Peristaltic VS Diaphragm Metering Pumps

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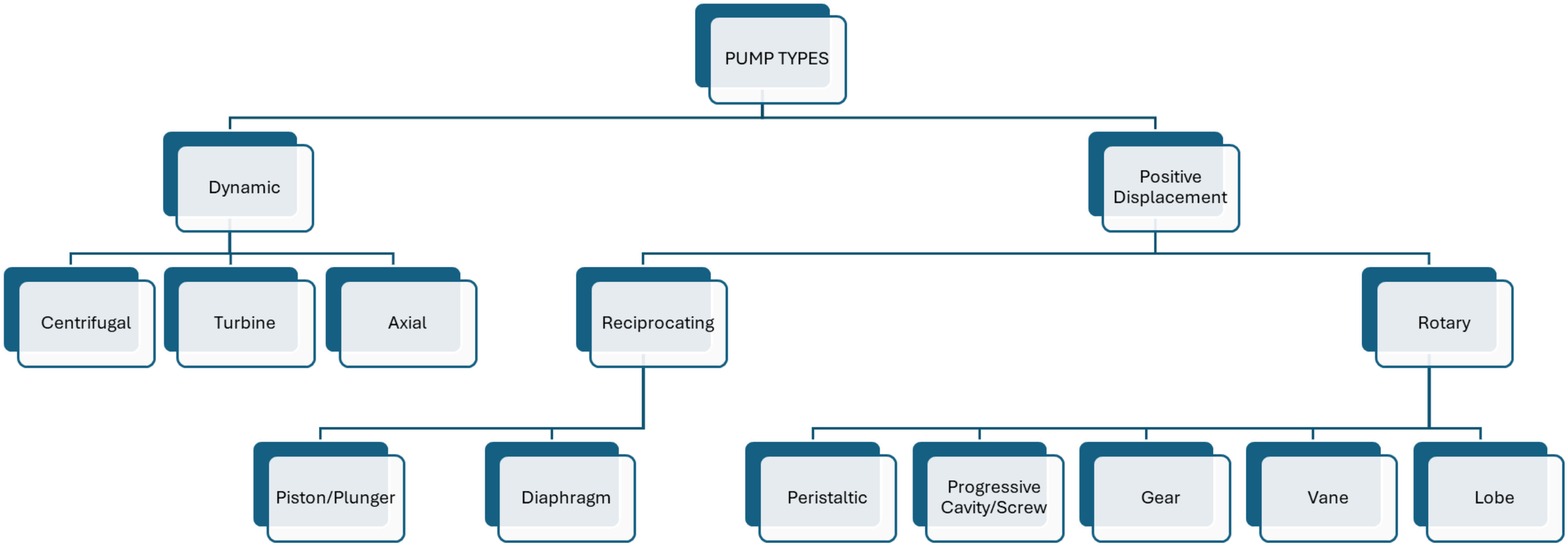
Agenda

This presentation will address the basic features of Peristaltic and Diaphragm Pumps.

- What is Metering & Dosing
- The differences between the two technologies
- What affects the performance of each
- Why choose one versus the other

Pump Types: Used for Metering/Dosing



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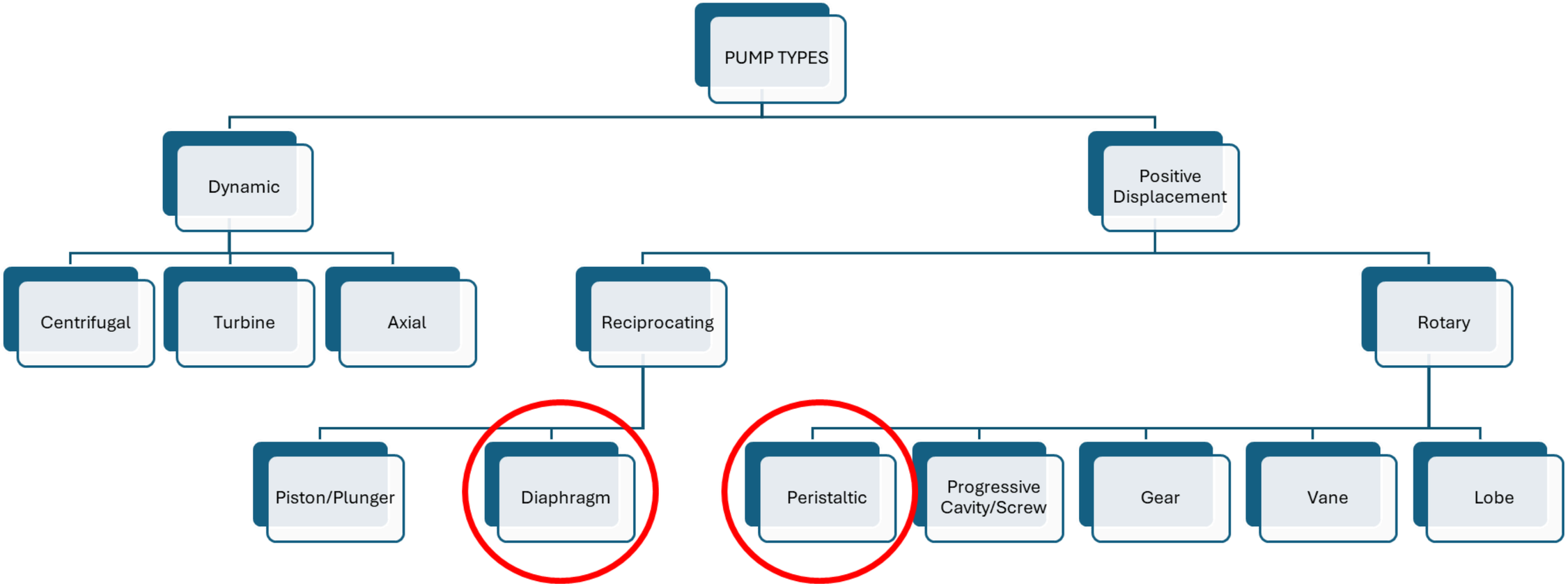
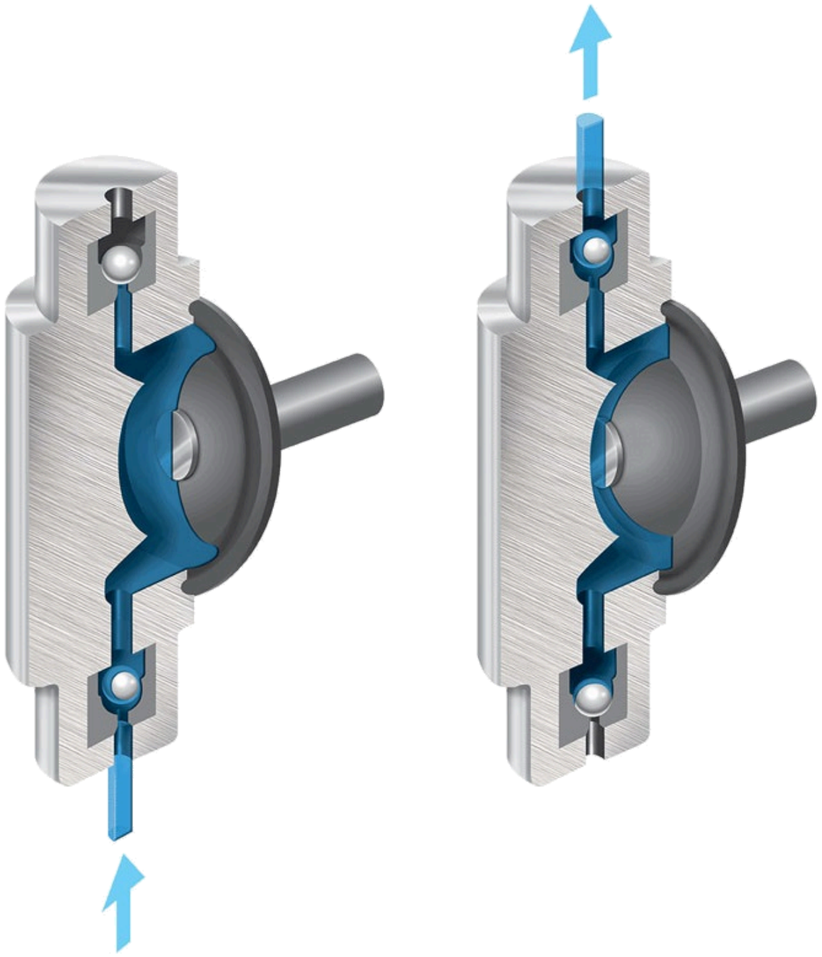
What is Metering & Dosing in our world?

- Metering & Dosing of fluids involves delivering a chemical, additive or ingredient into a process
- Metering & Dosing finds its application in a variety of industry sectors. From water & wastewater treatment to Food & Bev to Mining, and the list can go on.
- It doesn't matter if it is treating water, producing a product or material, or treating waste; its entire process requires precision, accuracy and repeatability.
- Ensuring that you have a chosen a highly functional metering pump should be one of the main priorities when designing and selecting a metering system
    - Saves chemical/additive/ingredient
    - Improves product quality
    - It saves on maintenance costs
    - Improves Uptime and Process Reliability
    - Improves Safety

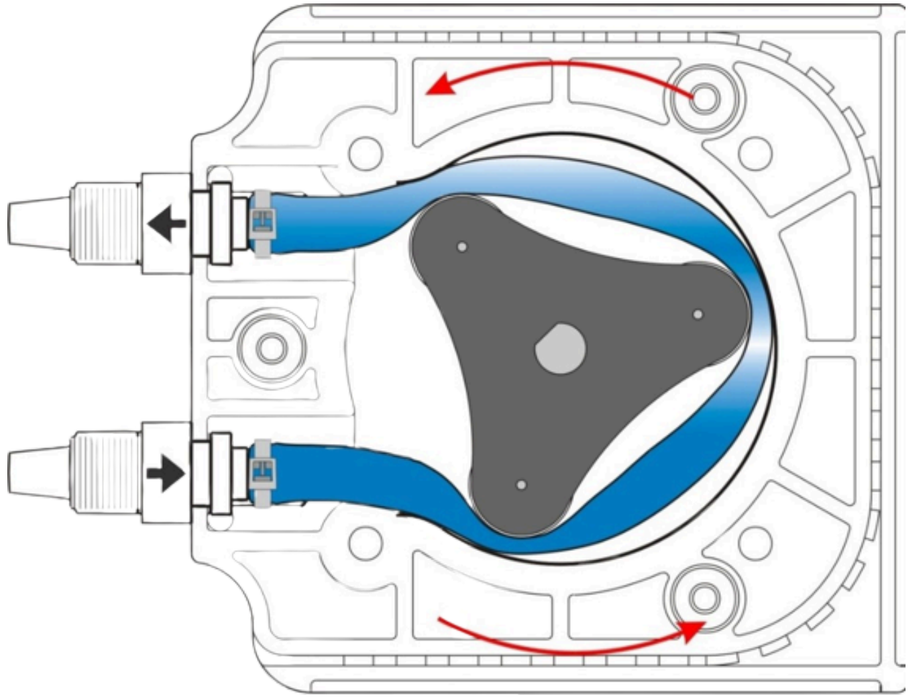
Pump Types: Used for Metering/Dosing



Diaphragm



Peristaltic



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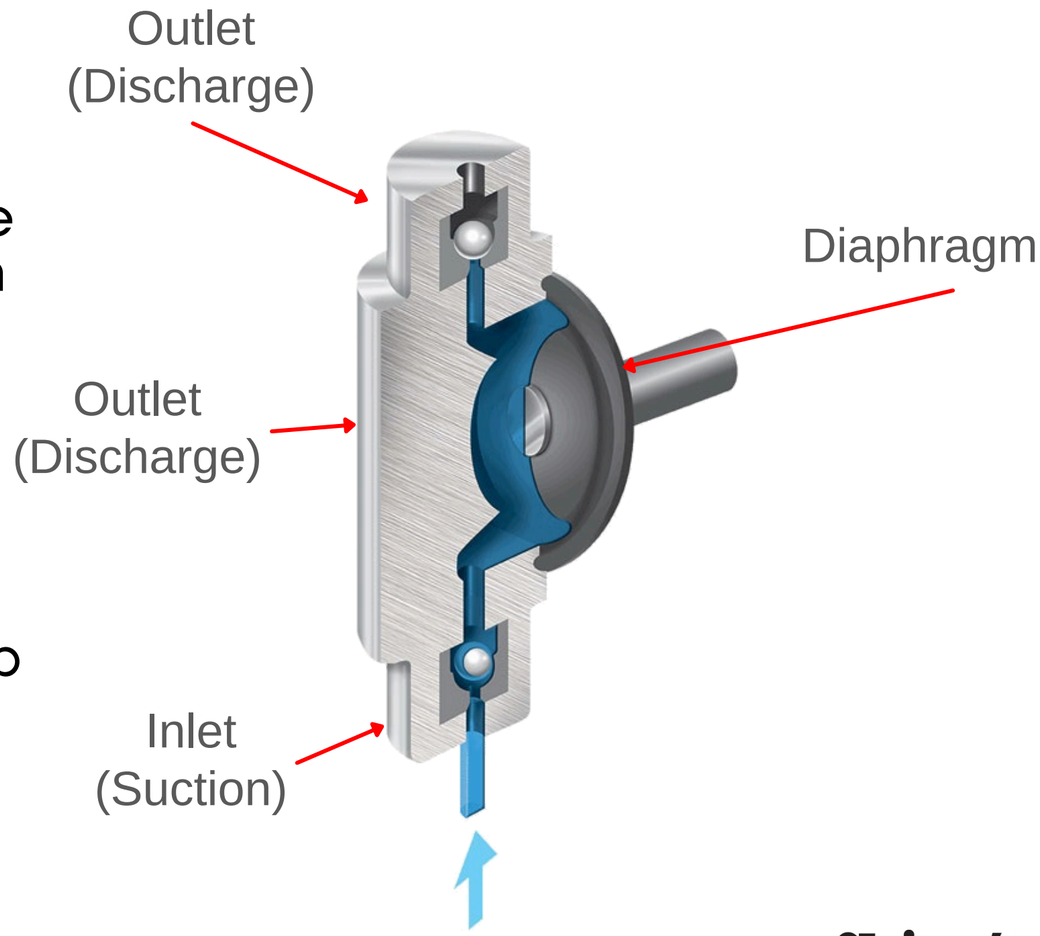
Diaphragm Pumps – How do they Work?

- Diaphragm pumps use a rubber or plastic diaphragm and corresponding valves on each side of the pump head to pump fluid.
- When the diaphragm flexes, the pressure inside the pump lowers, drawing fluid into the suction side of the pump head.
- When the diaphragm flexes back, the fluid is forced out of the discharge side of the pump head.
- Diaphragm pumps include check valves to keep the liquid from flowing backward in the pump.
- The diaphragm can be actuated mechanically, hydraulically or pneumatically



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Diaphragm Pumps – How do they Work?

PROS

- Low cost of ownership
- Energy-efficient, using more motor torque on the foreword (power) stroke, but far less on the backstroke.
- High pressure capabilities
- Less danger of leakage

CONS

- Pulsing Output
- Must be clean fluid being pumped
- Prone to Vapour lock
- More difficult to prime against pressure
- Check valve issues
- Speed vs Stroke adjustments
- Low to moderate suction lift
- More intensive maintenance

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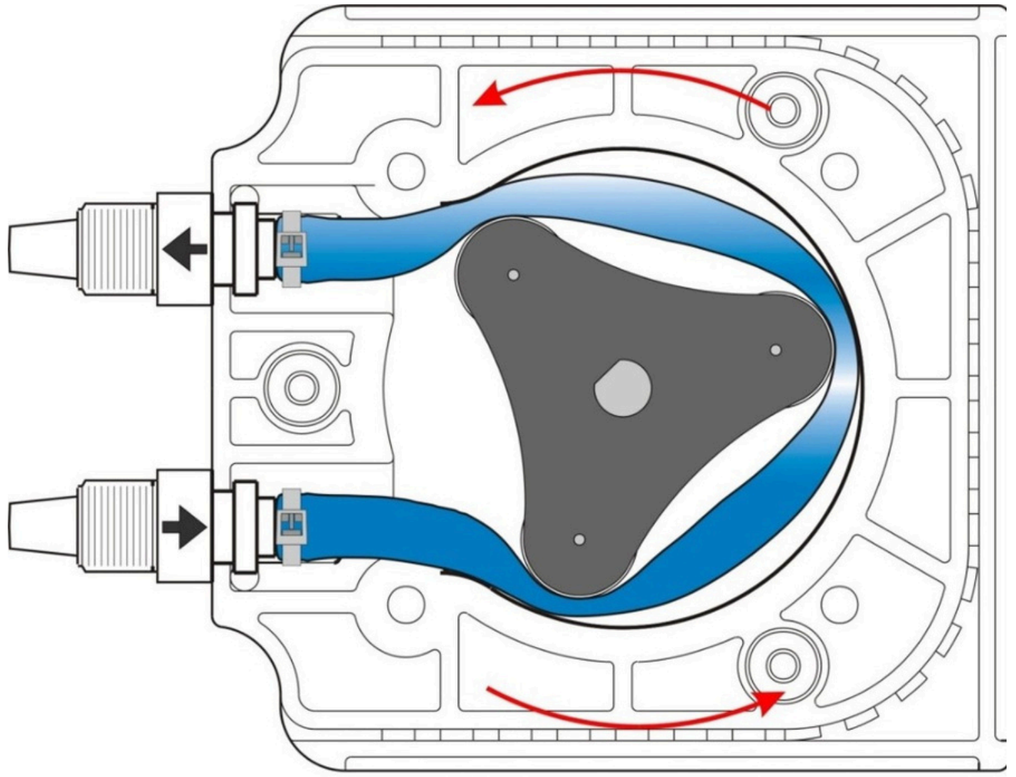
Peristaltic Pumps – How do they Work?

- Peristaltic pumps (hose or tube pumps) are a type of positive displacement pump that work using progressive squeezing action.
- Fluid is pumped through flexible tubing in a peristaltic motion. As the pump's rotor turns, the roller assembly rollers squeeze the tubing to force the fluid through the discharge line.
- When the squeeze pressure is released, the tube rebounds to its original state, creating a vacuum and drawing fluid into the suction side of the pump.
- The combination of suction and discharge principles produces a powerful, yet gentle pumping action.



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Peristaltic Pumps – How do they Work?

PROS

- Won't vapor lock or lose prime
- Ability to run dry without damaging the pump
- No check-valves to clean and replace
- 30 feet (9.1m) of suction lift
- Gentle, low-shear pumping action
- Can pump fluids up to 12,000 centipoise
- Can handle dirty fluids with particulates
- Safe, Simple and Easy Maintenance

CONS

- Drive motor under a constant load – uses more power.
- Tube wear – constant squeezing
- When neglected (tube not changed), the tube may leak eventually
- Operators underestimate how many hours the tube has been running.

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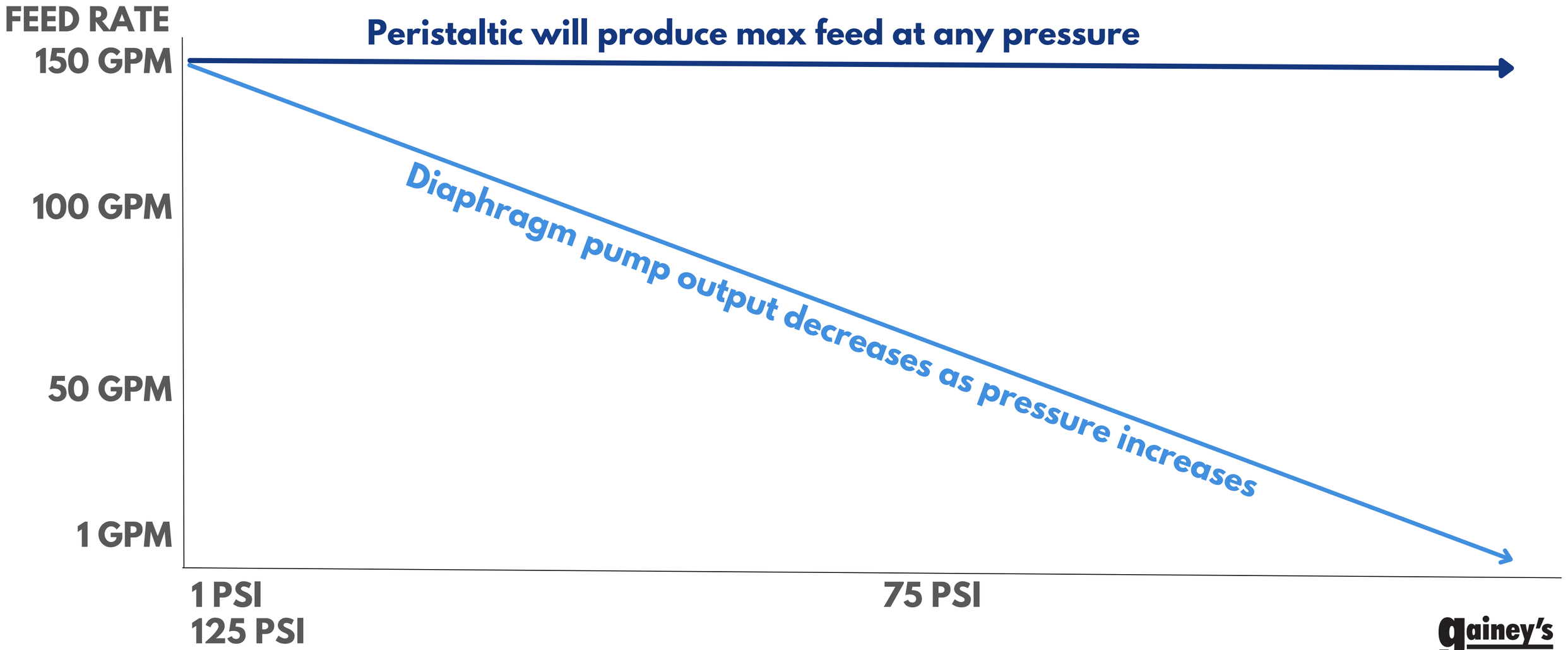
Peristaltic VS Diaphragm Metering Pumps

Parameter	Diaphragm	Peristaltic
	FLUID	
Chemical Resistance	• Many components to be attacked. • Many component material options.	• Fewer components to be attacked. • Few pump tube material options.
Particulate & Solids	• Check Valves can clog causing failure.	• No check valves to clog.
Off Gassing	• Can be difficult to prime	• Automatically primes.
	PRESSURE	
Injection Pressure	• Extended discharge range - >125 psi typical. • BUT output decreases as pressure increases.	• Limited discharge range - <125 psi typical. • No change in output due to changes in system pressure
	MAINTENANCE	
Service Interval	Service required at regular intervals. – low cost BUT tubes can have shorter life than diaphragms.	Service recommended at regular intervals – high cost but diaphragm usually lasts longer than tubes.

Output vs Pressure



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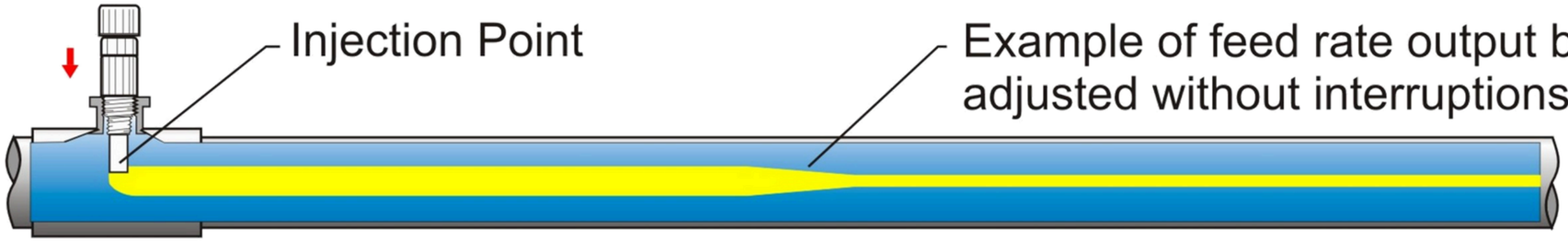
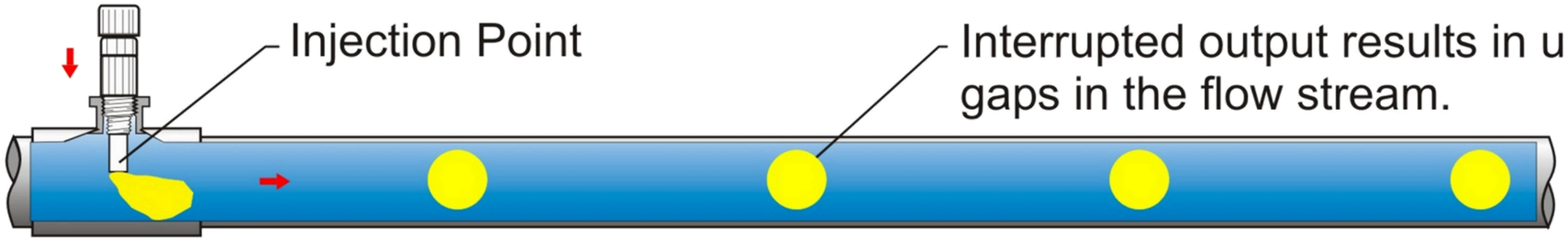
Pulsation (Hammer)

Variable Speed Peristaltic Pump



Continuous injection at low motor speed

Variable Speed/Frequency Diaphragm Pump



Intermittent Pulse at low motor speed or pulse frequency

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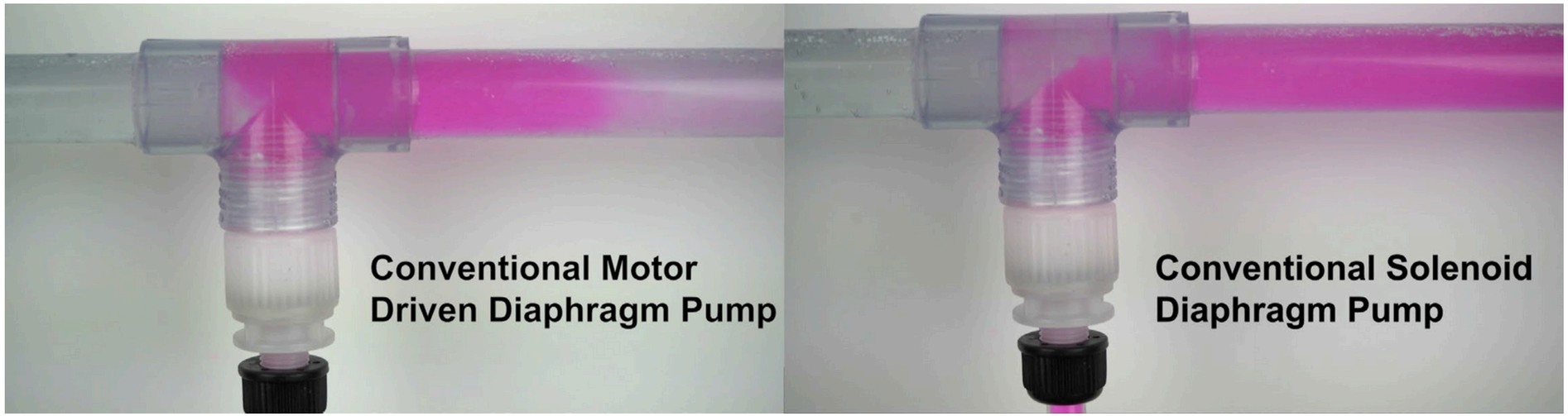
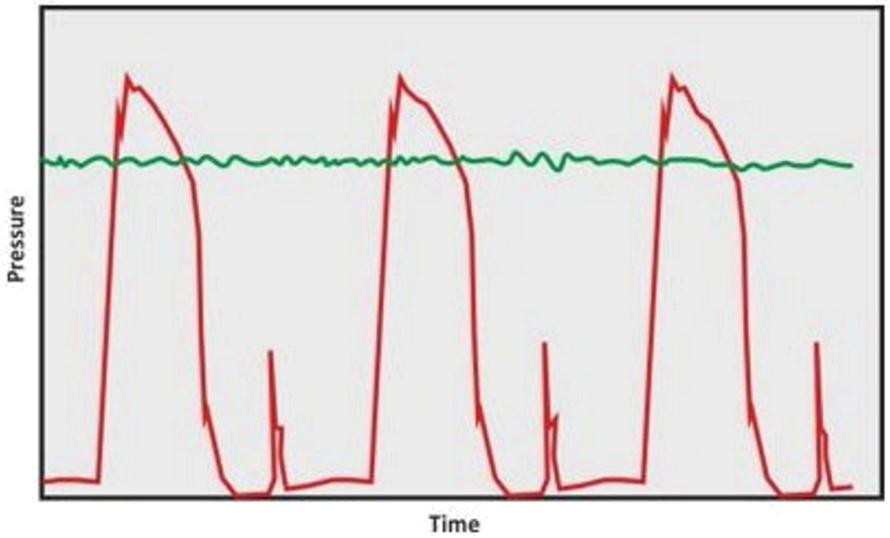
Pulsation (Hammer)





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