

ResearchReport

Kondinin Group

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Stock trough valves Under the pump

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Trough valves put under pressure

Few things are more important to the wellbeing of your stock than an adequate supply of water.

An unnoticed failure in the farm reticulation system can quickly have dire consequences, especially during the hot, dry summer months.

Often, the weak point is the trough valve, which either fails to open and allow water into the trough, or doesn't shut off, exhausting water supplies.

After comments from members over the years relating to perceived weaknesses in trough valve design, Kondinin Group engineers put 15 common trough valves to the test, simulating a lifetime of use in a month-long test.

VALVES PUT TO THE TEST

Kondinin Group engineers selected a range of 25mm trough valves made primarily from plastic, but also brass, bronze and stainless steel.

All valves were run off a common manifold in a test trough, and cycled on and off 20,000 times.

A maximum cut-out pressure of 240kPa (35psi) was chosen, although most valves are capable of much higher cut-off pressures.

The water level in the trough was ►



Kondinin Group engineers mounted 15 valves in one trough and cycled them 20,000 times to simulate an average working life. Apart from normal wear and tear, no valves actually failed during testing, leading engineers to conclude the vast majority of valve issues are caused by incorrect application, stock damage or poor water quality.

Table 1. Valve specifications

Make and model	Material	Operation	Float included	Main mounting position	Connection type	Float arm length mm E	Available sizes mm F
Apex brass	brass	sleeve	no	surface	male	290	20, 25
Apex sleeve valve	plastic	sleeve	no	surface	male	320	15, 20, 25
Apex Xcess (new)	plastic	sleeve	no	surface	male	280	25 D
Apex Xtraflow	plastic	diaphragm	yes	underwater	male	150	20, 25, 32
Cocky valve	stainless steel	plunger	no	surface	male	300	20, 25, 32, 40, 50
Hansen Max-flo	plastic	diaphragm	yes	underwater	female A	60	25 C
Hansen Super-flo	plastic	sleeve	no	surface	female	300	20, 25 B
Hansen Super-flo	brass	sleeve	no	surface	female	300	20, 25 B
Jobe Megaflow	plastic	diaphragm	yes	underwater only	male	NA	15, 20, 25, 32
Philmac high flow	brass	flap	no	surface	male	400	25, 32, 40, 50
Philmac horizontal	brass	sleeve	no	surface	male	360	10, 15, 20, 25, 32, 40, 50
Philmac PN12 (new)	plastic	sleeve	no	surface	male	300	25 D
Philmac sleeve valve	plastic	sleeve	no	surface	male	300	20, 25
Philmac Stockproof	plastic	plunger	yes	underwater only	male	80	20, 25, 32
Philmac Stockproof	brass	plunger	yes	underwater only	male	80	20, 25, 32
Raindrop HP	bronze	flap	no	surface	male	265	20, 25, 32, 40, 50
Raindrop HP	plastic	flap	no	surface	male	270	20, 25, 32, 40, 50

NOTE: A. includes male adapter nipple B. In short and long arm versions C. Adapters used for 20 and 32mm D. Adapter used for 20mm E. Arm length as tested. Alternate length arms are available for many of the valves tested. F. 15mm=1/2", 20mm=3/4", 25mm=1", 32mm=1 1/4, 40mm=1 1/2, 50mm=2"

controlled to rise and fall, allowing valves to cut in and out as they would in a real world environment.

Valves were then stripped down to compare internal condition with that of a new valve.

Apart from fair wear and tear, amazingly no valves suffered any mechanical failures during the test period; a result not expected by engineers. After 20,000 cycles, most were still capable of considerable further use.

The trough valves were then reassembled and connected to a pressure and flow test rig, and the flow rate was measured at an operational pressure of 200kPa.

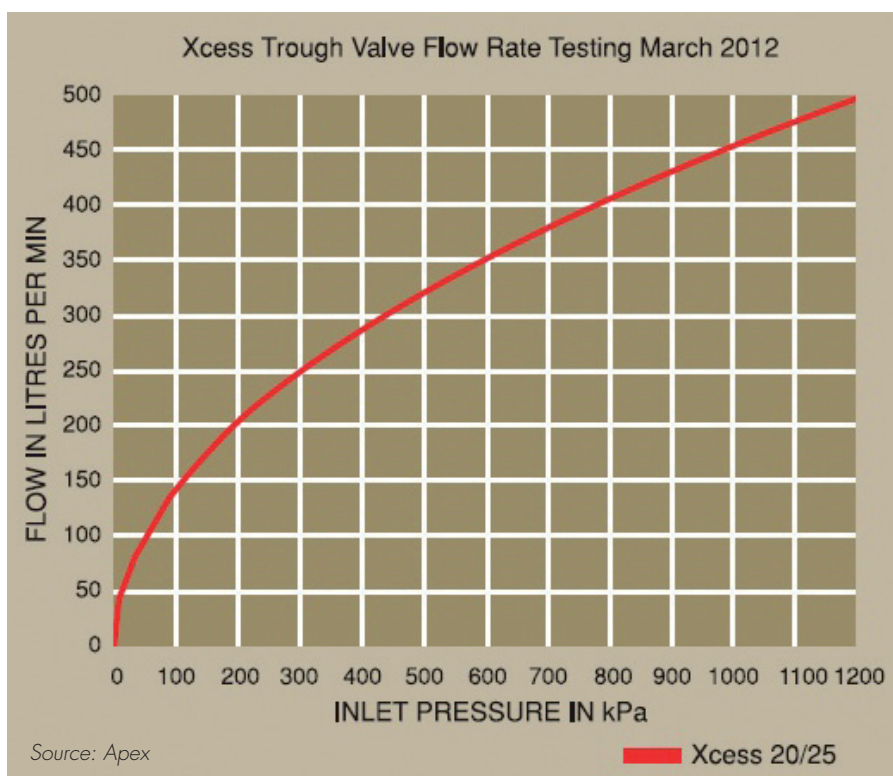
A couple of the valves with high flow rates could not be operated at 200kPa due to the lack of back pressure in the valve, and the capacity of the test equipment.

The flow rate for these units was measured at the maximum possible operating pressure the test rig was capable of (less than 200kPa). See Table 1 for valve specifications and Table 2 for test results.

THE BIG PICTURE

Farmers regularly invest big dollars in troughs, tanks, pipework and pumping infrastructure to provide a reliable water source for stock.

Generally speaking, the better the ►



Many manufacturers provide flow versus pressure graphs for their products, which help you decide if a valve will deliver enough water for the pressure available on farm. If you use a valve outside off its working range, expect problems.

Table 2. Trough valve star ratings

Max rated inlet pressure kPa	Flow rate measured @ 200kPa (l/min)	Price inc GST	Make and model	Construction quality	Ease of use	Flow rate
1000	115	\$48.00	Apex sleeve (brass)	★★★★↓	★★★★↓	★★★★
1200	121	\$25.70	Apex sleeve	★★★★	★★★★★	★★★★
1200	209	\$37.36	Apex Xcess (new)	★★★★★	★★★★★	★★★★★↓
1200	175	\$75.00	Apex Xtraflow	★★★★↓	★★★★↓	★★★★★
1035	235	\$118.20	Cocky Valve	★★★★★	★★★★★	★★★★★
1200	245	\$50.00	Hansen Max-flo	★★★★★	★★★★★	★★★★★
1200	180	\$32.80	Hansen Super-flo	★★★★↓	★★★★★	★★★★★
1200	186	\$75.00	Hansen Super-flo (brass)	★★★★★	★★★★★	★★★★★
1000	172	\$70.48	Jobe Megaflow	★★★★★↓	★★★★★	★★★★★
620	213	\$89.50	Philmac brass horizontal	★★★★★	★★★★★	★★★★★↓
1400	112	\$125.00	Philmac high flow (flap)	★★★★★	★★★★★↓	★★★★
1200	167	\$51.63	Philmac PN12 (new)	★★★★↓	★★★★↓	★★★★↓
1000	106	\$49.25	Philmac sleeve valve	★★★★	★★★★★	★★★★
300	92	\$66.25	Philmac Stockproof	★★★★↓	★★★★★	★★★★
300	97	\$120.25	Philmac Stockproof (brass)	★★★★★↓	★★★★★	★★★★
700	94	\$71.50	Raindrop HP (bronze)	★★★★↓	★★★★↓	★★★★
700	81	\$38.75	Raindrop HP valve	★★★★↓	★★★★★	★★★↓

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Stock damage is a common cause of trough valve problems, especially with surface mounted valves. Cattle will generally cause far more problems than sheep.

quality of the components, the less trouble they will give.

It makes little sense to skimp on the final piece of the puzzle, the trough valve, as it will ultimately decide how reliable the entire system is.

A poor valve can affect more than just the delivery of water to your stock. Pumps which cut in and out too frequently will use a considerable amount of electricity – and suffer a shorter life.

On the flipside, a pump which runs on and on will also fail early, and may exhaust the available supply of water.

A trough valve which has stuck open is even more serious where the supply of water is very limited, and inspections are less frequent due to remote locations.

It doesn't take long for a gravity-fed 25mm valve to empty a 10,000 litre tank, but it can take days to replenish the supply by solar or windmill pumps.

KEEP YOUR ANIMALS HAPPY

Much of the reliability of a trough valve will depend on the type used and how it is installed. A valve that cannot keep supply up to a large mob is vulnerable to damage as cattle and sheep play with it to get more water.

Stock damage is one of the leading causes of valve failure, and while a good supply of water goes a long way to improving the situation, valve design and location requires serious consideration.

Valves mounted on the surface of the water are most vulnerable to damage and lightweight units must be protected using a concrete or steel cover.

Alternatively, there are several heavy-duty units tested which would stand up to severe punishment without requiring additional protection.

The other valve mounting option is below the water line, which leaves only the float for animals to tamper with.

This option works well for valve protection, but requires either a trough with a sidewall fitting or pipework to travel up and over the trough wall. In addition, the trough will need to be reasonably deep to allow the float to be attached above the valve with sufficient vertical distance.

Table 3. Stock water requirements

Animal	Average consumption litres/day	Maximum consumption during summer litres/day
Cattle (lactating)	80	160
Cattle (adult, dry)	50	100
Cattle (weaners)	25	50
Sheep (lactating)	7	14
Sheep (adult, dry)	5	10
Sheep (weaners)	2.5	5



Floats are a pretty important, but often overlooked, part of the system. Make sure the threads are in good condition, and any locknuts on the float arm are tightened against the valve. Floats pictured (clockwise from left) are the Philmac 150mm, Cocky valve, Philmac Stockproof, Raindrop, Jobe, Hansen Max-flo and Apex Xtraflo.

TYPES OF VALVES

Most of the valves tested were the surface mount style, featuring either sleeve valve or flap valve arrangements. Pretty much all these units can be used underwater provided they are fitted with an appropriate adapter to attach a cord to the end of the lever arm, which is then attached to the float.

Mounted on the surface, the water height at which the valve shuts off is usually adjusted by simply bending the float arm, or adjusting a bolt and locknut as with the

flap style valves. Underwater, the level can be adjusted by either bending the arm or changing the length of the float cord.

While it isn't essential, it is good practice to remove the arm from the valve assembly before bending it to prevent possible damage to the valve body.

Diaphragm valves are quite a different kettle of fish, and usually have few moving parts. When stripped apart, it can be a little confusing to understand how the valve works, but it is really pretty simple. ►

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Water pressure acts on both sides of the diaphragm, thanks to a small pilot hole in the centre.

As the area on the rear of the diaphragm is larger than the area on the front face, a force is generated, holding the diaphragm against the seat and shutting off the water supply.

When the float falls and the lever is actuated to turn the valve on, a tiny valve is opened behind the diaphragm, allowing the water to leak out.

The diaphragm no longer has enough pressure to stay closed against the seat, and is forced open by the water pressure in the line.

One of the benefits of the diaphragm valve is they shut the water flow off slowly, often taking as much as five seconds to completely stem the flow.

This 'soft' closing action is ideal in situations where water hammer may be damaging pipe work.

If your water is less than clean, then the diaphragm style valve is probably not the best choice due to the potential for blockage of the fine ports inside the valve.

But most diaphragm valves tested were supplied with a small filter basket inside the intake, and worked fine with solids in the water, provided the filters were regularly cleaned.

Generally speaking, sleeve valves are a little more vulnerable to blockage than flap valves, as the path through the valve is a little more convoluted. Units like the Cocky valve have a large orifice, allowing plenty of room to pass solids in the water. Solids tend to cause more problems with valves failing to fully shut, rather than blocking the flow.

RR



It pays to install a globe valve on the water supply to the trough so the valve can be easily serviced, or the trough can be turned off. Note the valve handle has been removed to prevent cattle accidentally shutting off the trough. The valve can be operated using fencing pliers, or by using the old handle as a spanner.

TIPS FOR TROUBLE-FREE TROUGH VALVES

- Make sure you choose a valve rated to your water supply pressure. Remember, valves positioned further down a hill will have a higher shutoff pressure requirement than those higher up.
- If you have acidic water, choose valve materials wisely. Some brass units will leach zinc out of the alloy, leaving a brittle, porous material behind.
- If you have trash in your water supply, flap valves tend to cope best without blocking or undue wear.
- Pay attention to your water supply intake. A poorly-positioned intake or foot valve can pick up silt from dam floors, quickly wearing valve components (and pumps). Consider a fine mesh intake filter.
- Surface mounted valves are easy to service, but are vulnerable to stock damage. Unless you fit one of the heavy duty valve units (eg Philmac high flow or Cocky Valve), protect the valves using a concrete cap or steel frame.
- Stock are more likely to fiddle with a float valve if the water supply is insufficient. Consider fitting a larger flow rate valve or upgrading your water supply.
- Valves mounted underwater will generally be protected from damage by stock. When ordering troughs, make sure they are fitted with a sidewall or bottom attachment if you plan to use this style valve.
- It pays to install a ball valve in the trough pipe work. This will make maintenance on the trough valve far easier, and allows an overflowing or leaking trough to be quickly shut off. The ball valve handle can be removed and used as a spanner to prevent stock accidentally turning the trough off.
- Consider using brightly coloured floats, as they allow trough water levels to be quickly checked from a distance. You can always paint black poly floats with white enamel paint for improved visibility.
- Pipe risers which travel up and over the edge of a trough are vulnerable to damage from animals. Protect the pipe work with a star picket or post, or encase in concrete.
- If you are happy with the style of trough valve you use, keep a couple of spare parts handy at all times, such as sealing rubbers.
- If you are experiencing problems with water hammer in your reticulation system, or the pipes are old and susceptible to splitting, consider fitting a diaphragm valve which has a 'soft' closing action.
- Underwater valves can siphon water back through the pipe network if the water supply has been cut off. For example, troughs downhill can empty troughs at a higher level. Some diaphragm valves have an anti-siphon hole.
- If you are installing a valve in a thin trough wall, make sure you specify a long thread when buying the valve. Most manufacturers offer versions of their valves with long, parallel threads instead of tapered BSP threads, making them ideal for clamping in a trough or tank wall.
- If the valve seems in good condition, but will not shut off, a longer arm or larger float will increase shutoff pressure, but make sure components are manufacturer recommended. If you use a shorter arm for space considerations, you may need to fit a larger float.

Name	Web
Guyco (Apex)	www.guyco.com.au
Philmac	www.philmac.com.au
HR Products (Hansen)	www.hrproducts.com.au , www.hansenproducts.co.nz
Cocky valve	www.cockyvalve.com.au
Davydick (Jobe valves and Hansen)	www.davydick.com.au
RGD Corporation (Raindrop)	www.rgdcorp.com.au



Apex Xtraflo valve

PRICE: \$75

COMMENT

The simplicity of the Xtraflo diaphragm valve appealed to engineers, and the flow rate was also impressive.

Upon stripping the valve before cycle testing, it was found the diaphragm was installed incorrectly, and was pinched between the housings but when fixed the valve worked perfectly.

Servicing the valve is pretty easy as the housing unscrews in half without tools to allow access to the diaphragm. A filter basket is fitted to the intake, but it can accidentally slip out into the pipe, becoming difficult to retrieve as we found out.

The valve is available in both bottom and top entry models (as tested), but it is simple to use the top entry model underwater if desired.

LIKES

- Simple design with few moving parts
- Easy to service
- Cord hook to lock flow off
- High flow rate

DISLIKES

- Brass threaded arm is a little fiddly to adjust
- Filter basket can slip up intake pipe

Apex Plastic trough valve

PRICE: \$25.70

COMMENT

A simple sleeve valve affair, the Apex valve shares design cues with the Philmac sleeve valve, but with a slightly higher flow rate.

An O-ring is fitted to the sleeve, which is lubricated from new, and the large rubber sealing ring in the cap is reversible. Provided it is not overly tight, the cap can be removed by hand for servicing.



A diffuser is built into the outlet to break up the water jet and reduce trough turbulence. While the float arm is thin, it is a tensile brass alloy and does not bend easily.

LIKES

- Simple design
- Easy to service
- Has spanner flats on spigot
- Low cost

DISLIKES

- No locknut included on arm



Apex Brass trough valve

PRICE: \$48

COMMENT

A compact unit, the Apex valve features a brass body with brass-coloured plastic components, such as the seal insert and body cap. The valve is actually 20mm in size, with a plastic adapter bush included to bring it up to 25mm.

The sleeve is plastic and is fitted with an

O-ring, and the rubber sealing washer is reversible.

LIKES

- Brass construction
- Internal bore is nicely polished
- Spanner flats on spigot

DISLIKES

- Lower flow rate
- Need a spanner to service
- No locknut on float arm



NEW — Apex Xcess trough valve

PRICE: \$37.36

COMMENT

The new Apex Xcess valve was not available for cycle testing, but Kondinin Group engineers got their hands on one just in time to include it in the report.

The robust unit had the highest flow rate for any sleeve valve tested, and boasted several innovative design features.

A plastic pin mounted on the float arm can be used to shut off the valve, and the seal cap is shaped as a male camlock fitting, allowing the trough to be used as a water fill point

when connected to an appropriate camlock fitting and hose.

The plastic sleeve valve is fitted with an O-ring, and the rubber seal is reversible. An adapter is included to reduce 25mm to 20mm BSP.

LIKES

- High flow rate
- Shut-off pin
- Camlock fitting
- No tools needed for servicing
- Spanner flats on the spigot

DISLIKES

- No locknut on float arm



Hansen Super-Flo plastic valve

PRICE: \$32.80

COMMENT

The Hansen plastic sleeve valve is robustly constructed and features a high flow rate and simple design. The sturdy plastic cap is easy to remove by hand, and the seal can be turned over for further use once worn. The sleeve is fitted with a single O-ring.

The valve is supplied with a 25mm nipple



for male or female connection, a 20mm reducing nipple, and a cord with threaded ends for underwater mounting.

LIKES

- Robust construction
- High flow rate
- Accessories supplied with valve
- Easy to service without tools

DISLIKES

- No locknut on float arm



Hansen Super-Flo brass valve

PRICE: \$75

COMMENT

The Hansen brass sleeve valve shares all components with the plastic version, except the brass body.

The brass unit had a slightly higher measured flow rate compared to the plastic version, and is supplied with a 25mm nipple for male or female connection, a 20mm reducing nipple, and a cord with threaded

ends for underwater mounting.

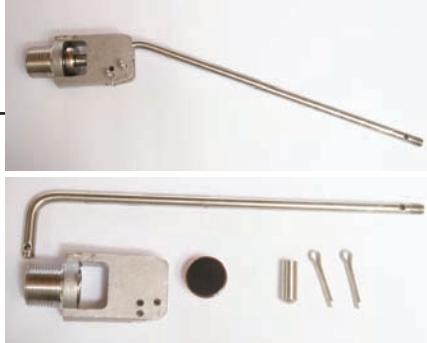
The sturdy plastic cap is easy to remove by hand, and the seal can be turned over for further use once worn.

LIKES

- Robust brass construction
- High flow rate
- Accessories supplied with valve
- Easy to service without tools

DISLIKES

- No locknut on float arm



Cocky Valve

PRICE: \$118.20 (INC 300MM ARM)

COMMENT

It is hard to fault the construction quality of the Cocky valve. Made with a cast 304 stainless steel body, the only component not made from the material is the reversible rubber sealing washer.

The valve is incredibly simple in construction, with a heavy duty stainless arm pivoting on a large split pin. Alternate split pin holes in the body allow the arm to be attached in a high pressure or low pressure position. The valve can handle high levels of trash in the water, similar to a flap style valve, and is designed to be mounted just below the surface of the water.

Water exits sideways from the valve to cut trough turbulence, and an optional stainless shroud is required for mounting above the waterline. Optional accessories allow the valve to be mounted underwater.

LIKES

- Construction quality – stock will not damage it
- High and low pressure mounting point
- Huge flow rate
- Large range of different size floats, arms, and underwater mounting accessories

DISLIKES

- Needs shroud for mounting above the water line
- Adjusting water level involves bending the float arm (very difficult).

Hansen Max-Flo valve

PRICE: \$50

COMMENT

The Hansen Max-Flo diaphragm valve was the only unit tested to feature a threaded outlet, allowing the flow to be diverted to other areas of the trough, or a tube installed to reduce turbulence for surface mounting.

The unit is rugged and well made, and easily disassembled by hand by unscrewing the barrel nut around the body of the valve.

The valve has a massive flow rate, topping all other valves at 245 litres/minute, and the test equipment could not provide enough pressure to match the 200kPa as used with other valves.

The unit has a 25mm female threaded spigot, and is supplied with a 25mm nipple and a 25/20mm nipple. The unit can be bottom or side-wall mounted, or surface mounted, and the arm can be lengthened with the extension piece provided.

No filter is used, as the valve has a 'self flushing' pilot hole and no blockages were experienced during testing.

LIKES

- Massive flow rate
- Good value
- Flexible mounting options
- Easy to service

DISLIKES

- Takes a while to shut off



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Philmac High Flow float valve

PRICE: \$89.50

COMMENT

Engineers loved the quality construction of the Philmac brass flap valve, and as a surface mount valve, stock are unlikely to damage it.

The body casting is smooth and nicely machined, and features a stainless steel insert for the flap to seal against. The float arm is massively thick (12mm) and has a 1/2-inch Whitworth thread and locknut on the end for float attachment.

The valve is held together with stainless



steel pins secured with R-clips, and is easily stripped without tools.

The rubber sealing disc can be reversed in the flap once it has become worn, and the float height is adjusted using a brass bolt and locknut

LIKES

- Quality, rugged construction
- Massive flow rate
- Very easy to service
- Copes well with dirty water.

DISLIKES

- None



Philmac Sleeve valve

PRICE: \$49.20

COMMENT

The Philmac plastic sleeve valve is similar in design to the Apex unit, with a slightly smaller diameter sleeve which is O-ring sealed.

The cap can be removed by hand for cleaning or to access the seal, which is reversible.



This valve is being superseded by the newer PN12 valve, but there will be stock available for some time.

LIKES

- Simple design
- Robust float arm with locknut
- Easy to service without tools

DISLIKES

- Thin neck on spigot may snap under abuse
- No spanner flats on spigot.



Philmac Horizontal float valve

PRICE: \$125

COMMENT

Other than brass, the Philmac horizontal valve is available in plastic and stainless steel construction, although the price of the latter is pretty frightening.

The brass valve tested is made from a dezincification resistant (DZR) alloy, which prevents acidic water leaching the zinc out of the alloy, leaving a brittle, spongy material behind.



After cycle testing, the rubber sealing face was a little hardened and cracked, but it still sealed well under pressure. The metal seal face is a stainless steel insert.

LIKES

- DZR brass construction
- Solid float arm with locknut
- Easy to service, spanner flats on body
- Stainless steel seal face insert

DISLIKES

- Low flow rate
- Expensive



Jobe Megaflow valve

PRICE: \$70.48

COMMENT

Engineers were impressed with the design of the Jobe Meagaflo diaphragm valve, which was well built and easy to service.

Water cleanliness is a little more important with diaphragm valves, and the Jobe unit is fitted with a filter basket on the intake. This is easily cleaned as the valve separates from the intake fitting via a bayonet-style attachment. With the water supply turned off, the valve body can be easily removed without tools, even though the entire unit is under water. A locking hook is provided so the cord can be secured to lock the valve in the off position. The rest of the valve body is held together with tamper-proof screws, but testing shows it should rarely need attention.

LIKES

- Construction quality
- Bayonet attachment
- Fewer moving parts
- High flow rate

DISLIKES

- Tamper proof screws on body

Philmac Stockproof valve (plastic)

PRICE: \$66.25

COMMENT

The Stockproof valve is a dedicated underwater unit, and cannot be surface mounted. The rectangular float is designed to hug the trough wall, making the entire unit extremely compact. As long as you tie the float on to the cord properly (which can be a little tricky), stock should not trouble the valve. The valve unit itself is very simple with a stainless steel arm operating a small plunger, which is fitted with a face seal. The seal is easily replaced when worn, and can be done without tools or even removing the valve from the trough.

LIKES

- Simple design
- Easy to service
- Spanner flats on valve shank

DISLIKES

- Very low flow rate
- Not designed for higher line pressure



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Raindrop Bronze float valve

PRICE: \$71.50

COMMENT

Operating on the same principle as the plastic Raindrop valve, the bronze unit is far less susceptible to corrosive conditions.

The unit is also available in high and low pressure versions (HP tested). Engineers found the casting to be a little rough, and the arm pivot is cast into the body of the valve, preventing its removal.

The float hole on the end of the arm was also drilled crooked. The seat is a plastic insert, and the flap is easy to replace once the two stainless steel split pins are removed.

A range of different length arms are available, and the entire valve is also available in stainless steel.

LIKES

- Bronze construction
- Easy to adjust float height
- Robust build

DISLIKES

- Rough construction
- Low flow rate
- Must use manufacturer's float



Philmac Stockproof valve (brass)

PRICE: \$120.25

COMMENT

The brass version of the 25mm Stockproof valve is of far heavier construction, and costs almost twice as much.

The brass body of the valve is of heavy construction, and the seat is a stainless steel insert. The valve operates in exactly the same way as the plastic version, and uses the same replaceable plunger with rubber face seal.

Both plastic and brass valves can be



mounted horizontally from the sidewall of the trough, or vertically from a fitting in the trough floor, provided the lever arm is repositioned on a different pivot hole.

LIKES

- Heavy duty brass construction
- Simple design and easy to service
- Spanner flats on shank
- Stainless steel seat

DISLIKES

- Very low flow rate
- Not designed for higher line pressure



NEW — Philmac PN12 float valve

PRICE: \$51.63

COMMENT

The new Philmac PN12 float valve has barely hit the shelves yet, and will replace the plastic sleeve valve in due course.

It features several improvements over the older model, such as a strengthened body, R-clip on pivot pin for easy removal, and a higher flow rate for quicker trough filling.

The cap nut has been changed to a threaded insert which now requires a spanner

for removal, but the thick internal seal is still reversible for longer life.

The valve is supplied with a 25 to 20mm reducing fitting to cater for both inch and 3/4-inch pipe attachment.

LIKES

- Stronger valve body
- R-pin attachment of float arm
- 25-20mm reducer fitting included
- High flow rate

DISLIKES

- Need a spanner to remove cap nut
- No spanner flats on spigot shank

Raindrop Nylon float valve

PRICE: \$38.75

COMMENT

As the only plastic flap-style valve tested, the Raindrop unit was reasonably well made and easy to service.

Construction is of glass-filled nylon, with stainless steel arm extension and water level adjustment bolt.

The flap is not hinged, but slides up against the seat on two large split pins, which are easily removed for servicing. The arm pivots on a plastic pin.

The valve is available in either low pressure (0 to 80kPa) or high pressure (0 to 410kPa), with a different size seat glued in to the body to suit. Engineers were unable to achieve the flow rates quoted in sales literature.

LIKES

- Easy to service
- Easy to adjust float height
- Inexpensive

DISLIKES

- Low flow rate
- Must use manufacturer's float



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