head

## Performance\* Maximum Estimated Flow at Designated Pressure

All Pumps (lph)		Metallic Pump Heads Only (lph)		Pump rpm	Gear Ratio	Motor rpm
7 bar	17 bar	34 bar	69 bar			
115.1	113.9	111.1	104.9	25	60:1	1500
138.5	137.2	134.0	127.3	30	50:1	
173.5	172.0	168.4	161.4	37.5	40:1	
232.0	230.2	225.8	216.9	50	30:1	
278.9	276.7	271.7	261.2	60	25:1	
349.2	346.5	340.5	327.8	75	20:1	
466.3	462.7	455.2	438.6	100	15:1	
700.5	695.3	684.7	660.4	150	10:1	
934.7	927.9	914.1	882.2	200	7.5:1	
1403	1393	1373	1326	300	5:1	
1872	1858	1832	1769	400	7.5:1	3000
2808	2788	2750	2656	600	5:1	

\* Capacity data is shown for pumps with elastomeric diaphragms. Consult factory for performance characteristics of pumps with PTFE diaphragms.

## Required Motor kW

0.37	0.55	0.75	1.1	1.5	2.2
3	3.7	4	5.5	7.5	



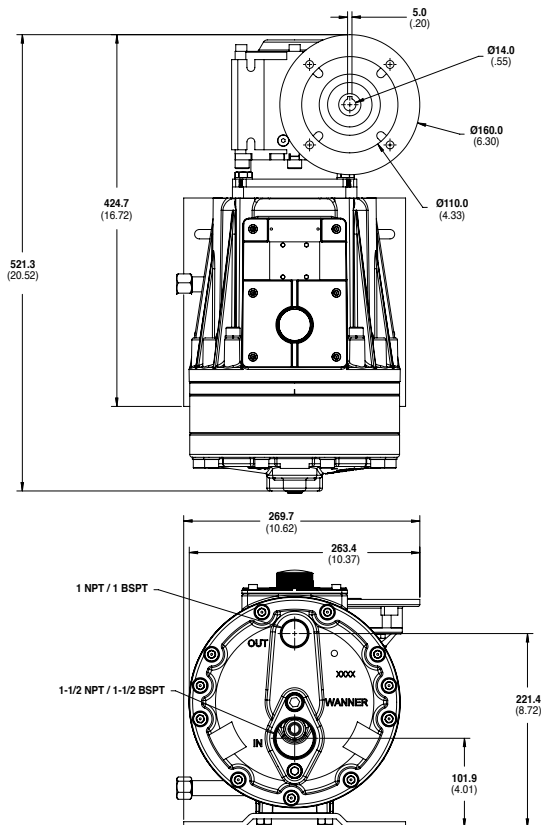
## Pump Data

Diaphragms per Liquid End	3
Flow Control	Electronic variable speed drive
Maximum Discharge Pressure	
Metallic Heads:	1000 psi (69 bar)
Non-metallic Heads:	PVDF- 350 psi (24 bar) Polypropylene- 250 psi (17 bar)
Maximum Inlet Pressure	250 psi (17 bar)
Maximum Operating Temperature	
Metallic Heads:	250 °F (121 °C)*
Non-metallic Heads:	140 °F (60 °C)
Inlet Port	1-1/2 inch NPT or BSPT
Discharge Port	1 inch NPT or BSPT
Weight (less motor)**	
Metallic Heads:	146.0 lbs (66.2 kg)
Non-metallic Heads:	111.0 lbs (50.3 kg)
Dimensions (less motor)**	
Metallic Heads:	10.74" W x 20.64" D x 11.57" H (272.7 mm W x 524.3 mm D x 293.9 mm H)
Non-metallic Heads:	10.74" W x 21.56" D x 11.57" H (272.7 mm W x 547.6 mm D x 293.9 mm H)

\* Consult factory for correct component selection for temperatures from 160 °F (71 °C) to 250 °F (121 °C).

\*\* For 71 B5 motor frame only. Consult factory for other motor frame sizes.

## Representative Drawings mm (Inches)



**Metallic Pump Heads**

For accessories, options, and a system installation example, see page 158.

## How to Order

A complete pump order number contains 13 digits based on the specified pump materials listed below.

1	2	3	4	5	6	7	8	9	10	11	12	13
P	6	0	0									

### Pump Model Size (Digits 1-4)

**P600** For all P600 Pumps (Kel-Cell)

### Pump Version (Digit 5)

**N** NPT or ANSI Ports (NEMA motors only)  
**M** BSPT or ANSI Ports (IEC motors only)  
**X** ATEX BSPT Ports (IEC motors only)

### Pump Head / Retainer Material (Digit 6)

**B** Brass / Hastelloy C  
**C** Cast Iron / Hastelloy C  
**M** PVDF / PVDF  
**P** Polypropylene / Polypropylene  
**R** 316L Stainless Steel (ANSI flange weldment) / Hastelloy C  
**S** 316L Stainless Steel (NPT or BSPT) / Hastelloy C  
**T** Hastelloy C / Hastelloy C

### Diaphragm & O-ring Material / Oil (Digit 7)▲

**A** Atlas / PTFE O-rings (Synthetic oil)  
**E** EPDM (EPDM-compatible oil)  
**X** FKM (Synthetic oil)  
**J** PTFE (Food-contact oil)  
**P** Neoprene (Synthetic oil)  
**T** Buna-N (Synthetic oil)

▲ See price list for different actuating oils available with these materials.

### Check Valve Material (Digits 8-9)

(Valve Spring / Valve Seat / Valve)

**SS** Elgiloy / Nitronic 50 / Nitronic 50  
**TT** Hastelloy C / Hastelloy C / Hastelloy C  
**SC** Elgiloy / Ceramic / Ceramic  
**TC** Hastelloy C / Ceramic / Ceramic

### Gearbox Ratio (Digits 10-12) IEC Motors

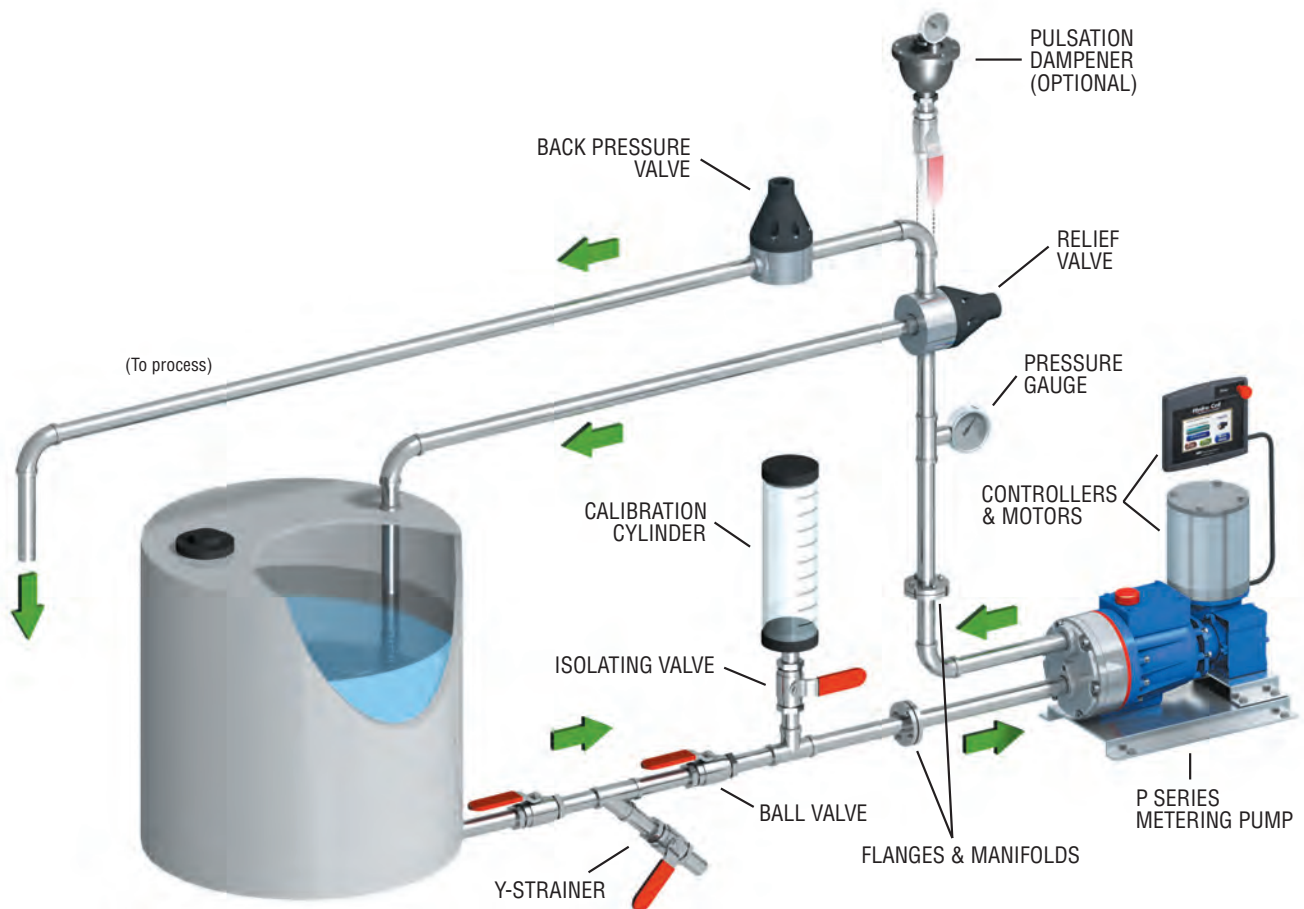
<b>A60</b>	60:1	(71 B5 Motor Frame)
<b>B60</b>	60:1	(80 B5 Motor Frame)
<b>A50</b>	50:1	(71 B5 Motor Frame)
<b>B50</b>	50:1	(80 B5 Motor Frame)
<b>A40</b>	40:1	(71 B5 Motor Frame)
<b>B40</b>	40:1	(80 B5 Motor Frame)
<b>A30</b>	30:1	(71 B5 Motor Frame)
<b>B30</b>	30:1	(80 B5 Motor Frame)
<b>B25</b>	25:1	(80 B5 Motor Frame)
<b>C25</b>	25:1	(90 B5 Motor Frame)
<b>B20</b>	20:1	(80 B5 Motor Frame)
<b>C20</b>	20:1	(90 B5 Motor Frame)
<b>B15</b>	15:1	(80 B5 Motor Frame)
<b>C15</b>	15:1	(90 B5 Motor Frame)
<b>B10</b>	10:1	(80 B5 Motor Frame)
<b>C10</b>	10:1	(90 B5 Motor Frame)
<b>D10</b>	10:1	(110/112 B14 Motor Frame)
<b>B07</b>	7.5:1	(80 B5 Motor Frame)
<b>C07</b>	7.5:1	(90 B5 Motor Frame)
<b>D07</b>	7.5:1	(110/112 B14 Motor Frame)
<b>B05</b>	5:1	(80 B5 Motor Frame)
<b>C05</b>	5:1	(90 B5 Motor Frame)
<b>D05</b>	5:1	(110/112 B14 Motor Frame)

### Base Plate (Digit 13)

**C** Carbon Steel (Epoxy painted) for A & B reducers, size 63  
**H** Carbon Steel (Epoxy painted) for C & D reducers, size 75

# Hydra-Cell® P Series Accessories and Options

## Metering System Installation Example



Hydra-Cell metering pumps are just one facet of a complete Hydra-Cell “Metering Solutions” system. We can furnish all components in your pumping system, individually tailored to your specific processing needs.

- Calibration cylinders
- Back pressure valves
- Pressure relief valves
- Pulsation dampeners
- Motors and motor adapters
- Motor controllers
- Variable frequency drives (VFD)
- Diaphragm materials
- Liquid end and check valve materials
- Gearbox ratios
- Manifolds and flanges
- Strainers
- Suction accumulators
- Actuating oils
- Witnessed and non-witnessed testing
- Drawing packages
- OEM paint and nameplate customization

See the Accessories section of this catalog, beginning on page 92 for more detailed information about the selection process and specific part numbers.

# Hydra-Cell® Bare Shaft Pumps for Metering



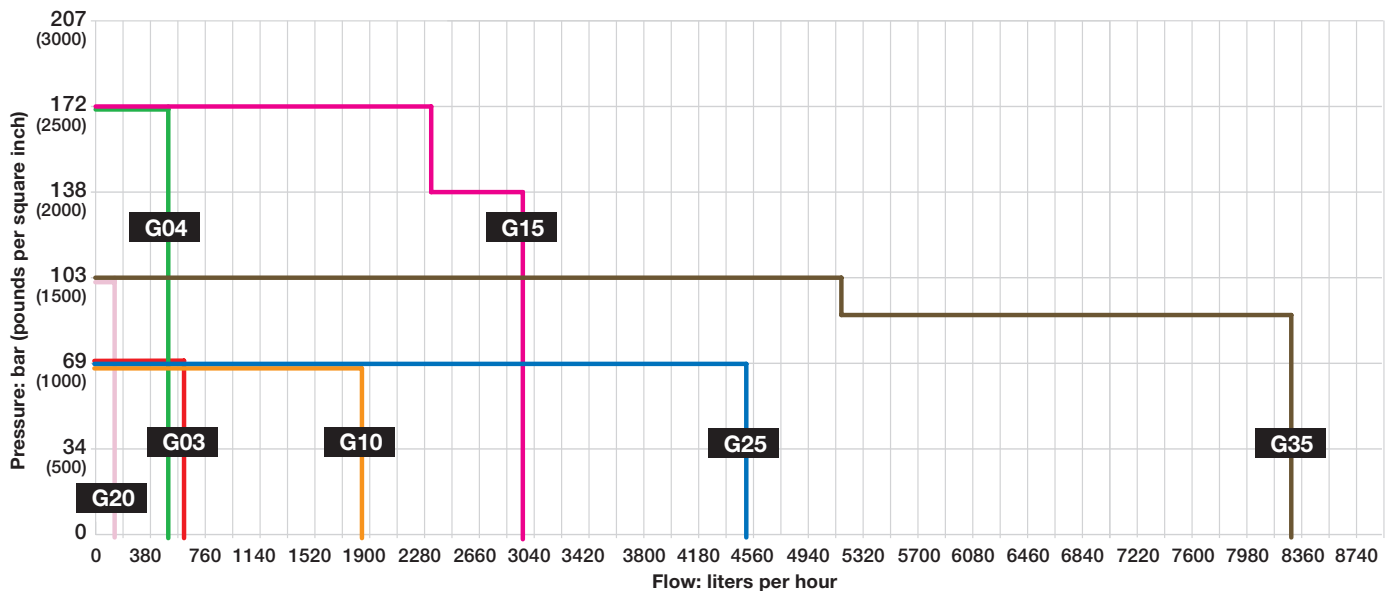
Note: Bare shaft pumps for metering must use X-cams and operate at speeds not exceeding those shown in the table.

In certain less critical metering and injecting applications listed below, Hydra-Cell Seal-less Pumps (without gearbox reducers) provide an alternative to Hydra-Cell Metering Solutions Pumps.

They meet API 675 performance standards for accuracy, linearity, and repeatability - a must for metering pumps.

- Flow capacities required exceed those of Hydra-Cell Metering Solutions pumps (see page 141).
- Flow rates for the application do not need to be as precise as what Hydra-Cell Metering Solutions pumps deliver.
- Space limitations or application parameters dictate the use of a direct drive or belt drive.
- Special components designed to resist chemical attack, such as epoxy-coated manifold plates and bases are not needed.
- Metering requirements can be met (including API 675) without using a gearbox reducer (or other components) thus lowering acquisition cost.

## Capacities and Ratings



Model <sup>1</sup>	Maximum Capacity lph	Maximum Discharge Pressure psi (bar)		Maximum Operating Temperature F (C) <sup>3</sup>		Maximum Inlet Pressure psi (bar)	Rated rpm for Metering
		Non-metallic <sup>2</sup>	Metallic	Non-metallic	Metallic		
<b>G20</b>	138.5	350 (24)	1500 (103)	140° (60°)	250° (121°)	250 (17)	1050
<b>G03</b>	588.6	350 (24)	1000 (69)	140° (60°)	250° (121°)	250 (17)	1440
<b>G04</b>	556.1	N/A	2500 (172)	N/A	250° (121°)	500 (34)	1440
<b>G10</b>	1831.4	350 (24)	1000 (69)	140° (60°)	250° (121°)	250 (17)	1440
<b>G15</b>	2298.5	N/A	2500 (172)	N/A	250° (121°)	500 (34)	1150
<b>G15</b>	2943.5	N/A	2000 (138)	N/A	250° (121°)	500 (34)	1440
<b>G25</b>	4531.1	350 (24)	1000 (69)	140° (60°)	250° (121°)	250 (17)	1050
<b>G35</b>	5246.6	N/A	1500 (103)	N/A	250° (121°)	250 (17)	700
<b>G35</b>	8275.3	N/A	1200 (83)	N/A	250° (121°)	500 (34)	1050

<sup>1</sup> Ratings are for X-cam design.

<sup>2</sup> 350 psi (24 bar) maximum with PVDF liquid end; 250 psi (17 bar) maximum with Polypropylene liquid end.

<sup>3</sup> Consult factory for correct component selection for temperatures from 160°F (71°C) to 250°F (121°C).

# Hydra-Cell® MT8 Triplex Metering Pump

This groundbreaking triplex metering pump is the latest addition to the Hydra-Cell Metering Solutions product line.

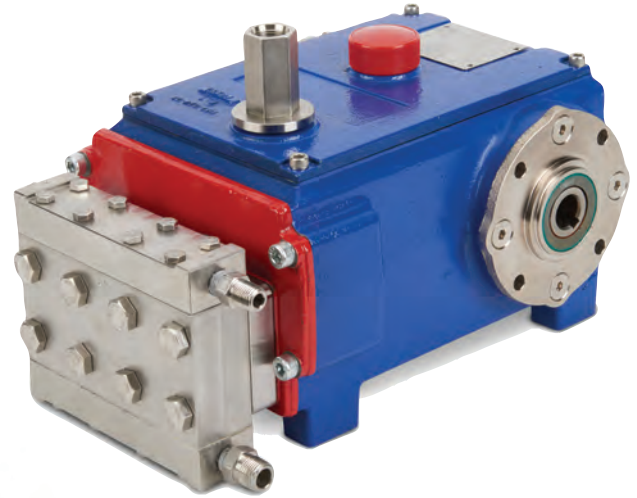
The MT8 meets or exceeds API 675 performance standards for Steady-State Accuracy ( $\pm 1\%$ ), Linearity ( $\pm 3\%$ ) and Repeatability ( $\pm 3\%$ ).

Hydraulically-balanced and actuated, the pump features an internal relief valve for added safety and cartridge check valves for ease of maintenance.

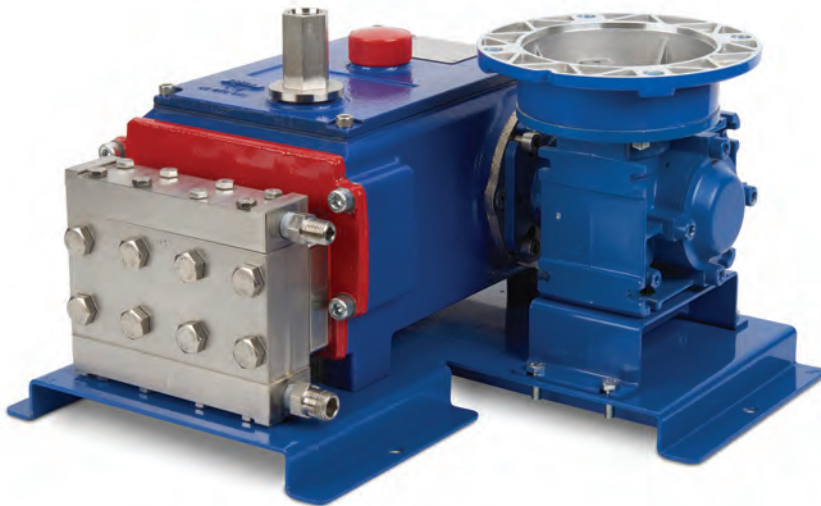
The MT8 is currently available with 316 SS liquid end and check valves plus PTFE diaphragms.

Minimum Flow Rate: 0.06 gph (0.227 lph)  
Maximum Flow Rate 8.00 gph (30.28 lph)  
Maximum Pressure: 3500 psi (241 bar) for Metallic Pump Heads

**Hydra-Cell**<sup>®</sup>  
METERING SOLUTIONS™



*The MT8 features a built-in pressure relief valve to protect the pump.*



*MT8 with gearbox reducer.*



*MT8 assembly including a Planetroll controller.*



# Hydra-Cell® S Series Solenoid Metering Pumps

The S Series pumps provide an economical choice for chemical injection in metering applications.

Solenoid driven, the S pumps feature a wide discharge-volume range, extensive choice of liquid end materials, various control functions, and a wide voltage range.

Materials of construction choices and versatile design options result in pumps perfected for specific applications including general chemicals, high-pressure boiler, high-viscosity fluids, outgassing and more.

Flow Rate	SM Series Models	SP/ST/SA Series Models
30 ml/min	SM030	SP/ST/SA-030
60 ml/min	SM060	SP/ST/SA-060
100 ml/min	SM100	SP/ST/SA-100
200 ml/min	N/A	SP/ST/SA-200
<b>With Relief Valve</b>		
30 ml/min	SM03R	SP/ST/SA-03R
60 ml/min	SM06R	SP/ST/SA-06R
100 ml/min	SM10R	SP/ST/SA-10R



SM030CAS manual control with stroke speed dial.



SP060HVS digital with pulse-in control.



ST03RPES digital with pulse-in control and timer.



SA03RPES digital with pulse-in and analog-in.



Spare parts kits to help extend service life.



Solution tanks for S Series pumps are available in various sizes and capacities.

# Hydra-Cell® Frequently Asked Questions

## What type of oil should be used with Hydra-Cell pumps?

The pump lubricant in Hydra-Cell pumps performs two functions: (1) it provides flooded oil lubrication to the bearings; (2) it provides hydraulically-balanced displacement to the diaphragms.

Critical to the hydraulic system within each piston, the oil must flow smoothly under high pressures.

Hydra-Oil is available in a variety of standard-duty motor oils, synthetic, EPDM-compatible, and food-grade lubricants to meet these requirements.

## Which way do I rotate the shaft when setting up the drive for my Hydra-Cell pump?

### **Either way.**

The smooth, positive displacement delivery of a Hydra-Cell pump can be achieved when rotating the shaft in either direction.

## What happens if the Hydra-Cell pump runs dry?

### **“Nothing.”**

The unique, seal-less design of Hydra-Cell means that the pump does not require lubrication from the process fluid. In the event of your tank or product source running dry, and air being pulled through the pump, no damage will occur. As fluid again is available, the Hydra-Cell pump will resume pumping.

## What is the maximum particle size that can pass through a Hydra-Cell pump?

### **Up to 800 microns depending on pump model.**

Round particles up to 200 microns can pass through Hydra-Cell models G20, G03, and G04. 500-micron particles can pass through models G10, G12, and G15/G17. 800-micron particles can pass through the G25, G35, and G66 model pumps. Critical to the successful pumping of particulates is ensuring that all particles are fully suspended in the fluid to avoid any settling of the solids. Key factors include fluid velocity (pump speed) and particle mass. With intermittent duty, care must be taken to avoid excessive settling in the inlet and discharge plumbing.

## What is the maximum hardness number on the Mohs Mineral Hardness Scale that Hydra-Cell pumps can handle?

### **9 Mohs.**

## Is a pressure relief valve necessary when using the Hydra-Cell pump?

### **Yes.**

The positive displacement performance of the Hydra-Cell pump requires that each application has a pressure regulating valve in the discharge line to allow fluid to divert in the event that excessive pressure builds in the system. Hydra-Cell C Series valves provide this protection for your high-pressure system.

## How long can I expect the diaphragms to last? **Indefinitely.**

When installed properly and no adverse stresses are applied to our elastomeric diaphragms (e.g. excessive vacuum, foreign matter, etc.) the hydraulically-balanced diaphragm will not be a wear component.

Due to their poor elastomeric memory, PTFE diaphragms will eventually wear. Maximum life can be achieved with reduced stroke cams and/or by limiting pump speed.

## Are Hydra-Cell pumps easy to service?

### **Yes.**

Hydra-Cell pumps are engineered to be easy and inexpensive to service. With regular oil changes, most wear is restricted to the check valve components in the fluid end pump head. All wear items are available in repair kits that include service and parts manuals to allow for fast and easy repairs in the field.

All repair manuals are available on our website ([www.Hydra-Cell.com](http://www.Hydra-Cell.com)). Online videos are also available – contact us for details.

## What determines an application duty cycle?

A continuous-duty cycle is typically defined as a pump running more than 8 hours per day, 5-to-7 days a week. Continuous applications running at or near maximum pressure may benefit and achieve a longer pump life by sizing the application with the next larger pump model.

Running a pump for shorter periods (intermittent-duty cycle) than a continuous-duty cycle under high temperatures or heavy loads may also affect pump duty selection. In addition, for excessive heat applications (greater than 180°F/82°C) using an oil cooler is recommended.

## How can the right flow be produced for a pump application?

Hydra-Cell pumps use positive displacement performance to produce a steady, dependable flow at pressures from 50 to 2500 psi (3.4 to 172 bar). The output of the pump is entirely dependent on the shaft rpm. Once the required flow rate is known, there are many ways to drive the pump. Shaft coupling directly to a motor with a motor adapter is the most popular drive arrangement.

All our pump models utilize different output crankshafts or cams to produce different flow rates at common electric motor speeds (e.g., 1150, 1450, 1750 rpm with 60 Hz power, etc.). In addition, pumps and motors can be mounted side-by-side and pulley driven with V-belts or cog style belts (see calculating pulley size formula on page 164). Other drive configurations include hydraulic motors, air motors, gas engines, PTO or any other means to drive the shaft.

# Hydra-Cell® Design Considerations

## Technical Pump Selection

To properly specify a pump to meet your requirements, please contact your local Hydra-Cell distributor for assistance in calculating the appropriate pump for your application. Your distributor will need to know the fluid being pumped and its characteristics (e.g. temperature range, viscosity, specific gravity, size/percentage of any abrasives) flow rates and inlet/discharge pressure ratings, as well as NPSHa, inlet pipe diameter and length, and supply voltage.

## Chemical Compatibility

Chemical compatibility of the pump materials of construction with the pumped fluid is a critical design consideration. Factors that must be reviewed as part of chemical compatibility include:

- Temperature
- Concentration
- Presence of other chemicals

## Temperature

Temperature factors that must be reviewed as part of this evaluation include:

- Stability of fluid
- Fluid end components
- Hydraulic end lubricity
- Vapor pressure

## Inlet Pressure

Inlet pressure to the pump is determined by the design of the pump system: flooded (gravity fed); suction lift; or pressure fed. Do not exceed vacuum and pressure limits as designated in the pump IOM Manual.

## NPSH (Net Positive Suction Head)

Two NPSH values are involved in pump selection: NPSHr (required head) and NPSHa (available head). NPSHa must be greater than NPSHr. If not, the pressure in the pump inlet will be lower than the vapor pressure of the fluid, and cavitation will occur. Use the following calculations as a guideline only.

## Calculating NPSHa

Use the following formula to calculate NPSHa:

$$\text{NPSHa} = P_t + H_z - H_f - H_a - P_{vp}$$

where:

- P<sub>t</sub> = Atmospheric pressure in feet or meters of water. (Use Atmospheric Pressure chart in next column.)
- H<sub>z</sub> = Vertical distance from the liquid surface to the pump centerline in feet or meters. (If liquid is below the pump centerline, H<sub>z</sub> is a negative value.)
- H<sub>f</sub> = Friction losses in suction piping. (Consult a reference for this calculation such as Cameron Hydraulic Data or similar.)
- H<sub>a</sub> = Acceleration head at pump suction. (See Calculating Acceleration Head formula in next column.)
- P<sub>vp</sub> = Absolute vapor pressure of liquid at pumping temperature.

**Note:** Be sure to use consistent units, either all feet or all meters.

## Atmospheric Pressure at Various Altitudes

Altitude		Pressure	
Feet	Meters	Ft. of H <sub>2</sub> O	M of H <sub>2</sub> O
0	0	33.9	10.3
500	152.4	33.3	10.1
1000	304.8	32.8	10.0
1500	457.2	32.1	9.8
2000	609.6	31.5	9.6
5000	1524.0	28.2	8.6

## Calculating Acceleration Head (Ha)

Use the following formula to calculate Ha losses. Subtract this result from the NPSHa and compare the result to the NPSHr of the appropriate Hydra-Cell pump (NPSHr curves in pump specification section).

$$H_a = \frac{L \times V \times N \times C}{K \times G}$$

where:

- H<sub>a</sub> = Acceleration head (in feet or meters of liquid).
- L = Actual length of suction line (feet or meters) – not equivalent length.
- V = Velocity of liquid in suction line (ft./sec or m/sec)  
For imperial units: I.D. in inches  
[V = gpm × (0.408 ÷ pipe I.D.<sup>2</sup>)]  
For metric units: I.D. in mm  
[V = lpm × (21.221 ÷ pipe I.D.<sup>2</sup>)]
- N = rpm of crank shaft.
- C = Constant determined by type of pump/Hydra-Cell: (consult your Hydra-Cell Installation & Service Manual).
- K = Constant of compensate for compressibility of the fluid – use:  
1.4 for de-aerated or hot fluids  
1.5 for most liquids  
2.5 for hydrocarbons with high compressibility
- G = Gravitational constant:  
Imperial: 32.2 ft./sec<sup>2</sup>  
Metric: 9.81 m/sec<sup>2</sup>

## Minimizing Acceleration Head

- Keep inlet lines less than 6 ft. (1.8 m) long
- Use appropriate size I.D. inlet hose
- Use flexible hose (low-pressure hose, non-collapsing) for inlet lines
- Minimize fittings (elbows, valves, tees, etc.)
- Use suction stabilizer on the inlet

# Hydra-Cell® Installation Guidelines

## General Installation

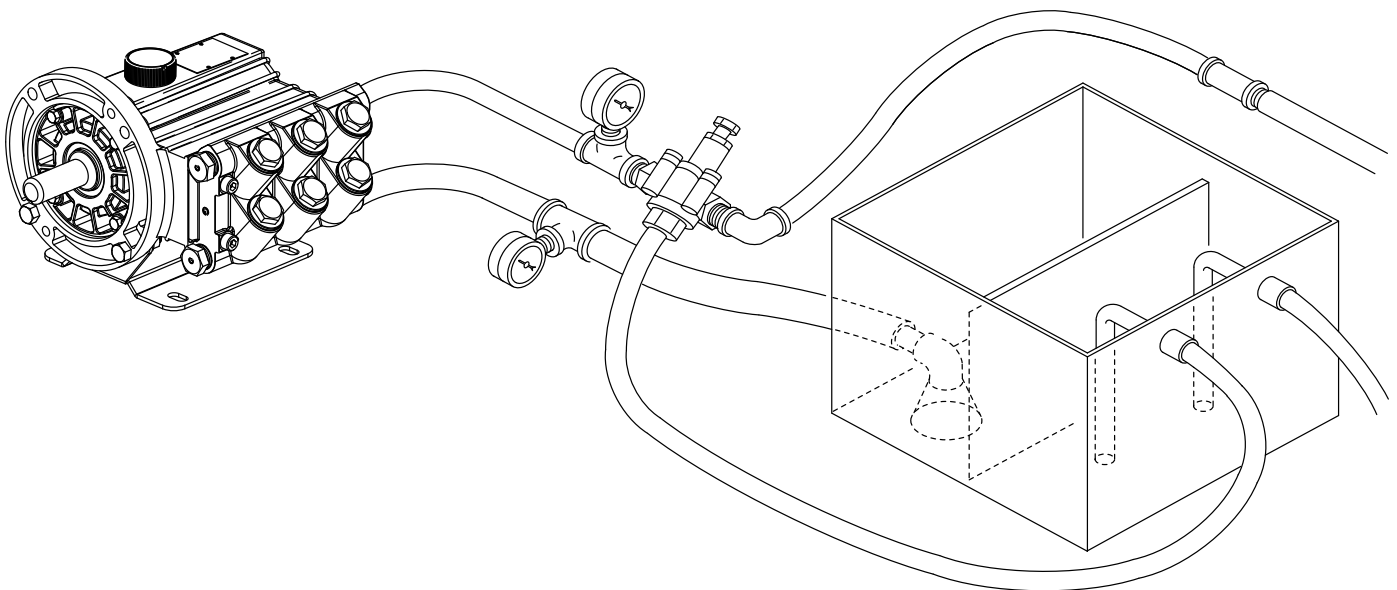
1. Read and follow all instructions and safety warnings in the Hydra-Cell IOM Manual.
2. Do not exceed the manufacturer's recommended maximum rpm or pressure.
3. Follow all codes and regulations regarding installation and operation of the pumping system.
4. For safety and easier servicing, provide adequate work space around the pump. Allow room for checking the oil level, changing the oil, and removing the valve plate and manifold.
5. To prevent vibration, mount the pump and motor securely to a rigid, level base.
6. Be sure the inlet system provides NPSHa that exceeds the sum of NPSHr of the pump, all friction losses and acceleration head.
7. Do not exceed the manufacturer's recommended maximum inlet pressure. Install an inlet pressure regulator if necessary.
8. On a belt-drive system, align the belts and pulleys accurately, and follow the manufacturer's specifications for belt tension.
9. On a direct-drive system, align shafts properly.
10. Install adequate safety guards on all belts and couplings.
11. Install drains in all low points of the system to allow draining in freezing conditions.

## Supply Tank Guidelines

1. Use a supply tank that is large enough to provide time for any entrapped air in the fluid to escape.
2. Isolate the pump and motor stand from the supply tank and support them separately.
3. Where possible, install a separate inlet line from the supply tank to each pump. Alternatively, target 1 ft/sec (0.3 m/sec) manifold velocity.
4. Install the inlet and bypass lines so that they empty into the supply tank below the lowest water level, on the opposite side of the baffle from the pump inlet line.
5. If a line strainer is used in the system, install it in the inlet line to the supply tank.
6. Install a completely-submerged baffle plate in the supply tank to separate the incoming and outgoing liquid so as to reduce aeration and turbulence.
7. Install a vortex breaker in the supply tank over the outlet port to the pump.
8. Place a cover on the supply tank to prevent foreign objects from falling into it.

## Calculating Pulley Size

$$\frac{\text{motor pulley OD}}{\text{pump rpm}} = \frac{\text{pump pulley OD}}{\text{motor rpm}}$$





# Hydra-Cell® Installation Guidelines

## Inlet Piping Guidelines

1. Size the suction line so that the velocity will not exceed 1 to 3 ft./sec (0.3 to 0.91 m/sec).  
For imperial units: ID in inches  
[ $V = \text{gpm} \times (0.408 \div \text{pipe I.D.}^2)$ ]  
For metric units: I.D. in mm  
[ $V = \text{lpm} \times (21.221 \div \text{pipe I.D.}^2)$ ]  
Multiple pump installations require 1 ft./sec (0.3 m/sec).
2. Keep the suction line as short and straight as possible, without any obstructions (e.g., valves, elbows, tees) within 10 pipe diameters of the pump inlet.
3. Use flexible, non-collapsible suction hose and/or expansion joints to absorb vibrations, expansions and contractions.
4. If possible, keep suction line level. Have no high points to collect vapor unless these high points are vented. Install drain cocks at any low points of the suction line to permit draining in freezing conditions.
5. Provide for permanent or temporary installation of a vacuum gauge to monitor the inlet suction.
6. It is recommended not to supply more than one pump from the same inlet line.
7. To reduce turbulence and resistance, do not use 90° elbows. If turns are necessary in the suction line, use 45° elbows (within 10 pipe diameters of the pump inlet) or arrange sweeping curves in the inlet hose.
8. If a block valve is used, be sure it is full-opening so that the flow to the pump is not restricted. The opening should be at least the same diameter as the inlet plumbing I.D.
9. It is recommended that a line strainer or filter not be used in the suction line unless regular maintenance is assured. If used, it should have a free-flow area at least three times the free-flow area of the inlet.
10. Install piping supports where necessary to relieve strain on the inlet line and to minimize vibration.

## Discharge Line Guidelines

1. Size the discharge line so that the velocity will not exceed 8 to 10 ft./sec (2.4 to 3.0 m/sec).
2. Use flexible hose between the pump and hard piping to absorb vibrations, expansions or contractions.
3. Install a pressure gauge between the pump and the pressure regulator, and as close as possible to the pump outlet.
4. Install a pressure regulator, unloader valve, or another safety relief valve in the discharge line.
5. Never install a shut-off valve in the discharge line between the pump and the regulator, or in the bypass line.

## Pressure Regulator (Relief Valve) Guidelines

1. Size the pressure regulator valve so that when fully open, it will be large enough to relieve the full capacity of the pump without excessive over-pressurizing of the system.
2. Locate the valve as close to the pump as possible and ahead of any other valves.
3. Adjust the pressure regulating valve to no more than 10% over the maximum working pressure of the system. Do not exceed the manufacturer's pressure rating for the pump and/or regulator.

# Hydra-Cell® Materials of Construction Reference

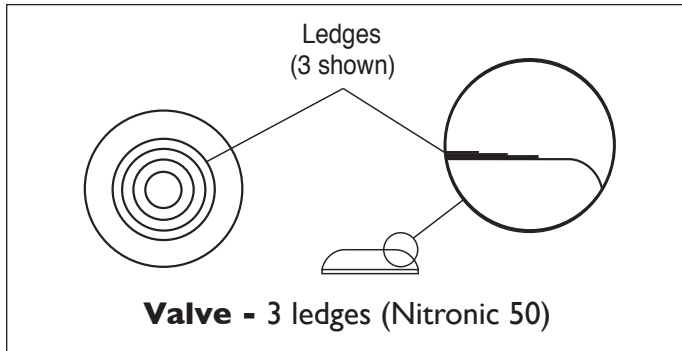
## Identifying Metallic Components

Since it is often difficult to distinguish between metallic materials used, identification marks have been added to several machined metallic components of Hydra-Cell pumps and valves.

### Valve (Pumps)

Identified by 0.003-inch (0.08mm) ledges (or no ledges) on one face.

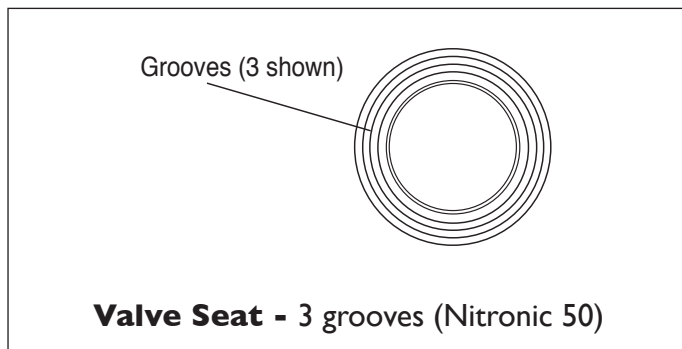
Nitronic 50	3 ledges
17-4 SST	2 ledges
316L SST	1 ledge
Hastelloy C	No ledges



### Valve Seat (Pumps)

Identified by circular V-shaped grooves (or no grooves) on one face.

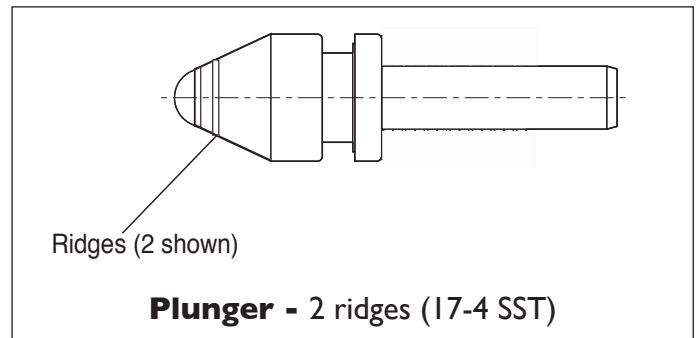
Nitronic 50	3 grooves
17-4 SST	2 grooves
316L SST	1 groove
Hastelloy C	No groove



### Plunger (C22/C23/C24 Valves)

Identified by ridges (or no ridges) around the tapered end.

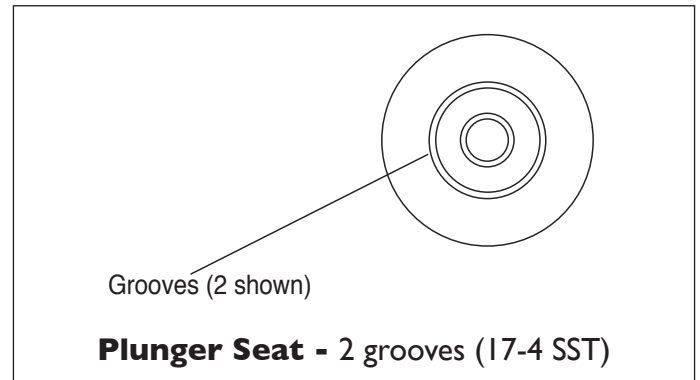
17-4 SST	2 ridges
316L SST	1 ridge
Hastelloy C	No ridges



### Plunger Seat (C22/C23/C24 Valves)

Identified by circular V-shaped grooves (or no grooves) on one face.

17-4 SST	2 grooves
316L SST	1 groove
Hastelloy C	No groove



# Hydra-Cell® Materials of Construction Reference

## Celcon Valve Spring Retainers

Also known as Polyoxymethylene, Celcon is a thermoplastic characterized by high strength, hardness, and rigidity. It is a highly abrasion-resistant and heat-resistant material with a low coefficient of friction.

## Elgiloy Valve Springs

A Cobalt-Nickel spring alloy, Elgiloy is highly recommended to reduce valve spring problems as it tested and proved to exceed Stainless Steel for many applications.

<b>Corrosion Resistance:</b>	Far superior to Stainless Steel
<b>Greater Spring Efficiency:</b>	Increased power with decreased size
<b>Fatigue Resistance:</b>	Operates significantly longer without breaking
<b>Set Resistance:</b>	Maintains constant reactive force
<b>Temperature Resistance:</b>	Maintains spring characteristics up to 600°F (316°C)

## Nitronic 50 Valve Seats and Valves

Nitronic 50 is an austenitic Stainless Steel that has greater corrosion resistance than 316, 316L, 317, and 317L Stainless Steel. It has very good mechanical properties at both elevated and sub-zero temperatures and a yield strength of three-times to four-times greater than 316 Stainless Steel.

## Diaphragm Start-up Temperatures and Material Markings

The back side of diaphragms for Hydra-Cell pumps have a letter marking to identify the material from which the diaphragm is made. (There may be additional markings, such as those to indicate mold numbers.)

Diaphragm Material	Pump Start-up Temperature Range	Fluid Temperature <sup>1</sup>	Marking
Atlas	100 to 250°F (37.8 to 121.1°C)	80°F (26.7°C)	A
Buna-N	30 to 230°F (-1.1 to 110°C)	15°F (-9.4°C)	NP <sup>2</sup>
Neoprene	50 to 120°F (10 to 48.9°C)	15°F (-9.4°C)	NE
EPDM	50 to 212°F (10 to 100°C)	15°F (-9.4°C)	EP
FKM	40 to 250°F (4.4 to 121.1°C)	15°F (-9.4°C)	V
PTFE	60 to 200°F (15.6 to 93.3°C)	40°F (4.4°C)	<sup>3</sup>

<sup>1</sup> Fluid temperature after pump is warmed to minimum start-up temperature.

<sup>2</sup> Buna-N diaphragms for T100 Medium Pressure pumps use H instead of NP.

<sup>3</sup> PTFE diaphragms are constructed with a light-blue PTFE material laminated onto a black rubber backing and do not have identification markings.

## Valve Retainer Temperatures and Material Markings

Non-metallic valve spring retainers used in Hydra-Cell pumps are color-coded to identify the material from which the retainer is made.

Valve Retainer Material	Fluid Temperature	Marking
Celcon (Polyacetal)	15 to 160°F (-9.4 to 71.1°C)	Black
PVDF	15 to 160°F (-9.4 to 71.1°C)	White
Nylon (Zytel)	15 to 160°F (-9.4 to 71.1°C)	Blue
Polypropylene	15 to 160°F (-9.4 to 71.1°C)	Red
Metal	15 to 250°F (-9.4 to 121.1°C)	

For hydraulic oil temperatures above 180°F (82.2°C) use a hydraulic end cooler.

All data based on water.

# Hydra-Cell® Glossary of Terms

**Absolute Pressure (PSIA):** The total force per unit area exerted by a fluid. It is the sum of Atmospheric Pressure and Gauge Pressure.

**Accuracy:** The degree of precision, usually expressed in terms of error, as a percentage of the specified value, or as a percentage of a range. (See separate definition for Steady-state Accuracy, per API 675 Standard, on the following page.)

**API 674 Standard:** This standard covers the minimum requirements for reciprocating positive displacement pumps for service in the petroleum, chemical, and gas industries. Both direct-acting and power-frame types are included. There are no test requirements defined within API 674 Standard for Steady-state Accuracy, Flow Repeatability, or Linearity.

**API 675 Standard:** This standard covers the minimum requirements for controlled volume positive displacement pumps for service in the petroleum, chemical, and gas industries. Both packed-plunger and diaphragm types are included. Diaphragm pumps that use direct mechanical actuation are excluded. Hydra-Cell pumps meet and exceed the performance test requirements of API 675 Standard for Steady-state Accuracy, Flow Repeatability, and Linearity (as defined in section 4.3.3); however, they do not meet all design requirements defined in section 2 of the standard.

## Atmospheric Pressure:

The force exerted on a unit area by the weight of the atmosphere; the higher the elevation above sea level, the lower the atmospheric pressure,  $P_{atm}$ . (See graph on right.)

**Cavitation:** Process in which small bubbles are formed and implode violently; occurs instantaneously when  $NPSH_a < NPSH_r$ .

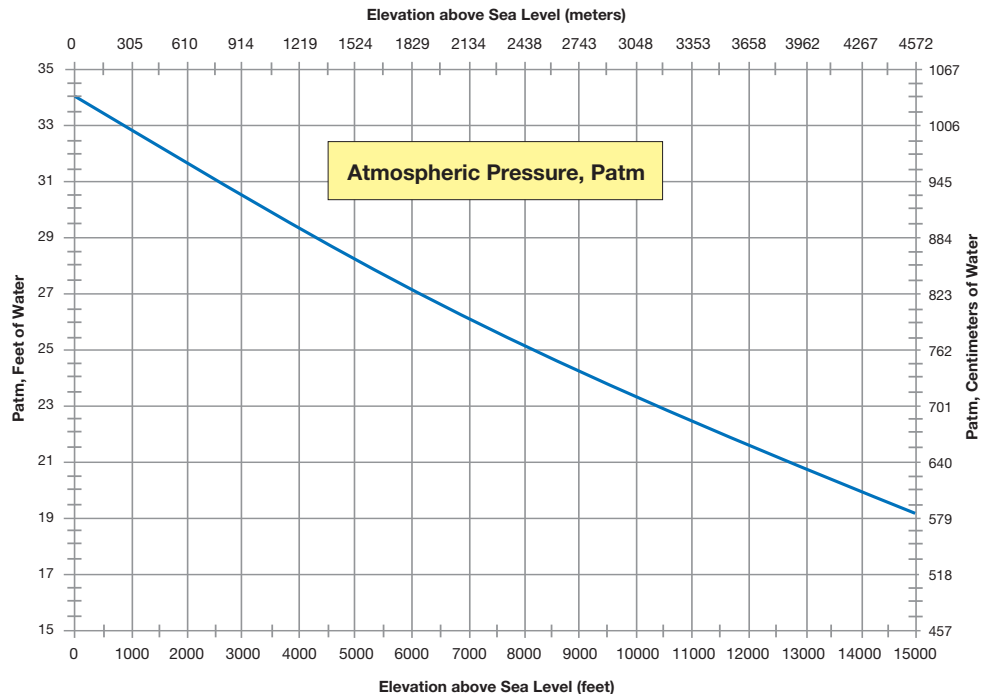
**Fluids:** Include liquids, gases, and mixtures of liquids, solids and gases. In this catalog, the terms fluid and liquid are both used to mean a pure liquid or a liquid mixed with gases or solids that act essentially like a liquid in pumping applications.

**Fluid Slip:** Commonly used to describe the migration of liquid around the internal moving parts of a pump. It is the volumetric difference between physical component displacement and liquid throughput of a pump system.

**Fluid Slip Loss:** Refers to the liquid that passes through the clearance space, ( $\sim .00005'' / .00127\text{mm}$ ) between the piston and the cylinder wall. The clearance between the piston and cylinder wall must be optimized for the liquid being pumped in order to minimize the loss due to fluid slip.

**Head:** A measure of pressure expressed in feet of head for centrifugal pumps; indicates the height of a column of water being moved by the pump (without friction losses).

**Metering Linearity:** The degree to which performance or response approaches the condition of being linear; the maximum deviation from the ideal straight line that can be drawn through plotted calibration test points describing how flow varies with capacity setting. It is expressed as percent ( $\pm$ ) of the Rated Capacity of the pump. API 675 Standard stipulates that Linearity must remain within  $\pm 3\%$ . Linearity of  $\pm 3\%$  or better can be achieved with Hydra-Cell pumps; it is a function of rated speed, Turndown Ratio, and system operating temperature and pressure ranges.





# Hydra-Cell® Glossary of Terms

**Metering Repeatability:** Describes the reproducibility of pump flow rate under a given set of conditions when the capacity setting is varied and then returned to the set point being tested; expressed as a percent ( $\pm$ ) of rated capacity. API 675 Standard stipulates that repeatability must remain within  $\pm 3\%$ . Flow Repeatability of  $\pm 3\%$  or better can be achieved with Hydra-Cell pumps; it is a function of rated speed, turndown ratio, and system operating temperature and pressure ranges.

**Metering Steady-state Accuracy:** Flow variation expressed as a percentage of mean delivered flow under fixed system conditions; applies over the Turndown Ratio. API 675 Standard stipulates that Steady-state Accuracy must remain within  $\pm 1\%$ . Steady-state Accuracy of  $\pm 1\%$  for Hydra-Cell P Series metering pumps reflects continuous run, injection-mode metering.

See pages 144 and 145 for graphs depicting Hydra-Cell performance pertaining to API 675 Standard for Accuracy, Linearity, and Repeatability.

## Net Positive Suction Head Available (NPSHa):

The total suction head (in feet or meters absolute) present at the pump suction connection, less the vapor pressure of the pumped liquid (in feet or meters absolute). NPSHa is a function of the system in which the pump operates everything on the suction side of the pump up to the suction port. The formula below is commonly used to determine system NPSHa.

$$\text{NPSHa} = P_t + H_z - H_f - H_a - P_{vp}$$

$P_t$ : Atmospheric pressure

$H_z$ : Vertical distance from surface liquid to pump centerline (if liquid is below pump centerline, then  $H_z$  is negative)

$H_f$ : Friction loss in suction pumping

$H_a$ : Acceleration head at pump suction

$P_{vp}$ : Absolute vapor pressure of liquid at pumping temperature

*Note: It is important to correct for the specific gravity of the liquid and to convert all terms to units of “feet absolute” or “meters absolute” when using this formula.*

**Net Positive Suction Head Required (NPSHr):** The positive pressure (in feet or meters absolute) required at the pump suction port to overcome pressure losses that occur as the fluid travels from the suction port to the point(s) inside the pump where the pressure starts to increase. NPSHr is

a function of the pump design, size (capacity), and operating speed. It is measured at the suction port of the pump and typically provided by the pump manufacturer in the form of a curve or set of curves.

*Note: Testing in water is standard practice; therefore, NPSHr data is generally provided in units of “feet of water” or “meters of water.” This must be taken into consideration and converted to “feet of pumped liquid” or “meters of pumped liquid” when comparing to the calculated value of NPSHa.*

**Prime:** Charge of liquid required to begin pumping action when the liquid source is lower than the pump; held in pump by a foot valve on the intake line or by a valve or chamber within the pump.

**Rated Capacity:** The quantity of fluid actually delivered per unit of time at the maximum operating speed. This quantity can be expressed in units of volume or mass; it includes liquid and any dissolved or entrained gases or solids, and is based on suction conditions.

**Specific Gravity:** The ratio of the weight of a given volume of liquid to pure water. Pumping heavy liquids (specific gravity greater than 1.0) will require more drive horsepower.

**Static Discharge Head:** Maximum vertical distance (in feet or meters) from pump to point of discharge with no flow.

**Total Head:** Sum of discharge head, suction lift, and friction loss.

**Turndown Ratio:** The Rated Capacity divided by the minimum capacity that can be obtained while maintaining specified Steady-state Accuracy, Flow Repeatability, and Linearity. A 10:1 Turndown Ratio capability is industry standard for metering applications. Use of sophisticated motor controls allows speed Turndown Ratios of 1000:1 and greater if required. The mechanical response of the metering pump over these extremely high Turndown Ratios may or may not meet API 675 Standard testing requirements.

**Viscosity:** The resistance of a fluid to flow when subjected to shear stress (the “thickness” of a liquid). Most liquids decrease in viscosity and flow more easily as they get warmer. Absolute viscosity is measured in centipoises. Kinematic viscosity includes the influence of the specific gravity of the fluid and is measured in centistokes.

# Wanner Engineering - Additional Product Lines

## Non-metallic ANSI Centrifugal Pumps Featuring Solid PVDF Pump Heads

**STAN-COR**



*Designed to handle difficult process fluids, Stan-Cor pumps offer total dynamic head to 350 feet and flow rate capacities to 700 gpm (2650 l/min).*

### Designed to Handle Dirty, Abrasive, Corrosive, and Reclaim Process Fluids

Manufactured in the USA by Wanner Engineering, Stan-Cor pumps provide superior handling of difficult process fluids in a cost-effective, rugged, and durable design. They operate with a smooth, full-curve performance and offer exclusive design advantages compared to other centrifugal pumps.

- Solid PVDF pump head for chemical compatibility and excellent abrasion resistance
- Handles high operating temperatures

- Concentric casing design for better flow patterns than other centrifugal pumps - less turbulence, longer seal life, and reduced shaft deflection
- Compact design features including heavy-duty drive shaft, adjustable bearing supports, and large-capacity oil bath ensure low maintenance as well as durable performance for the toughest fluid applications
- Back pull-out design for easy servicing
- Handles solid sizes up to 9/16" maximum

**For more information, contact Wanner Engineering or visit [www.StanCorPump.com](http://www.StanCorPump.com)**

# Wanner Engineering - Additional Product Lines

## Peristaltic Pumps that Isolate the Fluid Being Pumped

# VECTOR



Ten 2000 & 3000 Series Vector pump models offer maximum flow rates from 0.3 gpm (1.1 l/min) to 211 gpm (798.7 l/min) and discharge pressures from 30 psig (2.1 bar) to 116 psig (8 bar) depending on pump model.

Seven 4000 Series Vector pump models offer maximum flow rates from 0.79 gpm (3.0 l/min) to 154.1 gpm (583.3 l/min) and discharge pressures of 110 psig (7.6 bar) to 218 psig (15 bar) depending on pump model.

## Designed to Handle High-viscosity Fluids, Aggressive and Corrosive Fluids, and High-purity Solutions

Available from Wanner Engineering, Vector pumps can handle pasty, pulp, or thick fluids commonly found in industrial processing applications. They will reliably start, stop, and continuously pump such fluids at a wide range of pressures and flows. The pumping action is powerful, but will not break up delicate emulsions or cause excessive frothing of dissolved gases.

- Dry pump cavity
- Self-priming operation
- Runs dry without damage to the pump
- Complete isolation of the fluid being pumped from contact with mechanical parts for the fluid transport system
- Heavy-duty roller bearings
- Wide range of pump configurations and flow rates
- No cups, packing, or dynamic seals to leak or replace or come in direct contact with the pumped fluid
- Low maintenance
- Reversible flow

For more information, contact Wanner Engineering or visit [www.VectorPump.com](http://www.VectorPump.com)

# Wanner Engineering - Additional Product Lines

## Industries Served and Fluids Pumped

### Building & Construction

Adhesives, dyes, grout, iron oxide pigments, paints, plaster, pottery, tile

### Ceramic & Glass

Clay slips, dyes, enamels, glazes, grinding water, grout, quartz paste, silicon

### Chemical Processing

Abrasive mixes, acids, adhesive resins, caustic soda, detergent paste, latex, pigments, polyester mixes, polymers

### Distilleries

Alcohol, spices, spirits

### Electrical

Polyester slurries for insulating wire

### Food & Beverage Processing

Bentonite and carbon slurries, butter, cake dough, cake frosting, caramel, chocolate, cream, egg yolks with whites, fats, flavorings, fruit juices, gelatins, ice cream, jams and preserves, milk, mustard, potato waste, syrups, tomato sauce, water and salt mixtures, yeast solution, yogurt

### Marine

Sewage, wastewater, solid waste

### Meat Processing

Acids, animal and waste blood, hair and bone mixtures

### Medical, Pharmaceutical & Cosmetics

Face creams, latex, lotions, plasma, protein solutions, shampoo, vaccines, Vaseline

### Mining, Tunneling & Quarrying

Coal, copper and platinum slurries

### Photographic

Acids, diluents, thinners

### Pulp & Paper

Abrasive, fibrous fluids, aluminum sulfate, boiler wastewater, caustic soda (lye), cold seal, dyes, hydrochloric acid, inks, pre-paint coatings, sulfuric acid

### Tanneries

Acids, dyes, ferrous sulfate, waste fluids with solids

### Textile Manufacturing

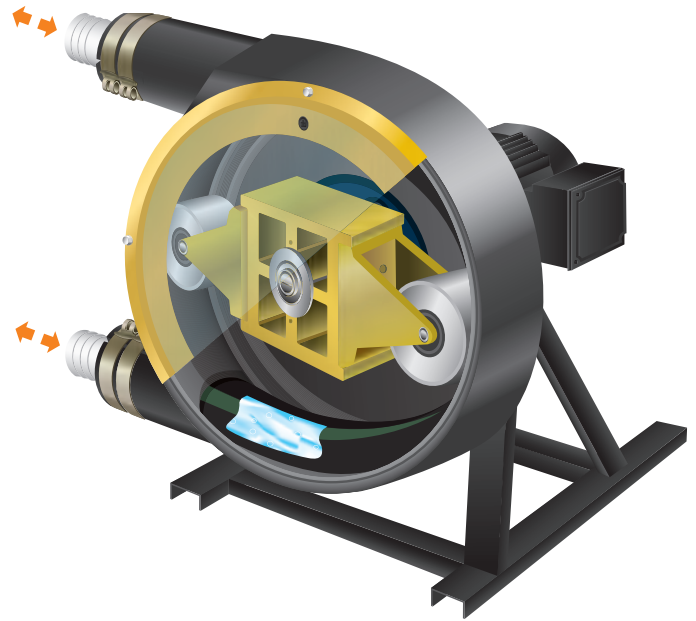
Acids, adhesives, bleach, dyes, sizing

### Water & Wastewater Treatment

Acids, activated carbon, aluminum sulfate, caustic soda (lye), ferrous chloride, flocculants, foam inhibitors, lime slurries, solid waste

# VECTOR

## Vector Peristaltic Pump Operating Principle



Peristaltic pumps work by compressing and relaxing a hose positioned between a rotating device and a circular pump housing. Vector 2000 Series pumps use rotating rollers that provide the same "push" with far less hose wear.

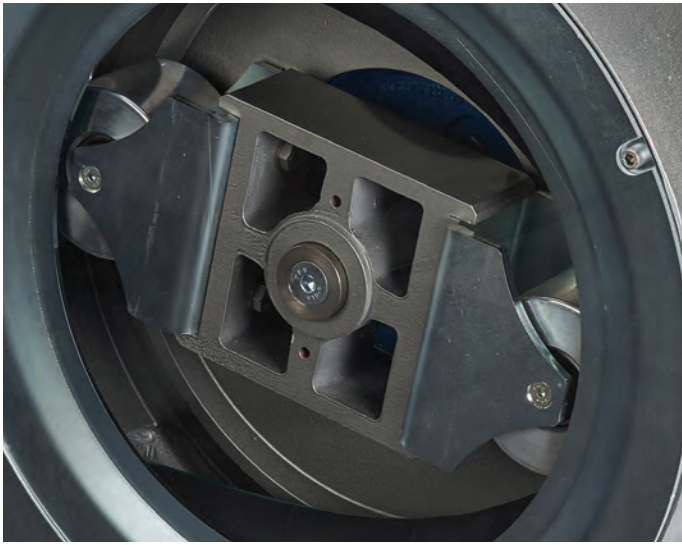
The peristaltic method employed in Vector pumps can create 100% compression at all times. As a result, there is virtually no slipping. Metering is highly accurate. Up to 29-1/2 feet of suction lift is produced.

Despite this powerful pumping action, Vector pumps will not cause frothing or delicate emulsions to break up. Since fluids travel through a single hose, they never come into contact with moving valves, springs, or seals. This makes Vector pumps ideal for handling abrasive, shear-sensitive, or corrosive fluids. Dyes, thick fluids, and solids up to 3-1/2 inches (90 mm) are also readily pumped.



# Wanner Engineering - Additional Product Lines

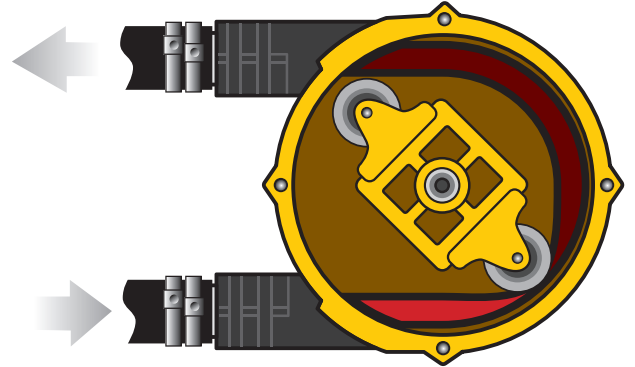
## Superior Roller Design



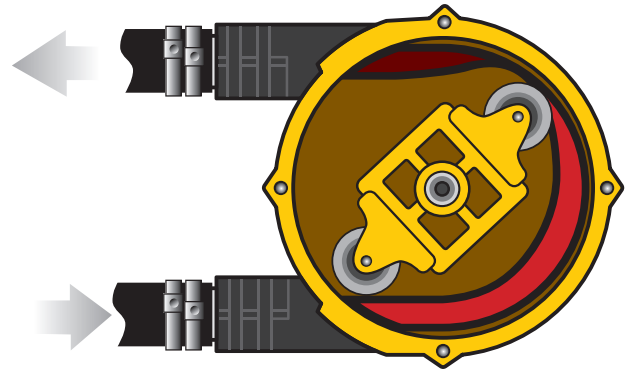
Vector uses an evolutionary roller mechanism instead of a rigid shoe to push fluids through its hose. This ensures longer working life with less downtime for maintenance.

The rollers generate less friction than shoes, extending hose life and reducing downtime.

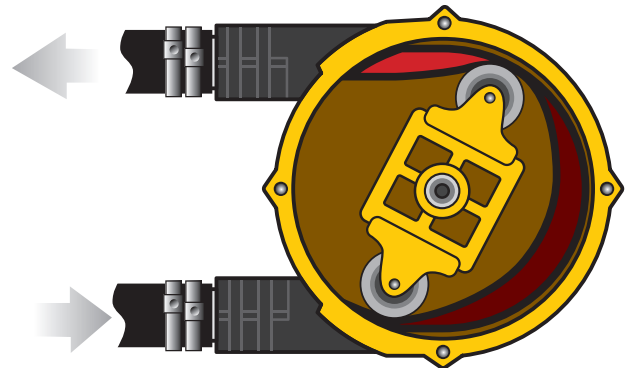
# VECTOR



*Fluid positioned ahead of the rollers gets pushed forward as the rollers rotate inside of the case.*



*Meanwhile, the portion of the hose just behind the rollers rebounds to create a vacuum.*



*The vacuum draws fluid into the pumping hose, which is then pushed forward by the rollers.*





WANNER

## Hydra-Cell® Limited Warranty

Wanner Engineering, Inc. (WEI) warrants that, for a period of one year from the date of delivery, equipment manufactured by WEI shall be free of defects in materials and workmanship under normal use and service, and provided the equipment is installed, operated and maintained in accordance with instructions supplied by WEI.

**This limited warranty is WEI's sole and exclusive warranty.**

If a defect in WEI's equipment appears within one (1) year from the date of delivery, and Purchaser has given written notice of such defect within thirty (30) days from the discovery thereof, WEI will repair or replace the defective part, at its option.

WEI requires the return to a designated WEI location of the defective part, transportation prepaid, to establish Purchaser's claim. A return goods authorization must be received prior to the return of the defective part. No allowance will be made for repairs undertaken without WEI's written consent or approval.

This limited warranty does not cover normal wear, or wear caused by or related to abrasion, corrosion, abuse, negligence, accident, faulty installation, or tampering which impairs normal operation of the equipment. This limited warranty applies only to equipment manufactured by WEI. Warranties, if any, on equipment manufactured by others including but not limited to electric motors (if applicable), are assigned to the purchaser by WEI (without recourse) at time of delivery.

Any descriptions of the equipment drawings, specifications, and any samples, models, bulletins, or similar material, used in connection with this sale are for the sole purpose of identifying the equipment and are not to be construed as an express warranty that the equipment will conform to such description. Any field advisory or installation support is advisory only.

**The foregoing warranties are in lieu of all other warranties.**

**Whether oral, written, express, implied or statutory, implied warranties of merchantability and fitness for a particular purpose will not apply.**

**WEI's warranty obligations and purchaser's remedies thereunder are solely and exclusively as stated herein.**

The purchaser's sole and exclusive remedy, whether based upon warranty, contract or tort, including negligence, will be to proceed under this warranty. All liability of WEI shall terminate one (1) year from the date of delivery of the equipment.

# Hydra-Cell® Worldwide Sales and Service



Hydra-Cell pumps are sold and serviced worldwide by a comprehensive network of factory-trained pump distributors. As specialists in pump technologies, our distributor organizations offer you a vital local resource for technical expertise, product training, sales and service.

Hydra-Cell distributors are located in more than 70 countries worldwide. In North America specifically, there are more than 100 Hydra-Cell distributor locations to provide local availability for every major commercial, institutional, industrial, and municipal marketplace.

## World Headquarters & Manufacturing

★ Minneapolis, Minnesota, USA

## Business Units

- ☀ Wichita Falls, Texas, USA
- ☀ Hampshire, United Kingdom
- ☀ Kowloon, Hong Kong
- ☀ Shanghai, China
- ☀ São Paulo, Brazil

## Contact us for the name and location of the authorized Hydra-Cell distributor nearest you:

Algeria	Colombia	Hungary	Mexico	Qatar	Thailand
Argentina	Costa Rica	India	Mongolia	Romania	Tunisia
Australia	Czech Republic	Indonesia	Morocco	Russia	Turkey
Austria	Denmark	Ireland	Netherlands	Saudi Arabia	Ukraine
Belarus	Ecuador	Israel	New Zealand	Singapore	United Arab Emirates
Belgium	Egypt	Italy	Norway	Slovakia	United Kingdom
Bolivia	Estonia	Japan	Oman	South Africa	United States
Brazil	Finland	Kazakhstan	Panama	South Korea	Uruguay
Bulgaria	France	Kuwait	Peru	Spain	Venezuela
Canada	Germany	Latvia	Poland	Sweden	Viet-Nam
Chile	Greece	Lithuania	Portugal	Switzerland	Yemen
China	Hong Kong	Malaysia	Puerto Rico	Taiwan	

# Hydra-Cell®

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