PAINT PUMP MAINTENANCE AND TROUBLE SHOOTING

Presented by Jason Lynch

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Fluid Transfer & Paint System Specialists

“PAINT PUMPS ONLY BREAK DOWN OR CAUSE ISSUES WHEN THEY ARE NEEDED”

Reduce down time,

Design the system well,

Set regular house keeping maintenance

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SYSTEM DESIGN

AIR AND HYDRAULIC REQUIREMENT

Rule 1

Stroud's will give assistance when designing or modifying a road striper,
Call us for Graco pump air and hydraulic requirement ,
Please ask or request input when building or changing a striper, design it right.

Typically the air or hydraulic volume (Stroud's specify) will be at Graco requirement plus at least 25% especially with hydraulic driven pumps
This is to ensure there is little or no potential for "DRIVER" starvation on pump change over.
With hydraulic supply on large Viscount or GH pumps we specify surge tanks and non return valve to be mounted at the pump inlet.

If energy into the pump (that's the volume not pressure) is greater than required then we can eliminate the energy source from the trouble shooting process

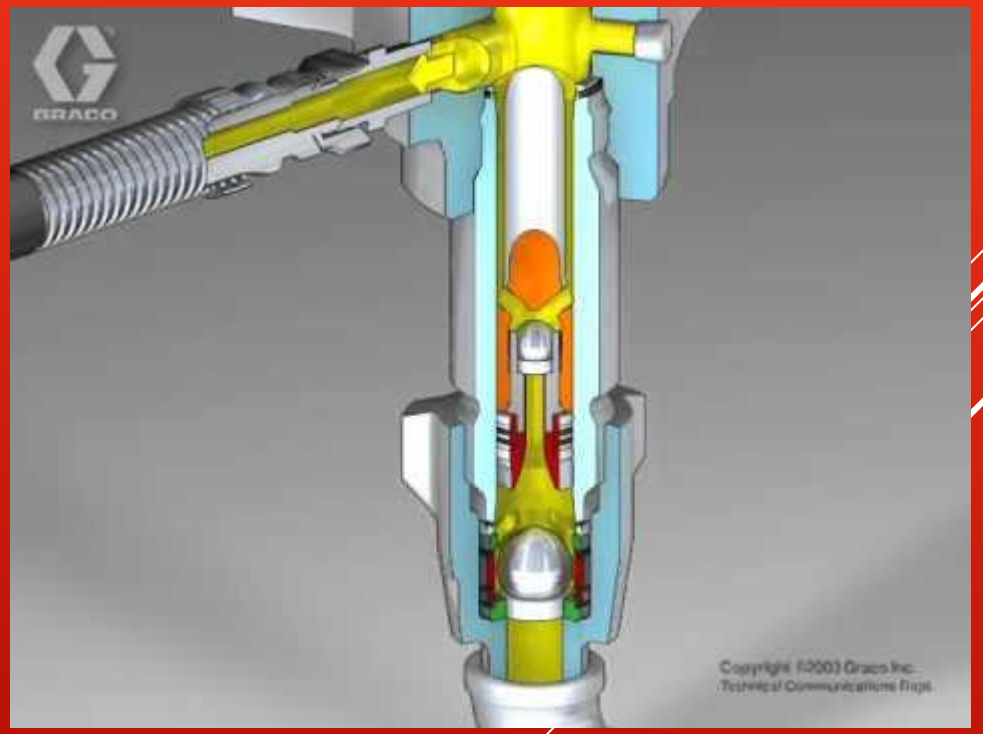
HOW A DOUBLE ACTING PISTON PUMPS WORKS

The area below the piston packing stack is twice the volume of the area above the packing stack

As the pump cycles paint is displaced into the hose outlet on both the up and the down cycle

If a pump on a large striper is painting at 25lpm then the input on the suction side is at 50lpm.

Why do we need to consider inlet volume



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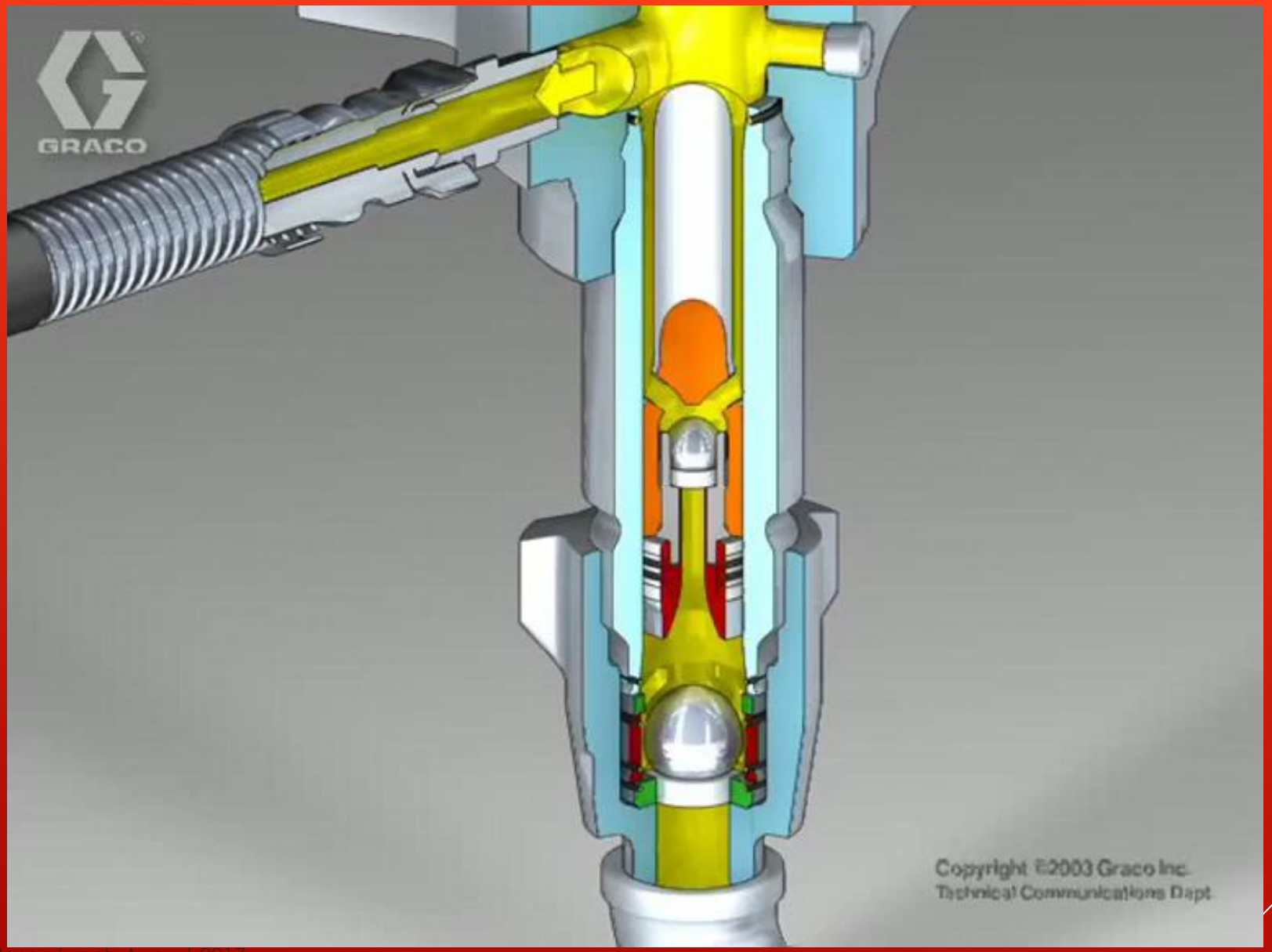

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INLET RESTRICTION CAUSES PUMP CAVITATION

Cavitation occurs when the inlet paint flow restriction (or line pressure loss exceeds) half of 1 atmosphere approximately 7.5 psi

Cavitation will destroy (at worst) or significantly reduce the life the intake ball seat, causes the pumps to dive putting significant hydraulic stress on packers and the high pressure side of the paint delivery system

Cavitation can often be seen as winking in the spray pattern, cold mornings, thick paint, requieing higher spray pressures

LINE PRESSURE LOSS PER METER OF HOSE

Cavitation is caused when the lower chamber of the pump is only partially filled.
The up stroke of the pump is when the lower chamber is filled

Questions to ask

Paint viscosity from supplier (note temperature REFERENCE 20-25 Deg C)
Paint Temperature (what is it now)
Ambient Temperature (is this above or below paint temperature)
Suction line length/diameter between bulk feed and pump inlet
Number of elbows and pipe fittings
Inline filter size (resistance)

LINE PRESSURE LOSS PER METER OF HOSE

Cavitation is caused when the lower chamber of the pump is only partially filled.
The up stroke of the pump is when the lower chamber is filled

What we KNOW

Paint viscosity *except for mid summer is mostly higher than lab test*
Paint Temperature *has an affect on viscosity*
Ambient Temperature *will either increase or reduce viscosity*
Line length/diameter between bulk feed and pump inlet *is our restriction*
Number of elbows and pipe fittings *compounds the restriction to flow*
Inline filter size (resistance) *check supplier for LPL overhead*

LINE PRESSURE LOSS PER METER OF HOSE

Cavitation is caused when the lower chamber of the pump is only partially filled.
The up stroke of the pump is when the lower chamber is filled

What do we know

Paint is pushed into a LOW PRESSURE zone by atmospheric pressure

If LPL on the infeed exceeds 7.5psi then we get cavitation

LINE PRESSURE LOSS

Cavitation is caused when the lower chamber of the pump is only partially filled.
The up stroke of the pump is when the lower chamber is filled

What do we know

Line pressure loss is calculated with the following formula

$$P = \frac{0.0273 \times V.Q.L}{D4}$$

0.0273=constant, V for viscosity in poise, Q for quantity in usgpm,l=length in feet
D=ID of hose in inches

LINE PRESSURE LOSS @ 25 DEG C

	Product	Constant	Viscosity CPS	Viscosity Poise	Volume required in LPM	Line length in metres	Pipework Dia in inches	Delta P=line pressure loss in PSI ID	Filter restriction	Total LPL+Overhead	Buffer		
Cat A	Aqua 98	0.0273	1200	12	40	2	2	1.43	0.29	1.77	5.59		
	QL90	0.0273	1000	10	40	2	2	1.19	0.24	1.47	5.89		
	Beadlock	0.0273	9000	9	40	2	2	1.07	0.21	1.33	6.03		
	Aqua 98	0.0273	1200	12	20	1.5	1.5	1.69	0.34	2.10	5.26		
	QL90	0.0273	1000	10	20	1.5	1.5	1.41	0.28	1.75	5.61		
	Beadlock	0.0273	900	9	20	1.5	1.5	1.27	0.25	1.57	5.79		
Cat B	Aqua 98	0.0273	1200	12	16	1	1	4.56	0.91	5.66	1.70		
	QL90	0.0273	1000	10	16	1	1	3.80	0.76	4.72	2.64		
	Beadlock	0.0273	900	9	16	1	1	3.42	0.68	4.24	3.12		

LINE PRESSURE LOSS @ 10 DEG C

	Product	Constant	Viscosity CPS	Viscosity Poise	Volume required in LPM	Line length in metres	Pipework Dia in inches	Delta P=line pressure loss in PSI	Filter restriction ID	Total LPL+Overhead	Buffer
Cat A	Aqua 98	0.0273	1600	16.5	40	2	2	1.96	0.39	2.39	4.96
	QL90	0.0273	1400	14.5	40	2	2	1.72	0.34	2.10	5.25
	Beadlock	0.0273	1200	12.5	40	2	2	1.49	0.30	1.81	5.54
	Aqua 98	0.0273	1600	16.5	20	1.5	1.5	2.32	0.46	2.84	4.51
	QL90	0.0273	1400	14.5	20	1.5	1.5	2.04	0.41	2.49	4.86
	Beadlock	0.0273	1200	12.5	20	1.5	1.5	1.76	0.35	2.15	5.20
Cat B	Aqua 98	0.0273	1600	16.5	16	1	1	6.28	1.26	7.66	-0.31
	QL90	0.0273	1400	14.5	16	1	1	5.51	1.10	6.73	0.62
	Beadlock	0.0273	1200	12.5	16	1	1	4.75	0.95	5.80	1.55

REDUCING LPL

Reduce infeed line to the shortest length

Reduce fittings required to the minimum, eliminate elbows where able

Where inlet filters are fitted, step up in size not down

ALWAYS use the largest feed hose, this will result in the biggest gain

If possible warm the paint

THROAT SEAL LIQUID (TSL)

Throat seal liquid is NOT a lubricant

Compatible with solvent and water based paints

TSL coats the piston rod

Stops paint adhering to the piston rod

Stops paint drying on the piston rod

Extends the life of the upper packing set

Flush out TSL and refill as required

UPPER PACKING ADJUSTMENT

Dump all pressure from the paint line

Clean out the upper packing cup

Refill with fresh TSL

With a C spanner, tighten the upper packing nut until solid then back off 1 half turn

HIGH PRESSURE HOSES

Hoses must be treated in the same way as an electrical flex.
If the cover is cut, bubbling or bleeding the hose requires replacing

Hoses continually expand and contract with pressure, they have a life, if they appear old or worn they probably are, replace before they fail

When extending the hose length over 15mtrs, increase the hose diameter

NEW TECHNOLOGY

HUSKY 2150H

HYDRAULIC OPERATED DIAPHRAGM PUMP

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The Husky 2150h allows for operation off of hydraulic power which is perfectly suited for mobile applications where hydraulic PTO's are available or an already installed hydraulic system i.e. cement trucks or other construction equipment.

The hydraulic operation removes the requirement for large compressor systems to power air operated pumps and allows for more space for critical operation equipment or material saving space and money for crews.

The adaptation of the electric pump drives with hydraulic power provides the safety and benefit of stalling under pressure and low pulsation with the desired hydraulic operation.

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PUMP OVERVIEW

2” porting

2150e drive technology

Diaphragm pump technology

Inlet and outlet hydraulic connections

Standard rotary hydraulic motor

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The Husky 2150h allows for operation off of hydraulic power which is perfectly suited for mobile applications where hydraulic PTO's are available or an already installed hydraulic system i.e. cement trucks or other construction equipment.

Feature	Benefit
Hydraulic operation	Removes requirement for large air compressor
Air charge	Patented air charge supports diaphragms to provide longer life and ability to stall under pressure and minimize pulsation
Stalls under pressure	Safe when valves close or lines clog
Low pulsation	Eliminates air introduction into paint, allows for smooth application with no pulsing in pattern
Husky parts	Common parts with husky 2150 pneumatic pumps reduces parts inventory and utilizes proven durable design
Diaphragm pump	Self primes, runs dry, offers many configurations for different fluids, handles particulates and other difficult to pump fluids

PRODUCT FEATURES

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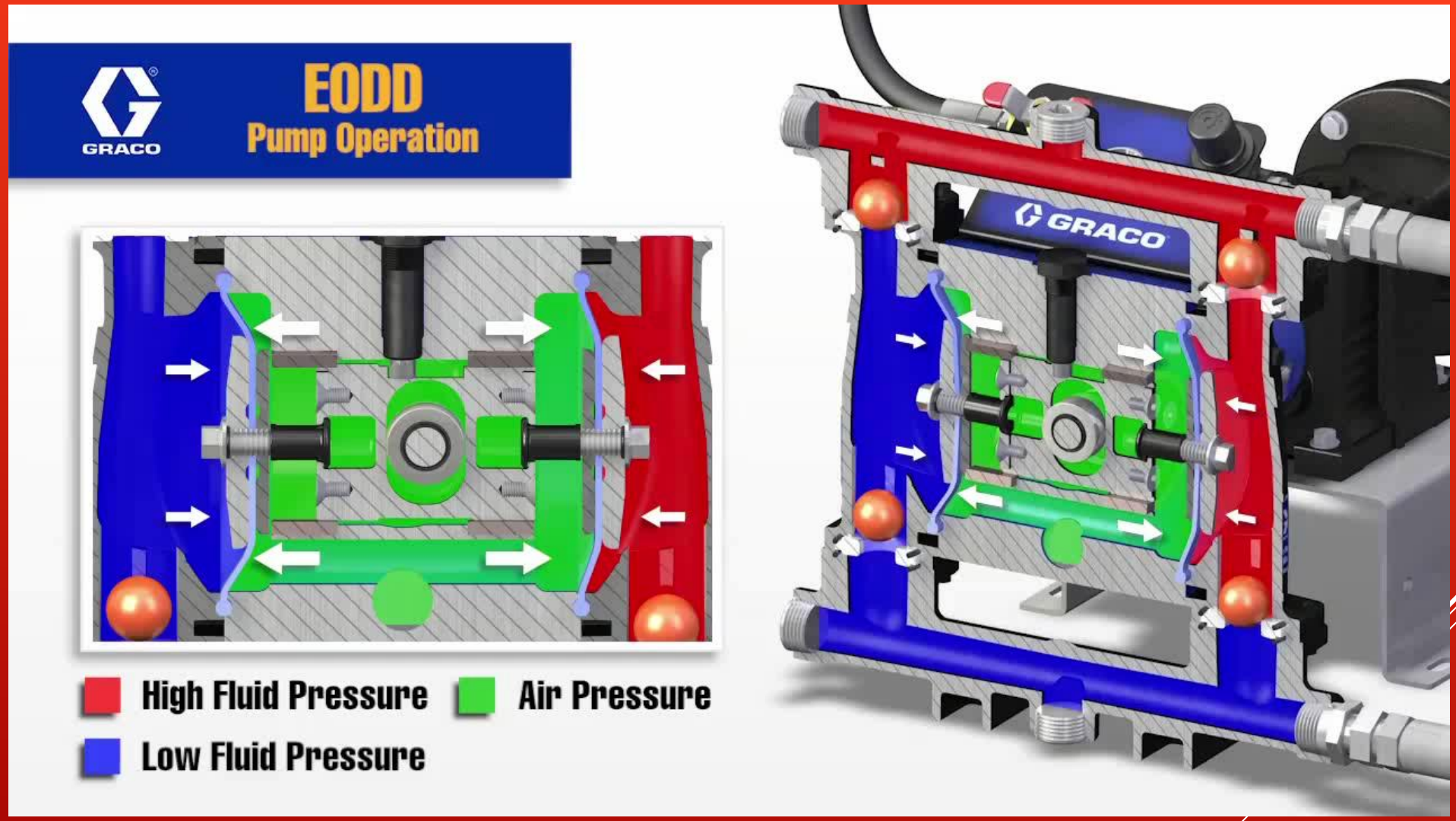
DRIVE OPERATION



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Specification	US	Metric
Maximum fluid flow	100 gpm	378 lpm
Maximum fluid pressure	100 psi	6.9 bar
Hydraulic fluid pressure	1,400 - 1,600 psi	96.5 – 110 bar
Hydraulic fluid flow	6 gpm hydraulic = 40 gpm fluid	22 lpm hydraulic = 151 lpm fluid
	10 gpm hydraulic = 70 gpm fluid	38 lpm hydraulic = 265 lpm fluid
	15 gpm hydraulic = 100 gpm fluid	57 lpm hydraulic = 378 lpm fluid
Fluid connection	2 inch npt(f)	2 inch bspt
Maximum particle size	¼ inch	6.3 mm
Suction lift	Wet or Dry: 18 feet	Wet or Dry: 5.5 meters

PERFORMANCE SPECS

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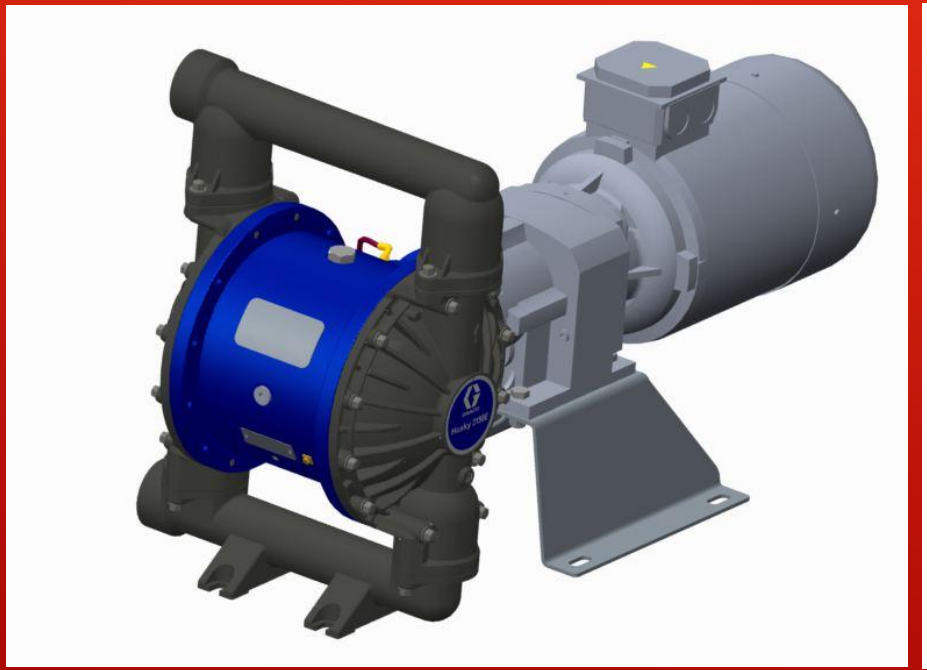
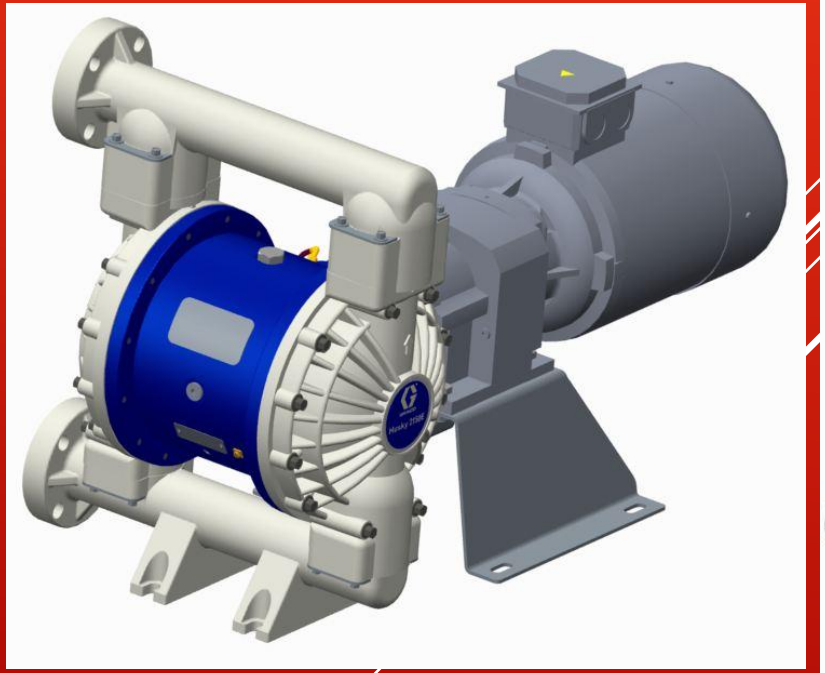
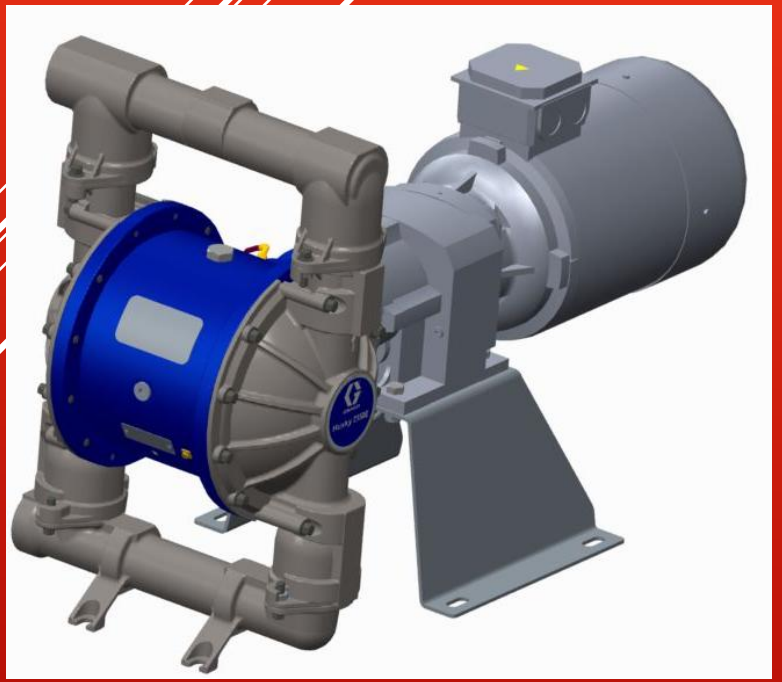
QUESTIONS







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