CARLISLE
FLUID TECHNOLOGIES

FINISHING EDUCATION UNIVERSITY

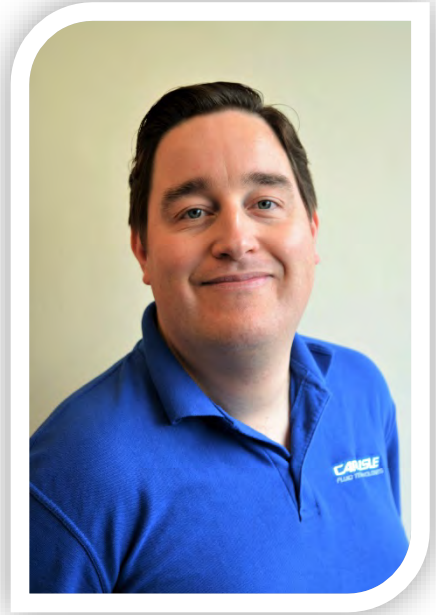
Industrial Fluid Supply Products

Webinar

October 2021

Webinar Overview

- **Dominic Martin**
- *Global Fluid Handling Product Manager*



- Match supply to atomization
- Effects of material choice on pumps
- Diaphragm pump range
- Pressure tank range
- Vertical piston pump range
- Horizontal bellows pump range
- Agitators
- Elevators
- Fluid regulators

Picking The Supply Method

Pump Type	Fluid Transfer	Air Atomization	Hydraulic Atomization	
	Low Pressure		Air Assisted Airless	Airless
Diaphragm Pump (AODD)	✓	✓	×	×
	Diaphragm pumps do not harm/shear sensitive paints (they squeeze, especially for specialist coatings			
Pressure Tank	×	✓	×	×
	Pressure pots are simple, robust but are pressurized containers and are heavy to move around. Good for materials sensitive to moisture and sensitive to shear, no pulsation.			
Pogo Plus	✓	✓	×	×
	Low pressure drum pumps for high volume fluid transfer and spray applications of low-medium viscosity fluids			
MX & MXL Pump	×	×	✓	✓
	High pressure, 2-ball piston pumps available in packages to make it easier to start spraying			
Maple Pump	×	×	✓	✓
	Best for applications that require no exterior leaking seals, shear and moisture sensitive			

Elevators / Agitators / Fluid Regulators

The Effects Of Material On Pumps

Understanding how paint influences your equipment choice

Many types Of Coatings Materials

o Solvent Based
- primary solvents used are VOC's

o Water Borne
- water is the primary solvent but not the only solvent
- Water-Borne coatings can contain small amounts of VOC's call co-solvents
- The solvents are dispersion intermediary; enabling water and polymers to mix in a way that they wouldn't without the VOC

o Water Based
- term used interchangeably but could mean that there are no VOC co-solvents

o Multi Component
o "UV" Coatings
o Adhesives
o Lubricants
o Mold Making/Casting Release Agent
o Dyes

What's In A Fluid?

4 Coating Components

Binder, Resin Or Polymer – holds other components together prior to application. Protects the substrate.

Examples
Polyurethane
Epoxy
Alkyd
Cellulose
Vinyl

What's In A Fluid?

4 Coating Components

Pigment – provides the colour, enhances coating properties (e.g corrosion resistance), hides the substrate.

What's In A Fluid?

4 Coating Components

Solvent – adjusts the viscosity of the binder for efficient application and curing characteristics.

Examples
Xylene
Toluene
Acetates
Keytones
Alcohols
Mineral Spirits

What's In A Fluid?

4 Coating Components

Additives – anything else used to give the coating its properties

Examples
Filler
Plasticisers
Metal Flake
UV Stabilisers

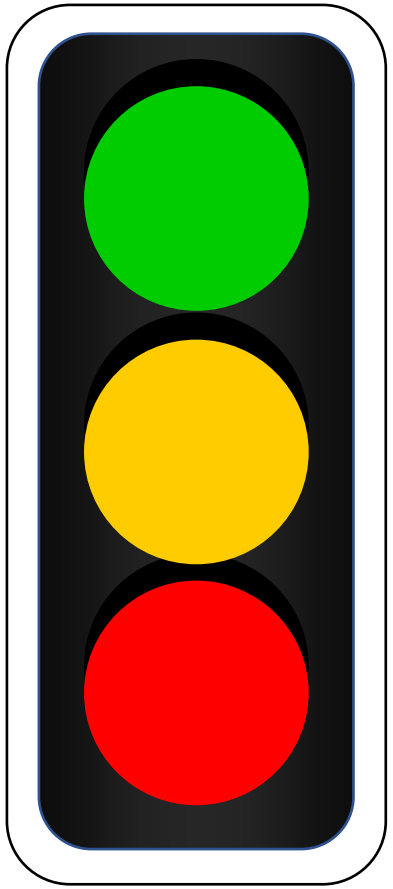
Difficult Ingredients

Cu
Copper

Fe
Iron

Zn
Zinc

Mg
Magnesium



Polyurethane
Alkyd
Toluene
Top-coat

Primer
Epoxy
Metallic

Corrosion protection
Zinc
Mio

Pb
Lead

Ti
Titanium

Si
Silicon

Al
Aluminium

Solvents

- "Any liquid that can dissolve some other substance." e.g. water is a solvent for sugar or salt.
- Solvent reduces the viscosity of the binder(s) to aid flow and uniform application of coating.
  - Universal Solvent does not exist!
  - Multiple solvents used.
- *Active Solvent* – dissolves binder, reduces viscosity
- *Latent Solvent* – alone does not dissolve but works in conjunction with active solvent to increase solvency of the whole.
- *Diluent/Thinner* – thins a solution (less viscous) but has no effect on the active solvent

Water-Borne Coatings & Pumps

- Water corrodes carbon steel, so water-borne coatings require plastic or stainless steel materials
- Water is not always a solvent that dissolves the binder. It may just be a carrier (emulsion) or fine solid particles are mixed in with it (dispersion).
  - If left to cure inside equipment, water-borne coatings cannot be re-dissolved after drying with water
- Water-Borne coatings can be more viscous than solvent-based until sheared and therefore require greater pressures to start paint flow.
- Water-Borne coatings may be reduced in viscosity with the addition of water (can be reduced too much).

Viscosity

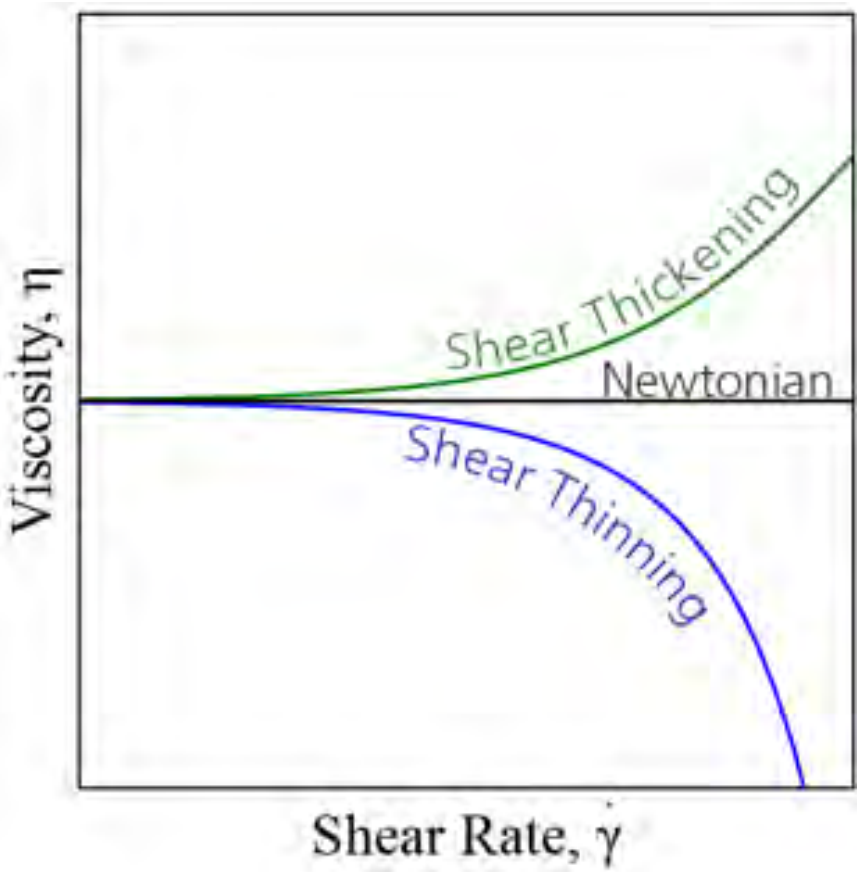
"….is the resistance of a fluid to flowing."

- Low viscosity ➔ fluid moves easily
- High Viscosity ➔ fluid resists flowing

- Viscosity is influenced by many factors.
- Heat is the most important
  - Viscosity always given in conjunction with a temperature.
  - Most fluid viscosities decrease with temperature

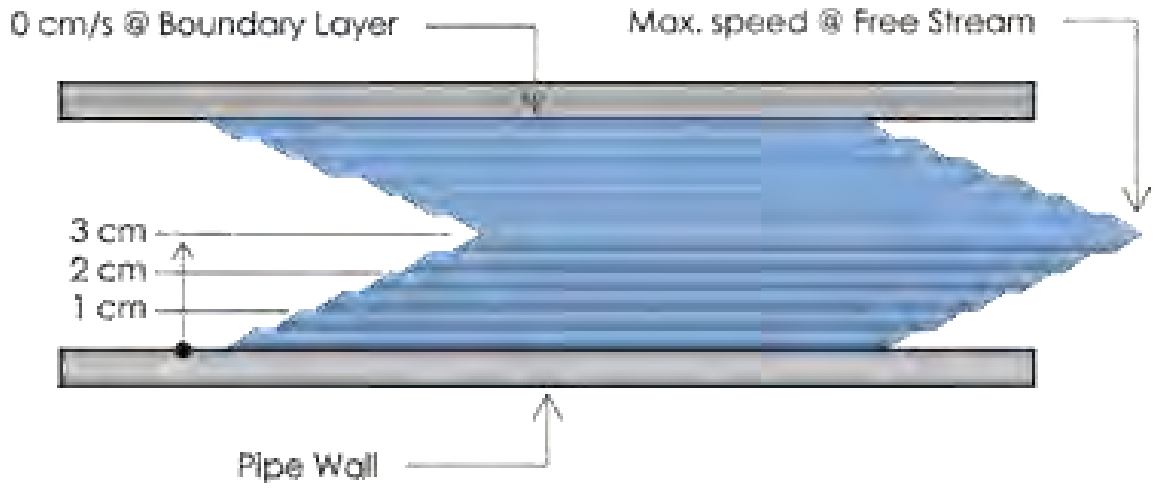
Types of Fluid & Viscosity

- Newtonian fluids include water. Linear relationship between the rate of shear and shear stress and viscosity is constant. Water will not change viscosity no matter how much you stir it.
- Non-Newtonian fluids vary viscosity with shear rate – no single viscosity
  - o Thixotropic liquids, eg. Ketchup are shear thinning. As shear increases, viscosity decreases.
  - o Rheofluidic liquids lower in viscosity with agitation/shear and return to their original viscosity as soon as you stop.
  - o Rheo-Thickening liquids increase viscosity with agitation/shear but will return to the original viscosity when you stop (e.g cornflour and water).
- Sometimes shear is about not damaging the paint with the pumping technology. Sometimes we need to shear paint to be able to make it flow.



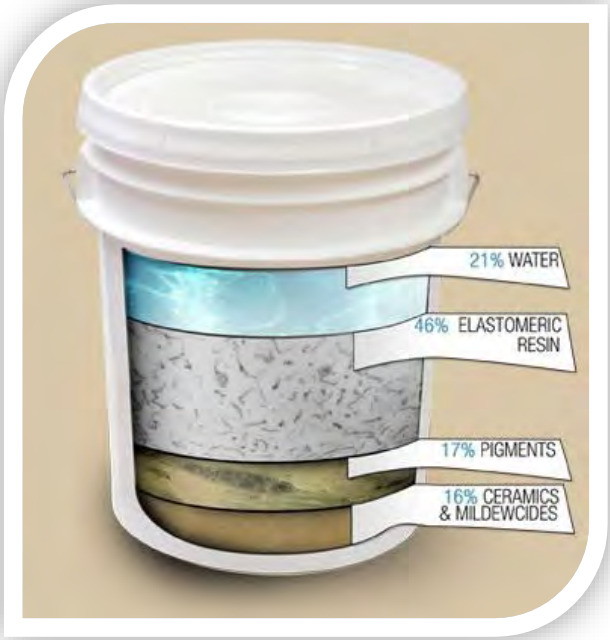
Shear & Viscosity

- Fluid is made up of multiple layers
- Applying force to some layers and not others (relative motion) cause layers to slide apart (Shear).
- Some fluids are more susceptible to Shear (sensitive) than others.
- Properties of the fluid is degraded.
- Some pumping technologies more likely to induce shear stress than others.
- Non-Newtonian liquids can change viscosity (thin or thicken) depending on shear rate



High Solids & Pumps

Historically, coatings are 50-70% solvents; low solids, high VOC



High Solids coatings =
20-50% solvents

- Lower VOC, environmentally friendlier

High solids coatings can contain highly abrasive pigments and/or fillers.

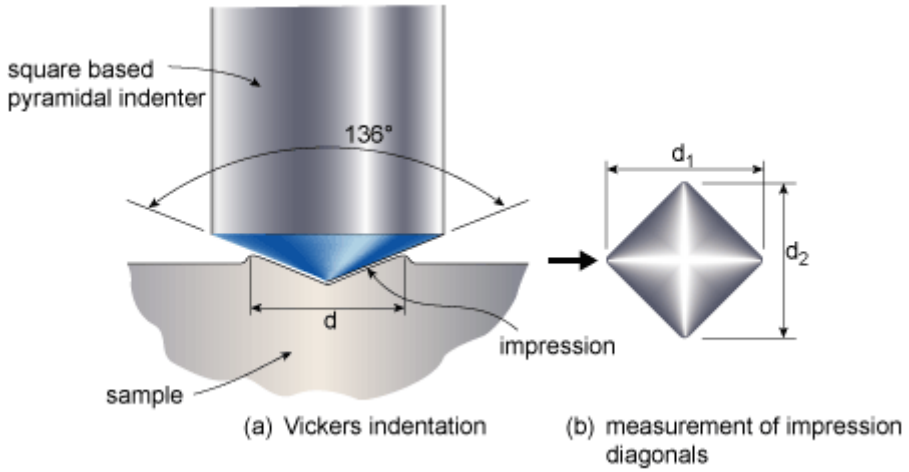
- Leads to premature wear of the pump parts.

High solids coatings are more viscous

- require higher pressures to move

Abrasiveness of Fluids

- "…its ability to scratch/scrape another material."
- Scale of Hardness = Vickers
- The higher the solids rating, the more abrasive the fluid
- Ceramic coated piston is twice the rating of typical hard chrome



Material	Vickers Rating
316 Stainless Steel	140HV 30kgf
Hardened Steel	700HV
Cordierite	800Hv
Titanium Dioxide	980HV
Silica	1100HV
Hard Chrome	1200HV
Aluminium Oxide	1600HV
Tungsten Carbide	1600HV
Ceramic	2500HV
Diamond	10000HV

Materials Of Construction

Conductive Acetal
- Good solvent and coating resistance
- Water-borne compatible
- For use with flammables
- Good levels of abrasion resistance

Anodized Aluminium
- Strong
- Heat resistant
- Medium corrosion resistance against water-borne
- Resists abrasion

Stainless Steel
- High level of corrosion resistance (316)
- Best for abrasion resistance
- Rugged

Ceramic
- Extremely abrasion resistant

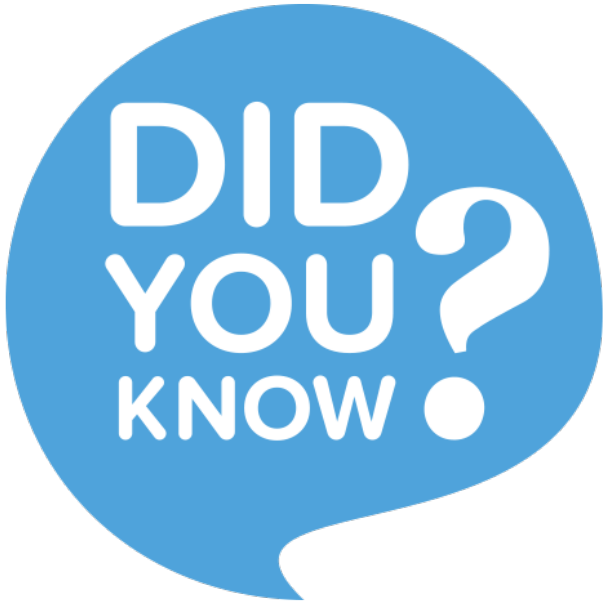
Tungsten Carbide
- Extremely hard
- Abrasion resistant

UHMWPE
- Abrasion resistant
- Self lubricating
- Not for high temperatures

FKM (Fluoroelastomer)
- Wide compatibility with fluids
- Resistant to aggressive solvents
- Very good compression set resistance

PTFE
- Chemically inert to most fluids
- Excellent when used with solvents
- Can use for high temperature

Pumps Don’t Create Pressure



- Positive displacement pumps produce fluid flow, not pressure
- Pressure is the resistance to flow
- Pumps are able to generate flow even against resistance
- When maximum resistance is reached (pressure), pneumatic pumps “stall out”

Air Operated Double Diaphragm Pumps

Low pressure transfer, supply & direct spray

Binks Diaphragm Pump Range

Gemini II 1:1

- ½” – 1 ½”
- Acetal & St. St.
- Traditional manifold design
- Bare pumps & packages available

DX70 1:1

- 3/8” Compact diaphragm pump
- Acetal only
- Alternative to pressure tanks for direct spray

DX200 1:1

- ¾” & ½”
- Aluminium & St. St.
- Designed for paint
- *European Range being introduced*

SCAN ME

DX200 3:1

- ½”
- St. St Wetted only
- 3:1 supply pump for higher pressures over longer or restricted distances

Inlet/Outlet Manifolds Built Into Body + Built In Regulation

Inside The DX 1:1 Series

DX70R3-CFG Cart mounted pump with 1.4 gal (6L) gravity bucket feed, filter and three air controls.

RECOMMENDED MATERIALS

- Solvent Based Coatings
- Water Based Coatings
- Stains, Lacquers, Varnishes
- Sealers and Undercoats

TYPICAL APPLICATIONS

- Woodworking
- Aerospace
- Agricultural and Off Road
- Marine Industry
- Truck and Bus

DX70R3-TF
Tripod mounted pump outfit with three air controls.

DX70R3-WF Wall mounted pump with paint filter and three air controls *(Pail not included)*.

DX70R3-PFA Pail mounted pump with agitator, filter and three air controls *(Pail not included)*.

Inside The DX 3:1 Series

SCAN ME

Pressure Tanks

Low pressure supply or direct spray

The Binks Pressure Tank Range

ASME Code Tanks: *Numerous government and insurance bodies (e.g. OSHA, your fire marshal, your insurance underwriter, etc.) use National Fire Protection Association (NFPA) standards. NFPA standards call for the use of ASME-code tanks. All Binks pressure tanks are made to ASME standards*

PT ASME Zinc Plated Lid/Shell

- Ideal for solvent-based coatings when used with a disposable tank liner.
- Zinc plated lid and all wetted parts in lid assembly including: fluid tube, lid bushing, outlet elbow and fitting, and agitator shaft, including a Zinc plated tank shell.

PT ASME SS Lid/Zinc Shell

- Ideal for waterborne coatings when used with a disposable tank liner.
- 300 grade stainless steel lid and all wetted parts in lid assembly including fluid tube, lid bushing, outlet elbow and fitting, agitator shaft with Zinc plated tank shell.

80 PSI

Galvanized Pressure Tanks

- Galvanized steel tanks are primarily used with non-corrosive materials.
- Constructed with a heavy pressed steel lid and forged steel clamps, galvanized tanks are equipped with top outlet. Can be adapted for bottom outlet.
- The bottom outlet is recommended for heavy, viscous materials such as emulsified asphalts, cutback asphalts, rubber compounds, etc.

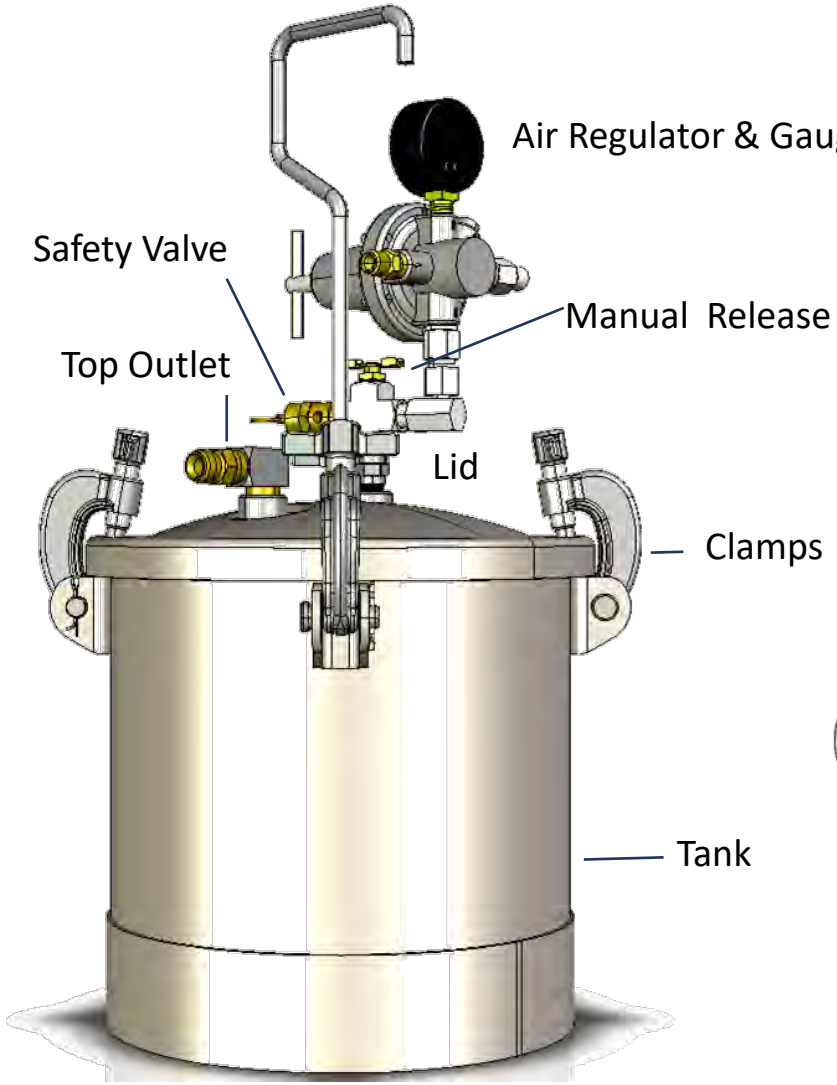
Stainless Steel Pressure Tanks

- Stainless Steel Pressure Tanks are suitable for virtually all fluids and solvents.
- Tanks and lids are constructed of heavy gauge 304 stainless steel and are also electro polished. Wetted parts are non-corrosive and non-corroding.
- All models are equipped with top outlet. Can be adapted for bottom outlet.

110 PSI

Pressure Tanks

- Ratio 1:1
- Pressure Vessel
- Galvanized Steel, Stainless, Zinc Plated with St St Wetted Parts
- Needs Servicing
- Various Sizes
- With or Without Agitators
- With or Without Gun Air Control



How To Choose

How to select a Binks Pressure Tank

It's helpful to know the following information:

- **Size/Scope of your operation in terms of gallons per day per spray for a given spray station.**
- **If you're using a plural component coating, what is the tank life of your coating?**
- **Is your coating waterborne or solvent borne? What degree of corrosion resistance do you need?**
- **Will you need to use a bottom outlet (may be needed for high viscosity materials or high cost materials).**
- **Will you be putting either 1-gallon or 5-gallon pails in the interior of the pressure tank?**

CAPACITY AND DIMENSIONS

	2 gal. tanks	5 gal. tanks	10 gal. tanks	15 gal. tanks
Standard paint container that will fit inside	1 gal.	5 gal.	5 gal.	5 gal.
Inside diameter	9½"	14"	14"	14"
Inside height at center	9½"	16"	19 1/16"	26 1/16"
Overall height	23⅜"	30 5/16"	33⅜"	43⅜"
Overall width	13⅜"	18½"	18½"	18½"

STEP 1: SELECT SIZE AND SCOPE

Gallons of Coating Per 8 Hour Shift	Suggested Tank Size for Single Component Coating	Suggested Tank Size for Plural Component Coating			
		1 Hour Tank Life	2 Hour Tank Life	3 Hour Tank Life	4 Hour Tank Life
Up to 5	2 or 5 Gallon	2 Gal.	2 Gal.	2 Gal.	5 Gal.
Up to 10	10 Gallon	2 Gal.	2 Gal.	5 Gal.	10 Gal.
Up to 15	15 Gallon	2 Gal.	5 Gal.	5 Gal.	15 Gal.
Up to 30	30 Gallon	5 Gal.	5 Gal.	15 Gal.	30 Gal.
Up to 60	60 Gallon	5 Gal.	15 Gal.	30 Gal.	60 Gal.
More than 60	60 Gallon	5 Gal.	15 Gal.	60 Gal.	60 Gal.

Examples: For a single component coating spraying of 12 gallons of coating per 8 hour shift, we suggest a 15 gallon tank. For a 4 hour tank life plural component coating, consuming 12 gallons per 8 hour shift, we suggest a 5 gallon tank.

Plus

3. Fluid Only OR Fluid & Air Regulation
   a. 0-30 psi Fluid Regulation

4. Direct Drive Agitation OR Gear Reduced Agitation

STEP 2: SELECT PRESSURE TANK FAMILY, BASED ON AVAILABLE FEATURES

	83C w/ZN Lid	83Z w/SS Lid	183G	183S	30/60 Gallon	30/60 Gallon w/SS Liner
2 Gallon	X	X	X	X		
5, 10, 15 Gallon			X	X		
30, 60 Gallon					X	X
Includes Fill Port			X	X	X	X
Waterborne Compatible	no	yes, w/liner	no	yes	no	yes
Overall Corrosion Resistance	good	better	better	best	better	best
Maximum Pressure Rating	80 psi (5.5 bar)	80 psi (5.5 bar)	110 psi (7.5 bar)	110 psi (7.5 bar)	110 psi (7.5 bar)	110 psi (7.5 bar)
Available with Bottom Outlet			X	X	X	X
2 Gallon Size (Accepts 1 gal. pail)	X	X	X			
5 Gallon Size (Accepts 5 gal. pail)			X	X		

MX Vertical Piston Pumps

Fluid Supply & Direct Spray

MX Piston Pump Range

Pogo Plus

- Drum mounted pump with MX technology
- Transfer or spray low to medium viscosity fluids:
  - Solvents
  - Mold Release
  - Adhesives
  - Paints
- 4:1
- 1.3 gal max per minute

MX MD

- Medium Duty
- Spray packages for AAA materials like:
  - Wood stains
  - Lacquers & Varnishes
  - Enamels & Polyurethanes
- 12:1 – 32:1
- Max 0.4 GPM – 1.2 GPM (1 – 2 Gun)
- Typical 0.13 GPM – 0.4 GPM

MXL

- European design to target price conscious market
- Same as MX MD with minor differences (e.g air controls)
- Designs will harmonize under global umbrella

MX HD

- Heavy Duty
- Durable for airless materials like:
  - Zinc rich primers
  - Coal tar epoxies
  - High solids epoxies
- 36:1 – 70:1
- Max 0.75 GPM – 0.875 GPM (1 – 2 gun)
- Typical 0.25 GPM – 0.29 GPM

Supply MX Pumps

MX122(MX19/)

- Typical 0.64GPM
- Ratios available
  - 20:1
  - 41:1
  - 64:1
- (Stainless Steel Only)

MX440(MX70/)

- Typical 2.4GPM
- Ratios available
  - 30:1
  - 46:1

MX880(MX140)

- Typical 4.8GPM
- Ratios available
  - 15:1
  - 23:1

Inside The MX Pump Series

Packing Choices

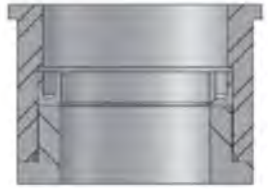
Packing Type	Description	Pump Model
PU *Standard packing choice*	Glass filled PTFE (Teflon) and UHMWPE (Ultra-high-molecular-weight polyethylene)	MXL, MX
PP	Glass filled PTFE for UV and acid based materials	MXL, MX
PL	Glass filled PTFE and Leather for high temperature applications	MXL, MX
UU	UHMWPE for very abrasive materials	MX
UL	UHMWPE and Leather for abrasive materials	MX
UC	U-Cups (UHMWPE) Lip seal rather than 'V' shaped chevron	MXL

PU

DETAIL "A" (UPPER PACKINGS)

DETAIL "B" (LOWER PACKINGS)

DETAIL "A" UPPER SEAL



DETAIL "B" LOWER SEAL

Maple Pumps For Industry

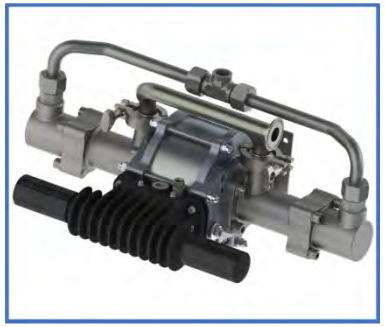
Robust bellows piston pumps

Maple Bellows Pump Range

Maple 7/7

- 7:1
- Max output 2.6 GPM
- Typical output 0.88GPM
- ½” NPT Outlet
- Will mount to cart
- Suction hose assembly available

Maple 7/15

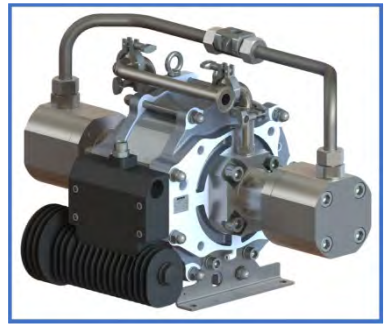


- 15:1
- Max output 2.6GPM
- Typical Output 0.88GPM
- ½” NPT Outlet
- Available as a package for Aerospace Paint Stripper

Maple 8/25

- 25:1
- Max Output 3.2GPM
- Typical output 1.06GPM
- ½” NPT Outlet
- Will mount to cart
- Suction hose assembly available

Maple 15/25



- 25:1
- Max output 6GPM
- Typical output 2GPM
- ¾” NPT Outlet

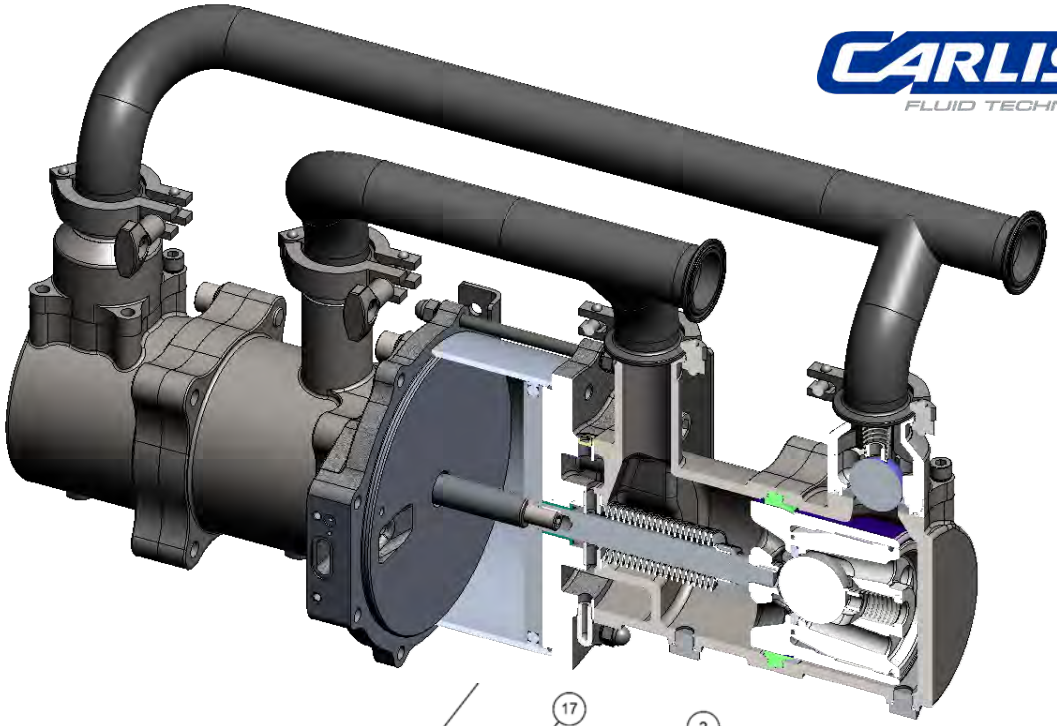
Typical Applications	Materials
Multi Gun Spray Booth	Ultra Violet (UV) Cure coatings
Auto Gun Spray Systems	Moisture Sensitive Materials
Airless and Air Assisted Airless Applications	Solvent and Waterborne Materials
Wood & Component Finishing Flat Machines	Catalysed Spray Coatings
Rotary Finishing Machines	Stains, Varnish and Lacquers
Automatic Spray Reciprocators	Sealers and Undercoats

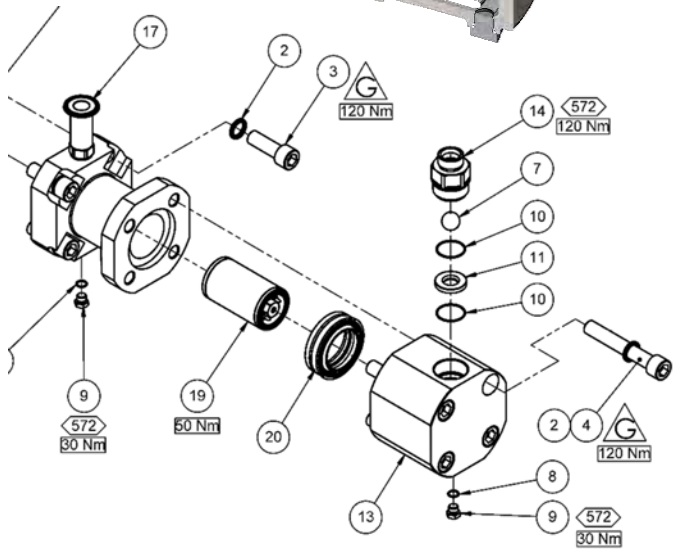
SCAN ME

Bellows Technology – No Exterior Leaking Seals

Maple Advantage

- Horizontal fluid section handles shear sensitive materials with kid-gloves
- Reciprocating horizontal piston configuration provides smooth balanced fluid pressure on each stroke, reducing pressure fluctuations on changeover
- Enclosed Bellows Seals - no exposed seals, eliminating shaft packing lubrication and significantly reducing pump maintenance
- Easy maintenance with quick access to balls, seats and piston seal

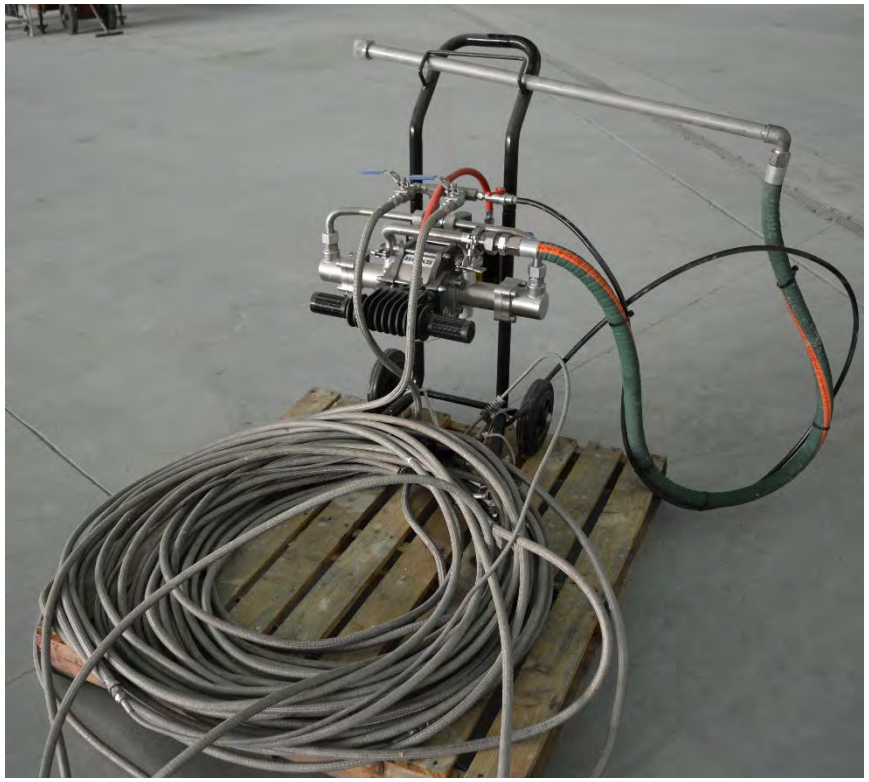




MAPLE 7:15 Paint Stripper Pump

Problem

Aircraft are scheduled for work in tight timeframes and time equals money for the airlines while the work is being carried out. Air Livery need equipment to work reliably every time. They discovered that the water based hydrogen peroxide paint stripper was eating away the bonding agent for the TC seats and damaging the ball checks on the existing competitors pump. This caused the pump to fail and resulted in an expensive and time consuming 6 week service. The competitive manufacturer refused to warranty the pump and Air Livery were left to transport a pump from another facility. The competitors pump is very heavy and not easily moved around.

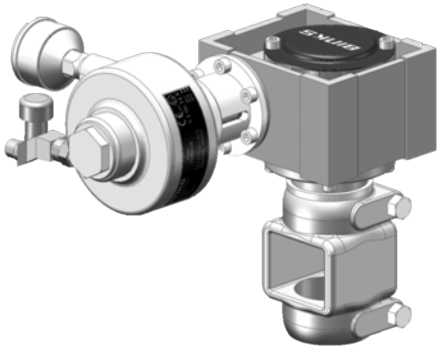


Solution

- **Binks R&D take the challenge head on**
  The successful Maple 7/15 was redeveloped with Suitable balls and seats for the ball check to work reliably with this special material, to resist the peroxide paint stripper. It was then packaged on a cart with filter regulator and a large diameter suction hose. Delivered with 1 or 2 gun set up
- **New Pump Is Lighter**
  The Maple 7/15 PSP is less than half the weight of the entrenched competitor, making transportation around the hanger easier.
- **A Better Pump**
  Tim Rosier, Production Manager at Air Livery Cambridge described the pump as “easy to use, easy to maneuver, more reliable, quiet running and simpler to flush than the existing pumps.”

Agitators

Mixing & Particle Suspension



Binks Agitator Range

Hand Held Quick Mixers

- Pneumatic Only
- 5 to 55 gallon
- 1 HP

5 Gallon Pails

- Pneumatic Only Cover Mounted
- Covers available
- Indirect agitator air motor drive 15:1, 166RPM

55 Gallon Open Top

- Electric or Pneumatic
- Direct drive for Light Body Materials
- Indirect drive available
- Uni-Drum for heavier fluids
- C-Clamp Agitators
- Cover Mounted
- Covers available

Closed Top 55 Gallon Drum

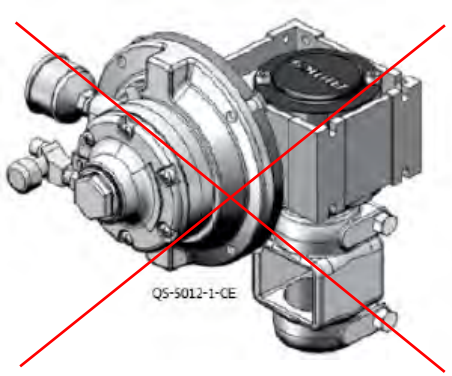
- Pneumatic Bung Agitator
- Collapsible blades
- 1 HP
- 3000RPM

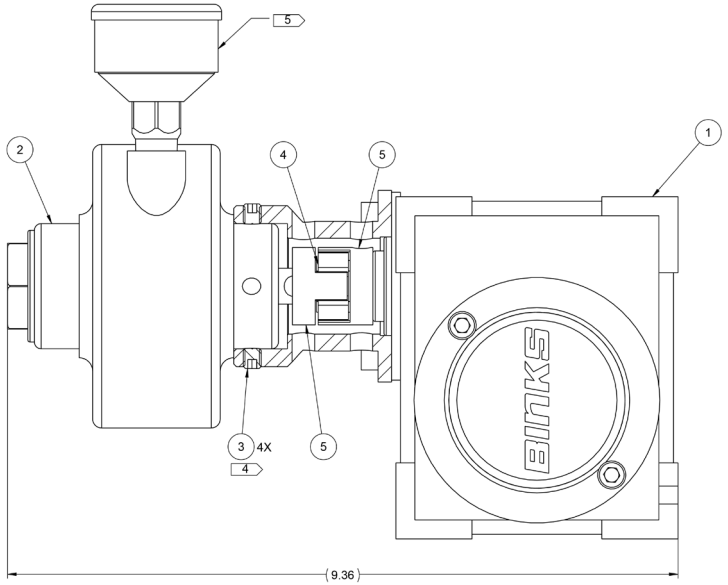
Pressure Tanks Agitators

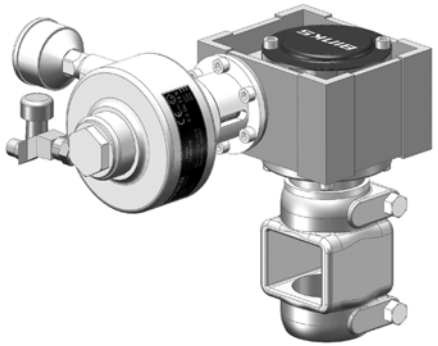
- Manual or Pneumatic
- Direct or Indirect
- Available for 2, 5, 10 and 15 gal tanks
- Indirect agitator air motor drive 15:1, 166RPM

Updated Indirect Drive Assembly

Air motor and gearbox coupling upgrade







	QS-5012-1	31-452
Ratio	20 : 1	15 : 1
Max speed	88 rpm	166 rpm
Lubricant	Required	**Lube free**
Coupling	Direct (rigid)	**Flexible coupling**

Old Motor Assemblies	Upgraded Motor Assemblies
31-391-1	31-434
QS-5001-1	31-450
QS-5003-1	31-451
31-393-1	31-453
31-394	31-454
31-396-1	31-455
31-401-1	31-456

QS Indirect Agitators - Electric

Electrical agitator

P/N:

QS-ES xxx xx x

Service Bulletin N°:
77-3318

SCAN ME

	QS-ES xxx xx M Frequency inverter
Hazardous Zones	Class 1 / Div 1
Electric power	0.37kW (0.5HP)
Max output torque	29.4 Nm
Minimum speed	47 rpm @ 20 Hz
Speed at 50hz	117.5 rpm @ 50 Hz
Max speed	190 rpm@80 Hz
Ratio gear box	11.55 : 1
Shaft / Stirring blade material	Stainless steel
Weight	68.3 lbs

QS Indirect Agitators - Electric

Pneumatic Agitators

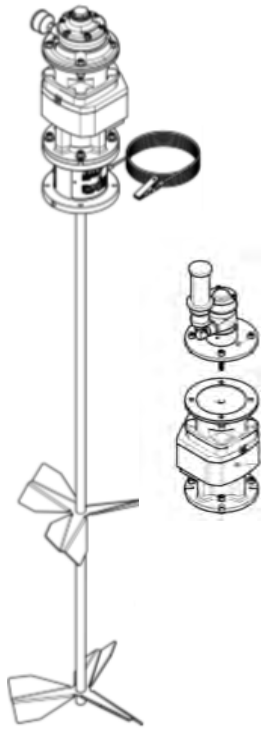
P/N:

QS-PS xxx xx K

QS-PS xxx xx L

Service Bulletin N°:
77-3318

SCAN ME



	QS-PS xxx xx K	QS-PS xxx xx L Long life
Hazardous Zones	Class 1 / Div 1	
Power equivalence	0.37 kW (0.5HP)	0.41 kW (0.55HP)
Max output torque	2.8 Nm (24.8 lb-in)	3.3 Nm (29.2 lb-in)
Minimum speed	0 RPM	0 RPM
Max speed	216 RPM	216 RPM
Air Pressure	6.2b (90 psi)	6.3b (90 psi)
Air consumption	23.3 CFM	28 CFM
Shaft / Stirring blade material	Stainless Steel	Stainless Steel
Weight	27.3lbs	28.2lbs

Lube free motors

Premium Elevator Systems

Complete fluid supply and transfer products

Binks Elevator Range

DE-05

- 5 Gallon
- Complete Elevator System

SCAN ME

DE-10

- 55 Gallon
- Complete Elevator System

41-9000

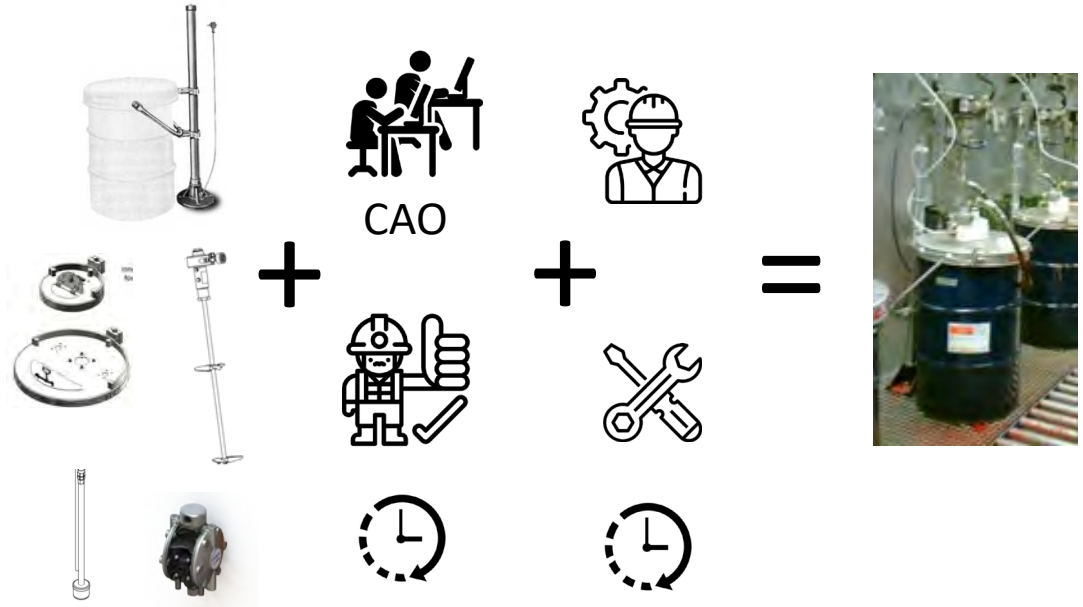
- 55 Gallon
- Single Post Elevator

Hidden Costs Of Elevators

ELEVATOR SYSTEMS:
YOUR BUILD! YOUR WAY!

Barrel elevators are simple products but which require significant integration work including the following tasks:

- *List the needs*
- *Select components*
- *Design the assembly*
- *Certify the assy. for safety*
- *Multiple orders*
- *Reception*
- *Assembly in workshop*
- *Packaging*
- *Set up*

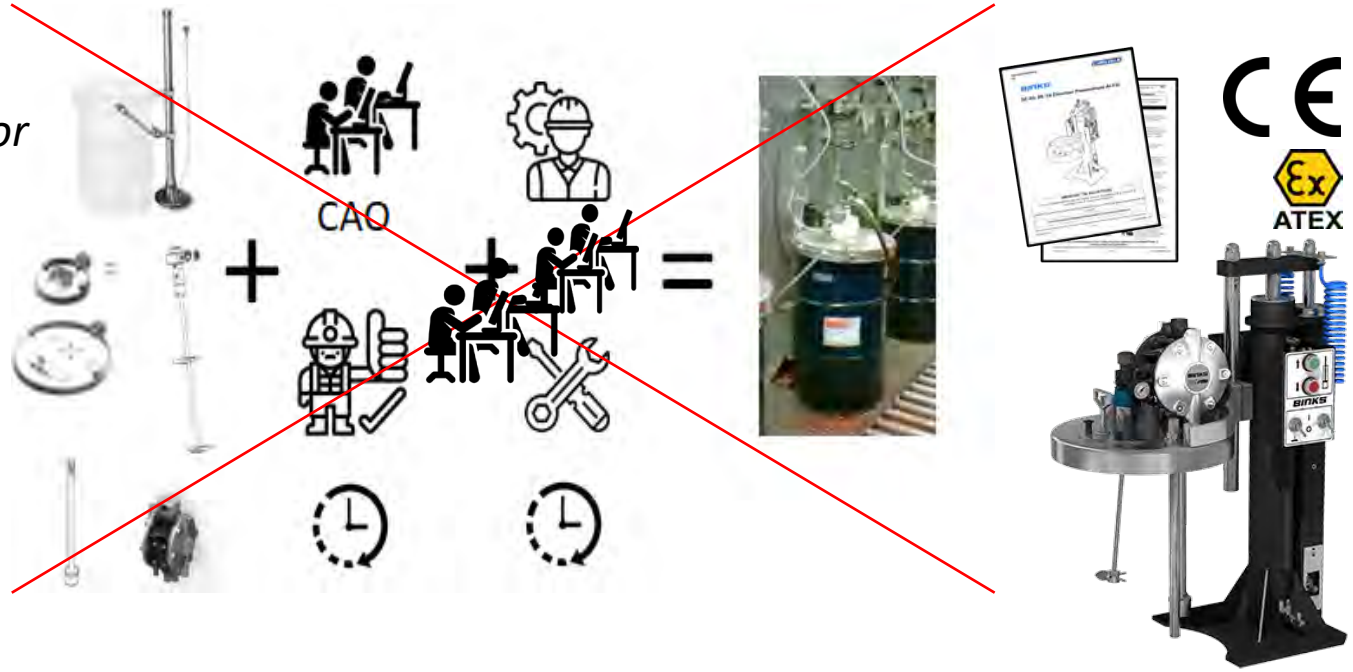


Hidden Costs Of Elevators

ASSEMBLY ELEVATOR BINKS :
YOUR NEEDS! YOUR FINISHED PRODUCT!

Binks barrel elevators are configurable on demand and delivered ready to install.

- *List the needs*
- *Configure your elevator*
- *1 single order*
- *Reception*
- *Set up*

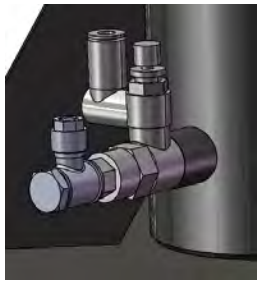


Product delivered finished ready for use, certified and documented

Safety Features: For Operators

- Multiple features make these elevators simple to operate but safe in their use

  - ☑ Descent speed is slow and controlled
  - ☑ Weight charge 110lbs 5gal / 165lbs 55gal (See manual)
  - ☑ Drum lid will never move up or down without operator control.
  - ☑ Anti-rotation *and drum positioning (curved base) features mean operators do not need to manually guide drum lid into position*
  - ☑ Sensor detection of drum in option

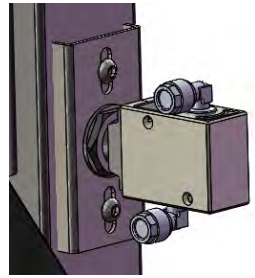


Speed regulator:
Including blocker = no movement without piloting even if there is an air cut

Push buttons:
Security against actions accidental orders

Safety Features: For Operators

- Safety interlocks automatically stop the agitator as the drum lid is raised.
- Lockable inspection hatch
- Only one box control for operation of the elevator, pump and agitator in one unit
- Right or left hand mounted controls of the elevator.



Stirrer lock:
Closed design, no access possible without tools

Examples

DE-05DD06KP-02A

25l elevator

Direct tire agitation

DX200 1: 1 Alu pump

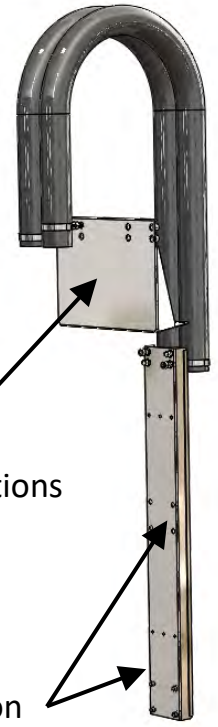
Suction & discharge rod

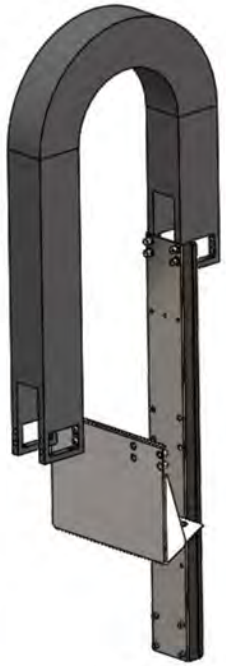
DE-10FL01DE

200l elevator

Electric agitation

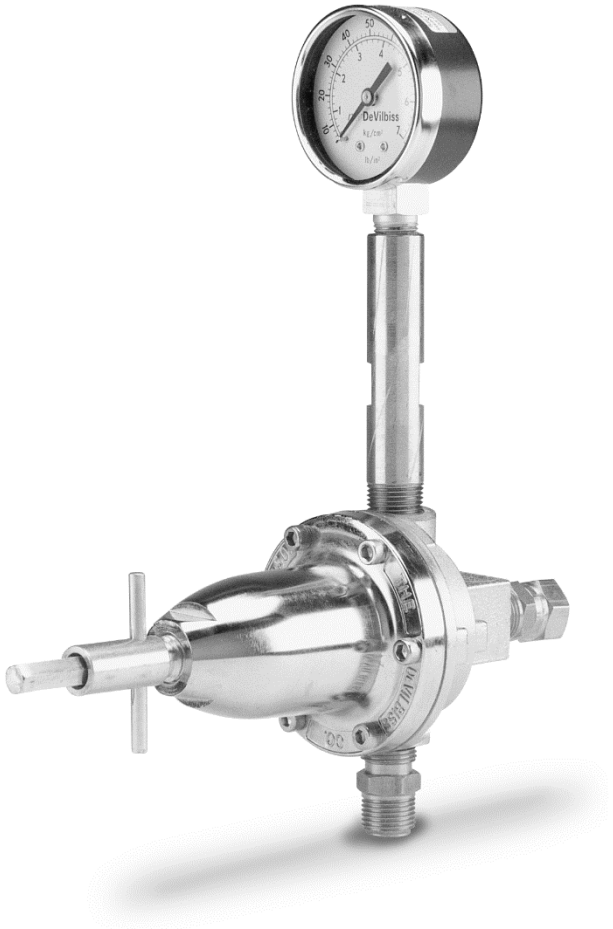
Suction tube





Fluid Regulators

Controlling downstream pressure



Fluid Reg vs BPR

- Fluid Regulator = Normally-Open Valve
  - Valve is open when spring/air force exceeds fluid pressure
  - Benefits equipment after the valve with the correct pressure
  - Max Input = what pressure can the valve hold back
  - Regulated Output = what is the regulated pressure after the valve

- Back Pressure Regulator = Normally-Closed Valve
  - Valve closes when spring/air force exceeds fluid pressure
  - Benefits equipment before the valve to ensure there is enough pressure
  - Max Static Pressure = what pressure can the regulator withstand, for example if somebody shuts off a ball valve after the BPR (preventing dissipation of line pressure)

The Fluid Regulator Range

DX Regs

- Included or mounted on DX Diaphragm Pumps
- Based on HGB design
- Active Surge Chamber (1:1 & 3:1)
- Pilot For DX 1:1
- Manual for DX 3:1

Low Pressure HGB

- Originally DeVilbiss design
- Manual & Pilot
- St St. Wetted parts
- Single diaphragm
- Ball & Seat valve
- 14-217psi inlet
- 2 – 217psi out

Low Pressure Binks

- Robust USA Model
- Manual & Pilot
- St. St or Zinc Plated wetted parts
- Single diaphragm
- Ball & Seat valve
- 0-200psi inlet
- 1-100psi outlet

HGS

- Gun mounted fluid regulators
- Manual & Pilot
- Circ & Non-Circ
- 50-290psi inlet
- 2-101psi outlet

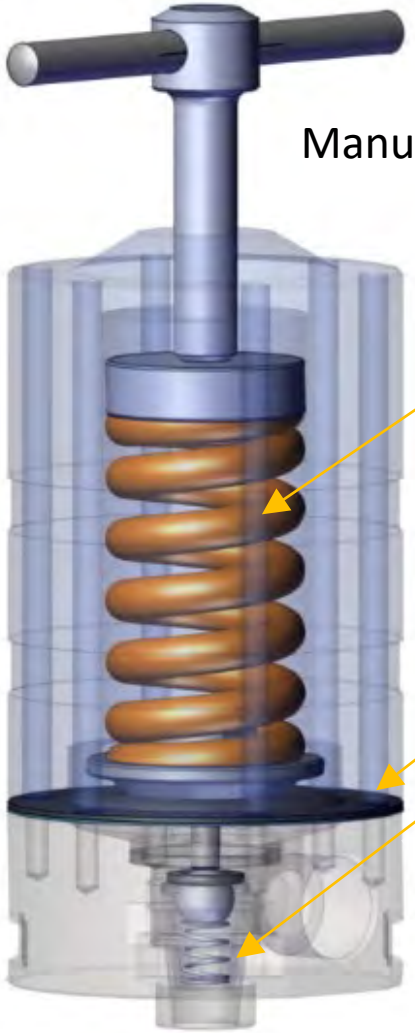
Ransburg DR-1

- Premium regulator for systems
- Pilot with turndown rations
- Dual diaphragm
- Flush port
- 300psi max inlet

Medium - High Pressure Binks

- Manual only
- St. St.
- Max inlet 2000-6000psi
- 100-5000psi outlet

DX Built In Fluid Regulator

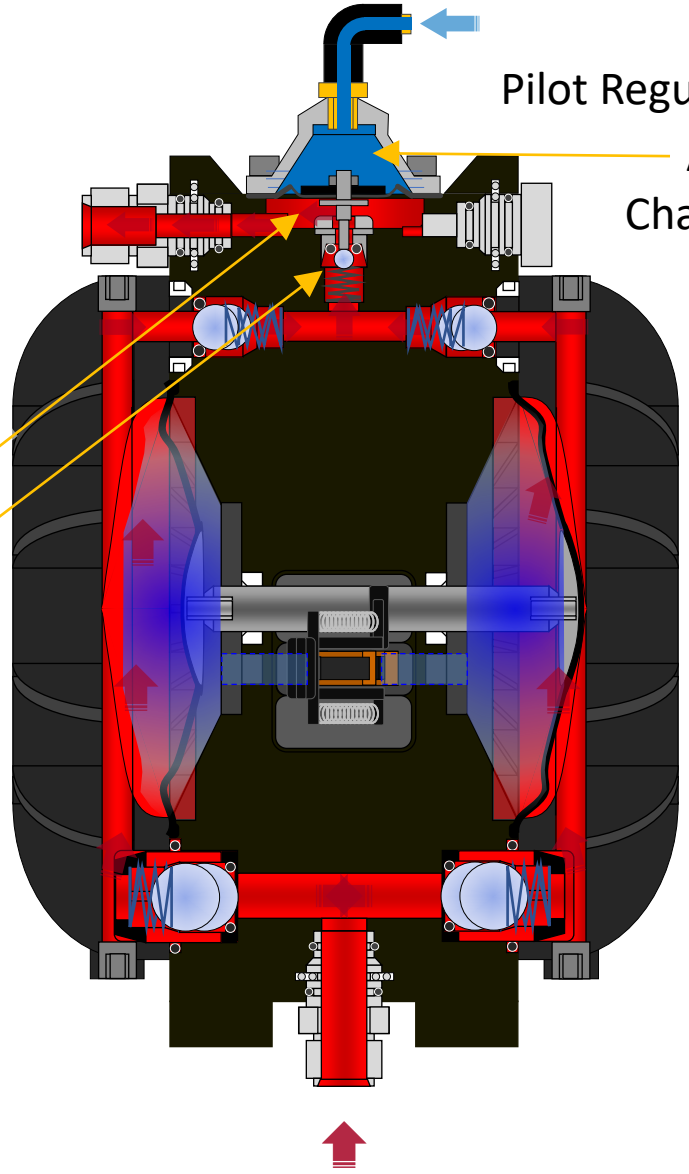


Manual Regulator

Spring

Diaphragm with Pin

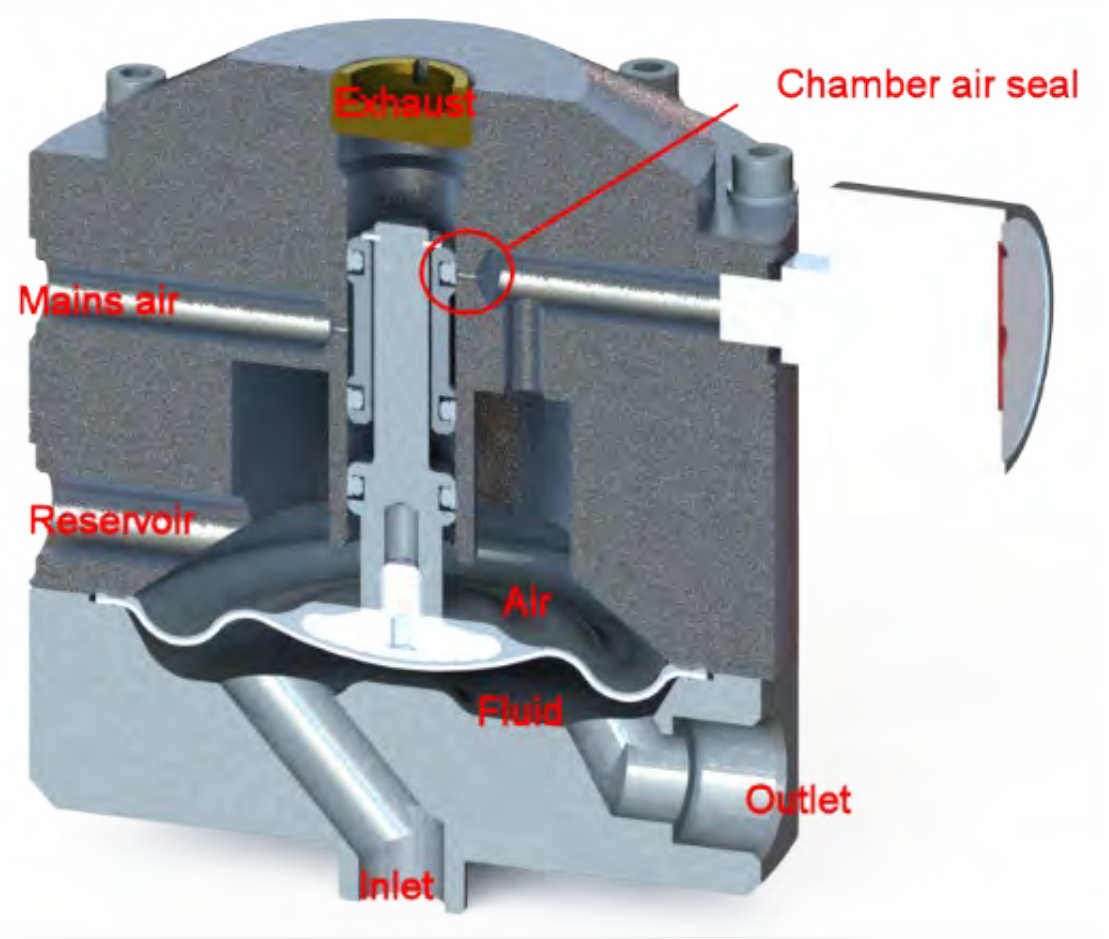
Ball, Seat & Spring



Pilot Regulator

Air Chamber

Active Surge Chamber



Summary: Questions?

Pump Type	Fluid Transfer	Air Atomization	Hydraulic Atomization	
	Low Pressure		Air Assisted Airless	Airless
Diaphragm Pump (AODD)	✓	✓	×	×
	Diaphragm pumps do not harm/shear sensitive paints (they squeeze, especially for specialist coatings			
Pressure Tank	×	✓	×	×
	Pressure pots are simple, robust but are pressurized containers and are heavy to move around. Good for materials sensitive to moisture and sensitive to shear, no pulsation.			
Pogo Plus	✓	✓	×	×
	Low pressure drum pumps for high volume fluid transfer and spray applications of low-medium viscosity fluids			
MX & MXL Pump	×	×	✓	✓
	High pressure, 2-ball piston pumps available in packages to make it easier to start spraying			
Maple Pump	×	×	✓	✓
	Best for applications that require no exterior leaking seals, shear and moisture sensitive			

The Brands You Trust

BGK™ products deliver precision-engineered curing capabilities for a full range of coatings including liquid, powder, wax, UV and adhesives.

Binks® products boast innovative spray gun and air cap design along with industry leading pumps and controls.

DeVilbiss® products include low pressure manual and automatic spray guns and related spraying accessories. *DeVilbiss* products are widely acclaimed for ergonomics and innovative spray gun design.

Hosco® products deliver smooth bore, “cavity free” stainless steel fittings and accessories designed for use in paint circulating and application finishing systems.

ms® products include powder coating systems and equipment. ms is recognized throughout the world for quality, efficiency and durability.

Ransburg® manual and automatic electrostatic finishing products offer spray finishing solutions to industrial and automobile manufacturing markets.

BGK A CARLISLE BRAND

BINKS A CARLISLE BRAND

DEVILBISS A CARLISLE BRAND

HOSCO A CARLISLE BRAND

ms A CARLISLE BRAND

Ransburg A CARLISLE BRAND

CARLISLE FLUID TECHNOLOGIES

Thank you!