

# **Hydra•Cell**<sup>®</sup>

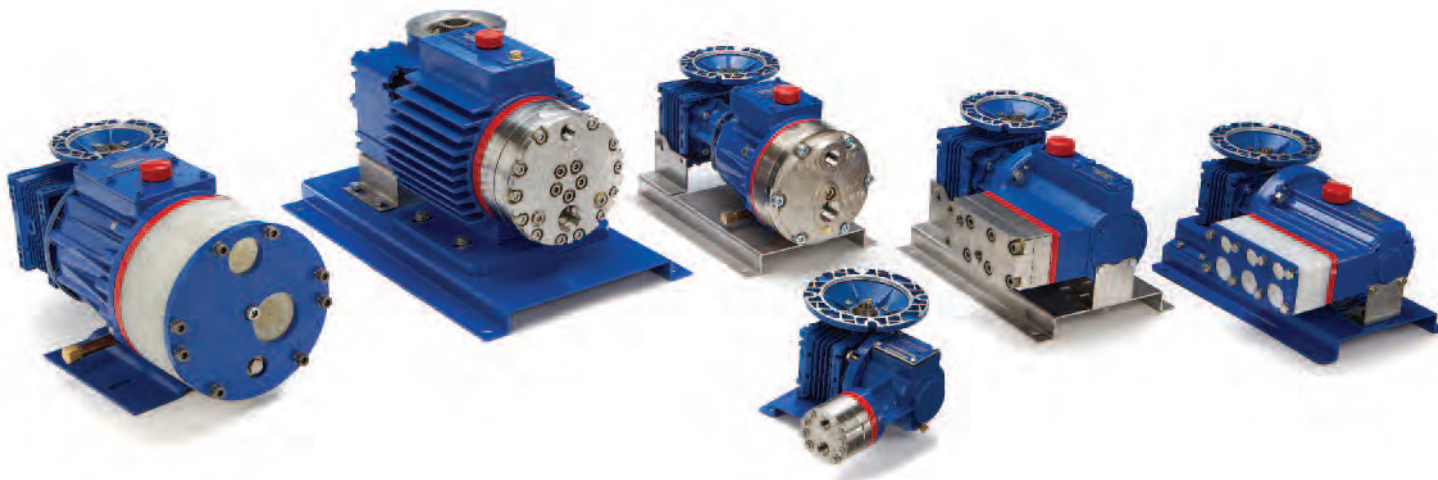
**METERING SOLUTIONS**<sup>™</sup>

## **Electronic Precision Metering Pumps**

**Built to exceed API 675 performance standards  
with “pulse-free” linear flow**



**Wanner Engineering, Inc.**



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The IChemE Awards recognize 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

Due to the Wanner Engineering Continuous Improvement Program, specifications and other data in this catalog are subject to change.  
Hydra-Cell<sup>®</sup> is a registered trademark of Wanner Engineering, Inc.

# Hydra-Cell® is not an Ordinary Metering Pump

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

Hydra-Cell is not a conventional 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 conventional 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 conventional 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:

<span style="font-size: 2em;">◀</span> <b>Non-Lubricating</b>	<b>Viscous Abrasives</b> <span style="font-size: 2em;">▶</span>											
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.

Conventional 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 turn-down range. It meets or exceeds API 675 performance standards while eliminating lost motion and a potential leak path.

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

<b>Hydra-Cell Electronic Flow Control</b>	<b>Other Pumps Manual Stroke Adjusters/Actuators</b>
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.

Conventional 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:

- FKM
- Buna-N
- 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 PVDF are available in standard Hydra-Cell packages. Hydra-Cell is lower in cost compared to conventional metering pumps that have substantial price adders for exotic liquid end materials.

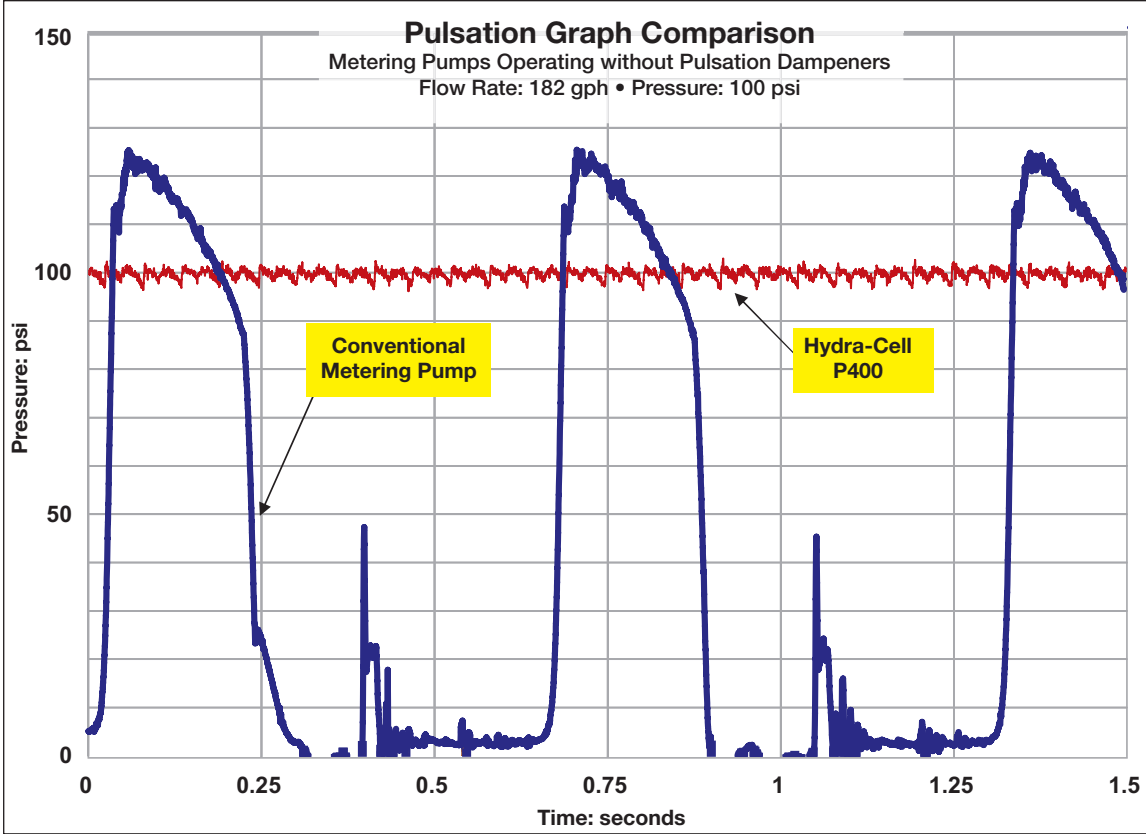
## Reduced pulsations improve operation.

Conventional metering pumps produce pulsing, surging flow and require large pulsation dampeners that add cost and complexity to a metering system. This inherent problem with conventional 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:

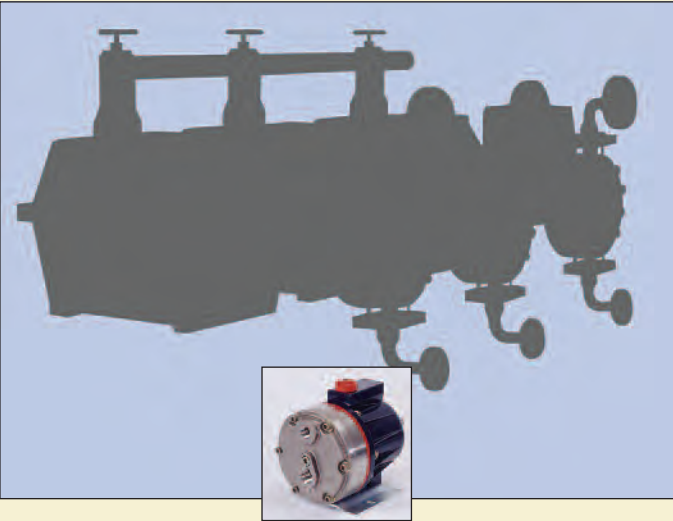
- Reduces pipe strain.
- Enhances operating safety.
- Minimizes maintenance.
- Reduces friction and acceleration losses.
- Eliminates the need for pulsation dampeners.
- Lowers system acquisition costs.
- Provides accurate metering with linear, constant flow.

(Note: Hastelloy® is a registered trademark of Haynes International, Inc.)



Compared to conventional 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 a conventional triplex metering pump – but has a much smaller footprint, saving you valuable real estate in your facility.

Conventional 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. Conventional 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<sup>®</sup>

### More Accurate

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

### Optimal Precision

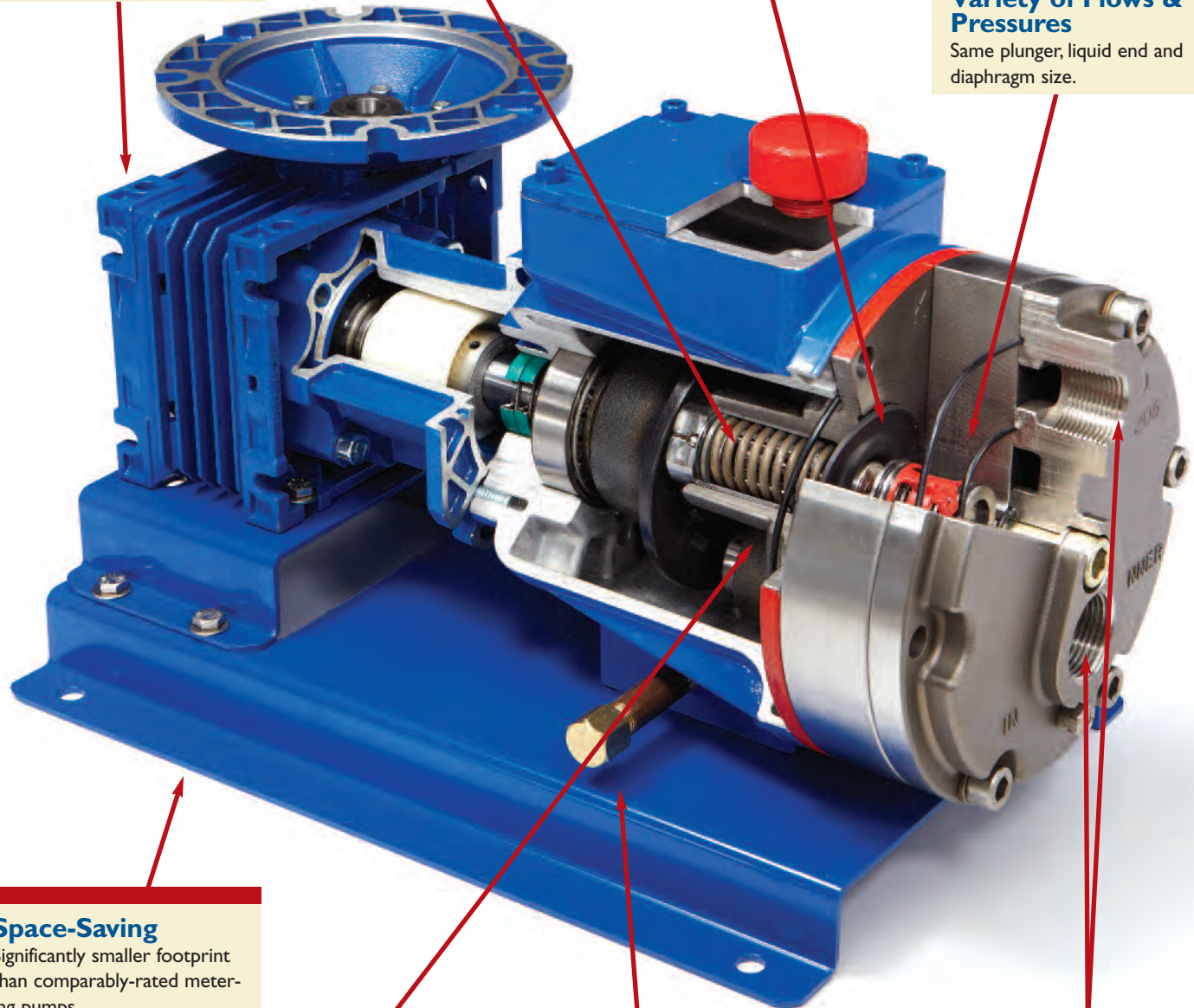
Full stroke - every stroke.

### Linear Flow

Multiple diaphragms reduce pulsations and acceleration losses.

### Variety of Flows & Pressures

Same plunger, liquid end and diaphragm size.



### Space-Saving

Significantly smaller footprint than comparably-rated metering pumps.

### Greater Repeatability

Replenishment valve for continuous accuracy.

### Easy Maintenance

Simple, neat drain plug for oil changes

### Less Chance of Entrapped Air

Porting is larger than normal to eliminate common oxygen scavenger metering problems.



### 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 labor costs.

### Extensive Choice of Materials

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

### Robust Construction

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

### Spring-Loaded, Horizontal Disk Check Valves

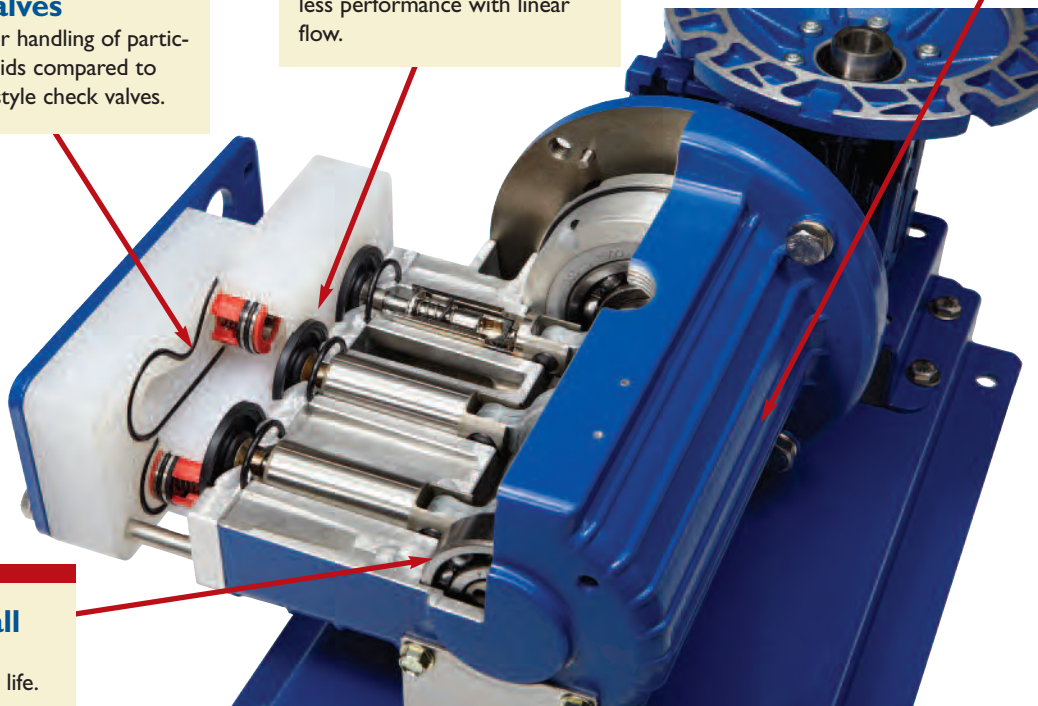
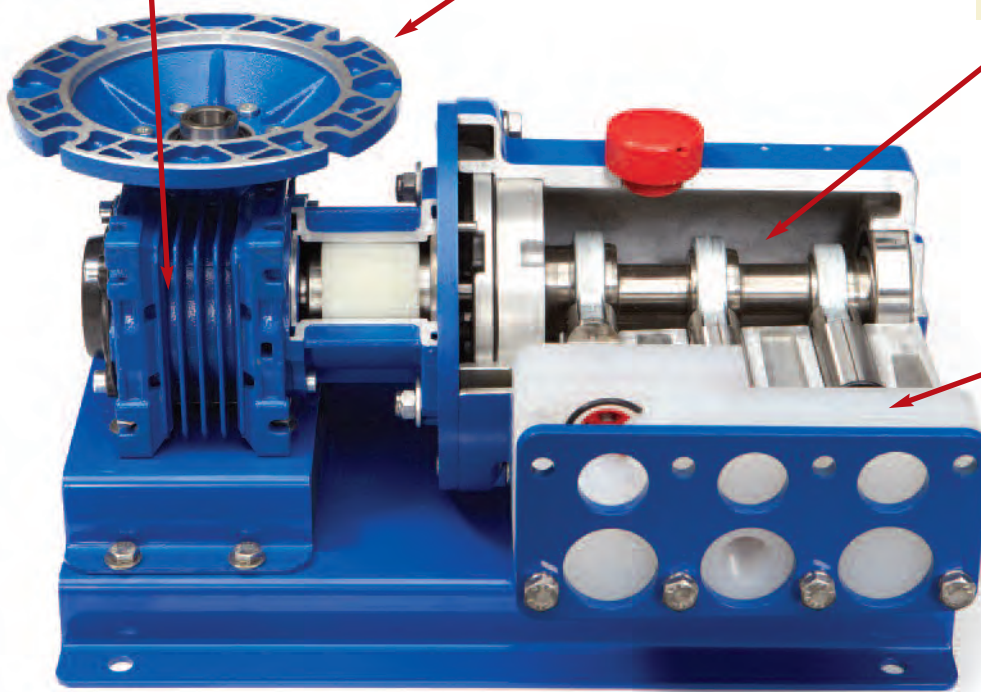
Designed for superior handling of particulates and viscous fluids compared to floating, vertical ball-style check valves.

### Multiple Diaphragms

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

### Lubricated Ball Bearings

Ensure optimal pump life.



# 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.

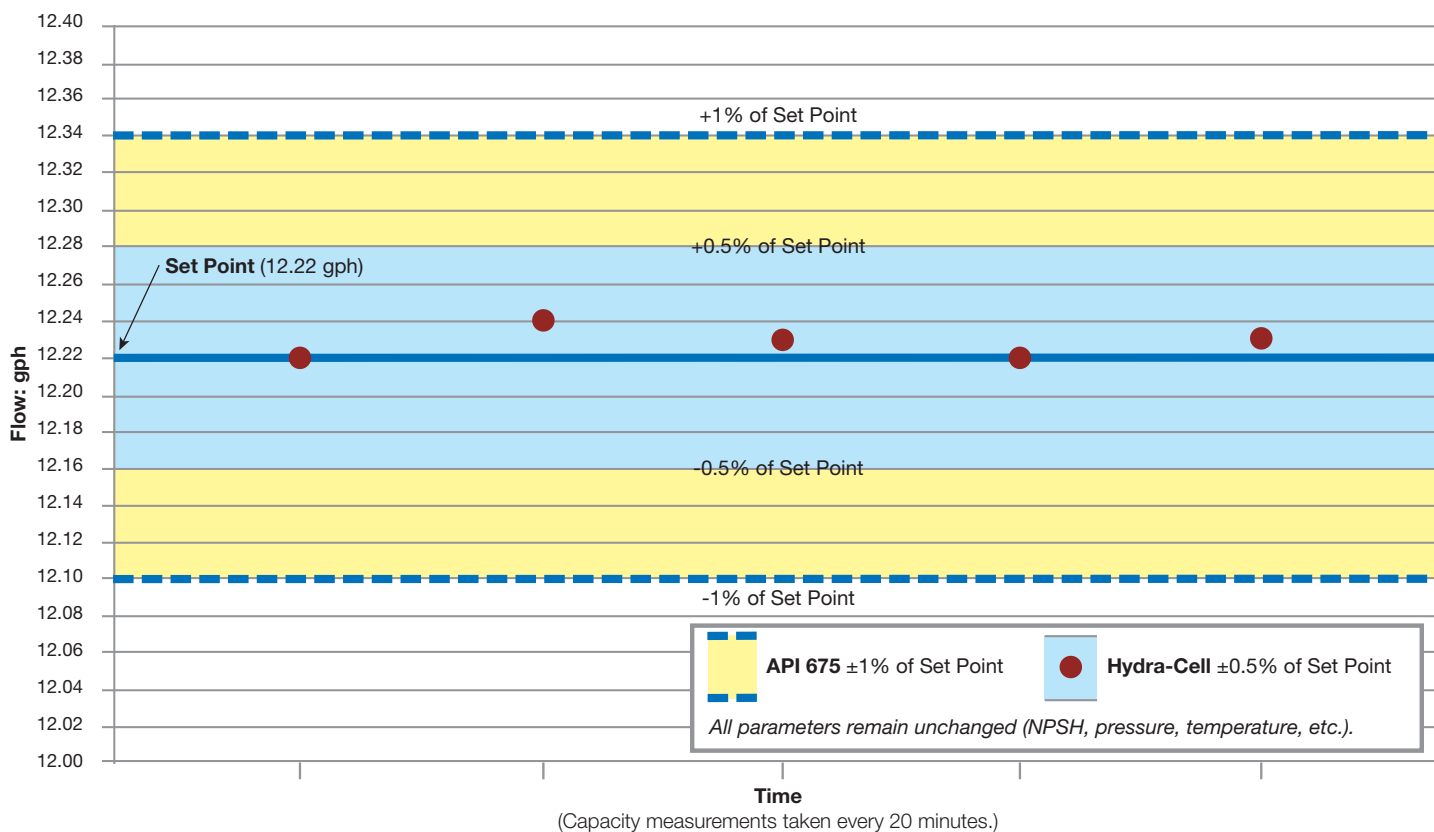
Hydra-Cell Metering Solutions meet or exceed API 675 performance standards by using electronic flow control to improve accuracy and a multiple-diaphragm design to reduce pulsations. Used in precise metering, dosing, injection, and mixing applications, Hydra-Cell pumps provide an economical alternative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

## Operational Data for Testing

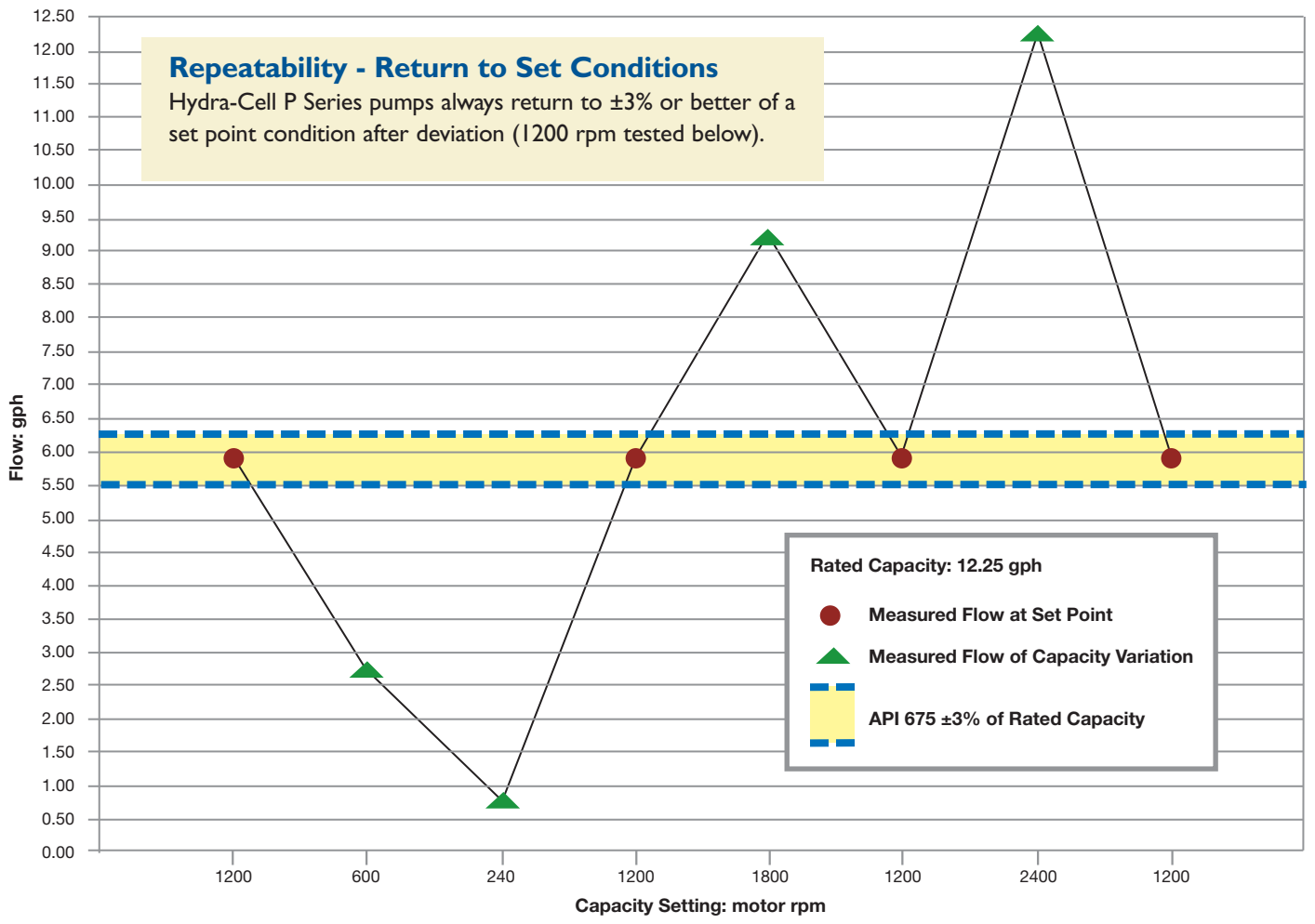
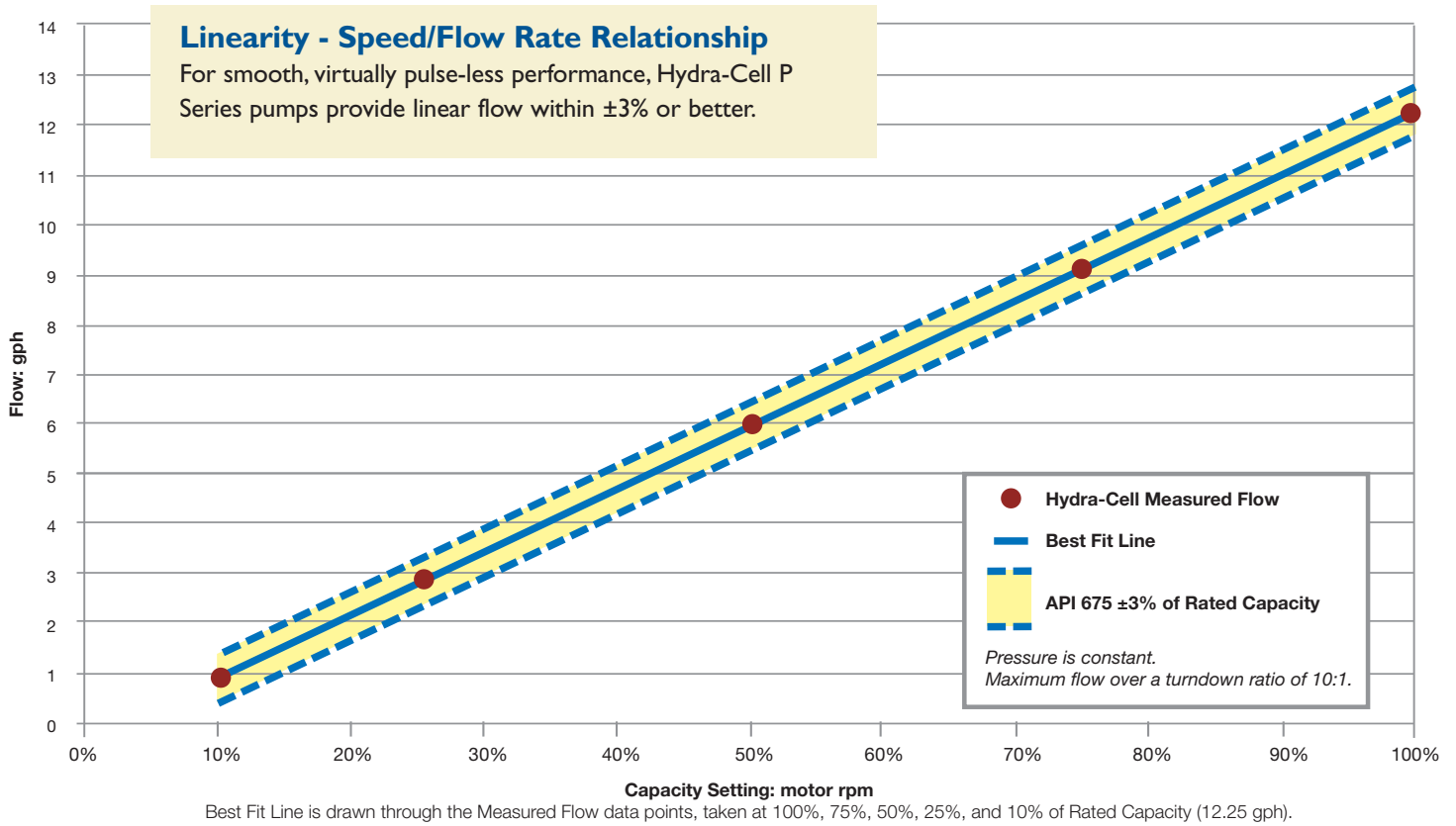
Pump Configuration:	P300NRGSS020S
Reducer:	20:1
Pressure:	1500 psi
Actuating Oil:	10W-30 Hydra-Oil
Ambient Temperature:	71.5°F
Pumped Fluid:	Water @72°F
Gravity Feed:	1-to-3 Feet Positive Head
Franklin IMDS Motor:	240-2400 rpm 1 hp

### Accuracy - Performance at a Set Point

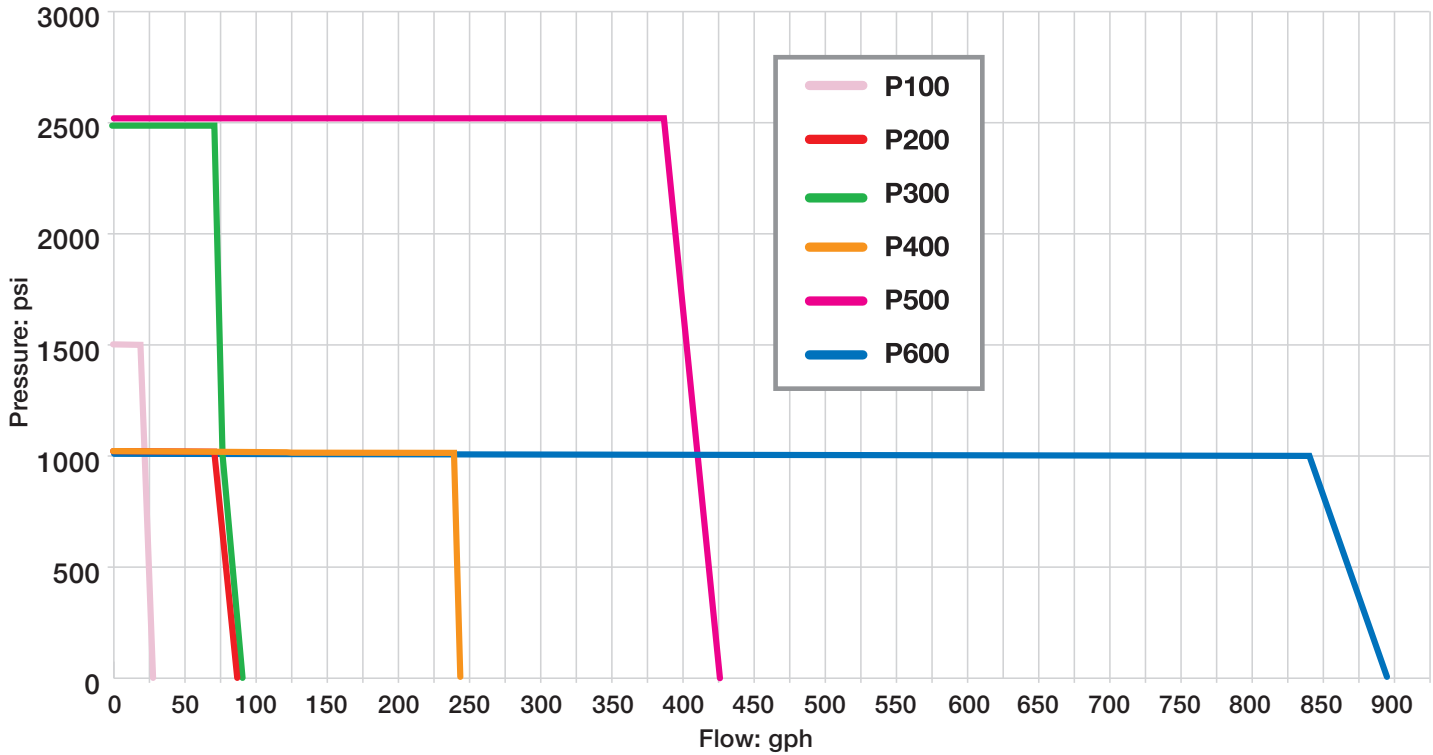
For continuous metering applications, Hydra-Cell P Series pumps provide precise steady-state accuracy of  $\pm 1\%$  or better.







## Hydra-Cell<sup>®</sup> 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 894.6 gph. See page 26 (Hydra-Cell Bare Shaft Pumps) or contact us for more information.

Model <sup>1</sup>	Maximum Capacity (gph)	Maximum Discharge Pressure (psi)		Maximum Operating Temperature (F) <sup>3</sup>		Maximum Inlet Pressure (psi)	Specifications on Pages:
		Non-metallic <sup>2</sup>	Metallic	Non-metallic	Metallic		
P100	26.5	350	1500	140°	250°	250	12-13
P200	80.8	350	1000	140°	250°	250	14-15
P300	82.3	N/A	2500	N/A	250°	500	16-17
P400	243.0	350	1000	140°	250°	250	18-19
P500	426.0	N/A	2500	N/A	250°	500	20-21
P600	894.6	350	1000	140°	250°	250	22-23

<sup>1</sup> Ratings are for X-Cam design.

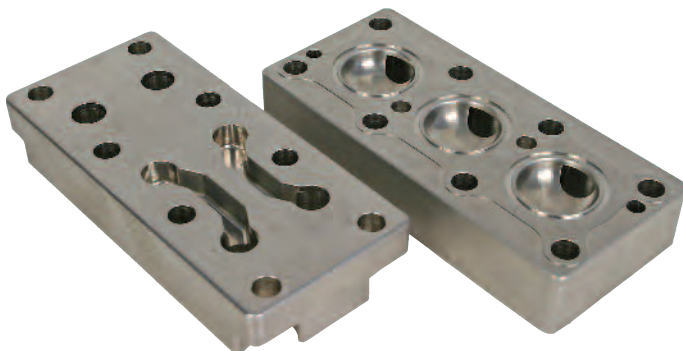
<sup>2</sup> 350 psi maximum with PVDF liquid end; 250 psi maximum with Polypropylene liquid end.

<sup>3</sup> Consult factory for correct component selection for fluid temperatures above 160°F (71°C).

# Special Metering Capabilities & Accessories

## Multiplexing

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. Conventional 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

## Touch-screen Metering Controller

An exclusive new electronic controller provides motor speed control for Hydra-Cell Metering Solutions pumps (or Hydra-Cell bare shaft pumps) with an easy-to-use touch-screen display. The user can enter the desired flow rate or volume in gallons or liters and system pressure in psi or bar, and the controller automatically runs the pump manually at desired flow rate or volume total/time, or in pre-set batches.



- Features 1/2-hp Variable Frequency Drive (VFD) - larger horsepower drives optionally available
- Pre-set (with password protection) for Hydra-Cell pump performance algorithms - can also be field-calibrated for greater accuracy
- 7" color graphic touch-screen user interface in a NEMA-4X enclosure (other enclosures available as option) - easy to operate and visible in low-light areas
- Safety features for emergency stop, loss of power, fault monitoring, and optional pump oil temperature probe
- Pump-drive information screen
- Four configurable on-off relays
- Ten separate batch set-up screens
- Two user-configurable analog input displays
- Analog and digital I/O for interfacing with external devices
- Includes real-time clock
- Option available to control multiple pumps with one Hydra-Cell "Smart Control"
- Versatile - enables programming for flow rate or totalization

## Mesamoll II® Oil

Mesamoll II oil offers outstanding gelling capacity and high saponification resistance along with good dielectric properties and resistance to weathering and light. It is ideal for use with many types of polymers and in instances where it will come into contact with water or an alkali. For information about ordering Hydra-Cell pumps with Mesamoll II oil, contact the factory.



# PI00 Pump Series

Capacities to 26.5 gph - Rated to 1500 psi

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



## Performance\*

### Maximum Flow at Designated Pressure

All Pumps (gph)		Metallic Pump Heads Only (gph)			Pump rpm	Gear Ratio	Motor rpm
100 psi	250 psi	500 psi	1000 psi	1500 psi			
0.66	0.57	0.51	0.32	-	18	100:1	1800
0.82	0.73	0.67	0.48	-	22.5	80:1	
1.10	1.01	0.93	0.73	-	30	60:1	
1.32	1.22	1.14	0.94	-	36	50:1	
1.65	1.55	1.46	1.25	0.35	45	40:1	
2.20	2.10	2.00	1.76	0.85	60	30:1	
2.64	2.53	2.42	2.17	1.26	72	25:1	
3.31	3.18	3.06	2.79	1.86	90	20:1	
4.41	4.27	4.13	3.82	2.87	120	15:1	
6.62	6.45	6.26	5.87	4.88	180	10:1	
8.83	8.63	8.39	7.93	6.89	240	7.5:1	
13.20	12.98	12.64	12.04	10.92	360	5:1	
17.66	17.33	16.90	16.16	14.94	480	7.5:1	
26.50	26.04	25.42	24.38	22.99	720	5:1	

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

### Required Motor hp

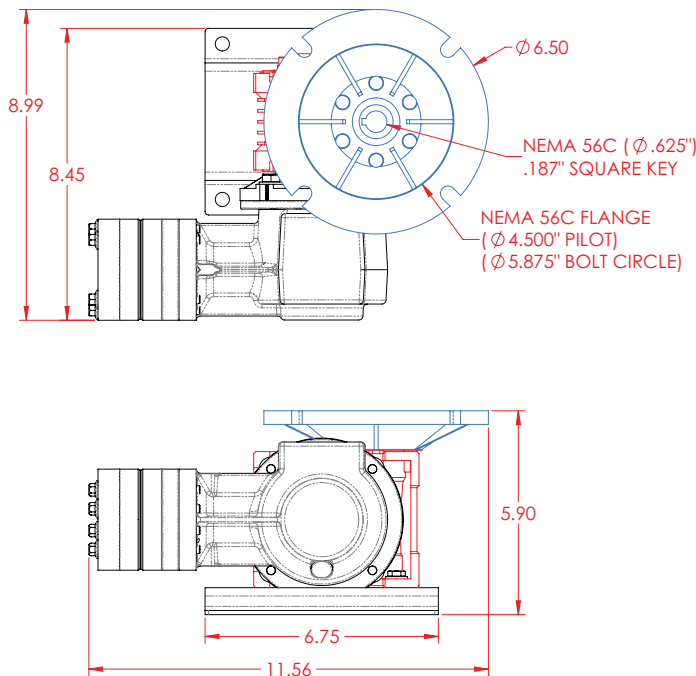
1/4    1/2    3/4

## Pump Data

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

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

## Representative Dimensional Drawings (Inches)



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	I	0	0									

### Pump Model Size (Digits 1-4)

**P100** For all P100 Pumps

### Pump Version (Digit 5)

**N** NPT Ports  
**M** BSPT Ports

### Pump Head Material (Digit 6)

**M** PVDF  
**P** Polypropylene  
**S** 316L Stainless Steel  
**T** Hastelloy C

### Diaphragm & O-ring Material (Digit 7)\*

**E** EPDM  
**G** FKM  
**J** PTFE  
**P** Neoprene  
**T** Buna-N

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

### Check Valve Material (Digits 8-9)

#### (Valve Spring / Valve & Seat)

**SS** 316L SST / 316L SST  
**TT** Hastelloy C / Hastelloy C  
**SC** 316L SST / Ceramic  
**TC** Hastelloy C / Ceramic

### Gearbox Ratio (Digits 10-12)

**100** 100:1 (56C Motor Frame)  
**080** 80:1 (56C Motor Frame)  
**060** 60:1 (56C Motor Frame)  
**050** 50:1 (56C Motor Frame)  
**040** 40:1 (56C Motor Frame)  
**030** 30:1 (56C Motor Frame)  
**025** 25:1 (56C Motor Frame)  
**020** 20:1 (56C Motor Frame)  
**015** 15:1 (56C Motor Frame)  
**010** 10:1 (56C Motor Frame)  
**007** 7.5:1 (56C Motor Frame)  
**005** 5:1 (56C Motor Frame)

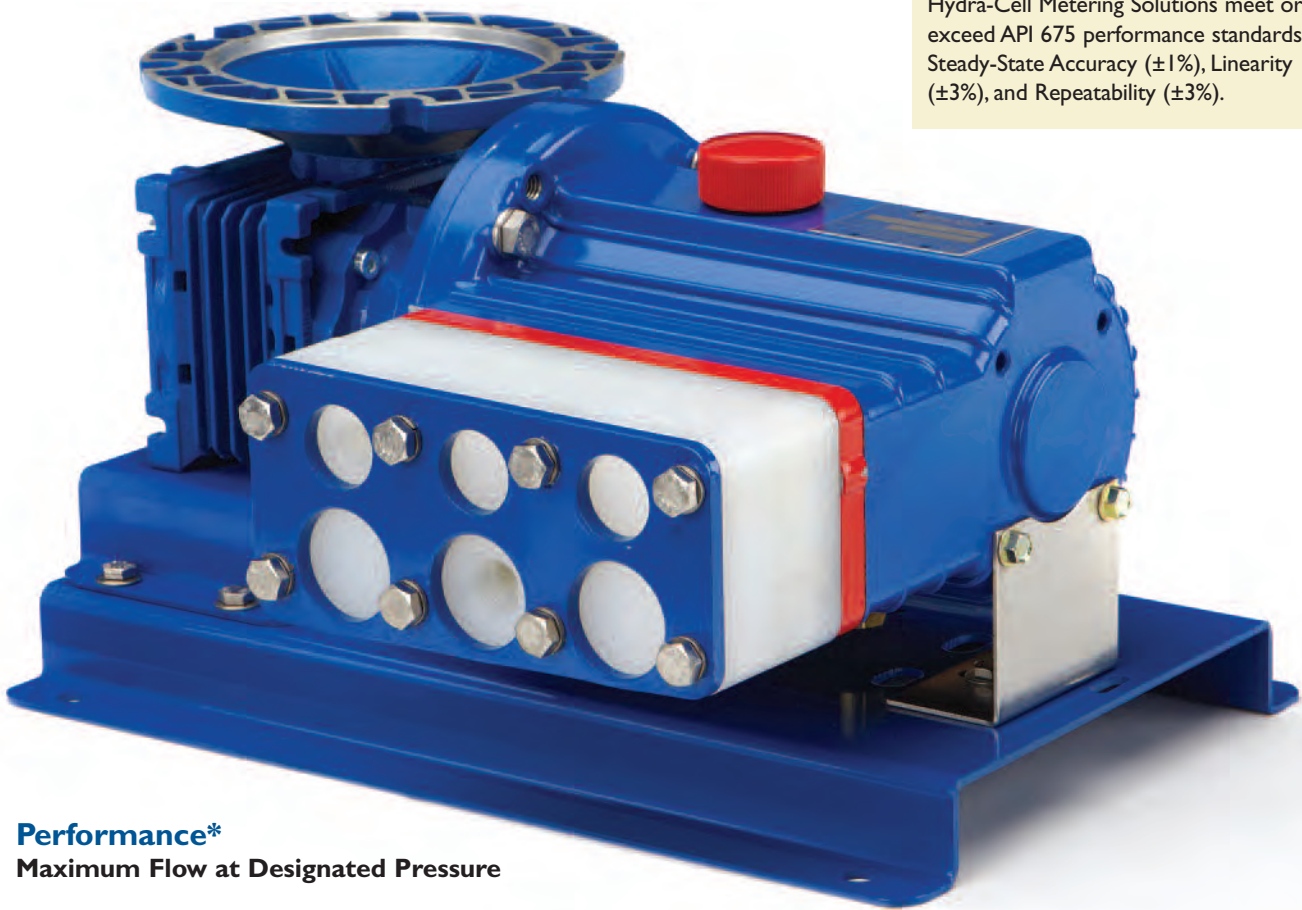
### Base Plate (Digit 13)

**A** Carbon Steel (Epoxy painted)

# P200 Pump Series

Capacities to 80.8 gph - Rated to 1000 psi

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



## Performance\*

Maximum Flow at Designated Pressure

All Pumps (gph)		Metallic Pump Heads Only (gph)		Pump rpm	Gear Ratio	Motor rpm
100 psi	250 psi	500 psi	1000 psi			
1.70	1.60	1.40	0.90	18	100:1	
2.21	2.10	1.90	1.38	22.5	80:1	
3.05	2.94	2.73	2.18	30	60:1	
3.73	3.62	3.39	2.81	36	50:1	
4.74	4.62	4.39	3.77	45	40:1	
6.43	6.30	6.05	5.36	60	30:1	1800
7.78	7.65	7.38	6.64	72	25:1	
9.81	9.67	9.37	8.55	90	20:1	
13.18	13.03	12.69	11.74	120	15:1	
19.94	19.75	19.34	18.12	180	10:1	
26.69	26.47	25.98	24.50	240	7.5:1	
40.20	39.92	39.26	37.25	360	5:1	
53.71	53.36	52.55	50.00	480	7.5:1	3600
80.72	80.25	79.11	75.51	720	5:1	

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

### Required Motor hp

- 1/4
- 1/2
- 3/4
- 1

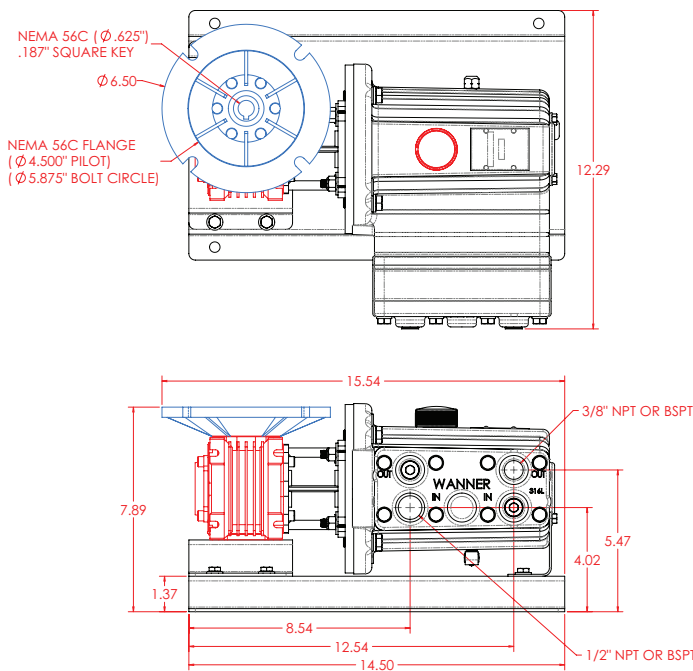


## Pump Data

Diaphragms per Liquid End	3
Flow Control	Electronic variable speed drive
Maximum Discharge Pressure	
Metallic Head:	1000 psi (69 bar)
Non-metallic Head:	PVDF- 350 psi (24 bar) Polypropylene- 250 psi (17 bar)
Maximum Inlet Pressure	250 psi (17 bar)
Maximum Temperature	
Metallic Head:	250°F (121°C)*
Non-metallic Head:	140°F (60°C)
Inlet Port	1/2 inch NPT or BSPT
Discharge Port	3/8 inch NPT or BSPT
Weight (less motor)	
Metallic Head:	39 lbs. (17.7 kg)
Non-metallic Head:	30 lbs. (13.6 kg)
Dimensions (less motor)	
Metallic Head:	15.56" W x 12.23" D x 8.06" H (395 mm W x 311 mm D x 205 mm H)
Non-metallic Head:	15.56" W x 12.61" D x 8.06" H (395 mm W x 320 mm D x 205 mm H)

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

## Representative Dimensional Drawings (Inches)



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)

**N** NPT Ports  
**M** BSPT Ports

### Pump Head Material (Digit 6)

**M** PVDF  
**P** Polypropylene  
**S** 316L Stainless Steel  
**T** Hastelloy CW12MW

### Diaphragm & O-ring Material (Digit 7)\*

**A** Aflas (with PTFE O-rings)  
**M** Aflas (with PTFE O-rings, FKM drive case elastomers and Mesamoll II oil)  
**E** EPDM  
**G** FKM  
**J** PTFE  
**P** Neoprene  
**T** Buna-N

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

### Check Valve Material (Digits 8-9)

#### (Valve Spring / Valve & Seat)

**SS** 316L SST / 316L SST  
**TT** Hastelloy C / Hastelloy C  
**SC** 316L SST / Ceramic  
**TC** Hastelloy C / Ceramic

### Gearbox Ratio (Digits 10-12)

**100** 100:1 (56C Motor Frame)  
**080** 80:1 (56C Motor Frame)  
**060** 60:1 (56C Motor Frame)  
**050** 50:1 (56C Motor Frame)  
**040** 40:1 (56C Motor Frame)  
**030** 30:1 (56C Motor Frame)  
**025** 25:1 (56C Motor Frame)  
**020** 20:1 (56C Motor Frame)  
**015** 15:1 (56C Motor Frame)  
**010** 10:1 (56C Motor Frame)  
**007** 7.5:1 (56C Motor Frame)  
**005** 5:1 (56C Motor Frame)

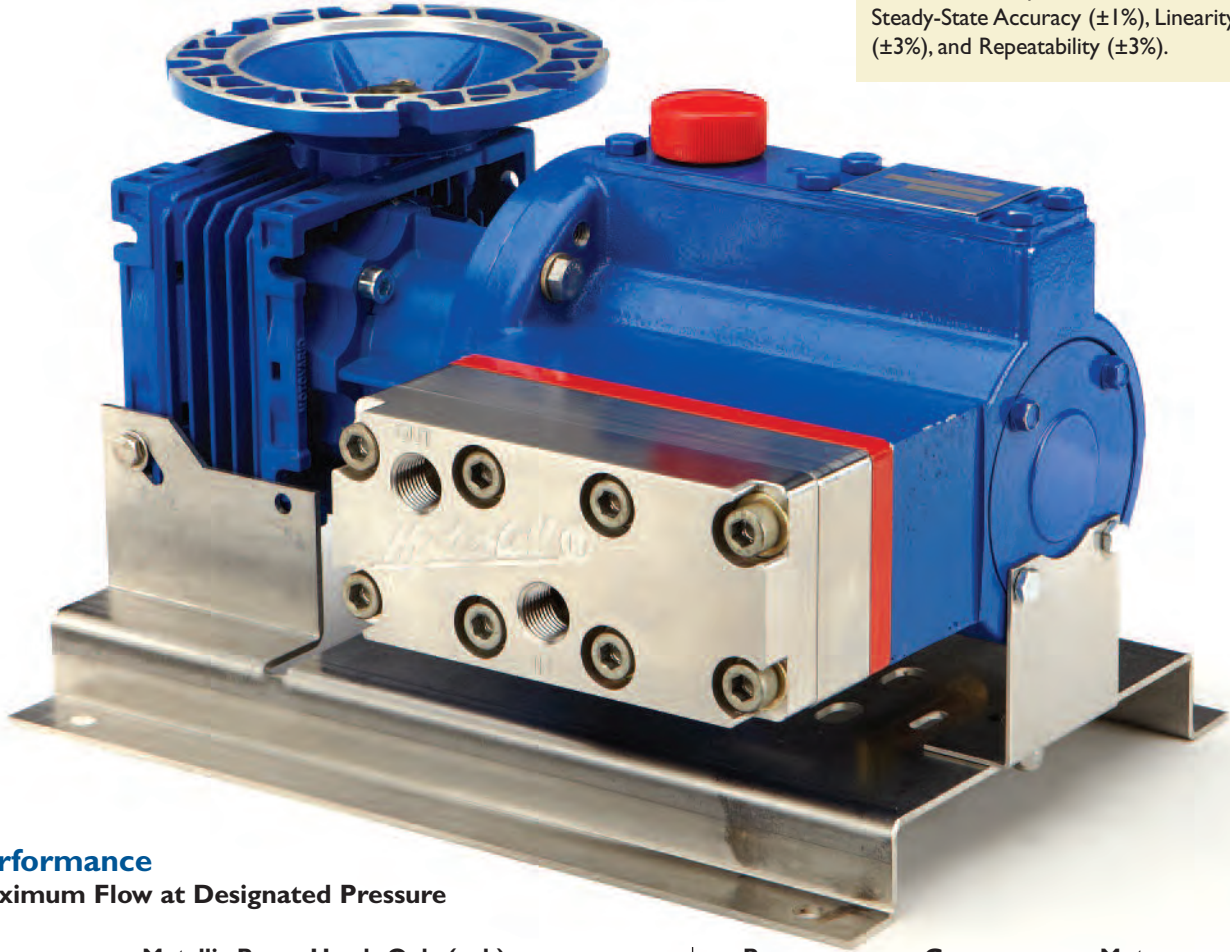
### Base Plate (Digit 13)

**C** Carbon Steel (Epoxy painted)  
**S** Stainless Steel

# P300 Pump Series

Capacities to 82.3 gph - Rated to 2500 psi

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



## Performance

### Maximum Flow at Designated Pressure

100 psi	Metallic Pump Heads Only (gph)			Pump rpm	Gear Ratio	Motor rpm
	500 psi	1500 psi	2500 psi			
2.00	1.85	1.50	1.15	18	100:1	1800
2.51	2.36	1.98	1.60	22.5	80:1	
3.37	3.21	2.79	2.36	30	60:1	
4.06	3.88	3.43	2.97	36	50:1	
5.09	4.89	4.40	3.88	45	40:1	
6.80	6.58	6.01	5.39	60	30:1	
8.17	7.94	7.30	6.60	72	25:1	
10.23	9.62	9.23	8.41	90	20:1	
13.66	13.34	12.46	11.44	120	15:1	
20.52	20.10	18.90	17.50	180	10:1	
27.38	26.86	25.35	23.55	240	7.5:1	
41.10	40.37	38.24	35.67	360	5:1	3600
54.82	53.89	51.13	47.78	480	7.5:1	
82.26	80.91	76.91	72.00	720	5:1	

### Required Motor hp

1/4	1/2	3/4	1
1-1/2	2	3	

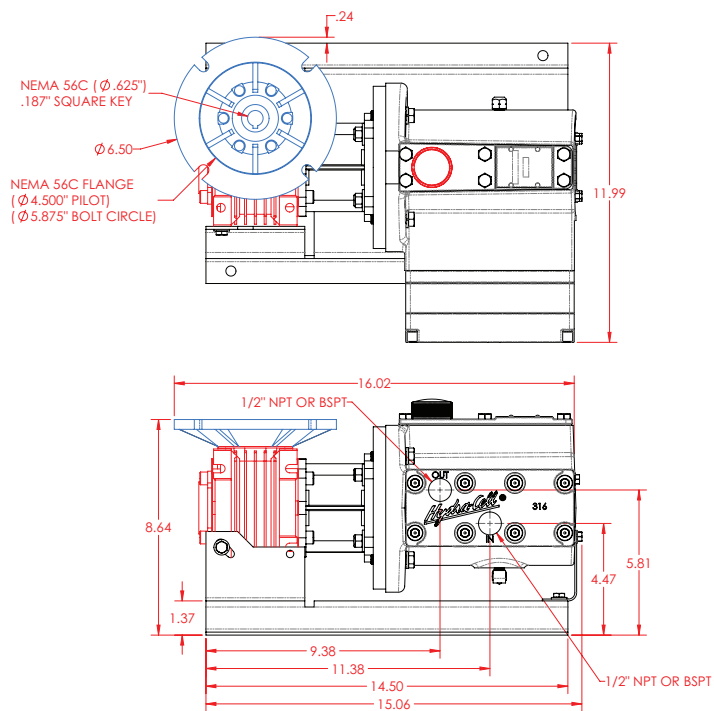
## Pump Data

Diaphragms per Liquid End	3
Flow Control	Electronic variable speed drive
Maximum Discharge Pressure	
Metallic Head:	2500 psi (172 bar)
Maximum Inlet Pressure	500 psi (34 bar)
Maximum Temperature	
Metallic Head:	250°F (121°C)*
Inlet Port	1/2 inch NPT or BSPT
Discharge Port	1/2 inch NPT or BSPT
Weight (less motor)**	
Metallic Head:	51 lbs. (23.2 kg)
Dimensions (less motor)**	
Metallic Head:	16.02" W x 12.23" D x 9.60" H (407 mm W x 311 mm D x 244 mm H)

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

\*\* For 56C motor frame only. Consult factory for other motor frame sizes.

## Representative Dimensional Drawings (Inches)



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	3	0	0									

### Pump Model Size (Digits 1-4)

**P300** For all P300 Pumps

### Pump Version (Digit 5)

**N** NPT Ports  
**M** BSPT Ports

### Pump Head Material (Digit 6)

**R** 304 Stainless Steel  
**S** 316L Stainless Steel

### Diaphragm & O-ring Material (Digit 7)\*

**E** EPDM  
**G** FKM  
**T** Buna-N

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

### Check Valve Material (Digits 8-9)

#### (Valve Spring / Valve & Seat)

**SS** 316L SST / 316L SST

### Gearbox Ratio (Digits 10-12)

<b>100</b>	100:1	(56C Motor Frame)
<b>080</b>	80:1	(56C Motor Frame)
<b>060</b>	60:1	(56C Motor Frame)
<b>050</b>	50:1	(56C Motor Frame)
<b>040</b>	40:1	(56C Motor Frame)
<b>030</b>	30:1	(56C Motor Frame)
<b>025</b>	25:1	(56C Motor Frame)
<b>020</b>	20:1	(56C Motor Frame)
<b>015</b>	15:1	(56C Motor Frame)
<b>010</b>	10:1	(56C Motor Frame)
<b>007</b>	7.5:1	(56C Motor Frame)
<b>A07</b>	7.5:1	(143/145TC Motor Frame)
<b>005</b>	5:1	(56C Motor Frame)
<b>A05</b>	5:1	(143/145TC Motor Frame)

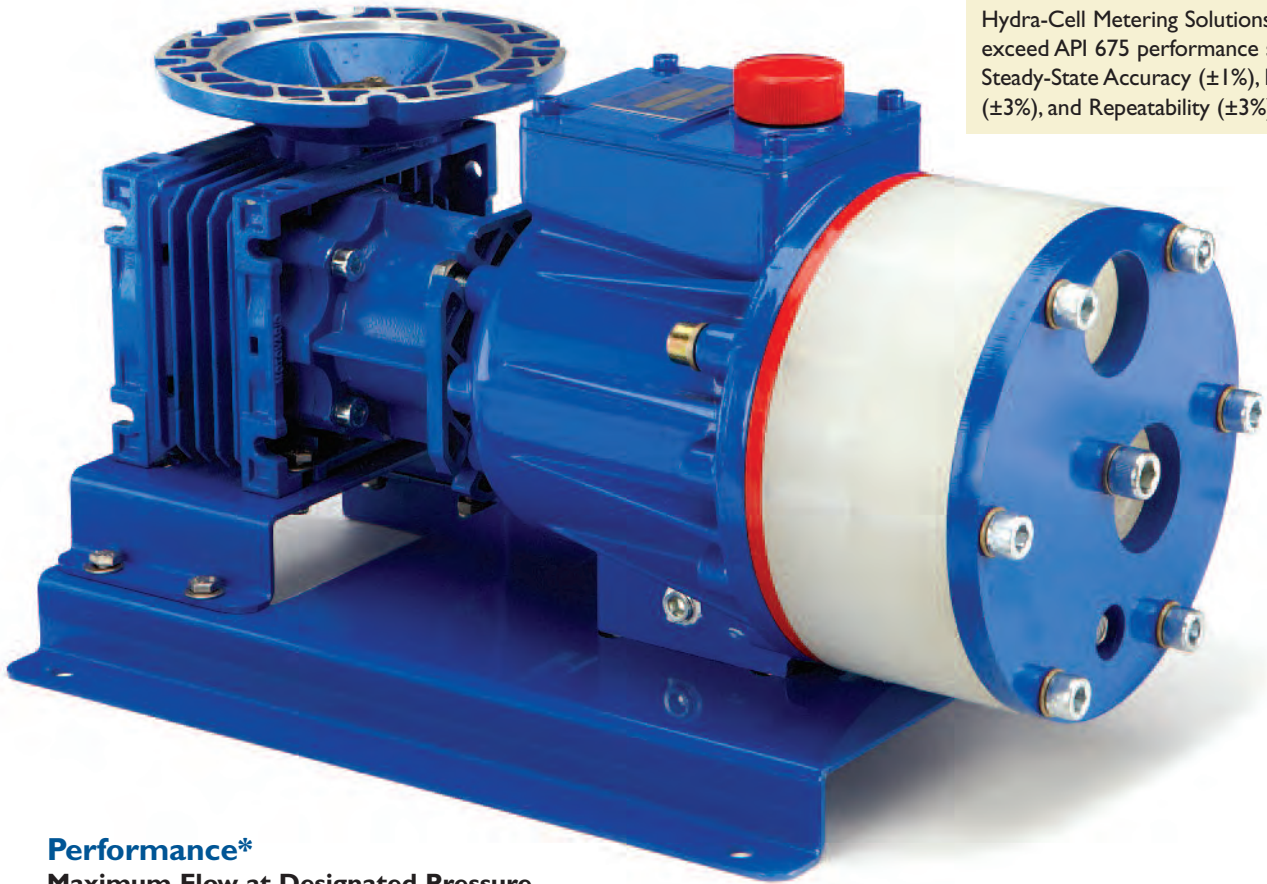
### Base Plate (Digit 13)

**C** Carbon Steel (Epoxy painted)  
**S** Stainless Steel



# P400 Pump Series

Capacities to 243.0 gph - Rated to 1000 psi



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

## Performance\*

Maximum Flow at Designated Pressure

All Pumps (gph)		Metallic Pump Heads Only (gph)		Pump rpm	Gear Ratio	Motor rpm
100 psi	250 psi	500 psi	1000 psi			
5.45	5.40	5.35	5.19	18	100:1	
6.97	6.92	6.86	6.68	22.5	80:1	
9.51	9.45	9.38	9.16	30	60:1	
11.54	11.48	11.40	11.15	36	50:1	
14.59	14.52	14.43	14.13	45	40:1	
19.66	19.59	19.47	19.10	60	30:1	1800
23.72	23.64	23.51	23.07	72	25:1	
29.81	29.72	29.56	29.04	90	20:1	
39.96	39.85	39.65	38.97	120	15:1	
60.27	60.12	59.83	58.84	180	10:1	
80.57	80.38	80.00	78.71	240	7.5:1	
121.2	120.9	120.4	118.5	360	5:1	
161.8	161.4	160.7	158.2	480	7.5:1	3600
243.0	242.5	241.4	237.7	720	5:1	

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

### Required Motor hp

1/4	1/2	3/4	1
1-1/2	2	3	

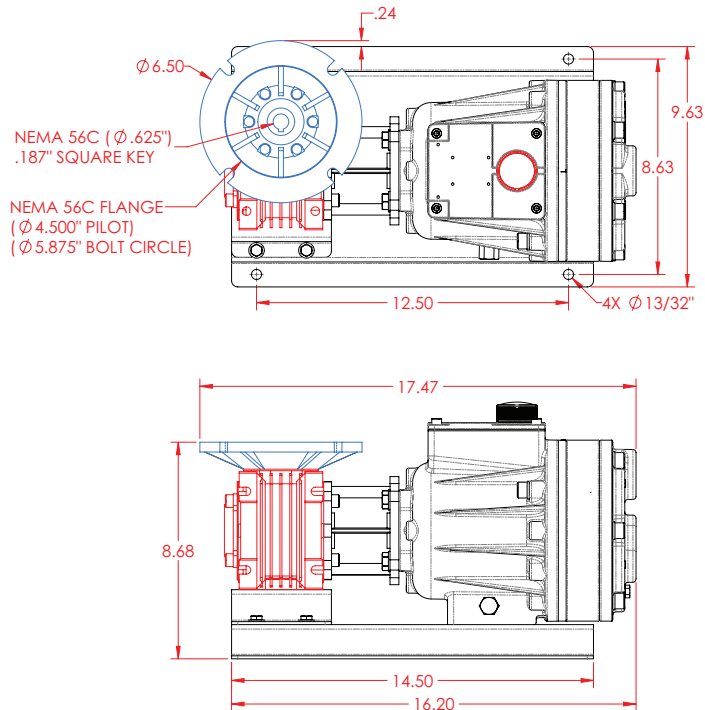
## Pump Data

Diaphragms per Liquid End	3
Flow Control	Electronic variable speed drive
Maximum Discharge Pressure	
Metallic Head:	1000 psi (69 bar)
Non-metallic Head:	PVDF- 350 psi (24 bar) Polypropylene- 250 psi (17 bar)
Maximum Inlet Pressure	250 psi (17 bar)
Maximum Temperature	
Metallic Head:	250°F (121°C)*
Non-metallic Head:	140°F (60°C)
Inlet Port	1 inch NPT or BSPT
Discharge Port	3/4 inch NPT or BSPT
Weight (less motor)**	
Metallic Head:	62 lbs. (28.1 kg)
Non-metallic Head:	49 lbs. (22.2 kg)
Dimensions (less motor)**	
Metallic Head:	17.59" W x 9.87" D x 10.34" H (447 mm W x 251 mm D x 263 mm H)
Non-metallic Head:	18.19" W x 9.87" D x 10.34" H (462 mm W x 251 mm D x 263 mm H)

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

\*\* For 56C motor frame only. Consult factory for other motor frame sizes.

## Representative Dimensional Drawings (Inches)



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)

**N** NPT Ports  
**M** BSPT Ports

### Pump Head Material (Digit 6)

**C** Cast Iron  
**M** PVDF  
**P** Polypropylene  
**S** 316L Stainless Steel  
**T** Hastelloy CW12MW

### Diaphragm & O-ring Material (Digit 7)\*

**E** EPDM  
**G** FKM  
**J** PTFE  
**P** Neoprene  
**T** Buna-N

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

### Check Valve Material (Digits 8-9)

#### (Valve Spring / Valve & Seat)

**SS** 316L SST / 316L SST  
**TT** Hastelloy C / Hastelloy C  
**SC** 316L SST / Ceramic  
**TC** Hastelloy C / Ceramic

### Gearbox Ratio (Digits 10-12)

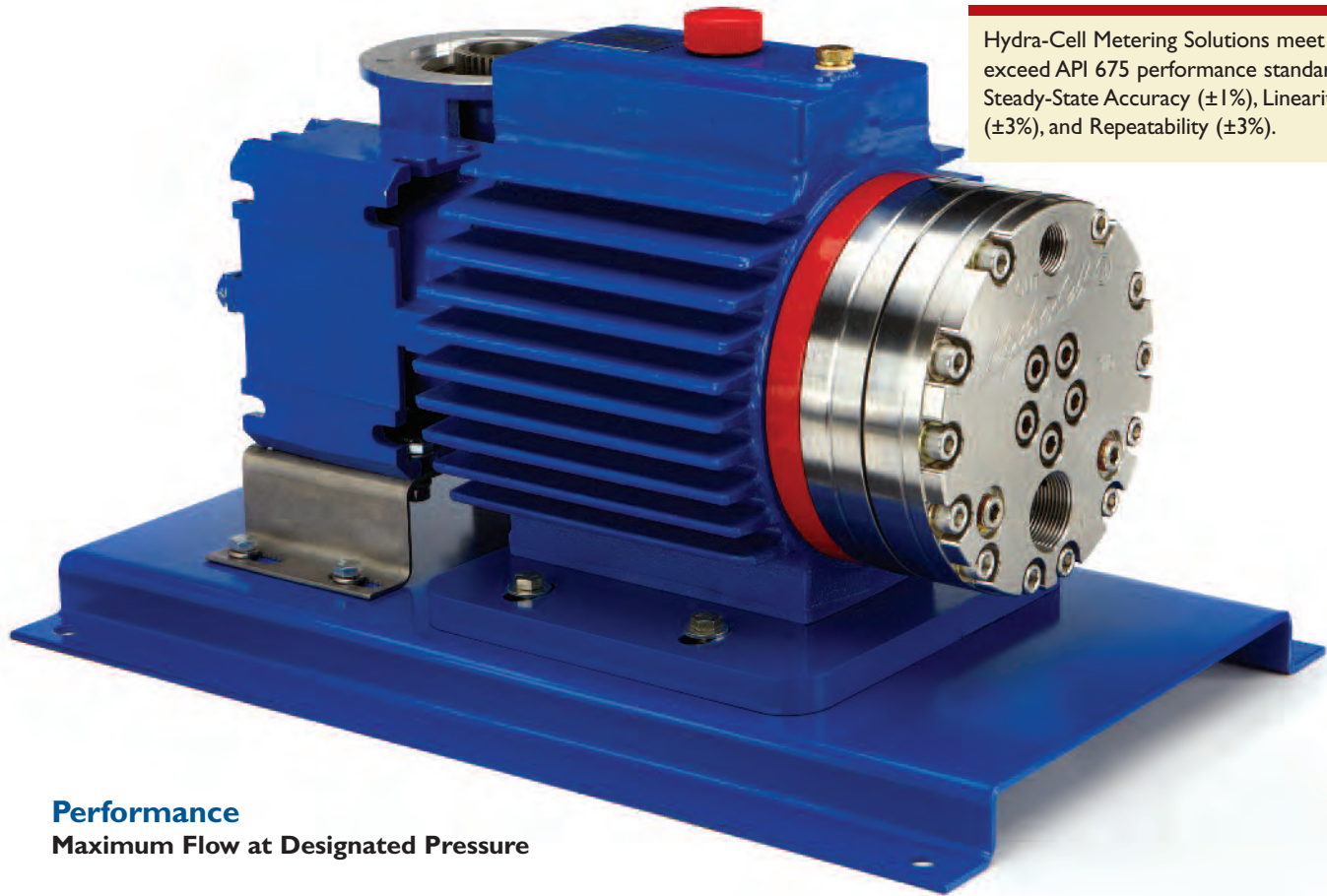
<b>100</b>	100:1	(56C Motor Frame)
<b>080</b>	80:1	(56C Motor Frame)
<b>060</b>	60:1	(56C Motor Frame)
<b>050</b>	50:1	(56C Motor Frame)
<b>040</b>	40:1	(56C Motor Frame)
<b>030</b>	30:1	(56C Motor Frame)
<b>025</b>	25:1	(56C Motor Frame)
<b>020</b>	20:1	(56C Motor Frame)
<b>015</b>	15:1	(56C Motor Frame)
<b>010</b>	10:1	(56C Motor Frame)
<b>007</b>	7.5:1	(56C Motor Frame)
<b>A07</b>	7.5:1	(143/145TC Motor Frame)
<b>005</b>	5:1	(56C Motor Frame)
<b>A05</b>	5:1	(143/145TC Motor Frame)

### Base Plate (Digit 13)

**C** Carbon Steel (Epoxy painted)  
**S** Stainless Steel

# P500 Pump Series

Capacities to 426.0 gph - Rated to 2500 psi



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

## Performance

### Maximum Flow at Designated Pressure

Metallic Pump Heads Only (gph)				Pump rpm	Gear Ratio	Motor rpm
100 psi	500 psi	1500 psi	2500 psi			
11.74	11.26	10.25	9.47	18	100:1	1800
14.39	13.89	12.79	11.89	22.5	80:1	
18.82	18.27	17.02	15.92	30	60:1	
22.36	21.78	20.41	19.15	36	50:1	
27.67	27.03	25.49	23.99	45	40:1	
36.52	35.80	33.95	32.06	60	30:1	
43.60	42.81	40.73	38.52	72	25:1	
54.22	53.32	50.89	48.20	90	20:1	
71.93	70.84	67.82	64.34	120	15:1	
107.3	105.9	101.7	96.62	180	10:1	
142.7	140.9	135.5	128.9	240	7.5:1	3600
213.6	211.0	203.3	193.5	360	5:1	
284.4	281.1	271.0	258.0	480	7.5:1	
426.0	421.3	406.5	387.1	720	5:1	

### Required Motor hp

1/4	1/2	3/4	1	1-1/2	2
3	5	7-1/2	10	15	

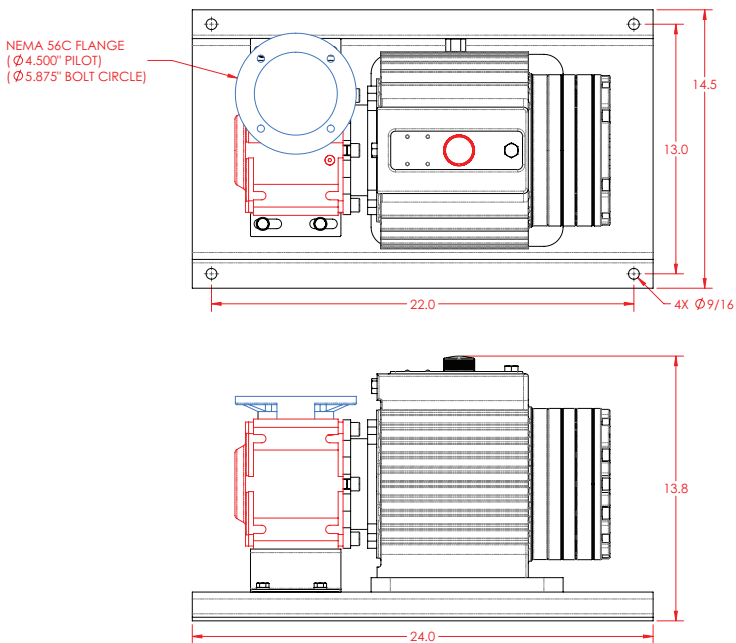
## Pump Data

Diaphragms per Liquid End	5
Flow Control	Electronic variable speed drive
Maximum Discharge Pressure	
Metallic Head:	2500 psi (172 bar)
Maximum Inlet Pressure	500 psi (34 bar)
Maximum Temperature	
Metallic Head:	250°F (121°C)*
Inlet Port	1-1/4 inch NPT or BSPT
Discharge Port	3/4 inch NPT or BSPT
Weight (less motor)**	
Metallic Head:	160 lbs. (72.6 kg)
Dimensions (less motor)**	
Metallic Head:	19.2" W x 10.7" D x 12.4" H (488 mm W x 272 mm D x 315 mm H)

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

\*\* For 56C motor frame only. Consult factory for other motor frame sizes.

## Representative Dimensional Drawings (Inches)



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)

**N** NPT Ports  
**M** BSPT Ports

### Pump Head Material (Digit 6)

**S** 316L Stainless Steel  
**T** Hastelloy C

### Diaphragm & O-ring Material (Digit 7)\*

**G** FKM      \* See price list for different actuating oils available with these materials.  
**T** Buna-N

### Check Valve Material (Digits 8-9)

#### (Valve Spring / Valve & Seat)

**SS** 316L SST / 316L SST  
**TT** Hastelloy C / Hastelloy C

### Gearbox Ratio (Digits 10-12)

<b>100</b>	100:1	(56C Motor Frame)
<b>080</b>	80:1	(56C Motor Frame)
<b>060</b>	60:1	(56C Motor Frame)
<b>050</b>	50:1	(56C Motor Frame)
<b>040</b>	40:1	(56C Motor Frame)
<b>A40</b>	40:1	(143/145TC Motor Frame)
<b>030</b>	30:1	(56C Motor Frame)
<b>A30</b>	30:1	(143/145TC Motor Frame)
<b>025</b>	25:1	(56C Motor Frame)
<b>A25</b>	25:1	(143/145TC Motor Frame)
<b>020</b>	20:1	(56C Motor Frame)
<b>A20</b>	20:1	(143/145TC Motor Frame)
<b>015</b>	15:1	(56C Motor Frame)
<b>A15</b>	15:1	(143/145TC Motor Frame)
<b>B15</b>	15:1	(182/184TC Motor Frame)
<b>010</b>	10:1	(56C Motor Frame)
<b>A10</b>	10:1	(143/145TC Motor Frame)
<b>B10</b>	10:1	(182/184TC Motor Frame)
<b>007</b>	7.5:1	(56C Motor Frame)
<b>A07</b>	7.5:1	(143/145TC Motor Frame)
<b>B07</b>	7.5:1	(182/184TC Motor Frame)
<b>C07</b>	7.5:1	(213/215TC Motor Frame)
<b>005</b>	5:1	(56C Motor Frame)
<b>A05</b>	5:1	(143/145TC Motor Frame)
<b>B05</b>	5:1	(182/184TC Motor Frame)
<b>C05</b>	5:1	(213/215TC Motor Frame)
<b>D05</b>	5:1	(254/256TC Motor Frame)

### Base Plate (Digit 13)

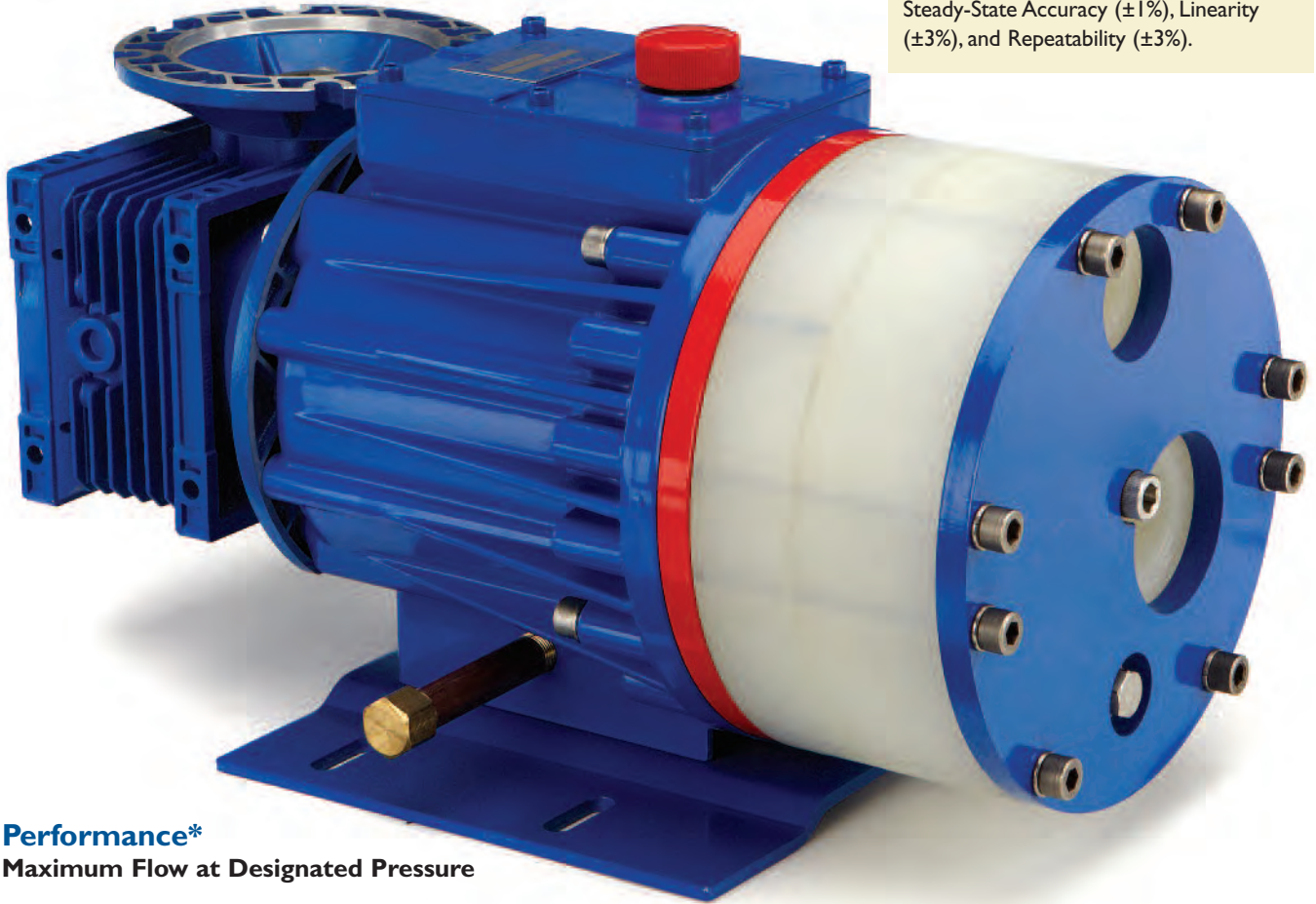
**A** Aluminum (Epoxy painted)  
**H** Carbon Steel (Epoxy painted)  
for B, C and D reducers



# P600 Pump Series

Capacities to 894.6 gph - Rated to 1000 psi

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



## Performance\*

Maximum Flow at Designated Pressure

All Pumps (gph)		Metallic Pump Heads Only (gph)		Pump rpm	Gear Ratio	Motor rpm
100 psi	250 psi	500 psi	1000 psi			
22.43	22.27	21.89	20.77	18	100:1	
28.03	27.79	27.31	26.05	22.5	80:1	
37.34	36.99	36.34	34.84	30	60:1	
44.80	44.35	43.57	41.87	36	50:1	
55.98	55.39	54.40	52.42	45	40:1	
74.62	73.79	72.46	70.01	60	30:1	1800
89.52	88.51	86.91	84.07	72	25:1	
111.9	110.6	108.6	105.2	90	20:1	
149.2	147.4	144.7	140.3	120	15:1	
223.7	221.0	216.9	210.7	180	10:1	
298.2	294.6	289.2	281.0	240	7.5:1	
447.3	441.8	433.7	421.7	360	5:1	
596.4	589.0	578.1	562.4	480	7.5:1	3600
894.6	883.4	867.1	843.7	720	5:1	

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

### Required Motor hp

1/4	1/2	3/4	1	1-1/2
2	3	5	7-1/2	10

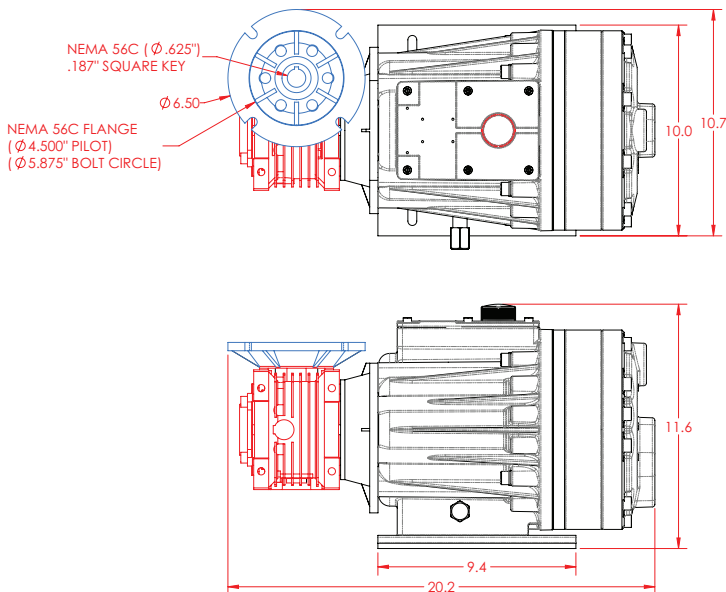
## Pump Data

Diaphragms per Liquid End	3
Flow Control	Electronic variable speed drive
Maximum Discharge Pressure	
Metallic Head:	1000 psi (69 bar)
Non-metallic Head:	PVDF- 350 psi (24 bar) Polypropylene- 250 psi (17 bar)
Maximum Inlet Pressure	250 psi (17 bar)
Maximum Temperature	
Metallic Head:	250°F (121°C)*
Non-metallic Head:	140°F (60°C)
Inlet Port	1-1/2 inch NPT or BSPT
Discharge Port	1 inch NPT or BSPT
Weight (less motor)**	
Metallic Head:	141 lbs. (64 kg)
Non-metallic Head:	106 lbs. (48 kg)
Dimensions (less motor)**	
Metallic Head:	21.0" W x 10.7" D x 11.2" H (533 mm W x 272 mm D x 285 mm H)
Non-metallic Head:	21.8" W x 10.7" D x 11.2" H (554 mm W x 272 mm D x 285 mm H)

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

\*\* For 56C motor frame only. Consult factory for other motor frame sizes.

## Representative Dimensional Drawings (Inches)



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)

**N** NPT Ports  
**M** BSPT Ports

### Pump Head Material (Digit 6)

**C** Cast Iron  
**M** PVDF  
**P** Polypropylene  
**S** 316L Stainless Steel  
**T** Hastelloy CW12MW

### Diaphragm & O-ring Material (Digit 7)\*

**E** EPDM \* See price list for different actuating oils available with these materials.  
**G** FKM  
**J** PTFE  
**P** Neoprene  
**T** Buna-N

### Check Valve Material (Digits 8-9)

#### (Valve Spring / Valve & Seat)

**SS** 316L SST / 316L SST  
**TT** Hastelloy C / Hastelloy C  
**SC** 316L SST / Ceramic  
**TC** Hastelloy C / Ceramic

### Gearbox Ratio (Digits 10-12)

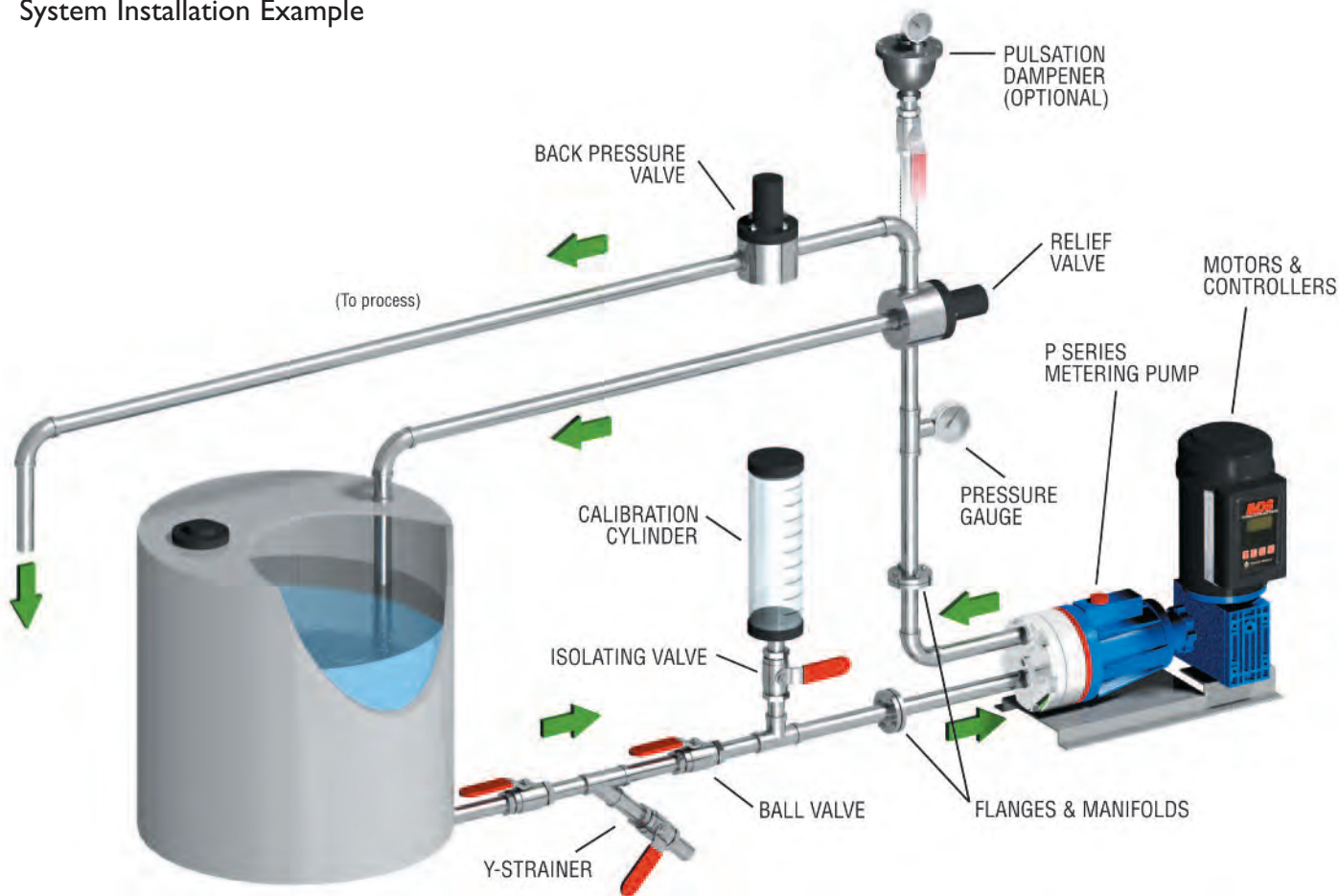
<b>100</b>	100:1	(56C Motor Frame)
<b>080</b>	80:1	(56C Motor Frame)
<b>060</b>	60:1	(56C Motor Frame)
<b>050</b>	50:1	(56C Motor Frame)
<b>040</b>	40:1	(56C Motor Frame)
<b>A40</b>	40:1	(143/145TC Motor Frame)
<b>030</b>	30:1	(56C Motor Frame)
<b>A30</b>	30:1	(143/145TC Motor Frame)
<b>025</b>	25:1	(56C Motor Frame)
<b>A25</b>	25:1	(143/145TC Motor Frame)
<b>020</b>	20:1	(56C Motor Frame)
<b>A20</b>	20:1	(143/145TC Motor Frame)
<b>015</b>	15:1	(56C Motor Frame)
<b>A15</b>	15:1	(143/145TC Motor Frame)
<b>010</b>	10:1	(56C Motor Frame)
<b>A10</b>	10:1	(143/145TC Motor Frame)
<b>B10</b>	10:1	(182/184TC Motor Frame)
<b>007</b>	7.5:1	(56C Motor Frame)
<b>A07</b>	7.5:1	(143/145TC Motor Frame)
<b>B07</b>	7.5:1	(182/184TC Motor Frame)
<b>C07</b>	7.5:1	(213/215TC Motor Frame)
<b>005</b>	5:1	(56C Motor Frame)
<b>A05</b>	5:1	(143/145TC Motor Frame)
<b>B05</b>	5:1	(182/184TC Motor Frame)
<b>C05</b>	5:1	(213/215TC Motor Frame)

### Base Plate (Digit 13)

**C** Carbon Steel (Epoxy painted)  
**H** Carbon Steel (Epoxy painted)  
for B and C reducers

## Hydra-Cell<sup>®</sup> System Options & Accessories

System Installation Example

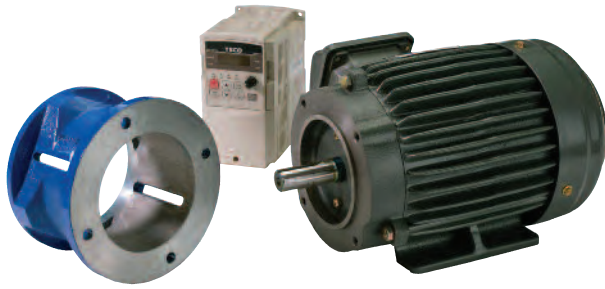


Hydra-Cell pumps are just one facet of a complete Hydra-Cell “Metering Solutions” system. We can furnish all components in your pumping system, individually tailored to your specific processing needs. For complete details, contact Hydra-Cell, your Hydra-Cell sales representative, or Hydra-Cell distributor.

- Calibration Cylinders
- Back Pressure Valves
- Pressure Relief Valves
- Pulsation Dampeners
- Motors - Motor Adapters - VFD - 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 Customization



**Motor Adapters - VFD - Controllers - Motors**



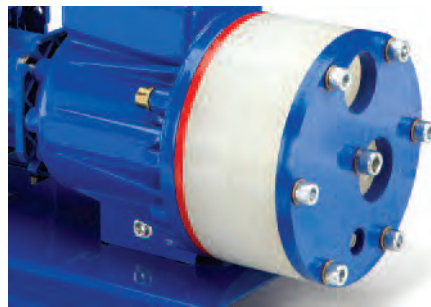
**Custom Motor Controller**



**Variety of Diaphragm & O-ring Materials**



**Metallic or Non-metallic  
Liquid End & Check Valve Materials**



**OEM Paint & Nameplate Customization  
Available**



**Pressure Relief & Back Pressure Valves**



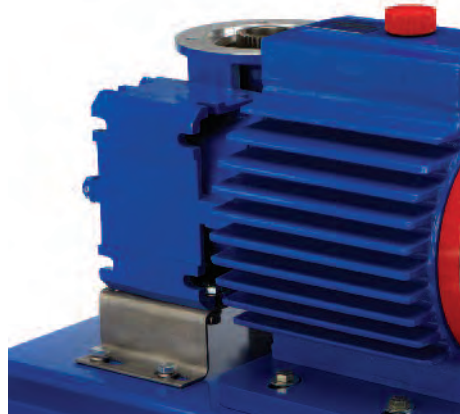
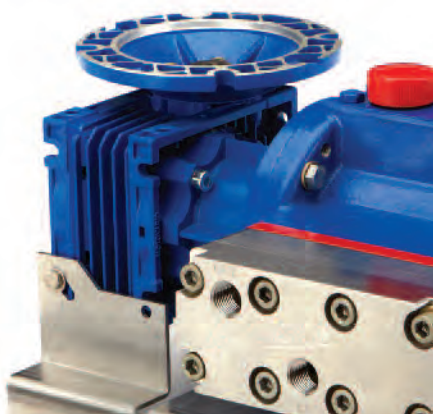
**Pulsation Dampeners**



**PVC or Glass Calibration Cylinders**



**Different Gearbox Ratios**





## Hydra-Cell<sup>®</sup> Bare Shaft Pumps for Metering



675 performance standards at the rated maximum rpm shown 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:

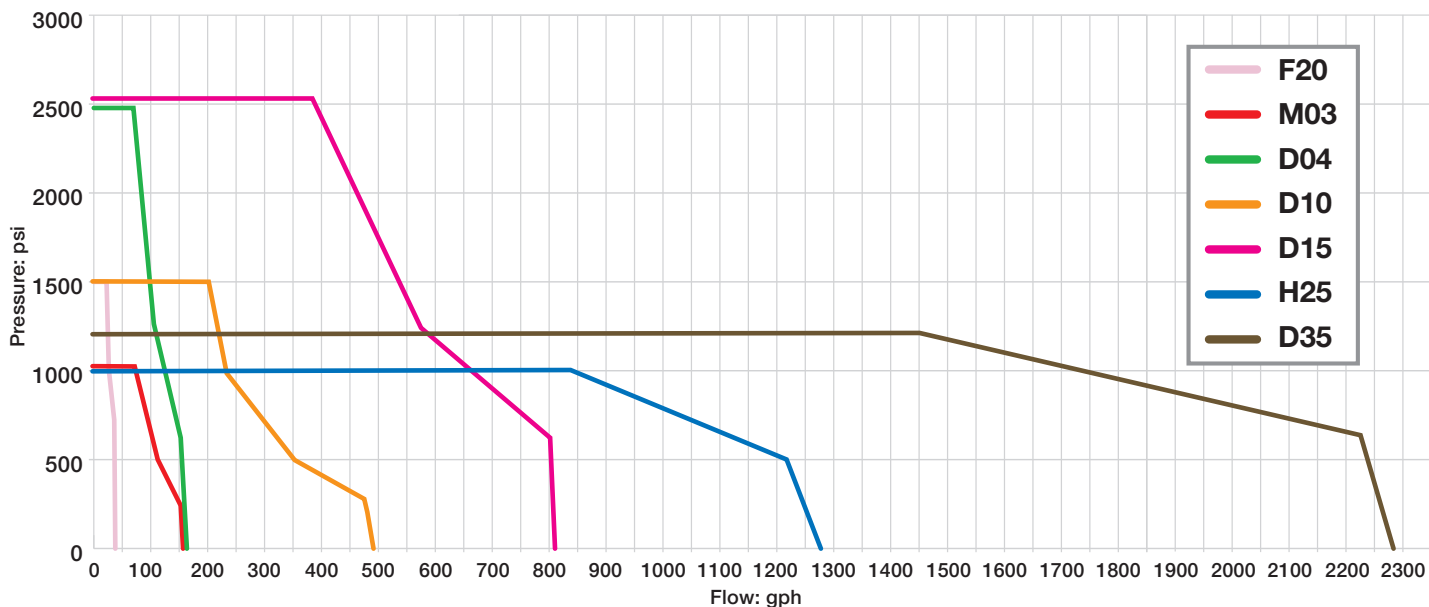
- Flow capacities required exceed those of Hydra-Cell Metering Solutions pumps (see page 10)
- Space or application parameters dictate the use of direct or belt drives
- Acquisition cost is the primary consideration

In certain less critical metering and injecting applications, Hydra-Cell pumps without the gear reducers (bare shaft pumps) provide an alternative to P Series metering pumps as they meet API

### Capacities & Ratings

Model*	Maximum Capacity (gph)	Maximum Discharge Pressure (psi)		Maximum Operating Temperature (F)		Maximum Inlet Pressure (psi)	Rated rpm for Metering
		Non-metallic	Metallic	Non-metallic	Metallic		
F20	36.6	350	1500	140°	250°	250	1050
M03	155.4	350	1000	140°	250°	250	1440
D04	156.6	N/A	2500	N/A	250°	500	1440
D10	246.0	N/A	1500	N/A	250°	250	790
D10	492.0	350	1000	140°	250°	250	1440
D15	813.0	N/A	2500	N/A	250°	500	1440
H25	1278.0	350	1000	140°	250°	250	1050
D35	2280.0	350	1200	140°	250°	250	1050

\* Ratings are for X-Cam design



# Hydra-Cell® Worldwide Sales & Service



Hydra-Cell pumps are sold and serviced worldwide by a comprehensive network of factory-trained pump distributors. As specialists in pump technologies, our distributor organizations offer you a vital local resource for technical expertise, product training, sales and service.

Hydra-Cell distributors are located in more than 60 countries worldwide. In North America specifically, there are more than 100 Hydra-Cell distributor locations to provide local availability for every major industrial marketplace.

**Contact us for the distributor location nearest you.**

- |                |             |                      |
|----------------|-------------|----------------------|
| Algeria        | Indonesia   | Russia               |
| Argentina      | Ireland     | Saudi Arabia         |
| Australia      | Israel      | Singapore            |
| Austria        | Italy       | Slovakia             |
| Belarus        | Japan       | South Africa         |
| Belgium        | Kazakhstan  | Spain                |
| Brazil         | Korea       | Sweden               |
| Bulgaria       | Kuwait      | Switzerland          |
| Canada         | Latvia      | Taiwan               |
| China          | Lithuania   | Thailand             |
| Czech Republic | Malaysia    | Tunisia              |
| Denmark        | Mexico      | Turkey               |
| Egypt          | Morocco     | Ukraine              |
| Estonia        | Netherlands | United Arab Emirates |
| Finland        | New Zealand | United Kingdom       |
| France         | Norway      | United States        |
| Germany        | Oman        | Uruguay              |
| Greece         | Poland      | Venezuela            |
| Hong Kong      | Portugal    | Viet-Nam             |
| Hungary        | Puerto Rico | Yemen                |
| Iceland        | Qatar       |                      |
| India          | Romania     |                      |

# Hydra·Cell<sup>®</sup>

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