# Hydra-Cell®

Seal-less Pump Technology


WANNER INTERNATIONAL

## Hydra-Cell G Series Seal-less Pumps

## Hydra-Cell T Series Seal-less Pumps


## Hydra-Cell Q Series Seal-less Pumps


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

# Hydra-Cell® Seal-less Pumps

## Contents




"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.*

WANNER Hydra-Cell® Seal-less Pump Technology

## Wanner Engineering ISO 9001: 2008 Certification

Wanner Engineering has earned ISO 9001: 2008 certification, the culmination of our on-going work and commitment to providing our customers with industry leading value in pumps and equipment. The certification was authorized by TÜVRheinland, a premier global provider of independent testing and certification services.

Certification of our Quality Management System shows how we have embraced a continuous improvement process that results in world-class products delivered on time, and at the best price and will ensure that Wanner Engineering will continue to provide the outstanding quality that our customers have come to expect, and rely on, from our pumps and equipment.

## Wanner International ISO 9001: 2008 Certification

The administration systems of Wanner International Ltd., in connection with pumps and associated products, have also been assessed and approved by the independent body QAS International to the standards laid down under ISO 9001:2008 (the latest version of ISO 9001).

It covers all aspects of administration including the systems in place for purchase and supply, handling enquiries and orders, internal and external communication, maintenance of records and the creation and handling of documents. It also covers the arrangements made for the continual review and improvement of its QM systems. The approved administration systems apply to the design, manufacture, assembly and distribution of pumps and associated products.

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

# 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 specialised applications. Hydra-Cell pumps can also be fitted with ANSI, DIN, SAE or other specialised flange connections.*

## Markets and Industries Served

- Automotive
- Biodiesel
- Biotechnical
- Car/Vehicle Washing
- Ceramics
- Chemical & Petrochemical
- Chip Board Manufacturing
- Cleaning & Washing
- Construction
- Electronics
- Emissions & Environmental Control

- Energy & Power Generation
- Energy Recovery - ORC
- Flue Gas Emission Control
- Food & Beverage Processing
- General Industrial & Manufacturing
- Glass & Clay
- Lawn Care & Agriculture
- Marine
- Machine Tool Coolant
- Mining, Quarrying & Tunnelling
- 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, Effluent & Wastewater Treatment

# Hydra-Cell® Primary Pumping Applications

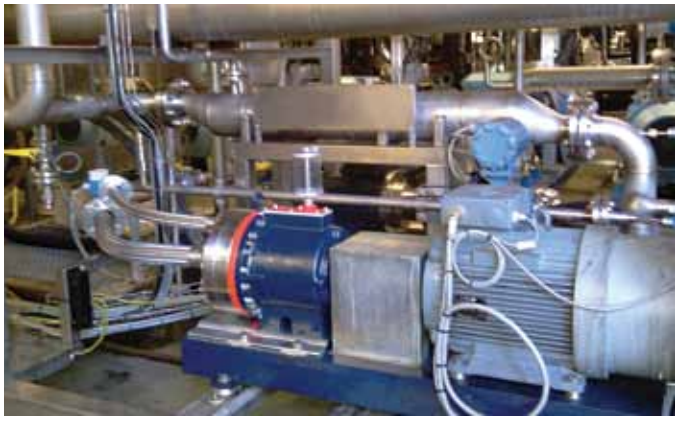
- Blending
- Cleaning
- Coating
- Dosing
- Filling
- Filtering
- Injecting
- Metering
- Mixing
- Sampling
- Spraying
- Transferring

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

*High-precision dosing of pentane at low flow rates can be achieved for specialised 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® Liquid Handling Capability


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

**Handles Low-to-High-Viscosity Liquids**

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

*Hydra-Cell T100 pumping gasoline in a distribution centre.*

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

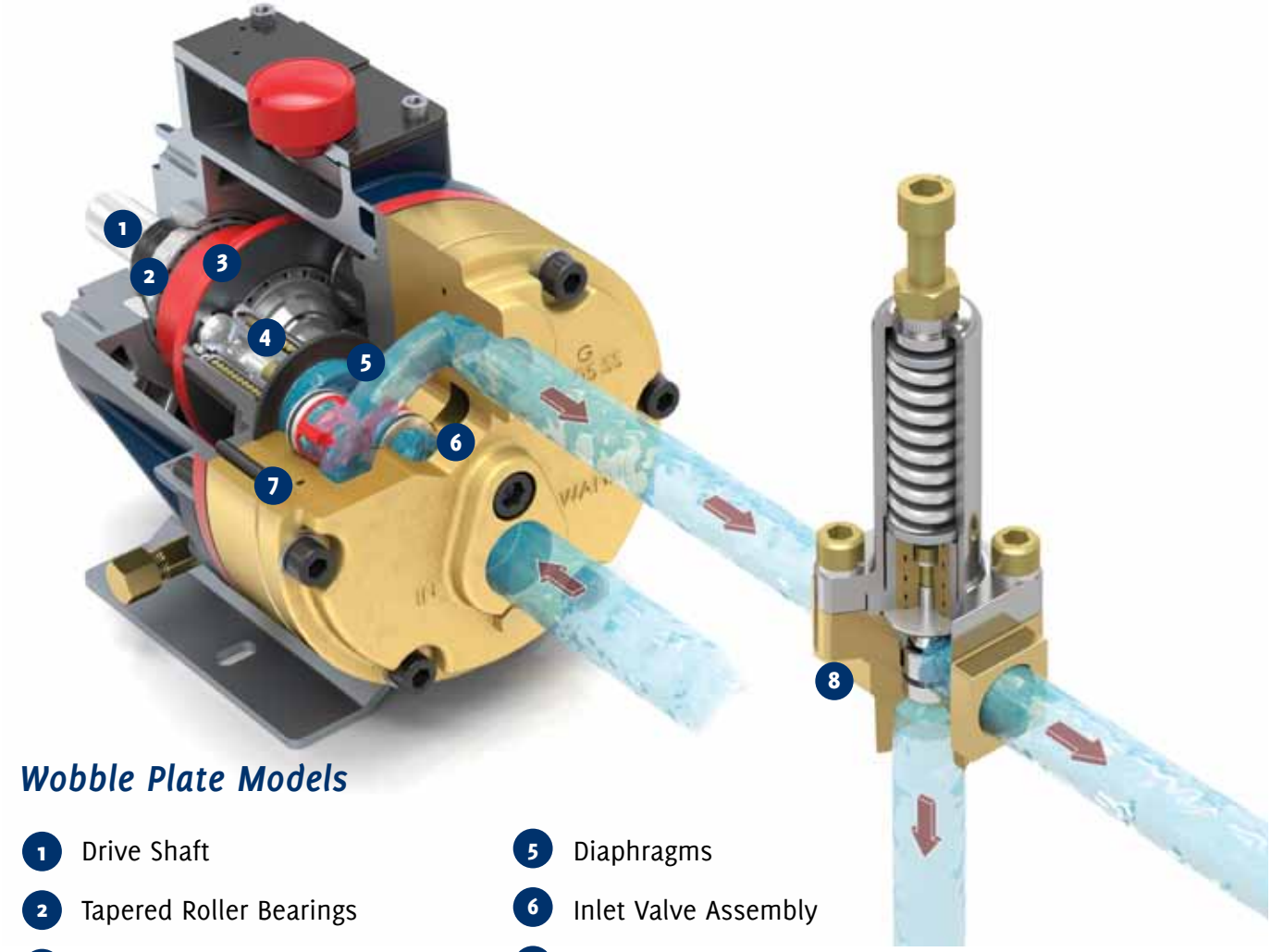
*Pumping dirty and recycled water at a commercial car wash is an everyday function for Hydra-Cell pumps.*

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

*Hydra-Cell pumping ethanol-based liquid for making jet fuel.*

# Hydra-Cell® Principles of Operation - Wobble Plate

## API 674 option available




### *Wobble Plate Models*

1. Drive Shaft
2. Tapered Roller Bearings
3. Fixed-angle Cam/Wobble Plate
4. Hydraulic Cells (Patented)
5. Diaphragms
6. Inlet Valve Assembly
7. Discharge Valve Assembly
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 swash plate moves, 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 their rearward stroke. A ball check valve in the bottom of the piston ensures that the cell remains full of oil on its forward stroke.

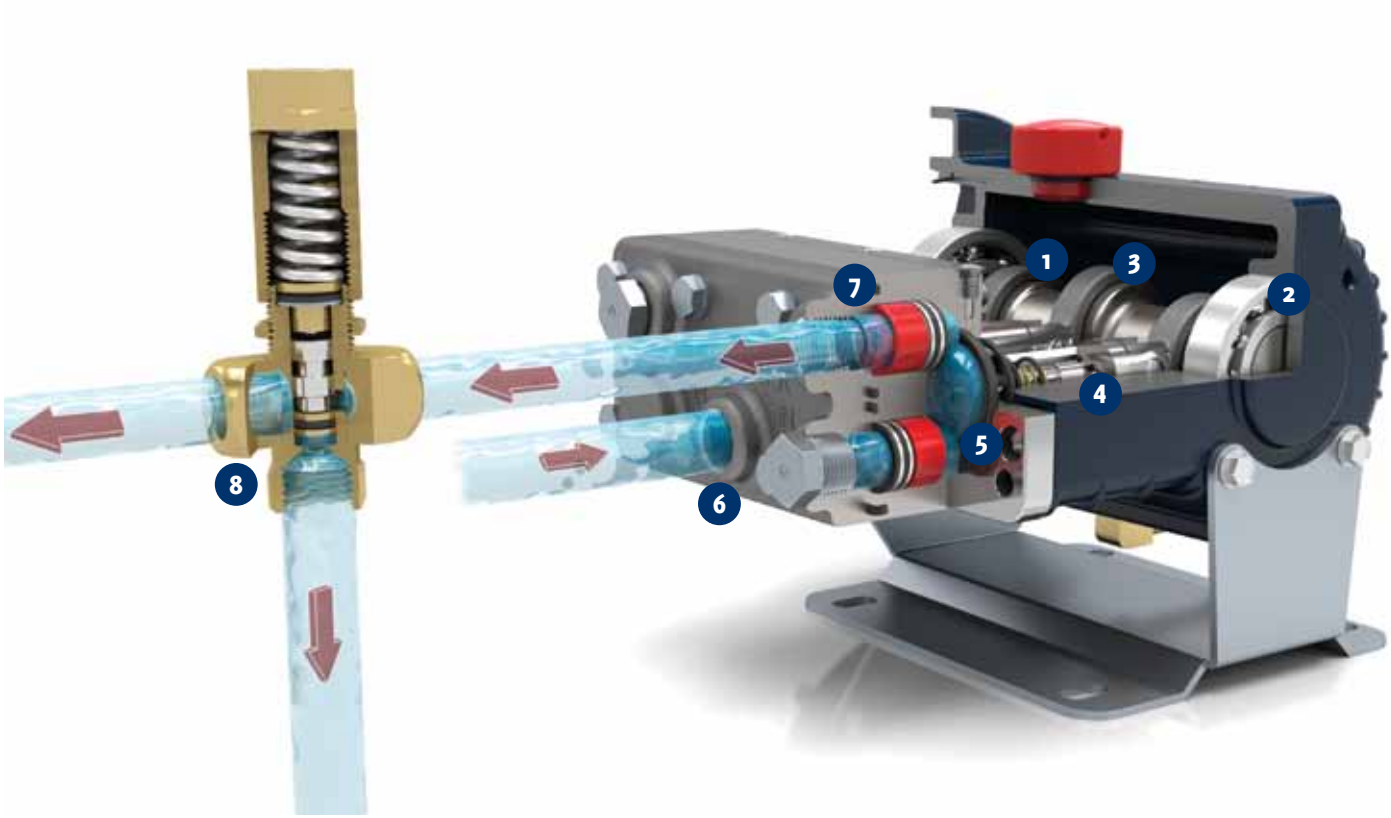
The oil held in the Hydra-Cell balances the back side of the diaphragms (5) and causes the diaphragms to flex forward and back as the Wobble plate moves. This provides the pumping action.

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 0.21 bar pressure differential regardless of the pressure at which liquid is being delivered - up to 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 spring loaded check valve assembly (6). As the diaphragms move back, liquid enters the pump through a common inlet and passes through one of the inlet check valves. On the forward stroke, the diaphragm forces the liquid 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 - Crankshaft




## *Crank-shaft Models*

1. Drive Shaft
2. Precision Ball Bearings
3. Connecting Rods
4. Hydraulic Cells (Patented)
5. Diaphragms
6. Inlet Valve Assembly
7. Discharge Valve Assembly
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.

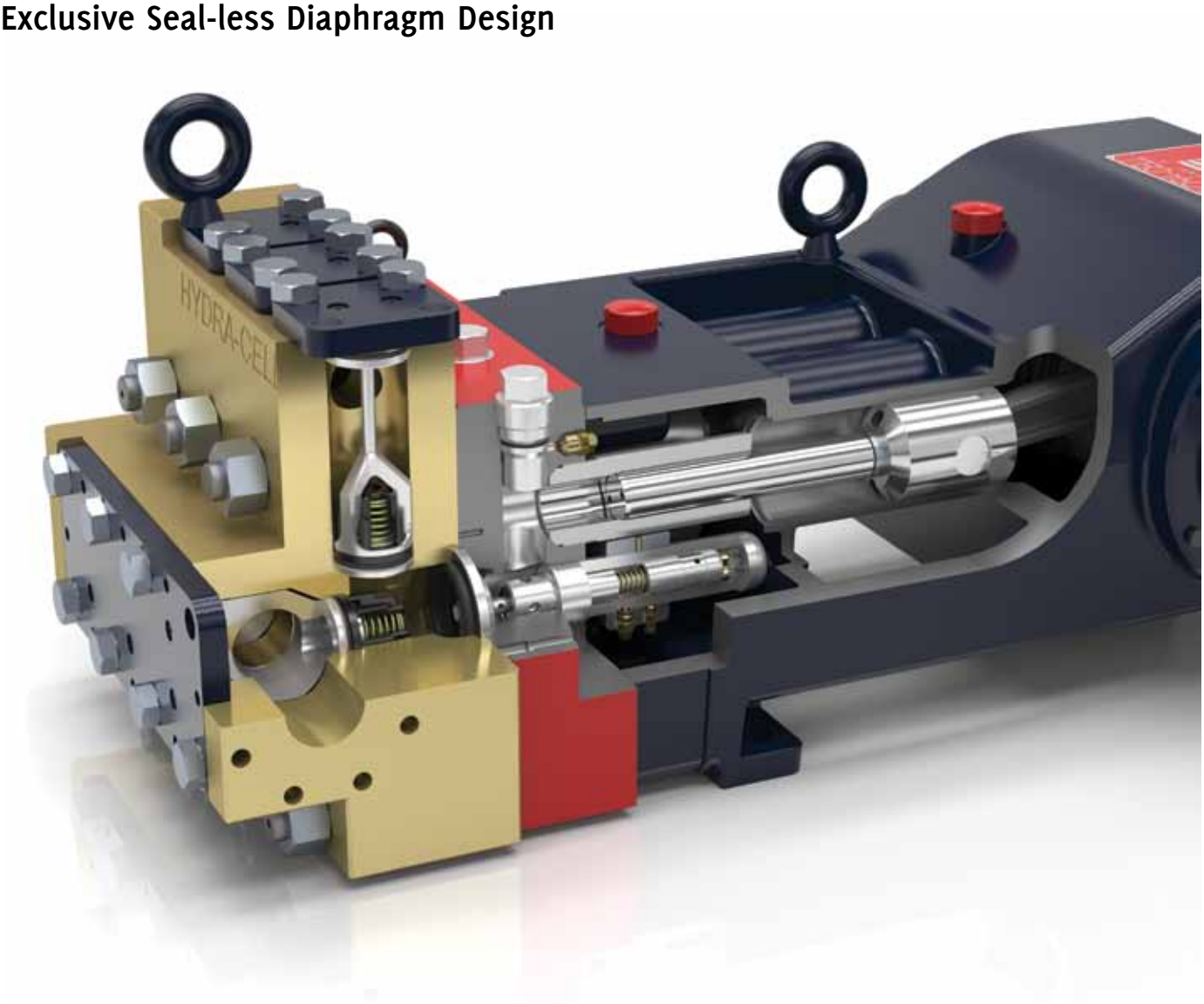
Each piston contains a patented hydraulic cell (4) that is moved sequentially by the crank-shaft. The innovative and proprietary Hydra-Cell maintains the precise balance of oil behind the diaphragm (5) regardless of the operating conditions of the pump. The oil in Hydra-Cell is pressurized on the forward 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 liquid being pumped, maintaining no more than a 0.21 bar differential regardless of the pressure at which the liquid is being delivered - up to 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 spring loaded check valve assembly (6). As the diaphragms move back, liquid enters the pump through a common inlet and passes through one of the inlet check valves. On the forward stroke, the diaphragm forces the liquid 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® Principles of Operation - Asynchronous Design
## API 674 option available

## Exclusive Seal-less Diaphragm Design




- Seal-less design separates the power end from the process liquid 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 suction 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
- Hydra-Cell T-Series pumps can be configured to meet API 674 standards – consult factory for details

*Hydra-Cell T80 Series pumps received a "Spotlight on New Technology" award from the Offshore Technology Conference.*

# Hydra-Cell® Compliance Certifications

## ATEX

ATEX is the directive applied to the use and sustainability of equipment allowed for installation in above-ground, explosive atmospheres. The full line of Hydra-Cell ATEX pumps are classified in Group II, Category 2 (Zone 1) for both gasses and dust. Temperature classification is T4 135˚C permitting a maximum process temperature of 90˚C.

## CE Marking

CE identifies compliance of Hydra-Cell pumps with Essential Health and Safety Requirements (EHSR) of the European Union. This includes the Safety of Machinery Directive 98/37/EC.

## DNV

Det Norske Veritas (DNV) is a maritime classification society, that for pumps, details intended service, flow/pressure ratings and service restrictions while specifying the destination vehicle. Hydra-Cell DNV individually test & certified pumps overcome the problems associated with pumping and metering low-viscosity, low-sulfur fuels as dictated for use in Sulfur Emissions Control Areas (SECA). They are also used for pumping residual fuel oils, seawater, FGD treatment chemicals, and for ballast treatment.

## ISO 9001: 2008

SO 9001 is an independent continuing assessment of an organisation's arrangements for Quality Management. It covers all aspects of administration including the systems in place for purchase and supply, handling enquiries and orders, internal and external communication, maintenance of records and the creation and handling of documents. It also covers the arrangements made for the continual review and improvement of its QM systems.

The administration systems of Wanner International Ltd in connection with pumps and associated products have been assessed and approved by the independent body QAS International to the standards laid down under ISO 9001:2008 (the latest version of ISO 9001).

## ISO 14001: 2004

ISO 14001 is an internationally accepted standard that brands a business as environmentally responsible, committed to reducing environmental impacts and meeting expectations of sustainability as the business grows.

To obtain Certification, Wanner International Ltd has undergone a two-part formal assessment by the independent body QAS International to the standards laid down under ISO 14001:2004. This ensures that the necessary ISO 14001 procedures and controls have been developed by the company and that they are being implemented and working satisfactorily as required.

## LLOYDS REGISTER

Wanner International is able to supply Hydra-Cell pumps for marine duties in compliance with the requirements of Lloyd's Register. Certificates for these pumps, backed by independent Witness Tests, have been issued by LR for duties that include transfer of low-sulphur fuels.

LR certificated Hydra-Cell diaphragm pumps overcome difficulties associated with pumping light viscosity oils and other poor lubricants.

## TR CU

Supervised by Rosstandart (Federal Agency for Technical Regulation & Metrology), the new TR CU certificate now replaces GOST-R.
Covering the three states of the Customs Union - Russia, Belarus & Kazakhstan, the main objectives of the certificate is to:

- To protect safety, health and environment of consumers & users of goods
- To prove compliance of products to Russian and Customs Union safety requirements
- Required for Customs clearance procedures at the Russian & CU border
- Required for the sale and use of products in the local market

The new TR CU certificate allows for the safe use of equipment in explosive atmospheres and is mandatory for any electrical equipment that is installed or operated in hazardous or potentially explosive atmospheres in the countries.

# Hydra-Cell® Materials of Construction

*As part of our "Mass Customisation" 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 liquids processed by the same pump. Special manifolds with a 2:1 dosing ratio are also available. (*Consult factory.*)

### Non-metallic Pump Heads

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

- Polypropylene
- PVDF

### Metallic Pump Heads

Metallic pump heads can handle higher operating pressures. Hastelloy CW12MW or Stainless Steel is also selected for corrosion resistance and other properties.

- Brass
- Bronze
- Cast Iron (Nickel-plated)
- Duplex Alloy 2205
- Super Duplex Alloy 2507
- Hastelloy CW12MW
- 304 Stainless Steel
- 316L Stainless Steel

## Diaphragms and O-rings

Diaphragms and corresponding o-rings are available in several elastomeric materials.

- Aflas (used with PTFE O-ring)
- Butyl
- Buna-N
- EPDM (requires EPDM-compatible oil)
- FFKM
- FKM
- Neoprene
- PTFE

## Valve Materials

Hydra-Cell valve assemblies (seats, valves, springs, and retainers) are available in a variety of materials to suit your process application.

### Valve Seats

- Ceramic
- Hastelloy CW12MW
- Nitronic 50
- Tungsten Carbide
- 17-4 PH Stainless Steel
- 316L Stainless Steel

### Valves

- Ceramic
- Hastelloy CW12MW
- Nitronic 50
- Tungsten Carbide
- 17-4 PH Stainless Steel

### Valve Springs

- Elgiloy (Exceeds SST grade 316L)
- Hastelloy CW12MW
- 17-7 PH Stainless Steel
- 316L Stainless Steel

### Valve Spring Retainers

- Celcon
- Hastelloy CW12MW
- Nylon (Zytel)
- Polypropylene
- PVDF
- 17-7 PH Stainless Steel

### 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® CW12MW | 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

G20

G03

G03 Mono-Block

G04

G10

G12

G15

G17

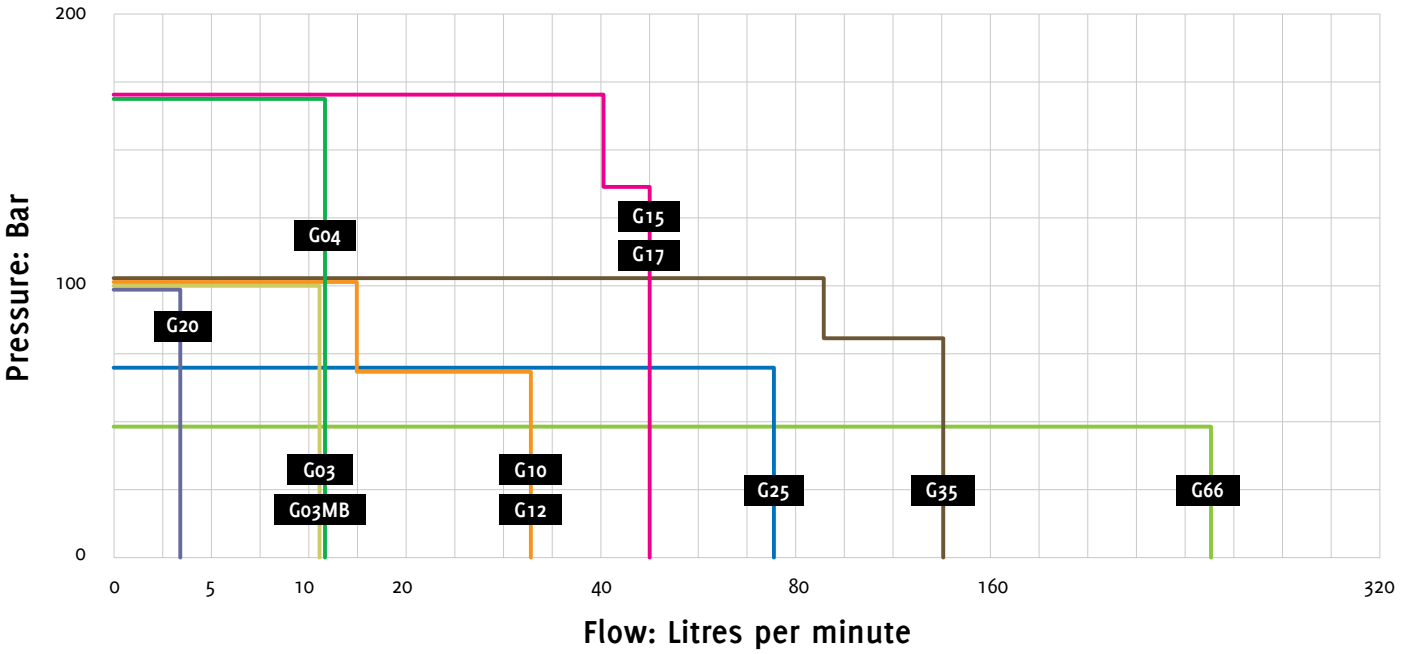
G25

G35

G66

# 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.

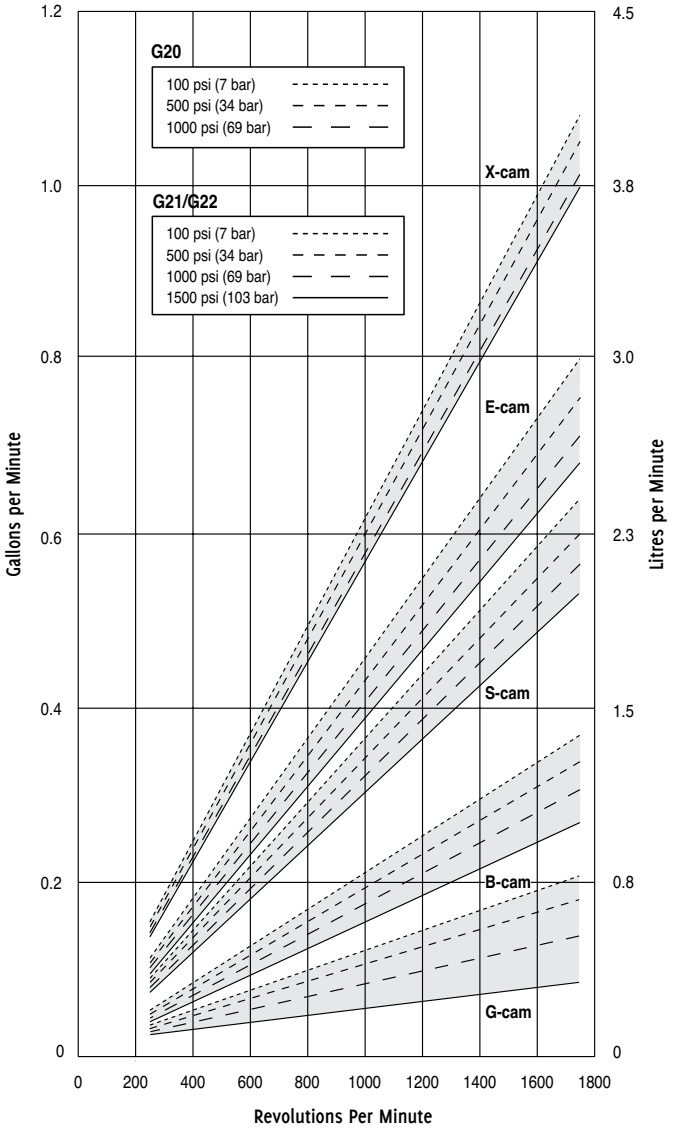
Please Note: Some models do not achieve maximum flow at maximum pressure. Refer to the individual model specifications in this section for precise flow and pressure capabilities by specific pump configuration.

| Model | Maximum Capacity l/min | Maximum Discharge Pressure bar | | Maximum Operating Temperature °C[2] | | Maximum Inlet Pressure bar |
|---|---|---|---|---|---|---|
| | | Non-Metallic[1] | Metallic | Non-Metallic | Metallic | |
| G20 | 3.8 | 24 | 103 | 60° | 121° | 17 |
| G03 | 11.7 | 24 | 103 | 60° | 121° | 17 |
| G04 | 11.2 | N/A | 172 | N/A | 121° | 34 |
| G10 | 33.4 | 24 | 103 | 60° | 121° | 17 |
| G12 | 33.4 | N/A | 103 | N/A | 121° | 17 |
| G15 | 58.7 | N/A | 172 | N/A | 121° | 34 |
| G17 | 58.7 | N/A | 172 | N/A | 121° | 34 |
| G25 | 75.9 | 24 | 69 | 60° | 121° | 17 |
| G35 | 138 | N/A | 103 | N/A | 121° | 34 |
| G66 | 248 | 17 | 48 | 49 | 121° | 17 |

*1 24 bar maximum with PVDF (Kynar®) liquid end; 17 bar maximum with Polypropylene liquid end.*
*2 Consult factory for correct component selection for temperatures from 160°F (71°C) to 250°F (121°C).*

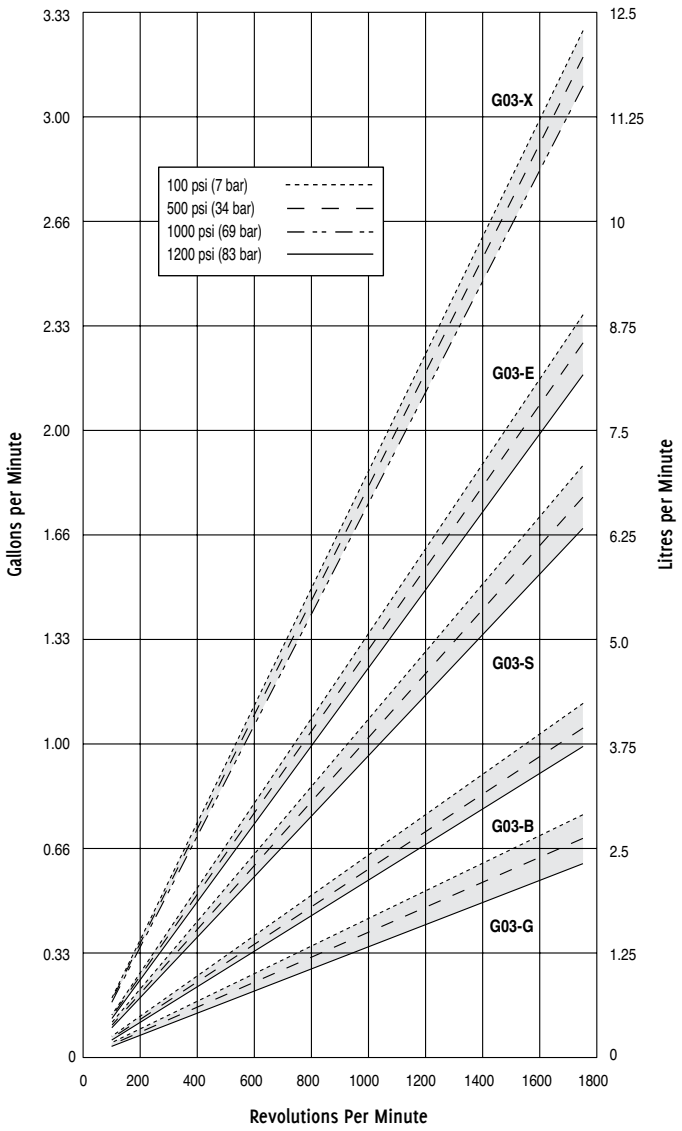
# Hydra-Cell® G Series Performance Graphs and Specifications

## G20




| | |
|---|---|
| **Maximum Particle Size** | 0.3mm @ 15% max. concentration |
| **Inlet Port** | 1/2 inch BSPT (NPT option available) |
| **Discharge Port** | 3/8 inch BSPT (NPT option available) |
| **Shaft Diameter**<br>G-20:<br>G-21/22: | <br>3/4 inch (19mm) hollow shaft<br>3/4 inch (19mm) |
| **Shaft Rotation** | Bi-directional |
| **Weight**<br>Metallic Heads:<br>Non-Metallic Heads: | <br>5.5 kg<br>4.1 kg |

## G03




| | |
|---|---|
| **Maximum Particle Size** | 0.3mm @ 15% max. concentration |
| **Inlet Port** | 1/2 inch BSPT (NPT option available) |
| **Discharge Port** | 3/8 inch BSPT (NPT option available) |
| **Shaft Diameter**<br>G-03:<br>G-13: | <br>7/8 inch (22.22 mm)<br>24 mm hollow shaft |
| **Shaft Rotation** | Bi-directional |
| **Weight**<br>Metallic Heads:<br>Non-Metallic Heads: | <br>12.7 kg<br>8.6 kg |

## Calculating Required Horsepower (kW)*

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

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

## Calculating Required Horsepower (kW)*

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

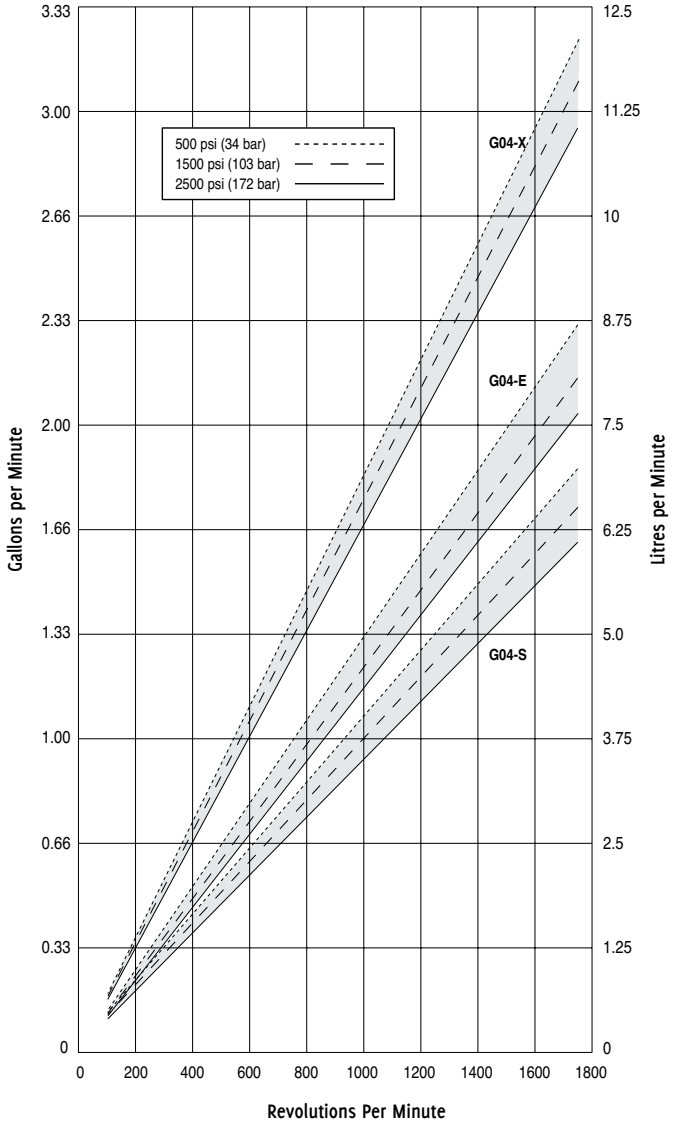
$$\frac{6 \times \text{rpm}}{84{,}428} + \frac{\text{l/min} \times \text{bar}}{511} = \text{electric motor kW*}$$

* rpm equals pump shaft rpm. HP/kW is required application power. Use caution when sizing motors with variable speed drives.

Note: For the low flow cams (B, G, I),a 1 bar pressurised inlet feed must be used. Performance specifications are guidelines only.

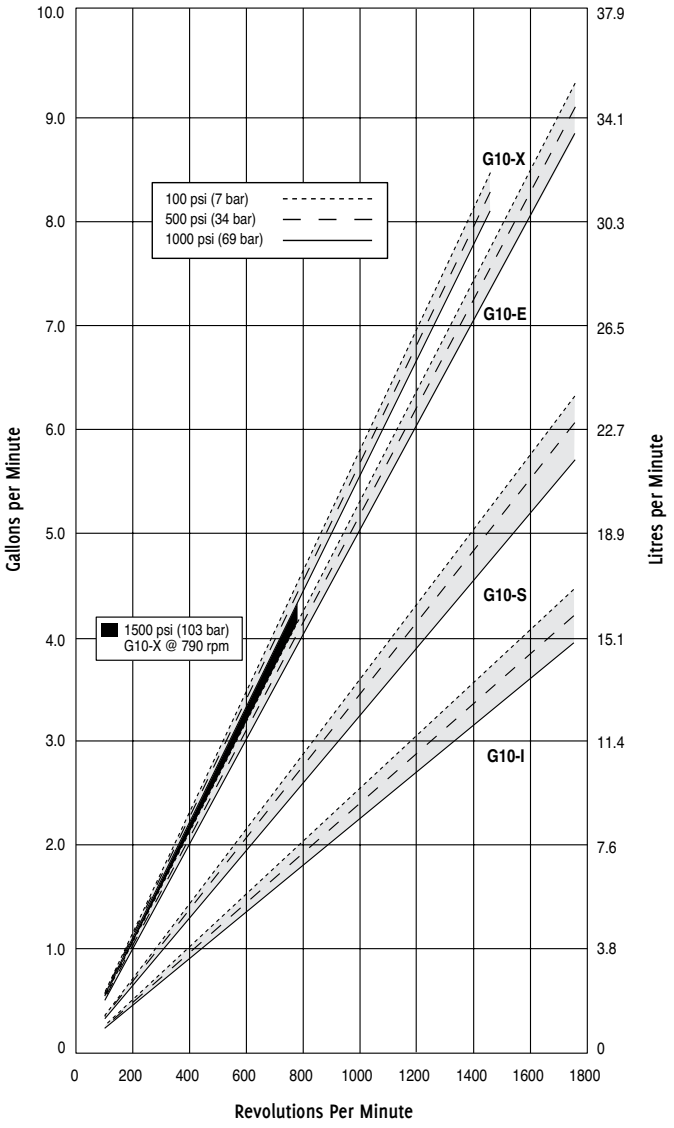
# Hydra-Cell® G Series Performance Graphs and Specifications

## G04




| | |
|---|---|
| **Maximum Particle Size** | 0.3mm @ 15% max. concentration |
| **Inlet Port** | 1/2 inch BSPT (NPT option available) |
| **Discharge Port** | 1/2 inch BSPT (NPT option available) |
| **Shaft Diameter** | 7/8 inch (22.22 mm) |
| **Shaft Rotation** | Bi-directional |
| **Weight** | 16.8 kg |

## G10 - API 674 option available




| | |
|---|---|
| **Maximum Particle Size** | 0.8mm @ 5-10% max. concentration |
| **Inlet Port** | 1 inch BSPT (NPT option available) |
| **Discharge Port** | 3/4 inch BSPT (NPT option available) |
| **Shaft Diameter** | 7/8 inch (22.22 mm) |
| **Shaft Rotation** | Bi-directional |
| **Weight** | |
| Metallic Heads: | 22 kg |
| Non-Metallic Heads: | 16 kg |

## Calculating Required Horsepower (kW)*

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

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

## Calculating Required Horsepower (kW)*

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

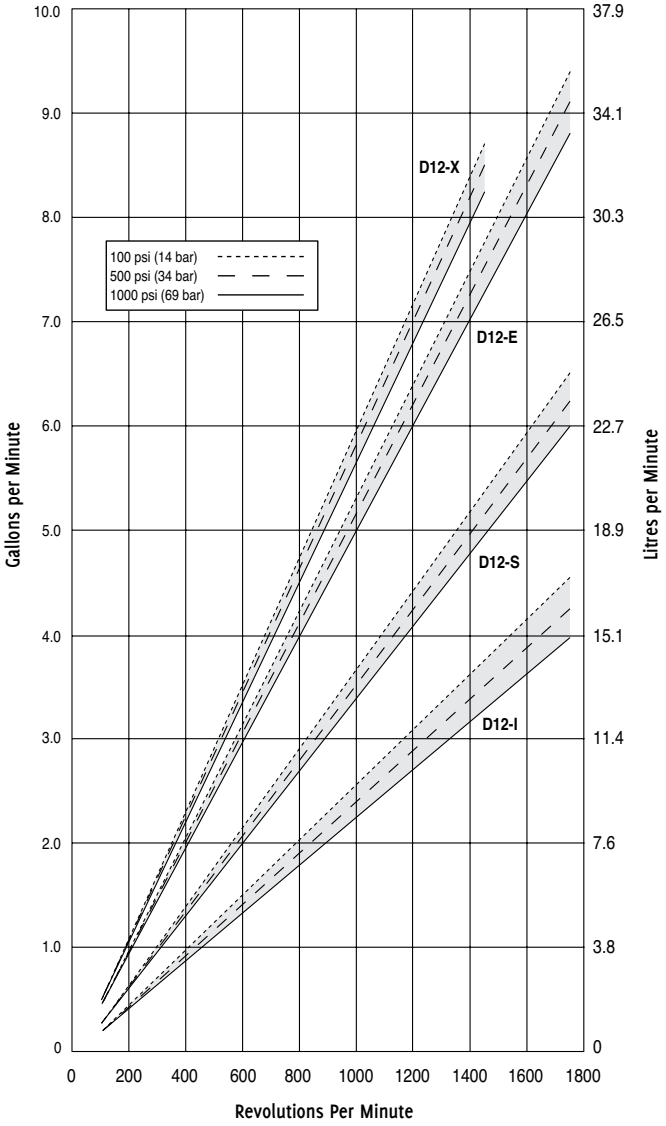
$$\frac{15 \times \text{rpm}}{84{,}428} + \frac{\text{l/min} \times \text{bar}}{511} = \text{electric motor kW*}$$

* rpm equals pump shaft rpm. HP/kW is required application power. Use caution when sizing motors with variable speed drives.

Note: For the low flow cams (B, G, I),a 1 bar pressurised inlet feed must be used. Performance specifications are guidelines only.

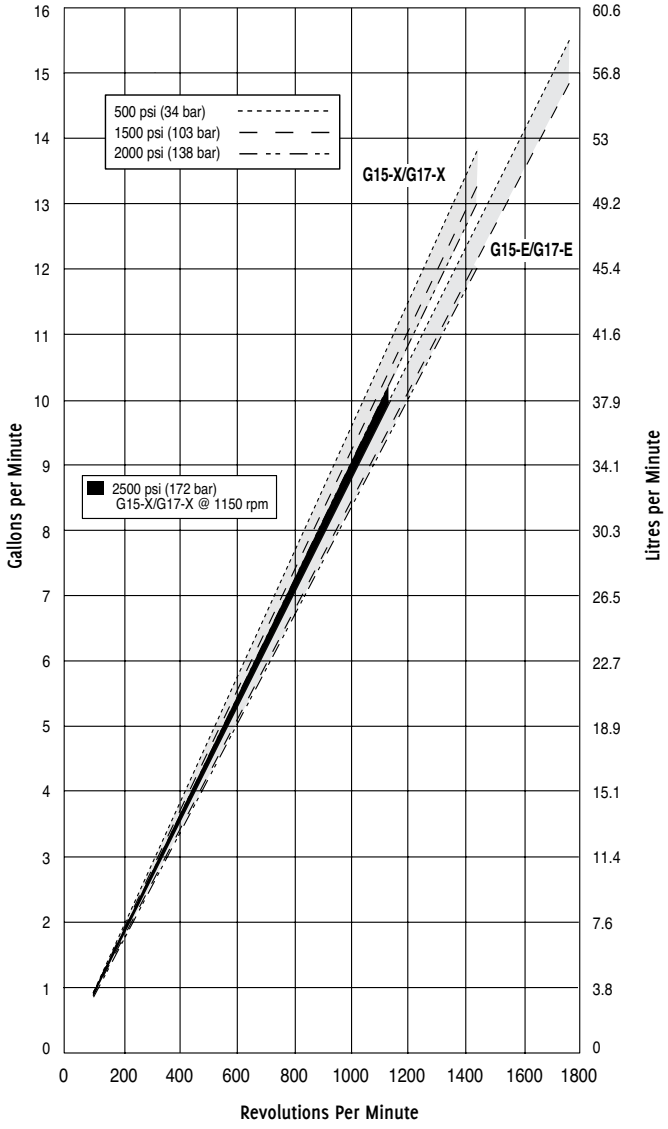
# Hydra-Cell® G Series Performance Graphs and Specifications

## G12




| | |
|---|---|
| **Maximum Particle Size** | 0.8mm @ 5-10% max. concentration |
| **Inlet Port** | 1 inch BSPT (NPT option available) |
| **Discharge Port** | 3/4 inch BSPT (NPT option available) |
| **Shaft Diameter** | 7/8 inch (22.22 mm) |
| **Shaft Rotation** | Bi-directional |
| **Weight**<br>Metallic Heads: | 22 kg |

## G15 (horizontal) G17 (vertical) - API 674 option available




| | |
|---|---|
| **Maximum Particle Size** | 0.3mm @ 15% max. concentration |
| **Inlet Port** | 1-1/4 inch BSPT (NPT option available) |
| **Discharge Port** | 3/4 inch BSPT (NPT option available) |
| **Shaft Diameter** | 1-1/8 inch (28.58 mm) |
| **Shaft Rotation** | Bi-directional |
| **Weight** | 66 kg |

## Calculating Required Horsepower (kW)*

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

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

## Calculating Required Horsepower (kW)*

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

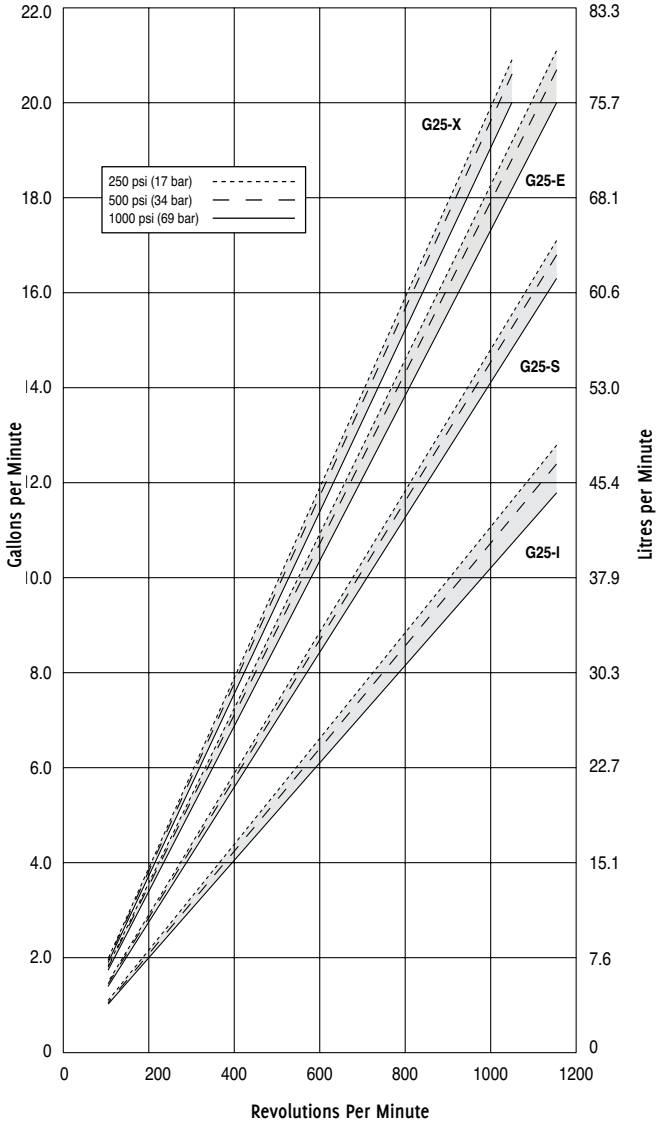
$$\frac{80 \times rpm}{84{,}428} + \frac{l/min \times bar}{511 - \left(\frac{bar - 35}{4}\right)} = \text{electric motor kW*}$$

* rpm equals pump shaft rpm. HP/kW is required application power. Use caution when sizing motors with variable speed drives.

Note: For the low flow cams (B, G, I),a 1 bar pressurised inlet feed must be used. Performance specifications are guidelines only.

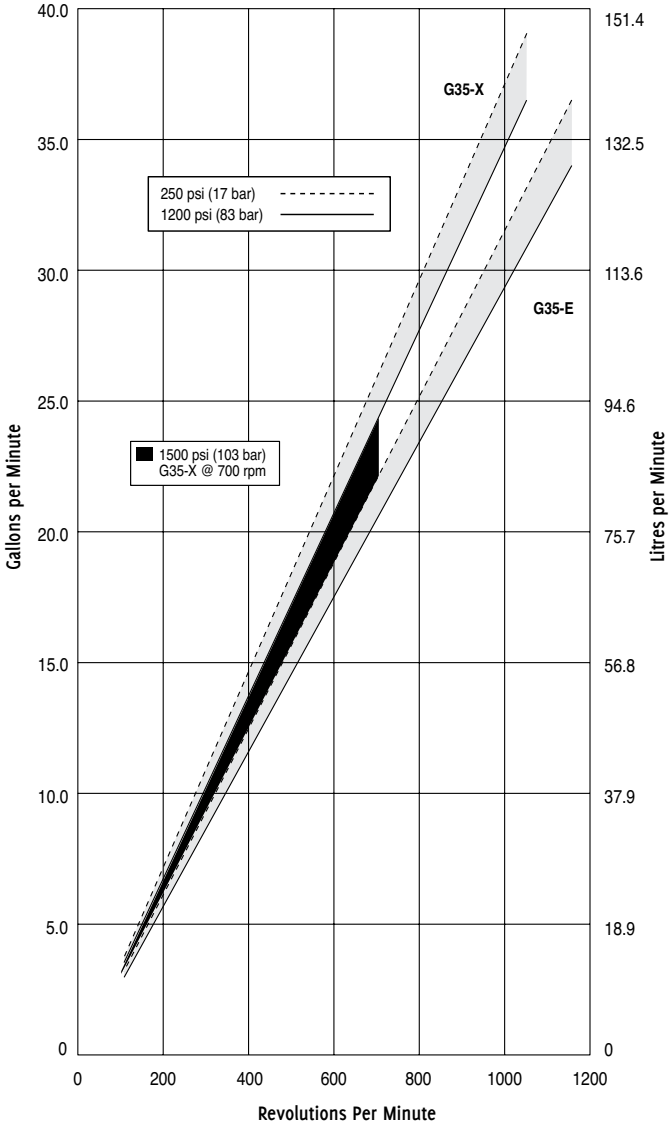
# Hydra-Cell® G Series Performance Graphs and Specifications

## G25 - API 674 option available




| | |
|---|---|
| **Maximum Particle Size** | 1.5mm @ 5-10% max. concentration |
| **Inlet Port** | 1-1/2 inch BSPT (NPT option available) |
| **Discharge Port** | 1 inch BSPT (NPT option available) |
| **Shaft Diameter** | 1-1/8 inch (28.58 mm) |
| **Shaft Rotation** | Bi-directional |
| **Weight**<br>Metallic Heads:<br>Non-Metallic Heads: | <br>56.8 kg<br>40.9 kg |

## G35 - API 674 option available




| | |
|---|---|
| **Maximum Particle Size** | 1.5mm @ 5-10% max. concentration |
| **Inlet Port** | 2-1/2 inch BSPT (NPT option available)<br>or 3 inch SAE flange |
| **Discharge Port** | 1-1/4 inch BSPT (NPT option available)<br>or 1-1/4 inch SAE flange |
| **Shaft Diameter** | 2 inch (50.8 mm) |
| **Shaft Rotation** | Bi-directional |
| **Weight** | 109 kg |

## Calculating Required Horsepower (kW)*

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

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

## Calculating Required Horsepower (kW)*

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

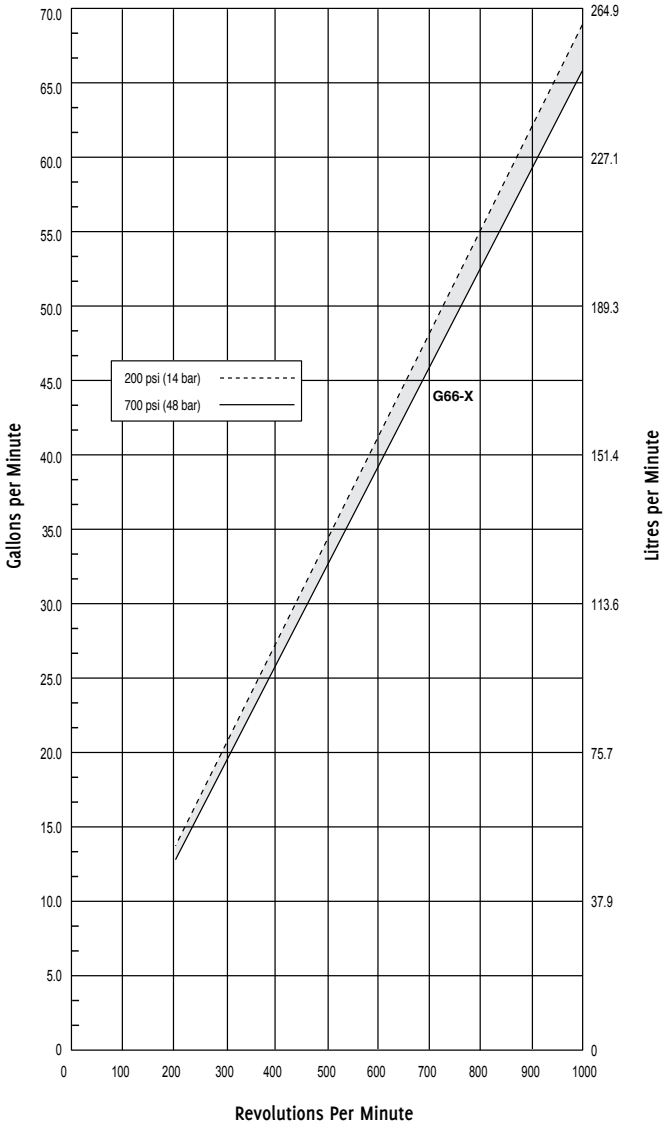
$$\frac{100 \times \text{rpm}}{84{,}428} + \frac{\text{l/min} \times \text{bar}}{511} = \text{electric motor kW*}$$

* rpm equals pump shaft rpm. HP/kW is required application power. Use caution when sizing motors with variable speed drives.

Note: For the low flow cams (B, G, I),a 1 bar pressurised inlet feed must be used. Performance specifications are guidelines only.

# Hydra-Cell® G Series Performance Graphs and Specifications

## G66 - API 674 option available





| | |
|---|---|
| **Maximum Particle Size** | 0.8mm |
| **Inlet Port** | 3 inch BSPT (NPT option available)<br>2-1/2 inch SAE J518 flange (Non-metallic)<br>3 inch SAE J518 flange (Metallic) |
| **Discharge Port** | 1-1/2 inch BSPT (NPT option available)<br>1-1/2 inch SAE flange |
| **Shaft Diameter** | 3 inch SAE J518 flange (Metallic) |
| **Shaft Rotation** | Bi-directional |
| **Weight**<br>Metallic Heads:<br>Non-Metallic Heads: | <br>226 kg<br>133 kg |

## Calculating Required Horsepower (kW)*

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

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

* rpm equals pump shaft rpm. HP/kW is required application power. Use caution when sizing motors with variable speed drives.

Note: For the low flow cams (B, G, I),a 1 bar pressurised inlet feed must be used. Performance specifications are guidelines only.

# C Series Valves Selection Guide

## Pressure Regulating Valves

## Air Bleed Priming Valves

**C20 Series**

**C46 Series**

**C60 series**
(Seal-less Valves)

**C80 Series**

### 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 - made in the USA

### Design Advantages

Tapered design of the C20 Series valves plunger.

### 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.

# Hydra-Cell® T and Q Series Seal-less Pumps


T100 Low Pressure


T100 Medium Pressure

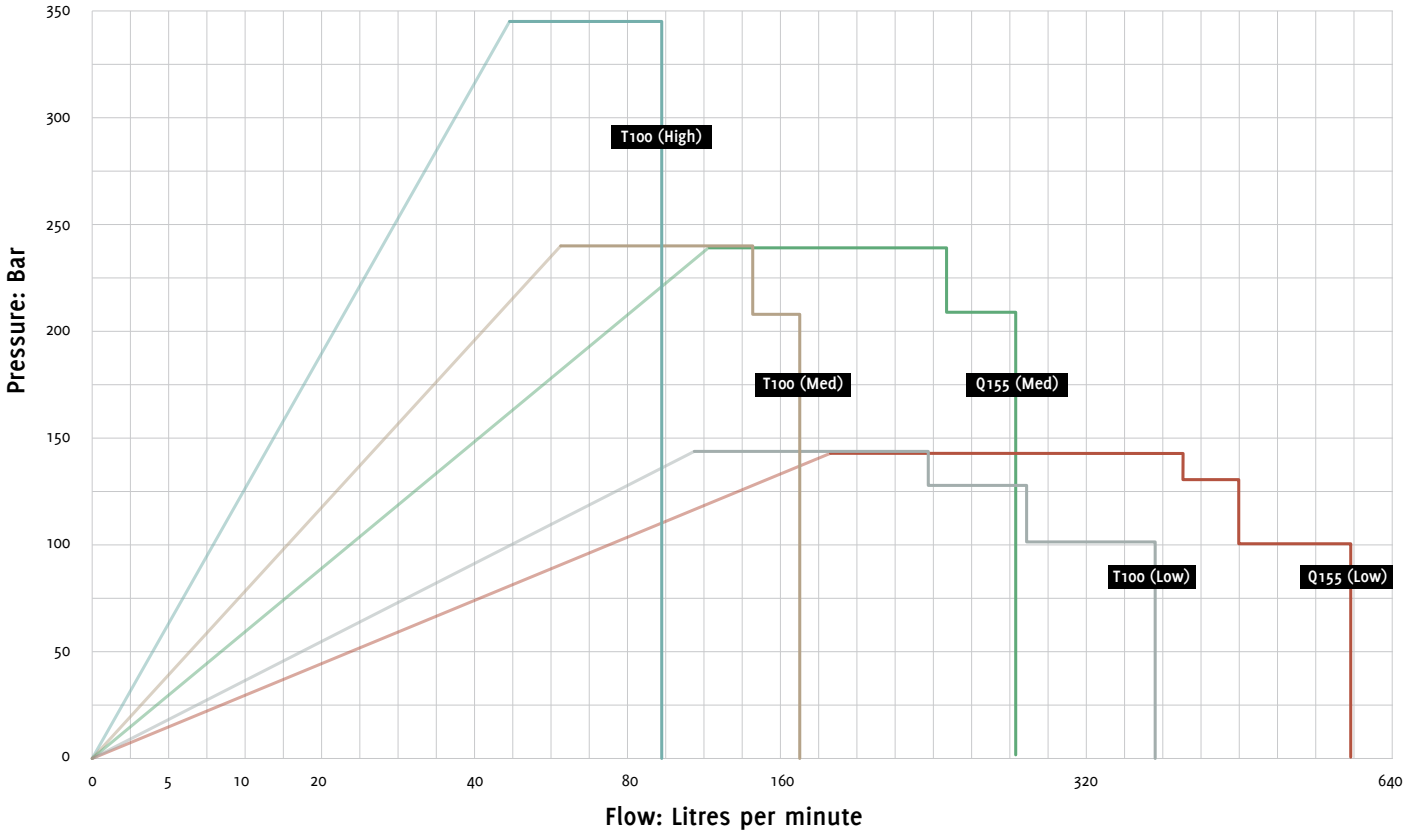
T100 High Pressure


Q155 Low Pressure


Q155 Medium Pressure

# Hydra-Cell® Flow Capacities and Pressure Ratings

## T 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.

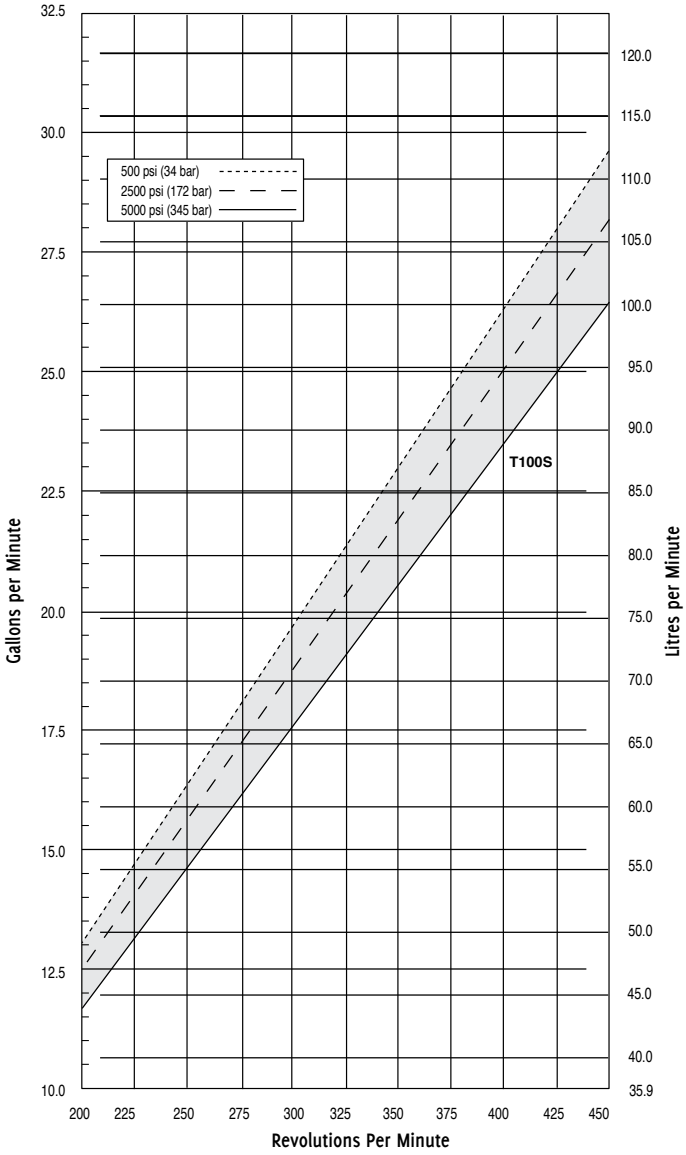
| Model | Maximum Capacity l/min | Maximum Discharge Pressure bar | Maximum Operating Temperature °C [1] | Maximum Inlet Pressure bar |
|---|---|---|---|---|
| | | Metallic | Metallic | |
| T100S | 98 | 345 | 82° | 34 |
| T100M | 144 | 241 | 82° | 34 |
| T100K | 170 | 207 | 82° | 34 |
| T100H | 259 | 145 | 82° | 34 |
| T100F | 290 | 128 | 82° | 34 |
| T100E | 366 | 103 | 82° | 34 |
| Q155E | 595 | 103 | 82° | 34 |
| Q155F | 490 | 127 | 82° | 34 |
| Q155H | 421 | 144 | 82° | 34 |
| Q155K | 295 | 207 | 82° | 34 |
| Q155M | 253 | 241 | 82° | 34 |

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

# Hydra-Cell® T Series Performance Graphs and Specifications

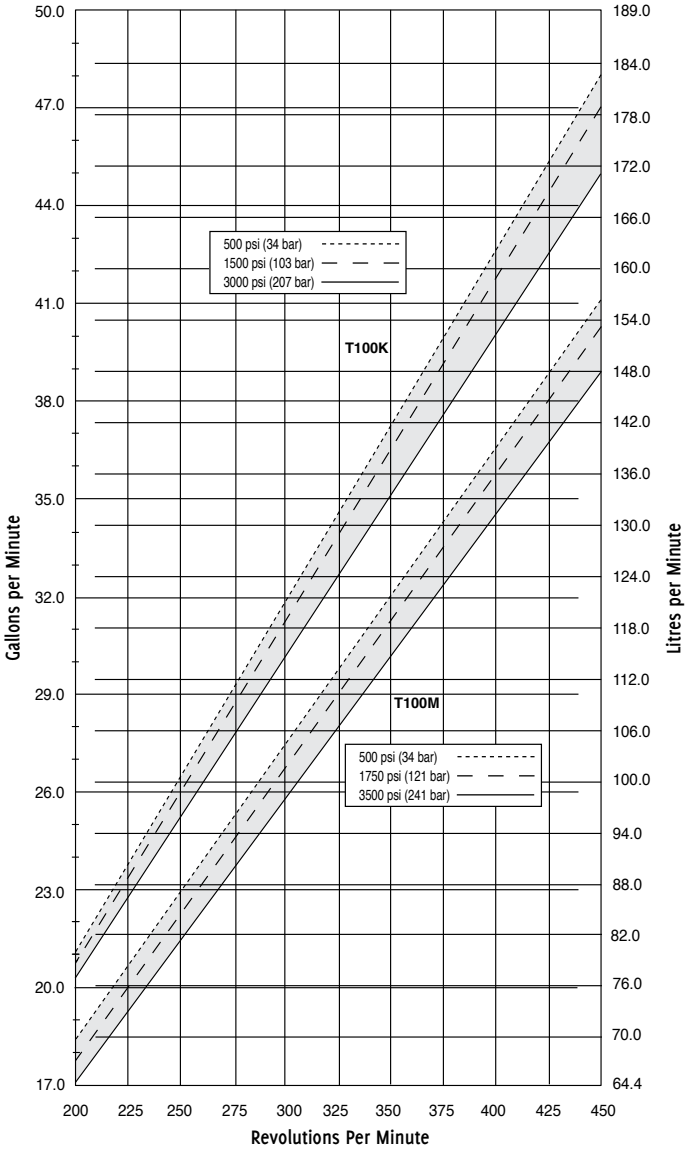
## API 674 option available

## T100S




| | |
|---|---|
| **Maximum Particle Size** | 0.8mm |
| **Inlet Port** | Two 2 inch 300 lbs ANSI FF flange |
| **Discharge Port** | Two 1-1/4 inch, 2,500 lbs ANSI RTJ flange |
| **Input Shaft** | Left or right side |
| **Shaft Diameter** | 76.2mm |
| **Shaft Rotation** | Bi-directional |
| **Weight** | 499 kg |

## T100K and T100M




| | |
|---|---|
| **Maximum Particle Size** | 0.8mm |
| **Inlet Port** | Two 3-1/2 inch 300 lbs RF ANSI or 2-1/2 inch NPT |
| **Discharge Port** | Two 1-1/4 inch, 2,500 lbs RTJ ANSI or 1-1/2 inch NPT |
| **Input Shaft** | Left or right side |
| **Shaft Diameter** | 76.2mm |
| **Shaft Rotation** | Bi-directional |
| **Weight** | 499 kg |

## Calculating Required Horsepower (kW)*

$$\frac{\text{gpm x psi}}{1{,}460} = \text{electric motor HP*}$$

$$\frac{\text{l/min x bar}}{511} = \text{electric motor kW*}$$


## Calculating Required Horsepower (kW)*

$$\frac{\text{gpm x psi}}{1{,}460} = \text{electric motor HP*}$$

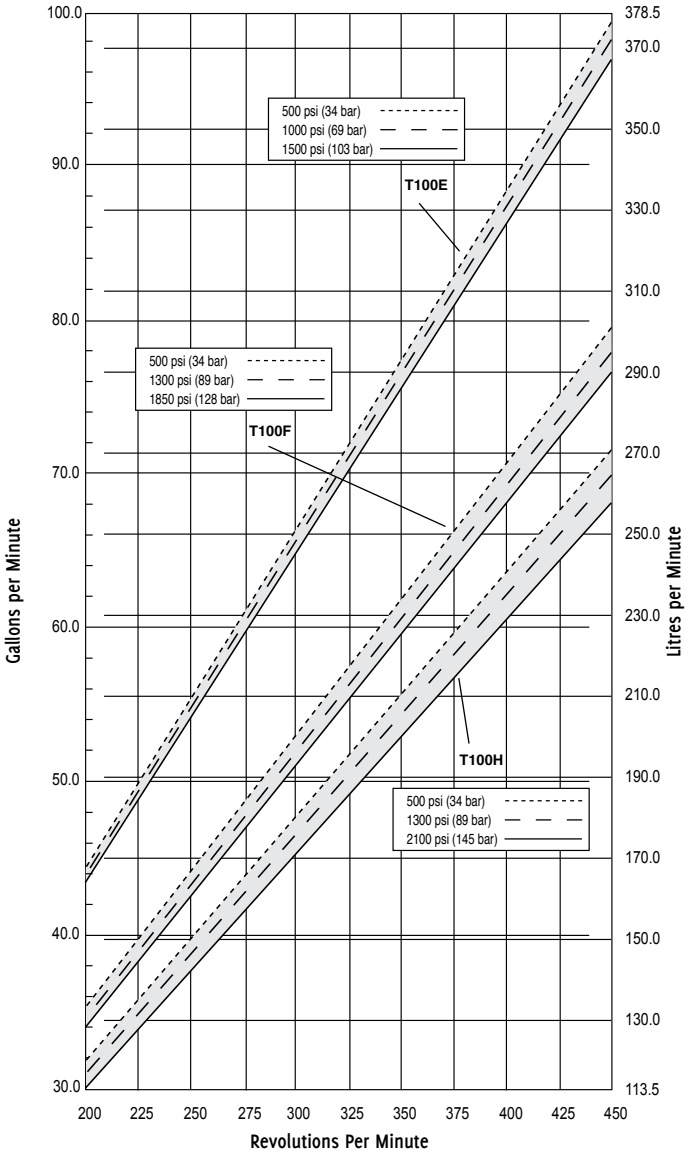
$$\frac{\text{l/min x bar}}{511} = \text{electric motor kW*}$$


* rpm equals pump shaft rpm. HP/kW is required application power. Use caution when sizing motors with variable speed drives.
Performance specifications are guidelines only.

# Hydra-Cell® T Series Performance Graphs and Specifications

## API 674 option available

## T100E, T100F and T100H





| | |
|---|---|
| **Maximum Particle Size** | 0.8mm |
| **Inlet Port** | Two 3-1/2 inch 300 lbs ANSI RF Flange |
| **Discharge Port** | Two 2 inch, 900 lbs ANSI RF Flange |
| **Input Shaft** | Left or right side |
| **Shaft Diameter** | 76.2mm |
| **Shaft Rotation** | Bi-directional |
| **Weight** | 499 kg |

## Calculating Required Horsepower (kW)*

$$\frac{\text{gpm x psi}}{1{,}460} = \text{electric motor HP*}$$

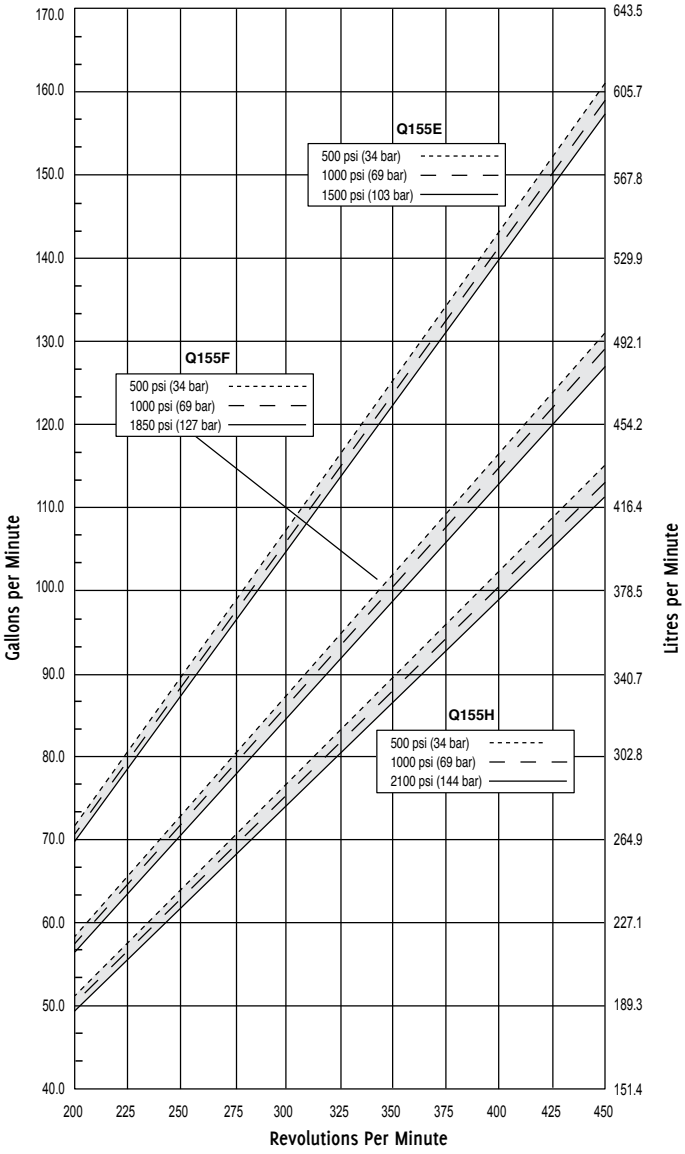
$$\frac{\text{l/min x bar}}{511} = \text{electric motor kW*}$$

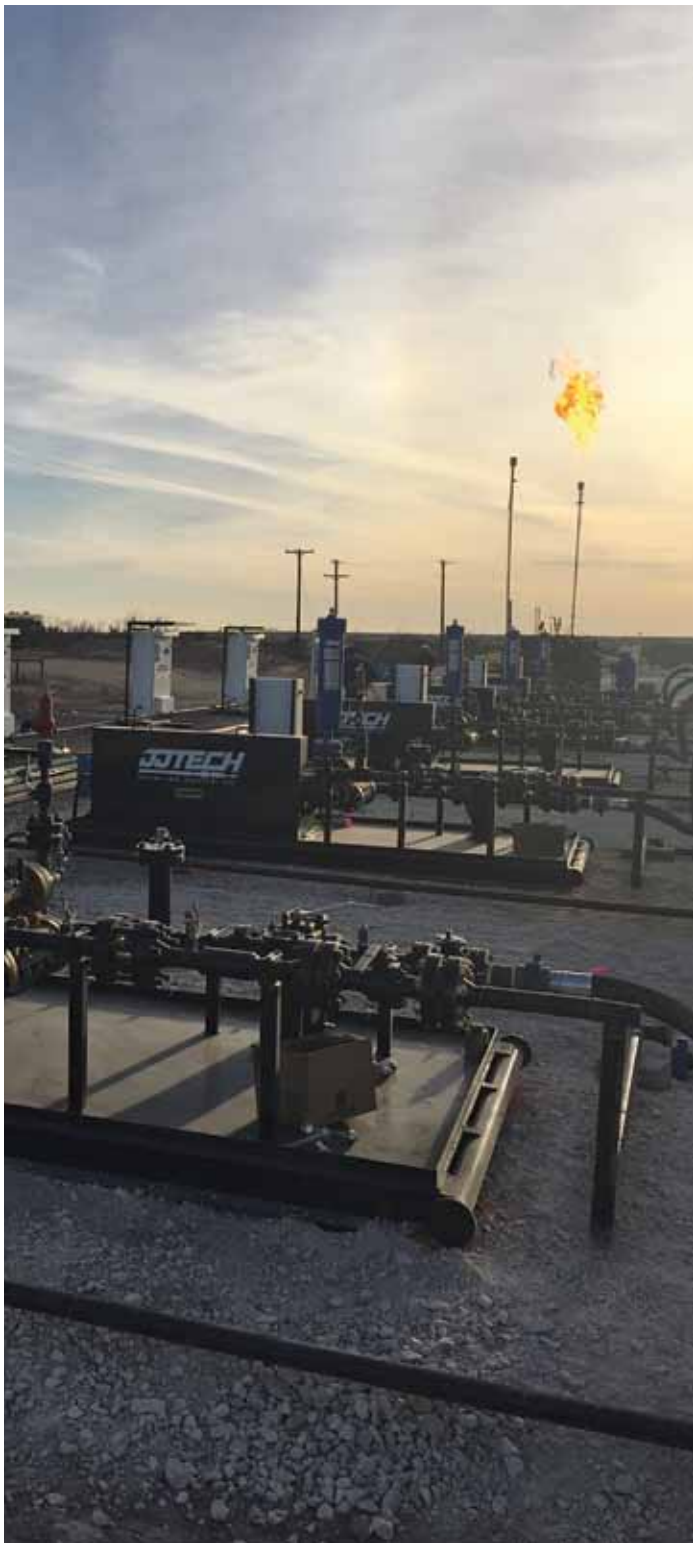
* rpm equals pump shaft rpm. HP/kW is required application power. Use caution when sizing motors with variable speed drives.
Performance specifications are guidelines only.

# Hydra-Cell® Q Series Performance Graphs and Specifications

## API 674 option available

## Q155E, Q155F and Q155H




| | |
|---|---|
| **Maximum Particle Size** | 0.8mm |
| **Inlet Port** | Weld On: 4 inch / SCH. 40 or 4 inch NPT |
| **Discharge Port** | Weld On: 3 inch / SCH. 80 or 3 inch NPT |
| **Input Shaft** | Left or right side |
| **Shaft Diameter** | 3 inch (76.2mm) |
| **Shaft Rotation** | Bi-directional |
| **Weight** | 771 kg |

## Calculating Required Horsepower (kW)*

$$\frac{\text{gpm x psi}}{1{,}460} = \text{electric motor HP*}$$

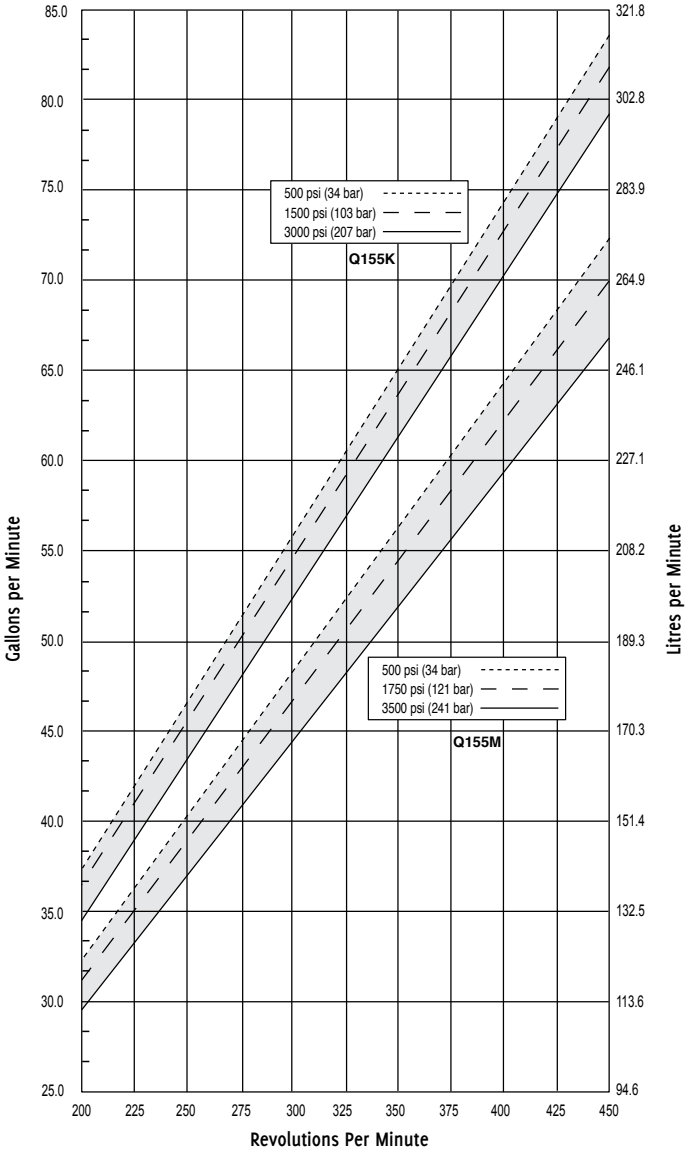
$$\frac{\text{l/min x bar}}{511} = \text{electric motor kW*}$$

* rpm equals pump shaft rpm. HP/kW is required application power. Use caution when sizing motors with variable speed drives.
Performance specifications are guidelines only.

# Hydra-Cell® Q Series Performance Graphs and Specifications

## API 674 option available

## Q155K and Q155M




| | |
|---|---|
| **Maximum Particle Size** | 0.8mm |
| **Inlet Port** | Weld On: 4 inch / SCH. 40 or 4 inch NPT |
| **Discharge Port** | Weld On: 2 inch / SCH. 160 or 2 inch NPT |
| **Input Shaft** | Left or right side |
| **Shaft Diameter** | 3 inch (76.2mm) |
| **Shaft Rotation** | Bi-directional |
| **Weight** | 771 kg |

## Calculating Required Horsepower (kW)*

$$\frac{\text{gpm x psi}}{1{,}460} = \text{electric motor HP*}$$

$$\frac{\text{l/min x bar}}{511} = \text{electric motor kW*}$$

* rpm equals pump shaft rpm. HP/kW is required application power. Use caution when sizing motors with variable speed drives.
Performance specifications are guidelines only.

# Hydra-Cell® G Series Dosing Performance Pumps

## G22 Dosing

## G13 Dosing

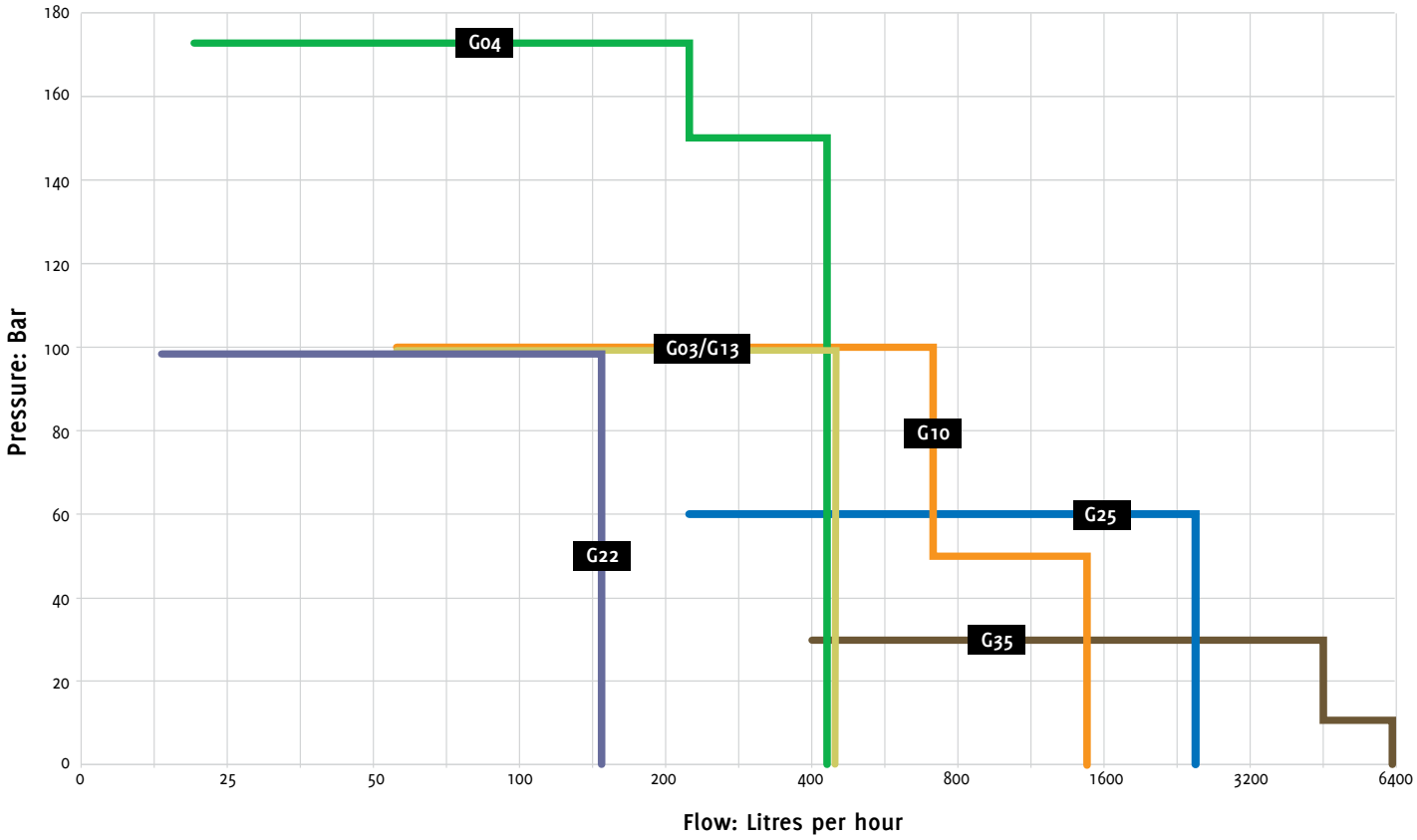
## G04 Dosing

## G10 Dosing

## G25 Dosing

## G35 Dosing

# Hydra-Cell® Series Dosing Performance Pumps




| Model | Adjustable Flow Range | | Maximum Discharge Pressure bar | | Maximum Operating Temperature °C [2] | | Maximum Inlet Pressure bar |
|---|---|---|---|---|---|---|---|
| | Minimum Capacity l/hr | Maximum Capacity l/hr | Non-Metallic[1] | Metallic | Non-Metallic | Metallic | |
| G22 -M6L | 4.2 | 50 | 24 | 30 | 60° | 121° | 17 |
| G22 - M4L | 6.6 | 78 | 24 | 30 | 60° | 121° | 17 |
| G22 - M2L | 13.2 | 156 | 24 | 30 | 60° | 121° | 17 |
| G22 - M6H | 4.2 | 50 | 24 | 100 | 60° | 121° | 17 |
| G22 - M4H | 6.6 | 78 | 24 | 100 | 60° | 121° | 17 |
| G22 - M2H | 13.2 | 156 | 24 | 100 | 60° | 121° | 17 |
| G13 - M2L | 38 | 462 | N/A | 20 | N/A | 121° | 17 |
| G13 - M4L | 19 | 230 | N/A | 20 | N/A | 121° | 17 |
| G13 - M2M | 38 | 462 | N/A | 60 | N/A | 121° | 17 |
| G03 - M2H | 38 | 462 | 24 | 100 | 60° | 121° | 17 |
| G04 - M2M | 38 | 452 | N/A | 150 | N/A | 121° | 34 |
| G04 - M4H | 19 | 226 | N/A | 172 | N/A | 121° | 34 |
| G10 - M2L | 120 | 1470 | 24 | 20 | 60° | 121° | 17 |
| G10 - M2M | 120 | 1470 | 24 | 50 | 60° | 121° | 17 |
| G10 - M4L | 60 | 732 | 24 | 20 | 60° | 121° | 17 |
| G10 - M4H | 60 | 732 | 24 | 100 | 60° | 121° | 17 |
| G25 - M4L | 216 | 2600 | 24 | 20 | 60° | 121° | 17 |
| G25 - M4M | 216 | 2600 | 24 | 60 | 60° | 121° | 17 |
| G35 - M4L | 396 | 4800 | N/A | 30 | N/A | 121° | 34 |
| G35 - M2L | 792 | 6360 | N/A | 10 | N/A | 121° | 34 |

*1 24 bar maximum with PVDF (Kynar®) liquid end; 17 bar maximum with Polypropylene liquid end.*
*2 Consult factory for correct component selection for temperatures from 160°F (71°C) to 250°F (121°C).*
*3 Refer to G Series data sheets for relevant material selections*

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

P100

P200

P300

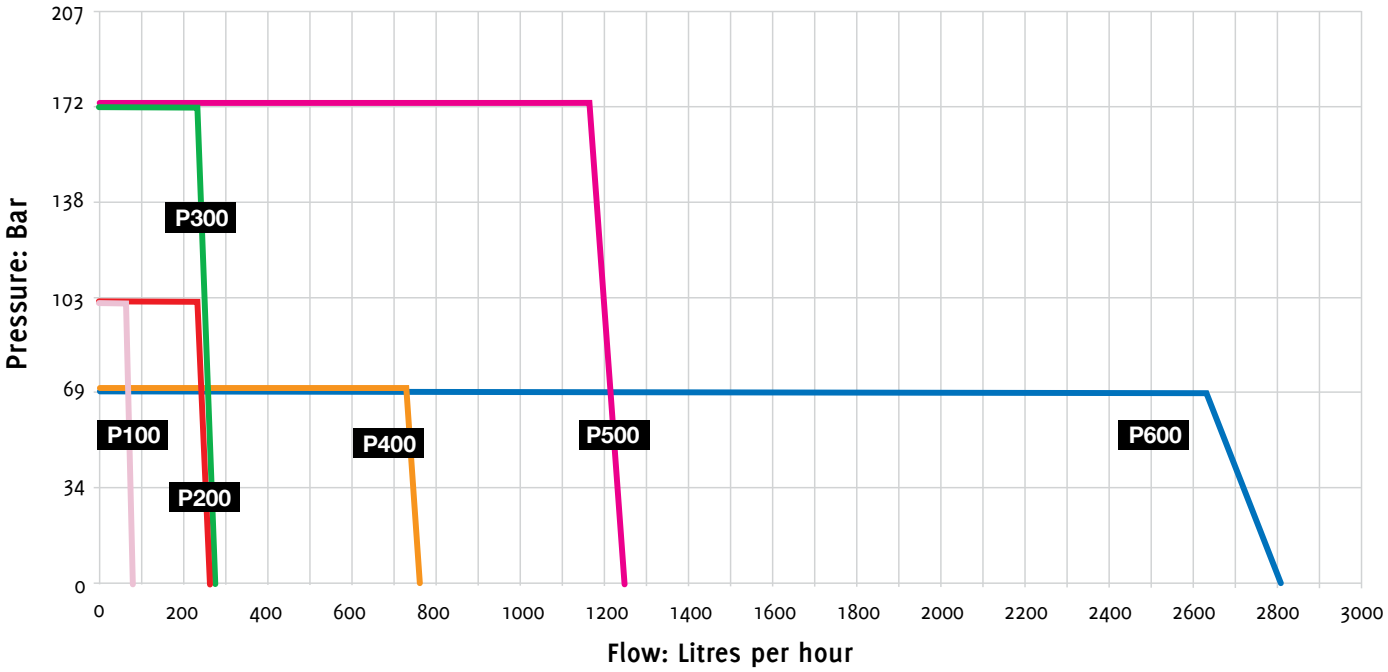
P400

P500

P600

# Hydra-Cell® P Series Flow Capacities and Pressure Ratings

## P Series Electronic Precision Metering Pumps




| Model[1] | Maximum Capacity l/hr | Maximum Discharge Pressure bar | | Maximum Operating Temperature °C[3] | | Maximum Inlet Pressure bar |
|---|---|---|---|---|---|---|
| | | Non-Metallic[2] | Metallic | Non-Metallic[2] | Metallic | |
| P100 | 85 | 24 | 103 | 60° | 121° | 17 |
| P200 | 255 | 24 | 103 | 60° | 121° | 17 |
| P300 | 257 | N/A | 172 | N/A | 121° | 34 |
| P400 | 766 | 24 | 69 | 60° | 121° | 17 |
| P500 | 1244 | N/A | 172 | N/A | 121° | 34 |
| P600 | 2808 | 24 | 69 | 60° | 121° | 17 |

*1 Ratings are for X-Cam design*
*2 24 bar maximum with PVDF (Kynar®) liquid end; 17 bar maximum with Polypropylene liquid end.*
*3 Consult factory for correct component selection for temperatures above 71˚C*

## Hydra-Cell® P Series Pumps Exceed API 675 Performance Standards

Hydra Cell Metering Solutions pumps meet or exceed API 675 performance standards for Steady-State Accuracy (± 1%), Linearity (± 3%) and Repeatability (± 3%).

# Hydra-Cell® P Series Flow Capacities and Pressure Ratings

## P100

### For Synchronous Speed, Self-Cooled Motors

L/hr Maximum Flow at Designated Pressure

| L/hr All Pumps | | L/hr Metallic Pump Heads Only | | | Pump RPM | Gear Ratio | Motor RPM |
|---|---|---|---|---|---|---|---|
| 7 Bar | 17 Bar | 34 Bar | 69 Bar | 100 Bar | | | |
| 3.4 | 3.4 | 3.3 | 3.2 | N/A | 25 | 60:1 | 1500 |
| 4.1 | 4.1 | 4.0 | 3.9 | N/A | 30 | 50:1 | |
| 5.1 | 5.1 | 5.1 | 4.8 | 4.7 | 37.5 | 40:1 | |
| 6.9 | 6.9 | 6.8 | 6.5 | 6.3 | 50 | 30:1 | |
| 8.3 | 8.3 | 8.1 | 7.8 | 7.6 | 60 | 25:1 | |
| 10.5 | 10.4 | 10.2 | 9.8 | 9.5 | 75 | 20:1 | |
| 14.0 | 13.9 | 13.6 | 13.1 | 12.7 | 100 | 15:1 | |
| 21.1 | 20.9 | 20.4 | 19.6 | 19.1 | 150 | 10:1 | |
| 28.2 | 27.9 | 27.3 | 26.2 | 25.5 | 200 | 7.5:1 | |
| 42.4 | 41.9 | 41.0 | 39.4 | 38.3 | 300 | 5:1 | |
| 56.6 | 55.9 | 54.6 | 52.5 | 51.1 | 400 | 7.5:1 | 3000 |
| 85.0 | 83.8 | 82.0 | 78.8 | 76.7 | 600 | 5:1 | |

Required Motor kW

| 0.18 | 0.25 | 0.37 | 0.55 | 0.75 |
|---|---|---|---|---|

The above motor kW are based on ambient temperature conditions up to 25c°
For ambient temperatures above 25c°, please consult Wanner International.

### For 10:1 Turndown, Self-Cooled Motors

L/hr Maximum Flow at Designated Pressure

| L/hr All Pumps | | L/hr Metallic Pump Heads Only | | | Pump RPM | Gear Ratio | Motor RPM |
|---|---|---|---|---|---|---|---|
| 7 Bar | 17 Bar | 34 Bar | 69 Bar | 100 Bar | | | |
| 3.4 | 3.4 | 3.3 | 3.2 | N/A | 25 | 60:1 | 1500 |
| 4.1 | 4.1 | 4.0 | 3.8 | N/A | 30 | 50:1 | |
| 5.1 | 5.1 | 5.1 | 4.8 | 4.7 | 37.5 | 40:1 | |
| 6.9 | 6.9 | 6.8 | 6.5 | 6.2 | 50 | 30:1 | |
| 8.3 | 8.3 | 8.1 | 7.8 | 7.6 | 60 | 25:1 | |
| 10.5 | 10.4 | 10.2 | 9.8 | 9.5 | 75 | 20:1 | |
| 14.0 | 13.9 | 13.6 | 13.1 | 12.7 | 100 | 15:1 | |
| 21.1 | 20.9 | 20.4 | 19.6 | 19.1 | 150 | 10:1 | |
| 28.2 | 27.9 | 27.3 | 26.2 | 25.5 | 200 | 7.5:1 | |
| 42.4 | 41.9 | 41.0 | 39.4 | 38.3 | 300 | 5:1 | |
| 56.6 | 55.9 | 54.6 | 52.5 | 51.1 | 400 | 7.5:1 | 3000 |
| 85.0 | 83.8 | 82.0 | 78.8 | 76.7 | 600 | 5:1 | |

Required Motor kW

| 0.18 | 0.25 | 0.37 | 0.55 | 0.75 | 1.1 |
|---|---|---|---|---|---|

The above motor kW are based on ambient temperature conditions up to 25c°
For ambient temperatures above 25c°, Force-Cooled Motors must be used.

| | |
|---|---|
| **Maximum Particle Size** | 0.3mm @ 15% max. concentration |
| **Inlet Port** | 1/2 inch BSPT |
| **Discharge Port** | 3/8 inch BSPT |
| **Weight** (less motor)<br>Metallic head:<br>Non-metallic head: | <br>9.7 kg (21.3 lbs)<br>8.7 kg (19.2 lbs) |

| | |
|---|---|
| **Maximum Particle Size** | 0.3mm @ 15% max. concentration |
| **Inlet Port** | 1/2 inch BSPT |
| **Discharge Port** | 3/8 inch BSPT |
| **Weight** (less motor)<br>Metallic head:<br>Non-metallic head: | <br>9.7 kg (21.3 lbs)<br>8.7 kg (19.2 lbs) |

Performance specifications are guidelines only.

# Hydra-Cell® P Series Flow Capacities and Pressure Ratings

## P200

### For Synchronous Speed, Self-Cooled Motors

L/hr Maximum Flow at Designated Pressure

| L/hr All Pumps 7 Bar | L/hr All Pumps 17 Bar | L/hr Metallic Pump Heads Only 34 Bar | L/hr Metallic Pump Heads Only 69 Bar | Pump RPM | Gear Ratio | Motor RPM |
|---|---|---|---|---|---|---|
| 10.6 | 10.5 | 10.2 | 9.9 | 25 | 60:1 | 1500 |
| 12.8 | 12.6 | 12.3 | 11.9 | 30 | 50:1 | |
| 16.0 | 15.8 | 15.5 | 15.0 | 37.5 | 40:1 | |
| 21.3 | 21.1 | 20.7 | 20.0 | 50 | 30:1 | |
| 25.6 | 25.3 | 24.8 | 24.1 | 60 | 25:1 | |
| 32.0 | 31.6 | 31.1 | 30.2 | 75 | 20:1 | |
| 42.6 | 42.2 | 41.5 | 40.3 | 100 | 15:1 | |
| 63.9 | 63.2 | 62.2 | 60.5 | 150 | 10:1 | |
| 85.1 | 84.3 | 83.0 | 80.8 | 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 | 3000 |
| 255.4 | 253.0 | 249.2 | 242.8 | 600 | 5:1 | |

Required Motor kW

0.18 | 0.37 | 0.75

The above motor kW are based on ambient temperature conditions up to 25c°
For ambient temperatures above 25c°, please consult Wanner International.

### For 10:1 Turndown, Self-Cooled Motors

L/hr Maximum Flow at Designated Pressure

| L/hr All Pumps 7 Bar | L/hr All Pumps 17 Bar | L/hr Metallic Pump Heads Only 34 Bar | L/hr Metallic Pump Heads Only 69 Bar | Pump RPM | Gear Ratio | Motor RPM |
|---|---|---|---|---|---|---|
| 10.6 | 10.5 | 10.2 | 9.9 | 25 | 60:1 | 1500 |
| 12.8 | 12.6 | 12.3 | 11.9 | 30 | 50:1 | |
| 16.0 | 15.8 | 15.5 | 15.0 | 37.5 | 40:1 | |
| 21.3 | 21.1 | 20.7 | 20.0 | 50 | 30:1 | |
| 25.6 | 25.3 | 24.8 | 24.1 | 60 | 25:1 | |
| 32.0 | 31.6 | 31.1 | 30.2 | 75 | 20:1 | |
| 42.6 | 42.2 | 41.5 | 40.3 | 100 | 15:1 | |
| 63.9 | 63.3 | 62.2 | 60.5 | 150 | 10:1 | |
| 85.1 | 84.3 | 83.0 | 80.8 | 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 | 3000 |
| 255.4 | 253.0 | 249.2 | 242.8 | 600 | 5:1 | |

Required Motor kW

0.18 | 0.25 | 0.37 | 0.55 | 0.75 | 1.1 | 1.5

The above motor kW are based on ambient temperature conditions up to 25c°
For ambient temperatures above 25c°, Force-Cooled Motors must be used.

| | |
|---|---|
| **Maximum Particle Size** | 0.3mm @ 15% max. concentration |
| **Inlet Port** | 1/2 inch BSPT |
| **Discharge Port** | 3/8 inch BSPT |
| **Weight** (less motor)<br>Metallic head:<br>Non-metallic head: | <br>19.0 kg (41.8 lbs)<br>14.9 kg (32.8 lbs) |

| | |
|---|---|
| **Maximum Particle Size** | 0.3mm @ 15% max. concentration |
| **Inlet Port** | 1/2 inch BSPT |
| **Discharge Port** | 3/8 inch BSPT |
| **Weight** (less motor)<br>Metallic head:<br>Non-metallic head: | <br>19.0 kg (41.8 lbs)<br>14.9 kg (32.8 lbs) |

Performance specifications are guidelines only.

# Hydra-Cell® P Series Flow Capacities and Pressure Ratings

## P300

### For Synchronous Speed, Self-Cooled Motors

L/hr Maximum Flow at Designated Pressure

| L/hr Metallic Pump Heads Only 7 Bar | 34 Bar | 103 Bar | 172 Bar | Pump RPM | Gear Ratio | Motor RPM |
|---|---|---|---|---|---|---|
| 10.2 | 10.0 | 9.5 | 8.6 | 25 | 60:1 | 1500 |
| 12.3 | 12.1 | 11.5 | 10.6 | 30 | 50:1 | |
| 15.6 | 15.4 | 14.5 | 13.5 | 37.5 | 40:1 | |
| 20.9 | 20.7 | 19.5 | 18.2 | 50 | 30:1 | |
| 25.2 | 24.9 | 23.5 | 22.1 | 60 | 25:1 | |
| 31.7 | 31.2 | 29.6 | 27.8 | 75 | 20:1 | |
| 42.4 | 41.7 | 39.6 | 37.4 | 100 | 15:1 | |
| 63.8 | 62.7 | 59.6 | 56.5 | 150 | 10:1 | |
| 85.3 | 83.7 | 79.6 | 75.6 | 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 | 0.37 | 0.55 | 0.75 | 1.1 | 1.5

The above motor kW are based on ambient temperature conditions up to 25c°
For ambient temperatures above 25c°, please consult Wanner International.

### For 10:1 Turndown, Self-Cooled Motors

L/hr Maximum Flow at Designated Pressure

| L/hr Metallic Pump Heads Only 7 Bar | 34 Bar | 103 Bar | 172 Bar | Pump RPM | Gear Ratio | Motor RPM |
|---|---|---|---|---|---|---|
| 10.2 | 10.0 | 9.51 | 8.6 | 25 | 60:1 | 1500 |
| 12.3 | 12.1 | 11.53 | 10.6 | 30 | 50:1 | |
| 15.6 | 15.4 | 14.53 | 13.5 | 37.5 | 40:1 | |
| 20.9 | 20.7 | 19.54 | 18.2 | 50 | 30:1 | |
| 25.2 | 24.9 | 23.54 | 22.1 | 60 | 25:1 | |
| 31.7 | 31.2 | 29.55 | 27.8 | 75 | 20:1 | |
| 42.4 | 41.7 | 39.56 | 37.4 | 100 | 15:1 | |
| 63.8 | 62.7 | 59.59 | 56.5 | 150 | 10:1 | |
| 85.3 | 83.7 | 79.61 | 75.6 | 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 | 2.2 | 3.0

The above motor kW are based on ambient temperature conditions up to 25c°
For ambient temperatures above 25c°, Force-Cooled Motors must be used.

| | |
|---|---|
| **Maximum Particle Size** | 0.3mm @ 15% max. concentration |
| **Inlet Port** | 1/2 inch BSPT |
| **Discharge Port** | 1/2 inch BSPT |
| **Weight** (less motor) | 24.7 kg (54.5 lbs) |

| | |
|---|---|
| **Maximum Particle Size** | 0.3mm @ 15% max. concentration |
| **Inlet Port** | 1/2 inch BSPT |
| **Discharge Port** | 1/2 inch BSPT |
| **Weight** (less motor) | 24.7 kg (54.5 lbs) |

Performance specifications are guidelines only.

# Hydra-Cell® P Series Flow Capacities and Pressure Ratings

## P400

### For Synchronous Speed, Self-Cooled Motors

L/hr Maximum Flow at Designated Pressure

| L/hr All Pumps 7 Bar | L/hr All Pumps 17 Bar | L/hr Metallic Pump Heads Only 34 Bar | L/hr Metallic Pump Heads Only 69 Bar | Pump RPM | Gear Ratio | Motor RPM |
|---|---|---|---|---|---|---|
| 30.4 | 29.3 | 26.8 | 20.4 | 25 | 60:1 | 1500 |
| 36.8 | 35.6 | 33.0 | 26.1 | 30 | 50:1 | |
| 46.2 | 45.1 | 42.2 | 35.4 | 37.5 | 40:1 | |
| 62.2 | 60.9 | 57.7 | 50.3 | 50 | 30:1 | |
| 75.0 | 73.6 | 70.1 | 62.3 | 60 | 25:1 | |
| 94.2 | 92.6 | 88.8 | 80.3 | 75 | 20:1 | |
| 126.2 | 124.2 | 119.9 | 110.2 | 100 | 15:1 | |
| 190.2 | 187.5 | 182.0 | 170.1 | 150 | 10:1 | |
| 254.2 | 250.8 | 244.2 | 230.0 | 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 | |

Required Motor kW

| | | | | | |
|---|---|---|---|---|---|
| 0.18 | 0.37 | 0.55 | 0.75 | 1.1 | |
| 1.5 | 2.2 | | | | |

The above motor kW are based on ambient temperature conditions up to 25c°
For ambient temperatures above 25c°, please consult Wanner International.

### For 10:1 Turndown, Self-Cooled Motors

L/hr Maximum Flow at Designated Pressure

| L/hr All Pumps 7 Bar | L/hr All Pumps 17 Bar | L/hr Metallic Pump Heads Only 34 Bar | L/hr Metallic Pump Heads Only 69 Bar | Pump RPM | Gear Ratio | Motor RPM |
|---|---|---|---|---|---|---|
| 30.4 | 29.3 | 26.8 | 20.4 | 25 | 60:1 | 1500 |
| 36.8 | 35.6 | 33.0 | 26.1 | 30 | 50:1 | |
| 46.2 | 45.1 | 42.2 | 35.4 | 37.5 | 40:1 | |
| 62.2 | 60.9 | 57.7 | 50.3 | 50 | 30:1 | |
| 75.0 | 73.6 | 70.1 | 62.3 | 60 | 25:1 | |
| 94.2 | 92.6 | 88.8 | 80.3 | 75 | 20:1 | |
| 126.2 | 124.2 | 119.9 | 110.2 | 100 | 15:1 | |
| 190.2 | 187.5 | 182.0 | 170.1 | 150 | 10:1 | |
| 254.2 | 250.8 | 244.2 | 230.0 | 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 | |

Required Motor kW

| | | | | | |
|---|---|---|---|---|---|
| 0.18 | 0.25 | 0.37 | 0.55 | 0.75 | 1.1 |
| 1.5 | 2.2 | 3.0 | | | |

The above motor kW are based on ambient temperature conditions up to 25c°
For ambient temperatures above 25c°, Force-Cooled Motors must be used.

| | |
|---|---|
| **Maximum Particle Size** | 0.8mm @ 5-10% max. concentration |
| **Inlet Port** | 1 inch BSPT |
| **Discharge Port** | 3/4 inch BSPT |
| **Weight** (less motor)<br>Metallic head:<br>Non-metallic head | <br>29.7 kg (65.5 lbs)<br>23.8 kg (52.5 lbs) |

| | |
|---|---|
| **Maximum Particle Size** | 0.8mm @ 5-10% max. concentration |
| **Inlet Port** | 1 inch BSPT |
| **Discharge Port** | 3/4 inch BSPT |
| **Weight** (less motor)<br>Metallic head:<br>Non-metallic head | <br>29.7 kg (65.5 lbs)<br>23.8 kg (52.5 lbs) |

Performance specifications are guidelines only.

# Hydra-Cell® P Series Performance Graphs and Specifications

## P500

### For Synchronous Speed, Self-Cooled Motors

L/hr Maximum Flow at Designated Pressure

| L/hr Metallic Pump Heads Only 7 Bar | 34 Bar | 103 Bar | 172 Bar | Pump RPM | Gear Ratio | Motor RPM |
|---|---|---|---|---|---|---|
| 55.1 | 53.5 | 49.7 | 45.6 | 25 | 60:1 | 1500 |
| 66.2 | 64.4 | 60.3 | 55.8 | 30 | 50:1 | |
| 83.2 | 81.2 | 76.3 | 71.5 | 37.5 | 40:1 | |
| 111.3 | 108.7 | 102.9 | 97.2 | 50 | 30:1 | |
| 133.7 | 130.8 | 124.2 | 117.7 | 60 | 25:1 | |
| 167.3 | 163.9 | 156.1 | 148.5 | 75 | 20:1 | |
| 223.3 | 219.1 | 209.3 | 199.8 | 100 | 15:1 | |
| 335.3 | 329.5 | 315.7 | 302.4 | 150 | 10:1 | |
| 447.3 | 439.8 | 422.0 | 405.1 | 200 | 7.5:1 | |
| 671.4 | 660.1 | 634.8 | N/A | 300 | 5:1 | |
| 895.4 | 881.3 | N/A | N/A | 400 | 7.5:1 | 3000 |
| 1343.5 | 1322.7 | N/A | N/A | 600 | 5:1 | |

Required Motor kW

0.18 | 0.37 | 0.55 | 0.75 | 1.1 | 1.5 | 2.2 | 4.0

The above motor kW are based on ambient temperature conditions up to 25c°
For ambient temperatures above 25c°, please consult Wanner International.

### For 10:1 Turndown, Self-Cooled Motors

L/hr Maximum Flow at Designated Pressure

| L/hr Metallic Pump Heads Only 7 Bar | 34 Bar | 103 Bar | 172 Bar | Pump RPM | Gear Ratio | Motor RPM |
|---|---|---|---|---|---|---|
| 55.1 | 53.5 | 49.7 | 45.6 | 25 | 60:1 | 1500 |
| 66.2 | 64.4 | 60.3 | 55.8 | 30 | 50:1 | |
| 83.2 | 81.2 | 76.3 | 71.5 | 37.5 | 40:1 | |
| 111.3 | 108.7 | 102.9 | 97.2 | 50 | 30:1 | |
| 133.7 | 130.8 | 124.2 | 117.7 | 60 | 25:1 | |
| 167.3 | 163.9 | 156.1 | 148.5 | 75 | 20:1 | |
| 223.3 | 219.1 | 209.3 | 199.8 | 100 | 15:1 | |
| 335.3 | 329.5 | 315.7 | N/A | 150 | 10:1 | |
| 447.3 | 439.8 | 422.0 | N/A | 200 | 7.5:1 | |
| 671.4 | 660.1 | N/A | N/A | 300 | 5:1 | |
| 895.4 | N/A | N/A | N/A | 400 | 7.5:1 | 3000 |
| 1343.5 | N/A | N/A | N/A | 600 | 5:1 | |

Required Motor kW

0.37 | 0.55 | 0.75 | 1.1 | 1.5 | 2.2 | 3.0 | 4.0

The above motor kW are based on ambient temperature conditions up to 25c°
For ambient temperatures above 25c°, Force-Cooled Motors must be used.

| | |
|---|---|
| **Maximum Particle Size** | 0.3mm @ 15% max. concentration |
| **Inlet Port** | 1-1/4 inch BSPT |
| **Discharge Port** | 3/4 inch BSPT |
| **Weight** (less motor) | 88.5 kg (192.1 lbs) |

| | |
|---|---|
| **Maximum Particle Size** | 0.3mm @ 15% max. concentration |
| **Inlet Port** | 1-1/4 inch BSPT |
| **Discharge Port** | 3/4 inch BSPT |
| **Weight** (less motor) | 88.5 kg (192.1 lbs) |

Performance specifications are guidelines only.

# Hydra-Cell® P Series Performance Graphs and Specifications

## P600

### For Synchronous Speed, Self-Cooled Motors

L/hr Maximum Flow at Designated Pressure

| L/hr All Pumps 7 Bar | L/hr All Pumps 17 Bar | L/hr Metallic Pump Heads Only 34 Bar | L/hr Metallic Pump Heads Only 69 Bar | Pump RPM | Gear Ratio | Motor RPM |
|---|---|---|---|---|---|---|
| 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 | N/A | 400 | 7.5:1 | 3000 |
| 2808 | 2788 | N/A | N/A | 600 | 5:1 | |

Required Motor kW

0.18 | 0.37 | 0.55 | 0.75 | 1.1 | 1.5 | 2.2 | 3.0 | 4.0

The above motor kW are based on ambient temperature conditions up to 25c°
For ambient temperatures above 25c°, please consult Wanner International.

### For 10:1 Turndown, Self-Cooled Motors

L/hr Maximum Flow at Designated Pressure

| L/hr All Pumps 7 Bar | L/hr All Pumps 17 Bar | L/hr Metallic Pump Heads Only 34 Bar | L/hr Metallic Pump Heads Only 69 Bar | Pump RPM | Gear Ratio | Motor RPM |
|---|---|---|---|---|---|---|
| 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 | N/A | 150 | 10:1 | |
| 934.7 | 927.9 | 914.1 | N/A | 200 | 7.5:1 | |
| 1403 | 1393 | 1373 | N/A | 300 | 5:1 | |
| 1872 | 1858 | N/A | N/A | 400 | 7.5:1 | 3000 |
| 2808 | N/A | N/A | N/A | 600 | 5:1 | |

Required Motor kW

0.37 | 0.55 | 0.75 | 1.1 | 1.5 | 2.2 | 3.0 | 4.0

The above motor kW are based on ambient temperature conditions up to 25c°
For ambient temperatures above 25c°, Force-Cooled Motors must be used.

| | |
|---|---|
| **Maximum Particle Size** | 1.5mm @ 5-10% max. concentration |
| **Inlet Port** | 1-1/2 inch BSPT |
| **Discharge Port** | 1 inch BSPT |
| **Weight** (less motor)<br>Metallic head:<br>Non-metallic head | <br>66.2 kg (146 lbs)<br>50.3 kg (111 lbs) |

| | |
|---|---|
| **Maximum Particle Size** | 1.5mm @ 5-10% max. concentration |
| **Inlet Port** | 1-1/2 inch BSPT |
| **Discharge Port** | 1 inch BSPT |
| **Weight** (less motor)<br>Metallic head:<br>Non-metallic head | <br>66.2 kg (146 lbs)<br>50.3 kg (111 lbs) |

Performance specifications are guidelines only.

# Hydra-Cell® MT8 Triplex Metering Pump

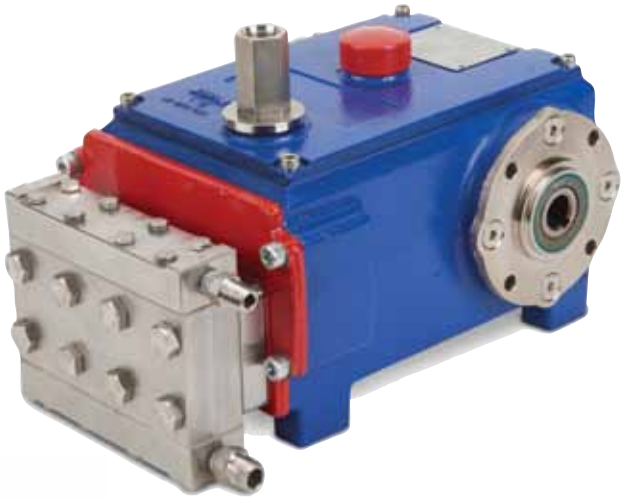
This groundbreaking triplex metering pump is the latest addition to the Hydra-Cell Metering Solutions product line.

The MT8 meets or exceeds API 675 performance standards for Steady-State Accuracy (±1%), Linearity (±3%) and Repeatability (±3%).

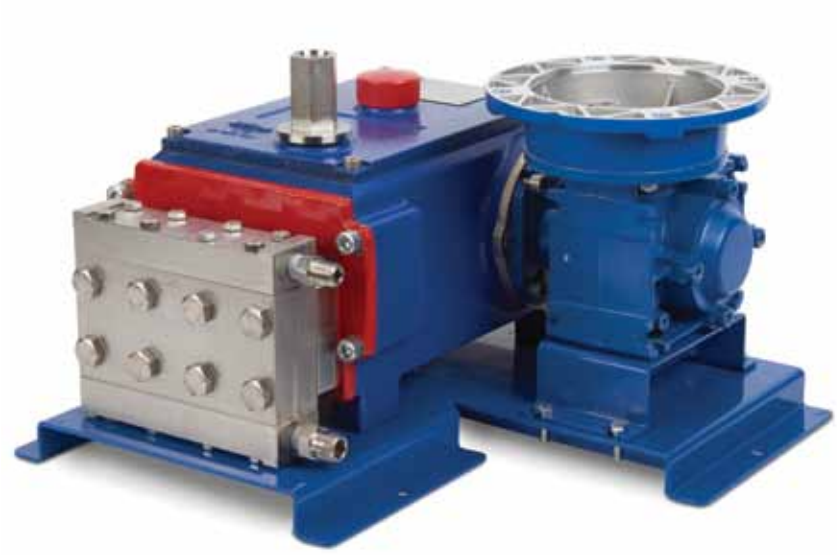
Hydraulically-balanced and actuated, the pump features an internal relief valve for added safety and cartridge check valves for ease of maintenance.

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 |



The MT8 features a built-in pressure relief valve to protect the pump.



MT8 with gearbox reducer.

MT8 assembly including flow rate control for ATEX & Explosives areas

# 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 |
| **With Relief Valve** | | |
| 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® Metering and Dosing Control Options

## For G and P-Series pumps

### Electronic Flow Rate Adjustment
### For Local Control

- ATEX Dust Zone 21 (Ex tb III C T125c Db)
- IP66 Standard
- Various flow rate adjustments options including:
  - On-board potentiometer(s)
  - On-board key-pad controller with flow rate display
  - Removable, hand-held key-pad controller for authorised personnel only

On-board
keypad control

Hand-held
keypad control

### Control Freak
### For Sophisticated Local Control

- Option available to control up to 6 x Hydra-Cell pumps with one Hydra-Cell "Control Freak"
- Multiple Variable Frequency Dive (VFD) options
- Enables programming for flow rate or totalisation
- Allows up to 10 x separate batch sequences
- Built-in Calibration mode


### Mechanical Flow Rate Adjustment
### For Local Control

ATEX

- ATEX Zone 1
- Linear fine adjustment scale on hand-wheel
- High reliability due to frictionless design
- Option to fit a mechanical lock to prevent unauthorised flow rate change

# Hydra-Cell® Pumps Accessories and Options

## Pump & Motor Adaptors:

## 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


## 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.

## Back Pressure & 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.

## 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 products Steel

## 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.

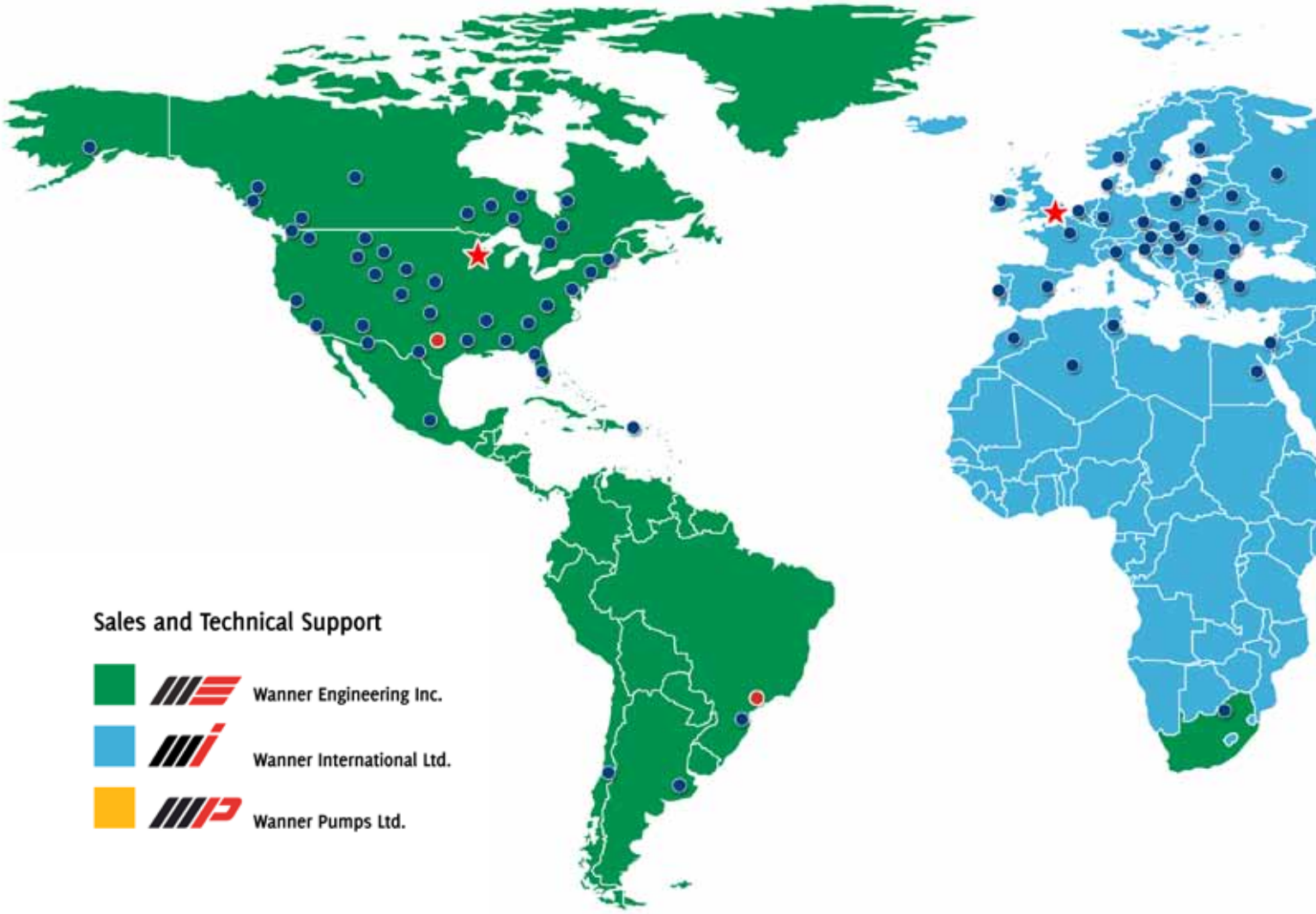
## Service Kits:

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).

# Hydra-Cell® Worldwide Sales and Service




**Contact us for the distributor location nearest you.**

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Morocco
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New Zealand
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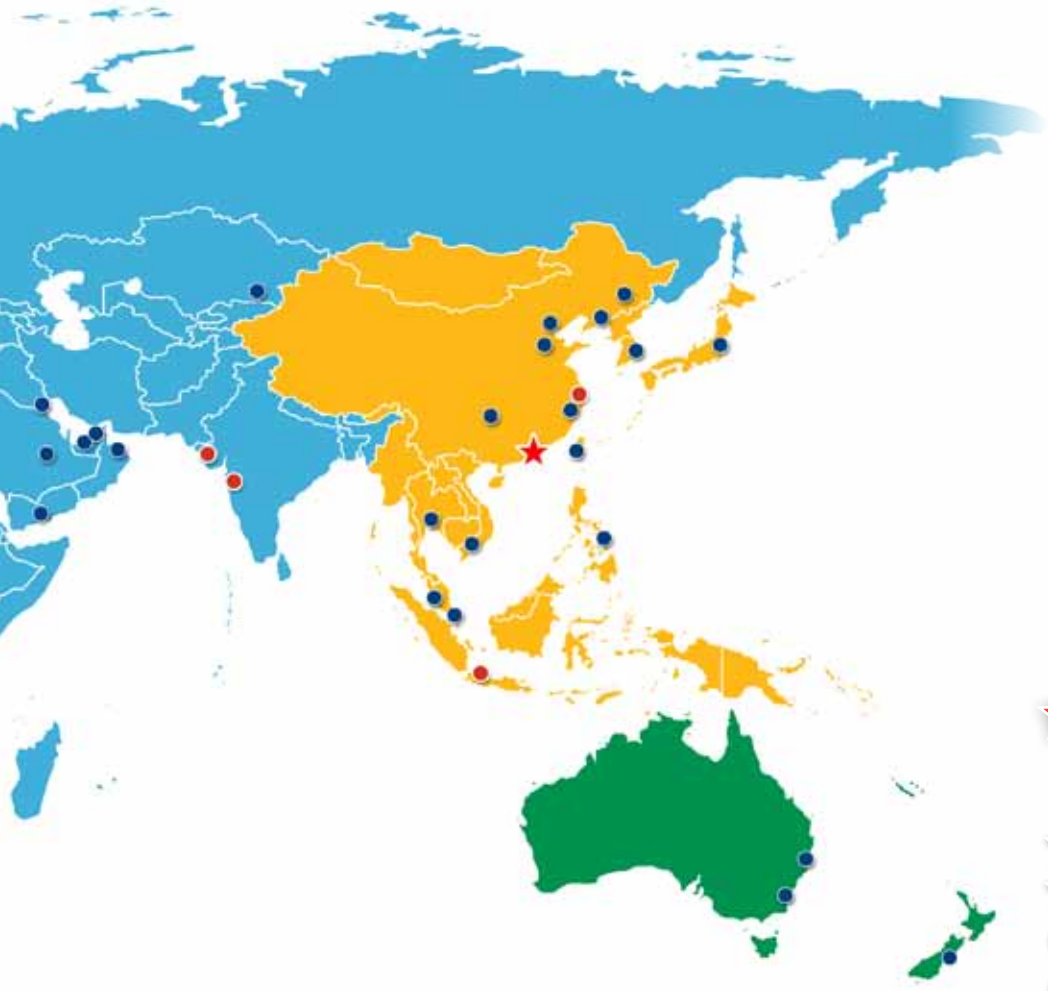

Hydra-Cell pumps are sold and serviced worldwide by a comprehensive network of factory-trained pump distributors. As specialists in pump technologies, our distributor organizations offer you a vital local resource for technical expertise, product training, sales and service.

Hydra-Cell distributors are located in nearly 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 and Manufacturing**

- Minneapolis, Minnesota, USA

**Business Units**

- Hampshire, United Kingdom
- Kowloon, Hong Kong
- Wichita Falls, Texas, USA
- Shanghai, China
- São Paulo, Brazil
- Mumbai, India

Russia
Serbia
Saudi Arabia
Singapore
Slovakia
South Africa
South Korea
Spain
Sweden
Switzerland
Taiwan
Thailand
Tunisia
Turkey
Ukraine
United Arab Emirates
United Kingdom
United States
Uruguay
Venezuela
Vietnam
Yemen

WANNER Hydra-Cell® Seal-less Pump Technology

# Hydra-Cell® Application Worksheet

Let us help you determine the best solution for your pumping application.
Simply provide the information below, tear out the page, and send it to us.

1. Fax to +44 (0) 1252 629242
2. Scan the page and email it as an attachment to sales@wannerint.com
3. Mail the page - either in an envelope or fold it, and using the other side as a mailing label, tape the page closed, affix postage and mail it
4. Give it to your local Wanner distributor

## Liquid Information:

Liquid Name: _____

Solids: Yes ❑ No ❑ If Yes, size and percentage: _____

Liquid Temperature: Operating _____ Min _____ Max _____

Viscosity: Min _____ Max _____ Specific Gravity: _____

Please provide a brief description of the application and liquid characteristics (e.g. abrasive, shear-sensitive)

_____

_____

*Please provide MSDS Sheet if available.*

## Equipment Information:

Installation: New ❑ Existing ❑

If existing, previous equipment installed: _____

Flow Rate: Operating _____ Min _____ Max _____ Units _____

Discharge Pressure: _____ Inlet (Suction) Pressure: _____

NPSHa: _____

Inlet Pipe Diameter: _____ Inlet Pipe Length: _____

Supply Voltage: Phase _____ Hertz _____

## Contact Information:

Name: _____ Date: _____

Title: _____

Company: _____

Address: _____

City: _____ State/Province: _____ Zip/Postal: _____

Phone: _____ Fax: _____

Email: _____

Company Website: _____

Market/Industry: _____

# Notes


WANNER

Hydra-Cell®

Partners in over 70 Countries

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