Hydra-Cell®
Seal-less Pumps

Versatile, Reliable Pumps for Mining, Tunneling, Quarrying and Dust Suppression

Mining/Tunneling/Quarrying/Dust Suppression

Wanner Engineering, Inc.

Hydra-Cell® Pumps for the Extraction Industries

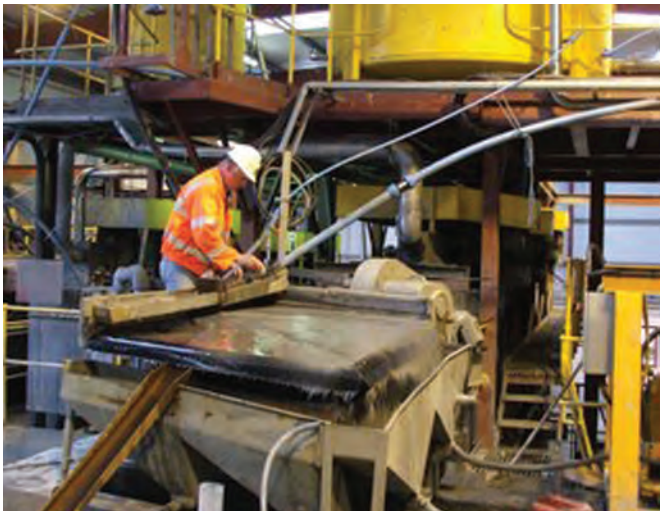
Pressure Injecting and Mixing • Transfer • Spraying • Metering and Dosing

Compact, Seal-less Pumps for Reliable Operation and Long Service Life

With more than 40 years of experience serving the extraction industries, including major global companies, Hydra-Cell pumps are performance-proved for reliable and durable operation in difficult applications that destroy lesser pumps. Hydra-Cell pumps require minimal maintenance, provide energy-efficient operation, and can run dry indefinitely, all resulting in a low total cost of ownership.

Advantages of Hydra-Cell:

- Variety of models, wide range of capacities and ratings, plus extensive choices in materials of construction make Hydra-Cell ideally suited to a wide range of mining, tunneling, quarrying, and dust suppression applications.
- Accurate and easy-to-control because the flow rate is proportional to the pump speed.
- Pumps the full spectrum of low-to-high viscosity fluids.
- Seal-less design can tolerate abrasive solids and particulate matter of up to 800 microns in size depending on pump model.
- Operational efficiencies reduce energy costs.
- Able to run dry without damage (or additional maintenance) to the pump in case of accident or operator error.
- Tolerates non-ideal operating conditions.
- Minimizes maintenance and downtime because there are no dynamic or mechanical seals, cups, or packing to leak or replace.
- Metering pump models designed to exceed API 675 performance standards and provide smooth, linear, virtually pulse-free flow without the use of expensive pulsation dampeners.



Hydra-Cell metering a cyanide solution in gold extraction.

Hydra-Cell Pumps Selection and Applications

Hydra-Cell positive displacement pumps are available in several models to cover a wide range of flows and pressures in different applications.

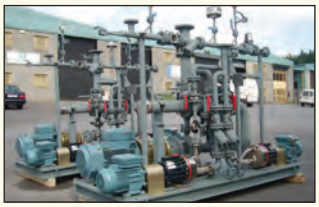
Ten (10) Hydra-Cell seal-less pump models are ideal for transfer, spraying, and pressure injecting and mixing.

Seven (7) Hydra-Cell metering pump models are ideal for metering and dosing, spraying, and pressure injecting and mixing.

Seven (7) Hydra-Cell T&Q Series pump models are designed for higher flow capacities and greater pressure ratings.

Designed for continuous or intermittent use, Hydra-Cell pumps are ideal for a variety of applications, both below and above ground.

- Borehole Stabilization *(Injecting of bentonite and other substances)*



- Liquid Explosives *(Charging liquid explosives into blast holes and rigs)*
- Drill Head Cooling *(Cooling the picks on coal cutters and tunneling machines while reducing dust generation)*

- Hazardous Chemical Pumping *(Metering hazardous solutions in metal extraction)*
- Conveyor Cleaning *(24/7 continuous duty in high pressure jet cleaning)*

- Seal Flushing *(Protecting large slurry pumps from seal damage)*
- Gas Extraction *(Powering a Venturi jet pump to lift drill-hole water and release gas to the surface)*

- Dust Suppression *(Controlling fugitive dust in mining, tunneling, quarrying and power generation)*

Requirements for Dust Suppression

Dust-filled air can cause discomfort for people living and working near quarries as well as produce other forms of contamination. Created when crushing or transporting bulk materials, fugitive dust can be controlled at its source by spraying the dust with very fine water droplets. In this way, operators can provide environmental protection and comply with occupational health and safety standards.

Hydra-Cell pumps play a crucial role in bringing down the cost of dust suppression. High-pressure pump models power fugitive dust suppression and water fogging systems without the use of compressed air and the costly equipment used to generate it. The efficient and accurate operation of Hydra-Cell pumps also helps minimize water usage and ensure a drier working environment.

Hydra-Cell pumps water or latex emulsions for airless spray in many types of installations:

- Cutting / Quarry Faces
- Crusher Stations
- Mills / Pulverizers
- Conveyor Belt Transfer Points
- Screens / Sieves
- Tips

Hydra-Cell providing dust control on a rotary drilling machine.

Typical Chemicals and Liquids Pumped	Challenges in Pumping	The Hydra-Cell Advantage
Aggressive Chemicals (Cyanide Solutions, Sulfur Dioxide, Acid Mine Drainage, Acid Rock Drainage & Leachate)	Corrosive - can contain solubilized impurities that form acidic solutions.	• No dynamic seals, so corrosive liquids can be pumped reliably. • Corrosion-resistant liquid end materials available.
	Containment of potentially harmful liquids and vapors.	• No cups, packing or dynamic seals to leak or wear. • Seal-less pumping chamber provides full containment of vapors and fumes.
Drill Head Cooling (Water & Drilling Fluids)	Non-lubricating and aggressive.	• No dynamic seals that need to be lubricated by the pumped liquid.
Dust Suppression Chemical Binders (Polymer Blends, e.g. Latex, Acrylic, Vinyl, Ethylene Glycol, Resins & Process Water)	May shear thin easily, breaking down the chemistry.	• Low-shear pumping action.
	May flocculate if exposed to excessive temperatures.	• Seal-less design results in minimal heat transfer from the pump to the process liquid.
	Premature failure of dynamic seals on other pump types in high-pressure misting applications.	• No dynamic seals to wear or replace.
Gland Seal Flushing (Water)	Non-lubricating and aggressive. Abrasive - water contains particles that can destroy dynamic seals in other pumps.	• No dynamic seals that need to be lubricated by the pumped liquid. • Seal-less design and spring-loaded, horizontal disk check valves can reliably pump liquids with particulates up to 800 microns in size (depending on model) without damage to the pump. • No dynamic seals to wear or replace.
	Dry running operation causes other pump types to fail instantly or prematurely.	• Can run dry indefinitely without damage.
Grouting Slurries (Bentonite, Cements)	Abrasive slurries cause wear to dynamic seals.	• Seal-less design and spring-loaded, horizontal disk check valves can reliably pump liquids with particulates up to 800 microns in size (depending on model) without damage to the pump. • No dynamic seals to wear or replace.

"As an engineer, I am extremely excited about Hydra-Cell pumps being used in our industry. They offer many advantages over other pump technologies common to this market.

"Hydra-Cell pumps are more reliable than centrifugal pumps, do not require the added complication of a PID loop for process control, and reduce energy costs by supplying only the required flow to the slurry pump gland. Unlike progressive cavity pumps, Hydra-Cell has low repair, maintenance and capital costs - all in a smaller footprint.

"Many of our customers were unfamiliar with Hydra-Cell pumps prior to receiving them on our systems. As their experience with the pumps has grown, so has their acceptance and appreciation of them. With its pulse-less flow and ability to pump fluids with no lubricity, Hydra-Cell is a true innovation for gland seawater service in mining and dredging pumps."

Bob Haglar
Application Engineer/President
Hagler Systems

Gland seal flushing for a Haglar Systems customer.

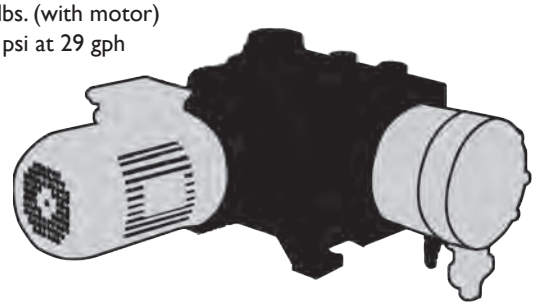
Lower Initial Investment and Lower Energy Costs

Uses lower hp motors

- Although both pumps have the same pressure rating, the lighter, more compact Hydra-Cell has a higher flow rating while requiring a less expensive, lower hp motor. This means Hydra-Cell saves approximately 30% to 55% on initial costs.

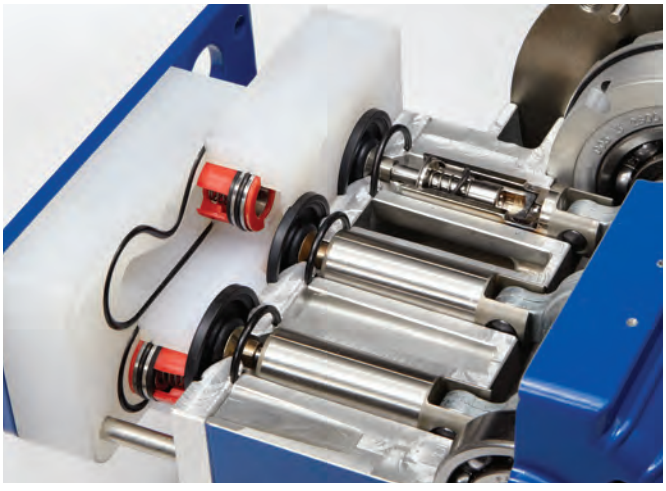
Hydra-Cell metering pump
Weight: 83.5 lbs. (with motor)
Rated: 2500 psi at 36 gph
Motor: 1-1/2 hp

Conventional metering pump
Weight: 220 lbs. (with motor)
Rated: 2500 psi at 29 gph
Motor: 5 hp



Low power consumption - 85% to 90% energy efficiency

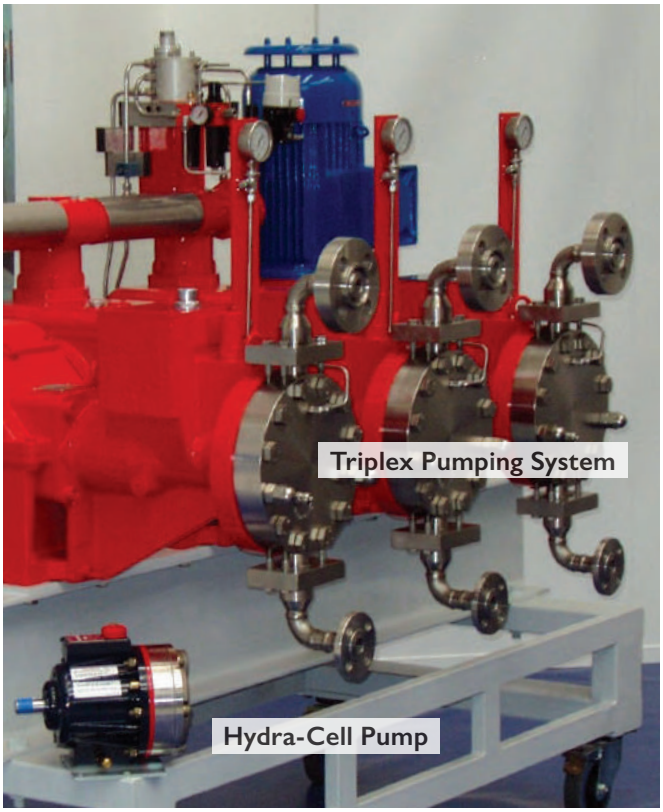
- The lower hp requirement of the Hydra-Cell pump achieves the same performance but with greater energy efficiency and less power consumption.
- Hydra-Cell positive displacement pumps show significant energy savings when compared to screw pumps and multi-stage centrifugal pumps (notably in cleaning and transfer applications).



The multiple-diaphragm liquid head of Hydra-Cell also allows a less expensive, energy-saving motor to be used.

Small footprint for savings

- Compact design can mean up to 30% lower initial cost compared to other pumps.
- Space-saving design creates a smaller footprint for more efficient use of plant space.
- Easier to access for routine maintenance or servicing.



Pumps Shown to Scale

The Hydra-Cell and triplex metering pumps both have the same flow capacity and pressure rating; however, space-saving Hydra-Cell has a much smaller footprint. Conventional metering pumps can become oversized and overpriced at higher flow/pressure requirements.

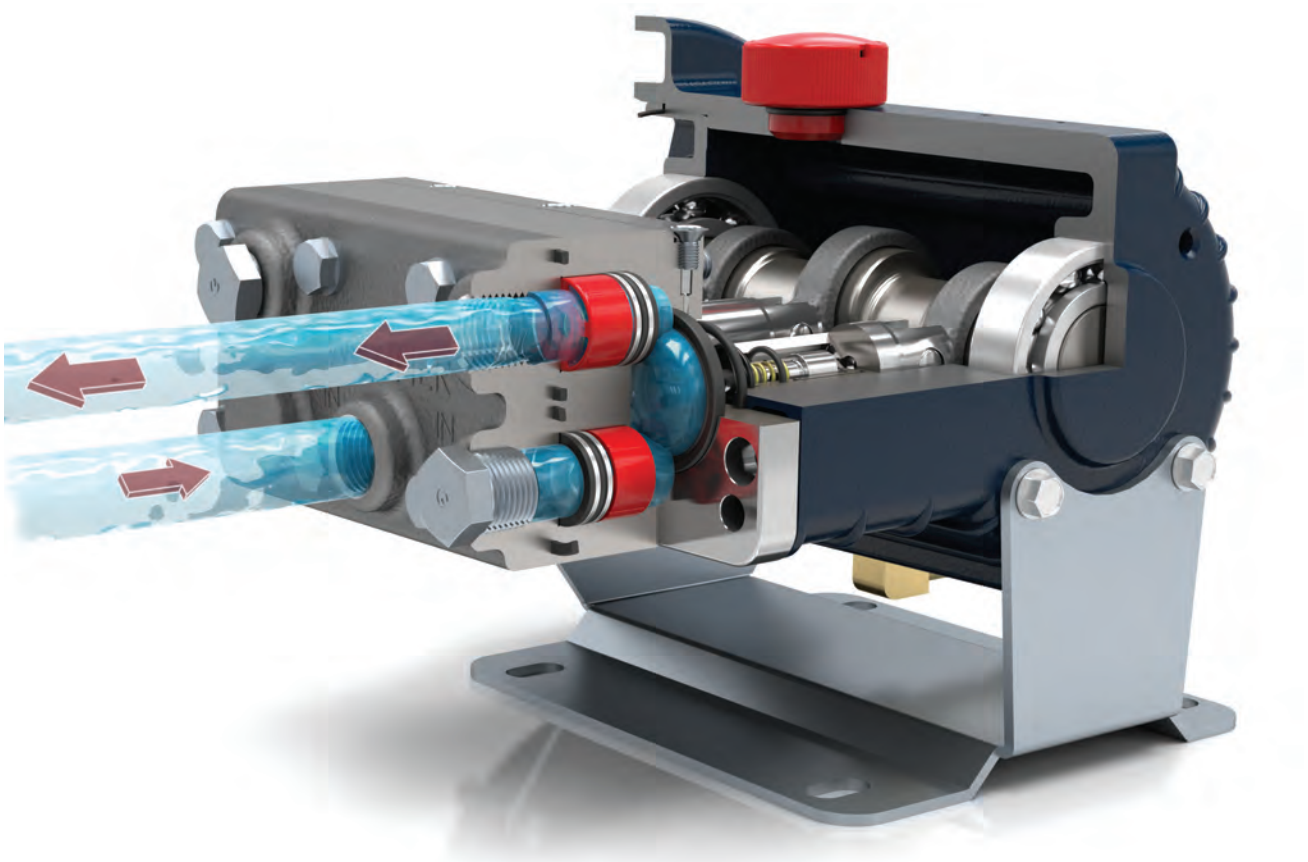
Ratings

Flow:	396 gph (1500 lph)
Pressure:	1160 psi (80 bar)

Minimal filtration

- Unlike gear pumps and screw pumps that wear excessively without fine filtration, Hydra-Cell has no dynamic seals or tight tolerances that need protection by fine filtration.
- Seal-less design handles abrasive particles up to 800 microns in size (depending on pump model) and up to 9 hardness (out of 10) on the Mohs scale.
- Can pump liquids with non-dissolved solids up to 40% depending on particle distribution.
- Unaffected by lapses in filtration, reducing costly pump repairs.
- Less need for costly filtration management and maintenance.

Pumps Abrasives and Low-to-High Viscosity Fluids



Abrasive particles and slurries can cause wear to dynamic seals and damage other types of pumps. Hydra-Cell's seal-less design and horizontal check valve orientation will handle abrasives and particulates without clogging or damaging the pump.

Handles abrasives and particulates

- Seal-less design and spring-loaded, horizontal disk check valves provide superior handling of abrasive fillers and particulates.
- Reliably pumps acids and caustics which crystallize.
- Efficiently pumps liquids with solids such as lime slurries and sour water containing sand.

Runs dry without damage

- Running dry can damage or destroy gear pumps and screw pumps, requiring costly repairs or pump replacement, and resulting in lost production. Hydra-Cell pumps can run dry without damage to the pump.
- When an interruption in flow is caused by suction blockage or a valve closure, gear pumps and screw pumps can fail immediately. Hydra-Cell pumps equipped with patented Diaphragm Position Control (DPC) technology will not be affected, allowing for correction of the interruption.

Environmental protection

- Liquids are 100% sealed from the atmosphere.
- No leak path for toxic vapors or harmful gases (e.g. H_2S).
- No dynamic seals to leak any Volatile Organic Compounds (VOC).

Handles low-to-high viscosity fluids

- Pumps thin to highly viscous liquids throughout the entire pressure range.
- Low-shear pumping action makes Hydra-Cell ideal for pumping and protecting shear-sensitive polymers.
- Non-lubricating liquids can be pumped reliably.

Hydra-Cell used for pumping liquid explosives into an injection rig.

Accurate Metering and Dosing with Pulse-free, Linear Flow

Accurate electronic flow control

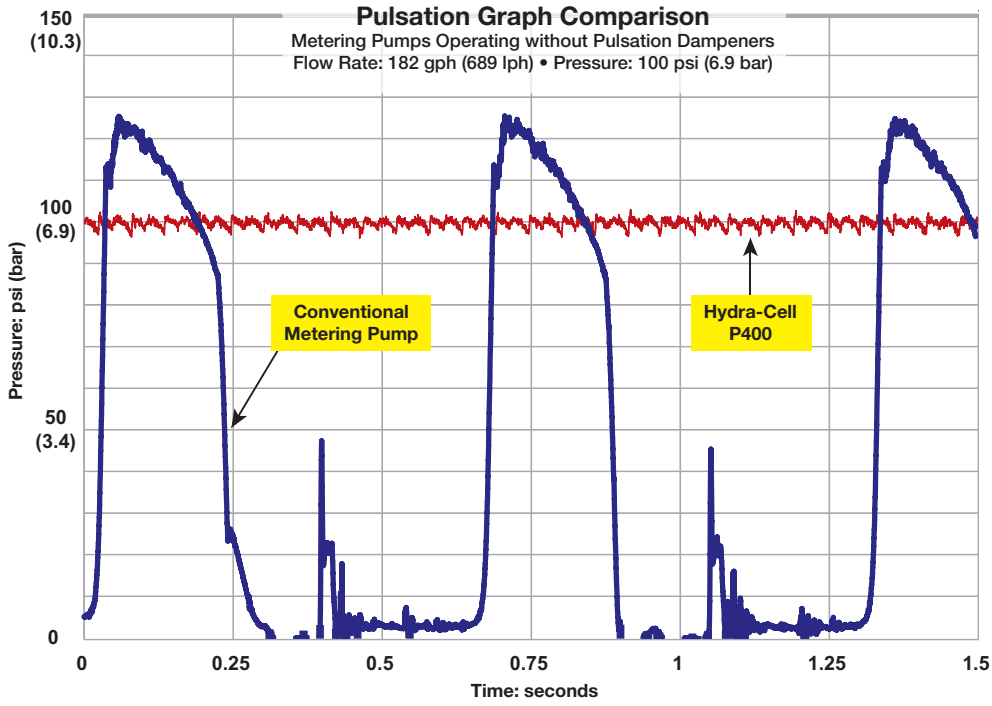
- Compared to pumps that rely on manual stroke adjustment or expensive actuators to change flow, Hydra-Cell metering pumps utilize speed control for greater accuracy throughout the turndown range.
- Can be equipped with solid-state electronic flow control where the volume per every stroke is constant and a known value.
- Electronic flow also provides easy calibration of the desired feed rate and a near instantaneous rate of change (0 to maximum rpm in 0.3 seconds).

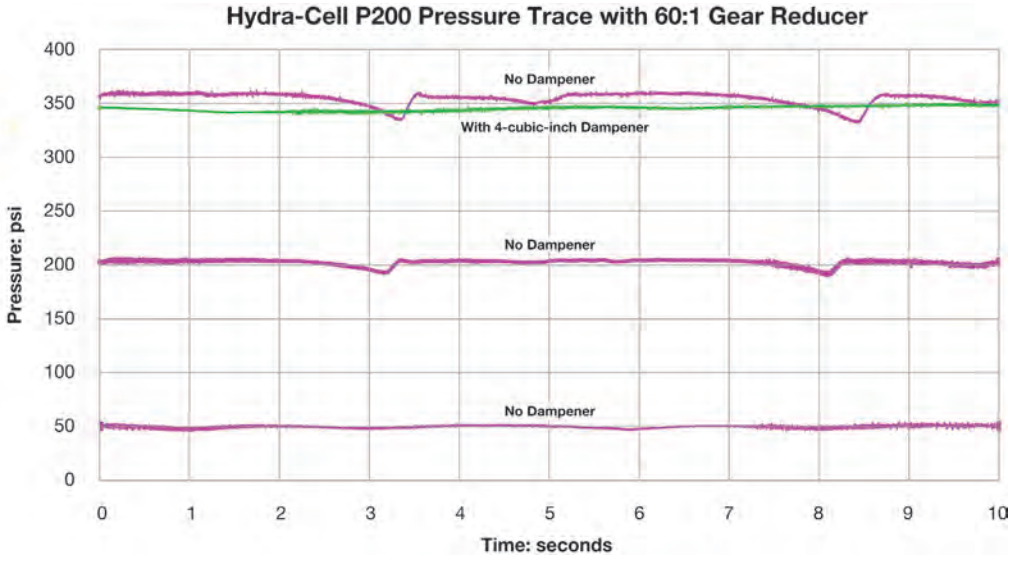
	Hydra-Cell Seal-less Pump Models	Hydra-Cell Metering Pump Models
Steady State Accuracy	±1%	±1% or better
Repeatability	±3%	±3% or better
Linearity	±3%	±3% or better

Typical results for recommended speed range.

Virtually pulse-free flow

- Multiple-diaphragm design minimizes pulsations, eliminating the need for expensive pulsation dampeners for most Hydra-Cell models.
- Reduces pipe strain.
- Enhances operating safety.
- Minimizes maintenance.
- Reduces acceleration/friction losses in the suction line.
- Provides accurate metering with linear, constant flow.
- Lowers system acquisition costs.





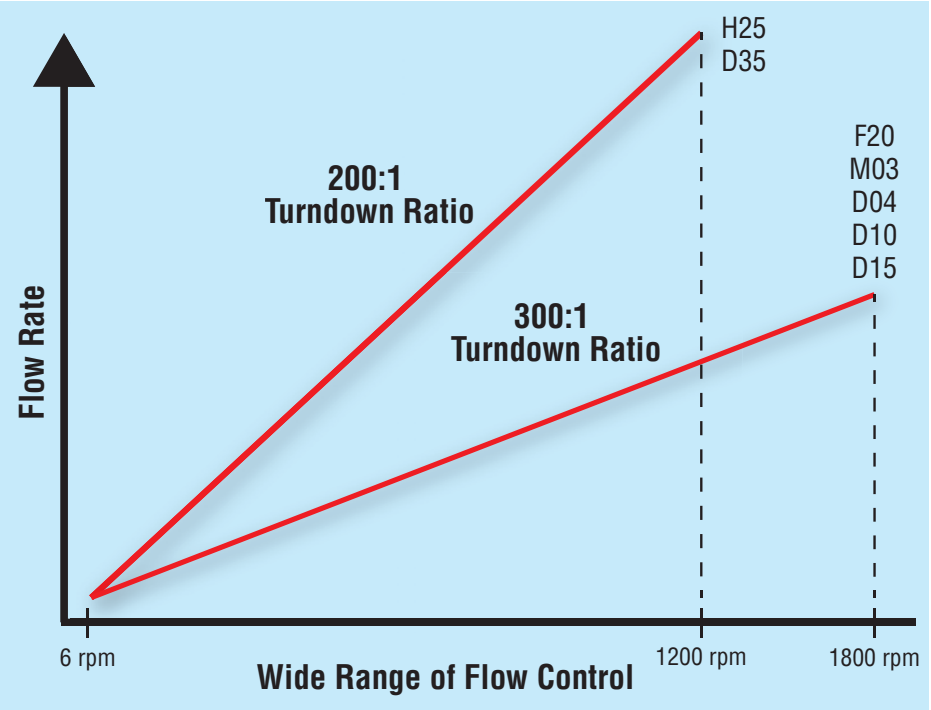
One Versatile, Low-Maintenance Pump Design

Adaptable to many applications

- One Hydra-Cell design applied to a large selection of models covers a wide range of operating flows and pressures.
- Can be fitted with ANSI, SAE or DIN flanges, IEC or NEMA motor mounts, or provided with ATEX certification to adapt to specific applications or meet international standards.
- Proven record of replacing different pump technologies with improved abrasives handling, less maintenance, and other benefits (as detailed on pages 9-12).

Extensive operating range

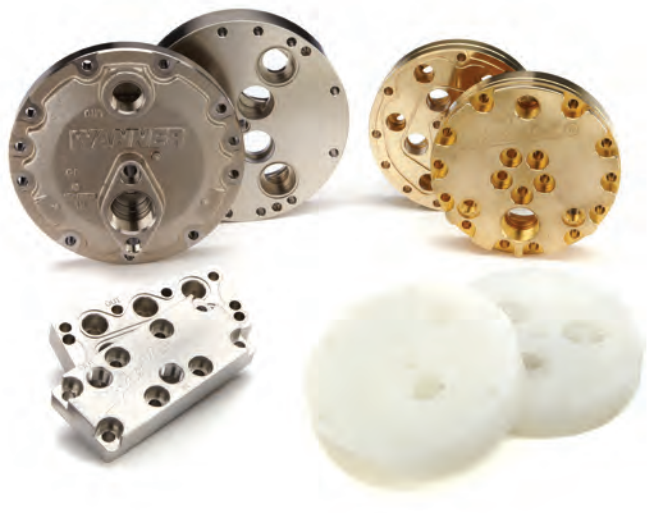
- Shaft speeds from 6 rpm to 1800/1200 rpm, yielding a 300/200:1 turndown ratio.
- Maximum discharge pressures from 700 to 5000 psi.
- Maximum flow rates range from 1 to 66 gpm for original Hydra-Cell sealless models; from 8 to 898 gph for metering pump models; and from 26 to 157 gpm for T&Q Series models.
- Minimum flow rates less than 0.15 gph at approximately 6 rpm.



Simple pump head design

- Liquid head materials can be changed readily, enabling Hydra-Cell to be used for many different chemicals and liquids pumped.
- Minimal maintenance required with no special tools needed.
- Low cost of spare parts.

	Minimum	Maximum
Flow Rate	0.0025 gpm (0.15 gph)	37 gpm (2220 gph)
Discharge Pressure	0 psi	2500 psi



Low maintenance

- No mechanical seals, cups or packing to leak, wear, or replace.
- No tight tolerances that could be susceptible to corrosion or damaged by solid particles.
- One design for all applications minimizes the need for standby pumps and spare parts, which optimizes training and service expertise and reduces inventory size and expense.
- Since there are no dynamic seals to wear or replace, Hydra-Cell pumps need little maintenance and will operate reliably under continuous duty at high pressure.
- Any maintenance or repair can usually be performed on-site.
- Can operate up to 6,000 hours between lubricating oil changes (compared to 1,500 hours recommended by many piston pump manufacturers).

Hydra-Cell® Performance Advantages Compared to Other Types of Pumps

Magnetic Drive Pump Disadvantages:	Hydra-Cell Advantages:
• Running dry can result in damage to the pump.	• Seal-less design enables Hydra-Cell to run dry without damage to the pump.
• Requires monitoring to ensure fluid flow.	• Ensures proper fluid flow without monitoring.
• Designed to pump clean, low-viscosity fluids.	• Low-shear pumping action handles higher viscosity fluids.
• Higher power requirements and energy costs.	• Uses lower hp motors. • More energy efficient.
• Can have a long horizontal footprint with higher acquisition and replacement costs.	• Smaller footprint compared to some magnetic drive pumps. • Easier to service. • Lower acquisition, operating, and replacement costs.

Peristaltic Pump Disadvantages:	Hydra-Cell Advantages:
• Require expensive pulsation dampeners to minimize pulsations.	• Multiple-diaphragm design provides virtually pulse-free flow, so expensive pulsation dampeners may not be required.
• Pump tube operates under stress, leading to failure and the expense of spare parts, maintenance, and repair.	• Diaphragms operate in hydraulic balance and are not under stress, thus providing long service life.

Conventional Metering Pump Disadvantages:	Hydra-Cell Advantages:
• Use manual stroke adjusters or expensive actuators to control flow, which can result in pumping inaccuracies, lost motion, operator error, and a greater chance of leakage.	• Hydra-Cell employs optional Variable Frequency Drive (VFD) electronic flow control for greater accuracy and repeatability, eliminating lost motion, reducing the chance of operator error, and removing a potential leak path.
• Require expensive pulsation dampeners to minimize pulsations.	• Multiple-diaphragm design provides smooth, linear, virtually pulse-free flow, so expensive pulsation dampeners may not be required.
• May only offer PTFE diaphragms, requiring frequent replacement due to stress and poor elastomeric memory.	• Available with a wide choice of cost-effective, elastomeric diaphragm materials.
• Large footprint to achieve required maximum flow and pressure.	• Can meet the same flow and pressure requirements with a much smaller footprint, saving space and costs.
• Different plunger and liquid end sizes needed to accommodate changes in operating pressures.	• Operates over a wide range of pressures without changes to the plunger or liquid end size.
• Integral gearing (necessary to prevent cross-contamination of actuating oil) is difficult and expensive to maintain.	• The simplicity of design means lower parts and maintenance costs. • Separate gearbox prevents cross-contamination of the actuating oil.

Hydra-Cell® Performance Advantages Compared to Other Types of Pumps

Centrifugal Pump Disadvantages:	Hydra-Cell Advantages:
• Double mechanical seals are expensive and require a fluid barrier system.	• The seal-less design of Hydra-Cell means that there are no mechanical seals or packing to leak or replace.
• Particulates and fines in the pumped fluid will cause wear in the case and the impellers.	• Seal-less pumping chamber with spring-loaded, horizontal disk check valves can pump particulates and fines up to 800 microns in size (depending on pump model).
• Difficult to maintain high efficiency with varying flow rates.	• Designed for efficient delivery at varying flow rates.
• Running dry and air entrapment can cause catastrophic mechanical seal failure.	• Can run dry without damage to the pump. Entrapped air does not cause immediate failure.
• Ineffective at low flow rates and high outlet pressures.	• Runs at very low speeds and flow rates while maintaining outlet pressures.
• Flow rate is difficult to control effectively.	• Positive displacement design allows for accurate speed control.
• Higher pressure requires additional stages with an increasing footprint for horizontal pumps.	• Can meet same flow and pressure requirements with a much smaller footprint, saving space as well as investment and operation costs.

Progressive Cavity Pump Disadvantages:	Hydra-Cell Advantages:
• Dynamic seals are worn by pumping abrasive fluids.	• No dynamic seals in the pumped fluid; can handle abrasive fluids reliably.
• Hydrodynamic film between the stator and rotor cam breaks down under pressure, reducing flow rate and negating true positive displacement pumping action.	• Seal-less pump chamber with hydraulically-balanced diaphragms mean that flow rate is maintained even as discharge pressure increases.
• Running dry can result in damage to the pump.	• Seal-less design enables Hydra-Cell to run dry without damage to the pump.
• Higher pressure requires additional stages with an increasing footprint for horizontal pumps.	• Can meet same flow and pressure requirements with a much smaller footprint, saving space as well as investment and operation costs.

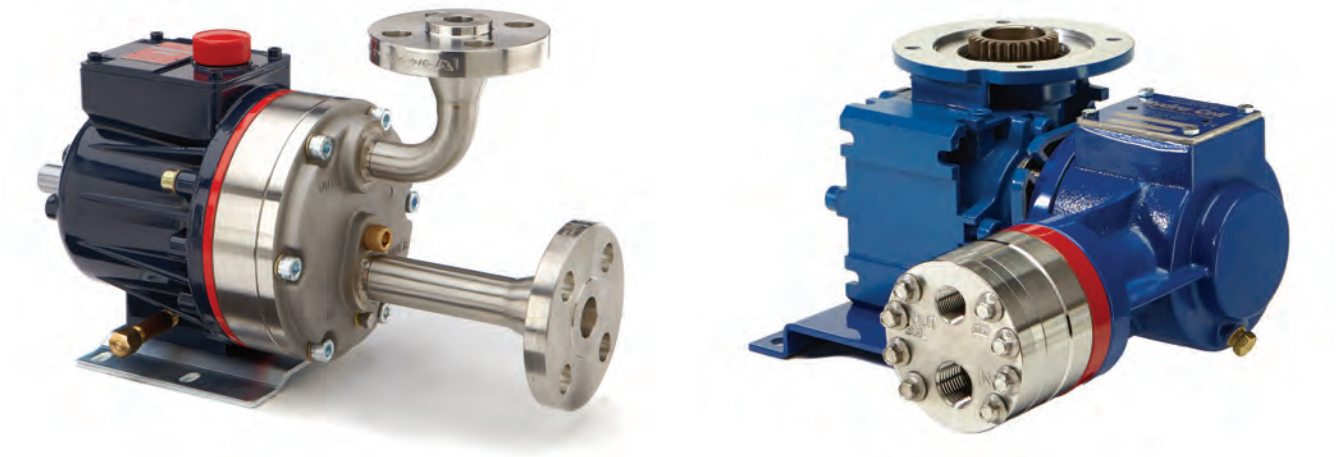
Plunger/Piston Pump Disadvantages:	Hydra-Cell Advantages:
• Packing requires frequent adjustments and then replacement as it wears.	• Seal-less design uses no packing, reducing downtime and maintenance costs.
• Packing must leak to provide lubrication - creating maintenance, environmental, safety, and housekeeping issues with their associated costs.	• No packing means no secondary containment requirements, no clean-up or disposal issues, improved safety, and reduced maintenance costs.
• Packing allows emissions that require expensive "vapor-less" alternatives or vapor recovery systems.	• Seal-less design eliminates emissions and costly associated fines.
• Packing causes plunger wear, which is made worse by abrasive media; the plunger, stuffing box, and packing must be compatible with the product being pumped.	• Diaphragm design allows pumping of abrasive and corrosive media without concern for wear, compatibility or replacement of packing or plunger/piston.
• May require external lubrication systems at an additional cost of up to $3,000 – another maintenance and repair factor.	• No lubrication necessary, resulting in less maintenance and lower cost of ownership expenses.

Compared to other pumps, Hydra-Cell requires minimal maintenance for companies in the extraction industries. Hydra-Cell has no mechanical seals, cups or packing that leak or need to be replaced and no internal gears to wear.

Internal Gear Pump Disadvantages:	**Hydra-Cell Advantages:**
• Mechanical seals and packing require maintenance, and replacement or adjustment.	• The seal-less design of Hydra-Cell means that there are no mechanical seals or packing to leak or replace.
• Does not tolerate thin/non-lubricating liquids, and does not handle solids, abrasives or particulates well.	• Seal-less pumping chamber and spring-loaded, horizontal disk check valves can pump solids, abrasive fillers, and particulates while handling liquids thick or thin.
• Designed for operating at low speeds and low pressure ratings. • Low volumetric efficiency.	• Operates at low-to-high speeds and at higher pressures with higher volumetric efficiency.
• Component wear reduces accuracy and efficiency.	• No internal gears to wear so there is less maintenance and spare part replacement. • Accuracy and efficiency are more stable.
• One bearing runs in the pumped fluid.	• No bearings in the pumped fluid.
• Unbalanced - overhung load on the shaft bearing.	• Hydraulically balanced design so there is no overhung load.

External Gear Pump Disadvantages:	**Hydra-Cell Advantages:**
• Mechanical seals and packing require maintenance, and replacement or adjustment.	• The seal-less design of Hydra-Cell means that there are no mechanical seals or packing to leak or replace.
• Does not tolerate solids, abrasives, or particulates.	• Seal-less pumping chamber and spring-loaded, horizontal disk check valves can pump solids, abrasive fillers, and particulates.
• Component wear reduces accuracy and efficiency.	• No internal gears to wear so efficiency is more stable and there is less maintenance and spare part replacement.
• Contains four bushings/bearings in the fluid area.	• No bushings/bearings in the pumped fluid.
• Fixed end clearances are typical.	• Design does not rely on clearances.
• Efficiency drops as outlet pressure increases.	• Efficiency remains relatively constant over its range of operating pressures.
• Depends on pumped liquid for lubrication.	• Seal-less design does not require pumped liquid for lubrication.

Hydra-Cell® Performance Advantages Compared to Other Types of Pumps



Model D10 (above left) fitted with ANSI flanges. Hydra-Cell pumps are also available with SAE or DIN flanges, NEMA or IEC motor mounts, or provided with ATEX certification to adapt to specific applications or meet international standards.

Triple Screw Pump Disadvantages:	**Hydra-Cell Advantages:**
• Close tolerances and running clearances require ultra-filtration (usually to <10 microns).	• Precisely-engineered tolerances and seal-less design eliminate the need for fine filtration.
• Performance characteristics sensitive to viscosity change.	• Pumps thin or highly viscous liquids with equal efficiency.
• Mechanical seals and packing require maintenance, and replacement or adjustment.	• The seal-less design of Hydra-Cell means that there are no mechanical seals or packing to leak or replace.
• Does not tolerate solids, fines, abrasives or particulates.	• Seal-less pumping chamber with spring-loaded, horizontal disk check valves can pump fines up to 800 microns in size (depending on pump model).
• Inefficient at low speeds (usually requires minimum 1000 rpm).	• Runs at very low speeds (from 18 to 1800 rpm) while maintaining outlet pressures.
• Depends on pumped fluid for sealing and hydrodynamic lubrication.	• No requirement for the pumped fluid to seal or lubricate.
• Contains bushings in the pumped fluid.	• No bushings in the pumped fluid.
• Dry running and entrapped air cause immediate damage.	• Can run dry without damage to the pump. Tolerates entrapped air.
• Incorrect direction of rotation results in damage to the pump.	• Hydra-Cell pumps are bidirectional, eliminating the risk of damage.

Hydra-Cell T and Q Series Pumps

Available to Meet API 674!

T and Q Series Design Features

- Seal-less design separates the power end from the process fluid end, eliminating leaks, hazards and the expense associated with seals and packing.
- Low NPSH requirements allow for operation with a vacuum condition on the suction - positive inlet pressure is not necessary.
- Can operate with a closed or blocked suction line and run dry indefinitely without damage, eliminating downtime and repair costs.
- Unique diaphragm design handles more abrasives with less wear than gear, screw, or plunger pumps.
- Hydraulically balanced diaphragms 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-end shaft (T100 and Q155) provide a variety of installation options.

Hydra-Cell® Seal-less Pumps

Product Innovation of the YEAR PUMPS & SYSTEMS 2010 FINALIST

OFFSHORE TECHNOLOGY CONFERENCE®

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

T100 High Pressure Model.

Q155 Low Pressure Model.

NEW

T200 Medium Pressure Model.

Model	Maximum Capacity BPD	gpm	l/min	Max. Discharge Pressure psi (bar)
T100E	3292	96.0	366.1	1500 (103)
T100F	2623	76.5	289.6	1850 (128)
T100H	2332	68.0	257.8	2100 (145)
T100K	1543	45.0	170.4	3000 (207)
T100M	1302	38.0	143.8	3500 (241)
T100S	891	26.0	98.4	5000 (345)

Model	Maximum Capacity BPD	gpm	l/min	Max. Discharge Pressure psi (bar)
Q155E	5383	157	595	1500 (103)
Q155F	4354	127	490	1850 (128)
Q155H	3806	111	421	2100 (145)
Q155K	2674	78	295	3000 (207)
Q155M	2228	65	246	3500 (241)

Model	Maximum Capacity BPD	gpm	l/min	Max. Discharge Pressure psi (bar)
T200K	3258	95	359	3000 (207)
T200M	2915	85	321	3500 (241)
T200P	2538	74	280	4000 (276)
T200Q	2230	65	246	4500 (310)

Maximum Inlet Pressure for all models: 500 psi (34 bar).
Maximum Operating Temperature for all models: 180˚F (82˚C). Consult factory for correct component specification for temperatures above 180˚F (82˚C) or below 40˚F (4˚C)

For complete specifications and ordering information, consult the Hydra-Cell T100, Q155, & T200 product bulletins.

Hydra-Cell Positive Displacement Diaphragm Pumps are Ideal for Handling Abrasives and Particulates

- Unmatched versatility and reliability for a wide range of pumping applications required in the mining, tunneling, quarrying, and dust suppression industries.
- Features a seal-less design and horizontal disk check valves that enable the pump to handle abrasives and particulates that might damage or destroy other types of pumps.
- Simple, compact design reduces initial investment and lowers maintenance costs.
- Selection of models that can operate with very low to very high flow rates and discharge pressures up to 2500 psi.
- Available in a wide range of pump head materials of construction and diaphragm materials.
- Variety of options and accessories to optimize performance.

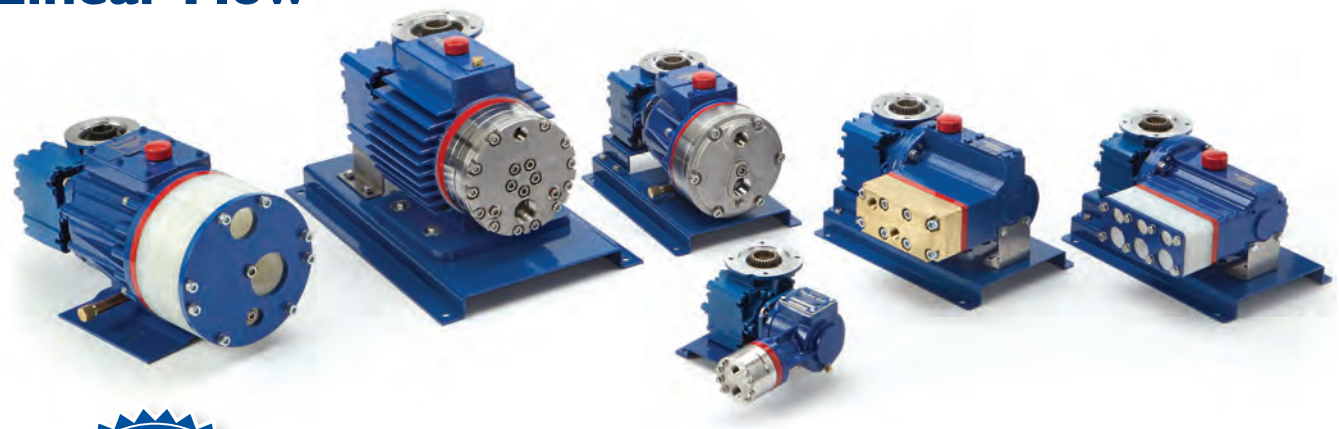
Flow Capacities and Pressure Ratings

Model[1]	Maximum Capacity gpm (l/min)	Maximum Discharge Pressure psi (bar) Non-metallic[2]	Metallic	Maximum Operating Temperature F (C)[3] Non-metallic	Metallic	Maximum Inlet Pressure psi (bar)
F20	1.0 (3.8)	350 (24)	1500 (103)	140° (60°)	250° (121°)	250 (17)
M03	3.1 (11.7)	350 (24)	1200 (83)	140° (60°)	250° (121°)	250 (17)
D04	2.9 (11.2)	N/A	2500 (172)	N/A	250° (121°)	500 (34)
D10[4]	4.3 (15.1)	N/A	1500 (103)	N/A	250° (121°)	250 (17)
D10	8.8 (33.4)	350 (24)	1000 (69)	140° (60°)	250° (121°)	250 (17)
D12	8.8 (33.4)	N/A	1000 (69)	N/A	250° (121°)	250 (17)
D15 & D17	15.5 (58.7)	N/A	2500 (172)	N/A	250° (121°)	500 (34)
H25	20.0 (75.9)	350 (24)	1000 (69)	140° (60°)	250° (121°)	250 (17)
D35[5]	23.1 (87.5)	N/A	1500 (103)	N/A	250° (121°)	250 (17)
D35	36.5 (138)	N/A	1200 (83)	N/A	250° (121°)	500 (34)
D66	65.7 (248.7)	250 (17)	700 (48)	120° (49°)	200° (93.3°)	250 (17)[6]

1 Ratings are for the cam design with the highest flow rate.
2 350 psi (24 bar) maximum with PVDF liquid end; 250 psi (17 bar) maximum with Polypropylene liquid end.
3 Consult factory for correct component selection for temperatures from 160°F (71°C) to 250°F (121°C).
4 D10 @790 rpm maximum.
5 D35 @700 rpm maximum.
6 D66 maximum inlet pressure 50 psi (3.4 bar) for non-metallic models.

For complete specifications and ordering information, consult the Hydra-Cell catalog.

Hydra-Cell Metering Solutions Pumps Exceed API 675 Standards and Provide "Pulse-free" Linear Flow



IChemE 2007 Honourable Mention

The IChemE Awards recognize innovation and excellence in making outstanding contributions to safety, the environment, and sustainable development in the chemical and bioprocess industries.

Hydra-Cell® METERING SOLUTIONS™

- Designed for use with Variable Frequency Drive (VFD) electronic flow control to maintain greater accuracy throughout the turndown range.
- Multiple-diaphragm design (except the P100) provides virtually pulse-free flow, eliminating the need to purchase expensive pulsation dampeners.
- Offers all the features and benefits of original Hydra-Cell pumps (F/M/D/H Series) including seal-less design, horizontal disk check valves (P Series) and space-saving, compact design.
- Selection of models that can operate with very low to very high flow rates and discharge pressures up to 3500 psi.
- Available in a wide range of pump head materials of construction and diaphragm materials.
- Every model is available with a variety of gear box ratios to meet your application needs.
- Variety of options and accessories to optimize performance.

Flow Capacities and Pressure Ratings

Model[1]	Maximum Capacity gph[2]	Maximum Discharge Pressure psi (bar)		Maximum Operating Temperature F (C)[3]		Maximum Inlet Pressure psi (bar)
		Non-metallic[3]	Metallic	Non-metallic[4]	Metallic	
MT8	8.0	350 (24)	3500 (241)	140° (60°)	250° (121°)	500 (34)[5]
P100	27.0	350 (24)	1500 (103)	140° (60°)	250° (121°)	250 (17)
P200	81.0	350 (24)	1000 (69)	140° (60°)	250° (121°)	250 (17)
P300	81.4	N/A	2500 (172)	N/A	250° (121°)	500 (34)
P400	242.8	350 (24)	1000 (69)	140° (60°)	250° (121°)	250 (17)
P500	425.9	N/A	2500 (172)	N/A	250° (121°)	500 (34)
P600	890.3	350 (24)	1000 (69)	140° (60°)	250° (121°)	250 (17)

1 Ratings are for X-cam design.
2 Consult factory for ratings in liters per hour (lph).
3 350 psi (24 bar) maximum with PVDF or PVC (MT8 only) liquid ends; 250 psi (17 bar) maximum with Polypropylene liquid end (P Series only).
4 Consult factory for correct component selection for temperatures from 160°F (71°C) to 250°F (121°C).
5 300 psi (21 bar) for MT8 non-metallic heads.

For complete specifications and ordering information, consult the Hydra-Cell Metering Solutions catalog.

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Seal-less Pumps

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