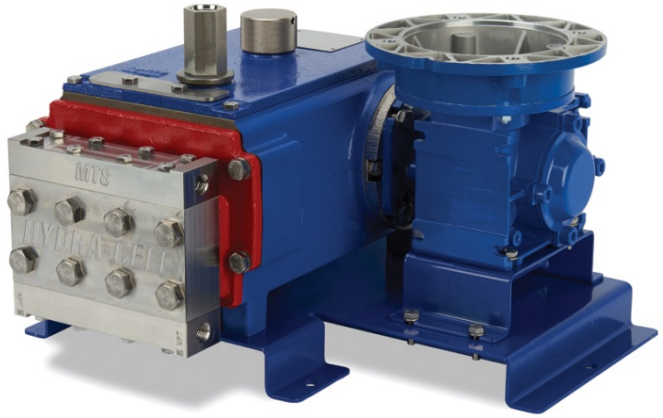
MT8 METERING PUMP



October 31, 2017

What is a metering pump?

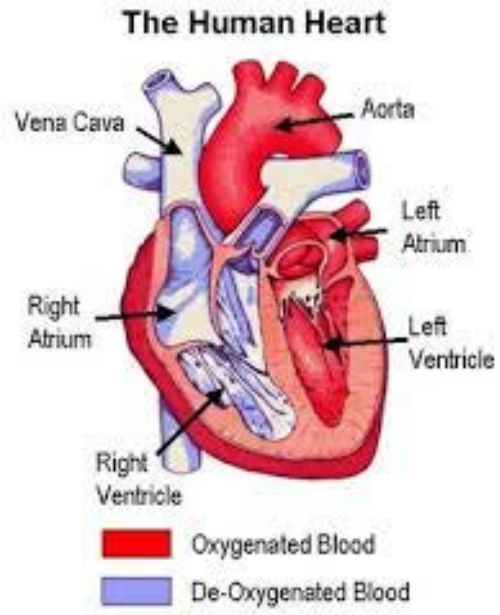
A **metering pump** moves a precise volume of liquid in a specified time period providing an accurate flow rate. Delivery of fluids in precise adjustable flow rates is sometimes called **metering**.

The term "**metering pump**" is based on the application or use rather than the exact kind of pump used, although some types of pumps are far more suitable than most other types of pumps.[1]

[1]From Wikipedia

What is a metering pump?

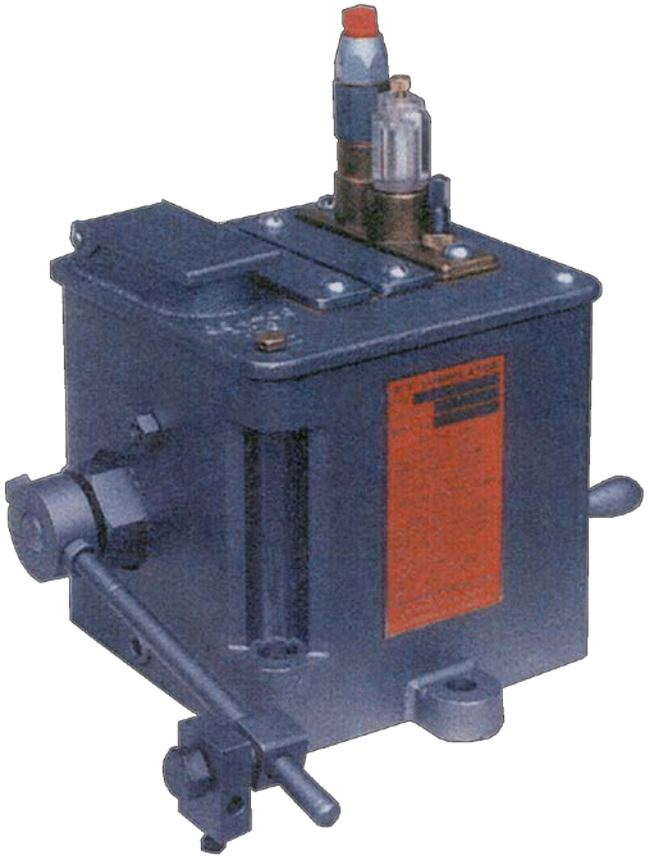
Each of us has one with us right now.



What is a metering pump?

The first metering pump was actually a lubricator, designed 150 years ago by Hills-McCanna, to oil the metal chains on steamboats.

Pictured here is its descendent.



What is a metering pump?

- A metering pump is an essential component of many industries today.
- As new processes emerge and higher levels of accuracy are required, metering pumps are becoming necessary in many different phases of production.
- Metering pumps should be used whenever a process requires more than a transfer of fluid. This could mean the pumpage of a fixed amount of fluid into an ongoing process or a varying amount of fluid controlled by the needs of an ongoing process.

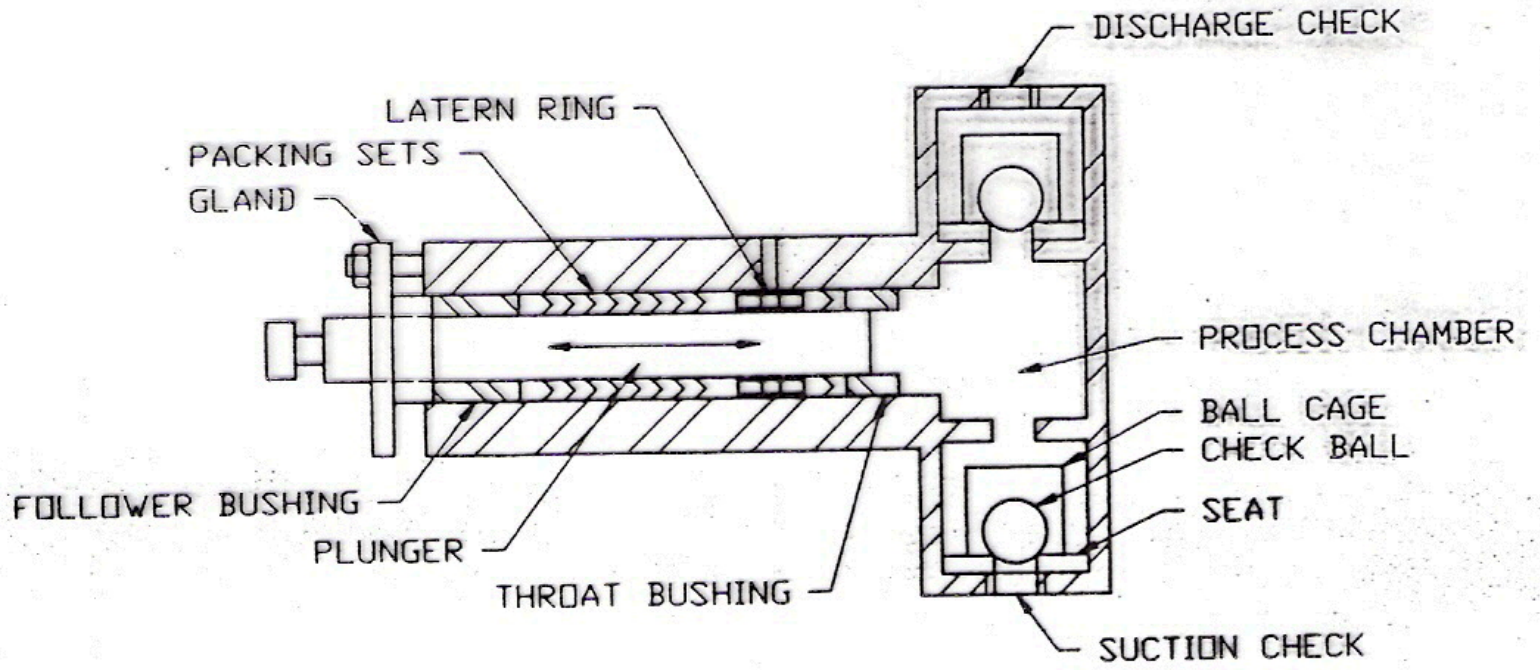
What is a metering pump?

- Metering pump technology has not changed dramatically in the past few decades
- Hydra-Cell's Metering Solutions Pump group has introduced new technology into the metering pump world
- The MT8 pump is our latest innovation – we want to introduce it to you and explain what makes it unique

What is a metering pump?

Metering pumps can be classified as:

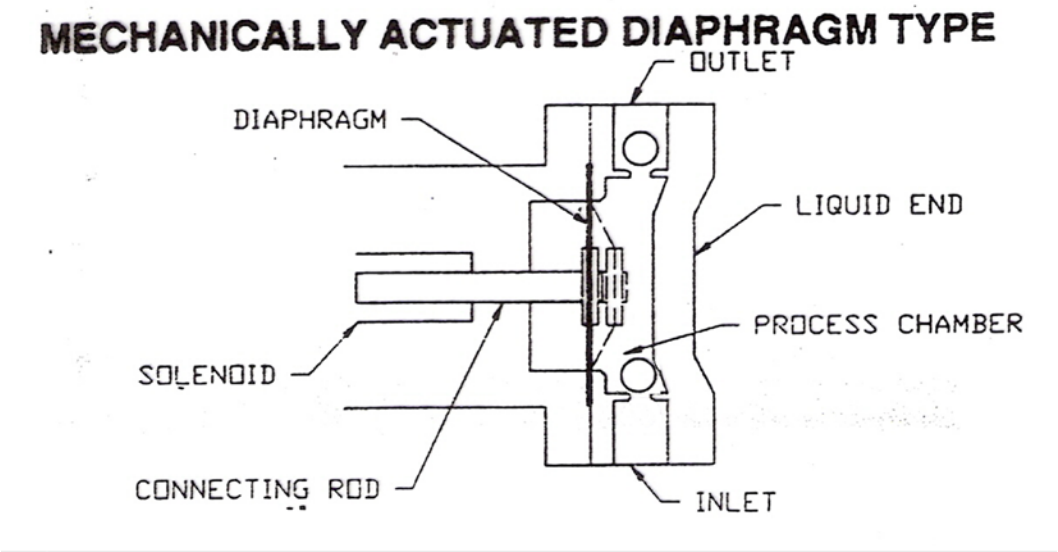
- Plunger type – where the plunger comes in direct contact with the process fluid



What is a metering pump?

Metering pumps can be classified as:

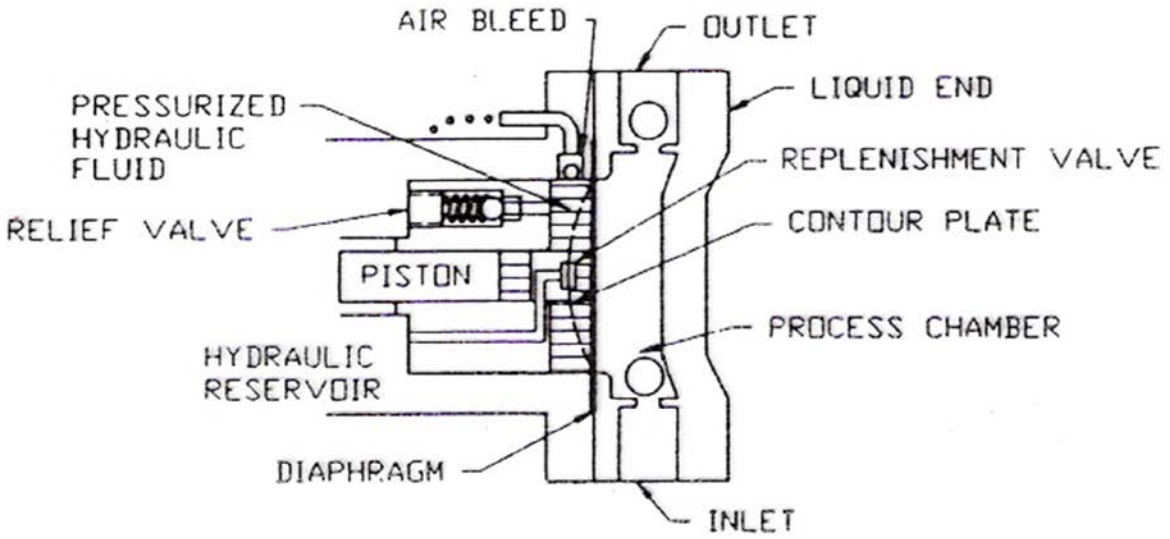
- Mechanically-actuated (Solenoid or Motor Drive) type – where an electromagnet or motor/worm gear/cam reciprocate a piston connected to a diaphragm



What is a metering pump?

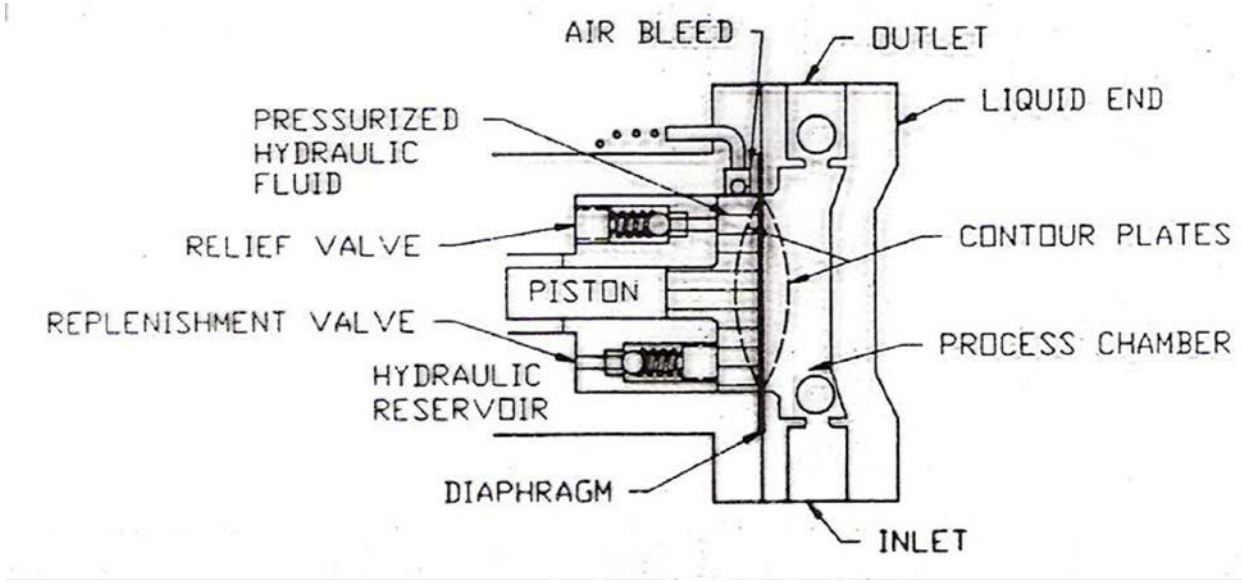
Metering pumps can be classified as:

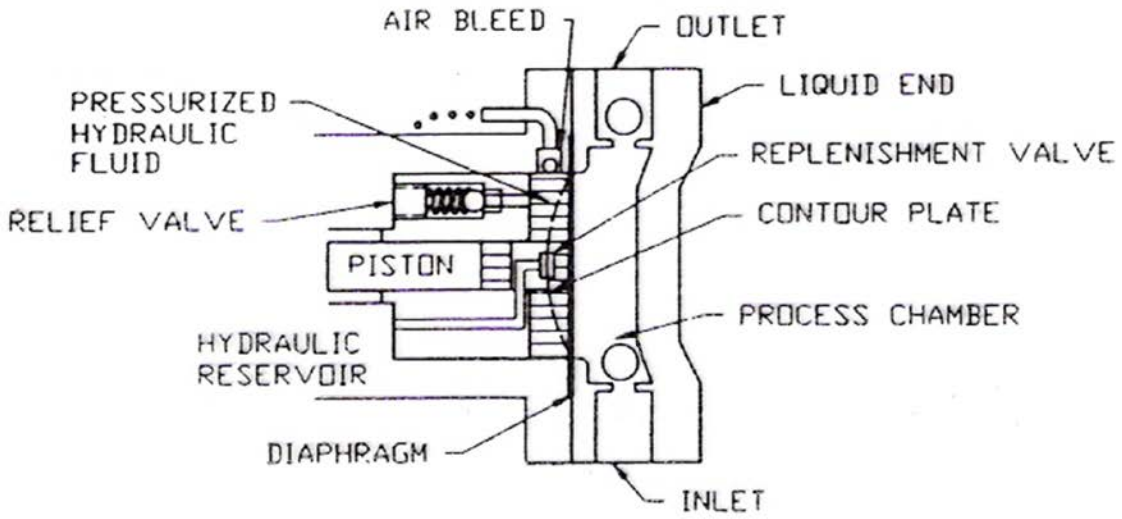
- Hydraulically-actuated/balanced diaphragm type – where hydraulic oil replaces the mechanical connection of the piston to the diaphragm and the oil displaced by the piston actuates the diaphragm



What is a metering pump?

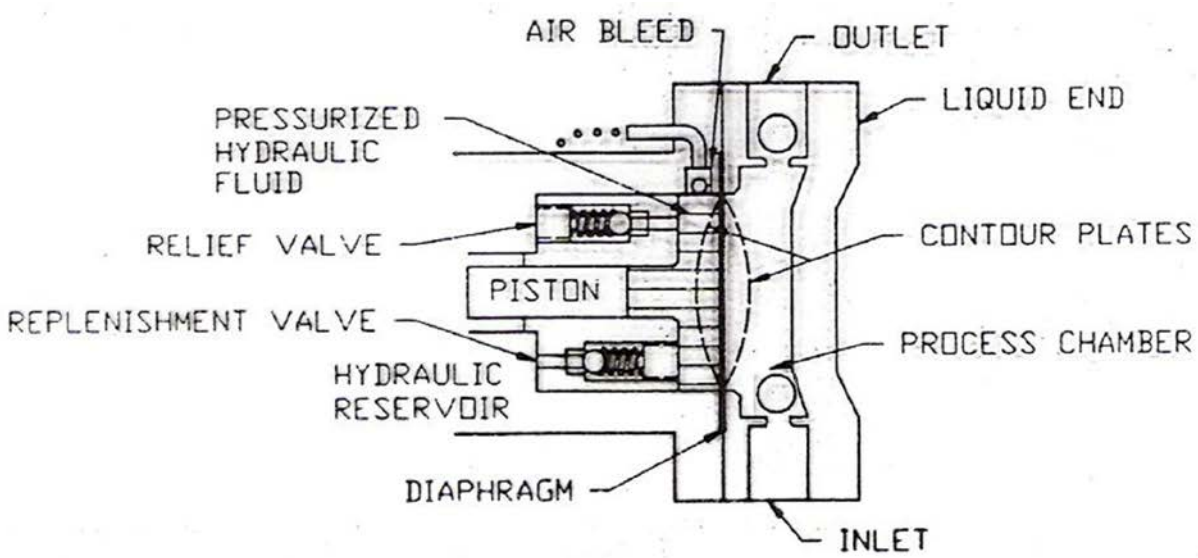
Hydraulically actuated/balanced metering pumps require replenishment of the actuating oil lost through air bleed and leakage along the piston to maintain accuracy. This is accomplished in two ways:



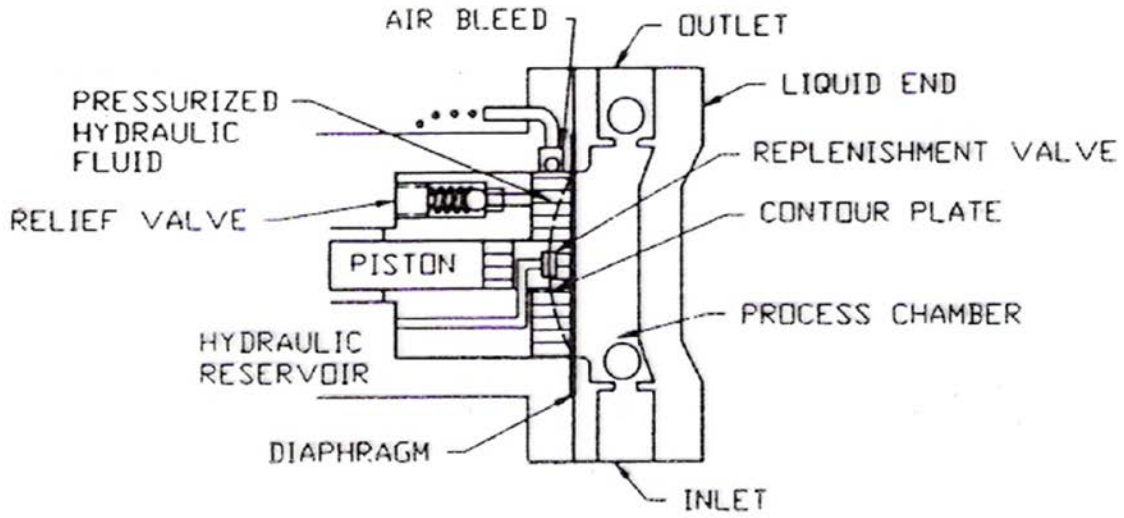


What is a metering pump?

Vacuum Replenishment Type



Mechanical Replenishment Type



What is a metering pump?

How often and how well a pump replenishes the actuating fluid has a significant impact on the accuracy of the pump.

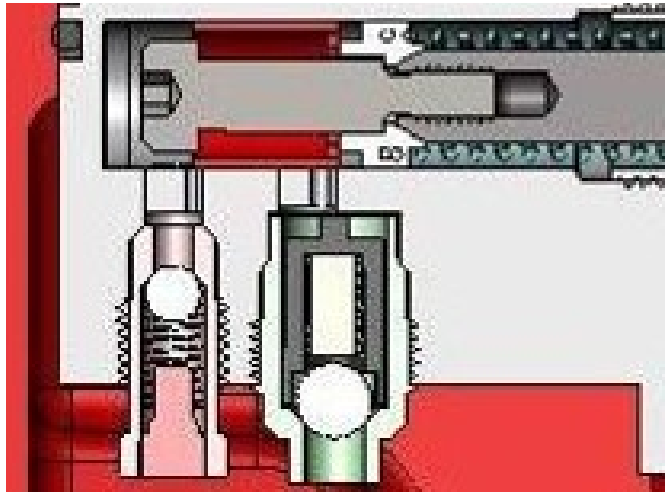
With both of these methods, replenishment does not occur until a vacuum is sensed in the liquid end or a mechanical valve is opened by a fully-retracted diaphragm.

Why is this important?

The MT8 features a replenishment system that compensates for any decrease in actuating fluid on every stroke, ensuring optimum accuracy.

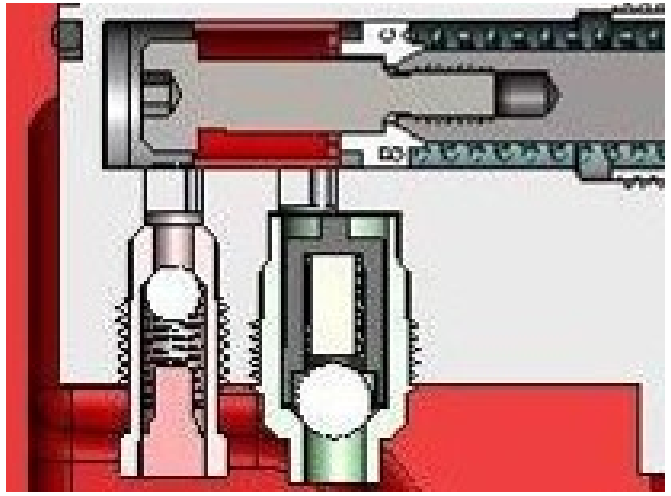
Hydra-Cell MT8 Technology Advantages

This patented replenishment system not only maintains accuracy which exceeds API 675 performance requirements, but also provides diaphragm protection. It prevents the diaphragm from moving too far forward or backward, protecting the pump from damage in blocked suction conditions.



Hydra-Cell MT8 Technology Advantages

And…the pump can run dry indefinitely without damage!



Hydra-Cell MT8 Technology Advantages

The single diaphragm movement causes significant pulsation and creates a slug-like delivery of process fluid

Why is this important?

The MT8 features a triplex diaphragm design in one liquid end which creates virtually “pulse-free” linear flow

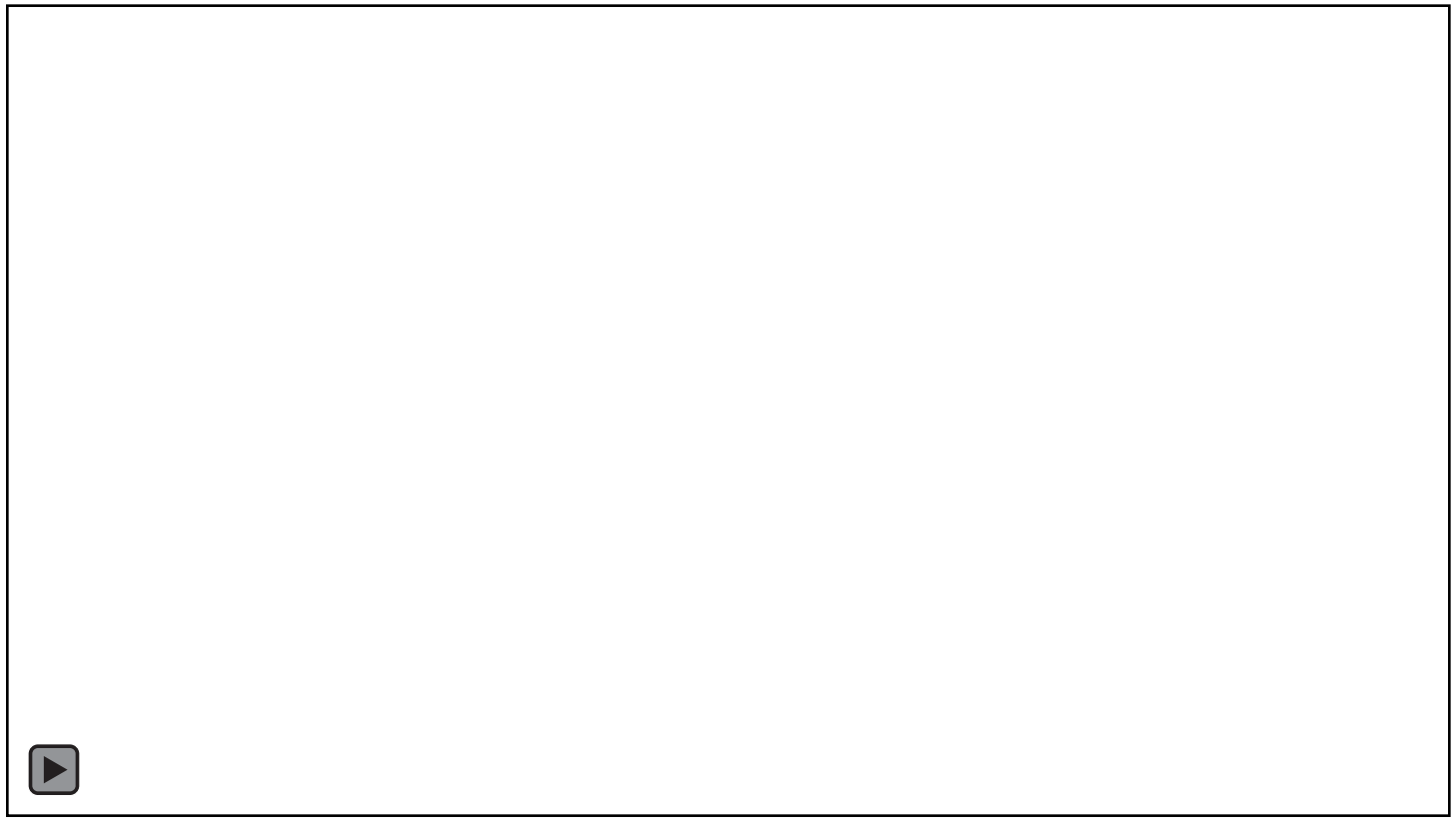
Hydra-Cell MT8 Technology Advantages

Minimizing or eliminating pulsations in metering pumps is significant because pulsations:

- May require the purchase and maintenance of large, expensive dampeners
- Create safety and housekeeping issues
- Cause friction losses
- Increase noise levels, especially in lost motion pump designs that feature metal to metal contact
- Result in process fluid flows that are slugs which average out to a specific gph

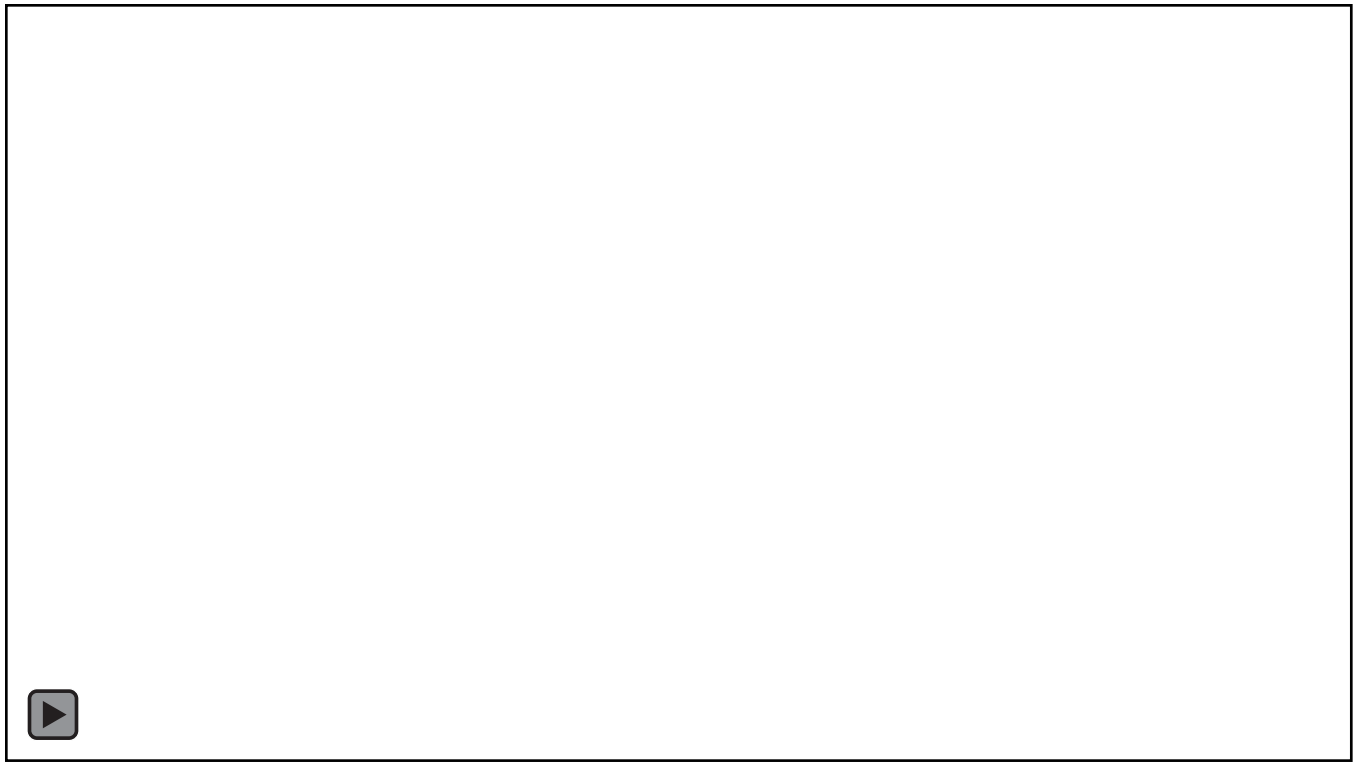
Hydra-Cell MT8 Technology Advantages

The triplex design of the MT8 minimizes the negative effects of pulsation



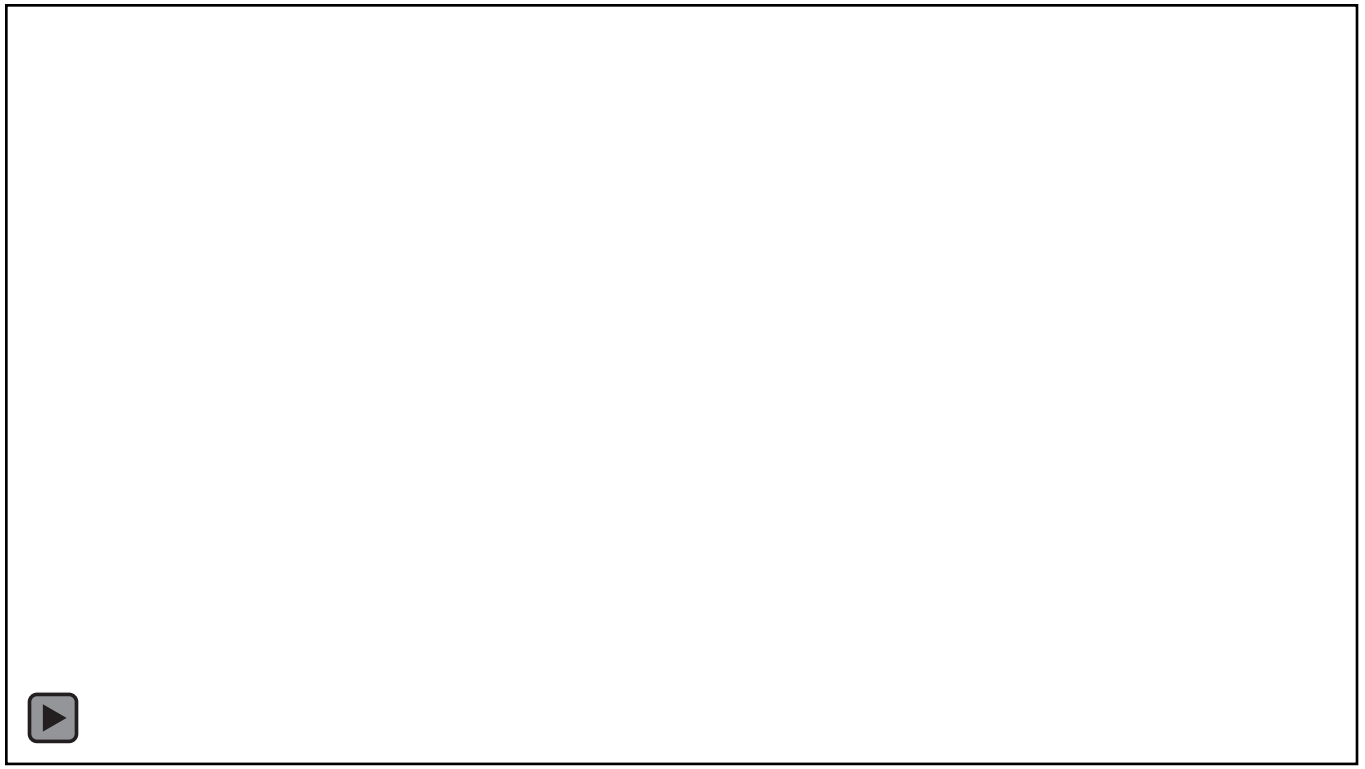
Hydra-Cell MT8 Technology Advantages

In addition, the resulting linear flow allows for the precise delivery of process fluids that remains constant



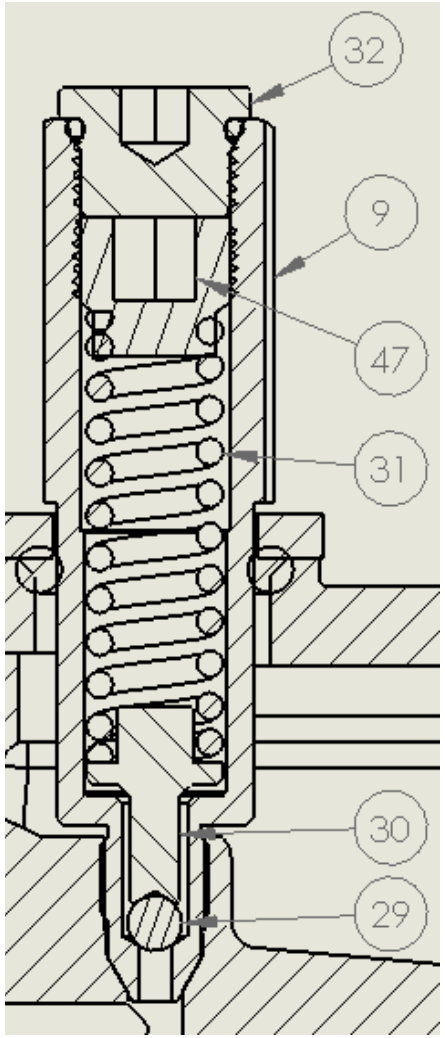
Hydra-Cell MT8 Technology Advantages

As air entrapment is a common problem with metering pumps, the MT8 has been designed to effectively purge air from the liquid end.



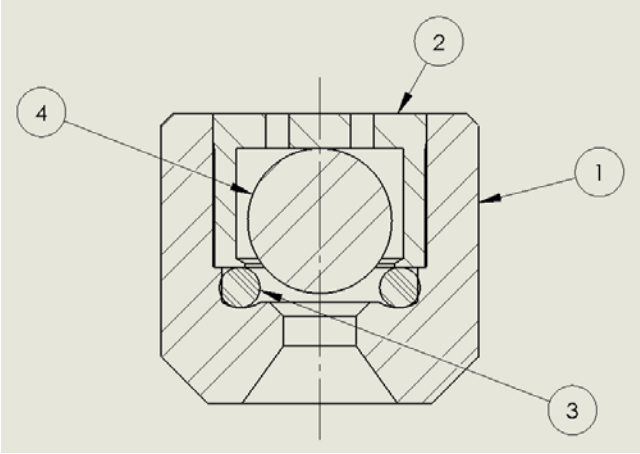
Hydra-Cell MT8 Technology Advantages

- Internal Pressure Relief Valve
  - Provides internal protection for over-pressurization of the pump
  - Does not negate the need for external PRV



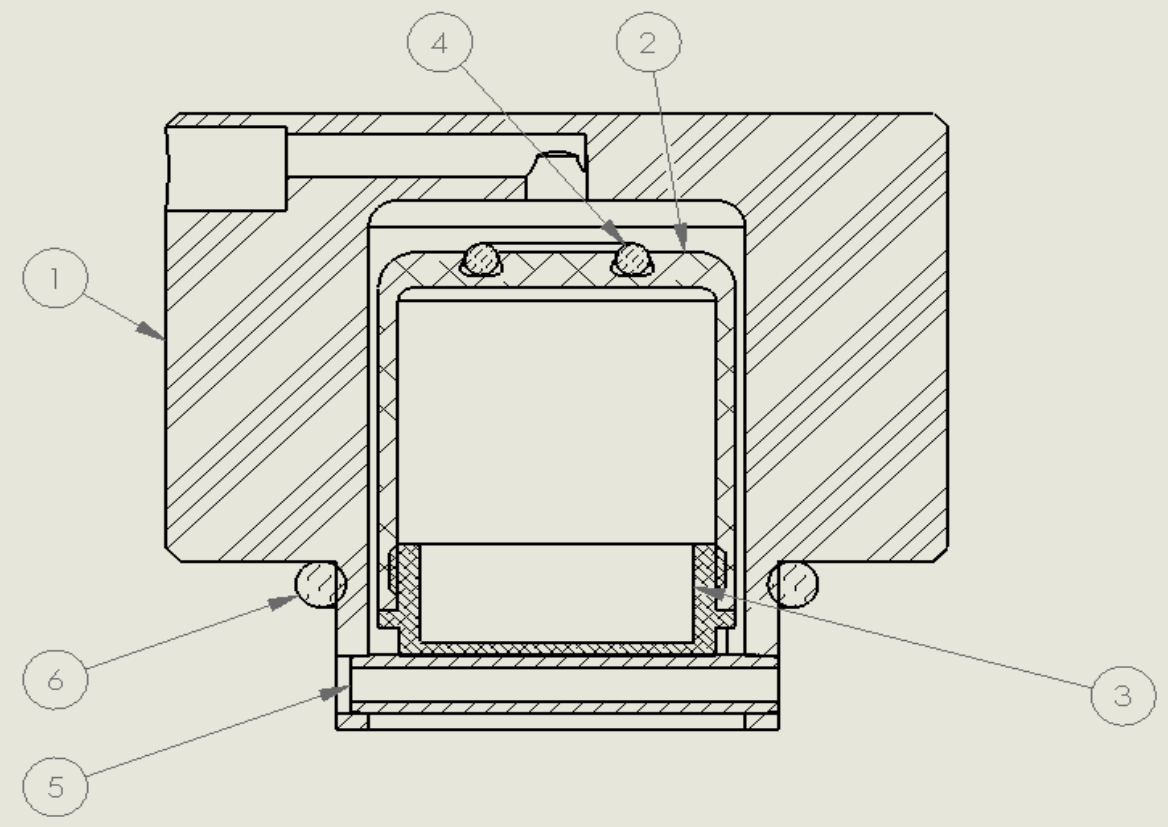
Hydra-Cell MT8 Technology Advantages

- Check valves
  - Cartridge one-piece check valves with easy access for simplified maintenance
  - Currently available in 316SS, Hastelloy and Alloy 20



Hydra-Cell MT8 Technology Advantages

- Sealing Oil Cap



MT8 Performance Points

- Maximum Flow 8.0 GPH (30.28 LPH)
- Minimum Flow 0.06 GPH (0.227 LPH)
- Maximum Outlet Pressure 3500 PSI (241 bar)
- Maximum Inlet Pressure 500 PSI (34 bar)
- Meets/exceeds API 675 performance standards for Linearity, Repeatability and Steady State Accuracy.

MT8 Options

- Manifold/Liquid End
  - Currently available in 316SS, PVC, PVDF, Hastelloy and Alloy 20
  - Optimized flow design along with non-spring loaded check valves makes priming quick and easy

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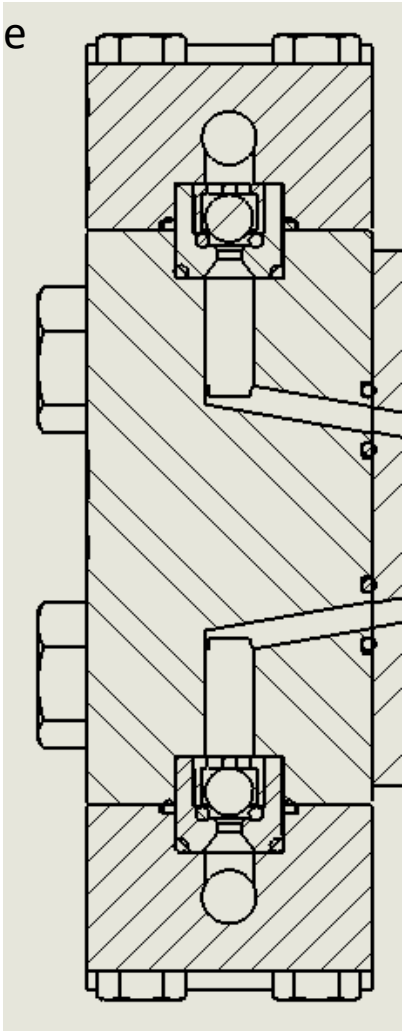
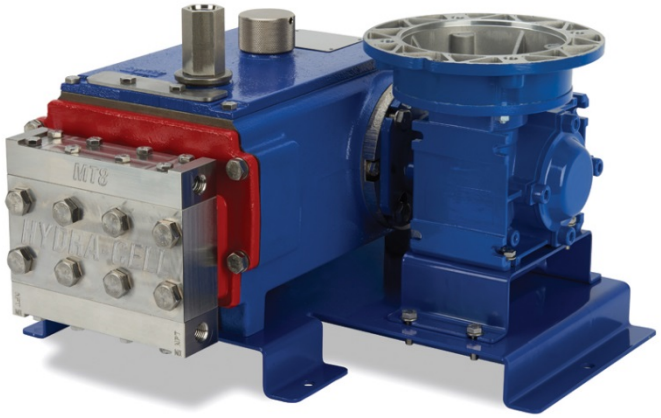


MT8 Options

- Gear box
  - Motor flanges: Nema 56C, 143/145TC; IEC 63 B5, 71 B5, 80 B5; Gear ratios of 5:1, 10:1, 20:1, 30:1, 40:1, 50:1, 60:1, 80:1, 100:1
  - Available with manual adjust



MT8 Options

- Can be duplexed
  - ✓ Allows for doubling of flow rate
  - ✓ Proportional injection of different fluids
  - ✓ Installed spare