Hydra-Cell®
METERING SOLUTIONS™

Electronic Precision Metering Pumps

Built to exceed API 675 performance standards with "pulse-free" linear flow

Wanner International Ltd.

Contents

IChemE 2007 Honourable Mention

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

"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
June 2006

Hydra-Cell® is not an Ordinary Metering Pump

The technology used to produce ordinary metering pumps has barely changed in over a generation. As a result, ordinary metering pumps have operational limitations and greater cost consequences.

Hydra-Cell is not an ordinary metering pump. Hydra-Cell Metering Solutions pumps enable you to meet and, in most cases, exceed API 675 performance standards with virtually pulse-less, linear flow while providing many other operational benefits.

Taking advantage of the most current technologies, Hydra-Cell P Series metering pumps achieve superior levels of accuracy, repeatability and linearity, while delivering precise, constant flow. This revolution in metering employs the latest available means of electronic flow control to replace antiquated, inaccurate stroke adjusters.

In addition, the modern design features of the Hydra-Cell pump lower your acquisition costs when compared to ordinary metering pumps, and its inherently simple yet elegant engineering keeps your maintenance and replacement costs down. Rugged construction and long-lasting durability will provide economy and value over the lifetime of your Hydra-Cell metering system.

Used in place of ordinary metering pumps to provide superior performance at a lower cost, Hydra-Cell is an extraordinary metering pump built to handle your precise metering and dosing applications.

Markets Served:

- Agriculture
- Biotech & Pharmaceutical
- Chemical Process
- Food & Beverage
- Glass & Clay
- Oil, Gas & Petrochemical
- Paints, Coatings, Sealants & Adhesives
- Pulp, Paper & Textiles
- Rubber & Plastics
- Water & Wastewater Treatment

Primary Applications:

- Coating
- Dosing
- Filling
- Filtering
- Injecting
- Metering
- Mixing
- Printing
- Spraying
- Transferring

Fluid Handling Capability:

Non-Lubricating ◄ ► **Viscous Abrasives**

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

Operational & Cost Advantages of Hydra-Cell Metering Solutions

Electronic flow control is more accurate and reliable.

Ordinary metering pumps rely on manual stroke adjustment or expensive actuators to change flow. This can result in pumping inaccuracies, lost motion, operator error, and a greater chance of leakage.

Hydra-Cell uses Variable Frequency Drive (VFD) electronic flow adjustment to maintain greater accuracy throughout the turndown range. It meets or exceeds API 675 performance standards while eliminating lost motion and a potential leak path.

Compared to many ordinary metering pumps, electronic flow control of Hydra-Cell reduces the chance of operator error and offers several other advantages:

Hydra-Cell Electronic Flow Control	***Other Pumps*** Manual Stroke Adjusters/Actuators
Solid-state electronics (SCR, VFD, or solenoid pulser) are unlikely to fail	Stepper motors or linear actuators driving against pressure are subject to wear and tear
Metering is linear over the entire range	Losses in repeatability below 30% stroke length and losses through check valves
Volume per every stroke is constant and a known value	Unknown with manual stroke adjustment and may not be proportional to the output
Easy calibration of the desired feed rate	Nearly impossible to calibrate unless a variable stroke rate or span-able controller is used
Rate of change is virtually instantaneous (0 to max. RPM in 0.3 seconds)	Up to one (1) second per 1% of the stroke length

Greater choice of materials enhances capability.

Ordinary metering pumps typically offer only PTFE diaphragms. When subjected to flex stresses, PTFE diaphragms do not have a "memory" like elastomeric diaphragms and will require more frequent and costly replacement due to stresses on the material. In addition, if fluid and process temperatures are low, and the PTFE diaphragm is cold, it can stiffen and cause irregularities in the output, and cause a drop in flow.

Hydra-Cell offers PTFE diaphragms as well as the following cost-effective elastomeric materials:

- Viton
- Buna
- EPDM
- Neoprene
- Aflas

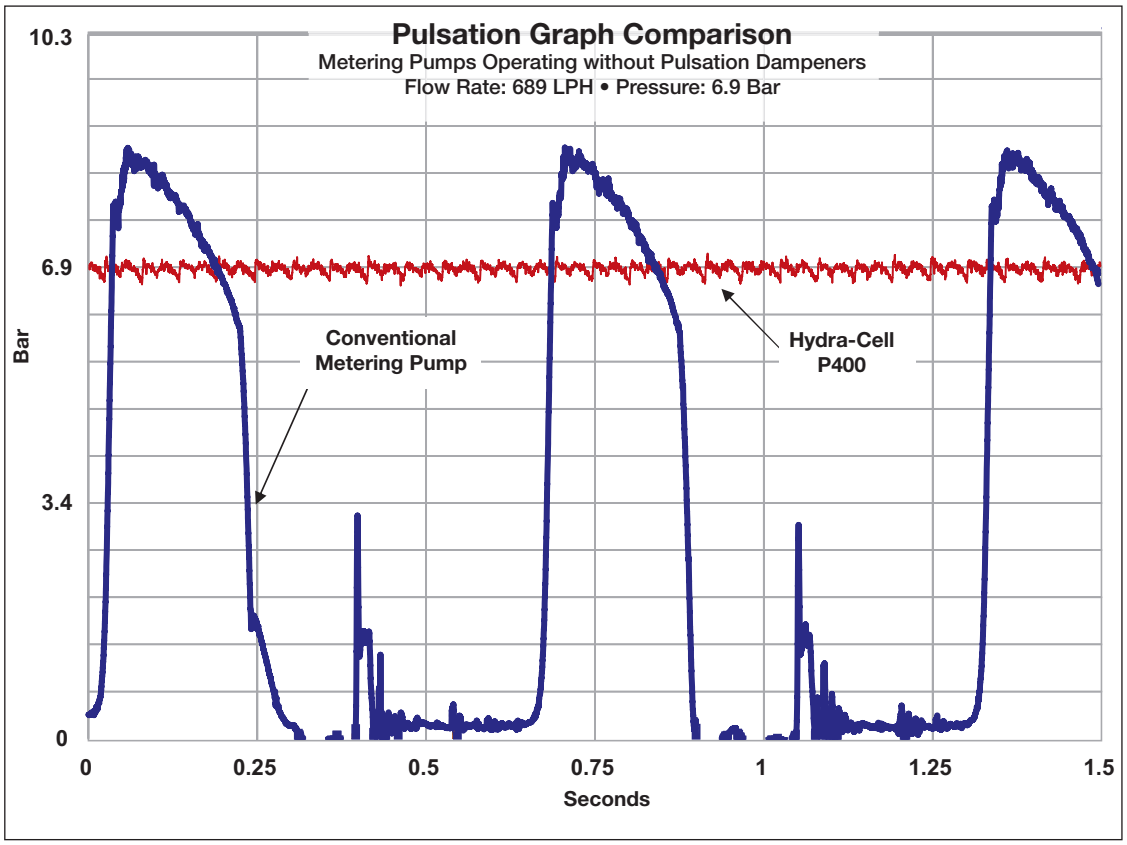
A choice of diaphragm, check valve, and liquid end materials also enables Hydra-Cell pumps to operate over a wider range of processing applications. Plus, special materials such as Hastelloy C and Kynar are available in standard Hydra-Cell packages. Hydra-Cell is lower in cost compared to ordinary metering pumps that have substantial price adders for exotic liquid end materials.

Reduced pulsations improve operation.

Ordinary metering pumps produce pulsing, surging flow and require large pulsation dampeners that add cost and complexity to a metering system. This inherent problem with ordinary metering pumps creates greater strain on the system and more wear and tear on the pump.

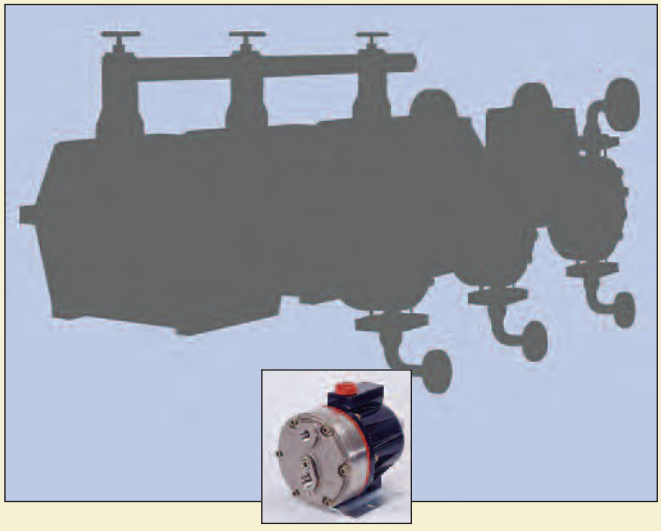
All Hydra-Cell models (except P100) feature a multiple diaphragm design that virtually eliminates pulsations and provides several benefits:

- Reduces pipe strain.
- Enhances operating safety.
- Minimizes maintenance.
- Reduces acceleration losses.
- Eliminates the need for pulsation dampeners.
- Lowers system acquisition costs.
- Provides accurate metering with linear, constant flow.



Compared to ordinary metering pumps operating under the same conditions at the same flow and pressure, Hydra-Cell metering pumps provide smooth, almost pulse-less performance. This allows for the design of a safer, less expensive metering pump system and for use in more accurate applications, such as spraying which cannot tolerate pulsing flow.

Achieve economy through technology.



This Hydra-Cell pump shown to scale has the same flow capacity and pressure rating as an ordinary triplex metering pump – but has a much smaller footprint, saving you valuable real estate in your facility.

Ordinary metering pumps use technology in existence or unimproved upon for many years. This poses limitations such as inaccurate stroke adjusters, pulsation problems, limited choice of materials, narrow adjustable flow ranges, large footprints to handle high flows and pressures, different plunger and diaphragm sizes, and difficulty handling slurries and suspended solids. Ordinary metering pumps result in higher costs of acquisition, maintenance, and replacement.

Hydra-Cell combines simple, elegant engineering with rugged construction to offer greater versatility while lowering life cycle costs. Design advantages include:

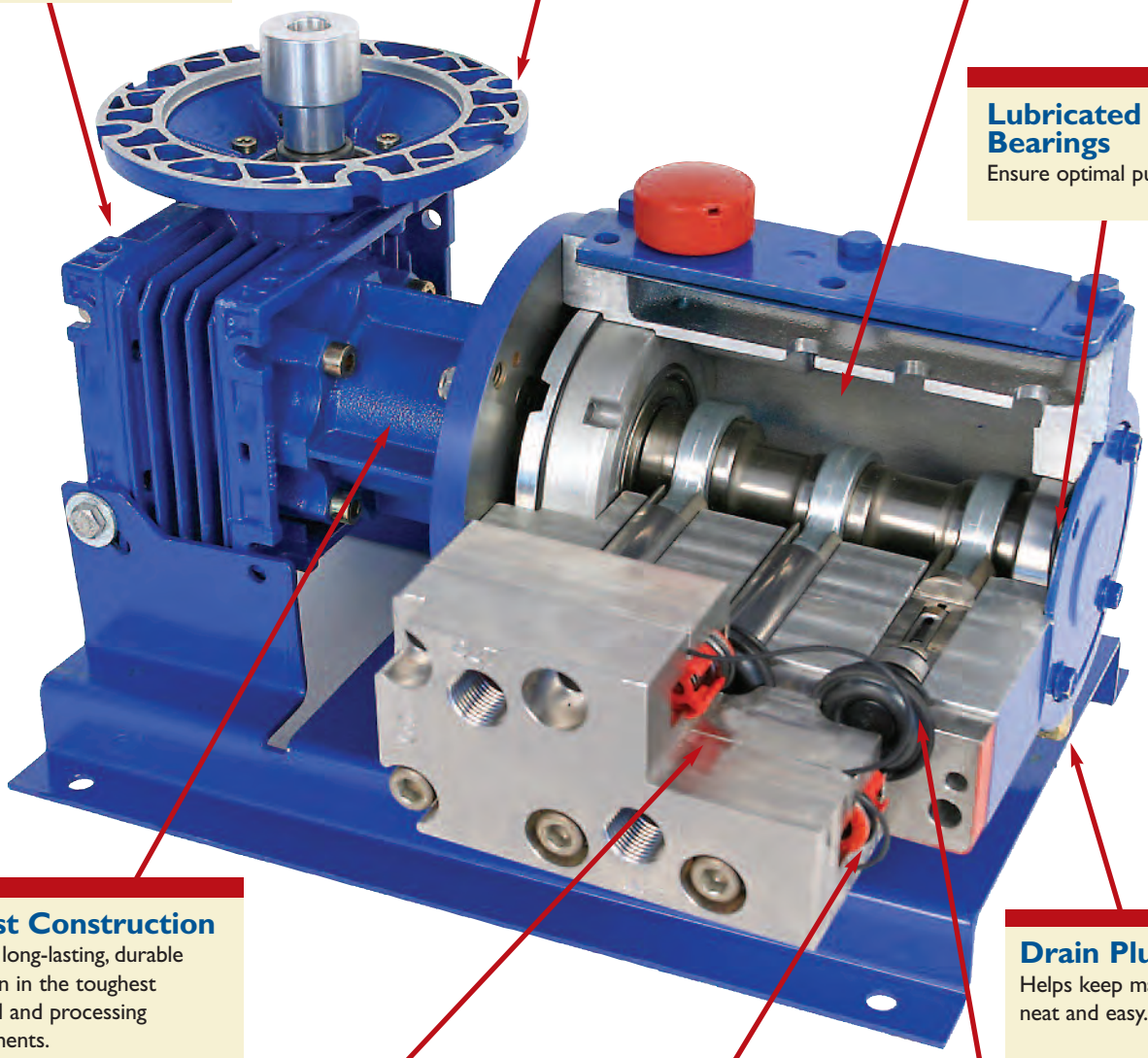
- Smaller footprint that offers the same capability as larger pumps – which are often over-sized and over-priced as flow and pressure requirements increase.
- Each model covers an extensive range of pressures and flows, whereas ordinary metering pumps may need different plunger and liquid end sizes to accommodate increases.
- The inherent simplicity of the Hydra-Cell design allows versatile application compared to complex metering pumps that require expensive construction changes to meet specific needs.
- Simplicity also means lower parts and maintenance costs.
- A separate gearbox allows greater versatility in changing applications and prevents cross-contamination of actuating oil – integral gearing on other pumps is difficult and expensive to change.

Design Features & Performance Benefits of Hydra-Cell

Separate Gearbox
Enables versatility in changing applications and prevents cross-contamination of actuating hydraulic oil.

C-Face Motor Adapter
Makes it easier to install or replace motors. (Variety of NEMA & IEC motor frames available.)

Inherent Simplicity
Lowers acquisition costs, reduces maintenance costs, and minimizes labour costs.



Lubricated Ball Bearings
Ensure optimal pump life.

Robust Construction
Delivers long-lasting, durable operation in the toughest industrial and processing environments.

Drain Plug
Helps keep maintenance neat and easy.

Extensive Choice of Materials
Choice of diaphragm, check valve, and liquid end materials allows pumps to operate in a wider range of applications.

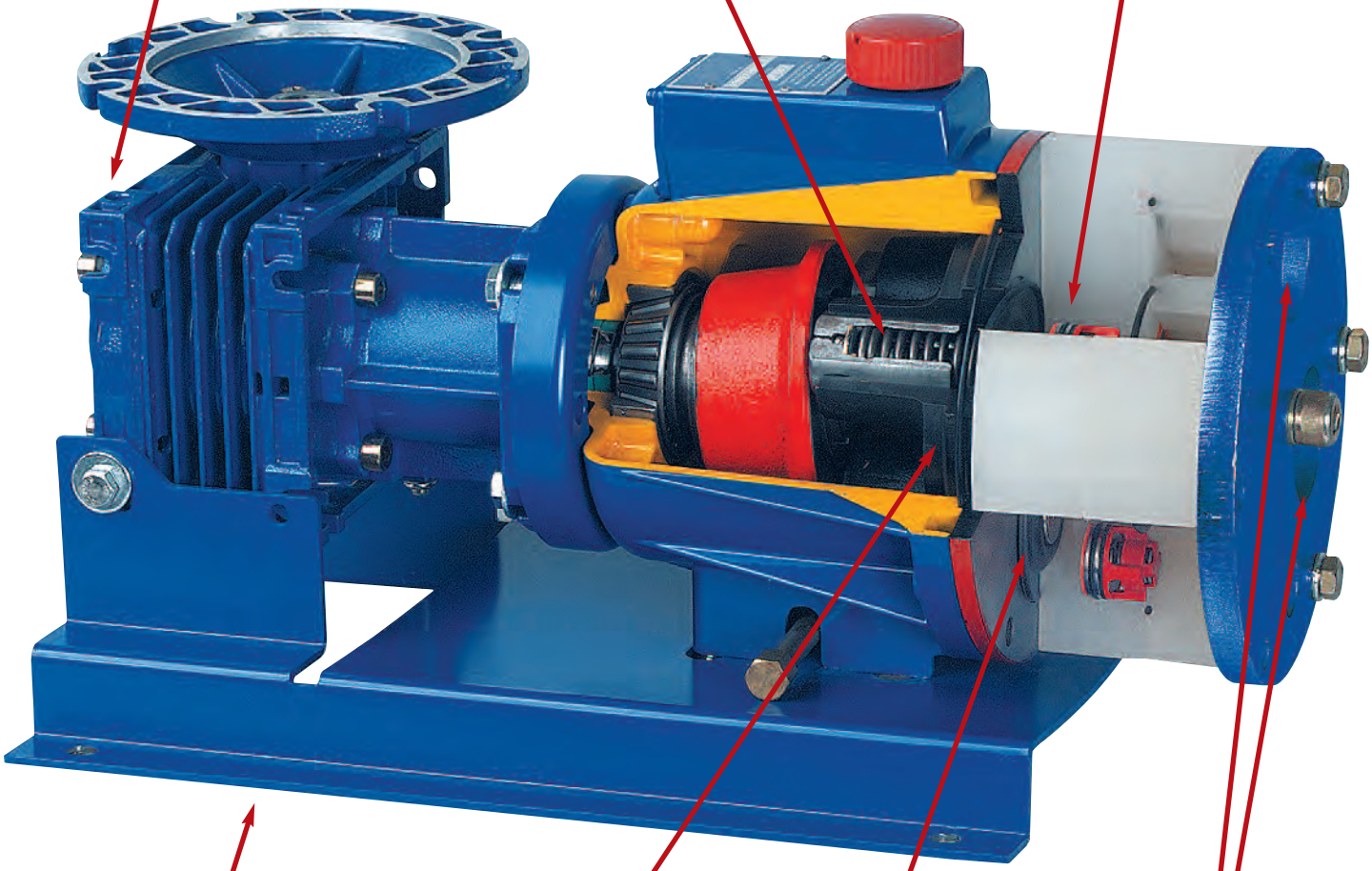
Spring-Loaded, Vertical Disk Check Valves
Designed for superior handling of particulates and viscous fluids compared to floating, vertical ball-style check valves.

Multiple Diaphragms
Provide smooth, almost pulse-less performance with linear flow.

Optimal Precision
Full stroke - every stroke.

More Accurate
No manual stroke adjustment to cause inaccuracies, potential leakage and operator error.

Variety of Flows & Pressures
Same plunger, liquid end and diaphragm size.



Space-Saving
Significantly smaller footprint than comparably-rated metering pumps.

Less Chance of Entrapped Air
Porting is larger than normal to eliminate common oxygen scavenger metering problems.

Linear Flow
Multiple diaphragms reduce pulsations and acceleration losses.

Greater Repeatability
Replenishment valve for continuous accuracy.

Hydra-Cell Metering Solutions Pumps Meet or Exceed API 675 Performance Standards

In 1994, the American Petroleum Institute (API) adapted its Standard 675 to stipulate performance characteristics for controlled-volume, positive displacement pumps. Although revised in 2000, API 675 primarily defined pumps using mechanical stroke adjustment.

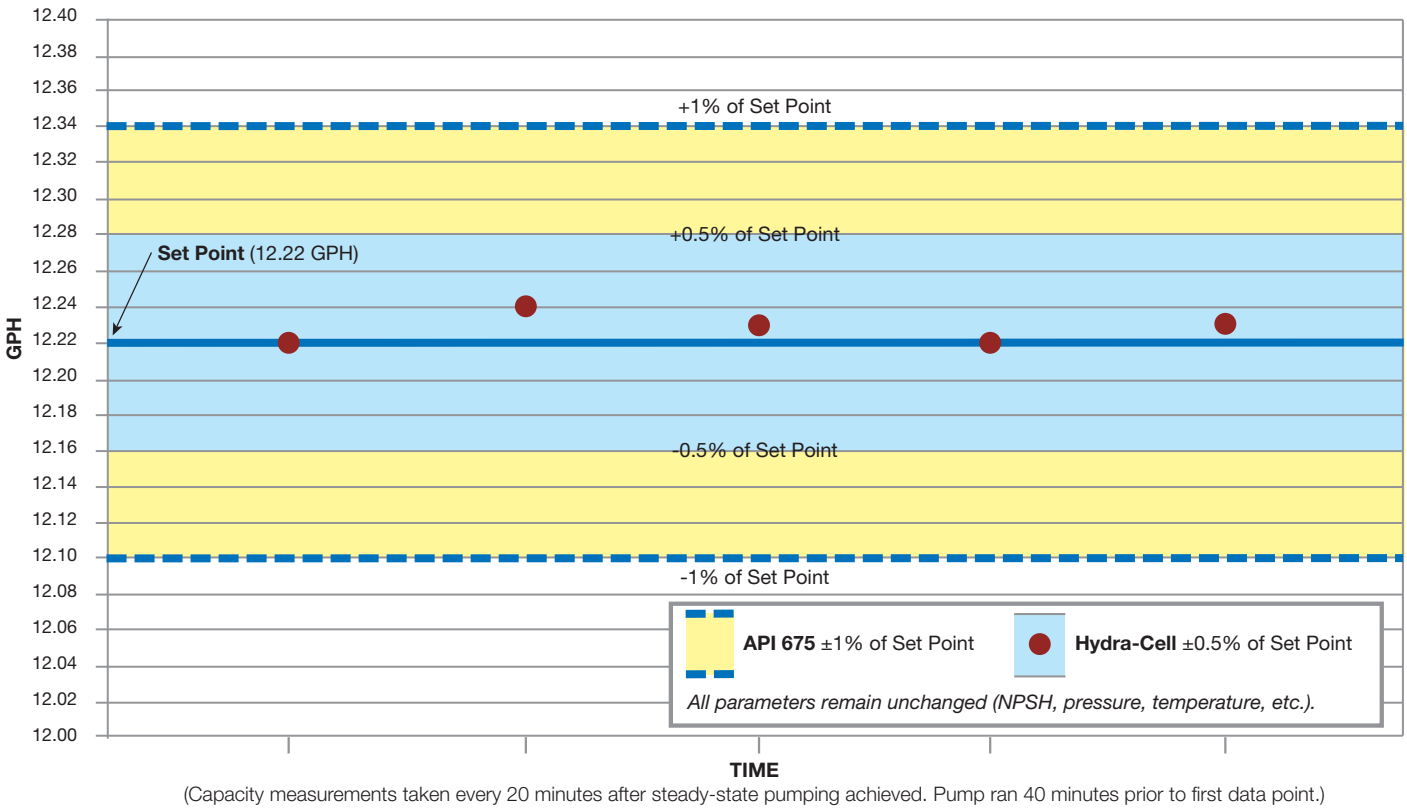
Hydra-Cell Metering Solutions meet or exceed API 675 performance standards by using electronic flow control to improve accuracy and a multi-diaphragm design to reduce pulsations. Used in precise metering, dosing, injection, and mixing applications, Hydra-Cell pumps provide an economical alternative to ordinary metering pumps.

Operational Data for Testing

Pump Configuration:	P300NRGSS020S
Reducer:	20:1
PSI:	1500
Actuating Oil:	10W-30 Hydra-Oil
Ambient Temperature:	71.5°F
Pumped Fluid:	Water @72°F
Gravity Feed:	1-to-3 Feet Positive Head
Franklin IMDS Motor:	240-2400 RPM 1 HP

Accuracy - Performance at a Set Point

For continuous metering applications, Hydra-Cell P Series pumps provide precise steady-state accuracy of ±1% or better.

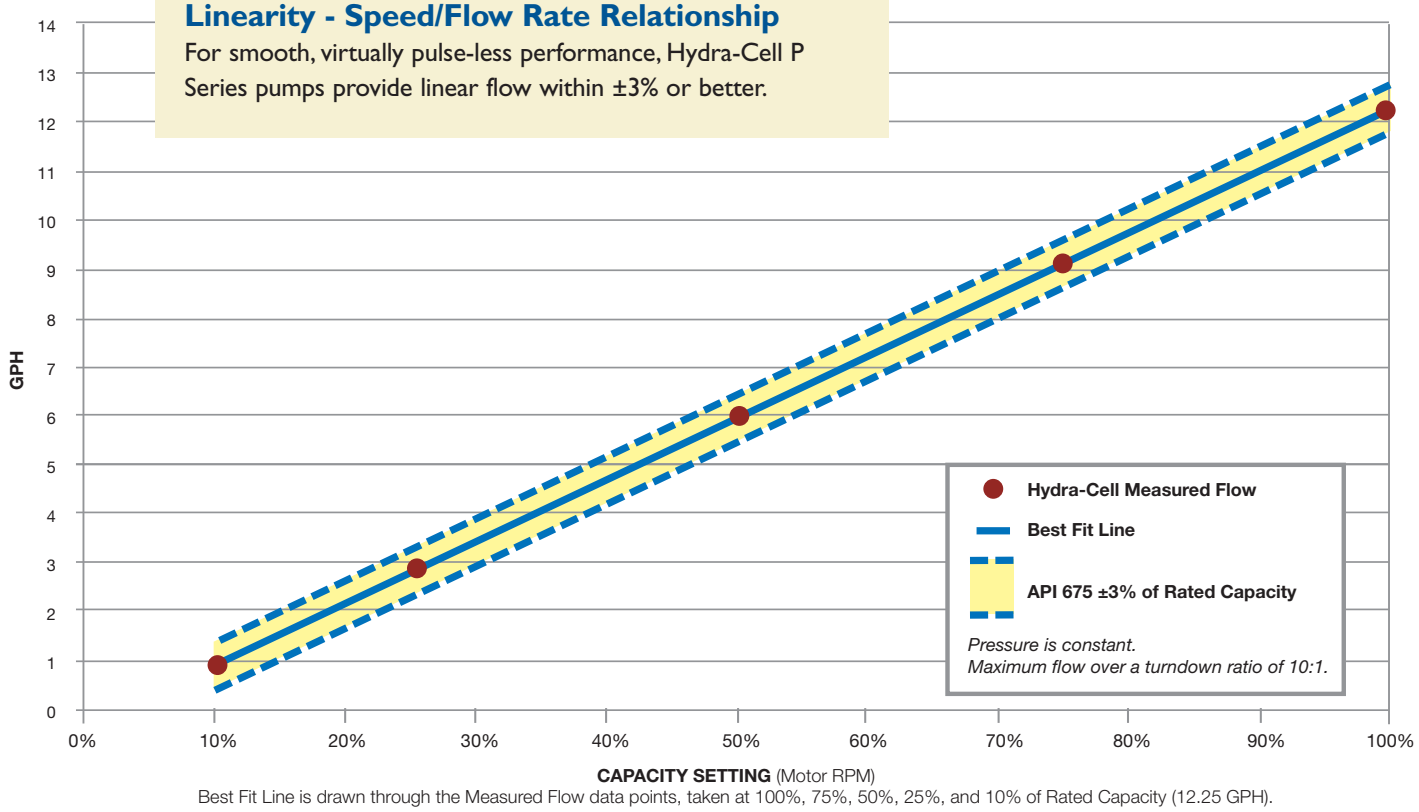


(Capacity measurements taken every 20 minutes after steady-state pumping achieved. Pump ran 40 minutes prior to first data point.)

All testing to API 675 performance standards conducted in the Wanner Engineering research and development laboratory (USA) based on gallons-per-hour (GPH).

Linearity - Speed/Flow Rate Relationship

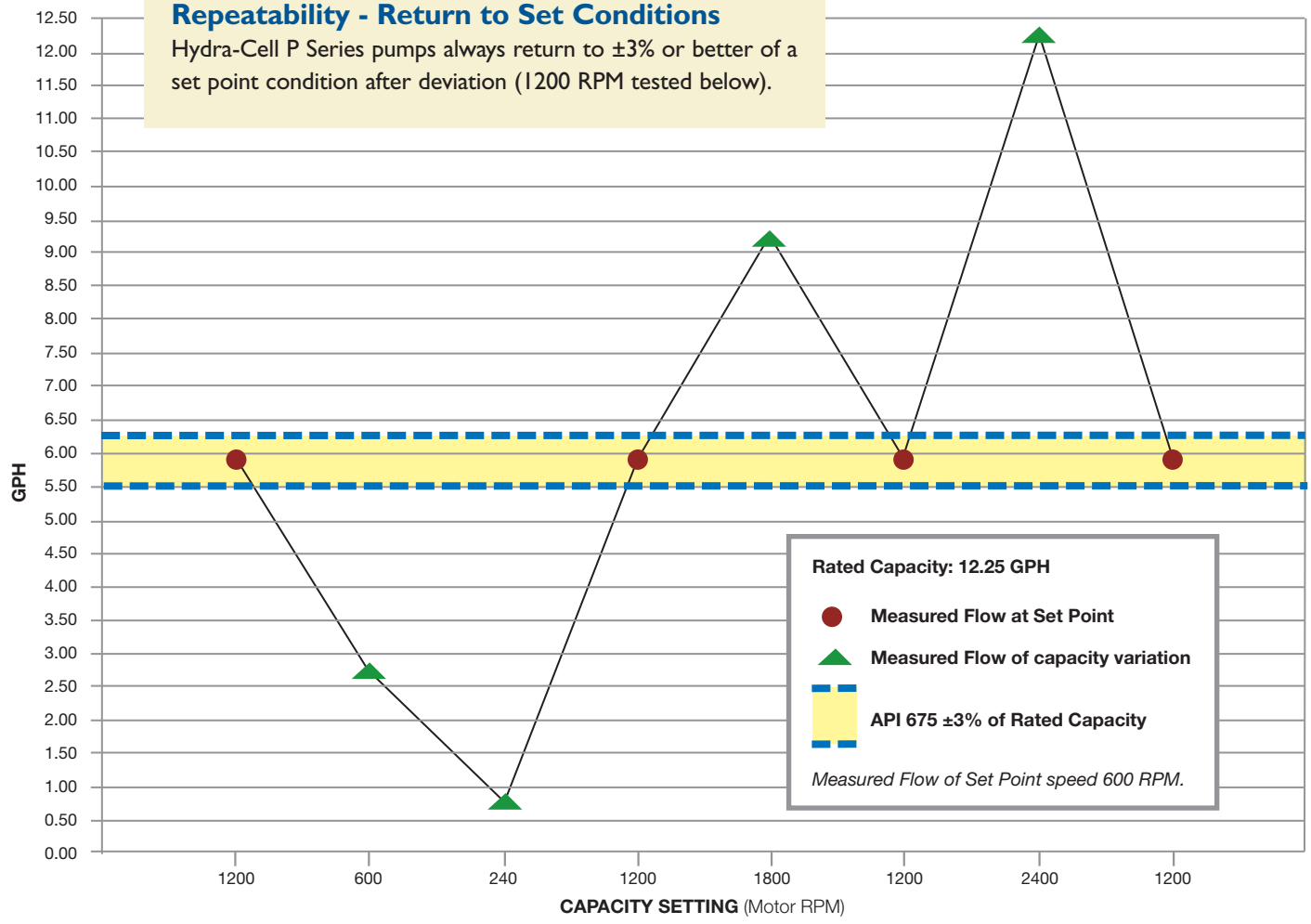
For smooth, virtually pulse-less performance, Hydra-Cell P Series pumps provide linear flow within ±3% or better.



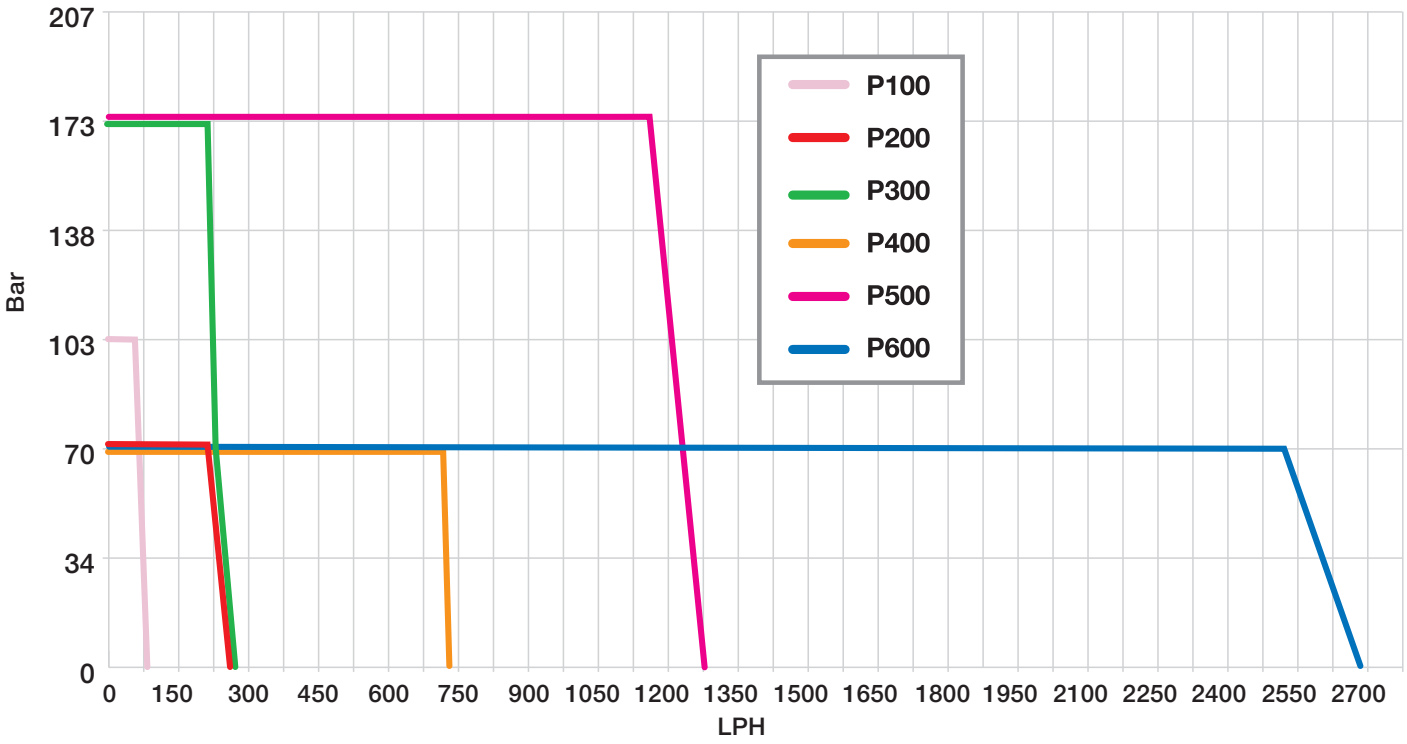
Best Fit Line is drawn through the Measured Flow data points, taken at 100%, 75%, 50%, 25%, and 10% of Rated Capacity (12.25 GPH).

Repeatability - Return to Set Conditions

Hydra-Cell P Series pumps always return to ±3% or better of a set point condition after deviation (1200 RPM tested below).



Hydra-Cell Metering Solutions Capacities & Ratings



Hydra-Cell Metering Solutions pumps comprise six standard models, each with a wide range of flow capacities and pressure ratings to lower costly stocking requirements.

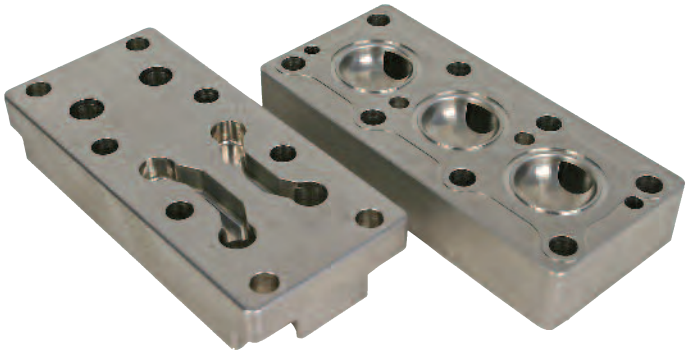
Hydra-Cell can also handle capacities greater than 2634 LPH. See page 26 (Hydra-Cell Bare Shaft Pumps) or contact us for more information.

Model	Maximum Capacity (LPH)	Maximum Discharge Pressure (Bar)		Maximum Temperature (˚C)**		Maximum Suction Pressure (Bar)	Specifications on Pages:
		Non-Metallic*	Metallic	Non-Metallic	Metallic		
P100	78.0	17	103	60˚	121˚	17	12-13
P200	237.4	17	70	60˚	121˚	17	14-15
P300	242.1	N/A	173	N/A	121˚	34	16-17
P400	714.9	17	70	60˚	121˚	17	18-19
P500	1255.1	N/A	173	N/A	121˚	34	20-21
P600	2634.0	17	70	60˚	121˚	17	22-23

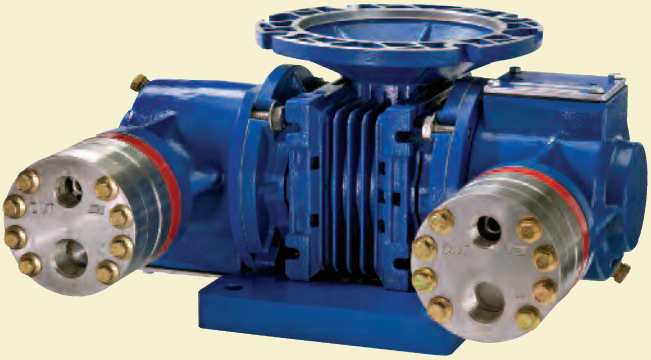
* 24 bar maximum with Kynar® liquid end.
** Consult factory for correct component selection for fluid temperatures above 71˚C (160˚F).

Multiplexing Capability

The simple design of Hydra-Cell enables mixing ratios of multiple fluids in flexible, economical ways. Using only one motor and one gearbox, Hydra-Cell Metering Solutions can provide spare, double-flow, side-by-side systems, or pre-mixed ratios. In fact, pumps utilizing the same gearbox and motor need not be the same model Hydra-Cell pumps. Up to six different fluids can be metered by using different manifold plates, and using special manifolds, a single Hydra-Cell P200 or P300 model can feed up to three systems from one liquid end. Ordinary metering pumps cannot provide the same capability without entailing the full cost of an additional pump.



Manifold and valve plate for 2:1 ratio dosing applications



In this case, two P100 model pumps driven by one gearbox and one motor can meter two liquids.

P100 Pump Series

Capacities to 78.01 LPH - Rated to 103 Bar

Hydra-Cell Metering Solutions meet or exceed API 675 performance standards for Steady-State Accuracy (±1%), Linearity (±3%), and Repeatability (±3%).

Performance*

LPH Maximum Flow at Designated Pressure

LPH All Pumps		LPH Metallic Pump Heads Only			Pump	Gear	Motor
7 Bar	17 Bar	35 Bar	70 Bar	103 Bar	RPM	Ratio	RPM
1.99	1.68	1.44	0.76	**	14.5	100:1	
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	1450
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	

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

*** Consult factory for performance specifications.*

Required Motor kW

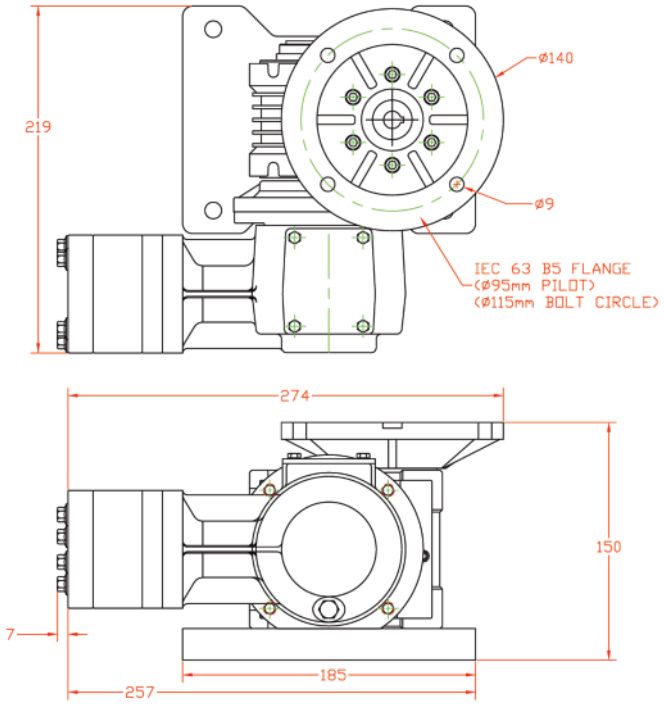
0.18	0.37	0.55

Pump Data

Diaphragms per Liquid End	1
Flow Control	Electronic variable speed drive
Maximum Discharge Pressure	
Metallic Head:	103 bar (1500 PSI)
Non-Metallic Head:	Polypropylene- 17 bar (250 PSI) Kynar- 24 bar (350 PSI)
Maximum Suction Pressure	17 bar (250 PSI)
Maximum Temperature	
Metallic Head:	121°C (250°F)*
Non-Metallic Head:	60°C (140°F)
Suction Port	1/2 inch BSPT or NPT
Discharge Port	3/8 inch BSPT or NPT
Weight (less motor)	
Metallic Head:	8.4 kg (18.5 lbs)
Non-Metallic Head:	7.4 kg (16.4 lbs)
Dimensions (less motor)	
Metallic Head:	230 mm W x 294 mm D x 150 mm H (9.07" W x 11.57" D x 5.9" H)
Non-Metallic Head:	230 mm W x 300 mm D x 150 mm H (9.07" W x 11.82" D x 5.9" H)

**Consult factory for correct component selection for fluid temperatures above 71°C (160°F).*

Representative Dimensional Drawings (in mm)



For accessories, options, and a system installation example, see pages 24-25.

Pump Ordering Information

A complete pump order number contains 13 digits based on the specified pump materials listed below. Contact your Hydra-Cell sales representative for accompanying motor drive options.

1	2	3	4	5	6	7	8	9	10	11	12	13
P	1	0	0									

Pump Model Size (Digits 1-4)

P100	For all P100 Pumps

Pump Version (Digit 5)

M	BSPT Ports
N	NPT Ports
A	ATEX Zone 1 (BSPT Ports)

Pump Head Material (Digit 6)

M	Kynar®
P	Polypropylene
S	316 Stainless Steel
T	Hastelloy®C

Diaphragm & O-ring Material (Digit 7)♦

E	EPDM
G	Viton®-XT
J	PTFE
P	Neoprene
T	Buna-N-XS

♦ *See price list for different actuating oils available with these materials.*

Check Valve Material (Digits 8-9)
(Valve Spring / Valve & Seat)

SS	316 SST / 316 SST
TT	Hastelloy®C / Hastelloy®C
SC	316 SST / Ceramic
TC	Hastelloy®C / Ceramic

Gearbox Ratio (Digits 10-12)

100	100:1	(63 B5 Motor Frame)
080	80:1	(63 B5 Motor Frame)
060	60:1	(63 B5 Motor Frame)
050	50:1	(63 B5 Motor Frame)
040	40:1	(63 B5 Motor Frame)
030	30:1	(63 B5 Motor Frame)
025	25:1	(63 B5 Motor Frame)
020	20:1	(63 B5 Motor Frame)
015	15:1	(63 B5 Motor Frame)
010	10:1	(63 B5 Motor Frame)
007	7.5:1	(63 B5 Motor Frame)
A07	7.5:1	(71 B14 Motor Frame)
005	5:1	(63 B5 Motor Frame)
A05	5:1	(71 B14 Motor Frame)

Base Plate (Digit 13)

A	Carbon Steel (Epoxy painted)

P200 Pump Series

Capacities to 237.4 LPH - Rated to 70 Bar

Hydra-Cell Metering Solutions meet or exceed API 675 performance standards for Steady-State Accuracy (±1%), Linearity (±3%), and Repeatability (±3%).

Performance*

LPH Maximum Flow at Designated Pressure

LPH All Pumps		LPH Metallic Pump Heads Only		Pump	Gear	Motor
7 Bar	17 Bar	35 Bar	70 Bar	RPM	Ratio	RPM
4.95	4.57	3.84	2.00	14.5	100:1	
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	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	1450
23.48	23.02	22.06	19.50	58	25:1	
29.66	29.17	28.14	25.33	72.5	20:1	
39.96	39.42	38.27	35.06	96.67	15:1	
60.55	59.92	58.52	54.50	145	10:1	
81.15	80.41	78.78	73.95	193.33	7.5:1	
122.3	121.4	119.3	112.9	290	5:1	
157.8	156.7	154.2	146.4	373.3	7.5:1	2800
237.4	235.9	232.4	221.5	560	5:1	

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

Required Motor kW

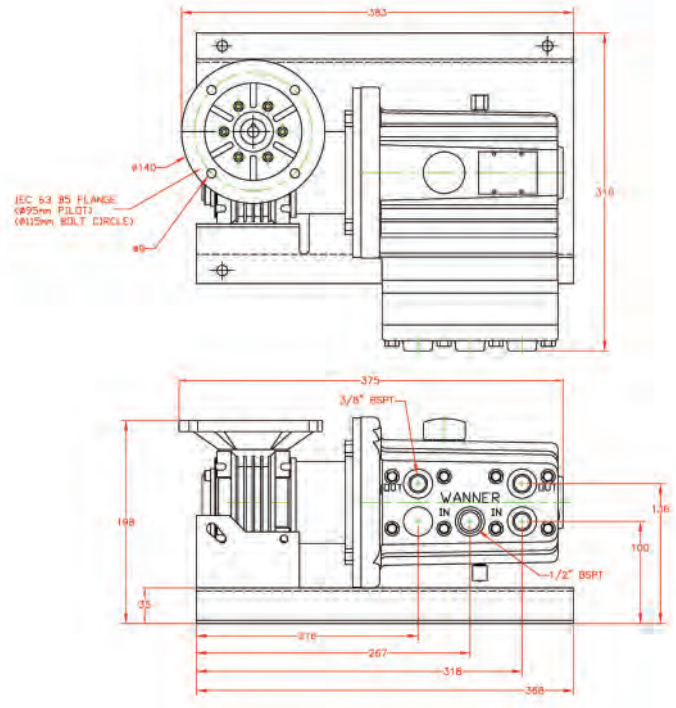
0.18	0.37	0.55	0.75

Pump Data

Diaphragms per Liquid End	3
Flow Control	Electronic variable speed drive
Maximum Discharge Pressure	
Metallic Head:	70 bar (1000 PSI)
Non-Metallic Head:	Polypropylene- 17 bar (250 PSI) Kynar- 24 bar (350 PSI)
Maximum Suction Pressure	17 bar (250 PSI)
Maximum Temperature	
Metallic Head:	121°C (250°F)*
Non-Metallic Head:	60°C (140°F)
Suction Port	1/2 inch BSPT or NPT
Discharge Port	3/8 inch BSPT or NPT
Weight (less motor)	
Metallic Head:	17.7 kg (39 lbs)
Non-Metallic Head:	13.6 kg (30 lbs)
Dimensions (less motor)	
Metallic Head:	395 mm W x 311 mm D x 205 mm H (15.56" W x 12.23" D x 8.06" H)
Non-Metallic Head:	395 mm W x 320 mm D x 205 mm H (15.56" W x 12.61" D x 8.06" H)

**Consult factory for correct component selection for fluid temperatures above 71°C (160°F).*

Representative Dimensional Drawings (in mm)



For accessories, options, and a system installation example, see pages 24-25.

Pump Ordering Information

A complete pump order number contains 13 digits based on the specified pump materials listed below. Contact your Hydra-Cell sales representative for accompanying motor drive options.

1	2	3	4	5	6	7	8	9	10	11	12	13
P	2	0	0									

Pump Model Size (Digits 1-4)

P200	For all P200 Pumps

Pump Version (Digit 5)

M	BSPT Ports
N	NPT Ports
A	ATEX Zone 1 (BSPT Ports)

Pump Head Material (Digit 6)

M	Kynar®
P	Polypropylene
S	316 Stainless Steel
T	Hastelloy®C

Diaphragm & O-ring Material (Digit 7)♦

E	EPDM
G	Viton®-XT
J	PTFE
P	Neoprene
T	Buna-N-XS

♦ *See price list for different actuating oils available with these materials.*

Check Valve Material (Digits 8-9)
(Valve Spring / Valve & Seat)

SS	316 SST / 316 SST
TT	Hastelloy®C / Hastelloy®C
SC	316 SST / Ceramic
TC	Hastelloy®C / Ceramic

Gearbox Ratio (Digits 10-12)

100	100:1	(63 B5 Motor Frame)
080	80:1	(63 B5 Motor Frame)
060	60:1	(63 B5 Motor Frame)
050	50:1	(63 B5 Motor Frame)
040	40:1	(63 B5 Motor Frame)
030	30:1	(63 B5 Motor Frame)
025	25:1	(63 B5 Motor Frame)
020	20:1	(63 B5 Motor Frame)
015	15:1	(63 B5 Motor Frame)
010	10:1	(63 B5 Motor Frame)
007	7.5:1	(63 B5 Motor Frame)
A07	7.5:1	(71 B5 Motor Frame)
005	5:1	(63 B5 Motor Frame)
A05	5:1	(71 B5 Motor Frame)
B05	5:1	(80 B5 Motor Frame)

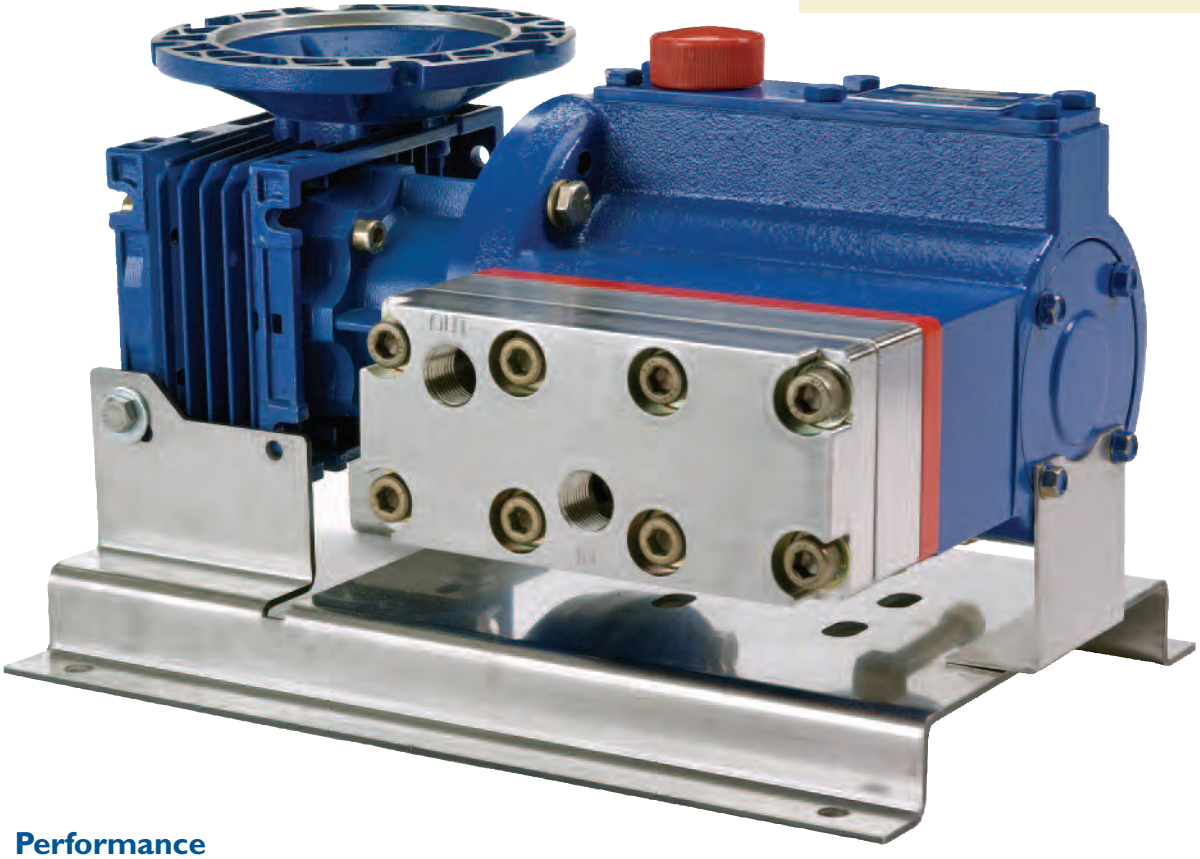
Base Plate (Digit 13)

S	Stainless Steel

P300 Pump Series

Capacities to 242.1 LPH - Rated to 173 Bar

Hydra-Cell Metering Solutions meet or exceed API 675 performance standards for Steady-State Accuracy (±1%), Linearity (±3%), and Repeatability (±3%).



Performance

LPH Maximum Flow at Designated Pressure

LPH Metallic Pump Heads Only				Pump	Gear	Motor
7 Bar	35 Bar	104 Bar	173 Bar	RPM	Ratio	RPM
6.05	5.52	4.24	3.02	14.5	100:1	
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	1450
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

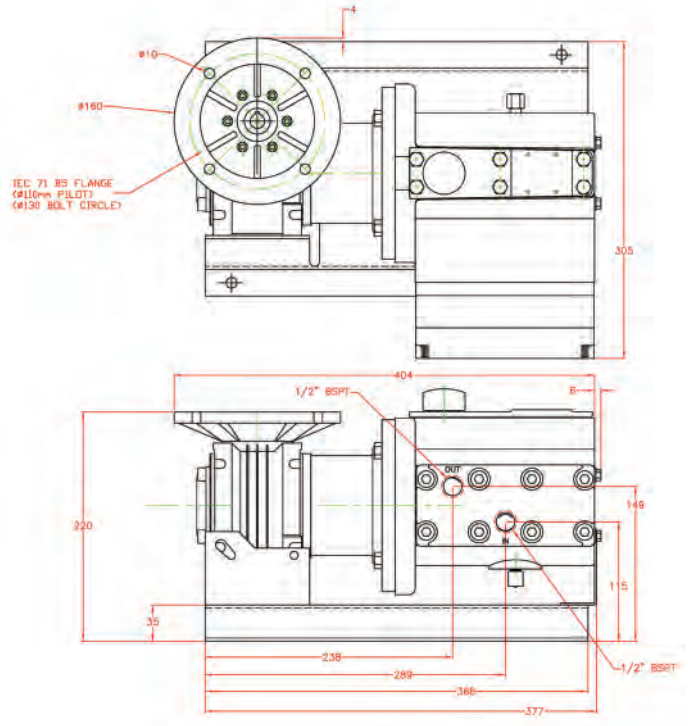
Pump Data

Diaphragms per Liquid End	3
Flow Control	Electronic variable speed drive
Maximum Discharge Pressure	
Metallic Head:	173 bar (2500 PSI)
Maximum Suction Pressure	35 bar (500 PSI)
Maximum Temperature	
Metallic Head:	121°C (250°F)*
Suction Port	1/2 inch BSPT or NPT
Discharge Port	1/2 inch BSPT or NPT
Weight (less motor)	
Metallic Head:	23.2 kg (51 lbs)
Dimensions (less motor)**	
Metallic Head:	407 mm W x 311 mm D x 244 mm H (16.02" W x 12.23" D x 9.60" H)

**Consult factory for correct component selection for fluid temperatures above 71°C (160°F).*

*** For 63 B5 motor frame only. Consult factory for other motor frame sizes.*

Representative Dimensional Drawings (in mm)



Pump Ordering Information

A complete pump order number contains 13 digits based on the specified pump materials listed below. Contact your Hydra-Cell sales representative for accompanying motor drive options.

1	2	3	4	5	6	7	8	9	10	11	12	13
P	3	0	0									

Pump Model Size (Digits 1-4)

P300	For all P300 Pumps

Pump Version (Digit 5)

M	BSPT Ports
N	NPT Ports
A	ATEX Zone 1 (BSPT Ports)

Pump Head Material (Digit 6)

R	304 Stainless Steel
S	316 Stainless Steel

Diaphragm & O-ring Material (Digit 7)♦

E	EPDM
G	Viton®-XT
T	Buna-N-XS

♦ *See price list for different actuating oils available with these materials.*

Check Valve Material (Digits 8-9)
(Valve Spring / Valve & Seat)

SS	316 SST / 316 SST

Gearbox Ratio (Digits 10-12)

100	100:1	(63 B5 Motor Frame)
080	80:1	(63 B5 Motor Frame)
060	60:1	(63 B5 Motor Frame)
050	50:1	(63 B5 Motor Frame)
040	40:1	(63 B5 Motor Frame)
A30	30:1	(71 B5 Motor Frame)
A25	25:1	(71 B5 Motor Frame)
A20	20:1	(71 B5 Motor Frame)
A15	15:1	(71 B5 Motor Frame)
A10	10:1	(71 B5 Motor Frame)
A07	7.5:1	(71 B5 Motor Frame)
B07	7.5:1	(80 B5 Motor Frame)
B05	5:1	(80 B5 Motor Frame)
C05	5:1	(90 B5 Motor Frame)

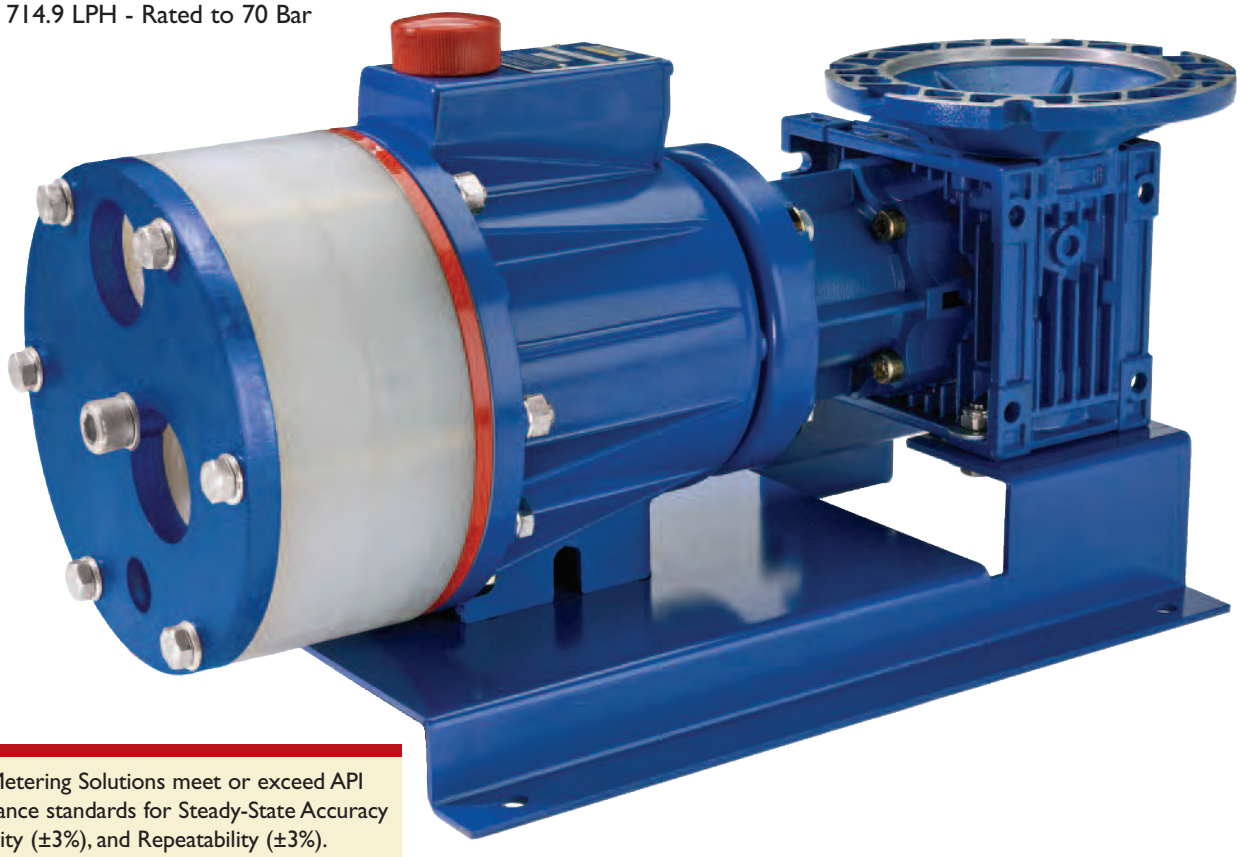
Base Plate (Digit 13)

S	Stainless Steel

For accessories, options, and a system installation example, see pages 24-25.

P400 Pump Series

Capacities to 714.9 LPH - Rated to 70 Bar



Hydra-Cell Metering Solutions meet or exceed API 675 performance standards for Steady-State Accuracy (±1%), Linearity (±3%), and Repeatability (±3%).

Performance*

LPH Maximum Flow at Designated Pressure

LPH All Pumps		LPH Metallic Pump Heads Only		Pump	Gear	Motor
7 Bar	17 Bar	35 Bar	70 Bar	RPM	Ratio	RPM
16.15	15.97	15.79	15.25	14.5	100:1	
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	1450
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	

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

Required Motor kW

0.18	0.37	0.55	0.75
1.1	1.5	2.2	

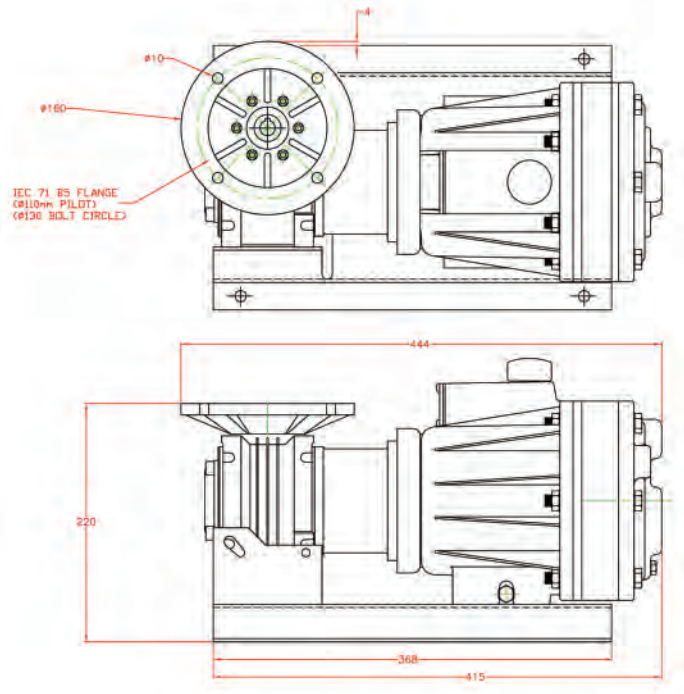
Pump Data

Diaphragms per Liquid End	3
Flow Control	Electronic variable speed drive
Maximum Discharge Pressure	
Metallic Head:	70 bar (1000 PSI)
Non-Metallic Head:	Polypropylene- 17 bar (250 PSI) Kynar- 24 bar (350 PSI)
Maximum Suction Pressure	17 bar (250 PSI)
Maximum Temperature	
Metallic Head:	121°C (250°F)*
Non-Metallic Head:	60°C (140°F)
Suction Port	1 inch BSPT or NPT
Discharge Port	3/4 inch BSPT or NPT
Weight (less motor)	
Metallic Head:	28.1 kg (62 lbs)
Non-Metallic Head:	22.2 kg (49 lbs)
Dimensions (less motor)**	
Metallic Head:	447 mm W x 251 mm D x 263 mm H (17.59" W x 9.87" D x 10.34" H)
Non-Metallic Head:	462 mm W x 251 mm D x 263 mm H (18.19" W x 9.87" D x 10.34" H)

**Consult factory for correct component selection for fluid temperatures above 71°C (160°F).*

*** For 63 B5 motor frame only. Consult factory for other motor frame sizes.*

Representative Dimensional Drawings (in mm)



For accessories, options, and a system installation example, see pages 24-25.

Pump Ordering Information

A complete pump order number contains 13 digits based on the specified pump materials listed below. Contact your Hydra-Cell sales representative for accompanying motor drive options.

1	2	3	4	5	6	7	8	9	10	11	12	13
P	4	0	0									

Pump Model Size (Digits 1-4)

P400	For all P400 Pumps

Pump Version (Digit 5)

M	BSPT Ports
N	NPT Ports
A	ATEX Zone 1 (BSPT Ports)

Pump Head Material (Digit 6)

C	Cast Iron
M	Kynar®
P	Polypropylene
S	316 Stainless Steel
T	Hastelloy®C

Diaphragm & O-ring Material (Digit 7)♦

E	EPDM
G	Viton®-XT
J	PTFE
P	Neoprene
T	Buna-N-XS

♦ *See price list for different actuating oils available with these materials.*

Check Valve Material (Digits 8-9) (Valve Spring / Valve & Seat)

SS	316 SST / 316 SST
TT	Hastelloy®C / Hastelloy®C
SC	316 SST / Ceramic
TC	Hastelloy®C / Ceramic

Gearbox Ratio (Digits 10-12)

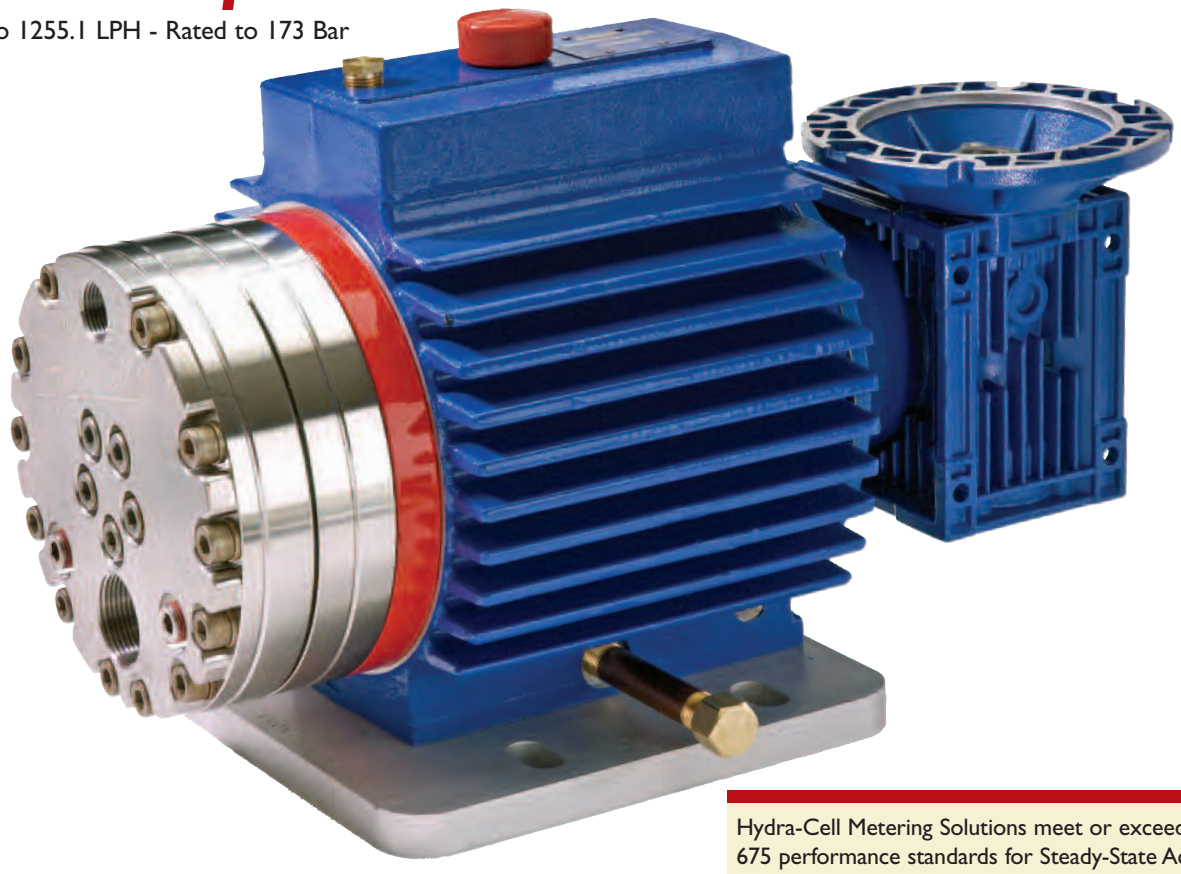
100	100:1	(63 B5 Motor Frame)
080	80:1	(63 B5 Motor Frame)
060	60:1	(63 B5 Motor Frame)
050	50:1	(63 B5 Motor Frame)
040	40:1	(63 B5 Motor Frame)
A30	30:1	(71 B5 Motor Frame)
A25	25:1	(71 B5 Motor Frame)
A20	20:1	(71 B5 Motor Frame)
A15	15:1	(71 B5 Motor Frame)
A10	10:1	(71 B5 Motor Frame)
B10	10:1	(80 B5 Motor Frame)
A07	7.5:1	(71 B5 Motor Frame)
B07	7.5:1	(80 B5 Motor Frame)
C07	7.5:1	(90 B5 Motor Frame)
B05	5:1	(80 B5 Motor Frame)
C05	5:1	(90 B5 Motor Frame)

Base Plate (Digit 13)

S	Stainless Steel

P500 Pump Series

Capacities to 1255.1 LPH - Rated to 173 Bar



Hydra-Cell Metering Solutions meet or exceed API 675 performance standards for Steady-State Accuracy (±1%), Linearity (±3%), and Repeatability (±3%).

Performance

LPH Maximum Flow at Designated Pressure

LPH Metallic Pump Heads Only				Pump	Gear	Motor
7 Bar	35 Bar	104 Bar	173 Bar	RPM	Ratio	RPM
36.60	34.90	31.32	28.70	14.5	100:1	
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	1450
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	
838.1	828.2	797.9	759.4	373.3	7.5:1	2800
1255.1	1241.0	1196.8	1139.6	560	5:1	

Required Motor kW

0.18	0.37	0.55	0.75	1.1
1.5	2.2	3.7	5.5	7.5

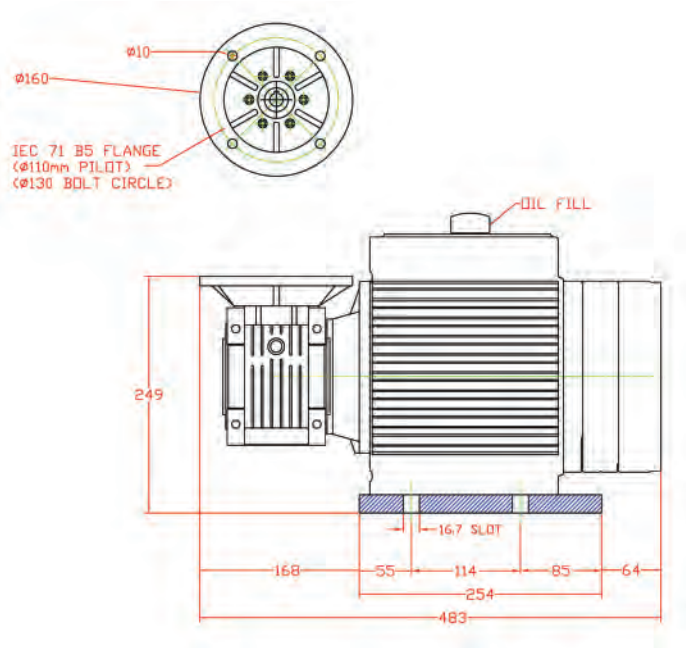
Pump Data

Diaphragms per Liquid End	5
Flow Control	Electronic variable speed drive
Maximum Discharge Pressure	
Metallic Head:	173 bar (2500 PSI)
Maximum Suction Pressure	35 bar (500 PSI)
Maximum Temperature	
Metallic Head:	121°C (250°F)*
Suction Port	1-1/4 inch BSPT or NPT
Discharge Port	3/4 inch BSPT or NPT
Weight (less motor)	
Metallic Head:	72.6 kg (160 lbs)
Dimensions (less motor)**	
Metallic Head:	488 mm W x 272 mm D x 315 mm H (19.2" W x 10.7" D x 12.4" H)

**Consult factory for correct component selection for fluid temperatures above 71°C (160°F).*

*** For 71 B5 motor frame only. Consult factory for other motor frame sizes.*

Representative Dimensional Drawings (in mm)



For accessories, options, and a system installation example, see pages 24-25.

Pump Ordering Information

A complete pump order number contains 13 digits based on the specified pump materials listed below. Contact your Hydra-Cell sales representative for accompanying motor drive options.

1	2	3	4	5	6	7	8	9	10	11	12	13
P	5	0	0									

Pump Model Size (Digits 1-4)

P500	For all P500 Pumps

Pump Version (Digit 5)

M	BSPT Ports
N	NPT Ports
A	ATEX Zone 1 (BSPT Ports)

Pump Head Material (Digit 6)

S	316 Stainless Steel
T	Hastelloy®C

Diaphragm & O-ring Material (Digit 7)♦

G	Viton®-XT
T	Buna-N-XS

♦ *See price list for different actuating oils available with these materials.*

Check Valve Material (Digits 8-9) (Valve Spring / Valve & Seat)

SS	316 SST / 316 SST
TT	Hastelloy®C / Hastelloy®C

Gearbox Ratio (Digits 10-12)

A00	100:1	(71 B5 Motor Frame)	
H00*	100:1	(71 B5 Motor Frame)	> 104 bar
A80	80:1	(71 B5 Motor Frame)	
H80*	80:1	(80 B5 Motor Frame)	> 104 bar
A60	60:1	(71 B5 Motor Frame)	
H60*	60:1	(80 B5 Motor Frame)	> 104 bar
A50	50:1	(71 B5 Motor Frame)	
B50	50:1	(80 B5 Motor Frame)	
H50*	50:1	(80 B5 Motor Frame)	> 104 bar
A40	40:1	(71 B5 Motor Frame)	
B40	40:1	(80 B5 Motor Frame)	
H40*	40:1	(80 B5 Motor Frame)	> 104 bar
B30	30:1	(80 B5 Motor Frame)	
C30	30:1	(90 B5 Motor Frame)	
B25	25:1	(80 B5 Motor Frame)	
C25	25:1	(90 B5 Motor Frame)	
H25*	25:1	(90 B5 Motor Frame)	> 104 bar
B20	20:1	(80 B5 Motor Frame)	
C20	20:1	(90 B5 Motor Frame)	
H20*	20:1	(90 B5 Motor Frame)	> 104 bar
B15	15:1	(80 B5 Motor Frame)	
C15	15:1	(90 B5 Motor Frame)	
H15*	15:1	(90 B5 Motor Frame)	> 104 bar
B10	10:1	(80 B5 Motor Frame)	
C10	10:1	(90 B5 Motor Frame)	
H10*	10:1	(100 B5 Motor Frame)	
B07	7.5:1	(80 B5 Motor Frame)	
C07	7.5:1	(90 B5 Motor Frame)	
H07*	7.5:1	(112 B14 Motor Frame)	
G07	7.5:1	(132 B14 Motor Frame)	
B05*	5:1	(80 B5 Motor Frame)	
C05*	5:1	(90 B5 Motor Frame)	
E05*	5:1	(112 B14 Motor Frame)	
G05	5:1	(132 B14 Motor Frame)	

Base Plate (Digit 13)

A	Aluminum (Epoxy painted)
G	Carbon Steel (Epoxy painted) for all G reducers
H	Carbon Steel (Epoxy painted) for all reducers with *

P600 Pump Series

Capacities to 2634.0 LPH - Rated to 70 Bar

Hydra-Cell Metering Solutions meet or exceed API 675 performance standards for Steady-State Accuracy (±1%), Linearity (±3%), and Repeatability (±3%).

Performance*

LPH Maximum Flow at Designated Pressure

LPH All Pumps		LPH Metallic Pump Heads Only		Pump	Gear	Motor
7 Bar	17 Bar	35 Bar	70 Bar	RPM	Ratio	RPM
68.14	68.04	66.92	63.09	14.5	100:1	
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	1450
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	
1755.9	1734.1	1702.2	1655.3	373.3	7.5:1	2800
2634.0	2601.0	2553.1	2483.8	560	5:1	

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

Required Motor kW

0.18	0.37	0.55	0.75	1.1
1.5	2.2	3.7	5.5	7.5

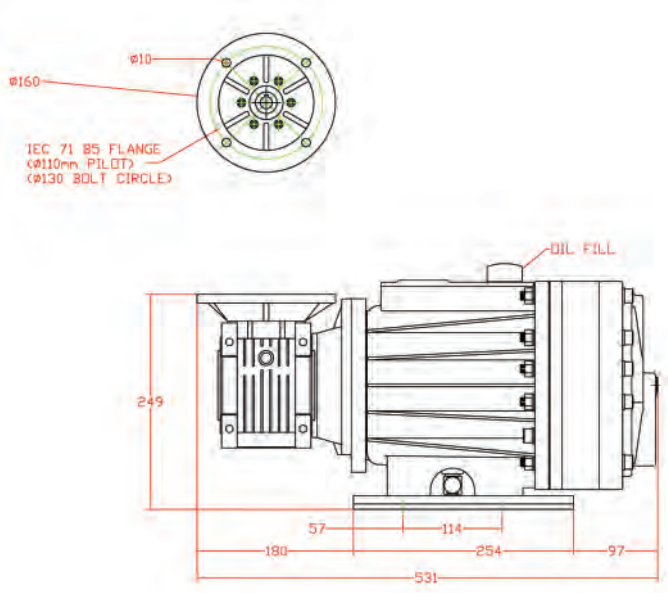
Pump Data

Diaphragms per Liquid End	3
Flow Control	Electronic variable speed drive
Maximum Discharge Pressure	
Metallic Head:	70 bar (1000 PSI)
Non-Metallic Head:	Polypropylene- 17 bar (250 PSI) Kynar- 24 bar (350 PSI)
Maximum Suction Pressure	17 bar (250 PSI)
Maximum Temperature	
Metallic Head:	121°C (250°F)*
Non-Metallic Head:	60°C (140°F)
Suction Port	1-1/2 inch BSPT or NPT
Discharge Port	1 inch BSPT or NPT
Weight (less motor)	
Metallic Head:	64 kg (141 lbs)
Non-Metallic Head:	48 kg (106 lbs)
Dimensions (less motor)**	
Metallic Head:	533 mm W x 272 mm D x 285 mm H (21.0" W x 10.7" D x 11.2" H)
Non-Metallic Head:	554 mm W x 272 mm D x 285 mm H (21.8" W x 10.7" D x 11.2" H)

**Consult factory for correct component selection for fluid temperatures above 71°C (160°F).*

*** For 71 B5 motor frame only. Consult factory for other motor frame sizes.*

Representative Dimensional Drawings (in mm)



For accessories, options, and a system installation example, see pages 24-25.

Pump Ordering Information

A complete pump order number contains 13 digits based on the specified pump materials listed below. Contact your Hydra-Cell sales representative for accompanying motor drive options.

1	2	3	4	5	6	7	8	9	10	11	12	13
P	6	0	0									

Pump Model Size (Digits 1-4)

P600	For all P600 Pumps

Pump Version (Digit 5)

M	BSPT Ports
N	NPT Ports
A	ATEX Zone 1 (BSPT Ports)

Pump Head Material (Digit 6)

C	Cast Iron
M	Kynar®
P	Polypropylene
S	316 Stainless Steel
T	Hastelloy®C

Diaphragm & O-ring Material (Digit 7)♦

E	EPDM	♦ *See price list for different actuating oils available with these materials.*
G	Viton®-XT	
J	PTFE	
P	Neoprene	
T	Buna-N-XS	

Check Valve Material (Digits 8-9) (Valve Spring / Valve & Seat)

SS	316 SST / 316 SST
TT	Hastelloy®C / Hastelloy®C
SC	316 SST / Ceramic
TC	Hastelloy®C / Ceramic

Gearbox Ratio (Digits 10-12)

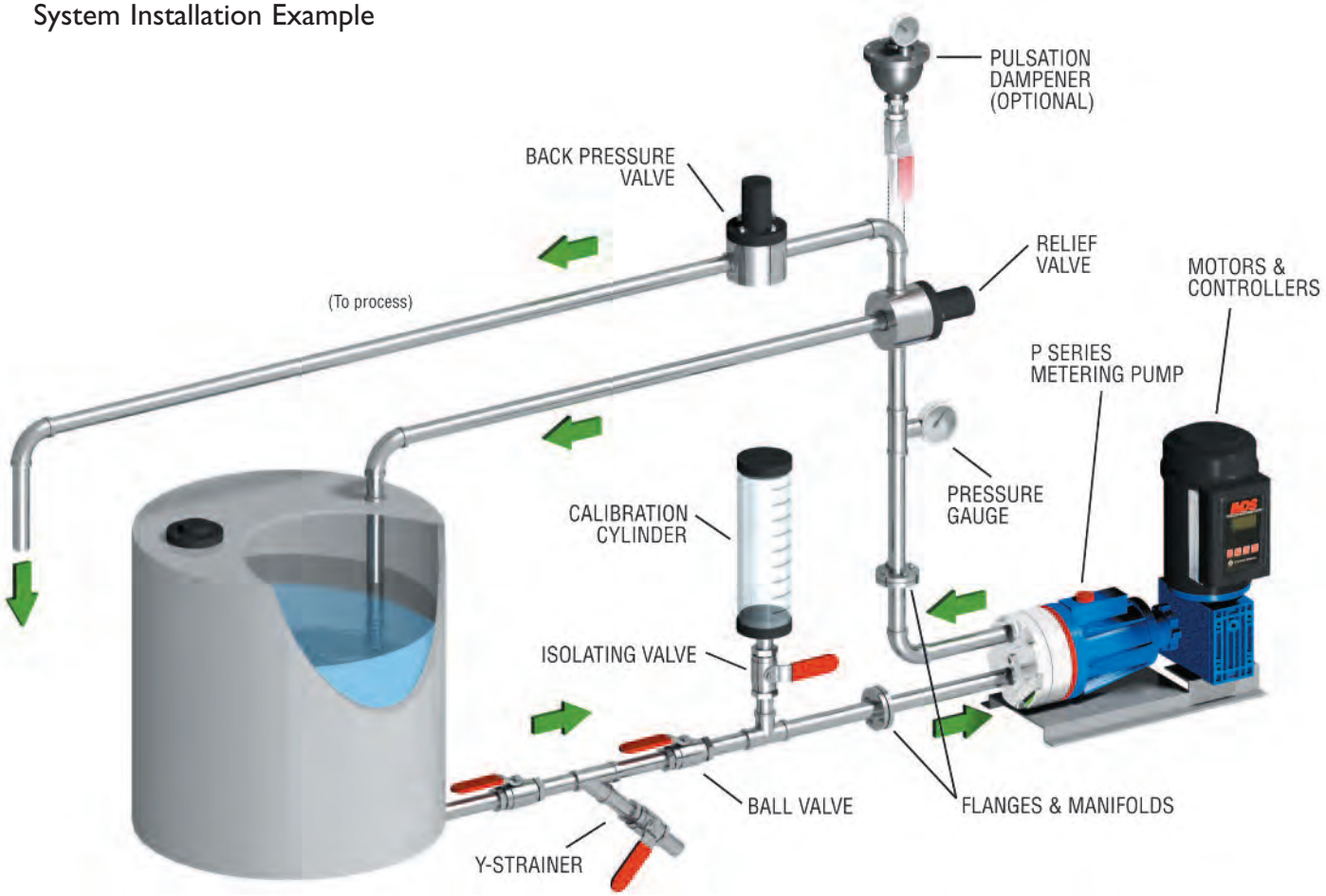
A00	100:1	(71 B5 Motor Frame)	
H00*	100:1	(71 B5 Motor Frame)	> 35 bar
A80	80:1	(71 B5 Motor Frame)	
H80*	80:1	(71 B5 Motor Frame)	> 35 bar
A60	60:1	(71 B5 Motor Frame)	
H60*	60:1	(80 B5 Motor Frame)	
A50	50:1	(71 B5 Motor Frame)	
B50	50:1	(80 B5 Motor Frame)	
A40	40:1	(71 B5 Motor Frame)	
B40	40:1	(80 B5 Motor Frame)	
B30	30:1	(80 B5 Motor Frame)	
B25	25:1	(80 B5 Motor Frame)	
C25	25:1	(90 B5 Motor Frame)	
B20	20:1	(80 B5 Motor Frame)	
C20	20:1	(90 B5 Motor Frame)	
B15	15:1	(80 B5 Motor Frame)	
C15	15:1	(90 B5 Motor Frame)	
B10	10:1	(80 B5 Motor Frame)	
C10	10:1	(90 B5 Motor Frame)	
H10*	10:1	(100 B5 Motor Frame)	
B07	7.5:1	(80 B5 Motor Frame)	
C07	7.5:1	(90 B5 Motor Frame)	
H07*	7.5:1	(112 B14 Motor Frame)	
G07	7.5:1	(132 B14 Motor Frame)	
B05*	5:1	(80 B5 Motor Frame)	
C05*	5:1	(90 B5 Motor Frame)	
D05*	5:1	(100 B5 Motor Frame)	
E05*	5:1	(112 B14 Motor Frame)	
G05	5:1	(132 B14 Motor Frame)	

Base Plate (Digit 13)

C	Carbon Steel (Epoxy painted)
G	Carbon Steel (Epoxy painted) for all G reducers
H	Carbon Steel (Epoxy painted) for all reducers with *

Hydra-Cell System Options & Accessories

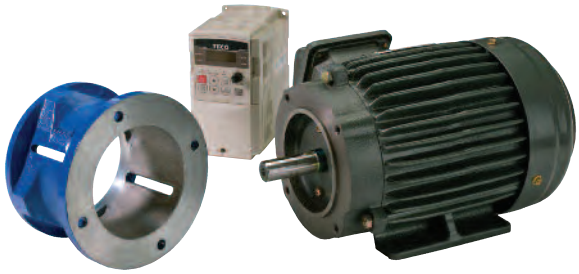
System Installation Example



Hydra-Cell pumps are just one facet of a complete Hydra-Cell "Metering Solutions" system. We can furnish all components in your pumping system, individually tailored to your specific processing needs. For complete details, contact Hydra-Cell, your Hydra-Cell sales representative, or Hydra-Cell distributor.

- Calibration Cylinders
- Back Pressure Valves
- Pressure Relief Valves
- Pulsation Dampeners
- Motors - Motor Adapters - VFDs - Controllers
- Diaphragm Materials
- Liquid End & Check Valve Materials
- Gearbox Ratios
- Manifolds & Flanges
- Strainers
- Suction Accumulators
- Actuating Oils
- Witnessed & Non-Witnessed Testing
- Drawing Packages
- OEM Paint & Nameplate Customisation

Motor Adapters - VFDs - Controllers - Motors



Custom Motor Controller

Variety of Diaphragm Materials

Metallic or Non-Metallic Liquid End & Check Valve Materials

Pulsation Dampeners

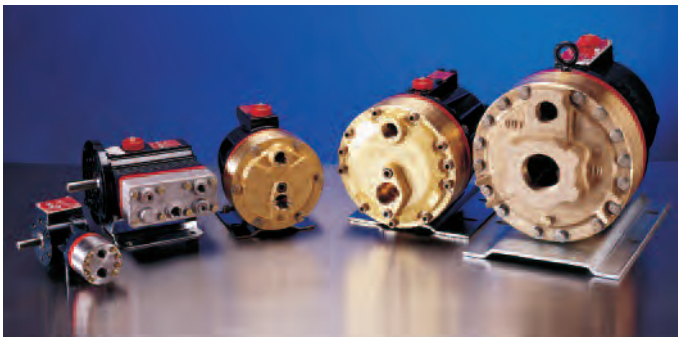
OEM Paint & Nameplate Customisation Available

Pressure Relief & Back Pressure Valves

Different Gearbox Ratios

PVC or Glass Calibration Cylinders

Hydra-Cell Bare Shaft Pumps for Metering



In certain dosing applications, Hydra-Cell pumps without the gear reducers (bare shaft pumps) are an ideal alternative to metering pumps, as they meet or exceed API 675 performance standards at the rated RPMs outlined in the table below.

Hydra-Cell bare shaft pumps should be considered instead of a Hydra-Cell Metering Solutions system when any of the following conditions apply:

- Flow capacities required exceed those of Hydra-Cell Metering Solutions pumps (see page 10)
- Space or application parameters dictate the use of direct or belt drives
- Acquisition cost is the primary consideration

Capacities & Ratings

Model*	Maximum Capacity (LPH)	Maximum Discharge Pressure (BAR)		Maximum Temperature (°C)		Maximum Suction Pressure (BAR)	Rated RPM for Metering
		Non-Metallic	Metallic	Non-Metallic	Metallic		
G20	138.5	17	103	82°	121°	17	1050
G03	588.3	17	70	82°	121°	17	1440
G04	593.0	N/A	173	N/A	121°	34	1440
G10	1862.4	17	70	82°	121°	17	1440
G15	3077.5	N/A	173	N/A	121°	34	1440
G25	4837.8	17	70	82°	121°	17	1050
G35	8630.7	17	83	82°	121°	17	1050

** Ratings are for X-Cam design*