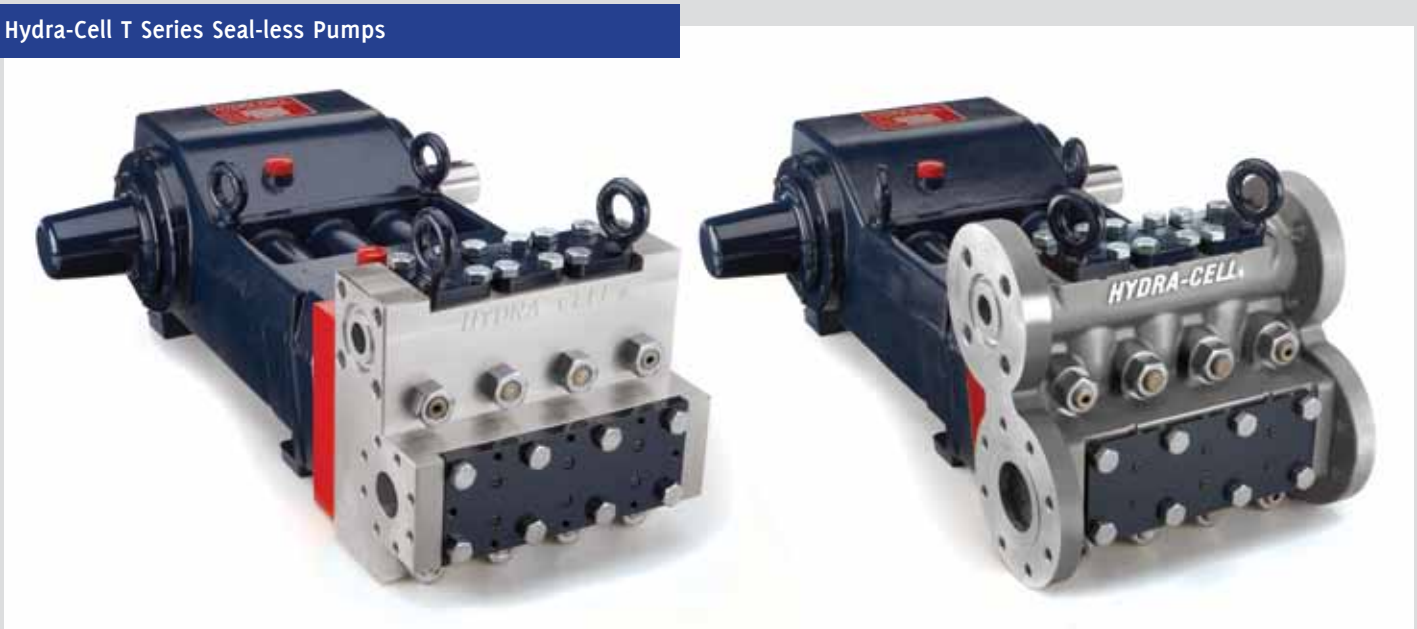
Hydra-Cell®

Seal-less Pump Technology

WANNER INTERNATIONAL

Hydra-Cell G Series Seal-less Pumps

Hydra-Cell T Series Seal-less Pumps



Hydra-Cell P Series Seal-less Metering Pumps

Hydra-Cell® Seal-less Pumps

Contents

WANNER Hydra-Cell® Seal-less Pump Technology

"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."

Dr. Ing Friedrich Wilhelm Hennecke
Chemical Engineering World

Wanner International ISO 9001: 2008 Certification

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).

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.

Wanner International ISO 14001: 2004 Certification

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.

Due to the Wanner Engineering Continuous Improvement Program, specifications and other data in this catalog 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 & 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, Effluent & Wastewater Treatment

Hydra-Cell® Primary Pumping Applications

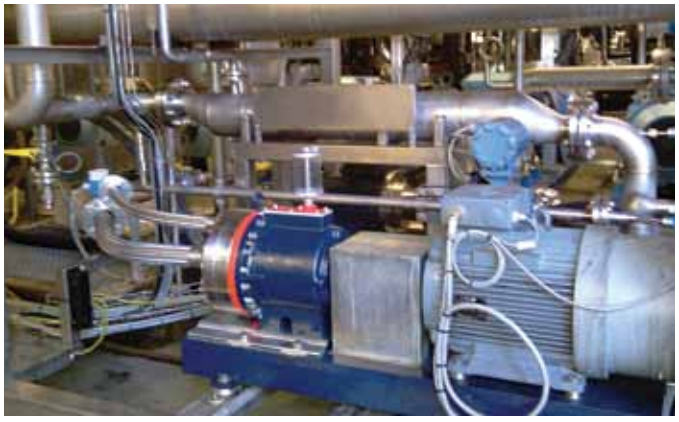
- Blending
- Cleaning
- Coating
- Dosing
- Filling
- Filtering
- Injecting
- Metering
- Mixing
- Sampling
- Spraying
- Transferring

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.

Pumpng for waste stream reduction and salt solution concentration at a pharmaceutical chemcial 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.

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

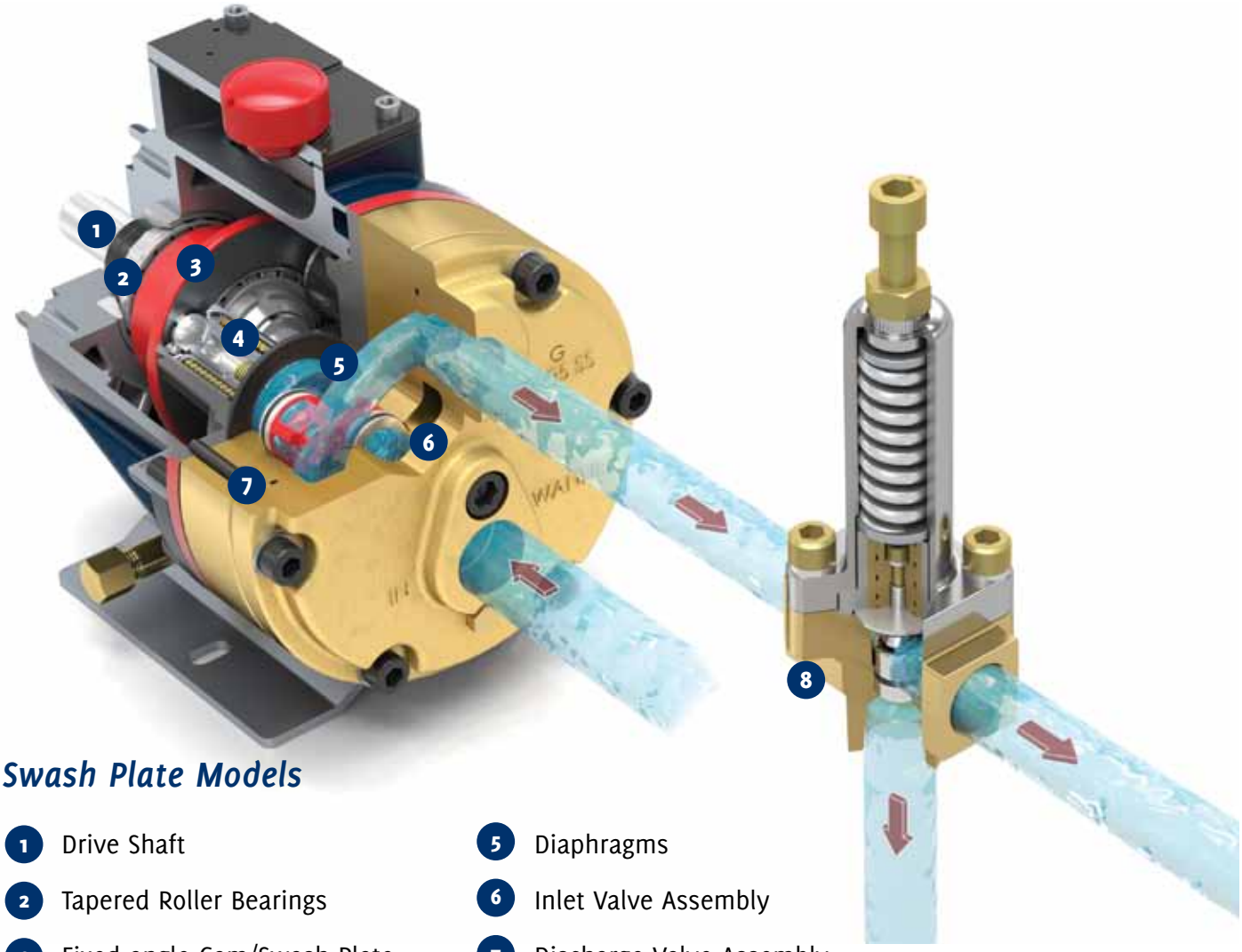
Wastewater treatment is a difficult pumping application that Hydra-Cell routinely handles.

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 liquid for making jet fuel.

Hydra-Cell® Principles of Operation - Swash Plate



Swash Plate Models

1. Drive Shaft
2. Tapered Roller Bearings
3. Fixed-angle Cam/Swash 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 Swash 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 swash 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.

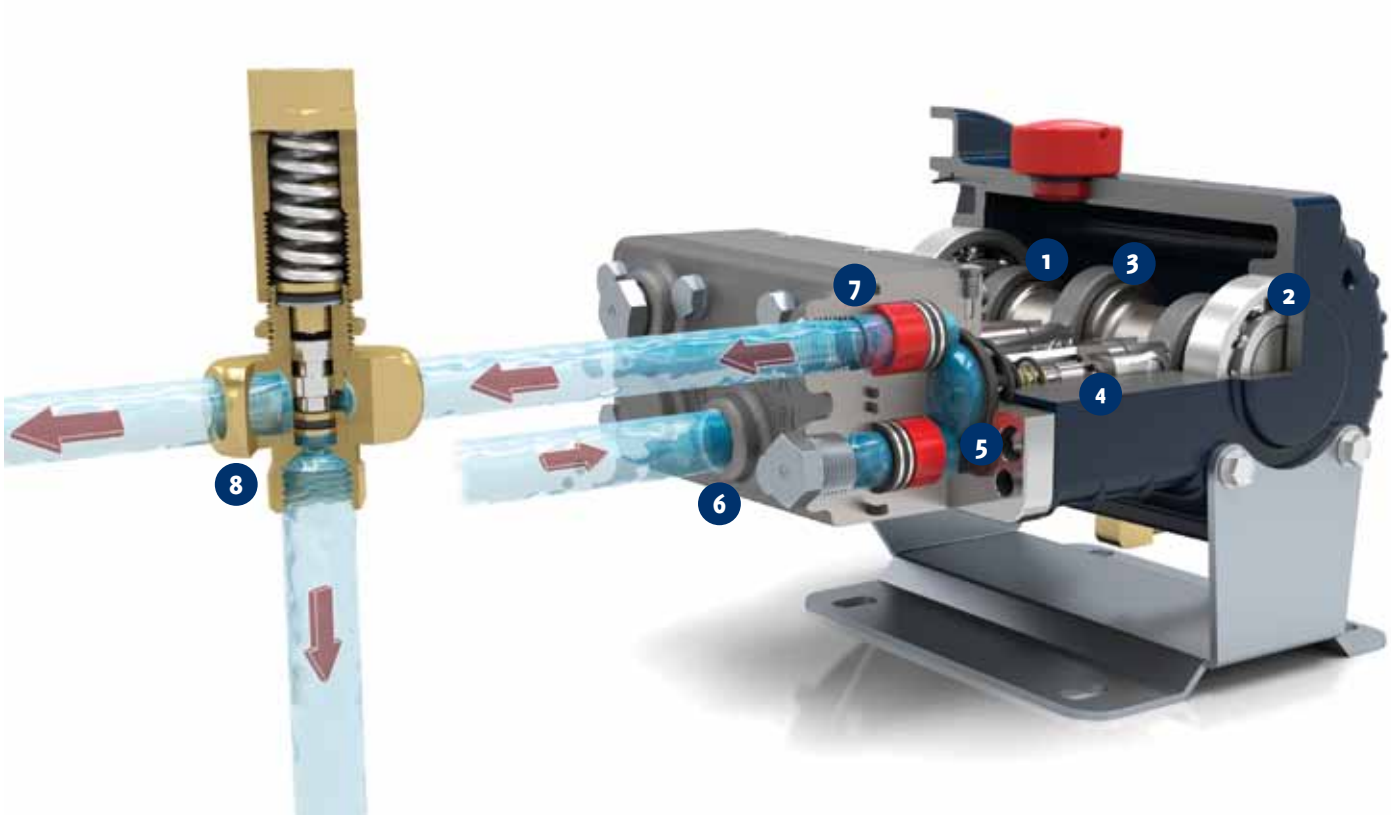
The oil held in the Hydra-Cell balances the back side of the diaphragms (5) and causes the diaphragms to flex forward and back as the swash plate moves. This provides the pumping action.

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 swash 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, 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.

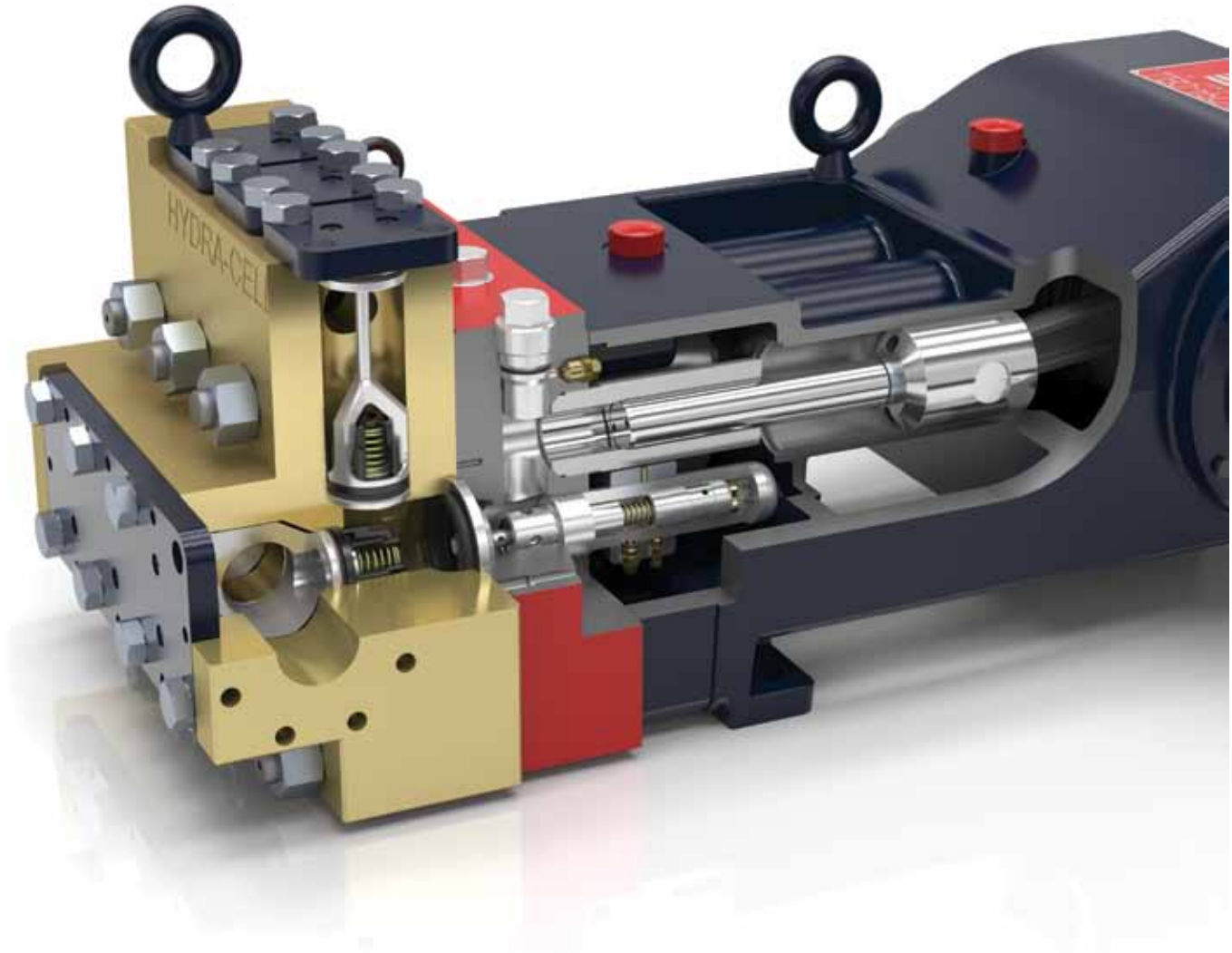
Hydra-Cell crank-shaft pumps can have up to three diaphragms, and each diaphragm has its own pumping chamber that contains an inlet and discharge self-aligning horizontal disk check valve assembly (6). As the diaphragms move back, liquid enters the pump through a common inlet and passes through one of 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 - T Series

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 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.

ATEX

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 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.

DNV

GOST-R and RTN

GOST-R is the Certificate of Conformity with Russian Federation norms, allowing for the sale of specified goods in the Russian market. The statutory regulation includes mandatory minimum product safety requirements and conformity with certain technical standards and requirements.

GOST R

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).

QAS INTERNATIONAL
ISO 9001:2008
REGISTERED FIRM

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.

QAS INTERNATIONAL
ISO 14001:2004
REGISTERED FIRM

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.

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.*)

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
- Nickel Alloy
- 304 Stainless Steel
- 316L Stainless Steel

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

Diaphragms and O-rings

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

- Aflas (used with PTFE O-ring)
- 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
- 17-4 PH Hardide Coated
  (For Increased Abrasion & Chemical Resistance)
- 316L Stainless Steel

Valves

- Ceramic
- Hastelloy CW12MW
- Nitronic 50
- Tungsten Carbide
- 17-4 PH Stainless Steel
- 17-4 PH Hardide Coated
  (For Increased Abrasion & Chemical Resistance)

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®	Seal Eastern, Inc.
Buna®-N (Nitrile)	E.I. Du Pont de Nemours and Company, Inc.
Celcon®	Celanese Company
Elgiloy®	Elgiloy Limited Partnership
Hardide	Hardide Coatings
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.
Zytel® (Nylon)	E.I. Du Pont de Nemours and Company, Inc.
Viton® (FKM)	DuPont Performance Elastomers, LLC

Hydra-Cell® G and T Series Seal-less Pumps Selection

G20

G03

G03 Mono-Block

G04

G10

G12

G15

G17

G25

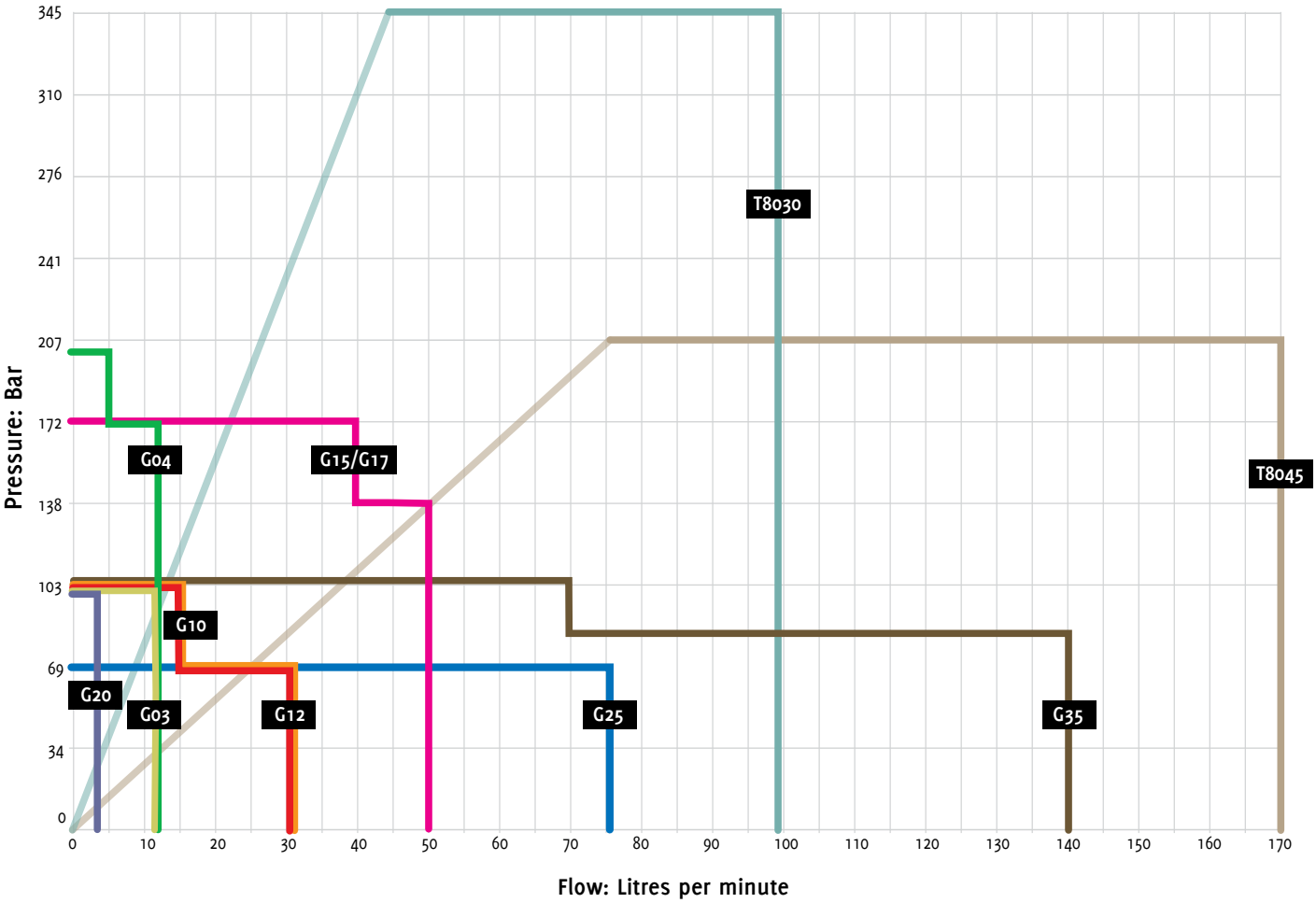
G35

T8045

T8030

Hydra-Cell® Flow Capacities and Pressure Ratings

G Series and 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.

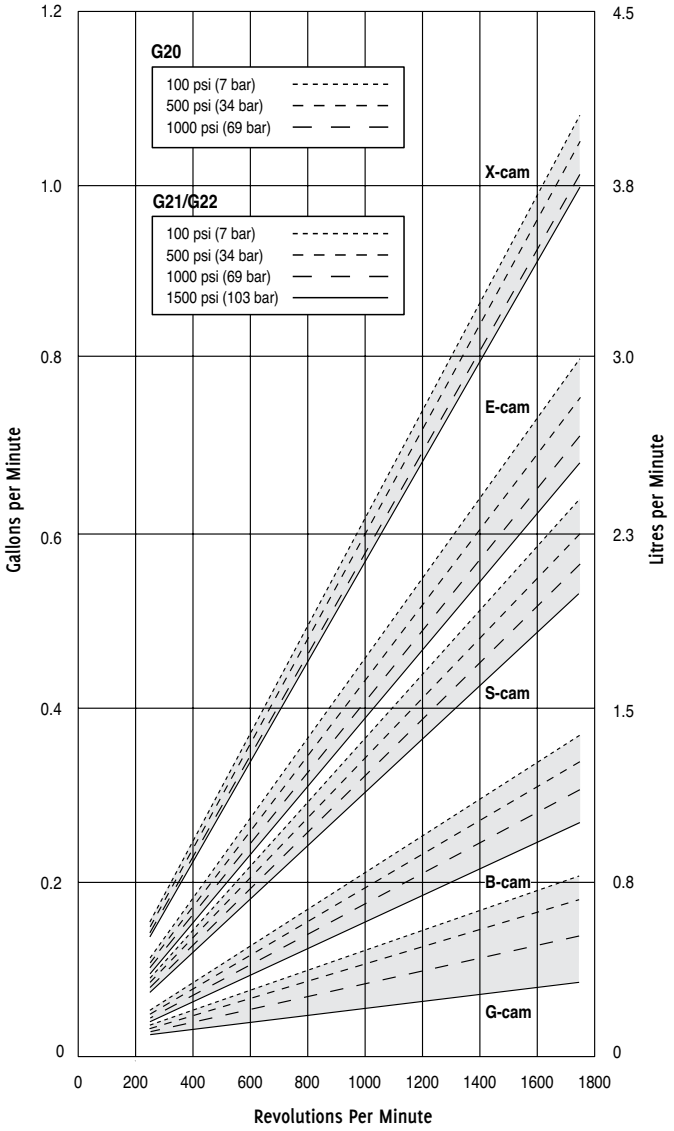
Model	Maximum Capacity l/min	Maximum Discharge Pressure bar (psi)		Maximum Operating Temperature °C[2]		Maximum Inlet Pressure bar (psi)
		Non-Metallic[1]	Metallic	Non-Metallic	Metallic	
G20	3.8	24	103	60°	121°	17
G03	11.7	24	103	60°	121°	17
G04	11.2	N/A	200	N/A	121°	34
G10	33.4	24	103	60°	121°	17
G12	33.4	N/A	103	N/A	121°	17
G15/17	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
T8045	170.4	N/A	207	N/A	82°	34
T8030	98.4	N/A	345	N/A	82°	34

1 *350 psi (24 bar) maximum with PVDF liquid end; 250 psi (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).*

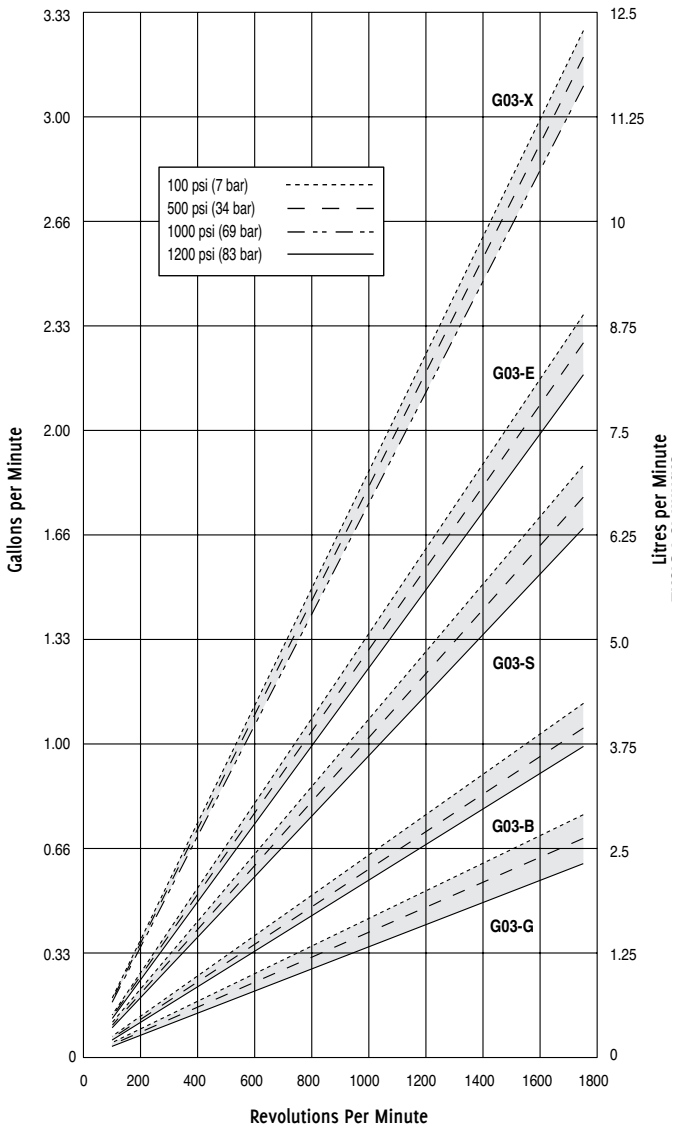
Hydra-Cell® G Series Performance Graphs and Specifications

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 G-20: G-21/22:	 5/8 inch (19mm) hollow shaft 5/8 inch (19mm)
Shaft Rotation	Bi-directional
Weight Metallic Heads: Non-Metallic Heads:	 5.5 kg 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 G-03: G-13:	 7/8 inch (22.22 mm) 24 mm hollow shaft
Shaft Rotation	Bi-directional
Weight Metallic Heads: Non-Metallic Heads:	 12.7 kg 8.6 kg

Calculating Required Horsepower (kW)*

$$\frac{5.5 \times \text{rpm}}{63{,}000} + \frac{\text{gpm} \times \text{psi}}{1{,}460} = \text{electric motor HP*}$$

$$\frac{5.5 \times \text{rpm}}{84{,}428} + \frac{\text{lpm} \times \text{bar}}{511} = \text{electric motor kW*}$$

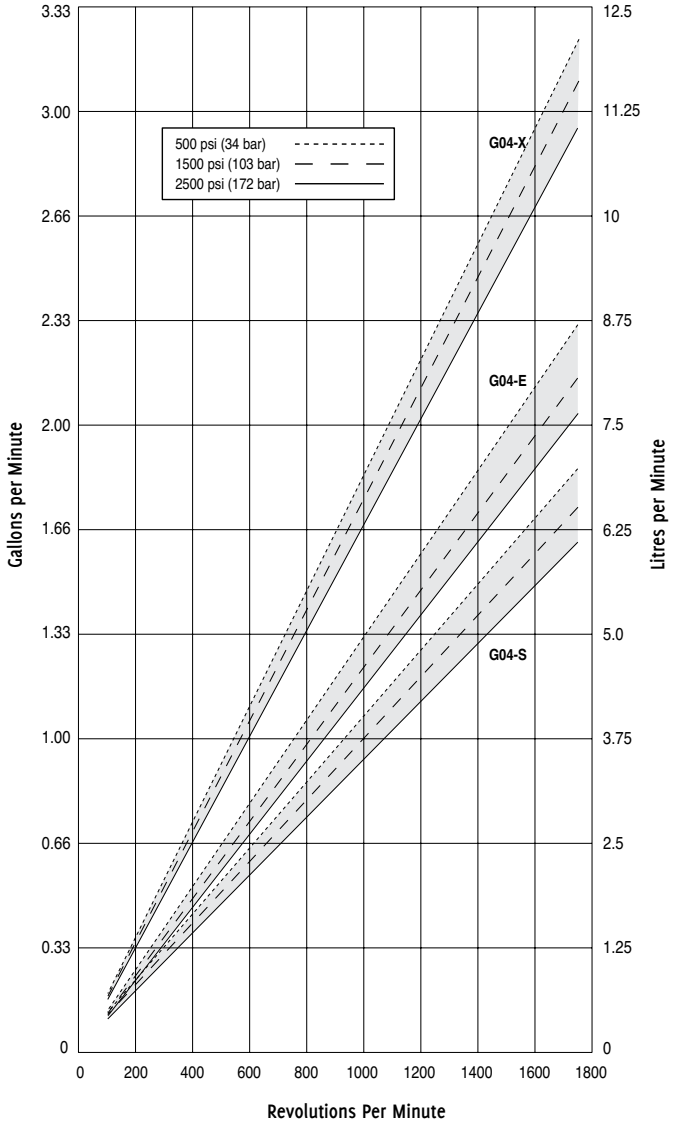
* rpm equals pump shaft rpm. HP/kW is required application power. Use caution when sizing motors with variable speed drives.

Note: For the low flow cams (B, G, I), a pressurised inlet feed must be used.

Performance specifications are guidelines only.

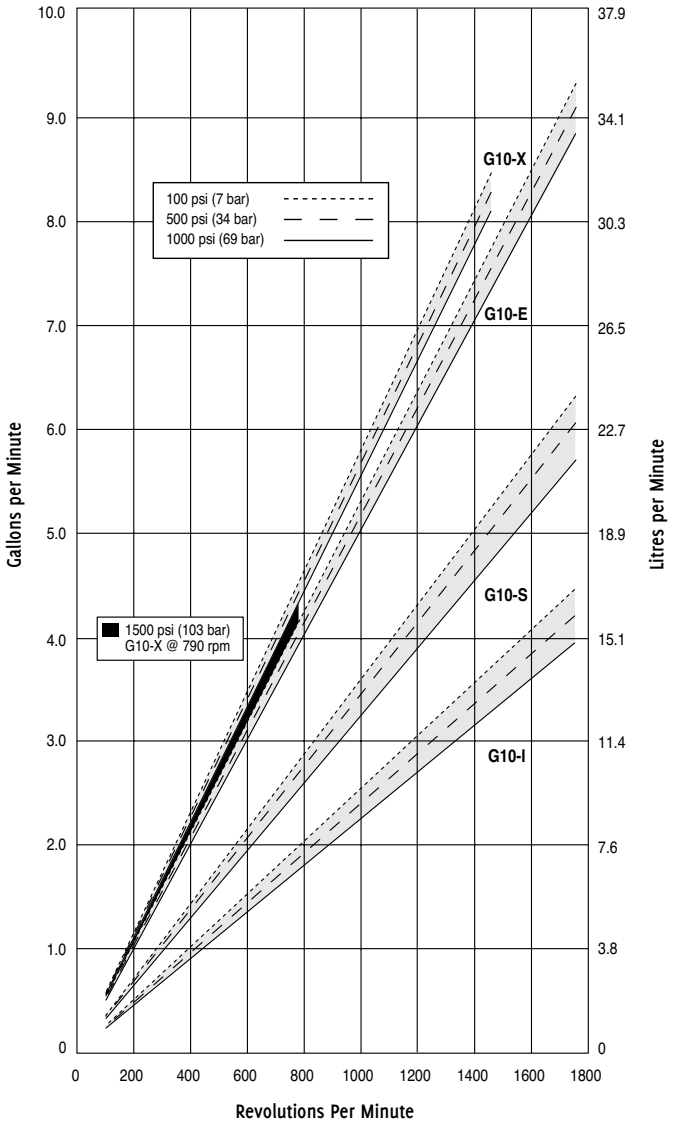
Hydra-Cell® G Series Performance Graphs and Specifications

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



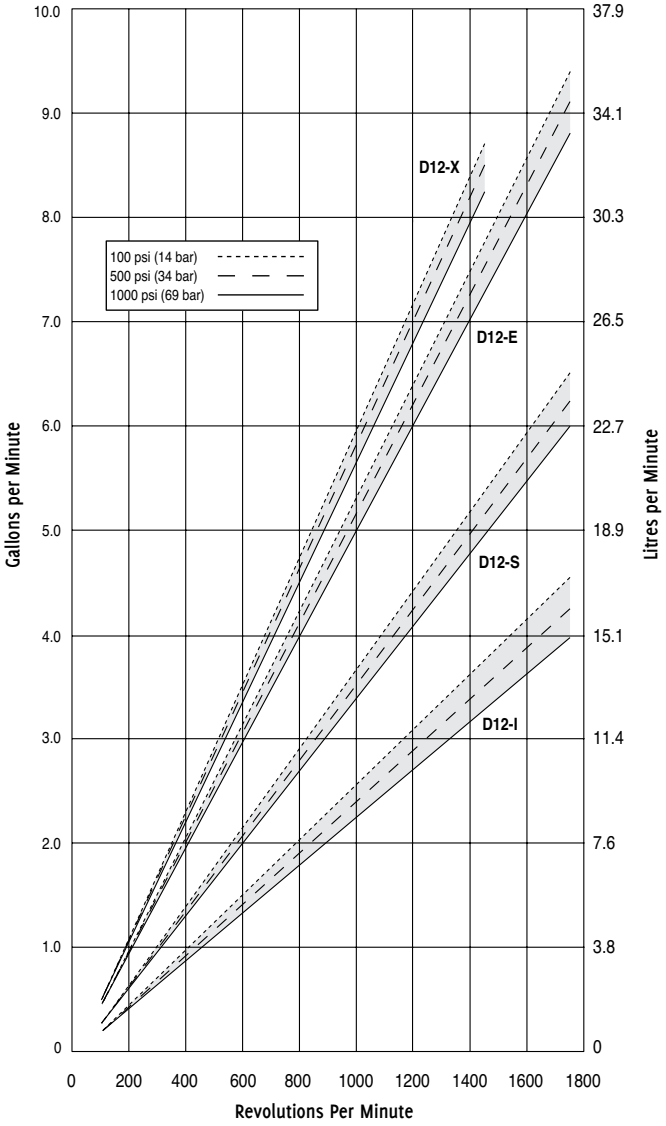
Maximum Particle Size	0.8mm @ 5-10% max. concentration
Inlet Port	1/2 inch BSPT (NPT option available)
Discharge Port	3/4 inch BSPT (NPT option available)
Shaft Diameter	7/8 inch
Shaft Rotation	Bi-directional
Weight Metallic Heads: Non-Metallic Heads:	 22 kg 16 kg

Note: For the low flow cams (B, G, I), a pressurised inlet feed must be used.

Performance specifications are guidelines only.

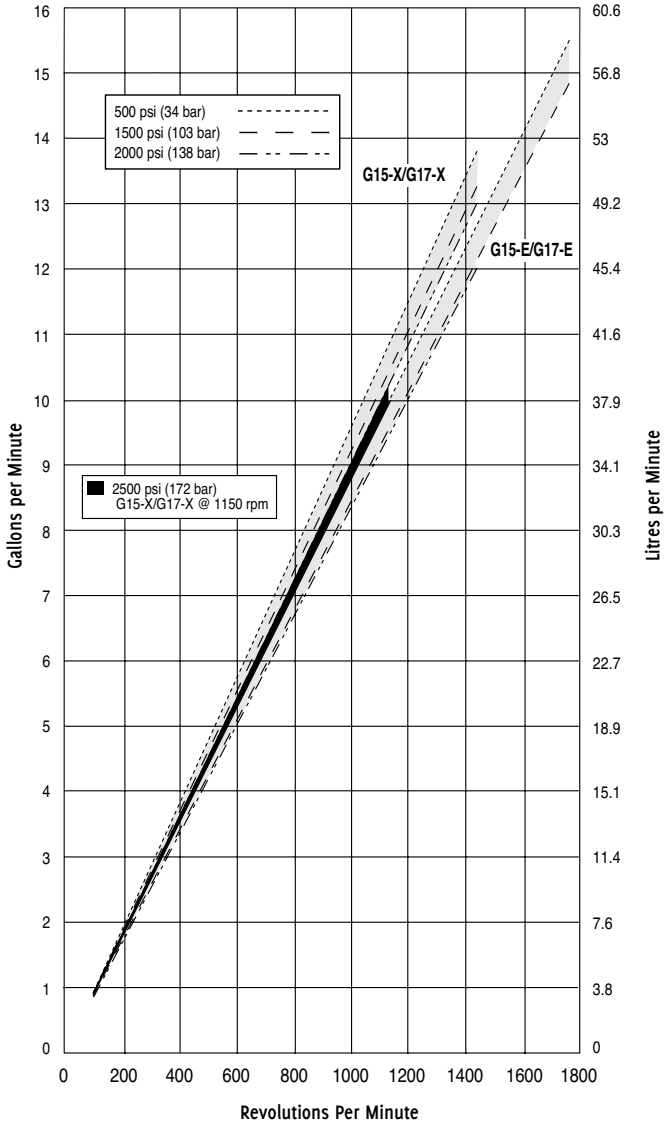
Hydra-Cell® G Series Performance Graphs and Specifications

G12



Maximum Particle Size	0.8mm @ 5-10% max. concentration
Inlet Port	1/2 inch BSPT (NPT option available)
Discharge Port	3/4 inch BSPT (NPT option available)
Shaft Diameter	7/8 inch
Shaft Rotation	Bi-directional
Weight Metallic Heads: Non-Metallic Heads:	 22 kg 16 kg

G15 (horizontal) G17 (vertical)



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)*

$$\frac{5.5 \times \text{rpm}}{63{,}000} + \frac{\text{gpm} \times \text{psi}}{1{,}460} = \text{electric motor HP*}$$

$$\frac{5.5 \times \text{rpm}}{84{,}428} + \frac{\text{lpm} \times \text{bar}}{511} = \text{electric motor kW*}$$

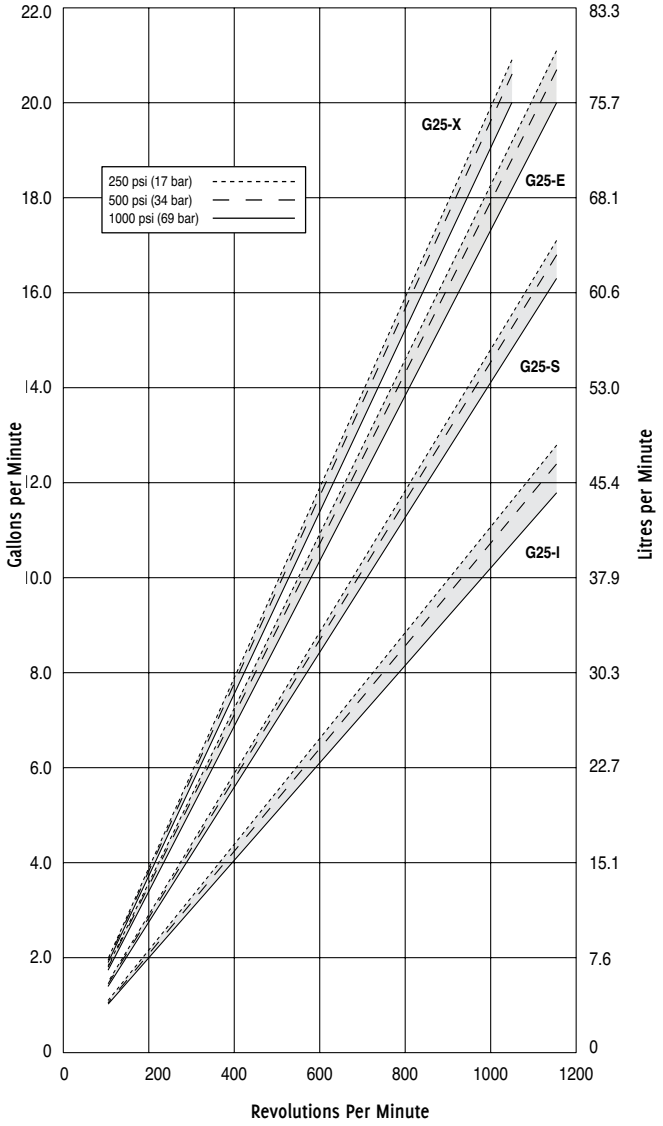
* rpm equals pump shaft rpm. HP/kW is required application power. Use caution when sizing motors with variable speed drives.

Note: For the low flow cams (B, G, I), a pressurised inlet feed must be used.

Performance specifications are guidelines only.

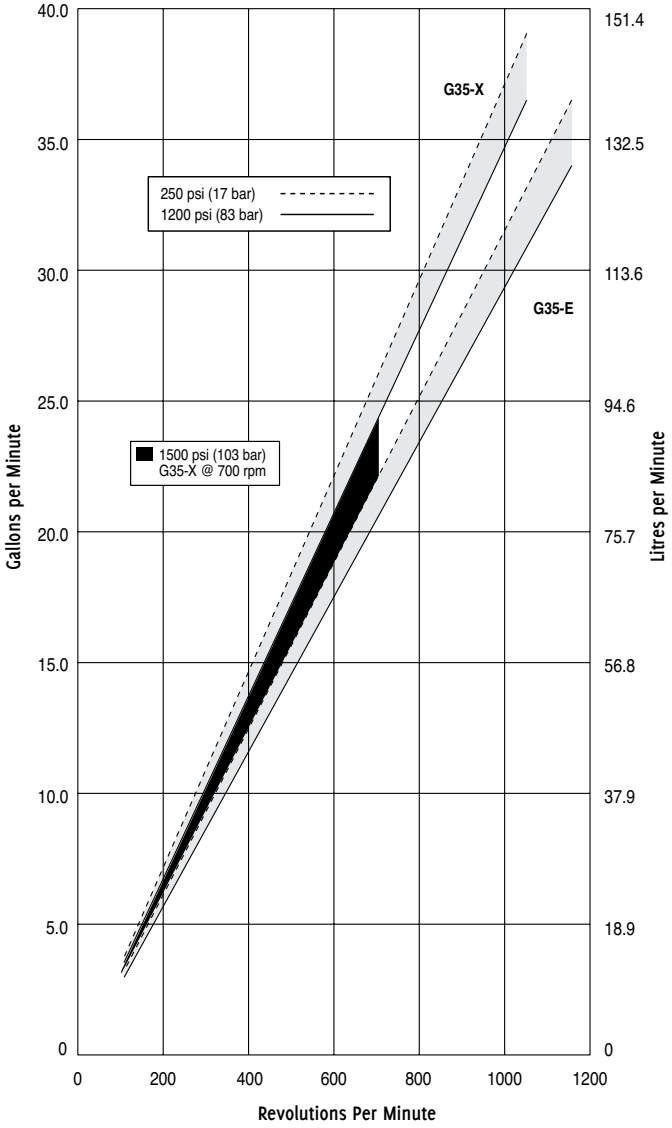
Hydra-Cell® G Series Performance Graphs and Specifications

G25



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 Metallic Heads: Non-Metallic Heads:	 56.8 kg 40.9 kg

G35



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

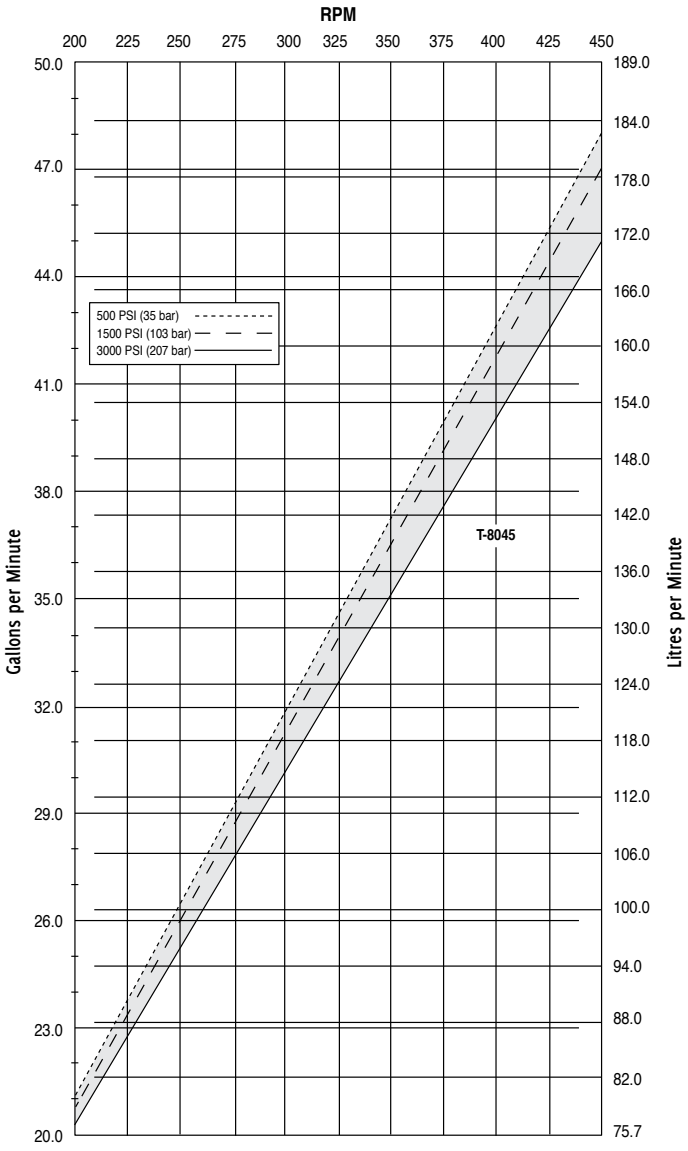
Note: For the low flow cams (B, G, I), a pressurised inlet feed must be used.

Performance specifications are guidelines only.

Hydra-Cell® T Series Performance Graphs and Specifications

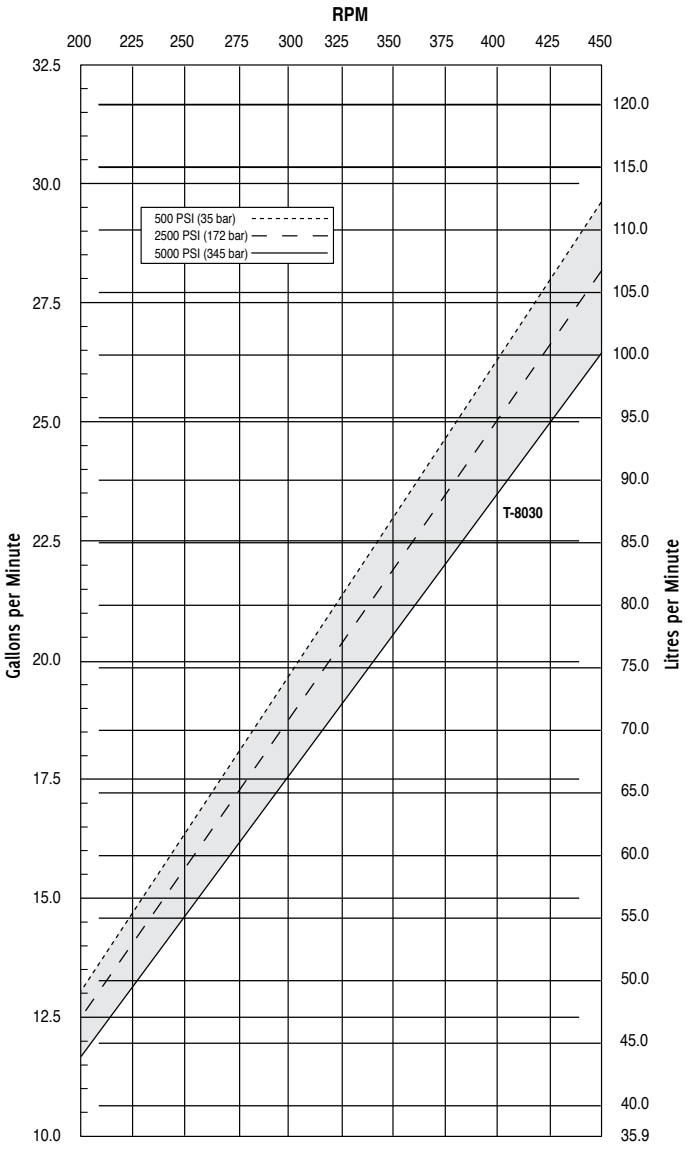
API 674 option available

T8045



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

T8030



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

Calculating Required Horsepower (kW)*

$$\frac{5.5 \times \text{rpm}}{63{,}000} + \frac{\text{gpm} \times \text{psi}}{1{,}460} = \text{electric motor HP*}$$

$$\frac{5.5 \times \text{rpm}}{84{,}428} + \frac{\text{lpm} \times \text{bar}}{511} = \text{electric motor kW*}$$

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

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® G SERIES DOSING PERFORMANCE PUMPS

G13 Mono-Block

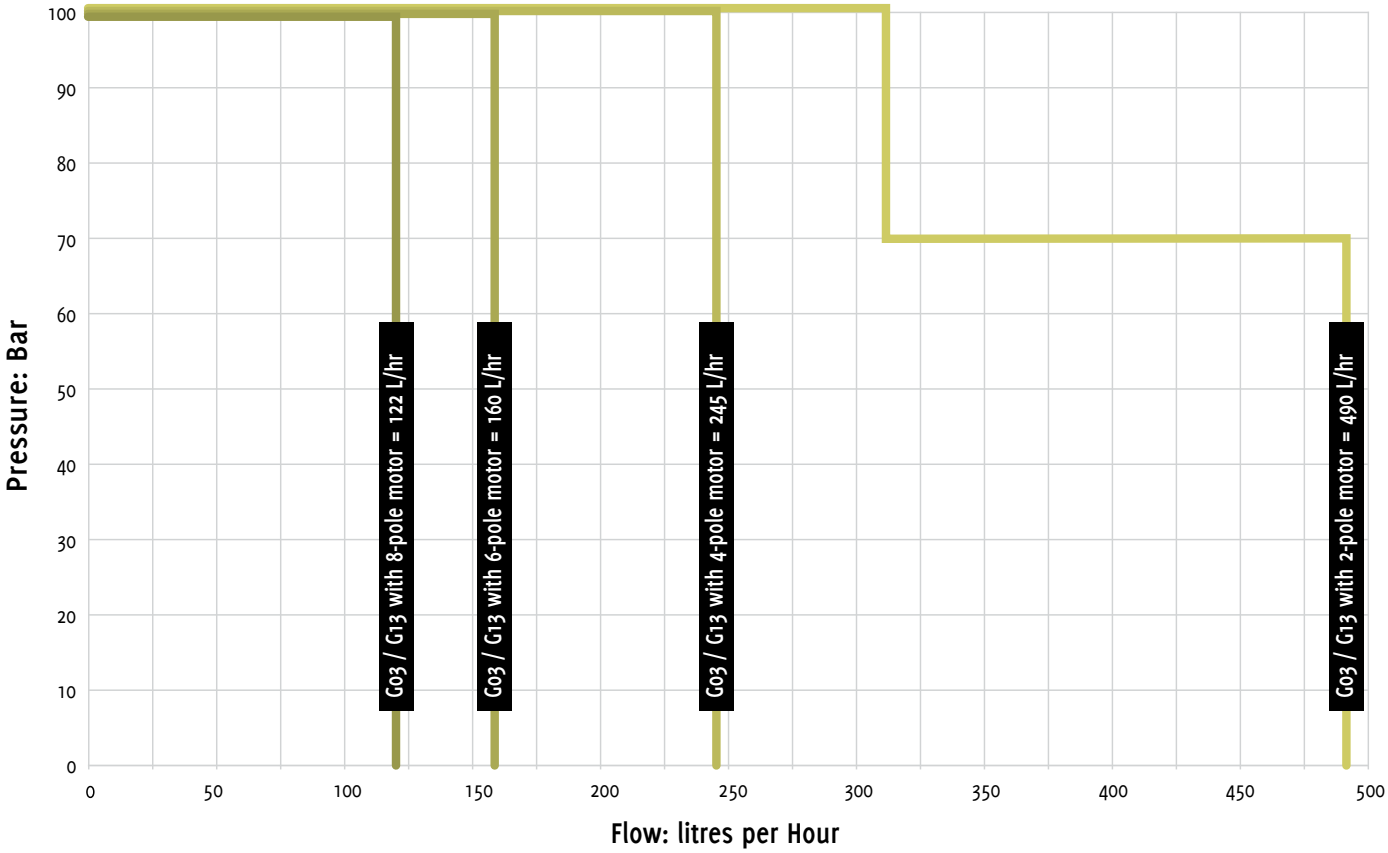
G13 Stainless Steel Head

G13 Plastic Head

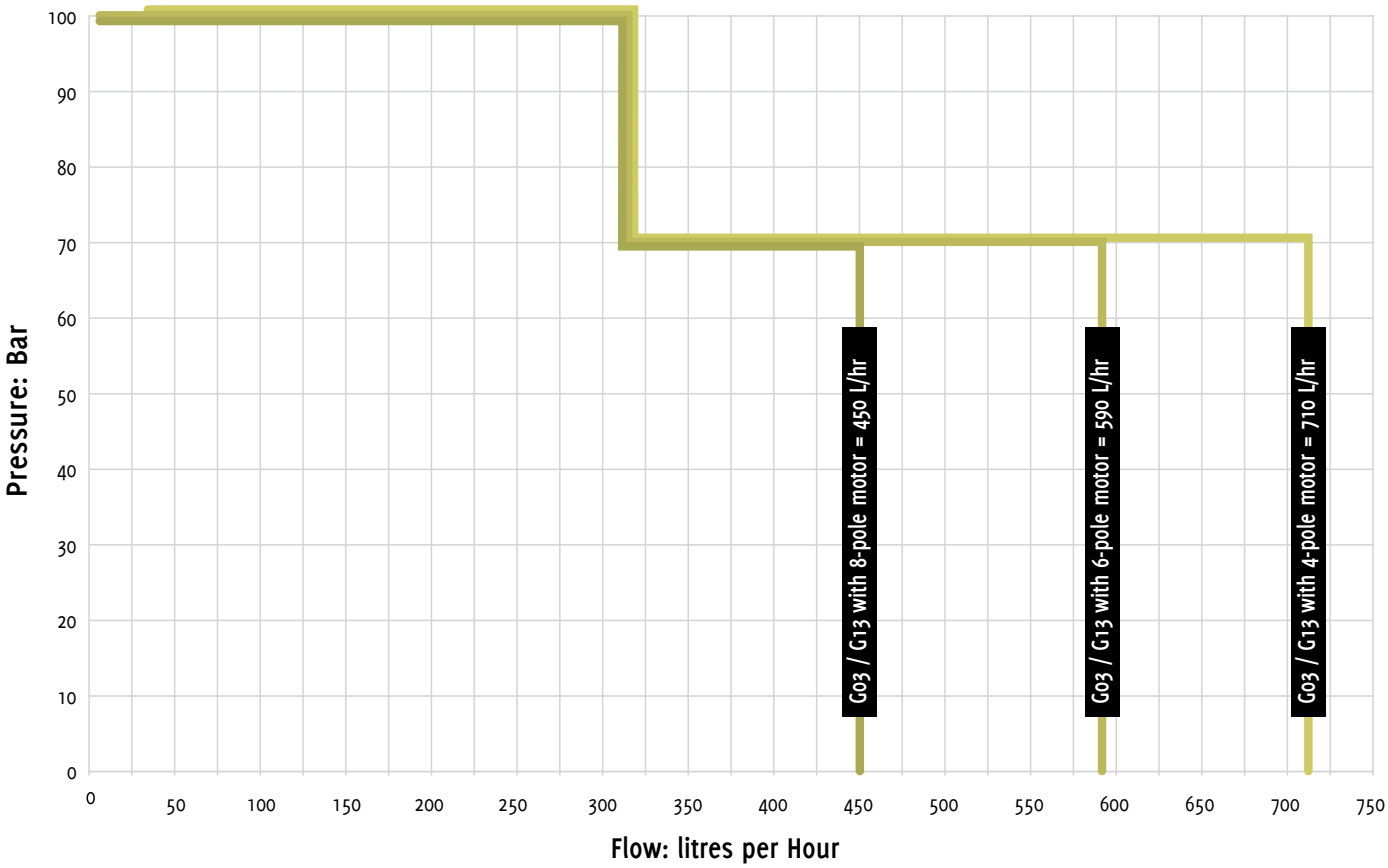
HYDRA-CELL® G SERIES DOSING PERFORMANCE PUMPS

G03/G13 Mechanical Flow Rate Adjustment

ATEX

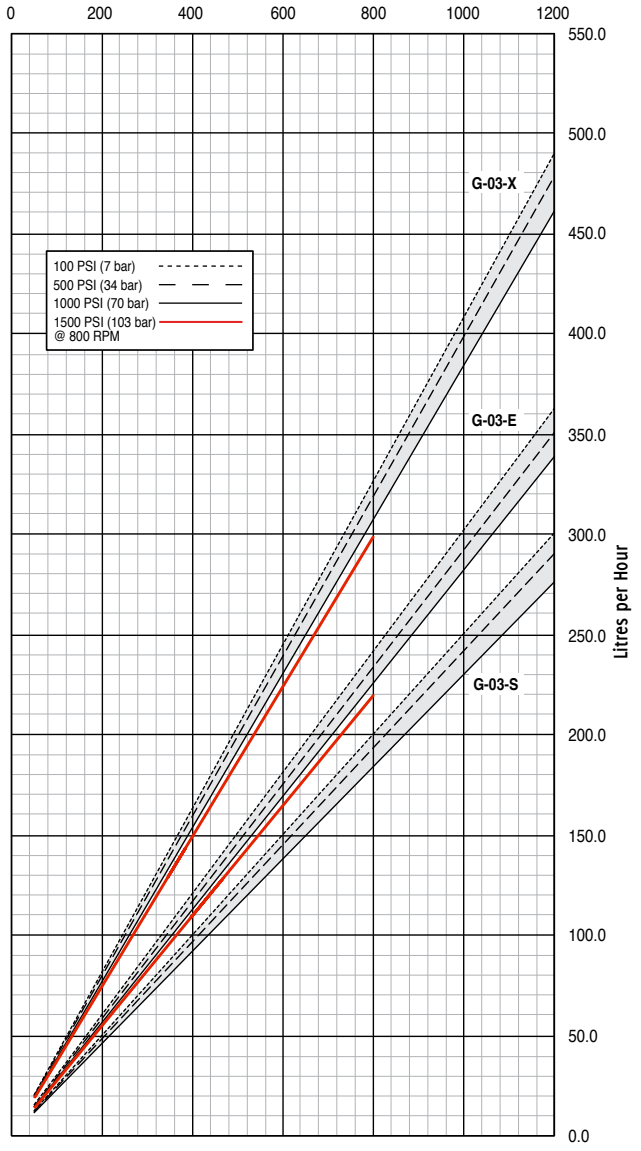


G03/G13 with Variable Frequency Drive (VFD) Flow Rate Adjustment

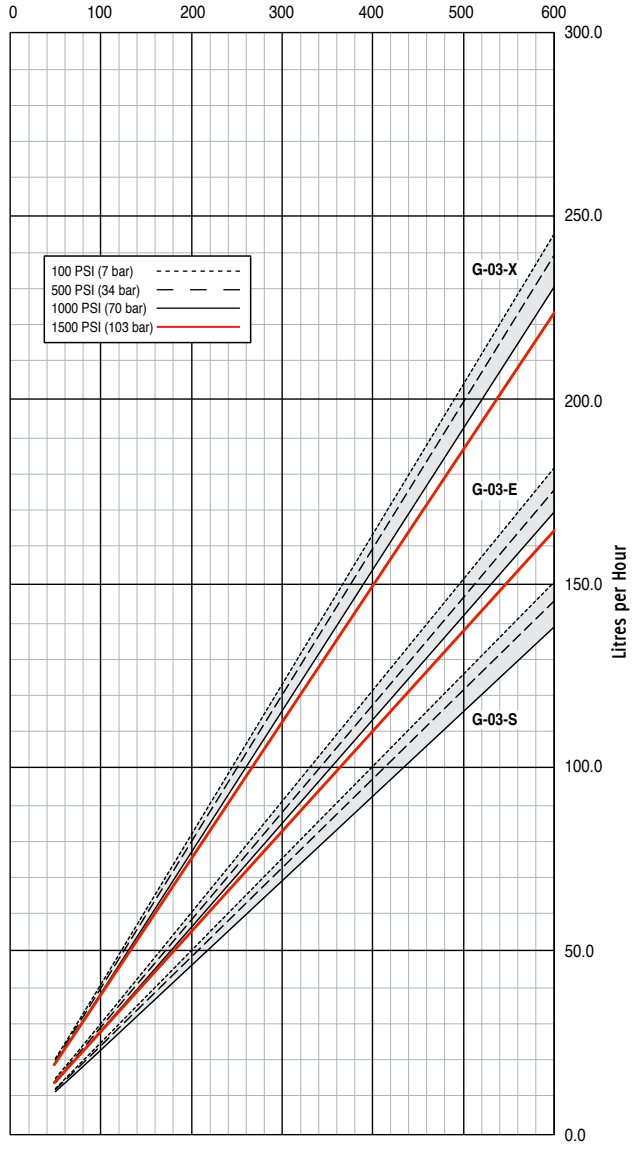


HYDRA-CELL® G03/G13 DOSING PERFORMANCE PUMPS
Mechanical Flow Rate Adjustment

G03/G13 Mechanical Flow Rate Adjustment 2 Pole Motor 50 Hz Supply



G03/G13 Mechanical Flow Rate Adjustment 4 Pole Motor 50 Hz Supply



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	
G-03:	7/8 inch (22.22 mm)
G-13:	24 mm hollow shaft
Shaft Rotation	Bi-directional
Weight	
Metallic Heads:	93 kg
Non-Metallic Heads:	89 kg

Weight – Complete assembly (Pump, Mechanical Adjust, Motor and Baseplate)

ATEX

- For G03 Monoblock use all cams
- For G03 with standard Pump Head, use X & E-cams only

Calculating Required Horsepower (kW)*

$$\frac{5.5 \times \text{rpm}}{63{,}000} + \frac{\text{gpm} \times \text{psi}}{1{,}460} = \text{electric motor HP*}$$

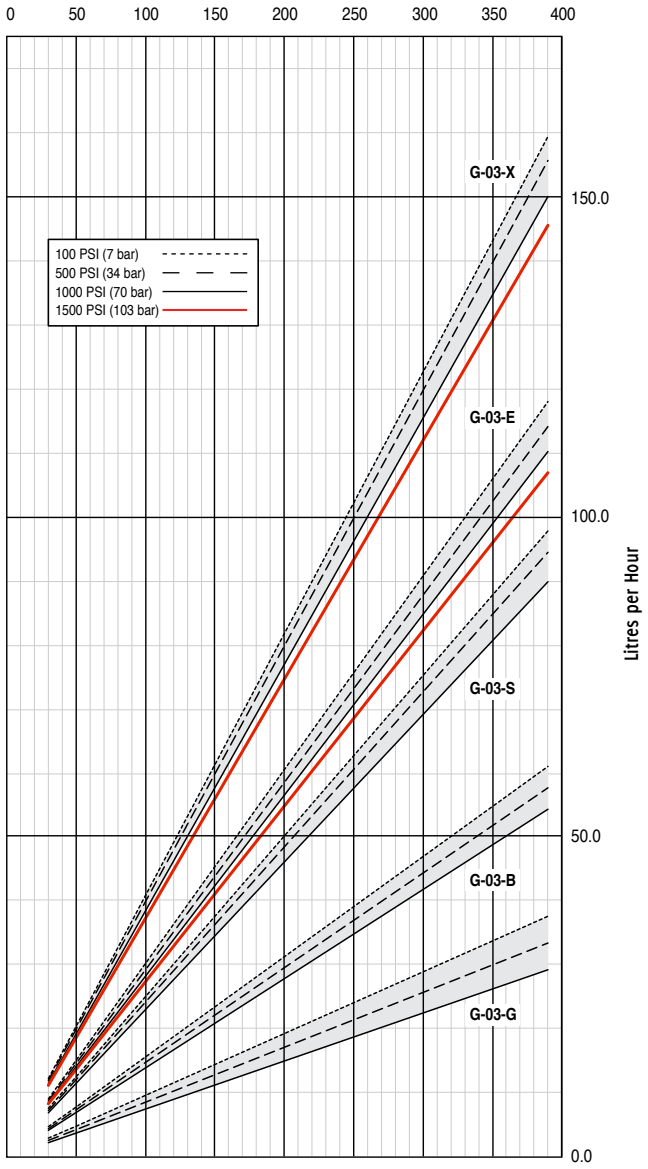
$$\frac{5.5 \times \text{rpm}}{84{,}428} + \frac{\text{lpm} \times \text{bar}}{511} = \text{electric motor kW*}$$

* rpm equals pump shaft rpm. HP/kW is required application power.

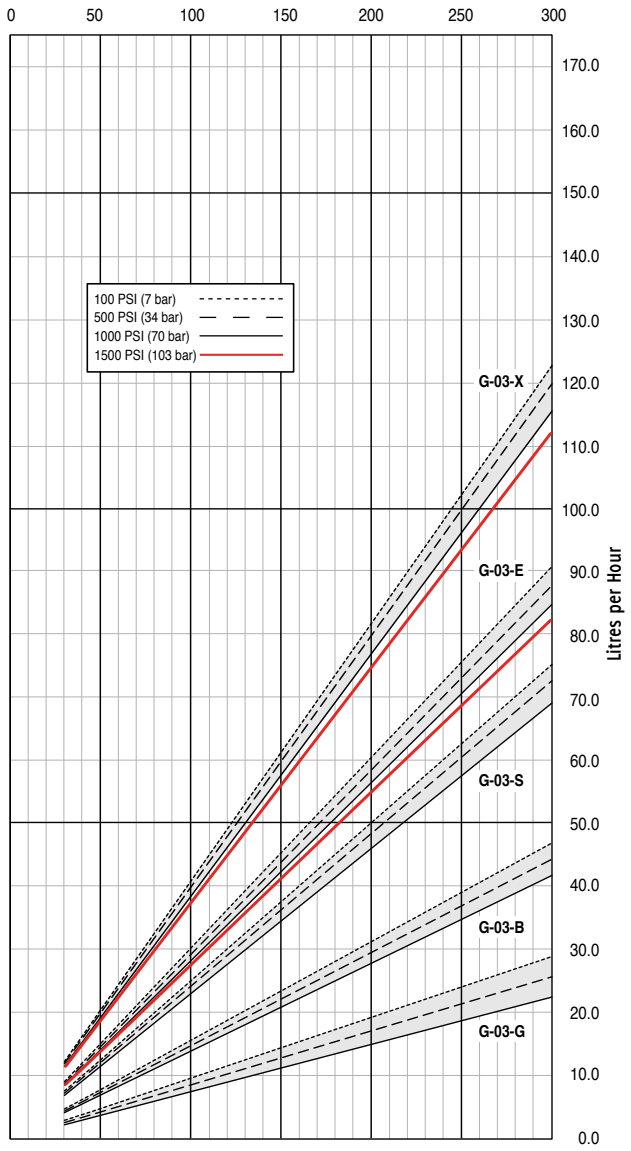
Performance specifications are guidelines only.

HYDRA-CELL® G03/G13 DOSING PERFORMANCE PUMPS
Mechanical Flow Rate Adjustment

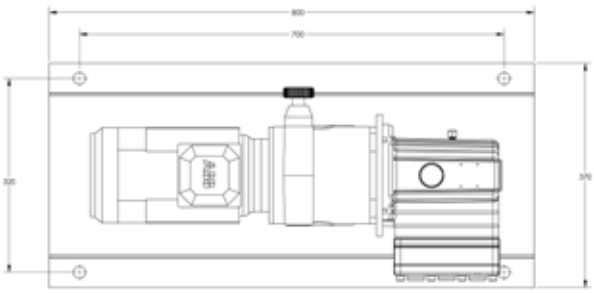
G03/G13 Mechanical Flow Rate Adjustment 6 Pole Motor 50 Hz Supply

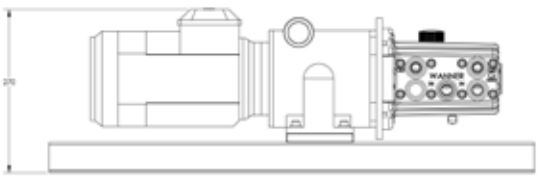


G03/G13 Mechanical Flow Rate Adjustment 8 Pole Motor 50 Hz Supply



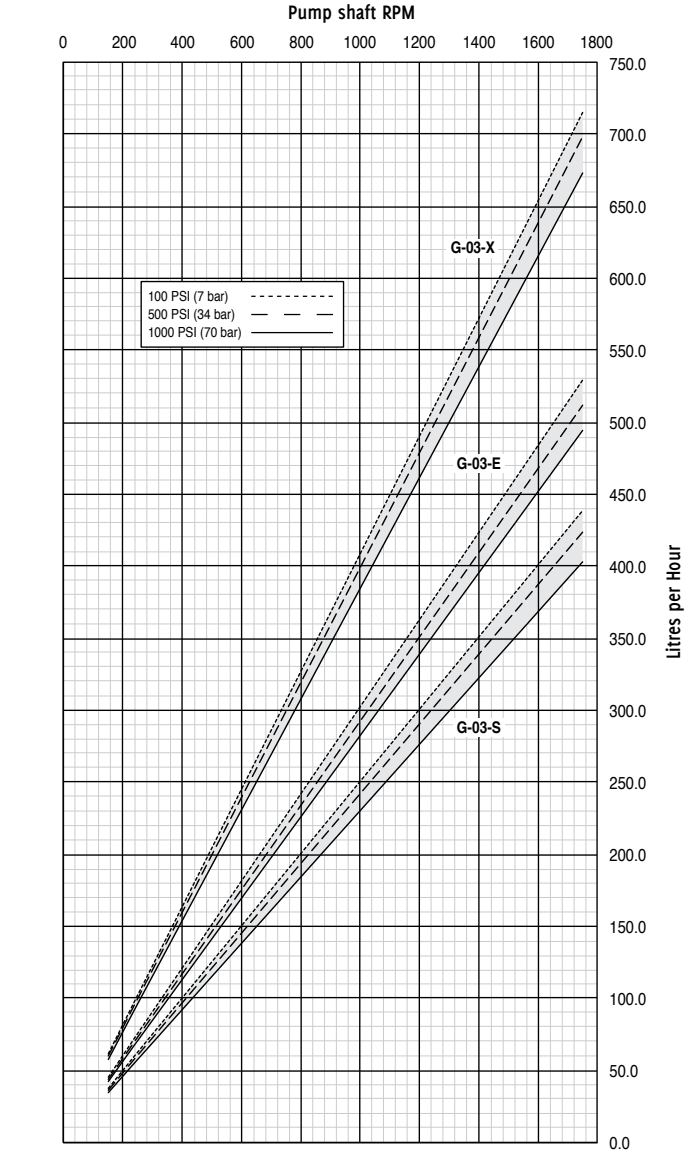
Representative Drawings (in mm)



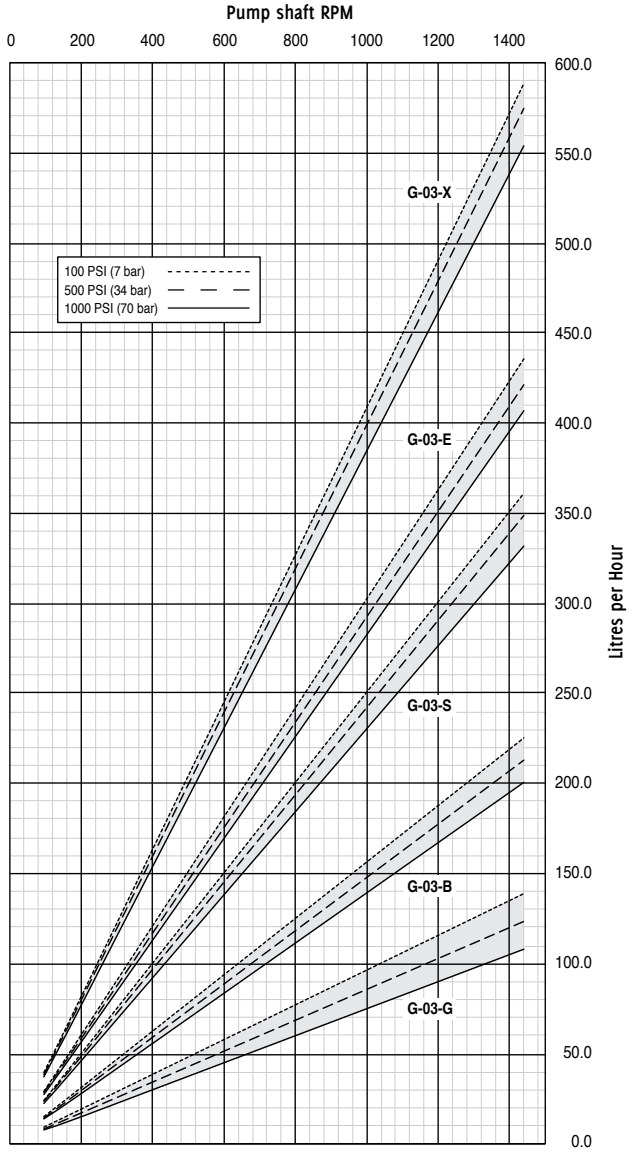


HYDRA-CELL® G03/G13 DOSING PERFORMANCE PUMPS
Variable Frequency Drive (VFD) Flow Rate Adjustment

G03/G13 VFD Flow Rate Adjustment 58 to 5hz
4 Pole Motor 50 Hz Supply



G03/G13 VFD Flow Rate Adjustment 75 to 5hz
6 Pole Motor 50 Hz Supply



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	
G-03:	7/8 inch (22.22 mm)
G-13:	24 mm hollow shaft
Shaft Rotation	Bi-directional
Weight	
Metallic Heads:	50kg
Non-Metallic Heads:	46kg

Weight – Complete assembly (Pump, Motor and Baseplate)

Calculating Required Horsepower (kW)*

$$\frac{5.5 \times \text{rpm}}{63{,}000} + \frac{\text{gpm} \times \text{psi}}{1{,}460} = \text{electric motor HP*}$$

$$\frac{5.5 \times \text{rpm}}{84{,}428} + \frac{\text{lpm} \times \text{bar}}{511} = \text{electric motor kW*}$$

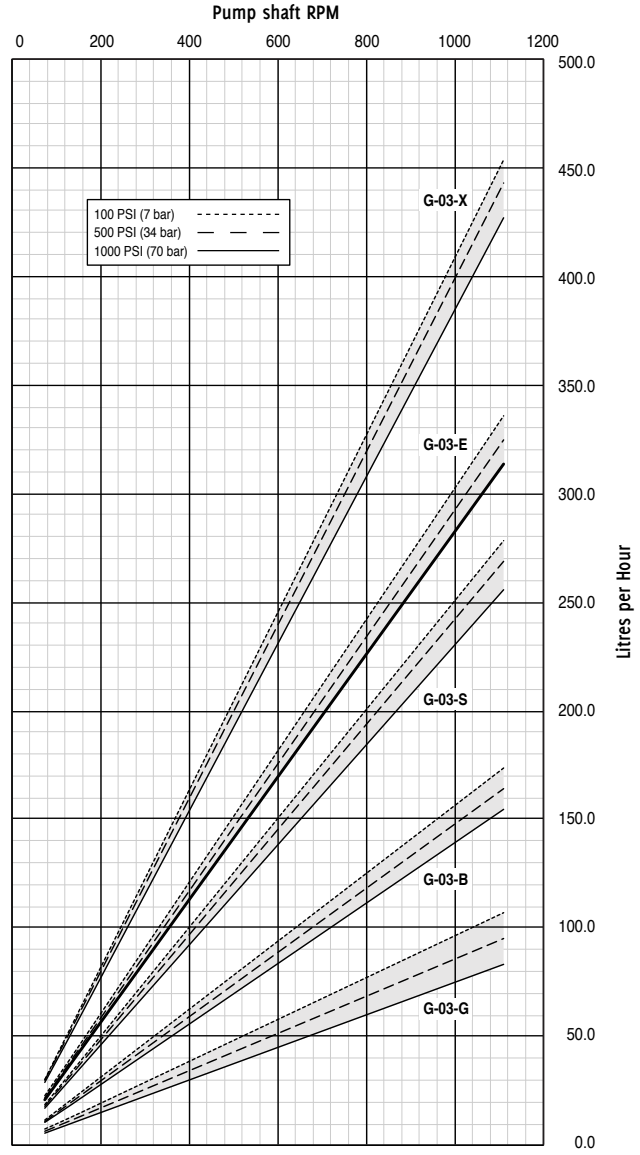
- For G03 Monoblock use all cams
- For G03 with standard Pump Head, use X & E-cams only

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

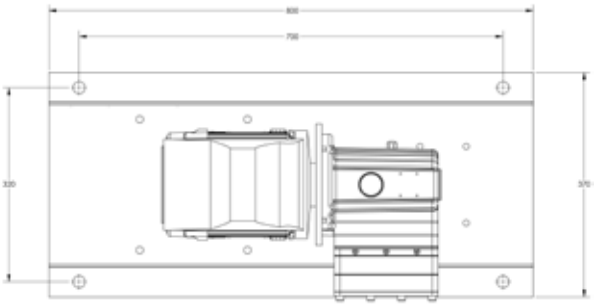
Performance specifications are guidelines only.

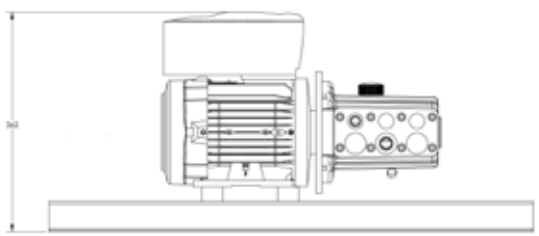
HYDRA-CELL® G03/G13 DOSING PERFORMANCE PUMPS
Variable Frequency Drive (VFD) Flow Rate Adjustment

G03/G13 VFD Flow Rate Adjustment 75 to 5hz
8 Pole Motor 50 Hz Supply



Representative Drawings (in mm)





Hydra-Cell® Liquid Handling Capability

Slurries

Resins

Inks/
Paints

Glues/
Adhesives

Acids/
Caustics

Chlorine

Glycols

D.I. Water

Fuels/
Additives

Ammonia

Freon

Propane/
Butane

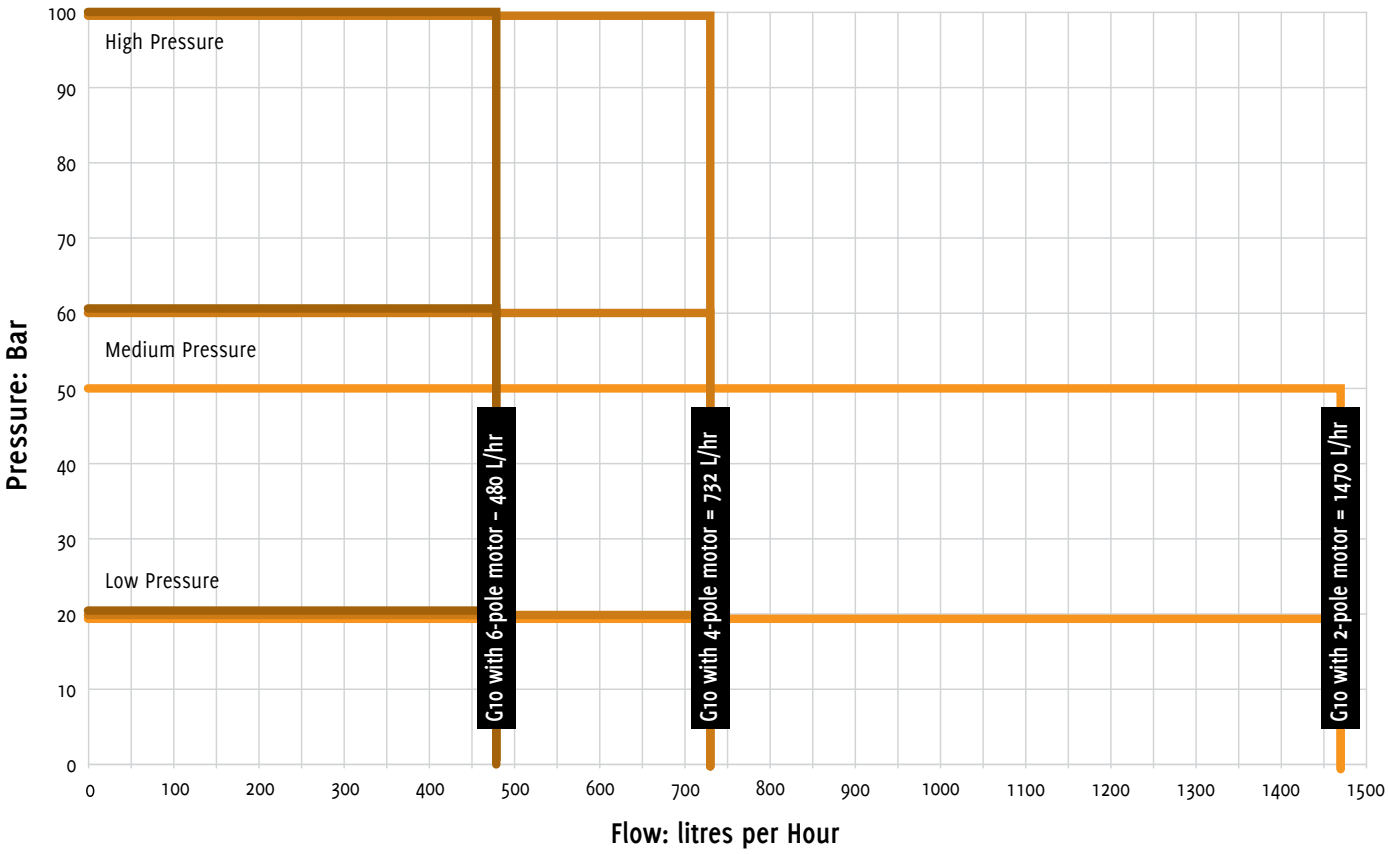
HYDRA-CELL® G SERIES DOSING PERFORMANCE PUMPS

G10 Stainless Steel Head

HYDRA-CELL® G SERIES DOSING PERFORMANCE PUMPS

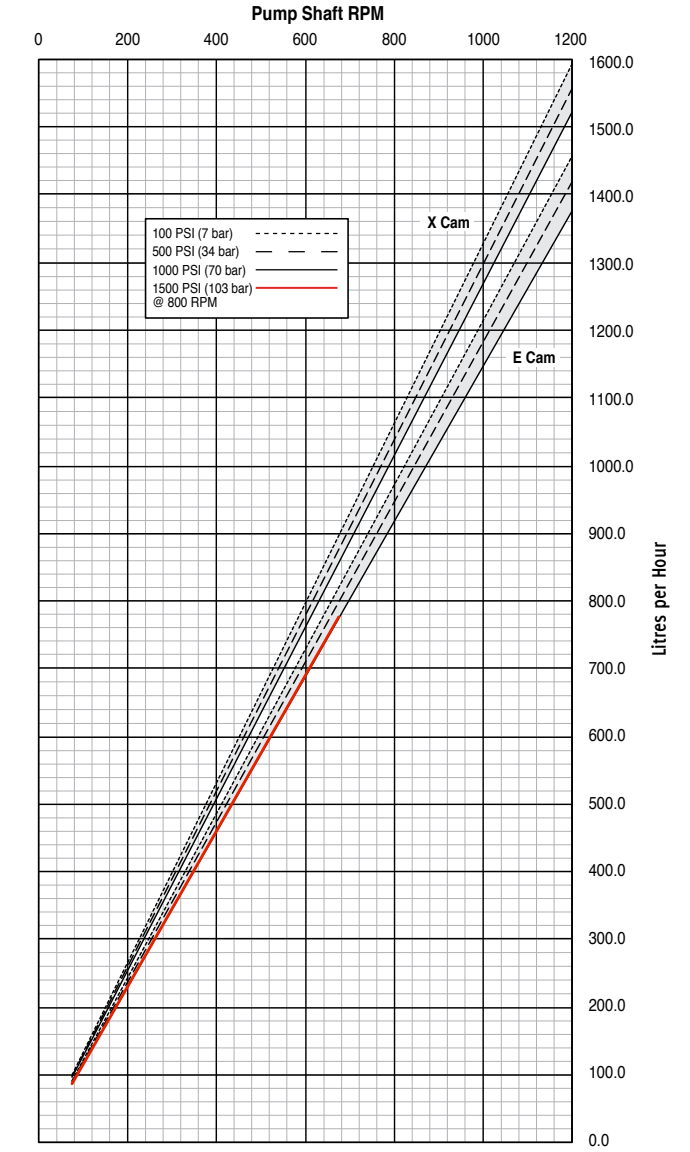
G10 Mechanical Flow Rate Adjustment

ATEX

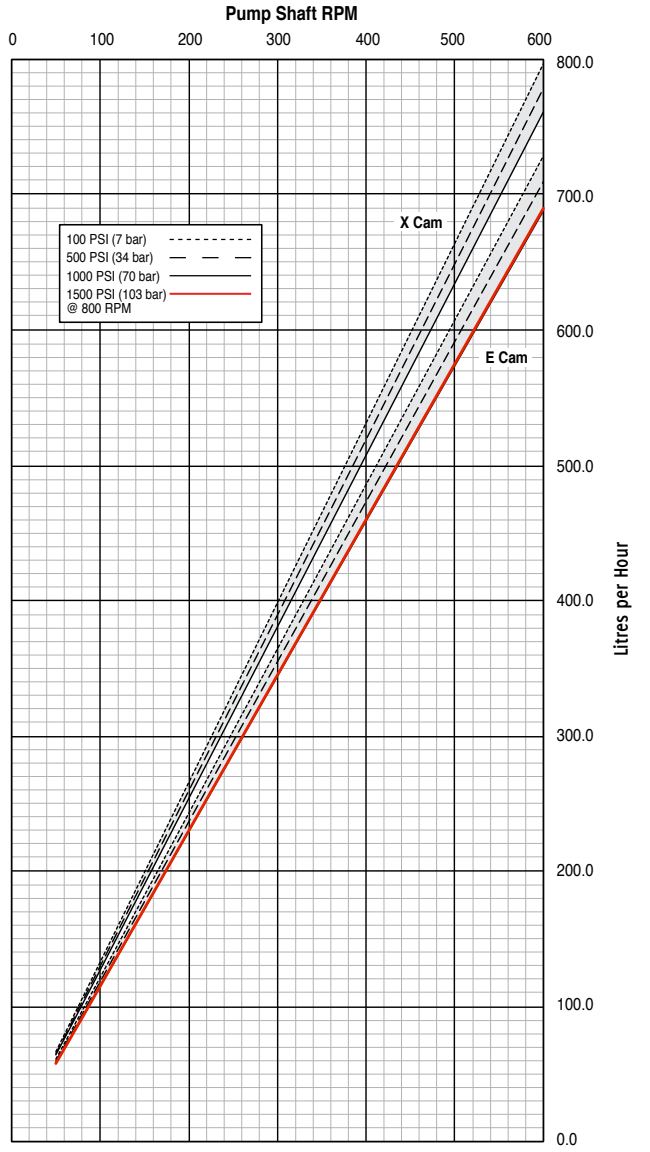


HYDRA CELL® G10 DOSING PERFORMANCE PUMPS
Mechanical Flow Rate Adjustment

G10 Mechanical Flow Rate Adjustment
2 Pole Motor 50 Hz Supply



G10 Mechanical Flow Rate Adjustment
4 Pole Motor 50 Hz Supply



Maximum Particle Size	0.8mm @ 5-10% max. concentration
Inlet Port	1/2 inch BSPT (NPT option available)
Discharge Port	3/4 inch BSPT (NPT option available)
Shaft Diameter	7/8 inch
Shaft Rotation	Bi-directional
Weight	
Metallic Heads:	114 kg
Non-Metallic Heads:	108 kg

Weight – Complete assembly (Pump, Mechanical Adjust, Motor and Baseplate)

ATEX

Calculating Required Horsepower (kW)*

$$\frac{5.5 \times rpm}{63{,}000} + \frac{gpm \times psi}{1{,}460} = \text{electric motor HP*}$$

$$\frac{5.5 \times rpm}{84{,}428} + \frac{lpm \times bar}{511} = \text{electric motor kW*}$$

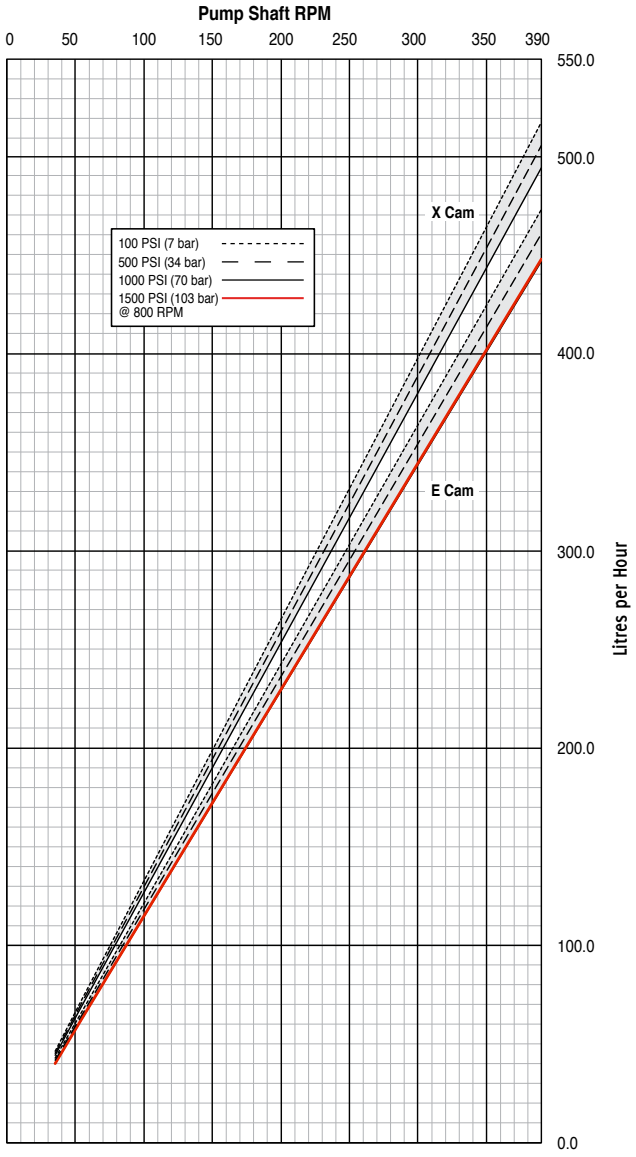
* rpm equals pump shaft rpm. HP/kW is required application power.

Note: For the low flow cams (B, G, I), a pressurised inlet feed must be used.

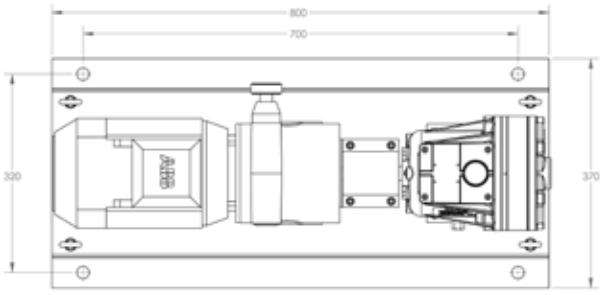
Performance specifications are guidelines only.

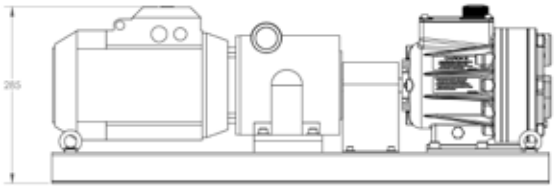
HYDRA CELL® G10 DOSING PERFORMANCE PUMPS
Mechanical Flow Rate Adjustment

G10 — Mechanical Flow Rate Adjustment
6 Pole Motor 50 Hz Supply



Representative Drawings (in mm)





Hydra-Cell® Liquid Handling Capability

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

HYDRA CELL® P Series Flow Capacities and Pressure Ratings

Hydra-Cell® METERING SOLUTIONS™

P100

P200

P300

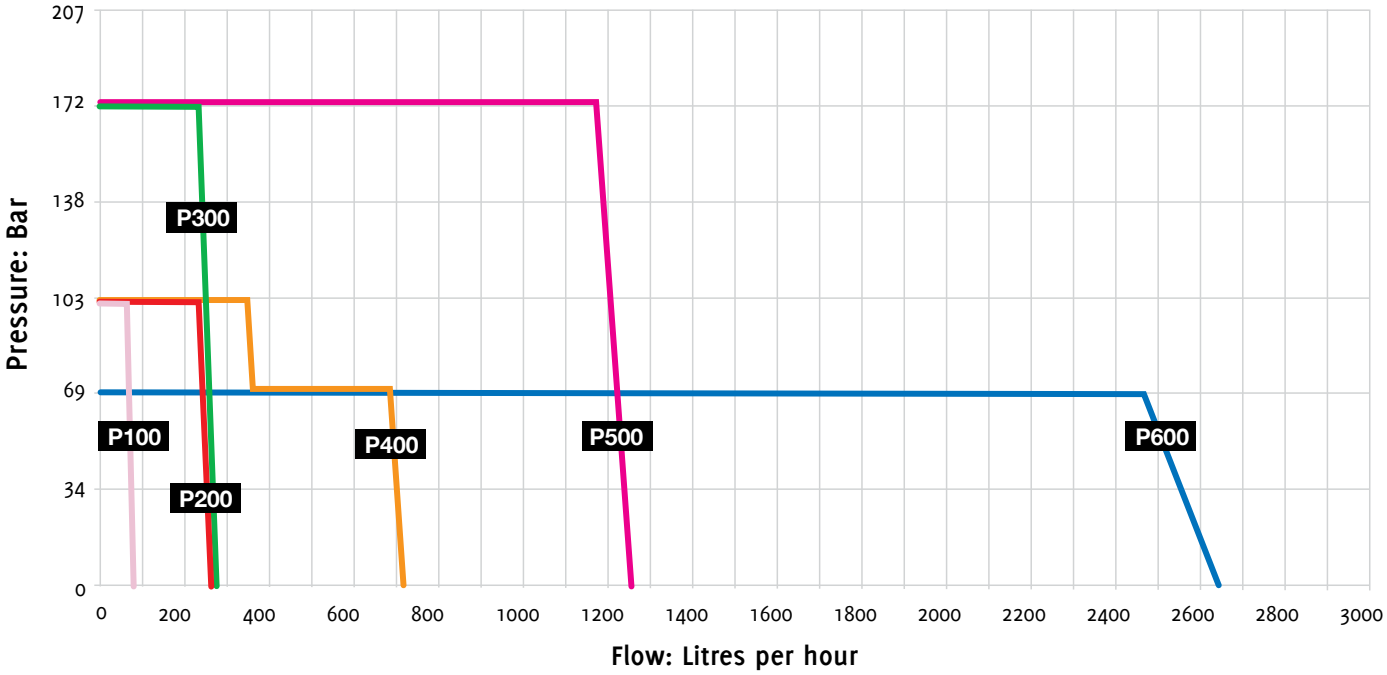
P400

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	78.0	24	103	60°	121°	17
P200	237.4	24	103	60°	121°	17
P300	242.1	N/A	172	N/A	121°	34
P400	714.9	24	69	60°	121°	17
P500	1255.1	N/A	172	N/A	121°	17
P600	2634.0	24	69	60°	121°	34

1 *Ratings are for X-Cam design*
2 *24 bar maximum with PVDF 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

L/hr Maximum Flow at Designated Pressure

All Pumps (l/hr)		Metallic Pump Heads Only (l/hr)			Pump rpm	Gearbox Ratio	Motor rpm
7 Bar	17 Bar	34 Bar	69 Bar	103 Bar			
1.99	1.68	1.44	0.76	**	14.5	100:1	1450
2.50	2.18	1.93	1.23	**	18.13	80:1	
3.39	3.01	2.74	2.01	**	24.17	60:1	
4.01	3.67	3.39	2.64	**	29	50:1	
5.02	4.67	4.36	3.58	**	36.25	40:1	
6.71	6.33	5.99	5.15	1.75	48.33	30:1	
8.05	7.65	7.29	6.40	2.98	58	25:1	
10.07	9.65	9.24	8.28	4.82	72.5	20:1	
13.44	12.97	12.48	11.42	7.89	96.67	15:1	
20.18	19.60	18.98	17.69	14.03	145	10:1	
26.91	26.24	25.47	23.96	20.16	193.33	7.5:1	
40.39	39.52	38.46	36.50	32.43	290	5:1	
51.99	50.96	49.65	47.31	43.01	373.3	7.5:1	2800
78.01	76.60	74.73	71.54	66.71	560	5:1	

Required Motor kW

0.18 | 0.37 | 0.55

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

Maximum Particle Size	0.3mm @ 15% max. concentration
Inlet Port	1/2 inch BSPT
Discharge Port	3/8 inch BSPT
Weight (less motor) Metallic head: Non-metallic head:	 8.4 kg 7.4 kg

P200

L/hr Maximum Flow at Designated Pressure

All Pumps (l/hr)		Metallic Pump Heads Only (l/hr)		Pump rpm	Gear-box Ratio	Motor rpm
7 bar	17 bar	34 bar	69 bar			
4.95	4.57	3.84	2.00	14.50	100:1	1450
6.49	6.11	5.36	3.46	18.13	80:1	
9.07	8.67	7.89	5.89	24.17	60:1	
11.12	10.72	9.91	7.83	29.00	50:1	
14.21	13.79	12.95	10.75	36.25	40:1	
19.36	18.92	18.01	15.61	48.33	30:1	
23.48	23.02	22.06	19.50	58.00	25:1	
29.66	29.17	28.14	25.33	72.50	20:1	
39.96	39.42	38.27	35.06	96.67	15:1	
60.55	59.92	58.52	54.50	145.00	10:1	
81.15	80.41	78.78	73.95	193.33	7.5:1	
122.3	121.4	119.3	112.90	290.00	5:1	
157.8	156.7	154.2	146.40	373.30	7.5:1	2800
237.4	235.9	232.4	221.50	560.00	5:1	

Required Motor kW

0.18 | 0.37 | 0.55 | 0.75

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

Maximum Particle Size	0.3mm @ 15% max. concentration
Inlet Port	1/2 inch BSPT
Discharge Port	3/8 inch BSPT
Weight (less motor) Metallic head: Non-metallic head:	 17.7 kg 13.6 kg

Calculating Required Horsepower (kW)*

$$\frac{5.5 \times \text{rpm}}{63{,}000} + \frac{\text{gpm} \times \text{psi}}{1{,}460} = \text{electric motor HP*}$$

$$\frac{5.5 \times \text{rpm}}{84{,}428} + \frac{\text{lpm} \times \text{bar}}{511} = \text{electric motor kW*}$$

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

Performance specifications are guidelines only.

HYDRA CELL® P Series Flow Capacities and Pressure Ratings

P300

L/hr Maximum Flow at Designated Pressure

Metallic Pump Heads Only (l/hr) 7 bar	34 bar	103 bar	172 bar	Pump rpm	Gear-box Ratio	Motor rpm
6.05	5.52	4.24	3.02	14.5	100:1	1450
7.62	7.07	5.72	4.40	18.13	80:1	
10.24	9.65	8.18	6.71	24.17	60:1	
12.33	11.71	10.14	8.56	29	50:1	
15.46	14.80	13.09	11.33	36.25	40:1	
20.69	19.95	18.00	15.94	48.33	30:1	
24.88	24.07	21.94	19.63	58	25:1	
31.15	30.25	27.83	25.17	72.5	20:1	
41.61	40.55	37.66	34.41	96.67	15:1	
62.53	61.16	57.32	52.87	145	10:1	
83.44	81.76	76.97	71.33	193.33	7.5:1	
125.3	123.0	116.3	108.3	290	5:1	
161.3	158.5	150.2	140.1	373.3	7.5:1	2800
242.1	238.1	226.1	211.4	560	5:1	

Required Motor kW

0.18	0.37	0.55	0.75	1.1	1.5

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

Maximum Particle Size	0.3mm @ 15% max. concentration
Inlet Port	1/2 inch BSPT
Discharge Port	1/2 inch BSPT
Weight (less motor)	23.2 kg

P400

L/hr Maximum Flow at Designated Pressure

L/hr All Pumps 7 Bar	17 Bar	L/hr Metallic Pump Heads Only 35 Bar	70 Bar	Pump RPM	Gear Ratio	Motor RPM
16.15	15.97	15.79	15.25	14.5	100:1	1450
20.80	20.61	20.41	19.81	18.13	80:1	
28.53	28.33	28.10	27.38	24.17	60:1	
34.72	34.50	34.25	33.43	29	50:1	
44.01	43.77	43.48	42.52	36.25	40:1	
59.48	59.22	58.85	57.67	48.33	30:1	
71.87	71.58	71.16	69.79	58	25:1	
90.44	90.12	89.62	87.97	72.5	20:1	
121.4	121.0	120.4	118.3	96.67	15:1	
183.3	182.8	181.9	178.9	145	10:1	
245.2	244.6	243.4	239.5	193.33	7.5:1	
369.0	368.2	366.5	360.7	290	5:1	
475.7	474.7	472.5	465.1	373.3	7.5:1	2800
714.9	713.4	710.2	699.2	560	5:1	

Required Motor kW

0.18	0.37	0.55	0.75	1.1	1.5	2.2

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

Maximum Particle Size	0.8mm @ 5-10% max. concentration
Inlet Port	1 inch BSPT
Discharge Port	3/4 inch BSPT
Weight (less motor) Metallic head: Non-metallic head	 28.1 kg 22.2 kg

Hydra-Cell® P Series Performance Graphs and Specifications

P500

L/hr Maximum Flow at Designated Pressure

L/hr Metallic Pump Heads Only 7 Bar	35 Bar	104 Bar	173 Bar	Pump RPM	Gear Ratio	Motor RPM
36.60	34.90	31.32	28.70	14.5	100:1	1450
44.71	42.93	39.07	36.10	18.13	80:1	
58.20	56.28	51.98	48.40	24.17	60:1	
68.99	66.96	62.30	58.23	29	50:1	
85.19	82.99	77.79	73.00	36.25	40:1	
112.2	109.7	103.6	97.60	48.33	30:1	
133.8	131.1	124.3	117.3	58	25:1	
166.2	163.1	155.2	146.8	72.5	20:1	
220.2	216.6	206.9	196.1	96.67	15:1	
328.1	323.4	310.1	294.5	145	10:1	
436.1	430.3	413.4	392.9	193.33	7.5:1	
652.0	644.1	619.9	589.8	290	5:1	

Required Motor kW

0.37	0.55	0.75	1.1
1.5	2.2	3.7	5.5

Maximum Particle Size	0.3mm @ 15% max. concentration
Inlet Port	1-1/4 inch BSPT
Discharge Port	3/4 inch BSPT
Weight (less motor)	72.6 kg

P600

L/hr Maximum Flow at Designated Pressure

L/hr All Pumps 7 Bar	17 Bar	L/hr Metallic Pump Heads Only 35 Bar	70 Bar	Pump RPM	Gear Ratio	Motor RPM
68.14	68.04	66.92	63.09	14.5	100:1	1450
85.53	84.90	83.47	79.20	18.13	80:1	
113.9	113.0	111.0	106.0	24.17	60:1	
136.7	135.4	133.0	127.4	29	50:1	
170.8	169.0	166.1	159.6	36.25	40:1	
227.6	225.1	221.1	213.2	48.33	30:1	
273.0	270.0	265.2	256.1	58	25:1	
341.2	337.4	331.3	320.5	72.5	20:1	
454.9	449.6	441.4	427.7	96.67	15:1	
682.2	674.0	661.7	642.2	145	10:1	
909.5	898.4	882.0	856.7	193.33	7.5:1	
1364.1	1347.3	1322.6	1285.7	290	5:1	

Required Motor kW

0.37	0.55	0.75	1.1
1.5	2.2	3.7	

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

Maximum Particle Size	1.5mm @ 5-10% max. concentration
Inlet Port	1-1/2 inch BSPT
Discharge Port	1 inch BSPT
Weight (less motor) Metallic head: Non-metallic head	 64 kg 48 kg

Calculating Required Horsepower (kW)*

$$\frac{5.5 \times \text{rpm}}{63{,}000} + \frac{\text{gpm} \times \text{psi}}{1{,}460} = \text{electric motor HP*}$$

$$\frac{5.5 \times \text{rpm}}{84{,}428} + \frac{\text{lpm} \times \text{bar}}{511} = \text{electric motor kW*}$$

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

Performance specifications are guidelines only.

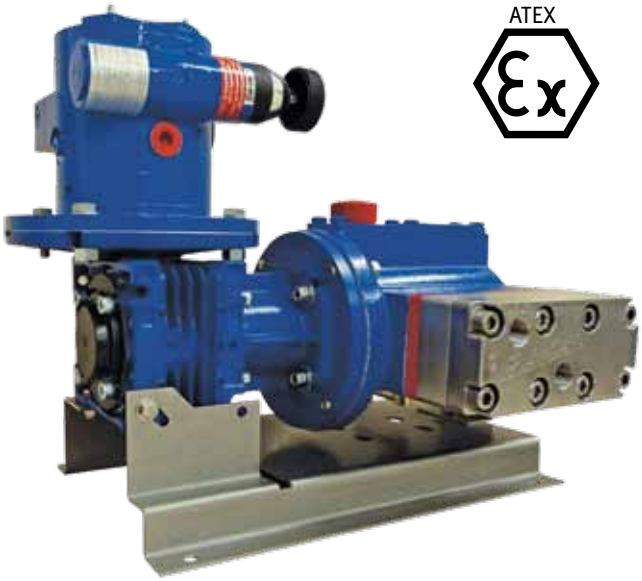
Hydra-Cell® Control Options

Electronic Control

- ATEX Dust Zone 21 (Ex tb III C T125c Db)
- IP55 Standard
- Flow adjustment scale via hand-wheel

Mechanical Adjustment

- ATEX Zone 1
- Linear fine adjustment scale on hand-wheel
- High reliability due to frictionless design



Control Freak

- Multiple Variable Frequency Dive (VFD) options
- Pre-set (with password protection) for Hydra-Cell pumps – Can be field calibrated for accuracy
- 7" colour graphic touch-screen user interface
- Safety features for emergency stop, loss of power, fault monitoring and optional pump oil temperature probe
- Pump-drive information screen
- Ten separate batch set-up screens
- Two user-configurable analogue input displays
- Analogue & digital I?O for interfacing with external devices
- Enables programming for flow rate or totalisation
- Option available to control multiple pumps with one Hydra-Cell "Control Freak"

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.

Replacement Part 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® 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: _____

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Lithuania
Malaysia
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Netherlands
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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.

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Notes

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