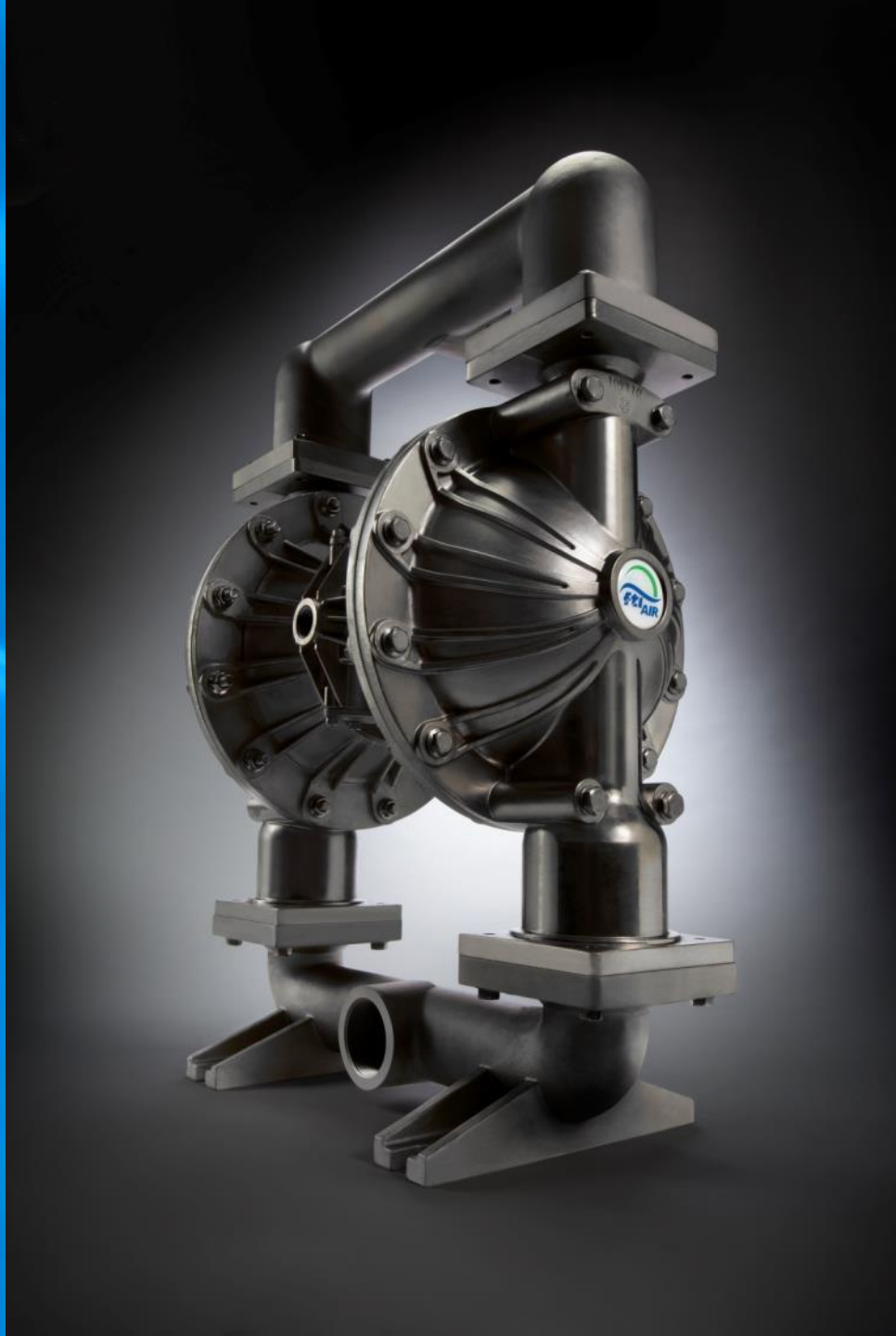
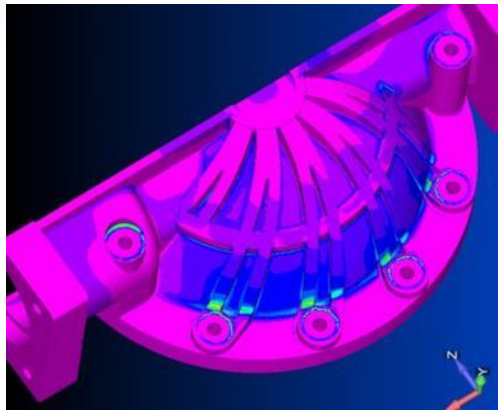
Change Is In The Air



Why FTI Air?

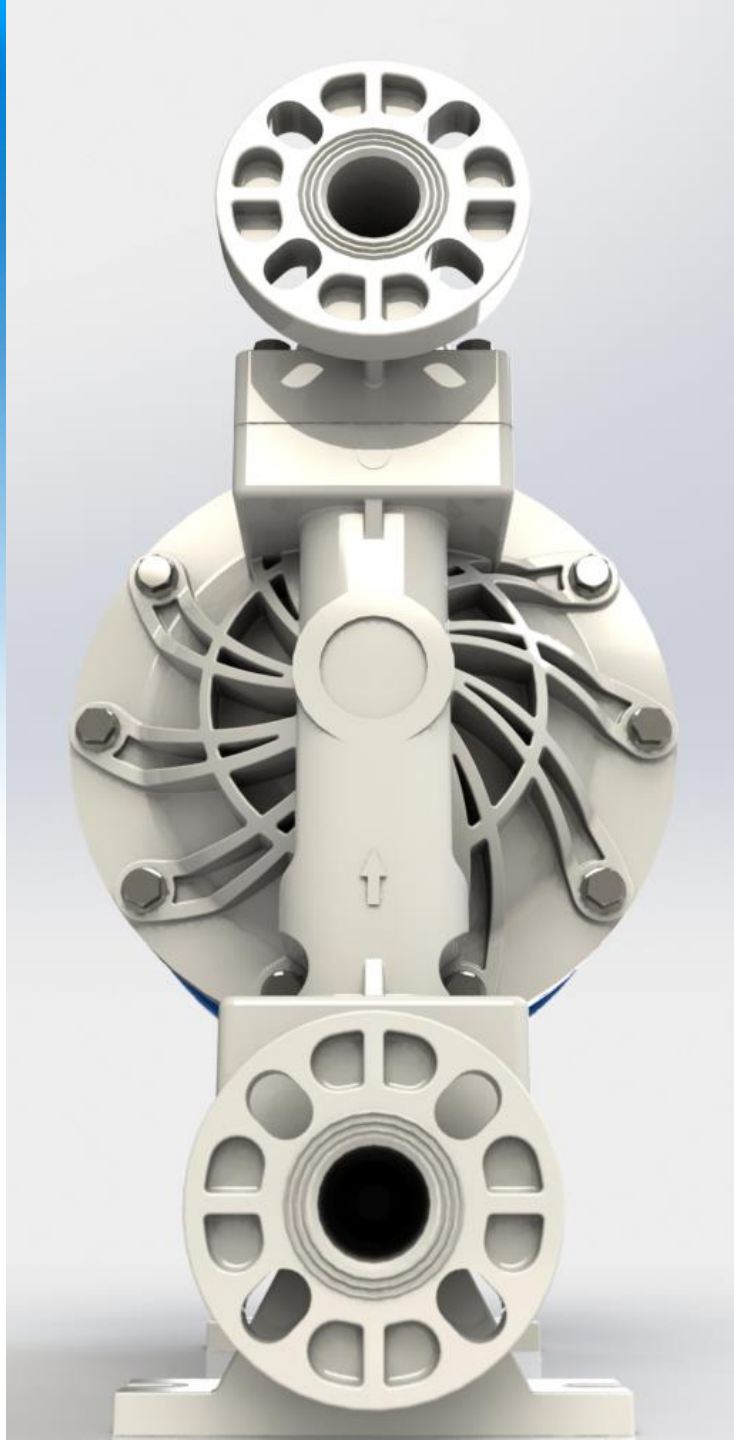
- FTI Air is a division of Finish Thompson, a manufacturer of quality products since 1951.
- FTI Air pumps are designed to be robust and reliable.
- Fewer parts means easier maintenance and improved reliability.
- All components designed by our skilled pump engineers using advanced computer-aided technology.
- Advanced design using quality materials backed by a five year warranty.



5 YEAR WARRANTY

FTI Air Feature and Benefits

- Fewer moving parts compared to competitors
- Easy to maintain – no special tools required
- Simple, reliable, leak-free air valve
- Lower noise levels
- Compact design
- All models CE, metal models ATEX certified



Why Use an AODD Pump?

- Easy to install, simple to operate
- Portable
- Installation versatility: Flooded suction, self-priming or submersible
- Application versatility: Dry running ability, solids handling, abrasive handling
- Pumps viscous fluids and shear sensitive fluids
- Economical compared to other positive displacement technologies

How It Works

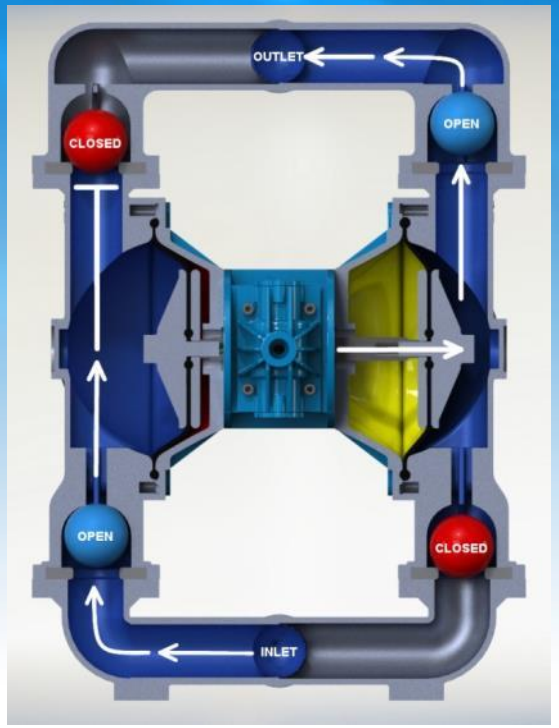


Figure 1

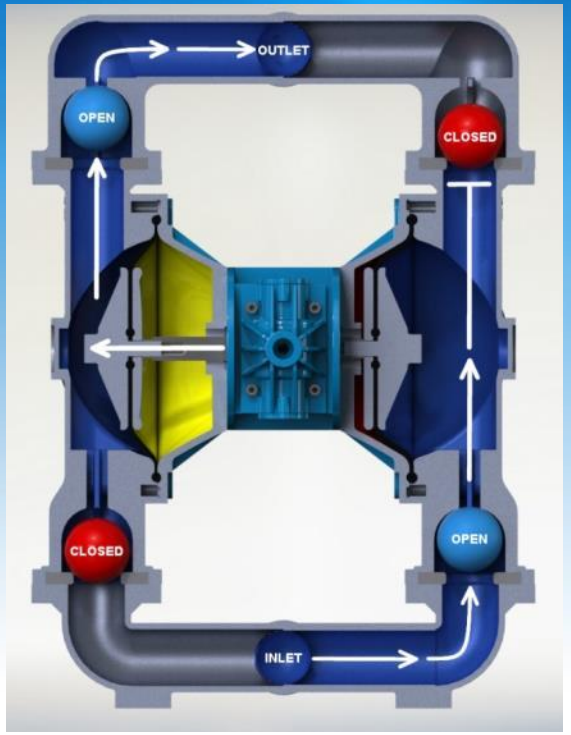


Figure 2

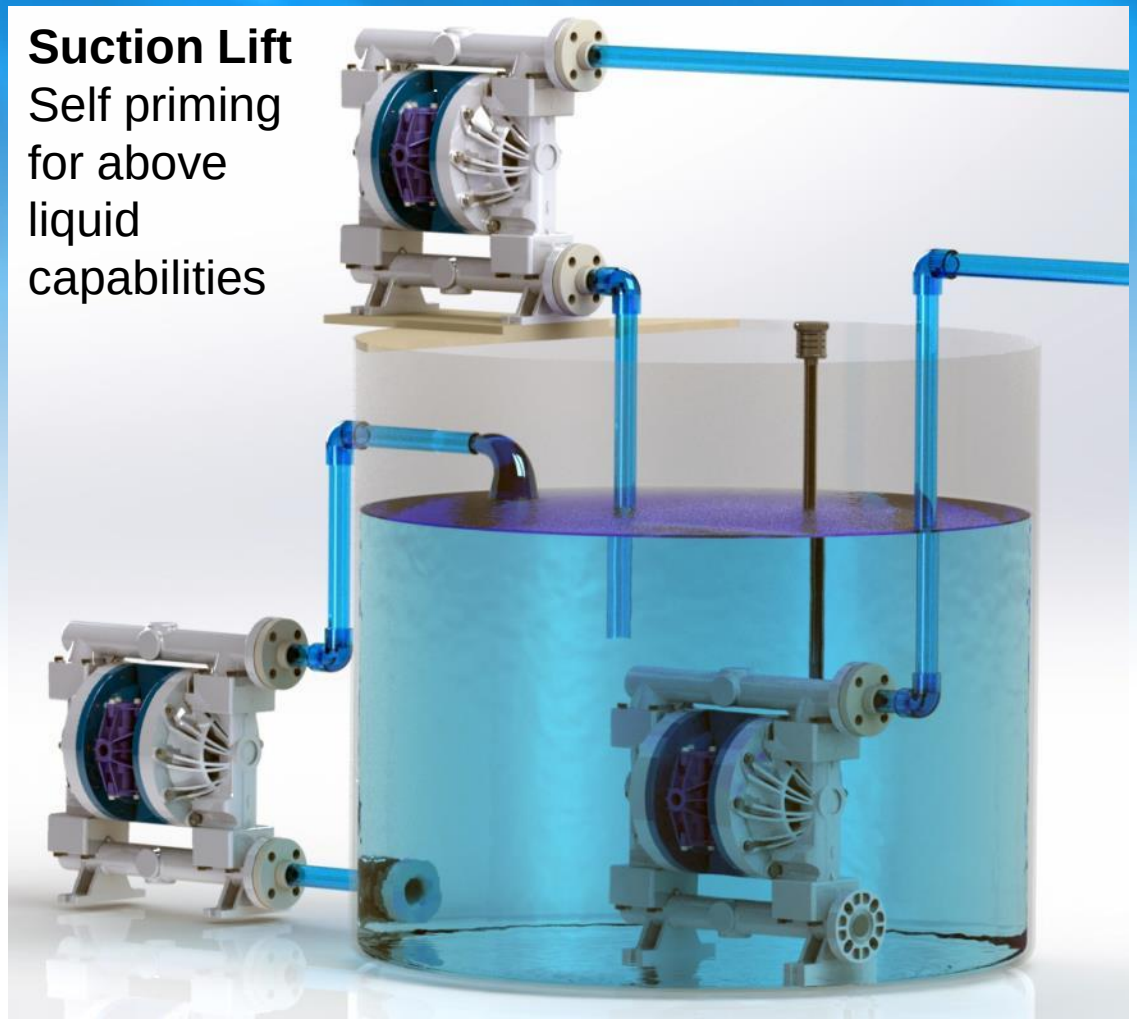
Figure 1: As the shaft located in the center section moves to the right, the diaphragm in the left chamber moves towards the center section. This creates a vacuum lifting the lower ball check allowing liquid to fill the left chamber.

Figure 2: As the shaft moves to the left, the diaphragm in the left chamber moves to the left pressurizing the liquid. This lifts the upper ball check, allowing liquid to flow through the discharge manifold and out of the pump.

DURING ONE STROKE ONE SIDE IS PUMPING FLUID WHILE THE OTHER SIDE IS FILLING.

Installation

Suction Lift
Self priming for above liquid capabilities



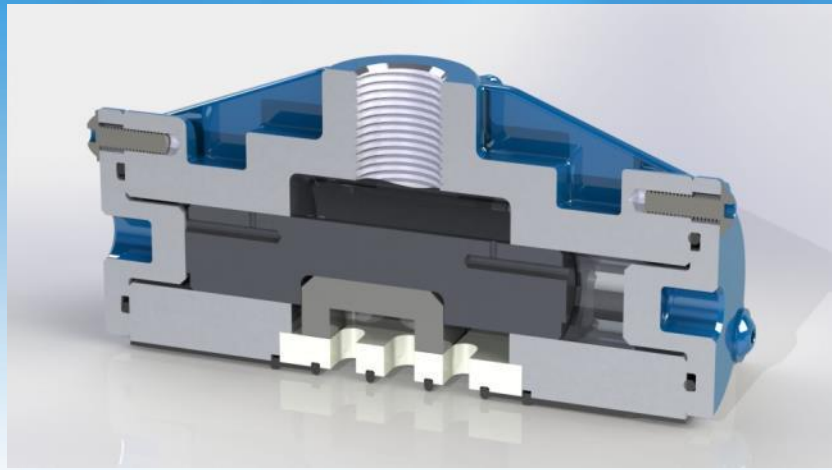
Flooded Suction
Most common application

Submerged
Capable of full submersion, materials must be compatible with liquid, muffler must be above liquid level

Aluminum Air Valve

Simple, rugged and reliable design

- Painted die cast aluminum valve body
- Sliding shoe design features low friction carbon filled PTFE slide valve (shoe), polished alumina valve plate and hard anodized aluminum valve carrier
- Molded Buna gasket is fitted to grooves in the face of the valve body and slide valve plate to ensure total sealing and eliminate flat gasket tearing.
- Uses air through slotted diaphragm shaft to shift the valve eliminating need for separate pilot valve or mechanically operated pilot valve.
- Uses differential pressure provided by the diaphragm shaft to shift and prevent stalling.



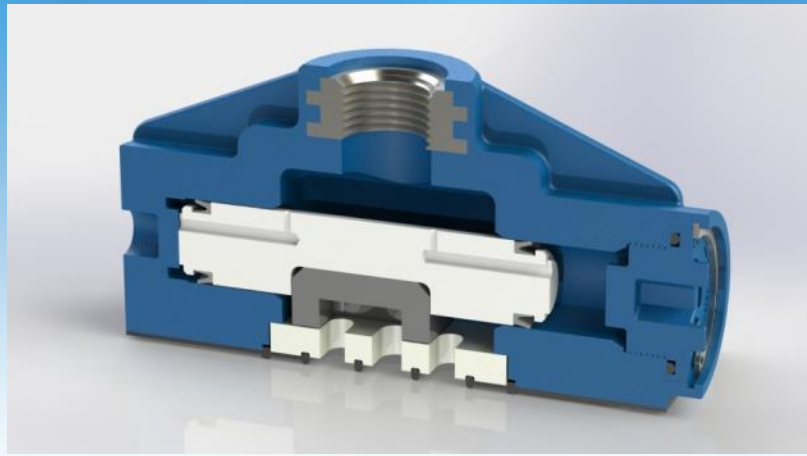
Aluminum Air Valve

Slotted Shaft

Non-Metallic Air Valve

Simple, rugged and reliable design

- Glass fiber reinforced polypropylene valve body
- Sliding shoe design features low friction carbon filled PTFE slide valve (shoe), polished alumina valve plate and UHMW valve carrier with permanently lubricated seals.
- Molded Buna gasket is fitted to grooves in the face of the valve body and slide valve plate to ensure total sealing and eliminate flat gasket tearing.
- Uses air through slotted diaphragm shaft to shift the valve eliminating need for separate pilot valve or mechanically operated pilot valve.
- Uses differential pressure provided by the diaphragm shaft to shift and prevent stalling.



Non-Metallic Air Valve

Slotted Shaft

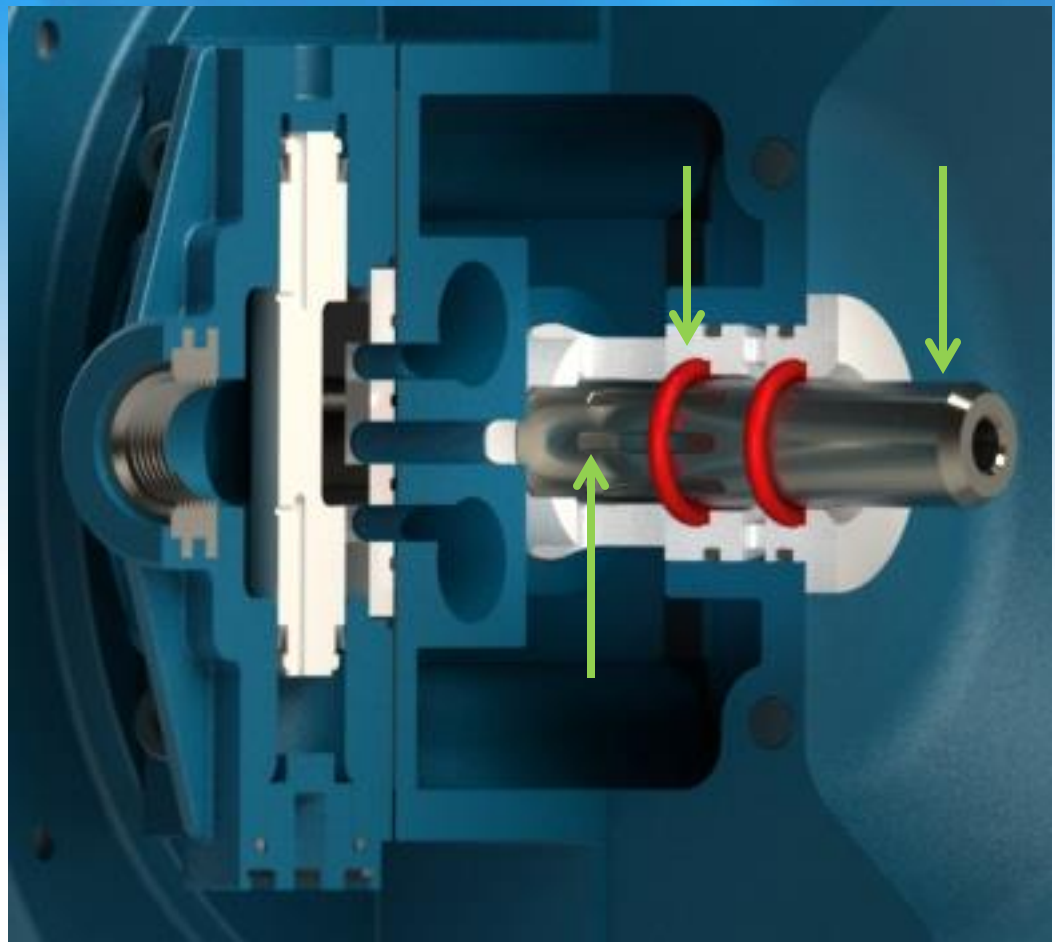
ADS (Air Distribution System)

Diaphragm Shaft
Stainless steel shaft located in the center section connects both diaphragms and acts as the pilot valve.

Shaft Slots
Ensure there is always a signal for the air valve and generous clearance makes virtually impossible to clog.

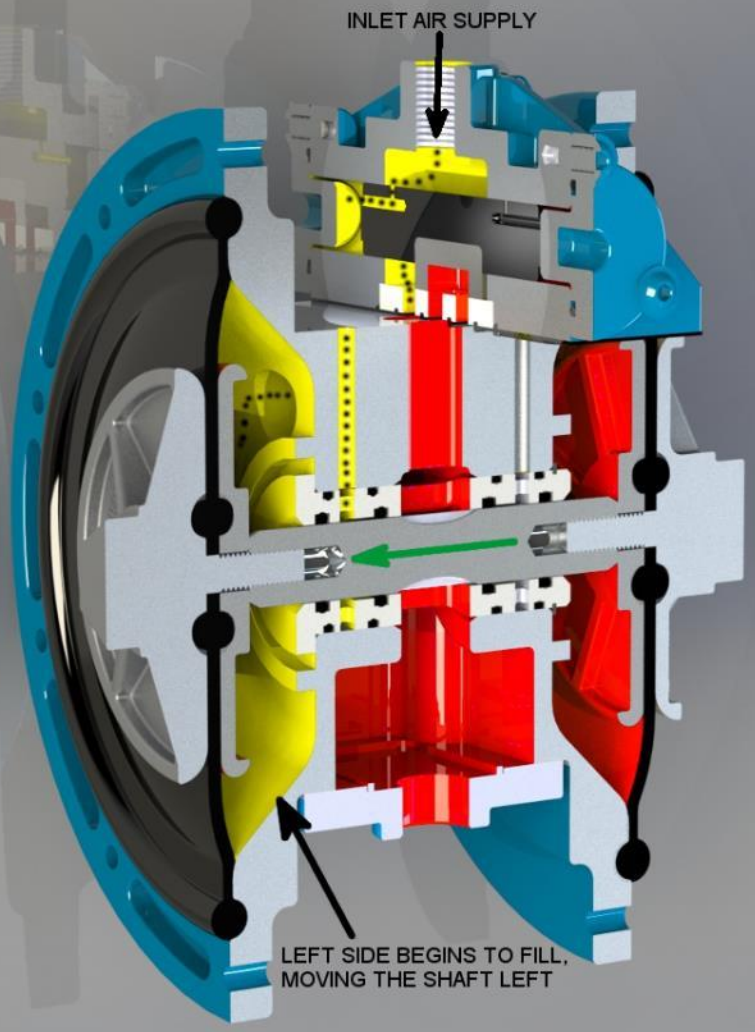
Bushings
The shaft rides inside bushings utilizing proprietary TPE material.

Non-freezing
Inlet air pathway is optimized (consistent area throughout the whole air pathway) to prevent ice buildup in the air distribution system.

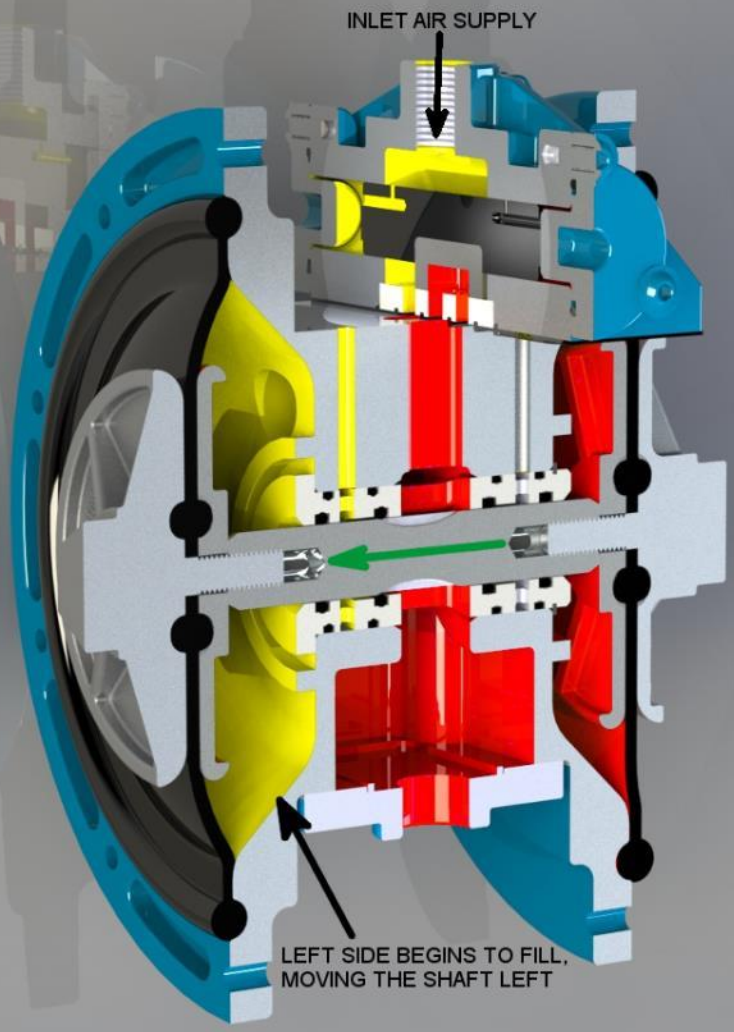


Plastic Air Valve with Diaphragm Shaft

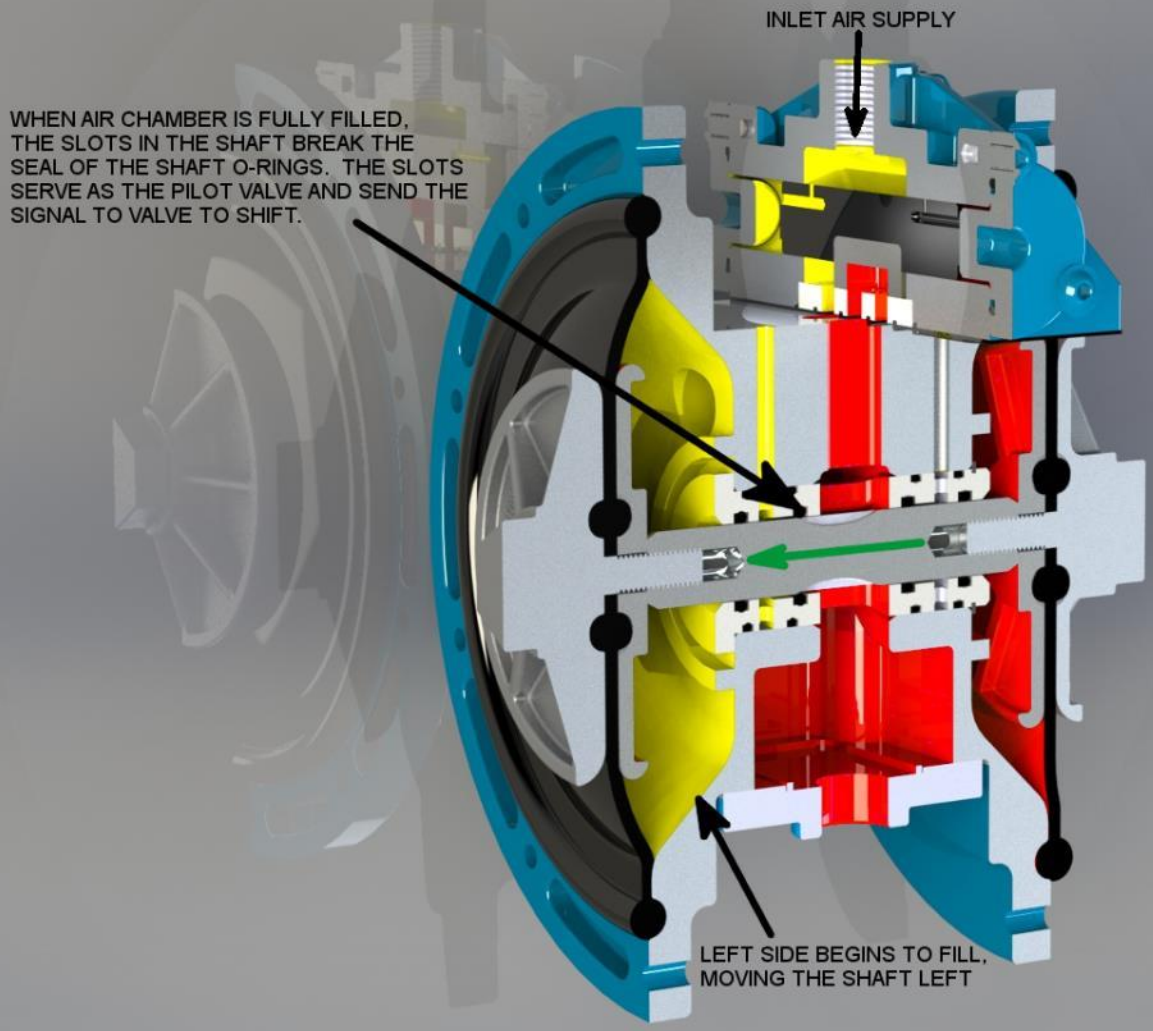
ADS (Air Distribution System)



ADS (Air Distribution System) Continued



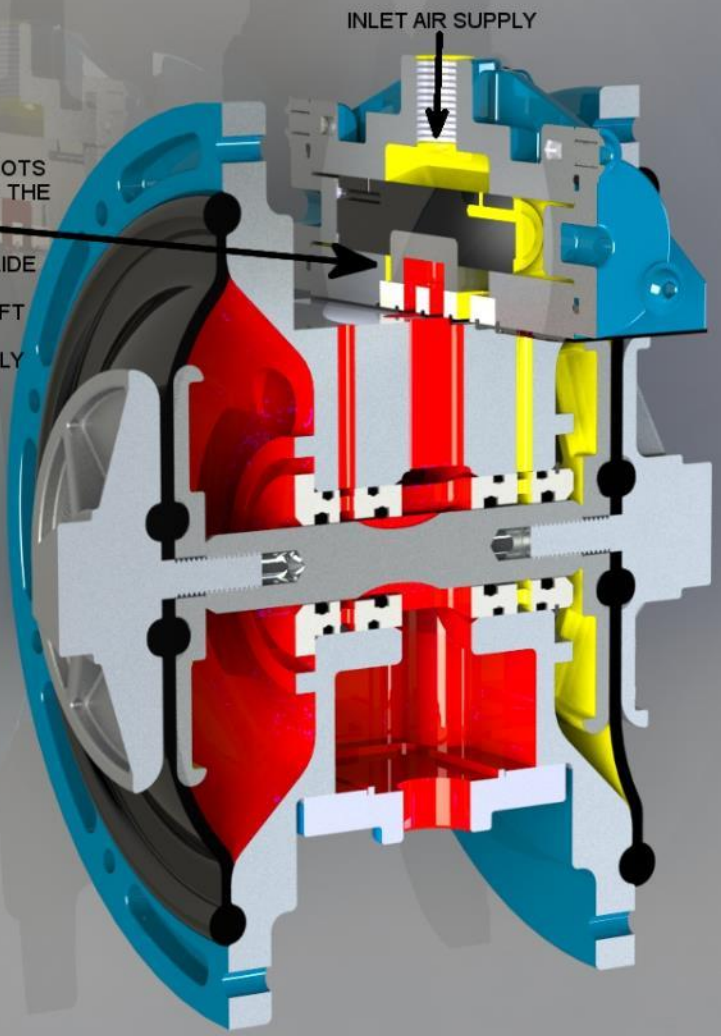
ADS (Air Distribution System) Continued



ADS (Air Distribution System) Continued

WHEN AIR CHAMBER IS FULLY FILLED, THE SLOTS IN THE SHAFT BREAK THE SEAL OF THE SHAFT O-RINGS. THE SLOTS SERVE AS THE PILOT VALVE AND SEND THE SIGNAL TO VALVE TO SHIFT.

THIS MOVES THE POSITION OF THE SLIDE VALVE ON THE VALVE PLATE WHICH CONNECTS THE FILL PORT OF THE LEFT CHAMBER TO ATMOSPHERE AND IT BEGINS TO EXHAUST. SIMULTANEOUSLY THE RIGHT CHAMBER BEGINS TO FILL



ADS (Air Distribution System) Continued

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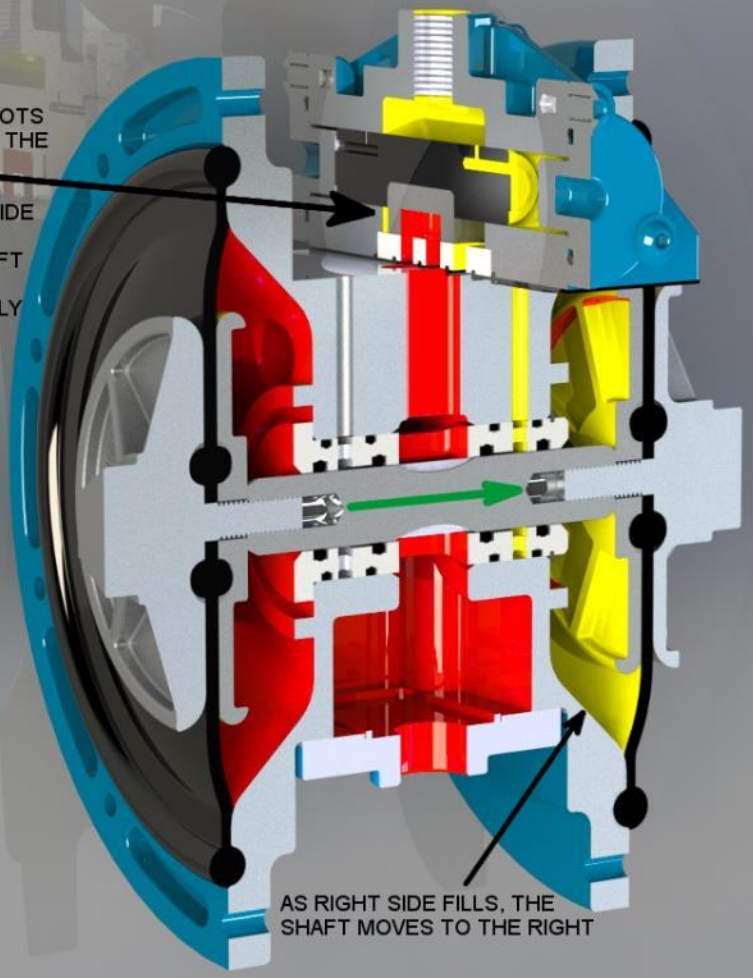
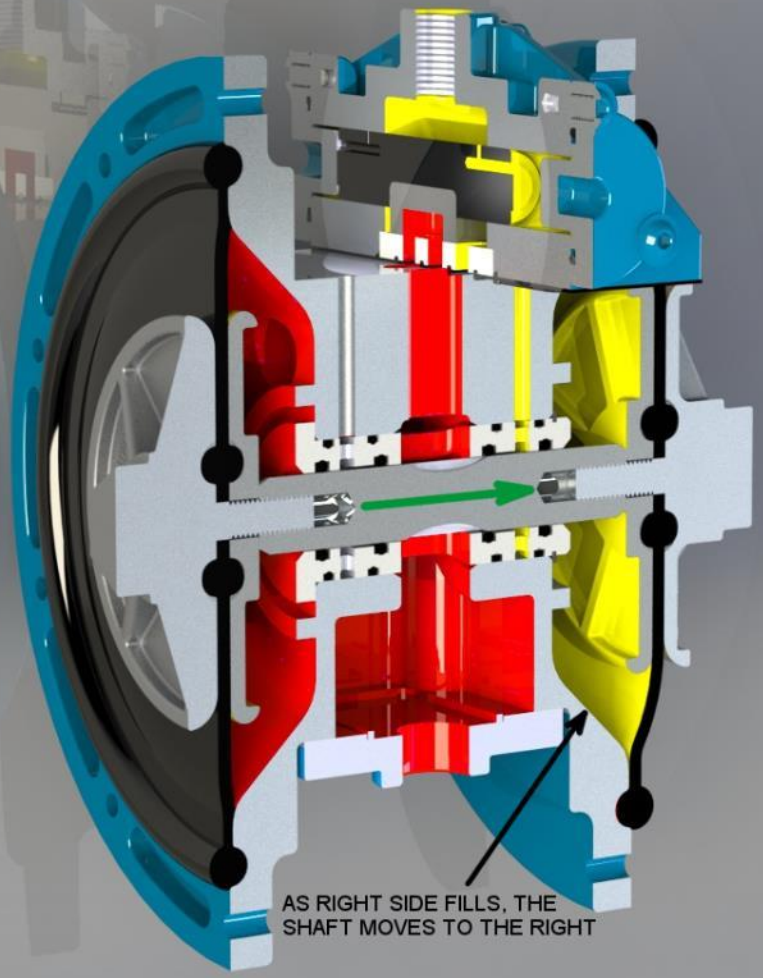
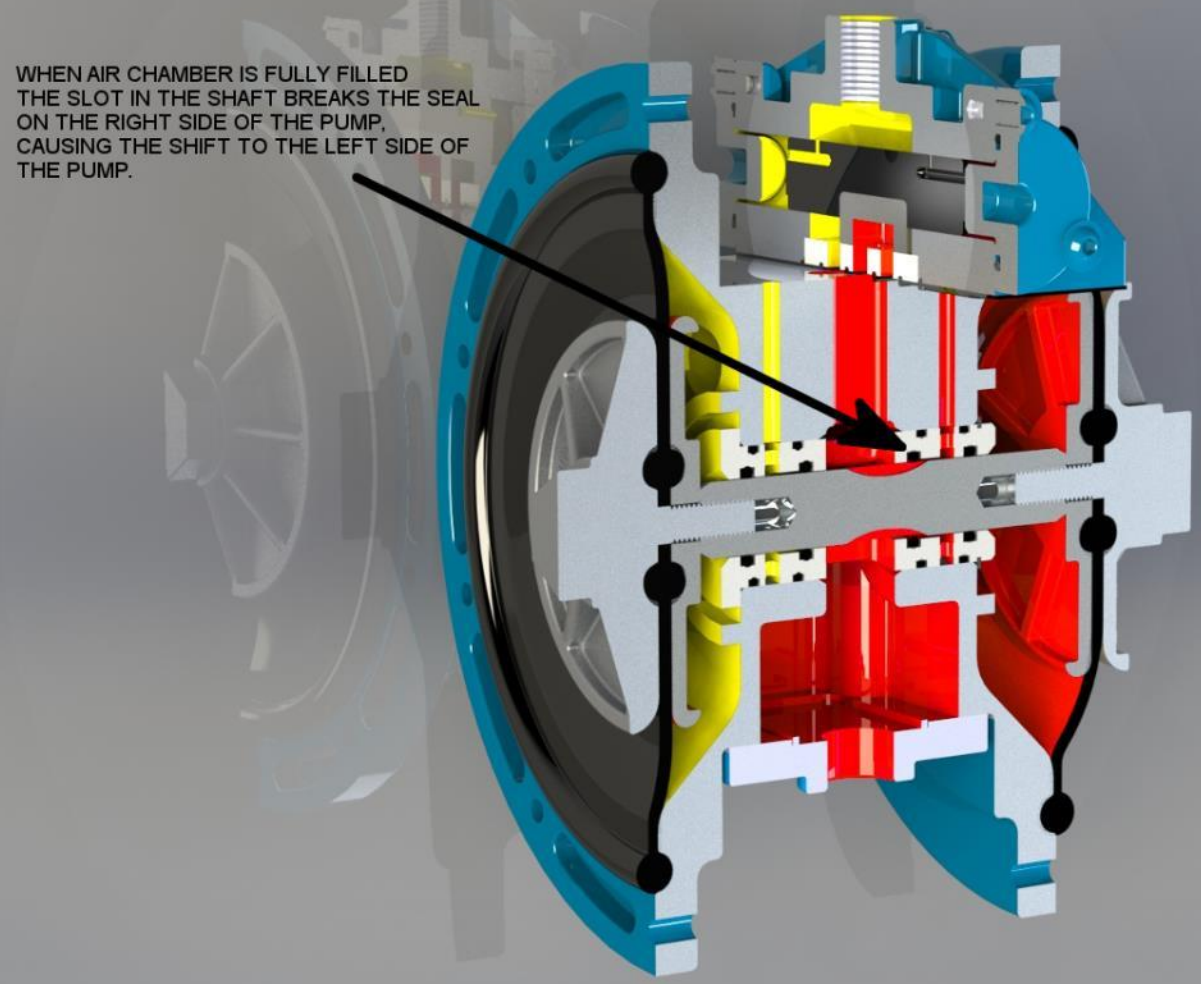


ADS (Air Distribution System) Continued

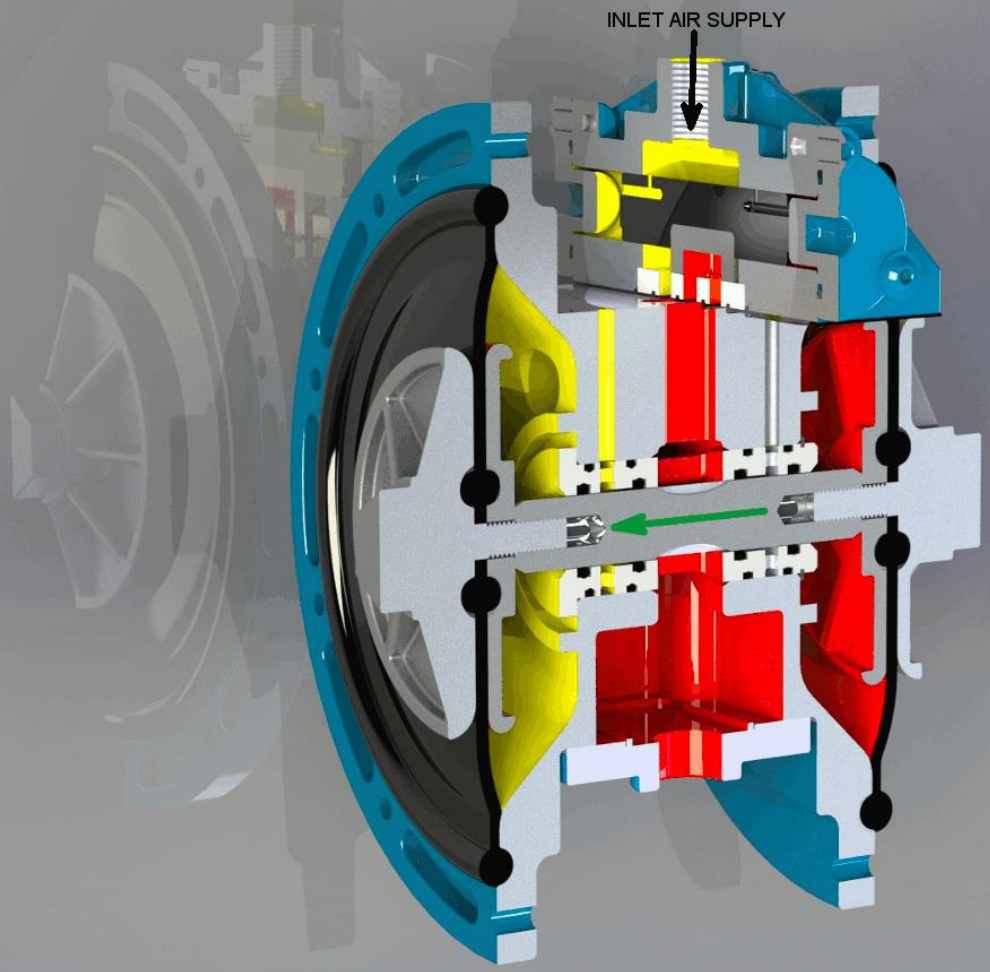


ADS (Air Distribution System) Continued



Air System Animation

Click “Play” Button



Pump Design

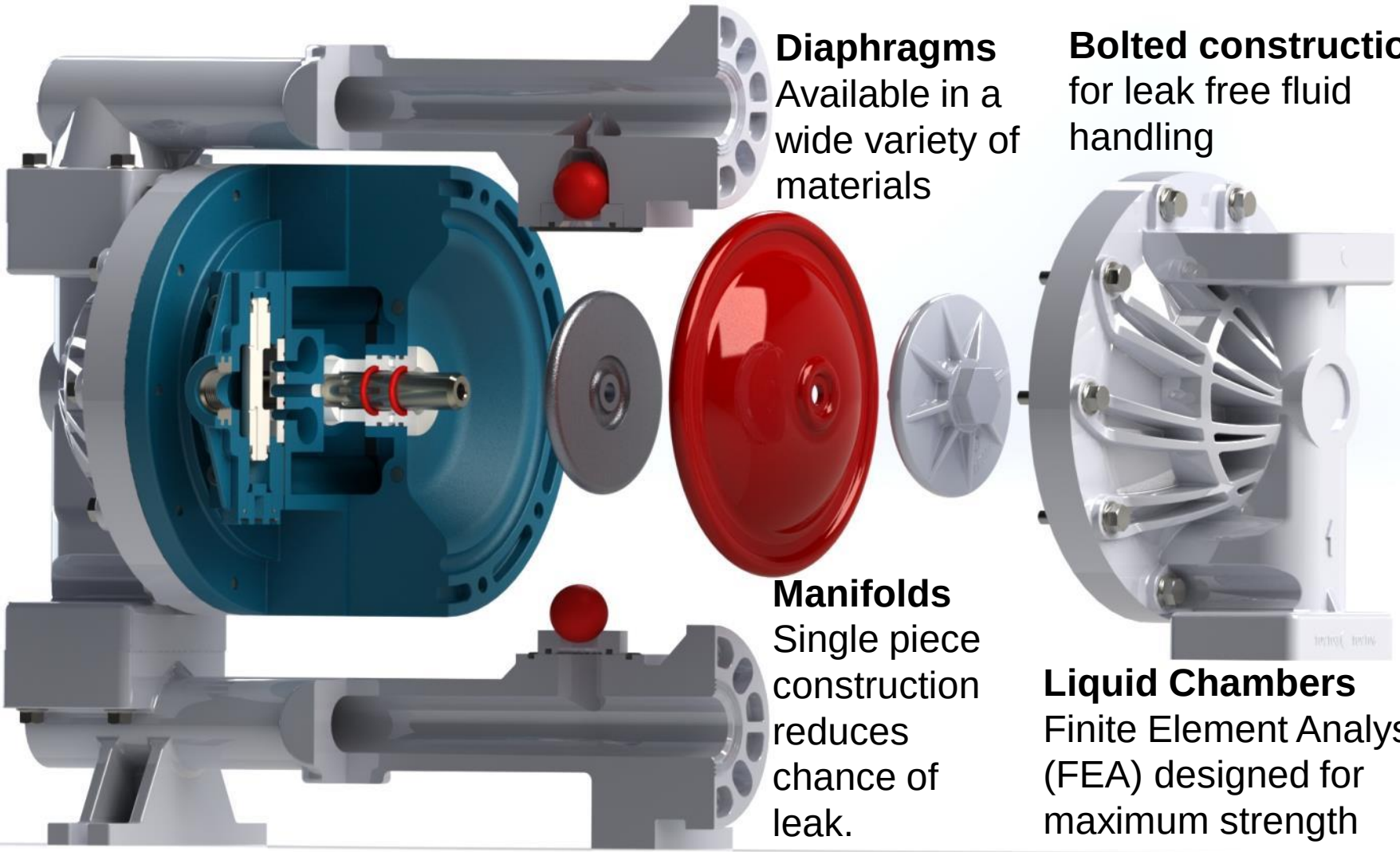
Our engineers are experts at designing robust and reliable pumping solutions for harsh industrial environments.

Simplicity of Design
Low number of parts for easy maintenance and improved reliability

Modular Design
Modular design simplifies maintenance with individually replaceable, lower cost wear parts and requires no special tools.

100% Factory Tested
Every pump is factory tested with an automated three point test for vacuum, leakage and run ability. Only air is used during testing to ensure no residual water is present when received.

A Look Inside
Pump Features



Diaphragms
Available in a wide variety of materials

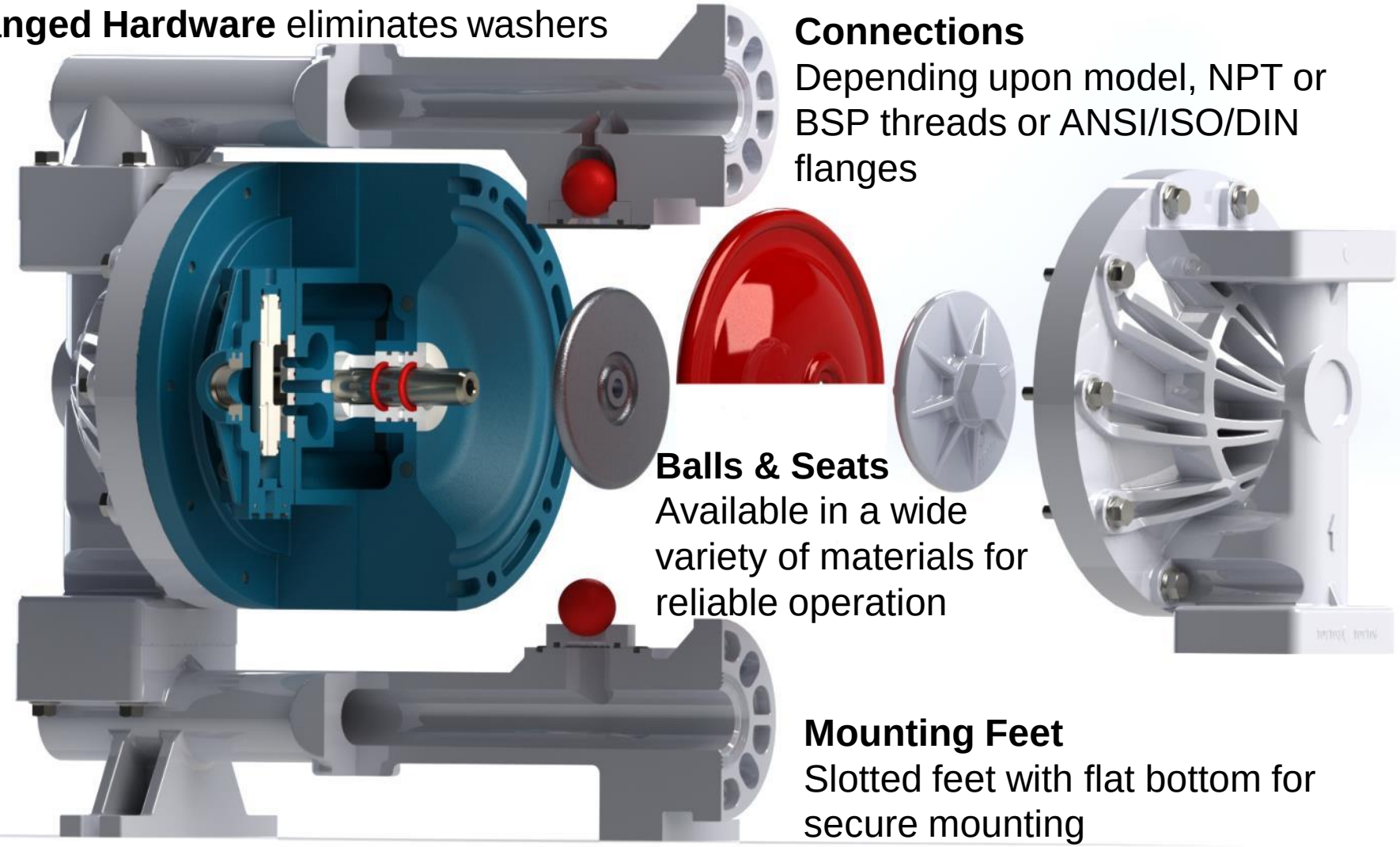
Bolted construction
for leak free fluid handling

Manifolds
Single piece construction reduces chance of leak.

Liquid Chambers
Finite Element Analysis (FEA) designed for maximum strength

A Look Inside
Pump Features

Flanged Hardware eliminates washers



Connections
Depending upon model, NPT or BSP threads or ANSI/ISO/DIN flanges

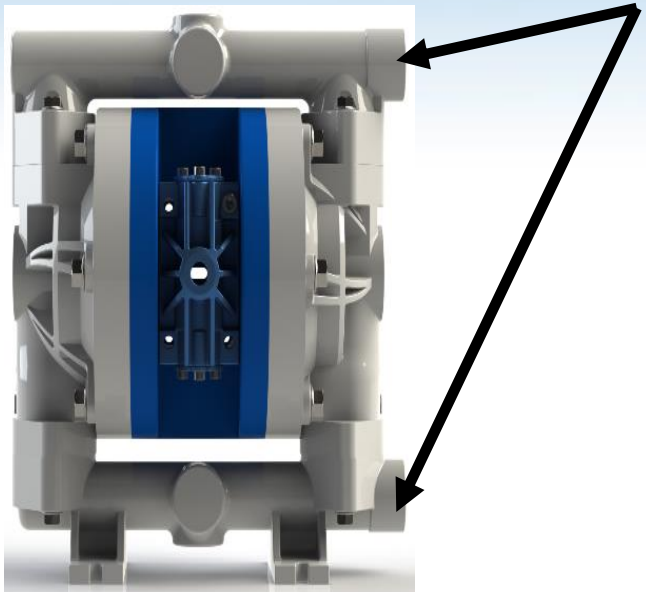
Balls & Seats
Available in a wide variety of materials for reliable operation

Mounting Feet
Slotted feet with flat bottom for secure mounting

Standard Port Orientation

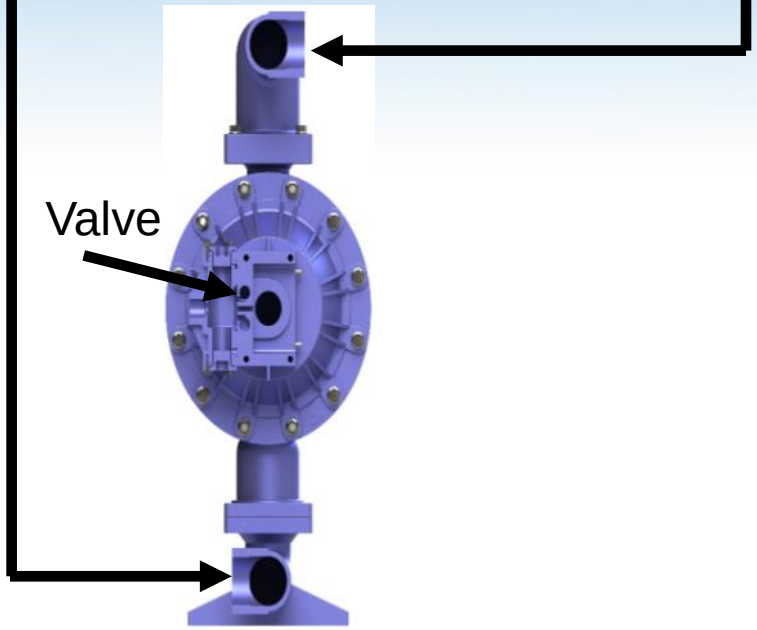
End Ported Pumps

- Facing same direction
- To the right when looking at valve



Center Ported Pumps

- Discharge towards muffler
- Suction towards valve

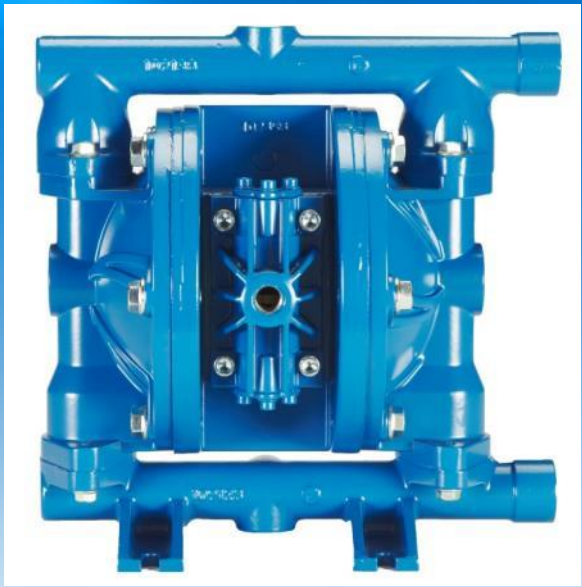


NOTE: Pumps selected with OPTIONAL center port location (pumps with standard end port) will have discharge towards muffler and suction towards valve.

Model FT05 Metallic Pumps

Specifications	
Wetted Materials	Aluminum, 316 SS
Suction & Discharge Size	½" x ½"
Standard Porting Location	End
Connection Types	NPT, BSP
Air Inlet & Exhaust Size	¼" FNPT x ½" FNPT

Capabilities	
Max Flow	20 gpm (77 lpm)
Max Air Supply Pressure	120 psi (8.3 bar)
Displacement/Stroke	0.02 gal (0.08 lit)
Min. Air Inlet Pressure	10 psi (0.7 bar)
Max Particle Size	0.19 in (4.7 mm)
Sound Pressure	72.1 dB(A)

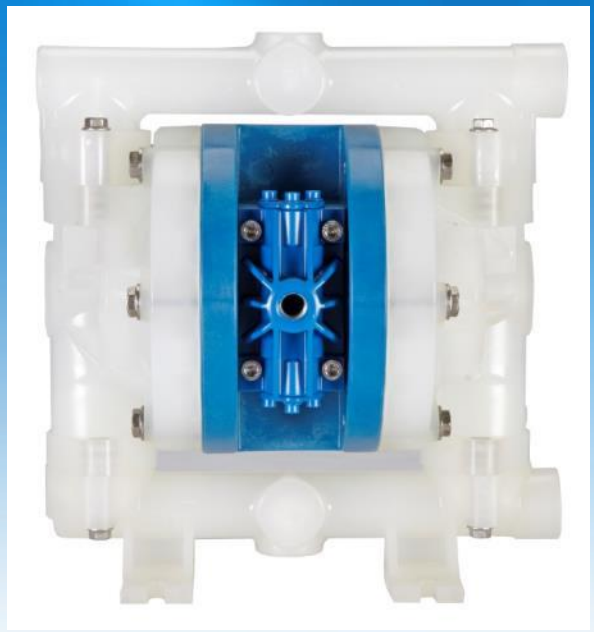


Note: Aluminum pumps are powder coated

Model FT05 Non-Metallic Pumps

Specifications	
Wetted Materials	Polypropylene, PVDF
Suction & Discharge Size	½" x ½"
Standard Porting Location	End
Connection Types	FNPT, FBSP
Air Inlet & Exhaust Size	¼" FNPT x ½" FNPT

Capabilities	
Max Flow	20 gpm (77 lpm)
Max Air Supply Pressure	100 psi (6.9 bar)
Displacement/Stroke	0.02 gal (0.08 lit)
Min. Air Inlet Pressure	10 psi (0.7 bar)
Max Particle Size	0.19 in (4.7 mm)
Sound Pressure	72.1 dB(A)



Model FT05 Pumps

Connection Options

Standard = End Port

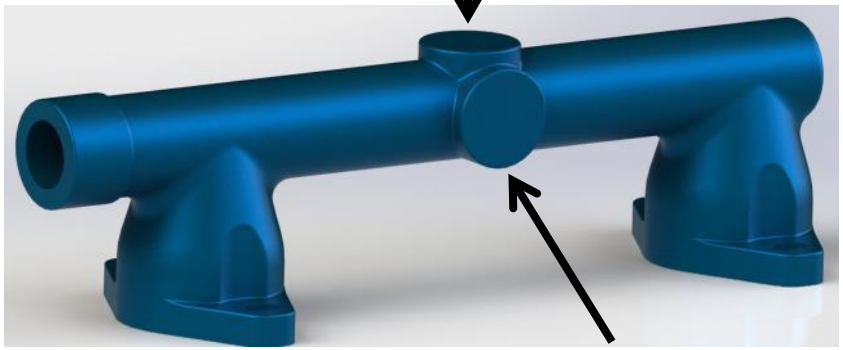
½” FNPT or ½” FBSP

Stainless parts will have both the standard and center horizontal drilled and tapped as received, one will be plugged prior to shipping.

Optional Locations

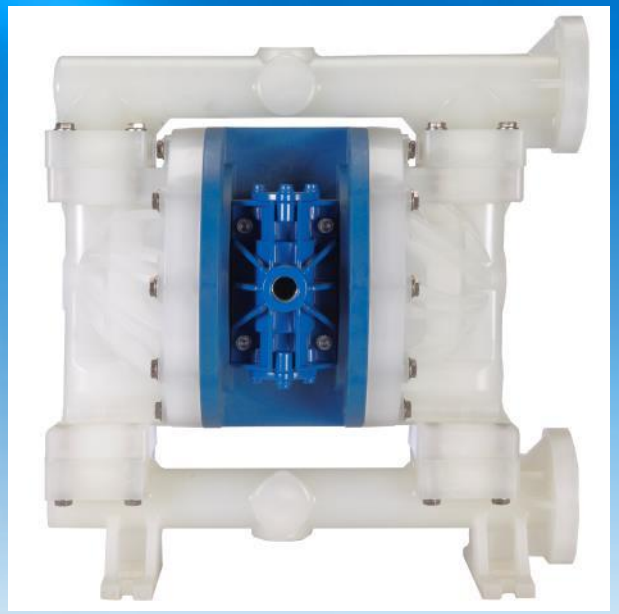
- Center Horizontal
- Center Vertical

½” FNPT or ½” FBSP



Model FT10 Non-Metallic Pumps

Specifications	
Wetted Materials	Polypropylene, PVDF
Suction & Discharge Size	1” x 1”
Standard Porting Location	End
Connection Types	ANSI/DIN/ISO Flange
Air Inlet & Exhaust Size	½” FNPT x ½” FNPT
Capabilities	
Max Flow	54 gpm (204 lpm)
Max Air Supply Pressure	100 psi (6.9 bar)
Displacement/Stroke	0.05 gal (0.19 lit)
Min. Air Inlet Pressure	10 psi (0.7 bar)
Max Particle Size	0.25 in (6.4 mm)
Sound Pressure	73.6 dB(A)



Model FT10 Non-Metallic Pump

Connection Options

Standard = End Port

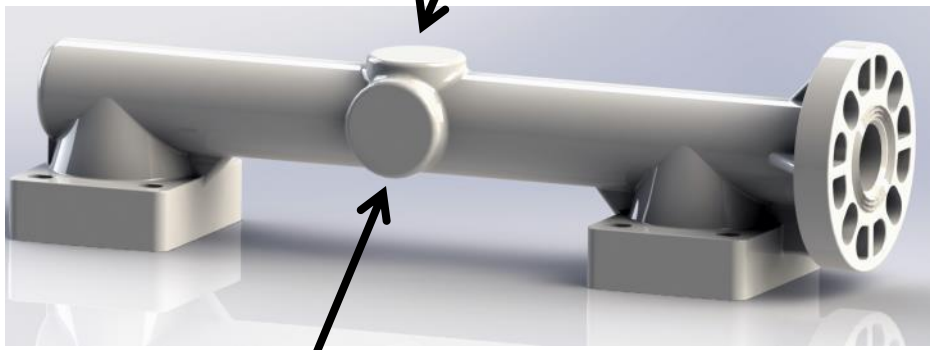
1” ANSI/DIN/ISO Flange

Optional Locations

- Center Horizontal
- Center Vertical

Optional Connection

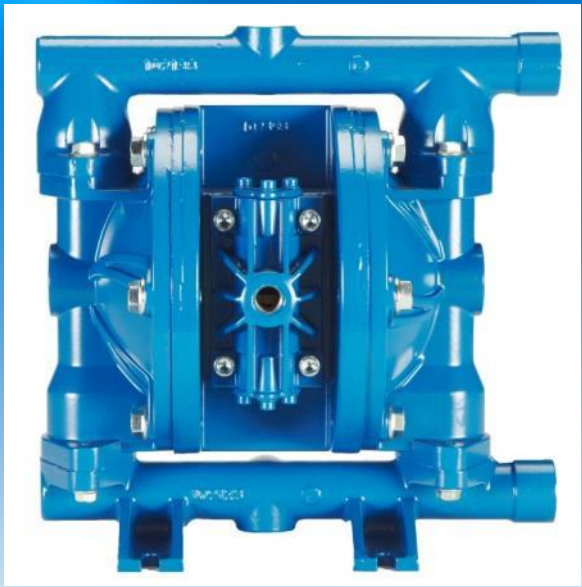
- 1” FNPT
- 1” FBSP



Model FT10 Metallic Pumps

Specifications	
Wetted Materials	Aluminum, 316 SS
Suction & Discharge Size	1” x 1”
Standard Porting Location	End
Connection Types	FNPT, FBSP
Air Inlet & Exhaust Size	½” FNPT x ½” FNPT

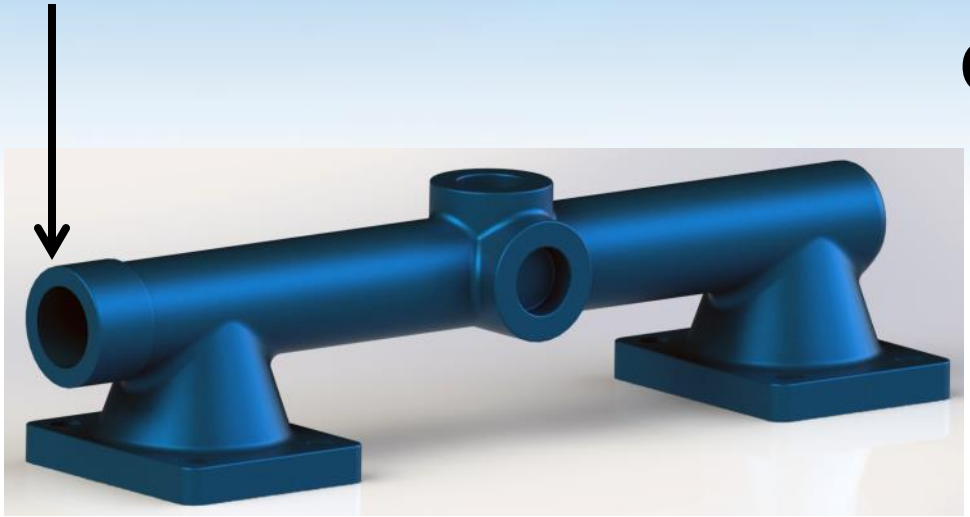
Capabilities	
Max Flow	56 gpm (212 lpm)
Max Air Supply Pressure	120 psi (8.3 bar)
Displacement/Stroke	0.05 gal (0.19 lit)
Min. Air Inlet Pressure	10 psi (0.7 bar)
Max Particle Size	0.25 in (6.4 mm)
Sound Pressure	73.6 dB(A)



Note: Aluminum pumps are powder coated

Model FT10 Metallic Pump
Connection Options

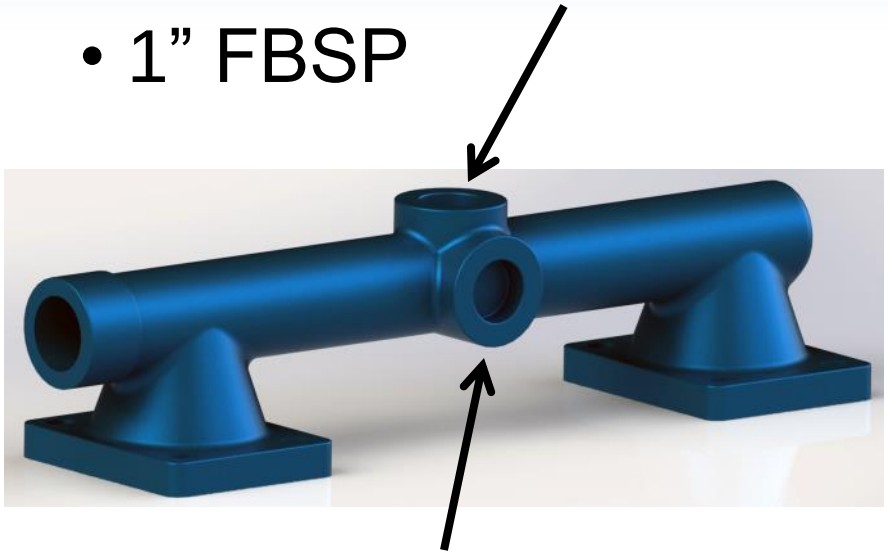
Standard = End Port
1” FNPT or 1” FBSPT



Stainless parts will have both the standard and center horizontal drilled and tapped as received, one will be plugged prior to shipping.

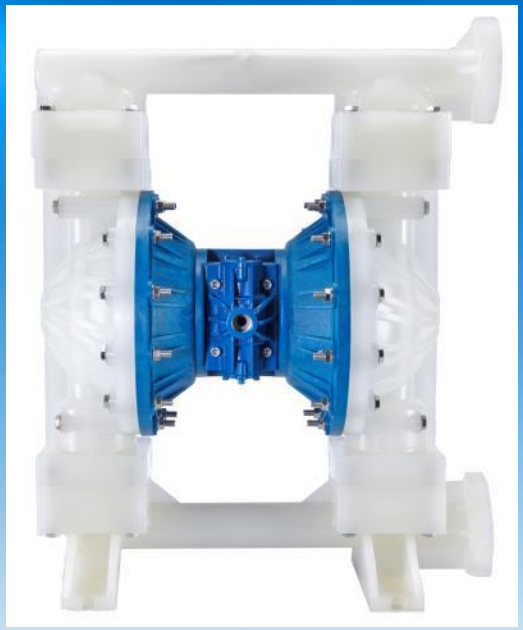
Optional Locations
- Center Horizontal
- Center Vertical

Optional Connection
- 1” FNPT
- 1” FBSP



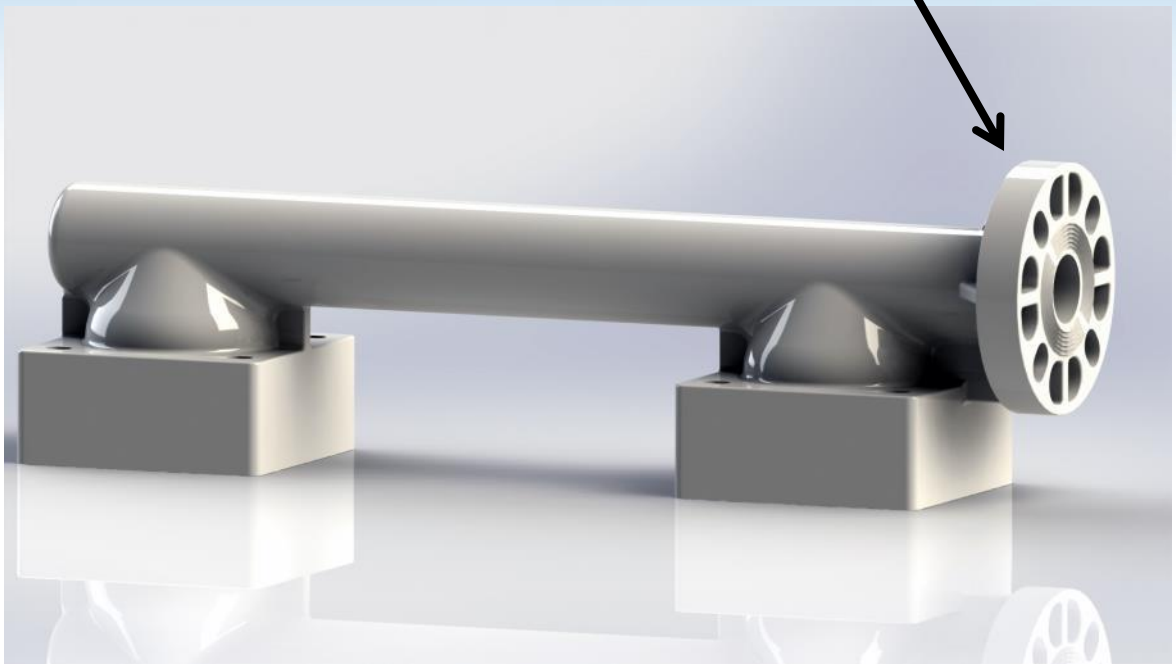
Model FT15 Non-Metallic Pumps

Specifications	
Wetted Materials	Polypropylene, PVDF
Suction & Discharge Size	1.5” x 1.5”
Standard Porting Location	End
Connection Types	ANSI/DIN/ISO Flange
Air Inlet & Exhaust Size	¾” FNPT x ¾” FNPT
Capabilities	
Max Flow	125 gpm (473 lpm)
Max Air Supply Pressure	100 psi (6.9 bar)
Displacement/Stroke	0.31 gal (1.2 lit)
Min. Air Inlet Pressure	10 psi (0.7 bar)
Max Particle Size	0.35 in (8.9 mm)
Sound Pressure	77 dB(A)



Model FT15 Non- Metallic Pump
Connection Options

Standard = End Port
1.5” ANSI/DIN/ISO Flange



Optional Locations
- None

Optional Connection
- None

Model FT15 Metallic Pumps

Specifications	
Wetted Materials	Aluminum, 316 SS
Suction & Discharge Size	1.5” x 1.5”
Standard Porting Location	End
Connection Types	FNPT, FBSP
Air Inlet & Exhaust Size	¾” FNPT x ¾” FNPT
Capabilities	
Max Flow	132 gpm (500 lpm)
Max Air Supply Pressure	120 psi (8.3 bar)
Displacement/Stroke	0.31 gal (1.2 lit)
Min. Air Inlet Pressure	10 psi (0.7 bar)
Max Particle Size	0.35 in (8.9 mm)
Sound Pressure	77 dB(A)

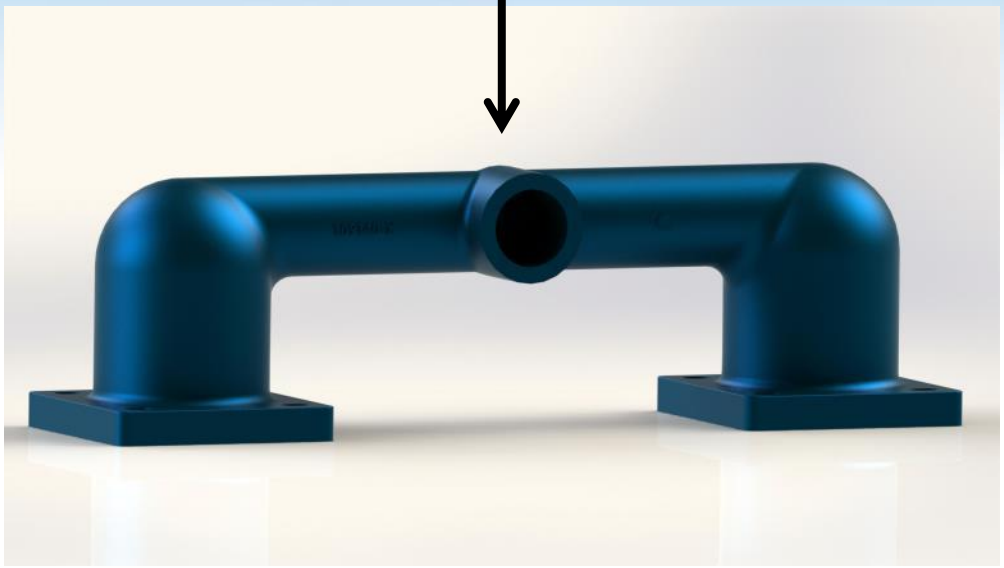
Note: Aluminum pumps are powder coated

Model FT15 Metallic Pump
Connection Options

Standard = Center Port

2” FNPT

2” FBSPT



Optional Locations

- None

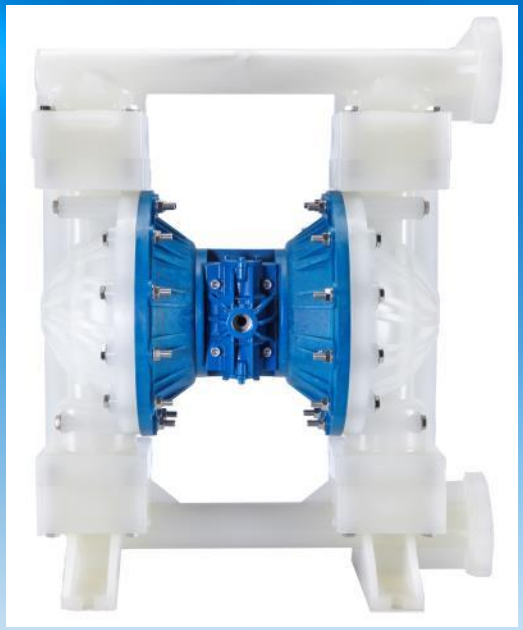
Optional Connection

- Aluminum = None
- Stainless Steel = 1.5” ANSI/DIN/ISO Flange

Flange is two piece Vanstone style

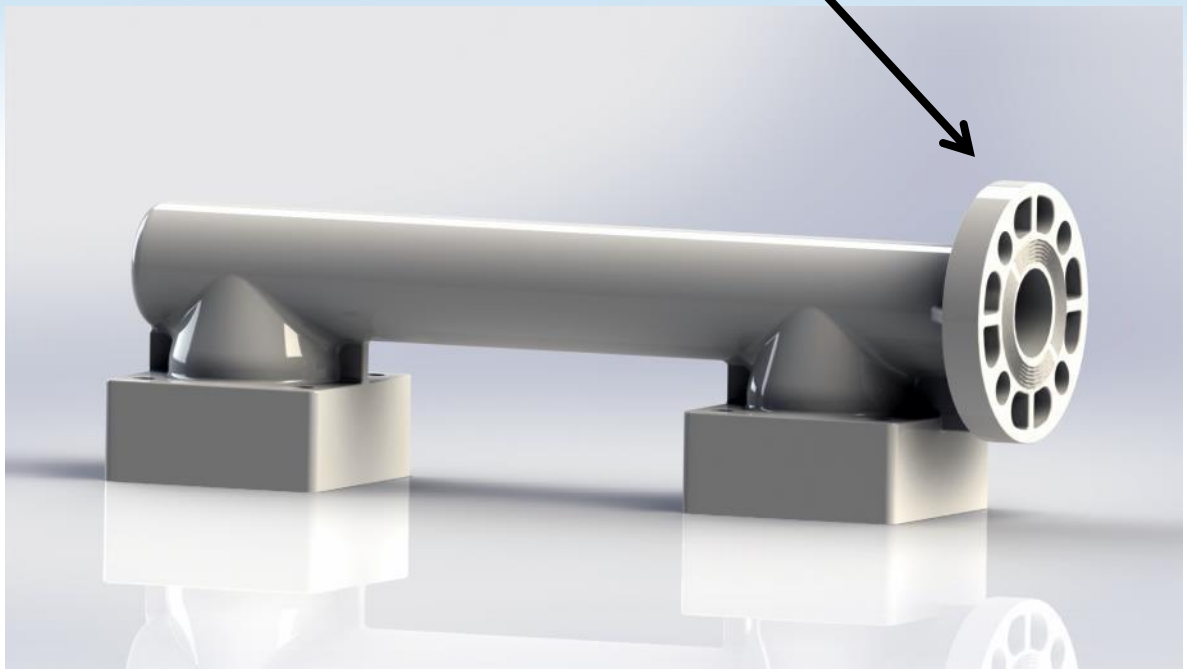
Model FT20 Non-Metallic Pumps

Specifications	
Wetted Materials	Polypropylene, PVDF
Suction & Discharge Size	2” x 2”
Standard Porting Location	End
Connection Types	ANSI/DIN/ISO Flange
Air Inlet & Exhaust Size	¾” FNPT x ¾” FNPT
Capabilities	
Max Flow	154 gpm (583 lpm)
Max Air Supply Pressure	100 psi (6.9 bar)
Displacement/Stroke	0.31 gal (1.2 lit)
Min. Air Inlet Pressure	10 psi (0.7 bar)
Max Particle Size	0.35 in (8.9 mm)
Sound Pressure	77 dB(A)



Model FT20 Non- Metallic Pump
Connection Options

Standard = End Port
2” ANSI/DIN/ISO Flange



Optional Locations
- None

Optional Connection
- None

Model FT20 Metallic Pumps

Specifications	
Wetted Materials	Aluminum, 316 SS
Suction & Discharge Size	2” x 2”
Standard Porting Location	End
Connection Types	FNPT, FBSP
Air Inlet & Exhaust Size	¾” FNPT x ¾” FNPT
Capabilities	
Max Flow	156 gpm (590 lpm)
Max Air Supply Pressure	120 psi (8.3 bar)
Displacement/Stroke	0.31 gal (1.2 lit)
Min. Air Inlet Pressure	10 psi (0.7 bar)
Max Particle Size	0.35 in (8.9 mm)
Sound Pressure	77 dB(A)

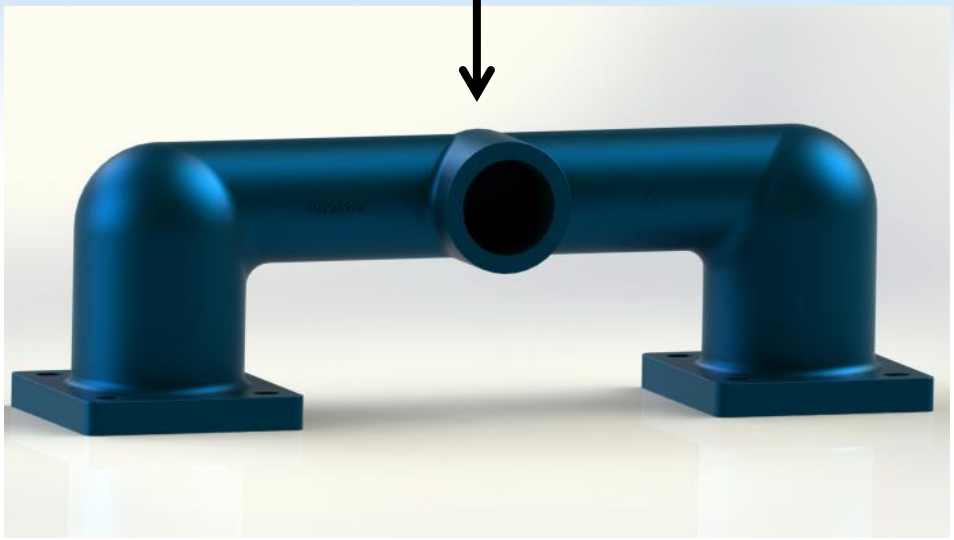
Note: Aluminum pumps are powder coated

Model FT20 Metallic Pump
Connection Options

Standard = Center Port

2” FNPT

2” FBSPT



Optional Locations

• None

Optional Connection

• Aluminum = None

• Stainless Steel =

2” ANSI/DIN/ISO Flange

Flange is two piece Vanstone style

Material Temperature Chart

Material	Chemical Composition	Description	Operating Temp º F (ºC)	
			Min.	Max.
Polypropylene	Pure Polypropylene	Thermoplastic that is resistant to alkali and strong acids.	32°F (0°C)	158°F (70°C)
PVDF	Pure Polyvinylidene Fluoride	Strong fluoropolymer with excellent chemical resistance.	10°F (-12°C)	220°F (104°C)
Stainless Steel	316 Stainless Steel	Excellent chemical resistance, high tensile and impact strength, abrasion resistant.	**Limited by other materials used**	
Aluminum	ADC 12, LM24, LM25	Moderate chemical resistance with good impact strength and abrasion resistance.	**Limited by other materials used**	
Buna	Acrylonitrile-butadiene Rubber	General purpose elastomer.Resistant to oil, water, solvent, and hydraulic fluid.	10°F (-12°C)	190°F (88°C)
EPDM	Ethylene Propylene Diene Rubber	Good resistance to mild acids, detergents, alkalis, ketones, and alcohols.	-40°F (-40°C)	250°F (121°C)
FKM	Fluorocarbon Rubber	Good chemical resistance and high temperature properties. Resistant to most acids, aliphatic, aromatic, and halogenated hydrocarbons, oils, grease, and fuels.	-40°F (-40°C)	350°F (177°C)
Neoprene	Chloroprene Rubber	General purpose elastomer with good resistance to moderate chemicals, oils, grease, solvents, and some refrigerants.	0°F (-18°C)	212°F (100°C)
Santoprene™	Fully cured EPDM rubber particles encapsulated in a polypropylene (PP) matrix	Thermoplastic elastomer with good abrasion resistance with chemical resistance to a wide range of solvents and chemicals. Injection molded with no fabric layer.	-40°F (-40°C)	225°F (107°C)
Hytrel®	Thermoplastic polyester elastomer	Combines resistance and flexibility of elastomers with the strength of plastics. Resistant to acids, bases, amines, and glycols. Injection molded with no fabric layer.	-20°F (-29°C)	220°F (104°C)
Polyurethane	Polyester Urethane	Thermoplastic that exhibits excellent abrasion resistance.Injection molded with no fabric layer.	32°F (0°C)	150°F (66°C)
PTFE	Polytetrafluoroethylene	Chemically inert. Resistant to a wide range of chemicals.	40°F (4°C)	225°F (107°C)
FEP	Fluorinated Ethylene Propylene	Similar to PTFE in composition and chemical resistance. Used to encapsulate FKM o-rings for superior chemical resistance.	40°F (4°C)	225°F (107°C)

Pump Matrix

PART # FT XX X - X X - X X X X - X X - X

Series	Pump Size	Wetted Material	Non-wetted Material	Air Valve Material	Diaphragm Material	Check Valve Ball	Check Valve Seat	Seat O-ring	Connection	Porting Location	Specials

Series
FT - Pump End
FW - Wet End

Pump Size
05 - 1/2"
10 - 1"
15 - 1.5"
20 - 2"
30 - 3"

Wetted Materials
P - Polypropylene
V - PVDF
A - Aluminum
S - 316SS

Non-wetted Materials
P - Polypropylene
A - Aluminum

Air Valve Materials
A - Aluminum
P - GFRPP

Diaphragm Materials
N - Neoprene
B - Buna-N
E - EPDM
F - FKM
R - Santoprene
H - Hytrel
U - Polyurethane
1 - PTFE/Neoprene
2 - PTFE/Santoprene

Check Valve Ball Materials
N - Neoprene
B - Buna-N
E - EPDM
F - FKM
R - Santoprene
T - PTFE

Check Valve Seat Materials
A - Aluminum
S - 316SS
P - Polypropylene
V - PVDF
T - PTFE
N - Neoprene
B - Buna-N
E - EPDM
F - FKM
R - Santoprene
H - Hytrel
U - Polyurethane

Check Valve Seat O-Ring Materials
N - Neoprene
B - Buna-N
E - EPDM
F - FKM
T - PTFE
U - Polyurethane
C - FEP/FKM
0 - None

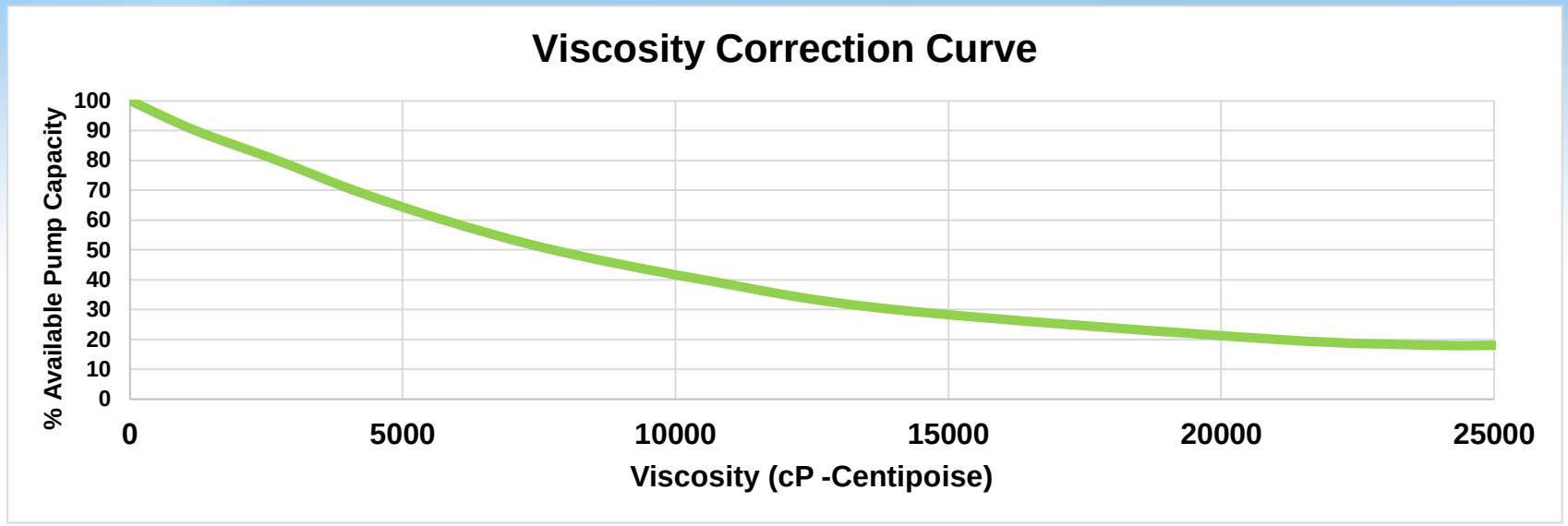
Connection
N - FNPT
B - FBSP
F - ANSI/DIN flange
1 - Center port threaded

Porting location
1 - End (standard)
2 - Center horizontal
3 - Center vertical

Specials
A - ATEX/HAZLOC

Viscosity chart with example

All capacity curves are based on viscosity of water (1 cP). An adjustment must be made when pumping viscous media. Viscous media reduces capacity and increases pipe friction. Use the chart below to adjust the pumping capacity.



Example: 2” pump maximum flow on water = 156 gpm (590 lpm)
Adjusted flow for 25,000 cP fluid = 156 gpm (590 lpm) X .2 = 31.2 gpm (118 lpm)

ATEX – Hazardous Location

- Aluminum and stainless steel models are ATEX certified for **II 2GD c IIB TX**
- ATEX models include conductive muffler plate, metal muffler and grounding lug
- All models ½”/13mm through 2”/51mm can use any of the available diaphragm materials
- ATEX models are also suitable for use in hazardous locations in non-European Union countries
- Use “A” in “Specials” code in pump matrix part number system and add price adder for ATEX/HazLoc option
- Optional six foot (183 cm) ground wire assembly is also available as an accessory

Accessories

Filter/Regulator
Compact, integrated design saves space and reduces piping, includes dual scale psi/MPa gage. Filters incoming air to five microns. Regulator adjusts air pressure from 7.3 to 120 psig (.5 to 8.3 Bar).

AODDampener
AODDampener is unique pulsation dampener manufactured from 316L stainless steel with PTFE backed diaphragm, has fully automatic air control and handles a wide variety of applications.

Pulsation Dampeners
Removes virtually all hydraulic shock while producing a near steady flow of fluid. Protects piping, valves and fittings from destructive pulsations and surges. Available in a wide range of materials of construction.

SPILLSTOP
Fully pneumatic system safely captures leaked product due to diaphragm failure and automatically shuts down failed pumps to eliminate costly product loss and prevent hazardous spills.

Applications

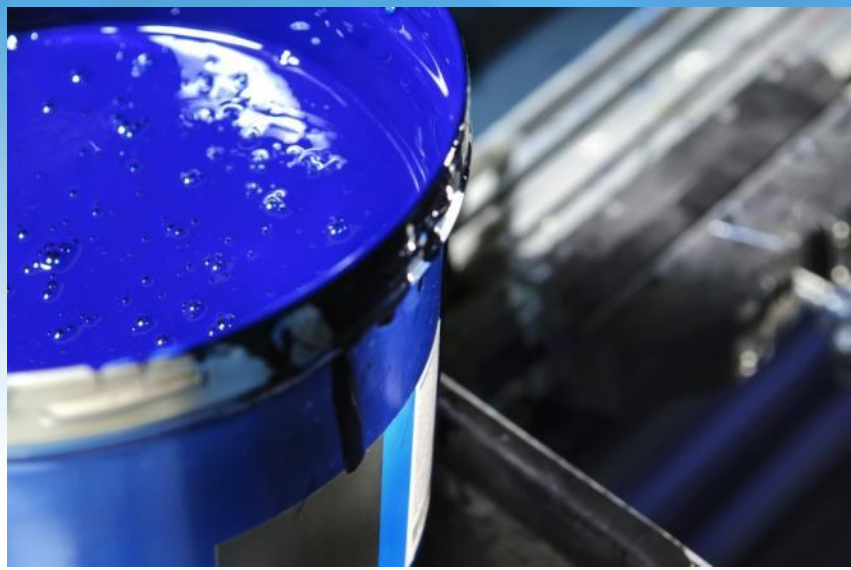
Mining

- Dewatering above and below ground sites and quarries
- Abrasive slurries and sludge mixtures
- Dosing Reagents
- Transfer solvents for separating minerals from ore
- Transfer fuels for vehicles and equipment
- Can operate in classified/hazardous areas

Applications

Coatings

- Transferring, dispensing and dosing paint, ink and dyes
- Can pump low to very viscous solutions
- Feed pump for spray guns
- Flush/clean paint lines with solvents
- When low shear / gentle fluid transfer is desired



Applications

Ceramics

- Highly abrasive slurries
- Ceramic slips
- Day tank transfer
- Filling molds
- Circulate ceramic slurry
- Waste water

Applications

Chemical Manufacturing and Distribution

- Excellent chemical resistance with corrosive/hazardous chemicals
- Loading and unloading tankers, totes and barrels
- Can pump low to very viscous solutions
- Use for portable utility pump
- Use for batching/dosing chemicals

Applications

Electroplating and Anodizing

- Replenish chemicals in plating and metal finishing tanks
- Agitate cleaning solutions
- Circulation of liquid to avoid sedimentation
- Filtration …when critical purification is required for high quality parts
- Offload corrosive, solid laden waste

Applications

Pulp and Paper

- Printing inks
- Glues
- Kaolin clay
- Bulk transfer
- Resins
- Dispersions

Applications

Oil and Gas

- Can operate in classified/hazardous areas
- Settling pond transfer
- Oils and glycol transfer
- Sumps
- Filter press
- Bulk transfer

Applications

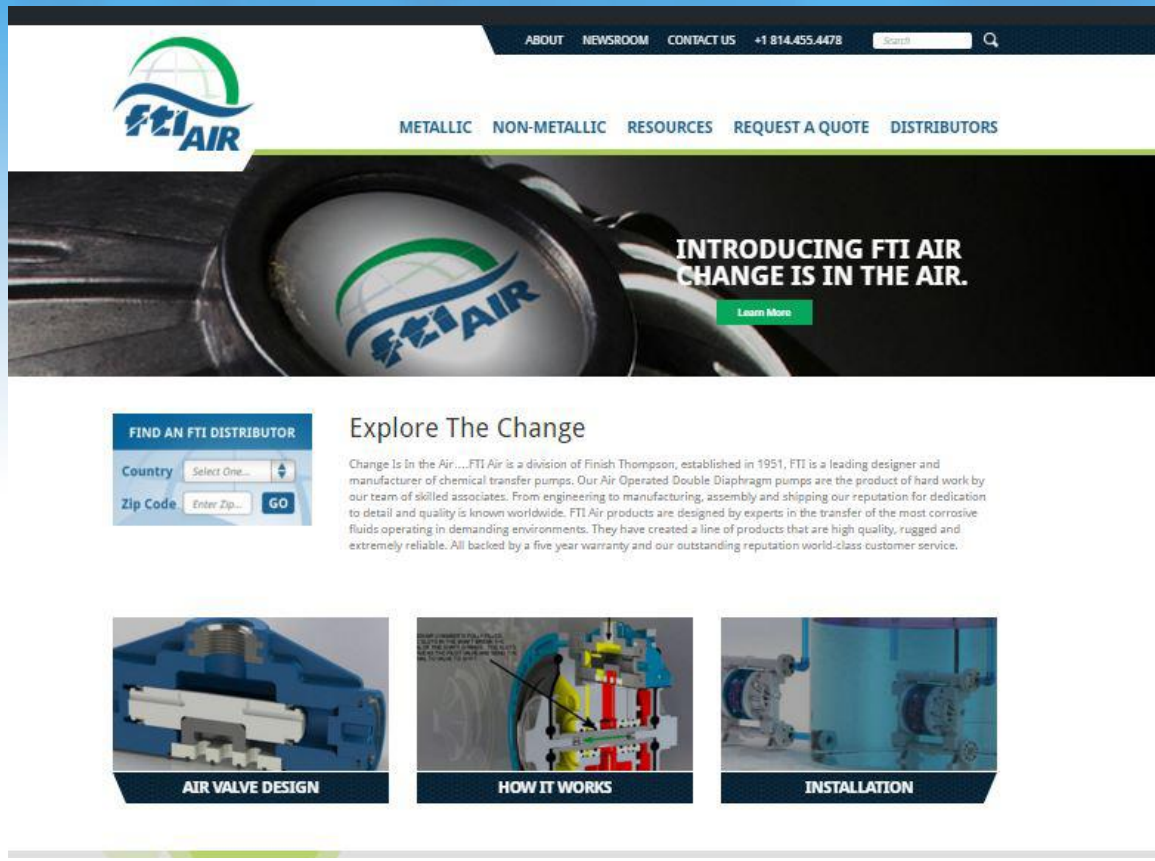
Water / Waste Water Treatment

- Transferring solid laden media
- Filter press
- Sumps
- Utility

Marketing Materials

Website is www.ftiair.com

- Comprehensive site with a modern look and feel
- “Sticky” navigation keeps header in view as user scrolls down the page
- Responsive design is mobile device friendly
- Site is loaded with technical information including brochure, tech fliers, manuals and drawings

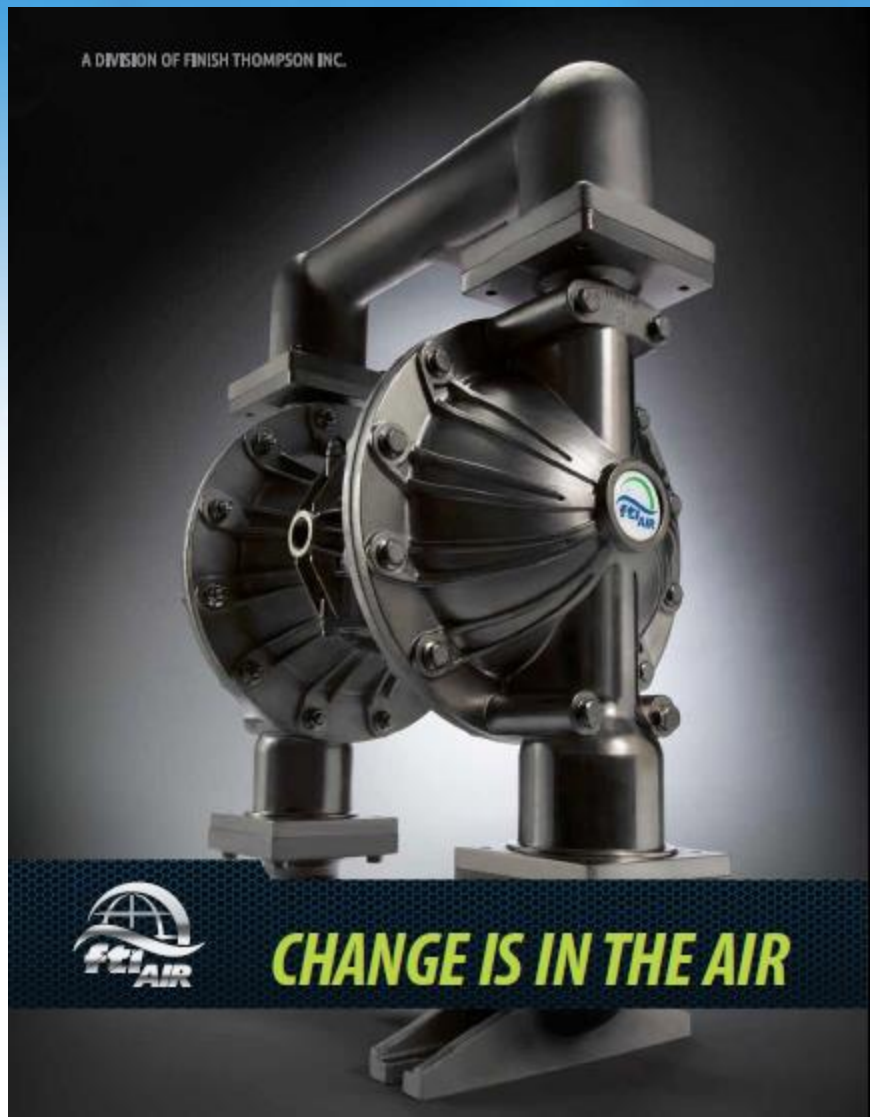


Marketing Materials

Brochure

Contains information on:

- Benefits of AODD pumps
- FTI Air pump design
- Exploded view
- How it works
- Installation options
- Pump model data pages
- Pump part number matrix
- Viscosity adjustment curve
- Material temperature chart
- Accessories



Marketing Materials

Tech Fliers

Contains:

- Product photo
- Specifications
- Capabilities
- Performance curve
- Material options
- Weight and dimensions
- Dimensional drawing

Marketing Materials

- **Price List**
- **Manuals**
- **Chemical Resistance Guide**

The information in this chart is to be used only as a guide. FTI does not warrant (neither express or implied) that the information in this chart is accurate or complete. If a number is in a cell that is the maximum temperature for that material in degrees Fahrenheit.

Key:
A = Excellent
B = Good
C = Fair
X = Not Recommended
ND = No Data Available

Chemical Name	Aluminum	316SS	Polypropylene	PVDF	Neoprene	Buna	Santoprene	Hytrel	FKM	EPDM	PTFE	Polyurethane
Acetamide	A	A	A/125	A	B	C	A	ND	A	A	A	X
Acetic Acid, 10%	B	A	A	A	C	C	C	A	X	A	A	C
Acetic Acid, 20%	B	A	A	A	C	C	C	A	X	A	A	C
Acetic Acid, 50%	X	A	B	A	C	C	C	A	X	A	A	C
Acetic Acid, 80%	C	A	B	A	C	C	C	A	X	A	A	X
Acetic Acid, Glacial	B	A	C	B	X	X	C	A	X	B	A	X
Acetone	B	A	X	X	X	X	B	C	X	A	A	X
(Methylcyanide)	A	A	C	B	C	X	A	A/70	X	A	A	B
Acetylene	A	A	X	A	C	X	C	A	A	A	A	X
(Propenoic Acid)	A	B	A/70	A	ND	ND	A	ND	X	A	A	X
Acrylonitrile	A	A	B	A	X	X	B	ND	X	X	A	X
Alcohol, Butyl	C	A	A	A	C	A	C	C	A	A	A	X
Alcohol, Butyl, Secondary	C	A	A	A	C	A	C	C	C	C	A	X
Alcohol, Ethyl	B	A	A	A	C	A	C	C	C	A	A	X
Alcohol, Isopropyl	B	A	A	A	C	B	B	C	A	A	A	X
Alcohol, Methyl	B	A	A	A	C	A	C	C	X	A	A	X
(Isopropyl Alcohol)	C	B	A	A	C	A	C	ND	A	A	A	X
Alcohols	C	A	A	A	C	B	ND	C	C	C	A	ND
Aluminum Acetate	A	C	A/100	A	C	B	A	ND	X	A	A	X
Aluminum Chloride, 1%	X	C	A	A	A	A	A/70	B	A	A	A	B
Aluminum Chloride, 5%	X	X	A	A	A	A	ND	C	A	A	A	X
Aluminum Chloride, 20%	X	X	A	A	A	A	A	B	A	A	A	C
Aluminum Chloride, 40%	X	X	A	A	A	A	ND	B	A	A	A	X
Aluminum Chloride, 100%	X	B	A	A	A	A	A	B	A	A	A	B
Aluminum Potassium Sulfate	C	A	A	A	A	A	A	ND	A	A	A	X

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