



**Hydra-Cell**<sup>®</sup>  
Seal-less Pump Technology

**Water and Waste Water Treatment**  
Economy through Technology



# Hydra-Cell® Pumps in Water Treatment



One technology – many applications

The unique attributes of Hydra-Cell® pumps offer distinct benefits in pumping the many chemicals and polymers used for water treatment, as well as brackish and 'grey' water that may contain particulate matter, making Hydra-Cell® the clear seal-less pump of choice for:

- Dosing
- Metering
- Injection
- Cleaning
- High Pressure Transfer

Hydra-Cell® is used in many industries for water treatment applications



Typical Chemicals and Liquids Pumped	Challenges in Pumping	The Hydra-Cell® Advantage
<b>Lime Slurries...</b> for pH balance and water softening	<ul style="list-style-type: none"> <li>• Abrasive</li> <li>• Smooth controllable flow</li> <li>• Requires smooth controllable flow</li> </ul>	<ul style="list-style-type: none"> <li>• Seal-less design handles abrasive materials</li> <li>• Flow rate directly proportionate to pump rpm</li> <li>• Virtually pulse-less, easily controllable flow</li> </ul>
<b>Sodium Hydroxide...</b> for pH control	<ul style="list-style-type: none"> <li>• Crystallisation occurs causing clogging</li> <li>• Aggressive</li> </ul>	<ul style="list-style-type: none"> <li>• Unique vertically orientated check valves</li> <li>• Corrosion resistant liquid head materials available</li> </ul>
<b>Sulphuric Acid...</b> for pH correction in potable water and air scrubbing	<ul style="list-style-type: none"> <li>• Corrosive</li> <li>• Crystallisation occurs causing clogging</li> </ul>	<ul style="list-style-type: none"> <li>• Seal-less design provides no leak path</li> <li>• Unique vertically orientated check valves</li> </ul>
<b>Hydrochloric Acid...</b> (up to 37% conc.) for pH correction	<ul style="list-style-type: none"> <li>• Corrosive</li> <li>• Crystallisation occurs causing clogging</li> </ul>	<ul style="list-style-type: none"> <li>• Seal-less design provides no leak path</li> <li>• Unique vertically orientated check valves</li> </ul>
<b>Sodium Hypochlorite...</b> for disinfection and odour control	<ul style="list-style-type: none"> <li>• Out gassing</li> <li>• Crystallisation occurs causing clogging</li> </ul>	<ul style="list-style-type: none"> <li>• High pump speed, high compression ratio, large discharge ports</li> <li>• Vertical check valves reduce clogging.</li> </ul>
<b>Polymers and Poly-electrolytes...</b> for flocculation, coagulation and clarification	<ul style="list-style-type: none"> <li>• Shear sensitive</li> <li>• High viscosity</li> <li>• Smooth controllable flow</li> </ul>	<ul style="list-style-type: none"> <li>• Low shear pumping action</li> <li>• Vertical check valves.</li> <li>• Virtually pulse-less, easily controllable flow</li> <li>• Flow rate directly proportionally to pump rpm</li> </ul>
<b>Alum...</b> for coagulating very fine suspended particles in potable water	<ul style="list-style-type: none"> <li>• Abrasive</li> <li>• Corrosive</li> </ul>	<ul style="list-style-type: none"> <li>• Seal-less design handles abrasive liquids</li> <li>• Corrosion resistant liquid head materials available</li> </ul>
<b>Phosphate Solutions...</b> for oxygen scavenging of high-pressure steam lines, prevention of scale build up and corrosion reduction	<ul style="list-style-type: none"> <li>• Corrosive</li> <li>• High discharge pressure</li> <li>• Crystallisation on contact with air</li> </ul>	<ul style="list-style-type: none"> <li>• Seal-less design</li> <li>• Hydraulically balanced diaphragms</li> <li>• Seal-less design prevents air ingress</li> <li>• Vertical orientated check valves reduces clogging</li> </ul>
<b>Potassium Permanganate...</b> for removal of objectionable tastes and odours	<ul style="list-style-type: none"> <li>• Potentially harmful and toxic</li> <li>• Accurate dosing essential</li> </ul>	<ul style="list-style-type: none"> <li>• Seal-less design provides 100% containment</li> <li>• Flow rate directly proportionate to pump rpm, dosing accuracy better than +/- 0.5% can be achieved</li> </ul>
<b>Grey Water...</b> (Containing particles) used in high pressure cleaning applications including algae growth removal from weirs in settling tanks and screen and filter cleaning / back-washing	<ul style="list-style-type: none"> <li>• Solid particles in water</li> </ul>	<ul style="list-style-type: none"> <li>• Seal-less design handles particles up to 500 µm</li> <li>• Reducing operating costs</li> </ul>
<b>Hydrogen Peroxide (H<sub>2</sub>O<sub>2</sub>)...</b> for disinfection	<ul style="list-style-type: none"> <li>• Corrosive</li> <li>• Light sensitive</li> <li>• Out gassing</li> </ul>	<ul style="list-style-type: none"> <li>• Corrosion resistant liquid head materials available</li> </ul>
<b>Iron Sulphate (FeSO<sub>4</sub>)</b> for precipitation of Phosphates and heavy metals	<ul style="list-style-type: none"> <li>• Sensitive to air and oxides when in contact with moisture forming corrosive ferric sulphate</li> </ul>	<ul style="list-style-type: none"> <li>• Seal-less design provides 100% containment</li> </ul>
<b>Manganese Oxide...</b> suspended in water used for removal of EE <sub>2</sub>	<ul style="list-style-type: none"> <li>• Abrasive liquid contains non-soluble solids</li> </ul>	<ul style="list-style-type: none"> <li>• Seal-less design handles abrasive liquids reliably</li> </ul>
<b>Ferric Chloride</b>	<ul style="list-style-type: none"> <li>• Attacks any Iron containing parts, can crystallise causing damage to pumps which can not handle liquids with particles.</li> </ul>	<ul style="list-style-type: none"> <li>• Iron-free liquid head materials</li> <li>• Unique horizontal check valves for efficient handling of liquids with particles</li> </ul>

# Hydra-Cell® advantages

There are widespread applications for Hydra-Cell® pumps throughout the water treatment industry. Potable water treatment, wastewater treatment and the collection network can all benefit from the use of Hydra-Cell®, unique, seal-less, multi-diaphragm pumping technology.



## Unique vertical check valves

- Reliably pump acids and caustics which crystallise.



- Efficient pumping of liquids with solids such as lime slurries and  $MgO_2$  water mixes.



## Low maintenance

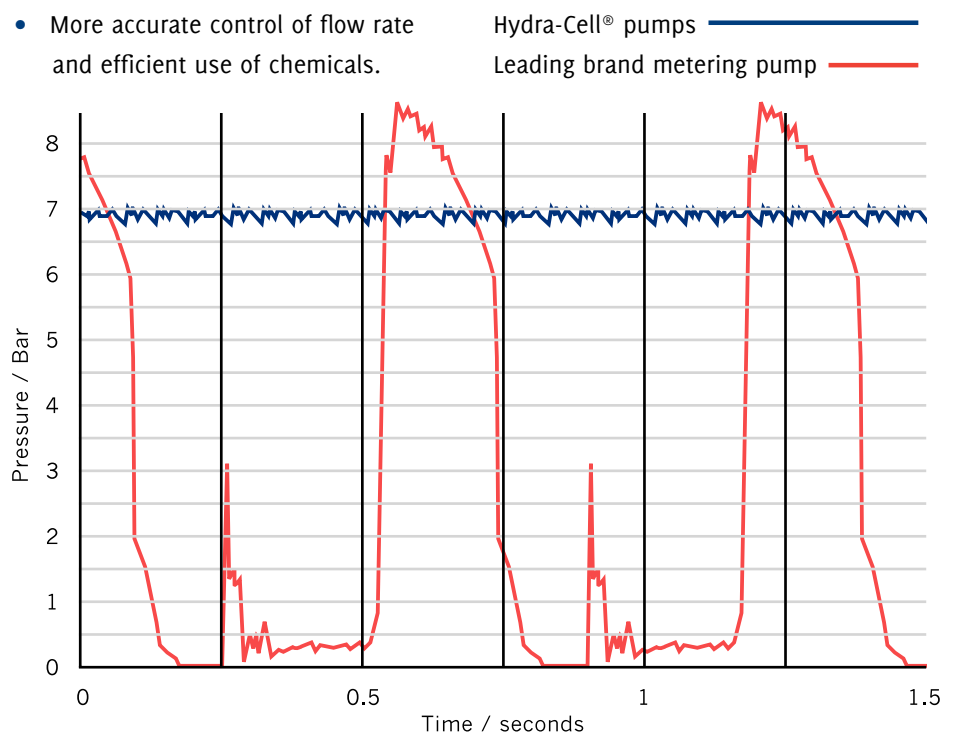
The Hydra-Cell® seal-less pumps need little maintenance and will operate reliably under continuous duty at high pressure.

## Virtually pulse-free flow

- Pulsation dampeners may not be required for most Hydra-Cell® pumps.
- More accurate control of flow rate and efficient use of chemicals.

## Wide operating range

Hydra-Cell®'s design allows pump shaft speeds to run from 10 rpm to 1450/1000 rpm. Discharge pressures to range from 1 bar to 70/172 Bar.



## High efficiencies – low power consumption

As a true positive displacement pump Hydra-Cell® can show significant energy savings when compared to screw pumps and multi-stage centrifugal pumps.

- When pumping non-lubricating or abrasive liquids, Hydra-Cell®'s seal-less design means that there is no decline in efficiency as the seals wear.
- In cleaning and transfer applications below 8m³/hr the following energy savings can be made.

Compared with multi-stage centrifugal pumps pumping water 20 bar:

Flow (m³/hr)	Energy used (kw)		Energy saving	Potential annual euro saving
	Centrifugal	Hydra-Cell		
0.6	1.54	0.5	67%	945
1.5	2.0	1.44	28%	470

Compared with multi stage centrifugal pumps pumping water 40 bar:

Flow (m³/hr)	Energy used (kw)		Energy saving	Potential annual euro saving
	Centrifugal	Hydra-Cell		
4.2	9.34	6.1	35%	2,830
7.6	15.4	11.0	28%	3,840

## Simple pump head design



- Low maintenance requirement
- Low cost of spare parts
- Unique vertical check valves maintain pumping efficiency by reducing clogging.

## Low-shear pumping action

- Ideal for pumping shear-sensitive polymers
- Pumps liquids with viscosities up to 5000 cps (pump model dependent)



## Accurate controllable flow rate

	G-Series	P-Series
Steady state accuracy	>±1%	>±0.5%
Repeatability	>±3%	>±1%
Linearity	>±3%	>±1%

## Seal-less pumping chamber

- Liquids are 100% sealed from the atmosphere
- Run-dry capability
- No seal maintenance
- No leak path for toxic vapours
- Can pump liquids with solid particles up to 500 µm.
- Non-lubricating liquids can be pumped reliably
- High pressure cleaning with grey water

## Compact design



- NaOH and H<sub>2</sub>SO<sub>4</sub> dosing, 600 lph ▲
- P300 - Weight: 23 kg ▶  
Capability: 172 bar, 210 lph



# Pump selection



## Hydra-Cell® G-Series - High Performance, Positive Displacement Diaphragm Pumps

Hydra-Cell® 'G' series heavy-duty pumps are designed for large volume dosing... 150 lph up to 8000 lph, at pressures up to 170 bar and have proven performance and reliability pumping aggressive, corrosive and abrasive liquids in many arduous applications.

Hydra-Cell®'s ability to tolerate particles enables them to pump 'grey water' and ground water successfully, enabling it to be used without fine filtration in many cleaning and

filter press back flushing applications, in place of expensive mains water.

The hydraulically balanced diaphragm design assures long-life in a seal-less unit that is both

compact and highly energy efficient. Run-dry capable, the Hydra-Cell® requires little maintenance and delivers smooth, low pulsation flow for high pressure wastewater transfer.



## Hydra-Cell® P-Series - Extraordinary Metering Pumps - exceeding API 675 performance standards

Designed for dosing chemicals from 0.5 lph to 2500 lph, when the high accuracy, control, simplicity and reliability of a hydraulically balanced diaphragm pump are needed.

Thanks to its modern design, acquisition cost of Hydra-Cell® high accuracy metering and dosing pumps compare

favourably with the cost of conventional metering pumps of similar performance.

Liquids that crystallise and can cause damage to other pumps can

usually be dosed very successfully and accurately with Hydra-Cell® 'P' Series pumps, thanks to their inherently unique and ground-breaking design.



Waste water long distance transfer to centralised treatment plant in Spain



## Materials

A variety of liquid head materials and diaphragm materials are available to suit the pumped liquid and varying performance conditions.

Liquid Head Materials	Diaphragm Materials	Pump Housing Materials
Hastelloy Duplex SS 316 SS Brass Cast Iron Polypropylene Kynar	EPDM Viton® PTFE Neoprene Buna Aflas	Cast Aluminium Ductile Iron for G10, G25 & G35 only

## Pipe connections

SAE flange connections



Specialised flange connections  
e.g. Tri-Clamp®



Simple threaded connections NPT or BSPT



Flanged connections



PVDF (Kynar) Flanged® connections



# Pump flow and pressure rates

