



Hydra-Cell[®]

Seal-less Pump Technology

Oil and Gas
Robust design - Reliability



Hydra-Cell® Oil and Gas Industry Pumps

Compact seal-less pumps for long life and high reliability



Gas Drying – Pumping hot TEG

With over 35 years experience in Oil and Gas industry service, Hydra-Cell® pumps have proven performance. In 2010, the new Hydra-Cell® T80 Series packing free triplex pump received a “Spotlight on New Technology” award from the Offshore Technology Conference (OTC)

• Production • Transport • Refining



Hydra-Cell® Pumps are used in a wide variety of applications.



Onshore / Offshore Oil Extraction and Distribution

- Well stimulation
- Water re-injection
- Chemical injection
- Methanol injection
- Biocide injection
- Polymer Injection
- Drilling muds
- Crude oil transfer and sampling
- Injection of Drag Reducing Agents
- Reverse Osmosis



Pressure Testing

- Pipes and Well testing



Gas Extraction

- Water re-injection
- Well dewatering
- NGL transfer



Gas Processing

- Gas Drying
- Sweetening • Odourising



Oil Refining

- Steam stripping • Additive injection
- Stack cooling • Chemical metering



Jet Pumps

- Power fluid pressurisation



Typical Chemicals and Liquids Pumped	Challenges in Pumping	The Hydra-Cell® Advantage
Produced Water and Sour Water... injection, disposal and transfer	Corrosive. Can contain H₂S, salt, CO₂ plus other impurities forming acidic solutions	- Corrosion resistant liquid head materials available - Seal-less pumping chamber
	Abrasive. Water contains sand and other contaminants... barium, cadmium, sulphur, chromium, copper, iron, lead, nickel, silver and zinc	- Seal-less pump head means that liquids containing particles can be pumped reliably - No dynamic seals to wear
	Containment of H₂S gas	- No cups, packing or seals to leak gas - Seal-less pump chamber provides 100% containment
Hot Tri-ethylene Glycol (TEG) and Diethylene Glycol (DEG)... for gas drying	Non-Lubricating	No need for lubrication from pumped liquid
	Liquid temperatures up to 100° C	No dynamic seals to be damaged
	Controllability of injected TEG /DEG	- Flow rate directly proportional to pump rpm. - RPM adjustable range from 10 rpm to 1500 rpm (1000 rpm for some models)
Methanol... for well icing prevention	Non-lubricating, especially pumping at pressure	No need for lubrication from pumped liquid
Natural Gas Liquids... Mixtures of Methane, Propane, Ethane	Non-lubricating	No need for lubrication from pumped liquid
	Must be 100% contained to comply with VOC emissions legislation	Seal-less pump chamber provides 100% containment
Amines	Containment of any H₂S saturated in Amine	Seal-less pump chamber provides 100% containment
	Responsive accurate control of flow rate	Virtually pulse-less flow gives responsive control with accuracy exceeding API 675 performance criteria
Caustics... Sodium Hydroxide, Potassium Hydroxide	Tend to crystallise when cold or in contact with air, forming solids which can damage mechanical seals	Seal-less pump head means that liquids containing particles can be pumped reliably
Acids... Sulphuric, Hydrochloric, Nitric	Corrosive	No dynamic seals to be damaged
	Tend to crystallise when cold or in contact with air, forming solids which can damage mechanical seals	Unique vertical check valve, which can handle liquids with particles reliably
Condensates	Non-lubricating	No need for lubrication from pumped liquid
	Must be 100% contained to comply with VOC emissions legislation	Seal-less pump chamber provides 100% containment
Polymers... for well stimulation	Shear sensitive gel structures which can be broken down easily	Low shear pumping action
	High viscosity	Unique vertical check valves for reliable pumping action
	Abrasive, contains soda ash	Seal-less pump chamber and vertical orientated check valves allows reliable pumping of liquids with suspended solids
	Responsive accurate control of flow rate	Virtually pulseless flow gives responsive control with accuracy exceeding API 675 performance criteria
Crude Oil	Range of viscosities makes it difficult to pump	Hydra-Cell® seal-less pumping action can handle liquids with viscosities from 0.01 to 6000 cSt, or liquids containing a mixture of viscosities.
Biocide Injection	Very low flow rates, accurate metering of chemicals to optimise usage, minimise environmental damage.	Unique multiple diaphragm pump head providing virtually pulseless flow for accurate metering.
Drag Reducing Agents	Very abrasive and highly viscous	- No dynamic seals to be damaged by abrasive product - Can handle high viscosity liquids

Hydra-Cell® advantages

Designed for continuous use, Hydra-Cell® Seal-less Pumps are robust, reliable, efficient and can be used in a wide variety of Oil and Gas applications, lowering the total cost of ownership.

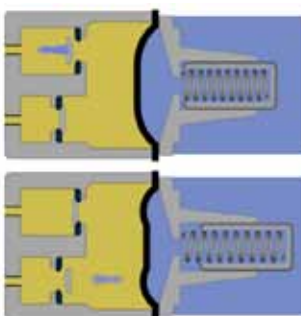


Enhanced oil recovery –
Pumping shear sensitive polymers

High reliability... low maintenance

Having **No Dynamic Seals** means high reliability.

- Run dry indefinitely
- No seals to wear
- No seals to leak any potentially harmful gases such as H₂S
- No seals to leak any Volatile Organic Compounds
- No tight tolerances that could be susceptible to corrosion or damaged by solid particles
- Pumps liquids with viscosities from 0.01 to 6000 cSt
- Pumps non-lubricating liquids reliably
- Pumps liquids with up to 500µm dia. particulate matter
- No 'drop-off' in performance due to seal wear



Hydra-Cell® pumps have no packing

Compact design

For metering and dosing applications Hydra-Cell®'s compact design gives real advantages.

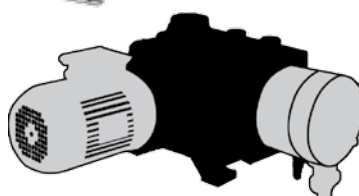
1. Space saving
2. Easier servicing
3. Lower initial purchase cost

Both pumps are rated at 172 Bar and 110 l/hr



Hydra-Cell®
Weight 23 kg

Traditional
metering pump
Weight 100 kg



High efficiencies

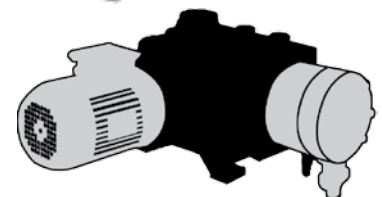
- A true positive-displacement pump, Hydra-Cell® is one of the most efficient metering and dosing pumps available.

Both pumps are rated at 172 Bar and 110 l/hr



Hydra-Cell® metering pump
Motor 0.75 kW (€60)

Traditional
Metering pump
Motor 4 kW (€180)



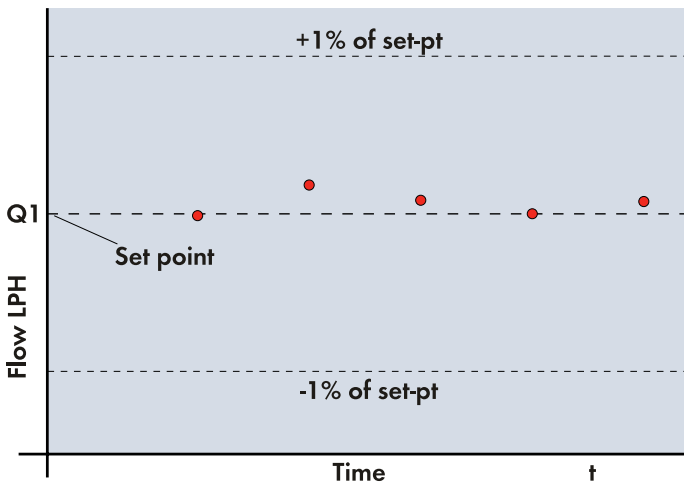
Save up to 65% on motor costs

Hydra-Cell® multiple diaphragm head means smaller motors can be used, saving energy.

Ultimate Controllability for Metering and Dosing

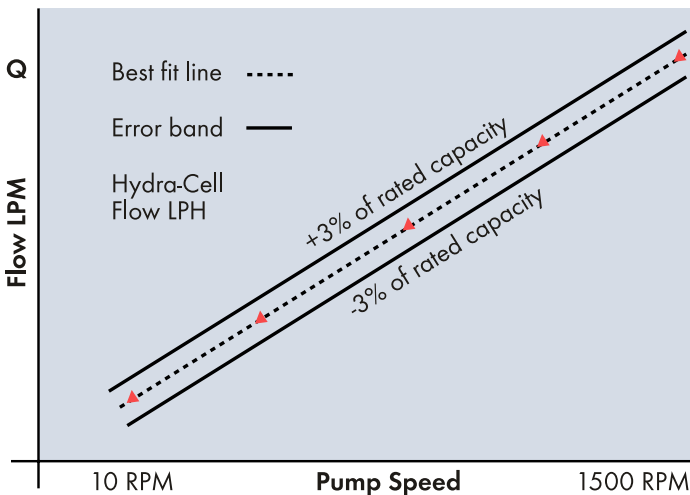
Metering and dosing performance better than API675.

- Steady state accuracy better than $\pm 1\%$



This is a measure of how well a set flow rate can be maintained.

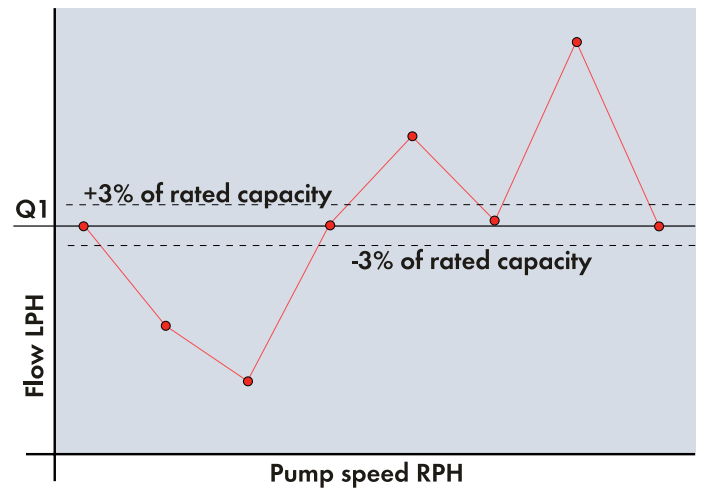
- Linearity (Pump shaft speed/flow rate relationship) better than $\pm 3\%$



This is a measure of how accurate the flow rate can be set by changing and setting pump speed.



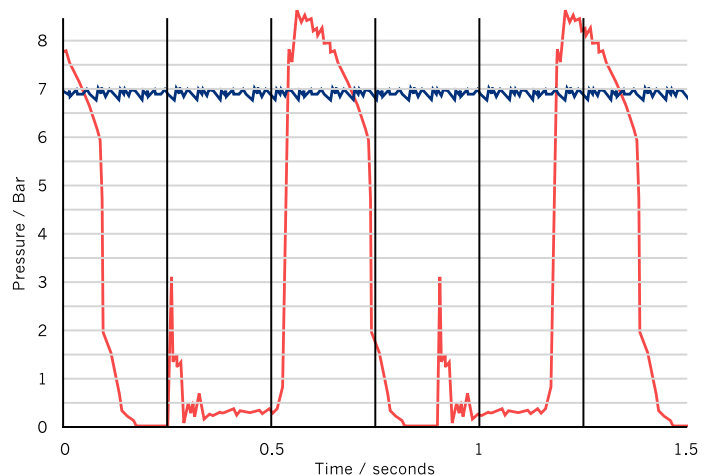
- Repeatability better than $\pm 3\%$



This is a measure of how accurate the flow rate can be controlled when varying the pump shaft rpm away from a set point and returning to that set point.

Virtually pulse-less flow for accurate metering

- Pulsation dampeners may not be required for most Hydra-Cell® pumps.
- More accurate control of flow rate and efficient use of chemicals.
- Significantly less inlet acceleration head issues than traditional single diaphragm metering pumps, especially with viscous liquids.



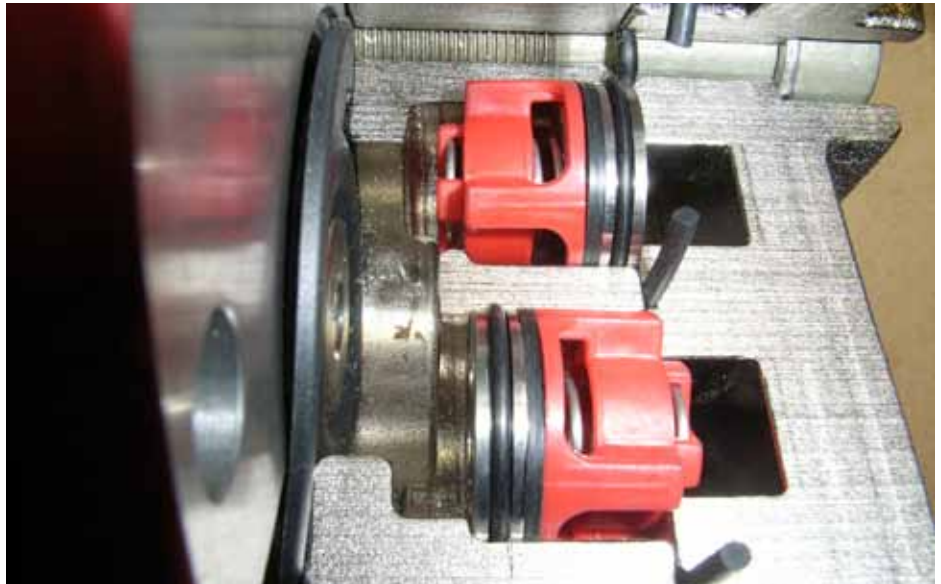
Hydra-Cell® pumps —————
Leading brand metering pump ————

Unique vertical check valves ►

- Reliably pump acids and caustics which crystallise.
- Efficient pumping of liquids with solids such as lime slurries, soured water containing sand.

Low shear pumping action

Due to the gentle pumping action, shear sensitive liquids, especially polymers, can be pumped without breaking down the long chain structures within the liquids.



Pumping ceramic slurry at 40% solid content.

Energy saving

- Very economical to run compared with centrifugal pumps
- Smaller, more compact motors required

Compared with multi-stage centrifugal pumping water at 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 pumping water at 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 robust design

- Designed and built for long service life
- Simple maintenance with no special tool requirements
- No critical tolerances to be aware of during maintenance
- On-site repair possible, no costly requirement for removal and transportation to workshops.

Minimal filtration

- No mechanical seals or tight tolerances that need protection by fine filtration. Hydra-Cell® pumps can handle particles up to 500 µm, depending on model. Also liquids with non-dissolved solids up to 40%, depending on particle distribution.
- Unaffected by lapses in filtration reducing costly pump repairs
- Reduced filtration maintenance and management



NGL transfer Russia

Pump selection

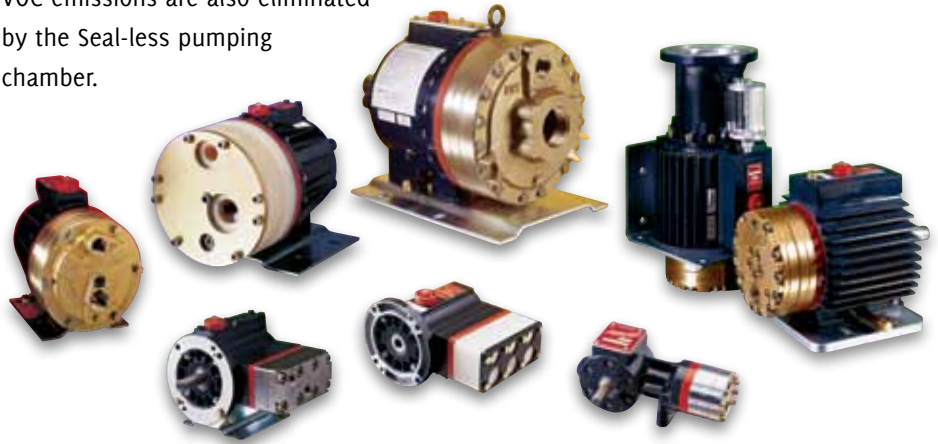


Hydra-Cell® G-Series - High Performance, Positive Displacement Diaphragm Pumps

Hydra-Cell® G-Series heavy duty pumps are designed for transfer, pressure injection, and dosing and have proven performance and reliability pumping aggressive, corrosive, abrasive, non-lubricating, hot liquids in many arduous applications.

Hydra-Cell®'s Seal-less design enables produced water and sour water to be handled reliably and safely, 100% containing any H₂S gas.

VOC emissions are also eliminated by the Seal-less pumping chamber.



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

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

Thanks to its modern design, the 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.



Hydra-Cell® T-Series High volume, high pressure process pumps

Hydra-Cell® T-Series pumps have flow rates to 170 l/min (45 gpm) and high pressure up to 350 bar (5000 psi) making them the 'workhorses' in high volume chemical processing.

With lower energy use and costs compared to multistage centrifugal and many other pump technologies, Hydra-Cell® T-Series pumps are an indispensable choice for economical and environmentally sound operation.





Gas field – Transfer of Hydro-Carbons

Materials

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

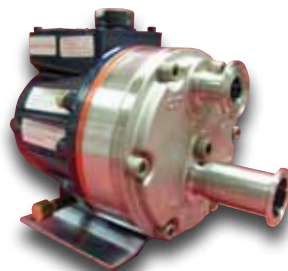
Liquid Head Materials	Diaphragm Materials	Pump Housing Materials
Hastelloy Duplex SS 316 SS Brass Cast Iron Polypropylene Kynar	EPDM Viton® PTFE Neoprene Buna Aflas	Cast Aluminium Ductile Iron for G10, G25 and G35

Pipe connections

SAE flange connections



Specialised flange connections
e.g. Tri-Clamp®



Simple threaded connections NPT or BSPT



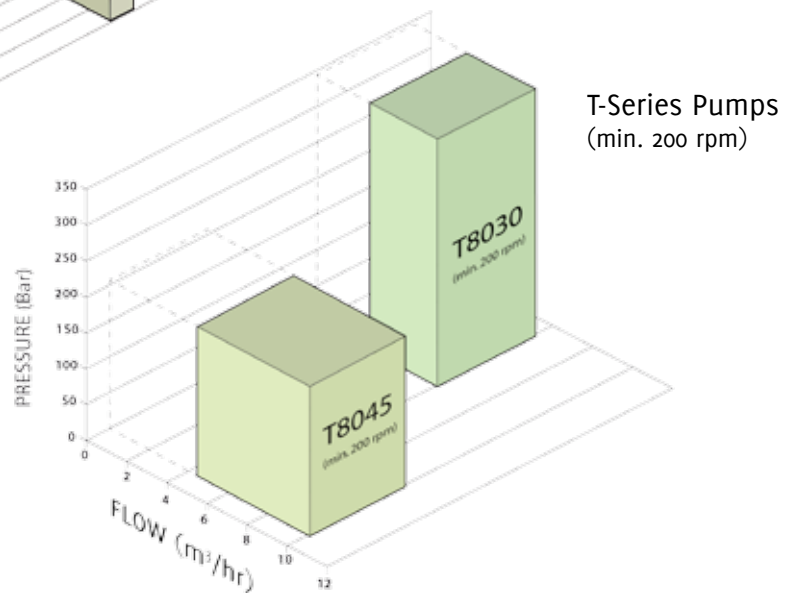
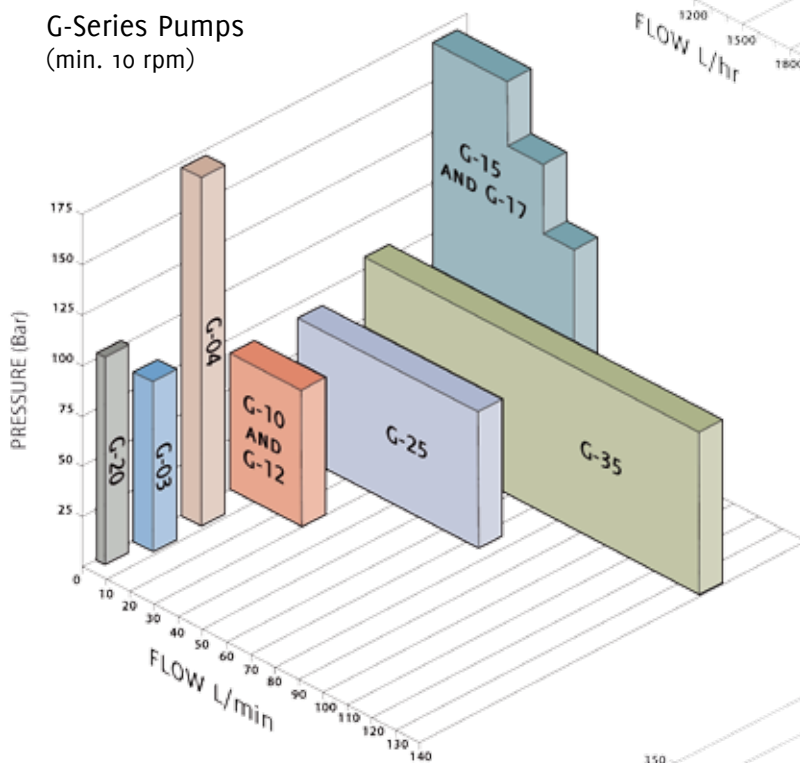
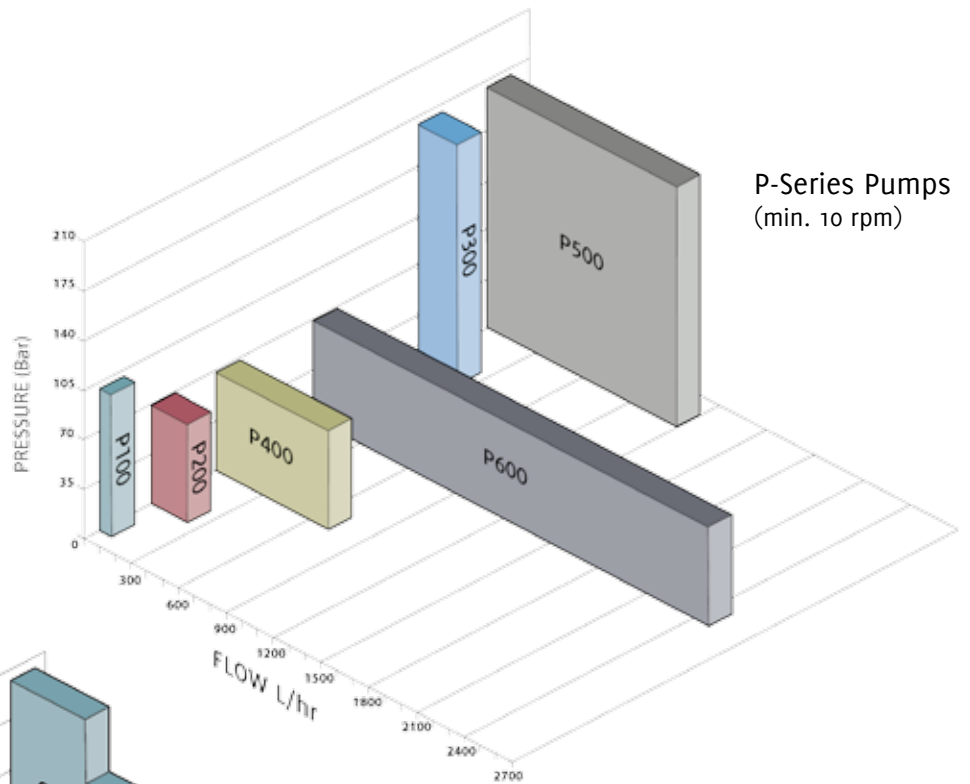
Flanged connections



PVDF (Kynar) Flanged® connections

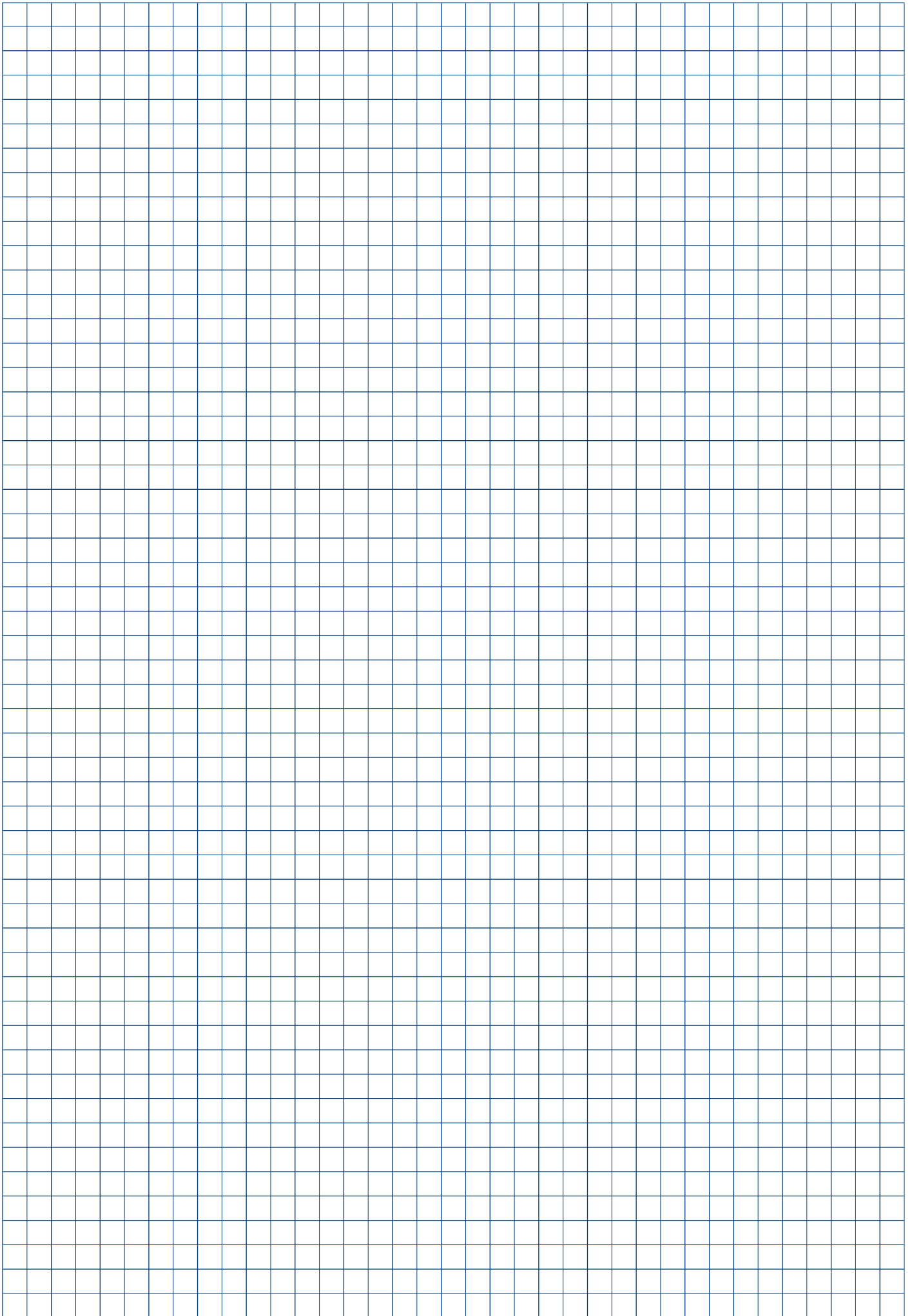


Pump flow and pressure rates



Notes

This image shows a blank sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.





WANNER

Hydra-Cell®

Partners in over 70 Countries

WANNER INTERNATIONAL
Hampshire UK
t: +44 (0) 1252 816847
e: sales@wannerint.com

WANNER ENGINEERING
Minneapolis USA
t: (612) 332-5681
e: sales@wannereng.com

WANNER PUMPS
Shanghai CHINA
t: +86-21-6876 3700
e: sales@wannerpumps.com

WANNER PUMPS
Kowloon HONG KONG
t: +852 3428 6534
e: sales@wannerpumps.com

www.hydra-cell.eu