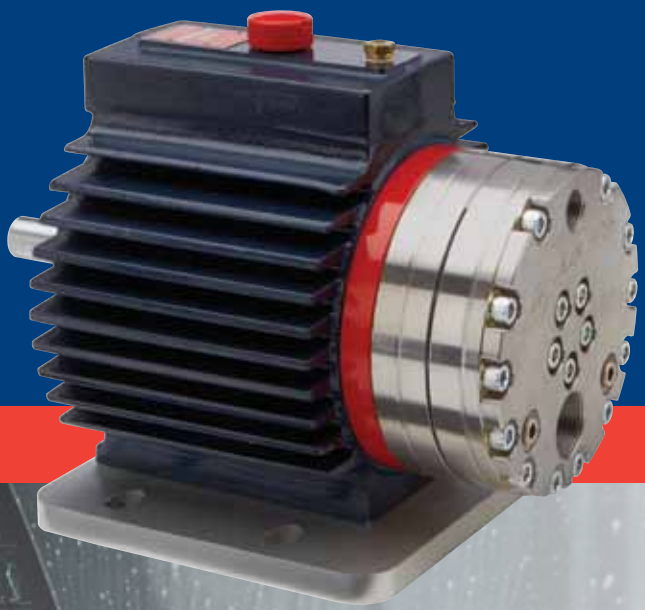
Hydra-Cell®

Seal-less Pump Technology



Car and Vehicle Washing

Economic Reliability

Hydra-Cell® economical and dependable high pressure pumps with 15+ years of life

"Wanner has been a fixture at AVW for at least 30 years. Back in the day there was a lot of research into which pump was the most reliable and the most efficient, Wanner came out on top and we haven't seen that change."

Bob Schaefer, AVW Equipment

Car wash

Rollover high-pressure touch-less contour wash

Chassis wash

Tunnel wash

Wheel wash

Jet wash / self-service wash

Truck, coach and train

Truck and coach wash

Construction site vehicle wash

Train and tram wash

Odour control injection

Cleaning chemicals

Reverse osmosis

Wash water recycling systems

Pumps recycled and grey water without extra maintenance

Hydra-Cell®

ECONOMICALLY AND RELIABLY PUMPING ANY LIQUID

Typical Liquids Pumped	Challenges in Pumping	The Hydra-Cell® ADVANTAGE
Clean, Recycled and Grey Water	• Sub 10 micron particles cause damage to dynamic seals	• Seal-less design handles sub 10 micron particles and large particles up to 0.8 mm reliably
	• Non-lubricating	• Pumping action does not require any lubrication from pumped liquid
	• In hard water areas hardness salts (scale) build-up can wear dynamic seals	• No dynamic seals to wear and leak
	• Running dry by accident or operator error	• Can run dry indefinitely
	• Filters may become blocked, a situation that can destroy pumps with dynamic seals	• Can tolerate blocked inlet conditions without damage
Hot liquids above 80°C	• Water at 80°C is approximately 64 times more aggressive then water at 20°C and can create maintenance for pumps with dynamic seals.	• With no dynamic seals Hydra-Cell reliably pumps water up to 120°C.
De-ionised Water	• Non-lubricating and aggressive	• No dynamic seals that need to be lubricated by the process liquid
Cleaning Chemicals… Detergents, Caustics, Proprietary Mixtures, Liquid polishes	• Corrosive and non-lubricating	• Corrosion resistant liquid head materials
		• Seal-less design prevents leakage
	• Undissolved solids can be abrasive	• Handles abrasives with ease
		• Seal-less design handles particles up to 1.5mm dia

Hydra-Cell®

ADVANTAGES LOWEST LIFE CYCLE COSTS

How does Hydra-Cell pump technology reduce life cycle costs?

Operating Costs:
Seal-less design eliminates the usual seal and packing maintenance costs while ensuring high reliability with minimal maintenance and downtime.

Long Pump Life Over 15 years:
Seal-less design means no dynamic seals and rugged materials of construction are tolerant of small solids, resistant to chemical and corrosive attack resulting in a long service life.

High Efficiencies - Low Power Consumption:
Hydra-Cell's packing-free design delivers consistent high efficiencies over life compared to plunger pumps that loose efficiency as packing is tightened and friction increases.

Servicing Costs:
Only $50* per year for service parts. With Hydra-Cell, the oil is separate from the cleaning liquid, so only occasional oil changes and servicing is required.

Environmental Cost:
Keep your pump room clean and safe. Seal-less design means 100% leak free eliminating clean-up costs also environmental and health & safety risks.

Energy Costs:
Save up to 70% with Intelligent Pump Control™ technology (patent pending). With no special valves or pressure feedback loops, Intelligent Pump Control automatically delivers the exact liquid flow, exactly when it's needed, at the exact pressure.

Installation and Commissioning Costs:
Indefinite run dry capable and the ability to run with a closed suction line due to Diaphragm Position Control (DPC) means that operator's mistakes during commissioning are not costly.

The ability of the Hydra-Cell pump to handle liquids with particles saves expensive fine filtration costs. Suction line charge pumps can be eliminated due to low NPSHr and dry lift priming.

Keep Operating 24/7:
Ensure your vehicle wash system operates at capacity to maximise your revenue with Hydra-Cell's seal-less durability and dependability, with no unplanned downtime.

Decommissioning and Disposal Cost:
Many Hydra-Cells have been operating successfully for over 30 years with minimal servicing. Averaging over 20 years service life means decommissioning and disposal costs are reduced over many years.

* Based on 25,000 Hydra-Cell pumps installed over 20 years in the USA car wash industry. An annual oil change and a complete liquid end kit replacement is all that is typically required.

Hydra-Cell® ADVANTAGES AND FEATURES

Hydra-Cell® car wash pumps are designed to handle clean water, grey water, recycled water, hot water up to 120°C and cleaning chemicals with the same outstanding economy, efficiency and reliability.

- 15+ year's service life and minimal maintenance
- Up to 90% energy efficiency
- Reliably handles hot corrosive, non-lubricating and abrasive liquids
- 100% containment
- Can run dry indefinitely
- Over 40 years of pump manufacturing and global customer support

Low cost servicing - only $50 per year!

80% of plunger pump maintenance and service costs are due to the wear and replacement of the seals and packing. With no dynamic seals or packing to wear or replace, Hydra-Cell seal-less pumps are reliable, versatile and extremely economic requiring minimal maintenance.

Hydra-Cell diaphragm pumps can handle entrained solids up to 800 microns without the need for fine filtration. Hydra-Cell pumps can be used for the reclaim and delivery of wash water, reducing spares holding and simplifying maintenance.

25,000 Hydra-Cell pumps have been installed over the years in the USA car wash industry. One car wash manufacturer calculates that over a 20 year period, maintenance, including an annual oil change and a complete liquid end replacement kit installed as and when necessary, costs only $50 per year.

High efficiency for lower costs

Hydra-Cell high pressure pumps operate at high efficiency levels. Hydra-Cell has a reciprocating positive displacement pumping action with multiple pumping elements to further enhance the overall efficiency.

Constant high efficiency over time

The seal-less pumping chamber of the Hydra-Cell does not rely on the pumped liquid properties to maintain a pressure seal. This results in constant efficiency and reliability over time.

From pump shaft to hydraulic power, Hydra-Cell's packing free design ensures constant high efficiencies throughout the life of the pump.

Hydra-Cell T series pump range up to 600 lpm and 345 bar with efficiencies of over 90%

Hydra-Cell® ADVANTAGES AND FEATURES

Reliably handling hot liquids up to 120°C

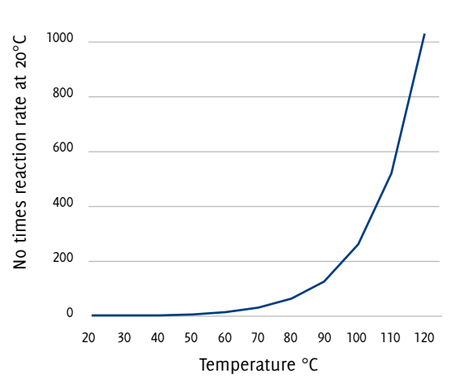
Using a high pressure and high temperature chemical cleaning process greatly reduces cleaning time but with hot liquids, chemical attack is accelerated on dynamic seals and packing; as the liquid temperature increases, maintenance increases.

Water at 90°C is 128 times more corrosive than water at 20°C and this causes accelerated damage to dynamic seals. Pumps with dynamic seals need special and expensive seal and packing materials, seal flushing may also be required.

With no dynamic seals or packing, Hydra-Cell seal-less design is reliable and versatile and can handle liquids up to 120°C, whilst sustaining performance for consistent cleaning with minimal maintenance.

Note: Oil Cooler may be needed for some duties over 90°C.

Chemical reaction rate increase due to temperature. Doubling general 'rule of thumb'



Water at 90°C is 128 times more corrosive than water at 20°C. This causes accelerated damage to dynamic seals.

For over 40 years, Wanner has been supplying Hydra-Cell® seal-less pumps into the car wash industry all around the world. The unique, seal-less design makes them extremely economical, dependable and energy efficient.

Hydra-Cell® ADVANTAGES AND FEATURES

Hydra-Cell® is the pump to keep your vehicle wash system running at capacity and keep your customers happy... Hydra-Cell, the byword for dependability and reliability.

G15 with Brass pump head

G25 with stainless steel pump head

NO SEALS. NO PACKING. NO PROBLEM.

Seal-less design sets the Hydra-Cell diaphragm pumps apart from typical plunger pumps for vehicle washing and is the basis for a long service life. Many liquids pumped are harmful to pump seals, the Hydra-Cell seal-less pumps are tolerant of small solids and resistant to chemical and corrosive attack.

With no dynamic seals and no packing to wear or replace, maintenance and servicing costs are greatly reduced with Hydra-Cell pumps resulting in a typical service life of 15+ years.

Eliminate blocking and clean-down for continuous operation

It is the very fine sub 10 micron solids that cause wear in all pumps with dynamic seals, as often they these solids are not captured during filtration. Seal maintenance can be both costly and time consuming. Continued seal deterioration further reduces pumping efficiency and can result in pump failure. The elimination of packing and dynamic seals means that Hydra-Cell pumps can handle liquids with suspended dirt particles and small particles from vehicles without clogging.

- No blocking or deterioration of pump performance with Hydra-Cell
- No requirement for seal maintenance means more productive time and greater efficiency

Reliably pumping any liquid up to 120°C

- **Clean water**
- **Recycled water**
- **Cleaning chemicals**
- **Grey water**
- **De-ionised water**

Hydra-Cell seal-less, packing-free car wash pumps are available in a variety of corrosion resistant materials and are designed to pump all liquids with the same outstanding efficiency and reliability.

Whether using hot liquids (up to 120°C), clean, recycled water, grey water or chemicals for cleaning, Hydra-Cell pumps reliably handle these liquids due to their seal-less design. With no dynamic seals, this eliminates seal maintenance thereby reducing running costs and maximising productivity.

Hydra-Cell® ADVANTAGES AND FEATURES

Reverse Osmosis

A car wash Reverse Osmosis (RO) system provides a final rinse of pure mineral-free water to each vehicle, resulting in glass, chrome and all painted surfaces drying spot-free. Hydra-Cell's renowned efficiency makes them the ideal choice as RO feed pumps, meeting the wide range of pressure and flow requirements and enabling charged and dirty liquids to be processed without need for fine filtration to protect the diaphragm pump. Pulsation is low, so dampeners may not be required for most applications.

Safety in mind - 100% leak-free operation

With their seal-less design, Hydra-Cell pumps ensure 100% containment of the cleaning liquid and no contamination of the process liquid from pump crank shaft oil, thereby eliminating health and safety risks caused by leakage, a common problem with piston pumps.

Hydra-Cell® seal-less pumps are used within the car wash industry throughout the world. Their rugged construction and choice of materials makes them the ideal pump for clean water, reclaim water applications hot liquids (up to 120°C), high pressure arches, side blast sprays, wheel washers, prep guns, self-service jet washers and chassis wash applications.

1 This single high-volume, fully automated car wash in The Netherlands cleans up to 130 cars per hour. They collect, treat and recycle water.
2 High Pressure water is used to clean tyres and wheels using a range of nozzles.
3 The portable units are self contained, with built in fuel tank and can be mounted with a carry frame complete with wash lance.

Hydra-Cell® ADVANTAGES AND FEATURES

Energy Efficiency Through Ultimate Controllability

Up to 70% energy savings - Year after year with Intelligent Pump Control™ (patent pending)

- **Automatically delivers the right liquid flow every time**
- **Easy to install 'plug and play' fixed solution**
- **Operate multiple lances from one pump**

Intelligent Pump Control™ technology enables further energy savings up to 70% simply by removing the need for wasteful bypass. With no special valves or pressure feedback loops, Intelligent Pump Control technology automatically delivers that right liquid flow every time it is called into action.

INTELLIGENT PUMP CONTROL™

Just one Hydra-Cell pump can service one or multiple lances simultaneously, providing each lance with the optimum volume flow required, without resorting to costly and inefficient bypass. Simply pre-set the required pressure and the pump will generate the required flow for the application, automatically and instantaneously. Soft starts avoid pressure spikes and pipe stress and precisely matching the pump performance to the requirement also extends the life of the pump and the entire system.

Simple "plug and play" installation solution

No need for separate inverter unit or wall-mounted cabinets.

- Pump
- Motor and integrated controller
- Compatible with standard communication protocols
- No external sensors

Full System Control

- Pre-programme service intervals for performance reliability and maintenance prevention
- Set-up fault diagnosis alerts to detect adverse conditions to reduce downtime

Hydra-Cell® ADVANTAGES AND FEATURES

Hydra-Cell S Series electronic solenoid metering pumps for low flow, low pressure chemical injection

- **"Plug and Play" -** Easy to install; simply connect piping and power to begin operation
- **Compact system -** Combined pump and tank solution offers large capacity in a space-saving design
- **Easy and fast maintenance -** Liquid-end parts can be disassembled and replaced quickly by simply detaching four bolts
- **Low cost replacement parts -** No need to replace complete pump, replacement diaphragm kits available
- **Easy pump priming -** Degassing valve for easy priming when using sodium hypochlorite
- **Robust design -** Extremely durable, heat resistant, dust tight and watertight to IP65 standard
- **Economical and eco-friendly -** 55% saving on running costs and environmental impact with energy saving mode (on selected models)
- **Versatile operation -** Adjustable stroke speed operation between 1 to 300 strokes per minute (dependant on model) with flow rates from 25 to 220 ml/min (0.40 gal/hr to 3.49 gal/hr)
- **Control options -** Choice of control: SM (manual control), SP (pulse-input), ST (pulse input with timer) or SA (pulse-input/analog-input)

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

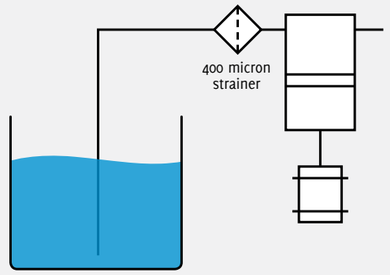
Hydra-Cell® S Series Solenoid Metering Pumps

Compact, "Plug and Play" solution for dosing detergent, foam, wax and shine agents.

Hydra-Cell® PERFORMANCE ADVANTAGES

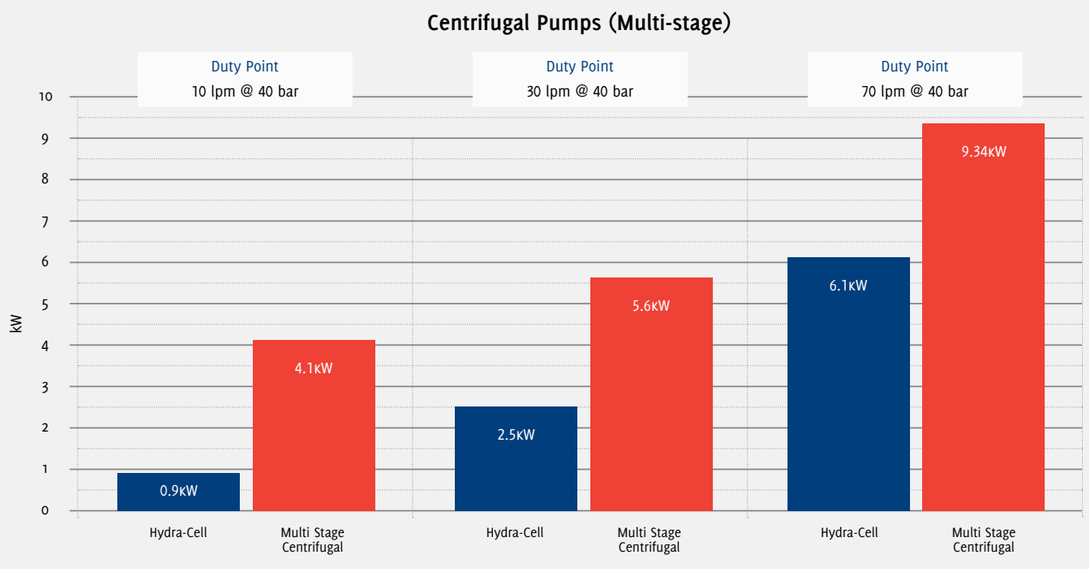
Compared to Plunger Pumps

- Fine abrasive particles and hot liquids both damage plunger pump seals. Having no dynamic seals, Hydra-Cell pumps handle abrasive particles without fine filtration and can pump hot liquids with ease.
- Hydra-Cell pumps can run dry indefinitely without damage, a condition that would destroy a plunger pump.
- In a Hydra-Cell pump, the crank oil and process liquid are completely separated enabling long oil change intervals. Plunger pump seals are designed to leak and in many instances this process liquid contaminates the crank oil resulting in the need for frequent replacement.
- Typically plunger seals or packings need to be replaced every 12 months: Hydra-Cell seal-less pumps have no dynamic seals to replace, reducing downtime and costs.
- Hydra-Cell pumps can dry lift and prime from a sunk pit. No need for a charge pump. (See diagram below)

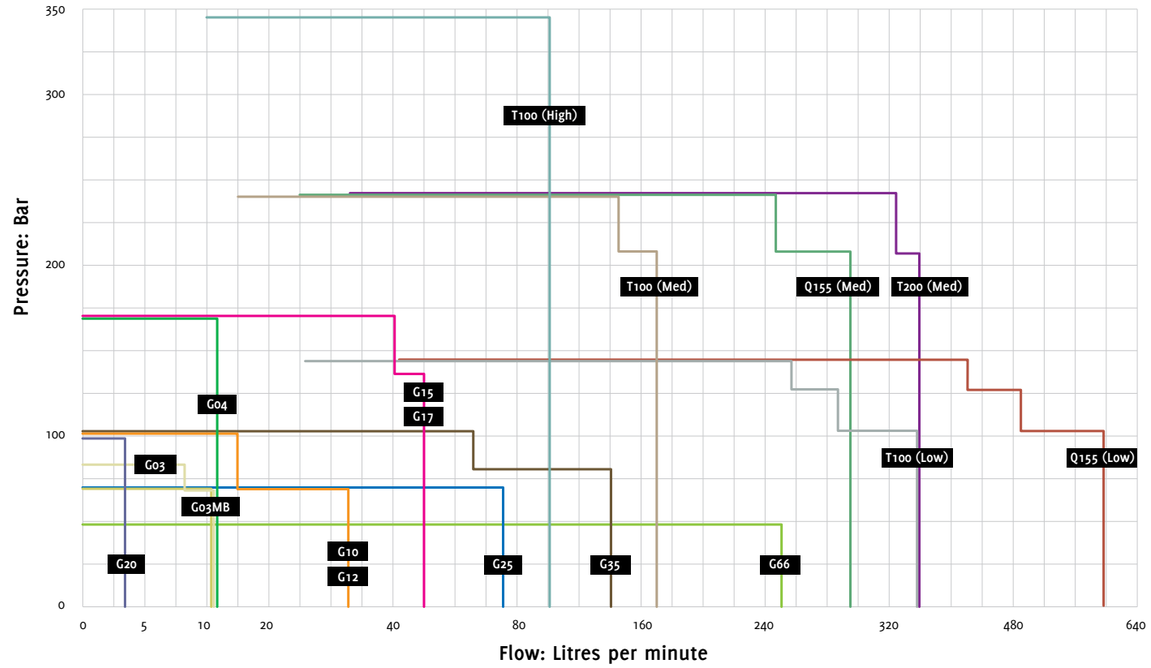


Compared to Centrifugal Pumps (Multi-stage)

- The seal-less design of Hydra-Cell means that there are no seals or packing to leak or replace.
- Pumps grey water with abrasive particles with ease.
- Designed for high pressure delivery.
- Can run dry indefinitely, without damage.
- Being a true positive displacement pump, the flow rate is independent of pressure. There is no loss of flow rate as pressure increases, giving a more consistent process. This characteristic is the same if the pump is running at 5 RPM to 1500 RPM.
- Higher energy efficiencies. (See chart below)



Hydra-Cell® Seal-less Pump Range



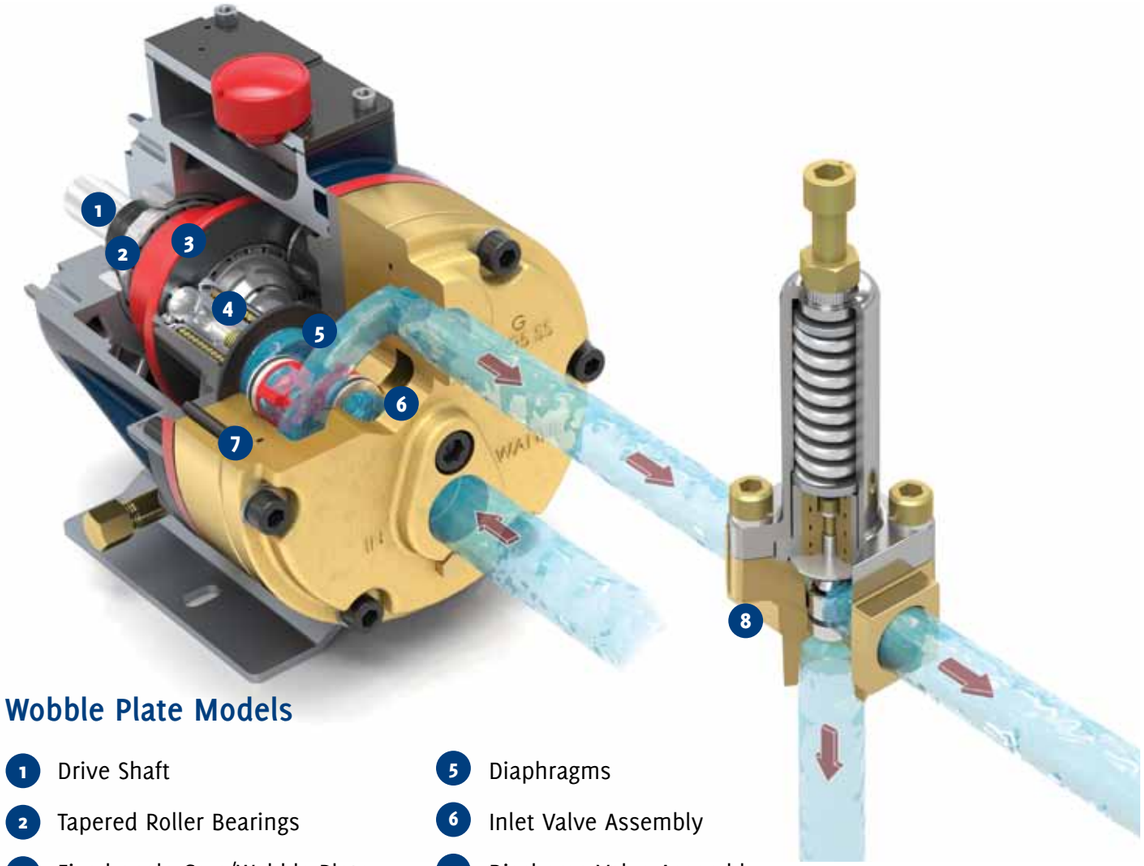
The graph above displays the maximum flow capacity at a given pressure for each model series. The table below lists the maximum flow capacity and maximum pressure capability of each model series.

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	83	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
G15/17	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
G66	248	17	48	49°	121°	17
T100S	98	N/A	345	N/A	82°	34
T100M	144	N/A	241	N/A	82°	34
T100K	170	N/A	207	N/A	82°	34
T100H	259	N/A	145	N/A	82°	34
T100F	290	N/A	128	N/A	82°	34
T100E	366	N/A	103	N/A	82°	34
T200K	359	N/A	207	N/A	82.2°	34
T200M	321	N/A	241	N/A	82.2°	34
Q155E	595	N/A	103	N/A	82°	34
Q155F	490	N/A	127	N/A	82°	34
Q155H	421	N/A	144	N/A	82°	34
Q155K	295	N/A	207	N/A	82°	34
Q155M	253	N/A	241	N/A	82°	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).

Hydra-Cell® Principles of Operation - Wobble Plate



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 cells (4) are 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.

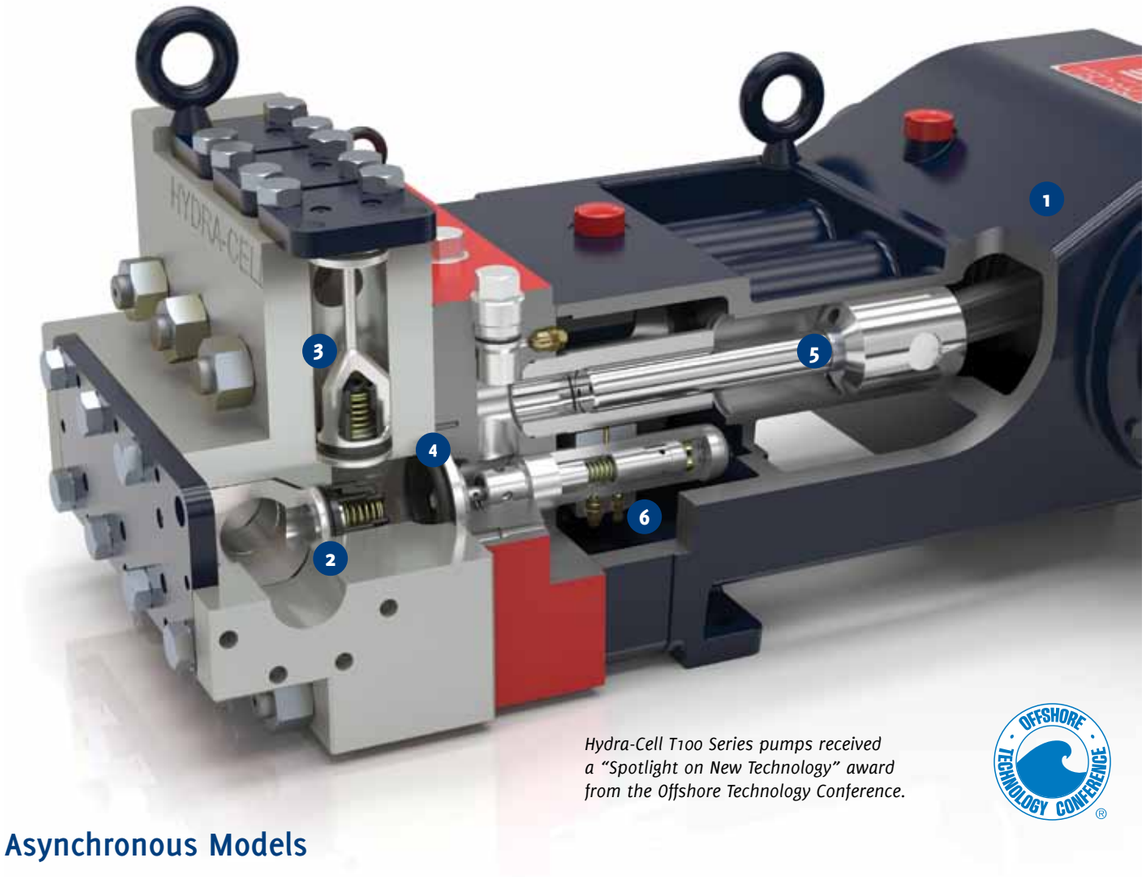
Hydra-Cell Wobble plate pumps can have up to five diaphragms, and each diaphragm has its own pumping chamber that contains an inlet and discharge self-aligning, disk check valve assembly (6). As the diaphragms move back, liquid enters the pump through a common inlet and passes through one of the inlet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

API 674 option available

Exclusive Seal-less Diaphragm Design



Hydra-Cell T100 Series pumps received a "Spotlight on New Technology" award from the Offshore Technology Conference.

Asynchronous Models

1. Drive Shaft
2. Inlet valve assembly
3. Discharge valve assembly
4. Diaphragms
5. Plunger
6. Underfill and overfill valves

Reliable, Efficient Pumping Action

The seal-less design of Hydra-Cell High Horsepower pumps eliminates leaks, hazards and the expense associated with seals and packing. The diaphragms completely separate the process liquid from the pump drive with no dynamic seals or packing being exposed to the pumped liquid.

The pump's high efficiency results in lower energy costs than centrifugal pumps and other pump technologies, while the simple, asynchronous design and exceptionally rugged construction lead to very low maintenance and service requirements. The hydraulically balanced diaphragms are able to handle high pressures with low stress.

These pumps can operate with a closed or blocked suction line and can run dry indefinitely without damage, eliminating downtime and repair costs. Their low NPSH requirements allow for operation with a vacuum condition on the suction… positive suction pressure is not necessary.

Thanks to unique diaphragm and valve designs, these pumps are able to handle more abrasives with less wear than gear, screw or plunger pumps. Their compact design and double-ended shaft provide a variety of installation options.

Hydra-Cell High Horsepower pumps can be configured to meet API 674 standards – consult factory for details.

Hydra-Cell® MATERIALS OF CONSTRUCTION

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.

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

S Series Pump Heads

- PVC
- PVDF
- Acrylic
- 316 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

Hydra-Cell T Series Seal-less Pumps

Hydra-Cell Q Series Seal-less Pumps

Hydra-Cell S Series electronic solenoid metering pumps

Notes

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VehicleWash. v1. 09/19