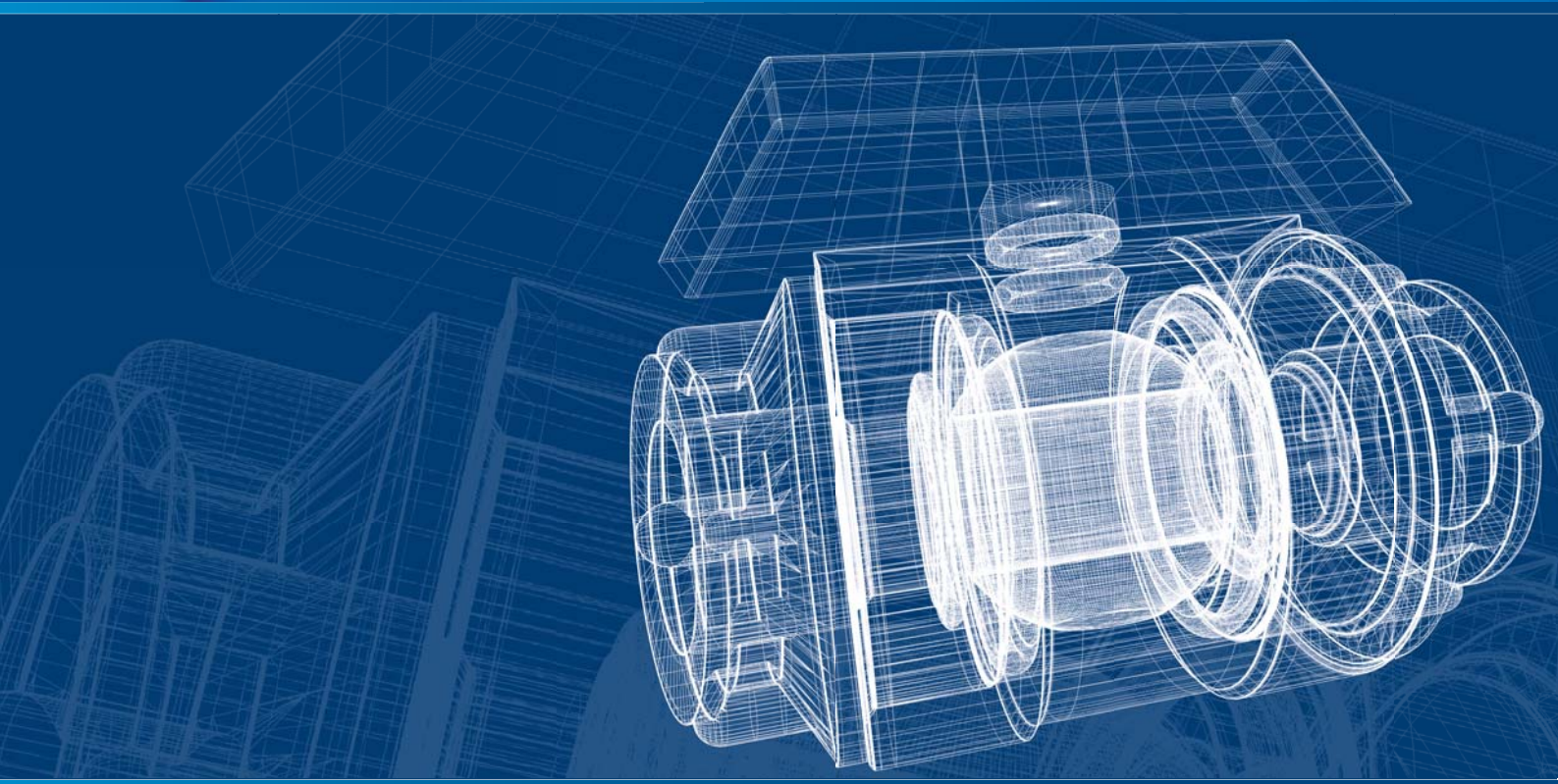
VALVES

Technical Manual



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The connection you can trust.

CONTENTS

Quality System™
Quality Endorsed Company
ISO 9001-2000 License No. 2658 SAI Global

Environmental System™
Certified Environmental Management
ISO 14001 Lic CEM20307 SAI Global

NATA
NATA Accredited Laboratory Number: 14673

Committed to sustainable development, Philmac is well renowned for quality products and services. Philmac manufactures pipe fittings and valves under a Quality Assurance System assessed and approved to ISO 9001-2000 and has obtained the prestigious environmental management certification ISO 14000. Philmac has a NATA accredited laboratory and tests fittings and valves to international and national standards. Third party accreditation is carried out by SAI Global.

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INTRODUCTION

Valves play an integral part in the performance, management and control of water quality, flow and pressure within a pipe system. Philmac manufacture a broad range of valves. Each valve is designed to cater for an array of applications. Whether you want high flow, high shut-off, high pressure, compact size, plastic or metal, tapered or parallel threads, solid levers or chain/rope levers (with a choice in lever length).

Philmac has the right valve for you!

Philmac®

The connection you can trust.

VALVE RANGE QUICK REFERENCE GUIDE

	Sleeve	Horizontal Float	Servo Tank	Cistern	Ball
Primary Application					
Stock Water	♦	♦	♦		♦
Mains Water Connection		♦	♦	♦	♦
Commercial/Industrial		♦	♦	♦	♦
Pump					♦
Trough	♦	♦			♦
Tanks		♦	♦	♦	♦
Pipes					♦
Features					
Hot Water Application					
Potable Water Approval (4020)	♦	♦	♦		♦
Underwater installation		With Cord Attachment			
Lever length options		♦			
Recycled Water Identification Option					♦
Technical					
Maximum Flow Rate (L/min)	238	496	2820	10.4	1680
Maximum Pressure Rating (kPa)	1000	1400	2000	3500	1400
Connection Type (Inlet)	BSP	BSP	BSP	BSP	BSP
Connection Type (Outlet)			BSP	BSP	BSP
Sizes	¾" & 1" (DN20 & 25)	½" to 2" (DN15 to 50)	1 ½" to 3" (DN40 to 80)	½" (DN15)	½" to 2" (DN15 to 50)

[A] 400 kPa for ¾" Brass
[B] Shutoff pressure varies with valve size
[C] Screwed
[D] Flanged

Foot/Non-Return	Trough	High Flow Float	Air Release	Ratio	Floats
♦	♦	♦		♦	♦
				♦	♦
♦				♦	♦
♦					
	♦	♦			♦
♦	♦				♦
♦			♦	♦	
					♦ (95°C) Max.)
				♦	♦
	♦				
900	187	330		2260[C] & 46000[D]	
1400	300[A]	620[B]	1400	3500	
BSP	BSP	BSP	BSP	BSP or Flanged	BSW
BSP		BSP		BSP or Flanged	
½" to 2" (DN15 to 50)	¾" to 1 ¼" (DN20 to 32)	1" – 2" (DN25 to 50)	1" (DN25)	½" to 6"	3" to 10"

HORIZONTAL FLOAT VALVES

Based on a simple yet effective operating principle, Philmac horizontal float valves are quick and easy to install ensuring a constant water level is maintained.

Philmac's versatile valve range is designed to handle the most demanding domestic, commercial and plumbing applications.

The high quality brass or stainless steel valves and the robust plastic materials are non-toxic, taint free and suitable for drinking water. They can also be used in situations where the tank water is subsequently heated to a maximum of 95° Celsius.

Designed to make the job at hand so much easier and backed by a full range of spare parts, these valves will deliver years of reliable operation.

APPLICATIONS

Agriculture: Stock troughs and water tanks.
Plumbing: Hot and cold water storage tanks for domestic and industrial applications
Industrial: Dishwashers and hospital sterilisers
Commercial: Air-conditioning units.

BENEFITS

Fast and Easy Installation

- **Choice of Threads:** Philmac offers a range of parallel (fastening) threads or tapered (sealing) threads which makes them suited to a variety of installations. This includes troughs/tanks with pre-fitted tapered inlets or tanks where only a pre-drilled hole exists.
- **Easy Disassembly:** The valves have been designed for easy replacement of the rubber seal. Simply remove the pivot pin, disconnect the lever assembly and remove the body cap (where fitted) to allow the piston to slide out and access the seal.
- **Minimum Space Required for Installation:** Based on a compact body design and a range of lever lengths in the ½" range makes them perfect for tight applications such as industrial dishwashers.
- **BSP Inlet Threads:** The Plumbing and Irrigation sectors use British Standard Pipe (BSP) threads as a standard. Philmac also uses these thread types across the valve range to ensure compatibility with other threaded fittings and make installation easy.

Complete Security

- **Corrosion Resistant:**
  Brass Valve - The bodies, plungers, lever assemblies, backnuts, collars and pivots pin are manufactured from DZR brass. With a stainless steel seat as standard it means years of hassle free operation.

  Plastic Valve – The bodies, seats, backnuts and plungers are manufactured from plastic. The lever assemblies and pivot pins are manufactured from DZR brass ensuring longevity of the valve.

  Stainless Steel – All components, except the seal, are manufactured from stainless steel for high chemical resistance.
- **Reliable Operation:** High quality engineered components means years of reliable operation.
- **Positive Shut-Off:** The action between the lever assembly and plunger assembly ensures the plunger assembly provides a complete seal against the water inlet and prevents unwanted loss of water.
- **Approvals:** All valves comply with Australian/New Zealand Standard 4020 which means the valves are suitable for use with drinking water.

High Performance

- **Manufactured from DZR brass:** Philmac brass float valves are manufactured from dezincification resistant (DZR) brass which means the brass is resistant to corrosion involving the loss of zinc leaving a residue of spongy or porous copper.
- **Manufactured from engineering grade thermoplastic materials:** Philmac plastic float valves are Australian made and manufactured from lightweight high performance thermoplastic materials which have excellent impact, UV and corrosion resistance. The material is non-toxic and taint free.
- **High pressure shutoff:** Horizontal float valves are rated to a pressure of 1400 kPa (200 psi) (static shutoff). This is based on using the standard lever arm and recommended float (ball) size.

Complete Coverage

- **Wide range:** The range of float valves is comprehensive and includes sizes from 3/8" to 2" (DN10 to DN50). In addition the ½" range is offered with tapered or parallel thread configurations, and lever lengths.

STANDARDS & TESTS

Philmac's range of horizontal float valves are designed to comply with the following standards and undertake a range of tests to ensure they comply with these standards.

Standards

AS1910: Water Supply – Float control valves for use in hot and cold water.

AS/NZ 4020: Testing of products for use in contact with drinking water.

AS1722.1: Pipe threads of Whitworth form part 1: sealing pipe threads.

AS1722.2: Pipe threads of Whitworth form part 2: fastening pipe threads.

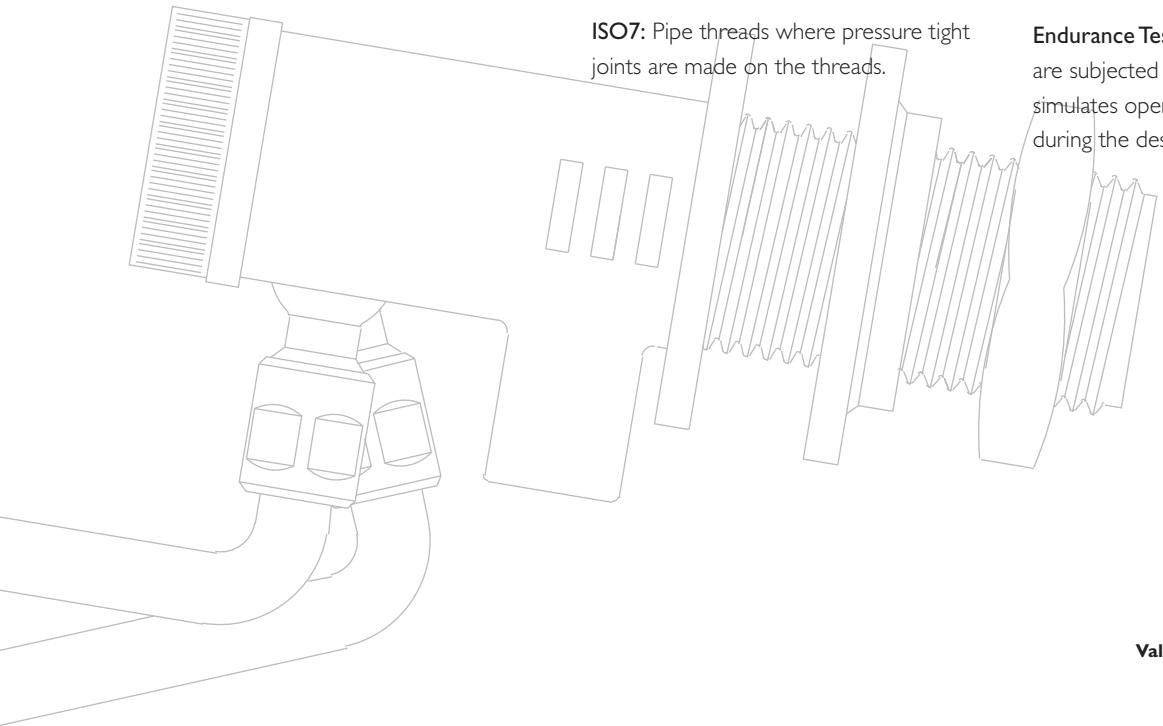
ISO7: Pipe threads where pressure tight joints are made on the threads.

Tests

Shut Off Test: Valves are tested for shut off against a hydrostatic water pressure of 2000 kPa (290 psi) or 20 bar.

Strength Test: Valves are tested for adequate strength for their intended application. This includes testing at the maximum recommended operating temperature and a pressure of 3000 kPa (435 psi) or 30 bar.

Endurance Test: Operating mechanisms are subjected to 50,000 cycles. This simulates opening and closing operations during the design service life of the valve.

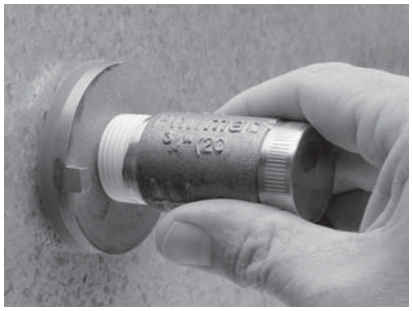


HORIZONTAL FLOAT VALVE OPERATION & INSTALLATION INSTRUCTIONS

The Philmac horizontal float valves operate by opening and closing a plunger against a seat through the action of a lever arm attached to a float. The lever arm is interconnected to the plunger via a cam. As the water level drops, the float and lever arm move in a downward direction allowing the plunger to move away from the seat, which opens the valve. When the water level rises, the float and lever arm move in an upward direction and the plunger moves towards the seat until it sits firmly against the seat and shuts the valve off.

Tapered Thread

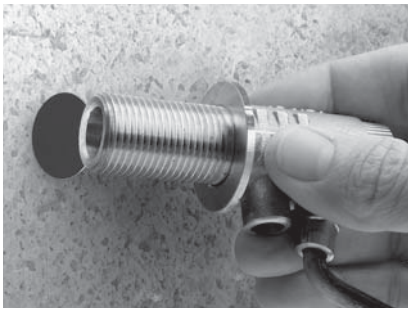
1. Apply PTFE tape or approved sealant to the thread ensuring a sufficient amount is applied to guarantee a watertight seal.



2. Screw the valve into the female thread by hand until firm*.

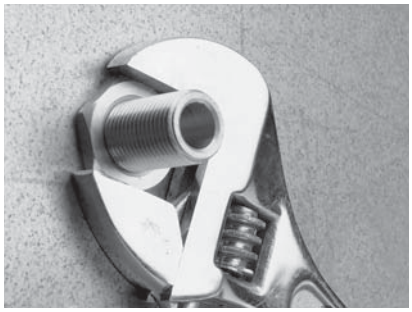
3. Using a pipe wrench or multigrips on the body** of the valve, screw it into the female thread until tight. Where necessary ensure the female thread is held stationary to avoid it from moving.

Parallel Thread



1. Remove the backnut and slide the thread through the appropriate sized hole.

2. Where using the stem sleeve to fit the valve into ¾" holes, ensure it is properly located on the valve side of the installation to prevent the valve moving.

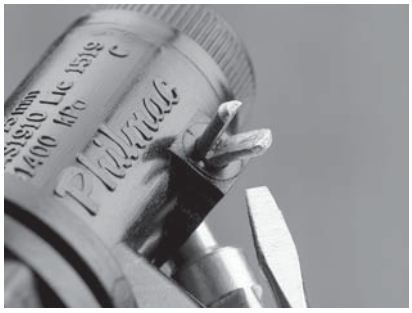


3. Refit the backnut and tighten with a spanner. The valve body** can be held in place with a spanner, multi-grips or equivalent.

Adjusting Lever Arm

1. Where necessary bend the lever arm to adjust the water level. This can be done by removing the lever arm assembly by first straightening the tabs on the end of the pivot pin with a pair of pliers then slide it out.

2. By using a pair of multi-grips or equivalent the lever can then be bent to the necessary angle.



3. Adjust the lever arm and then refit. Once the correct lever arm angle is achieved ensure the pivot pin tabs are flared outward by using a small screwdriver.

* For underwater installations it may be necessary to remove the lever arm assembly to prevent it from fouling on the bottom of the tank/trough
** Take care when holding the plastic body that excessive pressure is not applied or the body may be damaged

SYSTEM DESIGN CONSIDERATIONS

Threads: All threads are BSP (Whitworth form).

Maximum Operating Pressure: 1400 kPa (200 psi) or 14 bar at 20° C.

Operating temperature: Connection is cold water (less than 20°C) rated. However the brass and stainless steel valves can be used in an environment where the water is subsequently heated to 95° C in a tank. In these cases a hot water rated float must be used.

Floats (balls)

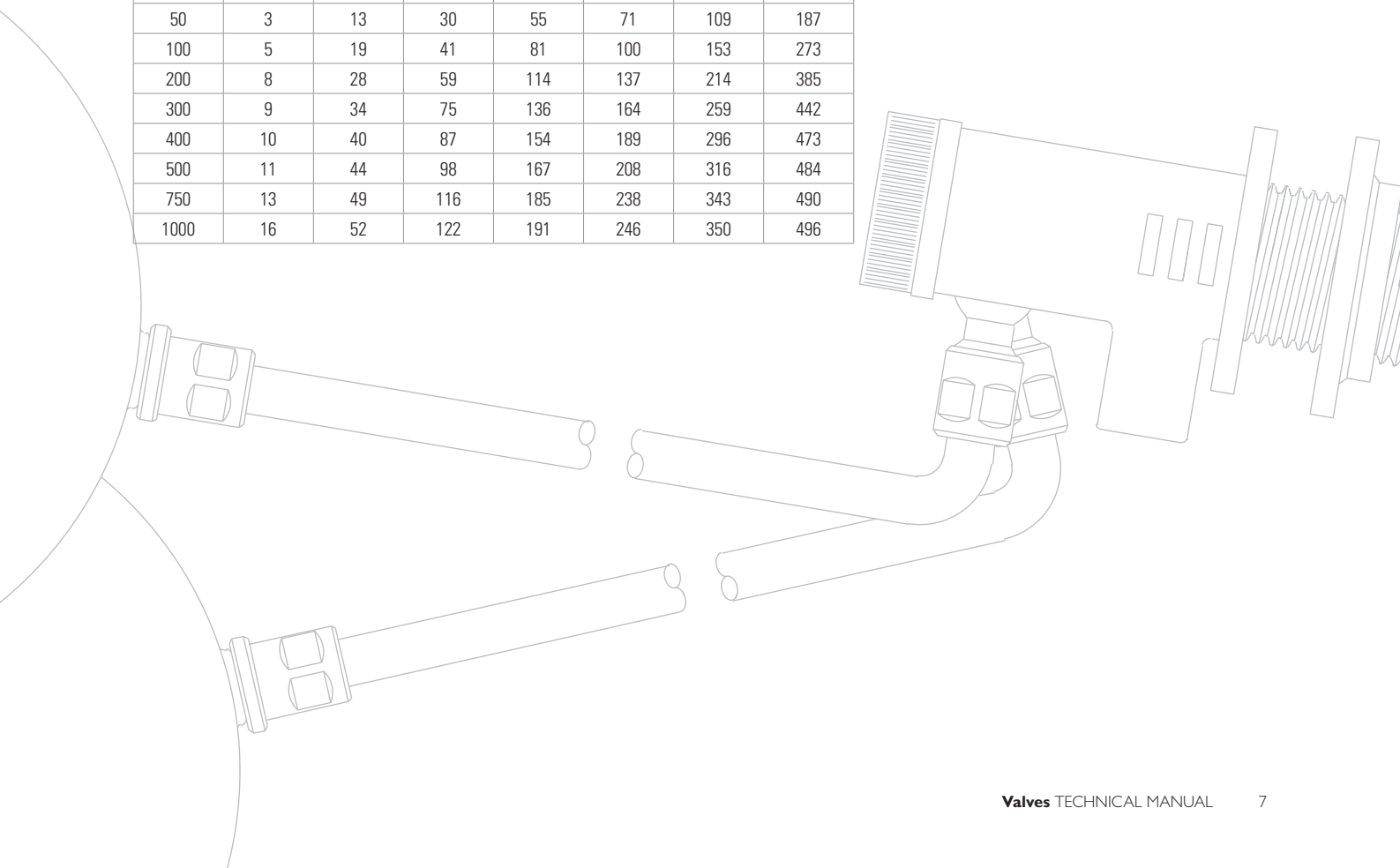
Plastic – cold water rated
Plastic – hot water rated (95°C)
Copper – cold water rated
Copper – hot water rated (95°C)

Weathering: All plastic materials used contain pigments to provide excellent protection against degradation from ultra-violet (UV) radiation. However long-term continuous exposure to UV is not recommended and plastic components should ideally be shielded from direct sunlight. Brass components are UV resistant.

Air Gap: When connecting to drinking water the installation should comply with the relevant air gap standards to prevent back siphonage.

Flow Rates (L/min)

Inlet Pressure (kPa)	Inlet Size						
	3/8" (DN10)	½" (DN15)	¾" (DN20)	1" (DN25)	1 ¼" (DN32)	1 ½" (DN40)	2" (DN50)
10	1	5	13	23	27	41	65
20	2	7	19	33	40	65	83
30	2	10	23	38	51	81	96
40	3	12	25	48	62	96	162
50	3	13	30	55	71	109	187
100	5	19	41	81	100	153	273
200	8	28	59	114	137	214	385
300	9	34	75	136	164	259	442
400	10	40	87	154	189	296	473
500	11	44	98	167	208	316	484
750	13	49	116	185	238	343	490
1000	16	52	122	191	246	350	496



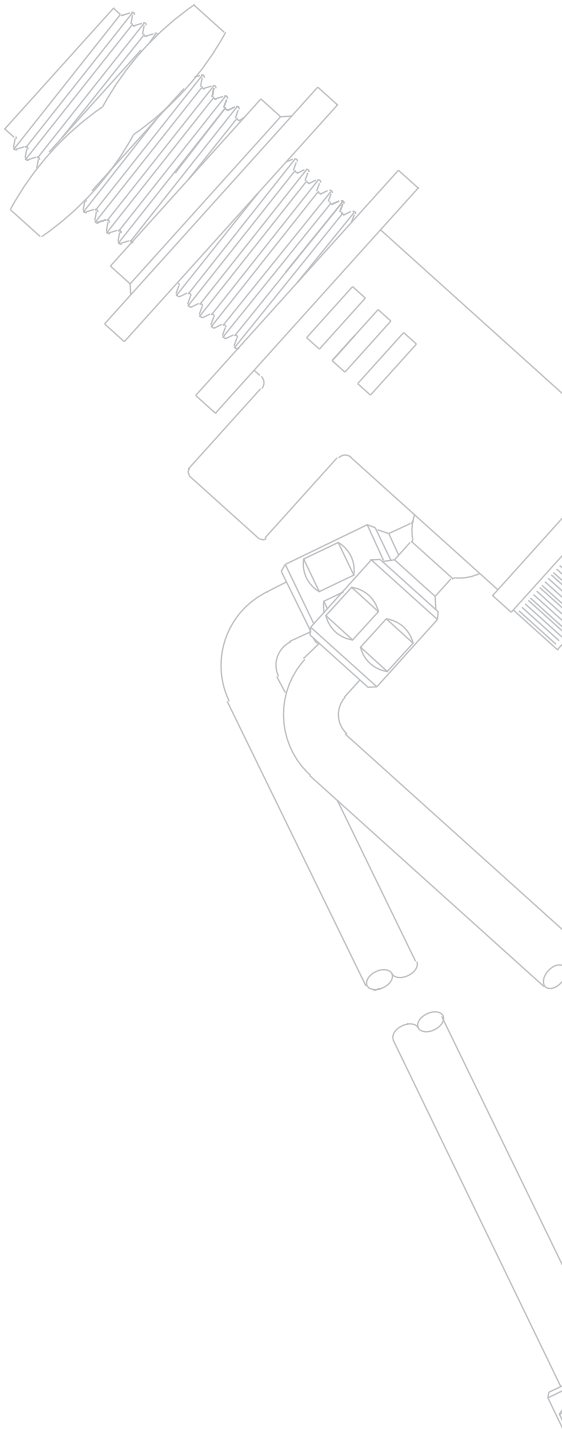
CHEMICAL RESISTANCE

Philmac's horizontal float valves are primarily designed to convey water. However there may be occasions where the water contains chemicals and/or alternative fluids that may need to be controlled. The following table is provided as a **guide only** for the compatibility of various chemicals or alternative fluids to Philmac brass and plastic horizontal float valves. The mixing together of chemicals may affect the compatibility.

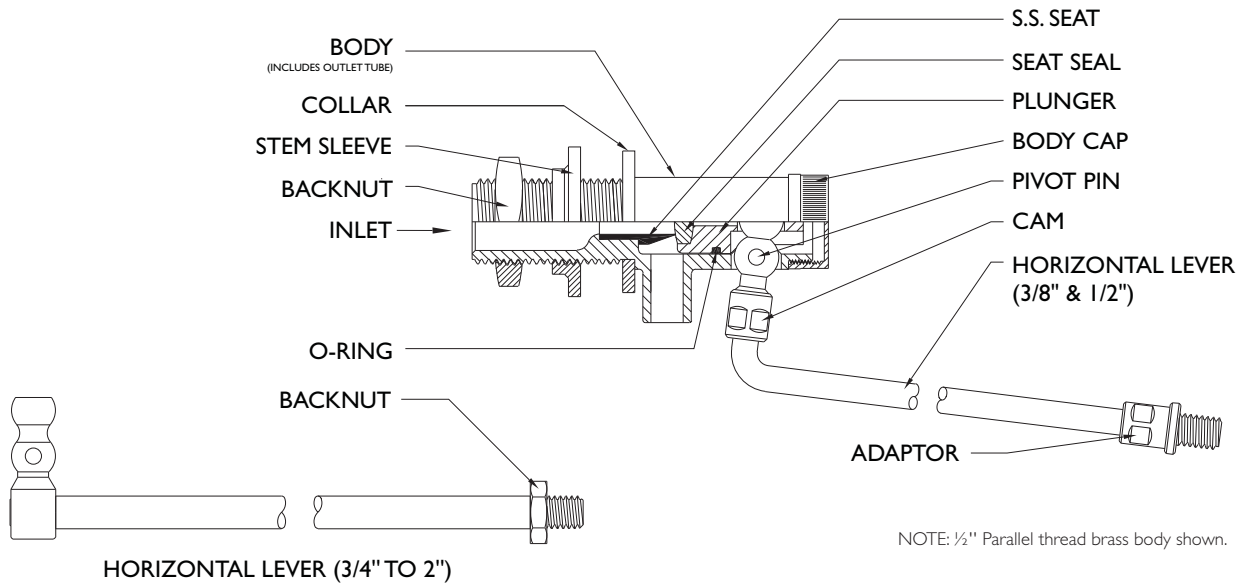
Chemical	Compatibility		
	Brass Float Valve	Stainless Steel Float Valve	Plastic Float Valve
Acetic acid (10%)	N	R	R
Acetic acid (50%)	N	R	N
Alcohol (ethanol)	N	R	N
Ammonium nitrate	N	R	R
Antifreeze	R	R	R
Brine	N	R	R
Calcium carbonate		R	R
Calcium chloride	R	R	N
Calcium nitrate		R	N
Calcium sulphate		R	N
Chlorine water	N	R	N
Citric Acid	N	R	N
Copper Sulphate >5%	N	R	N
Diesel (fuel)	R	R	R
Ethyl alcohol (ethanol)	N	R	N
Hydrochloric acid (10%)	N	R	N
Hydrochloric acid (30%)	N	N	N
Kerosene	R	R	R
Lubricating oils (not synthetic)	R	R	R
Magnesium nitrate		R	R
Magnesium sulphate	R	R	R
Mineral oils	R	R	R
Nitric acid (10%)	N	R	N
Nitric acid (40%)	N	R	N
Olive oil		R	N
Orange juice		R	R
Petrol		R	R
Phosphoric acid (85%)	N	N	N
Drinking water	R	R	R
Potassium chloride	N	R	R
Potassium nitrate	R	R	R
Potassium sulphate	N	R	R
Sodium bicarbonate	N	R	R
Sodium hypochlorite (<10%)	N	R	N
Sulphuric acid (10%)		R	N
Sulphuric acid (30%)		R	N
Urea		R	R
Zinc nitrate		R	
Zinc sulphate	R	R	N

N = Not Recommended R = Resistant Empty Cell = No data available

Note recommendations based on fluids at 20^0 C or less



HORIZONTAL FLOAT VALVES MATERIAL & COMPONENTS



NOTE: ½" Parallel thread brass body shown.

Plastic Body with Plastic Seat

Size	Nominal Size	Part Number	Body	Body Cap	Plunger	Seal	Collar	Back Nut	Lever Assembly
½"	DN15	90300200	Acetal	Nylon	Acetal	Nitrile rubber	Integral with body	Acetal	DZR Brass
½"	DN15	90300300	Acetal	Nylon	Acetal	Nitrile rubber	Integral with body	Acetal	DZR Brass
½"	DN15	90300400	Acetal	Nylon	Acetal	Nitrile rubber	Integral with body	Acetal	DZR Brass

Note: Outlet Tube is an integral part of the body

Brass Body with 316 Stainless Steel Seat

Size	Nominal Size	Part Number	Body	Body Cap	Plunger	Seal	Collar*	Stem Sleeve**	Back Nut	Lever Assembly
3/8""	DN10	90300500	DZR Brass	DZR Brass	DZR Brass	Nitrile rubber	-	-	-	DZR Brass
½"	DN15	90300700	DZR Brass	DZR Brass	DZR Brass	Nitrile rubber	-	-	-	DZR Brass
½"	DN15	90301300	DZR Brass	DZR Brass	DZR Brass	Nitrile rubber	DZR Brass	-	DZR Brass	DZR Brass
½"	DN15	90301500	DZR Brass	DZR Brass	DZR Brass	Nitrile rubber	DZR Brass	-	DZR Brass	DZR Brass
½"	DN15	90302300	DZR Brass	DZR Brass	DZR Brass	Nitrile rubber	DZR Brass	Polypropylene	DZR Brass	DZR Brass
½"	DN15	90303100	DZR Brass	DZR Brass	DZR Brass	Nitrile rubber	DZR Brass	-	DZR Brass	DZR Brass
¾"	DN20	90304400	DZR Brass	DZR Brass	DZR Brass	Nitrile rubber	-	-	-	DZR Brass
1"	DN25	90304600	DZR Brass	DZR Brass	DZR Brass	Nitrile rubber	-	-	-	DZR Brass
1¼"	DN32	90304800	DZR Brass	DZR Brass	DZR Brass	Nitrile rubber	-	-	-	DZR Brass
1½"	DN40	90404900	DZR Brass	DZR Brass	DZR Brass	Nitrile rubber	-	-	-	DZR Brass
2"	DN50	90405000	DZR Brass	DZR Brass	DZR Brass	Nitrile rubber	-	-	-	DZR Brass

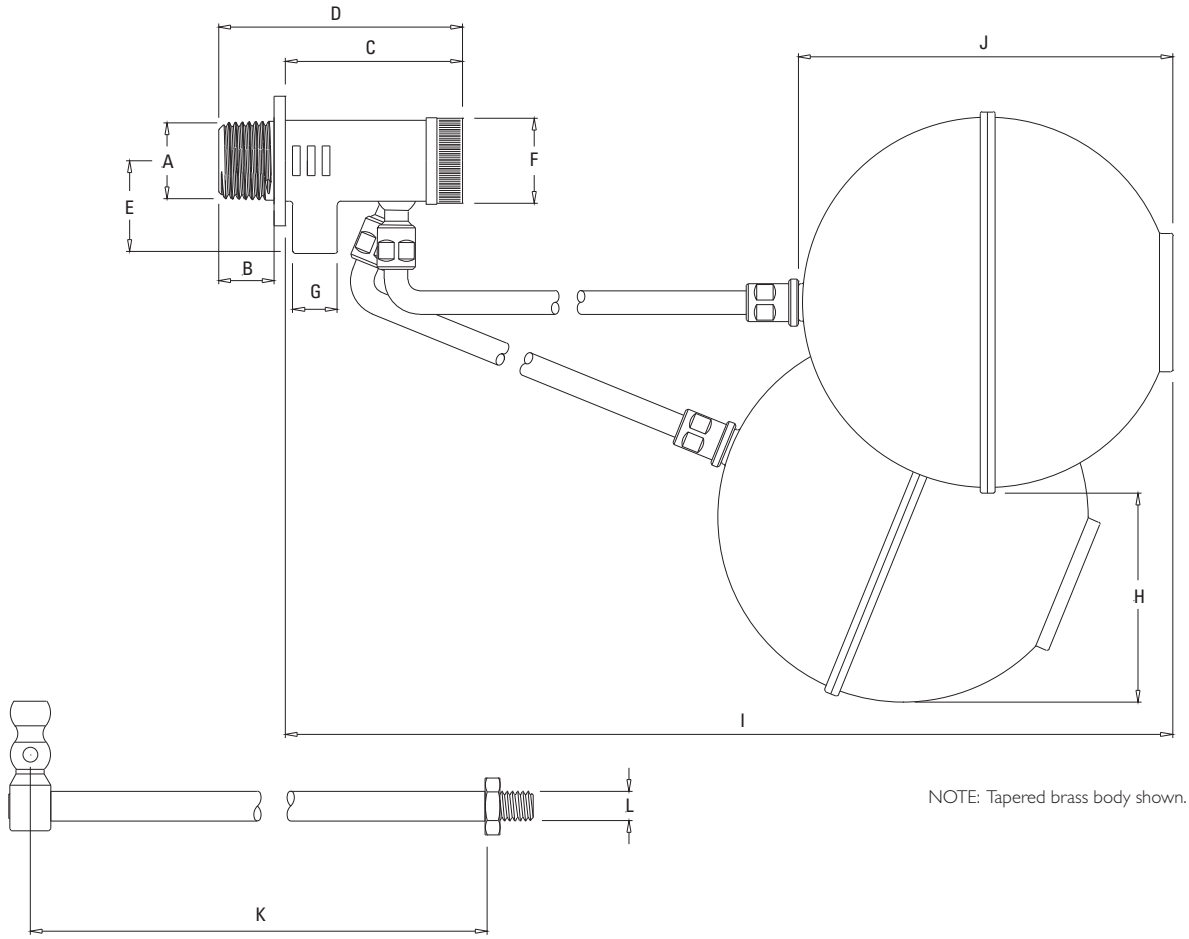
* A collar is only fitted to valves with parallel threads.
** A stem sleeve is a stepped washer which allows a ½" valve to be fitted to a hole that would be used by a ¾" valve.

Stainless Steel Body with 316 Stainless Steel Seat

Size	Nominal Size	Part Number	Body	Body Cap	Plunger	Seal	Lever Assembly
½"	DN15	90399100	316 S/S	316 S/S	316 S/S	Viton A	316 S/S
¾"	DN20	90399200	316 S/S	316 S/S	316 S/S	Viton A	316 S/S
1"	DN25	90399300	316 S/S	316 S/S	316 S/S	Viton A	316 S/S
1½"	DN40	90399400	316 S/S	316 S/S	316 S/S	Viton A	316 S/S

HORIZONTAL FLOAT VALVES RANGE & DIMENSIONS

The following diagram shows dimensions related to the different horizontal valve sizes. (Dimensions are also shown on page 11).



NOTE: Tapered brass body shown.

Brass/Stainless Steel

Size (A)	Nominal Size	C	E	F	G	H	I
⅜"	DN10	36	16.5	17.5	9.5	45	225
½"	DN15	46.5	22	23.5	12.7	135	365*
¾"	DN20	50.3	28	30	16	96	444
1"	DN25	62.2	33	35	19	189	545
1 ¼"	DN32	68.5	39	43	22.2	205	580
1 ½"	DN40	73.5	44.5	44	25	195	685
2"	DN50	88	55	62	32	280	780

* With 200 mm lever
All dimensions in millimetres unless otherwise stated

Plastic Float Valves

Size (A)	Nominal Size	C	E	F	G	H	I
½"	DN15	44	25	24	12	95*	345

* With 200 mm lever

All dimensions in millimetres unless otherwise stated

HORIZONTAL FLOAT VALVES RANGE & DIMENSIONS

(Refer page 10 for diagram).

Plastic Body with Plastic Seat

Size (A)	Nominal Size	Part Number	Thread Type	B	D	J	K	L
½"	DN15	90300200	Parallel	41	88	100	250	5/16" BSW
½"	DN15	90300300	Parallel	41	88	100	200	5/16" BSW
½"	DN15	90300400	Parallel	41	88	100	125	5/16" BSW

All dimensions in millimetres unless otherwise stated

Brass Body with 316 Stainless Steel Seat

Size (A)	Nominal Size	Part Number	Thread Type	B	D	J	K	L
3/8"	DN10	90300500	Tapered	15	50.9	80/100*	125	5/16" BSW
½"	DN15	90300700	Tapered	15	61.5	100	200	5/16" BSW
½"	DN15	90301300	Parallel	38	84.2	100	250	5/16" BSW
½"	DN15	90301500	Parallel	38	84.2	100	200	5/16" BSW
½"	DN15	90302300	Parallel	38	84.2	100	200	5/16" BSW
½"	DN15	90303100	Parallel	25	71.2	100	200	5/16" BSW
¾"	DN20	90304400	Tapered	19	69.3	150	250	5/16" BSW
1"	DN25	90304600	Tapered	19	80	150	355	5/16" BSW
1¼"	DN32	90304800	Tapered	22	91	175	355	3/8" BSW
1½"	DN40	90404900	Tapered	22	96	200	425	3/8" BSW
2"	DN50	90405000	Tapered	25	114	255	455	½" BSW

All dimensions in millimetres unless otherwise stated
* For pressures over 1000kPa the 100mm float is recommended.

Stainless Steel Body with 316 Stainless Steal Seat

Size (A)	Nominal Size	Part Number	Thread Type	B	D	J	K	L
½"	DN15	90399100	Tapered	16	61.5	125	255	5/16" BSW
¾"	DN20	90399200	Tapered	18	69.1	125	255	5/16" BSW
1"	DN25	90399300	Tapered	19	80.9	125	355	5/16" BSW
1 ½"	DN40	90399400	Tapered	22	94.3	200	405	3/8" BSW

All dimensions in millimetres unless otherwise stated

SLEEVE VALVES

Philmac's plastic sleeve valves are designed to deliver high volumes of water quickly. Through their simple yet effective operating principle, sleeve valves are quick and easy to install saving precious time.

Manufactured from high grade materials to provide a high level of corrosion and impact resistance, sleeve valves ensure a constant water level is maintained.

Based on a compact body design, Philmac's plastic sleeve valve is perfect for tight applications such as small troughs.

APPLICATIONS

Agriculture: Stock troughs and water tanks.

BENEFITS

Fast and Easy Installation

- **Easy Disassembly:** The valves have been designed for easy replacement of the rubber seal without having to un-install the valve. Simply unscrew the cap/seal washer assembly and access the seal.
- **Minimum Space Required for Installation:** Based on a compact body design it makes them perfect for tight applications such as small troughs.
- **BSP Inlet Threads:** The Plumbing and Irrigation sectors use British Standard Pipe (BSP) threads as a standard. Philmac also uses these thread types across the valve range to ensure compatibility with other threaded fittings and make installation easy.

Complete Security

- **Reliable Operation:** Consistent high quality injection moulded plastic bodies plus plastic and brass engineered components means years of reliable operation.
- **Corrosion Resistant:** The body, cap and piston are manufactured from plastic. The seal and O-ring are manufactured from Nitrile rubber. The lever assemblies and pivot pins are manufactured from DZR brass ensuring all materials used have a high level of corrosion resistance.
- **Positive Shut-Off: T**he action between the lever assembly and piston ensures the piston provides a complete seal against the water inlet and prevents unwanted loss of water.

High Performance

- **Manufactured from advanced thermoplastic materials:** Philmac sleeve valve bodies are manufactured from lightweight high performance thermoplastic material which has excellent impact, UV and corrosion resistance. The material is non-toxic and taint free.
- **Manufactured from DZR brass:** Philmac sleeve valves also utilise a brass lever assembly. These are manufactured from dezincification resistant (DZR) brass which means the brass is resistant in soil and water environments to corrosion involving the loss of zinc leaving a residue of spongy or porous copper.
- **High pressure shutoff:** Sleeve valves are rated to a pressure of 1000 kPa (145 psi) or 10 bar (static shutoff). This is based on using the recommended float (ball) size.
- **High flow rates:** Due to the piston moving out of the flow path of the water the sleeve valve can achieve higher flow rates than a corresponding sized horizontal float valve.

Complete Coverage

- **Wide range:** The range of sleeve valves includes ¾" and 1" (DN20 and DN25).

STANDARDS & TESTS

Philmac's range of sleeve valves are designed to comply with the following standards and undertake a range of tests to ensure they comply with these standards.

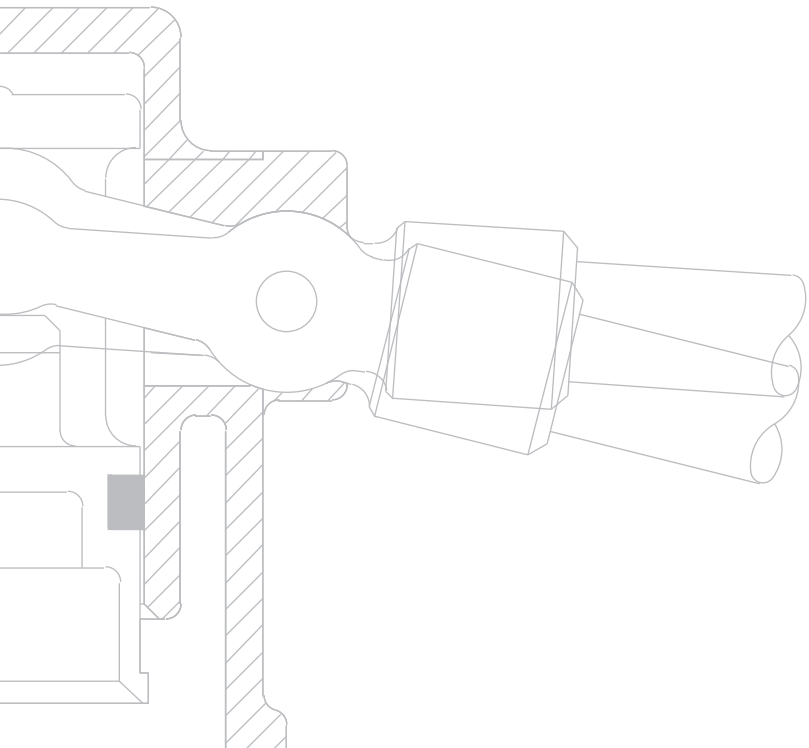
Standards

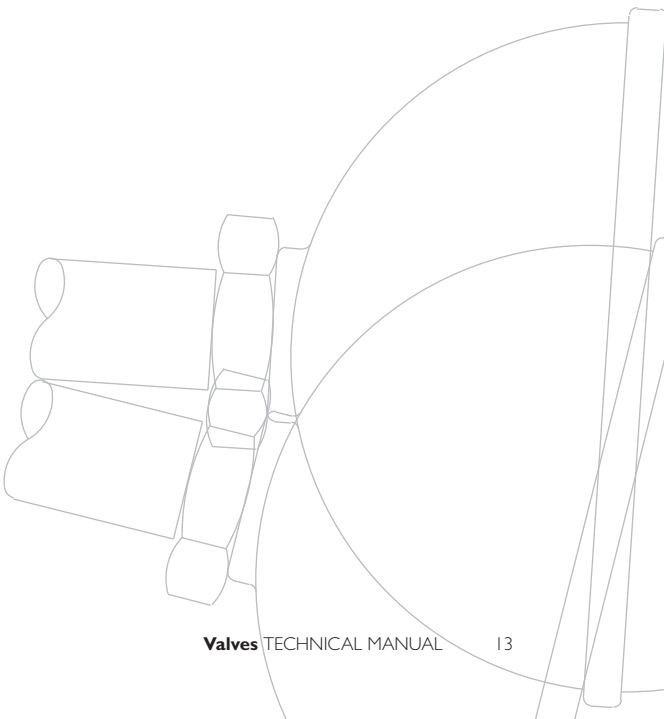
AS1722.1: Pipe threads of Whitworth form part 1: sealing pipe threads.

ISO7: Pipe threads where pressure tight joints are made on the threads.

Tests

Shut Off Test: Valves are tested for shut off against a hydrostatic water pressure of 2000 kPa (290 psi) or 20 bar.



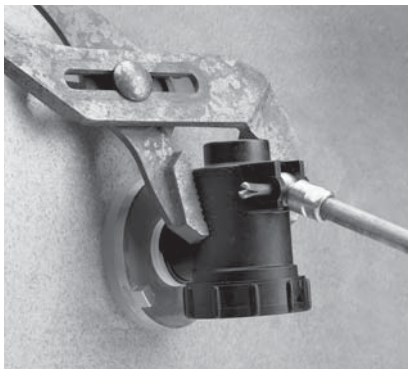


SLEEVE VALVE OPERATION & INSTALLATION INSTRUCTIONS

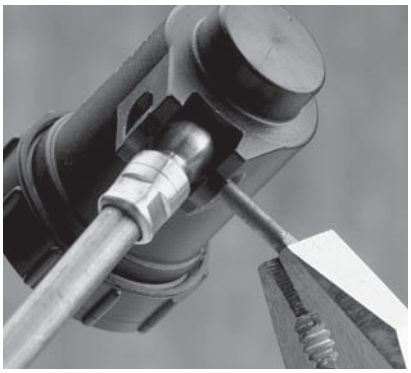
The Philmac sleeve valves operate by opening and closing a plunger against a seat through the action of a lever arm attached to a float. The lever arm is interconnected to the plunger via a cam. As the water level drops, the float and lever arm move in a downward direction and the plunger moves away from the seat which opens the valve. Once the water level has risen, the float and lever arm move in an upwards direction and the plunger moves towards the seat until it sits firmly against the seat and shuts the valve off.

1. Apply PTFE tape or approved sealant to the thread ensuring sufficient is applied to ensure a watertight seal.

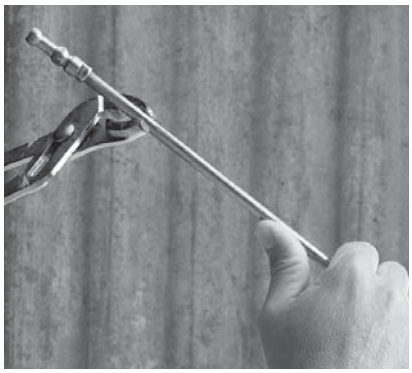
2. Screw into female thread by hand until firm*.



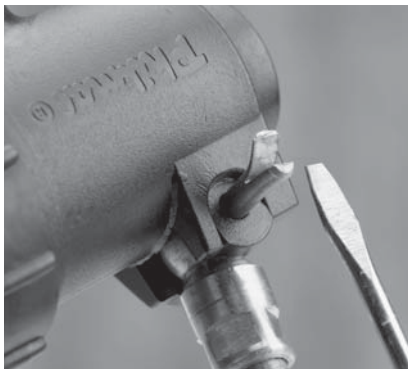
3. Using a pipe wrench or multigrips on the body** of the valve screw it into the female thread until tight. Where necessary ensure the female thread is held stationery to avoid it from moving.



4. Where necessary bend the lever arm to adjust the water level. This can be done by removing the lever arm assembly by first straightening the tabs on the end of the pivot pin with a pair of pliers then slide it out.



5. By using a pair of multi-grips or equivalent the lever can then be bent to the necessary angle.



6. Adjust the arm and then refit. Once the correct arm angle is achieved ensure the pivot pin tabs are flared outward by using a small screwdriver

* For underwater installations it may be necessary to remove the lever assembly to prevent it from fouling on the bottom of the tank/trough

** Take care when holding the body that excessive pressure is not applied or the body may be damaged

SYSTEM DESIGN CONSIDERATIONS

Threads: All threads are BSP (Whitworth form).

Maximum Operating Pressure: 1000 kPa (145 psi) or 10 bar.

Operating temperature: Connection is cold water (less than 20°C) rated.

Floats (balls):
Plastic – cold water rated
Copper – cold water rated

Weathering: All plastic materials used contain pigments to provide excellent protection against degradation from ultra-violet (UV) radiation. However long-term continuous exposure to UV is not recommended and plastic components should ideally be shielded from direct sunlight. Brass components are UV resistant.

Flow Rates (L/min)

Inlet Pressure (kPa)	Inlet Size	
	¾" DN20)	1" (DN25)
50	65	65
100	90	90
150	105	105
200	132	132
250	140	140
300	156	156
350	165	165
400	174	174
450	185	185
500	195	195
750	238	238

CHEMICAL RESISTANCE

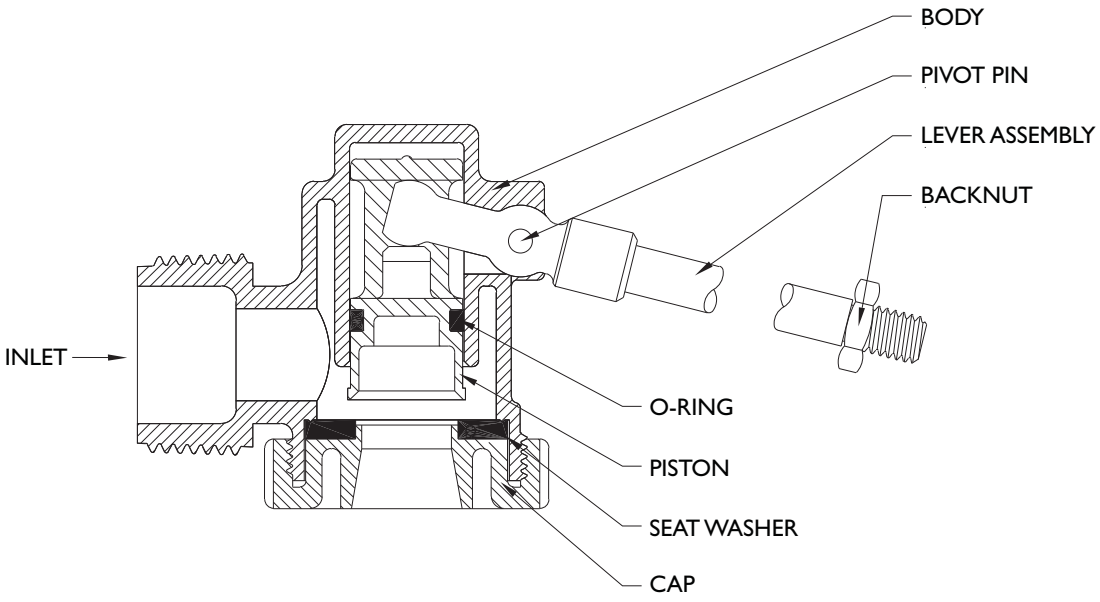
Philmac's sleeve valves are primarily designed to convey water. However, there may be occasions where the water contains chemicals and/or alternative fluids need to be controlled. The following table is provided as a **guide only** for the compatibility of various chemicals and alternative fluids to Philmac's sleeve valves. The mixing of chemicals may affect the compatibility.

Chemical	Sleeve Valve
Acetic acid (10%)	R
Acetic acid (50%)	N
Alcohol (ethanol)	N
Ammonium nitrate	R
Antifreeze	R
Brine	R
Calcium carbonate	R
Calcium chloride	N
Calcium nitrate	N
Calcium sulphate	N
Chlorine water	N
Citric Acid	N
Copper Sulphate >5%	N
Diesel (fuel)	R
Ethyl alcohol (ethanol)	N
Hydrochloric acid (10%)	N
Hydrochloric acid (30%)	N
Kerosene	R
Lubricating oils (not synthetic)	R
Magnesium nitrate	R
Magnesium sulphate	R
Mineral oils	R
Nitric acid (10%)	N
Nitric acid (40%)	N
Olive oil	N
Orange juice	R
Petrol	R
Phosphoric acid (85%)	N
Drinking water	R
Potassium chloride	R
Potassium nitrate	R
Potassium sulphate	R
Sodium bicarbonate	R
Sodium hypochlorite (<10%)	N
Sulphuric acid (10%)	N
Sulphuric acid (30%)	N
Urea	R
Zinc nitrate	
Zinc sulphate	N

N = Not Recommended
R = Resistant
Empty Cell = No data available

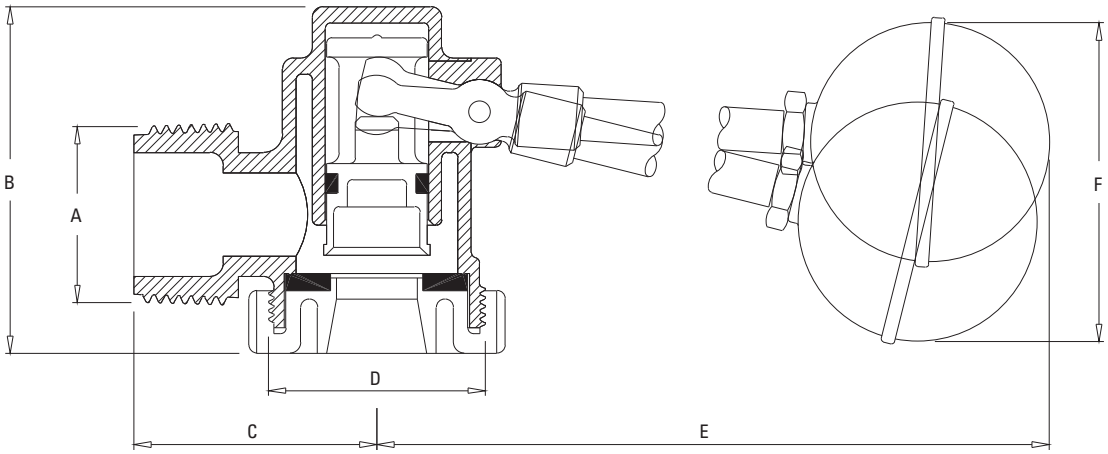
Note recommendations based on fluids at 20^0 C or less

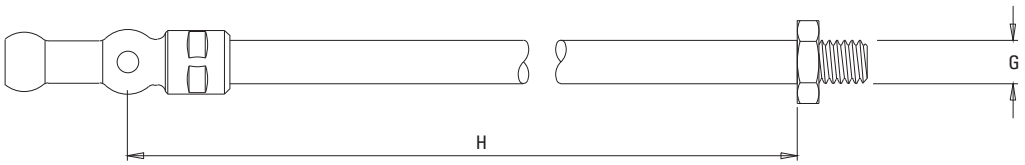
SLEEVE VALVE MATERIAL & COMPONENTS



Size	Nominal Size	Part Number	Body	Cap	Piston	Seat Seal	O-ring	Lever Assembly
¾"	DN20	91470200	Acetal	Nylon	Acetal	Nitrile rubber	Nitrile rubber	DZR Brass
1"	DN25	91470300	Acetal	Nylon	Acetal	Nitrile rubber	Nitrile rubber	DZR Brass

SLEEVE VALVE RANGE & DIMENSIONS





Size (A)	Nominal Size	B	C	D	E	F	G	H
¾"	DN20	62.5	45	44	480	145	5/16" BSW	300
1"	DN25	62.5	45	44	480	145	5/16" BSW	300

All dimensions in millimetres unless otherwise stated

MARK II SERVO TANK FILLING VALVES

Philmac's Australian made Mark II servo tank filling valve is designed to deliver high volumes of water very quickly.

Due to the unique servo action, the valve requires only a small float, which makes them ideal for confined spaces.

The unique design of the secondary servo action guarantees shut off at extremely high pressure.

Manufactured from high grade materials the Mark II servo tank is suitable for a range of applications such as fire service water tanks.

APPLICATIONS

Agriculture: Water tanks on bore schemes.

Plumbing: Water tanks for drinking water and fire service tanks

BENEFITS

Fast and Easy Installation

- **Minimum Space Required for Installation:** Based on a servo action the body has a secondary chamber which assists the lever/float assembly in closing the valve. This reduces the length of lever arm and float size that would otherwise be required to close at high pressures. With a compact body design it makes them perfect for tight applications such as fire service tanks.
- **BSP Inlet/Outlet Threads:** The Industrial and Plumbing sectors use British Standard Pipe (BSP) threads as a standard. Philmac also uses these thread types across the valve range to ensure compatibility with other threaded fittings making installation easy.
- **Hexagonal Inlet/Outlet:** Both the inlet and outlet are hexagonal in shape to make it easy to use a spanner or pipe wrench for installation.
- **Easy Disassembly:** The valves have been designed allowing easy replacement of the seals and O-rings. Simply remove the pivot pin, disconnect the lever arm assembly and remove the hexagonal seat bottom to allow the piston assembly to slide out and access the seals and O-rings.

Complete Security

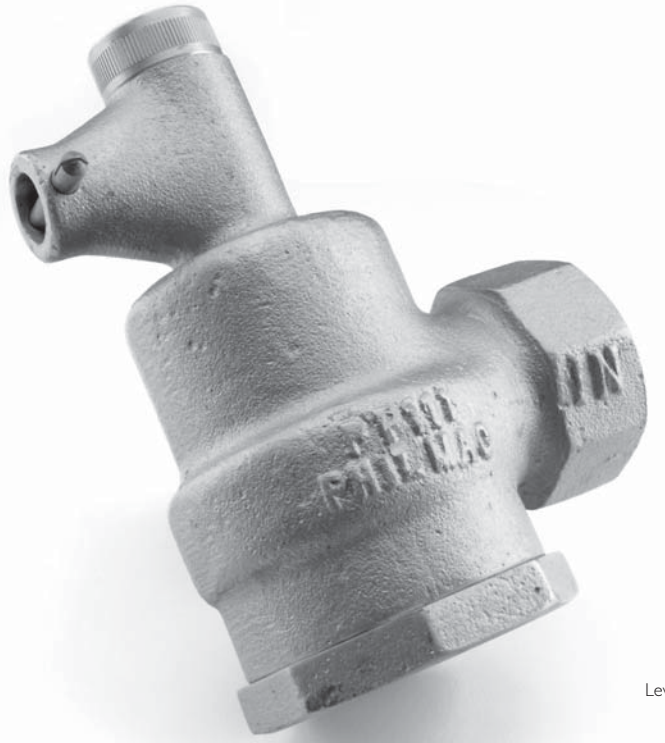
- **Servo Sealing Action:** By allowing water into the top chamber of the body it provides an additional or secondary force to the piston to assist the lever/float assembly and provide complete shutoff.
- **Corrosion Resistant:** With a gun metal body, 316 stainless steel seat, DZR brass components, polypropylene split ring, nitrile O-rings and seals, the valve is manufactured using high corrosion resistant materials.
- **Float Security:** The lever arm has been designed so that the copper float slides over the lever arm and is secured with a cotter pin to prevent it coming loose. In addition, by sliding the float onto the lever arm it ensures force is applied to the complete float not just a socket on the end. This ensures reliable operation.
- **Approvals:** All valves comply with Australian/New Zealand Standard 4020 which means the valves are suitable for use with drinking water.

High Performance

- **Manufactured from DZR brass:** The brass components in Philmac servo tank filling valves are manufactured from dezincification resistant (DZR) brass. This means the brass is resistant in soil and water environments to corrosion involving the loss of zinc leaving a residue of spongy or porous copper.
- **High pressure shutoff:** Servo tank filling valves are rated to a pressure of 2000 kPa (290psi) or 20 bar (static shutoff) at 20^0 Celsius to meet the requirements of high pressure systems.

Complete Coverage

- **Wide range:** The range of servo tank filling valves is comprehensive and includes 1½", 2" and 3" (DN40, 50 and 80).



Lever arm included

STANDARDS & TESTS

Philmac's range of servo tank filling valves are designed to comply with the following standards and undertake a range of tests to ensure they comply with these standards.

Standards

AS/NZ 4020: Testing of products for use in contact with drinking water.

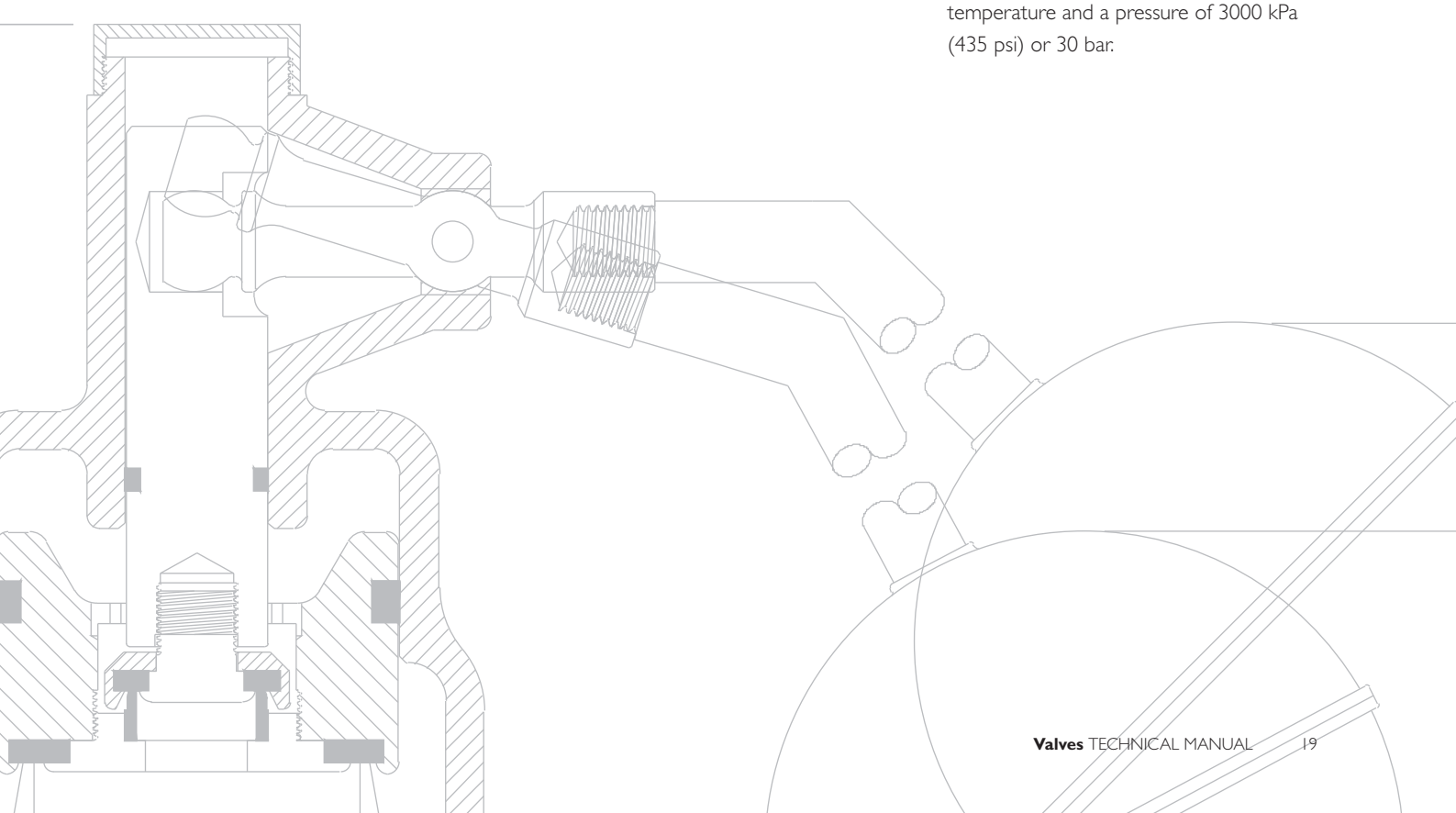
AS 1722.1: Pipe threads of Whitworth form part 1: sealing pipe threads.

ISO7: Pipe threads where pressure tight joints are made on the threads.

Tests

Shut Off Test: Valves are tested for shut off against a hydrostatic water pressure of 2000 kPa (290 psi) or 20 bar.

Strength Test: Valves are tested for adequate strength for their intended application. This includes testing at the maximum recommended operating temperature and a pressure of 3000 kPa (435 psi) or 30 bar.

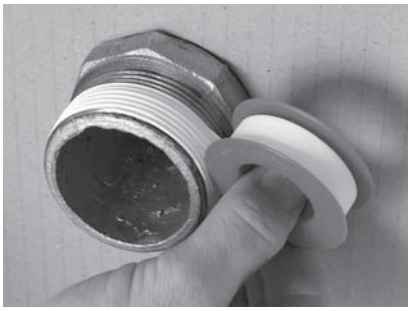


MARK II SERVO TANK FILLING VALVES OPERATION & INSTALLATION INSTRUCTIONS

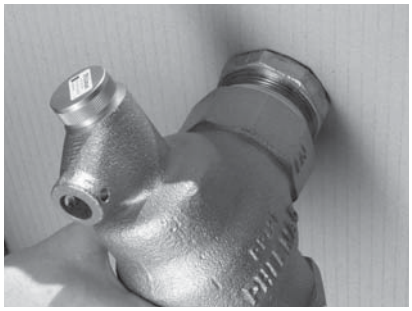
The Philmac servo tank filling valves operate by opening and closing a piston against a seat through the action of a lever arm attached to a float. The lever arm is interconnected to the secondary piston via a cam.

As the water level drops, the float and lever arm move in a downward direction and the secondary piston lifts allowing water in the top chamber to pass downstream. The secondary piston in interconnected to the main piston and as it lifts so does the main piston which moves it away from the seat and opens the valve.

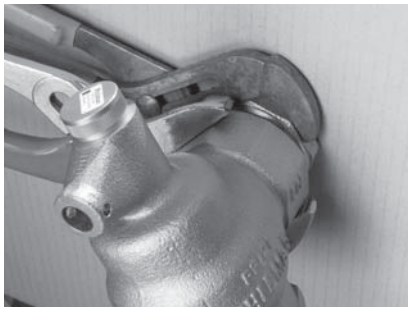
When the water level rises, the float and lever arm move in an upwards direction and the secondary and main piston moves towards the seat until it sits firmly against the seat. Water then enters the top chamber by passing along the side of the main piston and through a small slot in the piston split ring. By doing this, water pressure is applied to the main piston. This secondary or servo action combined with the action of the float and lever arm ensures the valve shuts off.



1. Apply PTFE tape or approved sealant to the inlet thread ensuring sufficient is applied to ensure a watertight seal.

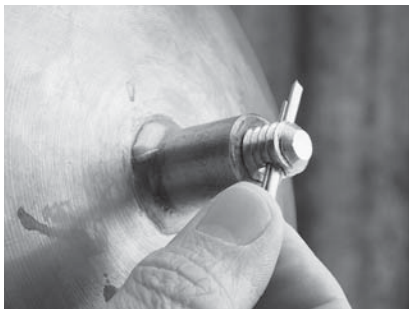


2. Screw into female thread by hand until firm.



3. Using a pipe wrench or multigrips on the hex of the valve, screw it into the female thread until tight. Where necessary ensure the female thread is held stationary to avoid it from moving.

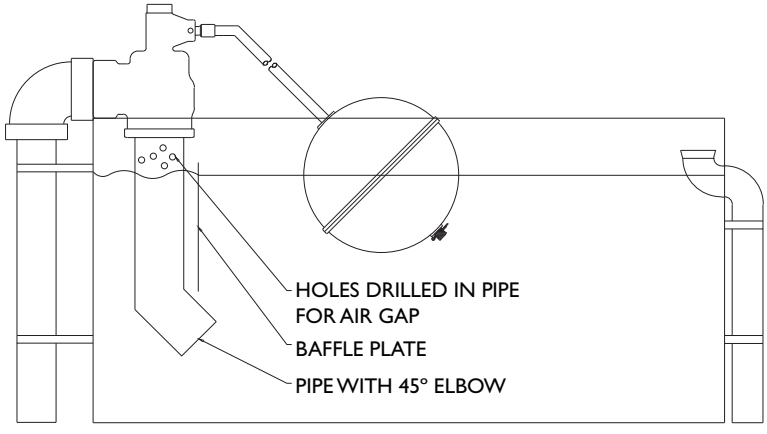
4. Thread the lever arm through a 10" (255 mm) copper float (ball) and tighten.



5. Fit the split (cotter) pin on the end of the arm to prevent it from coming loose.

6. Remove the pivot pin from the body and fit the lever arm then ensure the pivot pin tabs are flared outward by using a small screwdriver.

Schematic diagram showing a typical installation with either a baffle plate to minimise float bounce or a pipe to direct water away from the float and prevent float bounce.



SYSTEM DESIGN CONSIDERATIONS

Threads: All threads are BSP (Whitworth form).

Maximum Operating Pressure: 3500 kPa (435 psi) or 35 bar.

Sealing threads: Philmac recommends sealing threads with PTFE tape. When being fitted to a metal thread an approved metal sealant can be used.

Operating temperature: Connection is cold water (less than 20^{0}C) rated.

Weathering: All non-ferrous materials are protected from the affects of UV.

Air Gap: When connecting to drinking water the installation should comply with the relevant air gap standards to prevent back siphonage.

Flow Rates (L/min)

Inlet Pressure (kPa)	Inlet Size		
	1 ½" (DN40)	2" (DN50)	3" (DN80)
100	420	600	1440
150	510	720	1680
200	600	840	1960
250	670	960	2170
300	730	1020	2290
350	770	1080	2460
400	800	1140	2580
450	830	1220	2700
500	900	1300	2820

Valve selection should be directly related to demand and not to pipe size. The flow required should be determined at a given dynamic pressure and then the valve should be selected from the table above.

CHEMICAL RESISTANCE

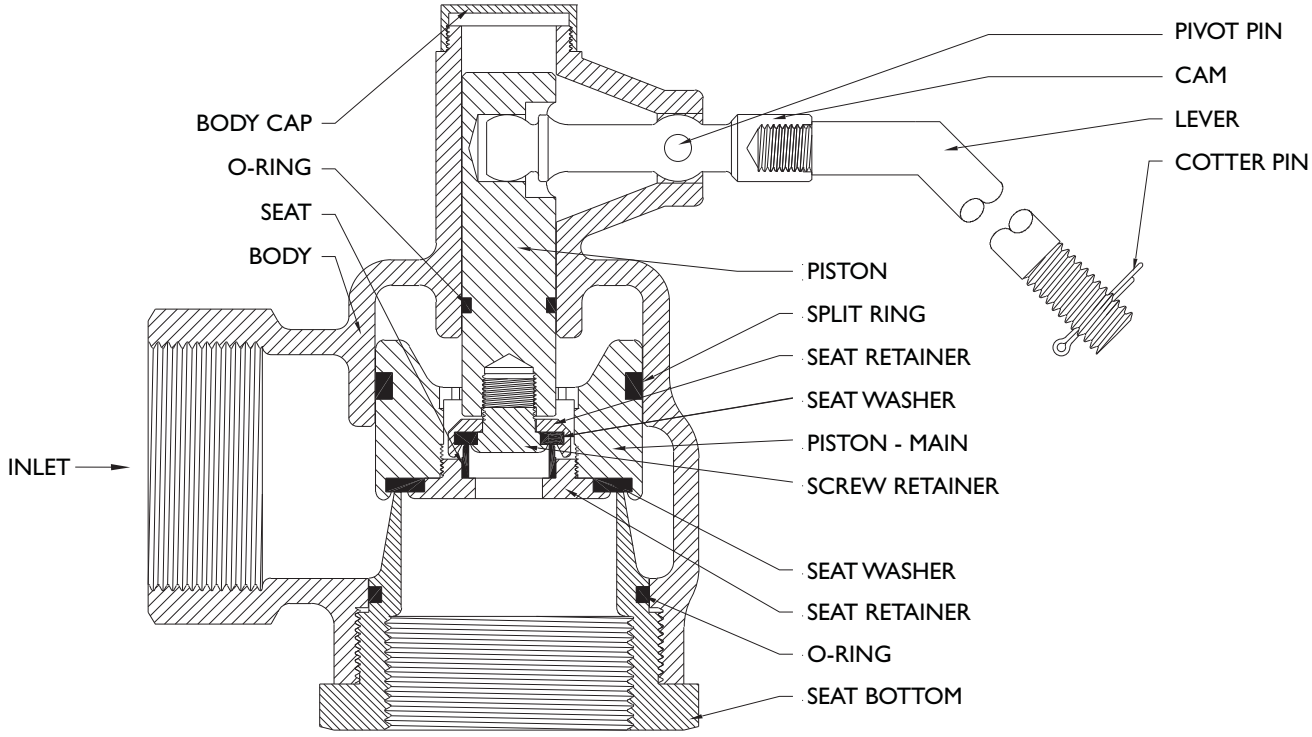
Philmac's servo tank filling valves are primarily designed to convey water. However there may be occasions where the water contains chemicals and/or alternative fluids need to be controlled. The following table is provided as a **guide only** for the compatibility of various chemicals and alternative fluids to Philmac servo tank filling valves. The mixing together of chemicals may affect the compatibility.

Chemical	Compatibility
Acetic acid (10%)	N
Acetic acid (50%)	N
Alcohol (ethanol)	N
Ammonium nitrate	N
Antifreeze	R
Brine	R
Calcium carbonate	
Calcium chloride	N
Calcium nitrate	
Calcium sulphate	
Chlorine water	N
Citric Acid	N
Copper Sulphate >5%	N
Diesel (fuel)	R
Ethyl alcohol (ethanol)	N
Hydrochloric acid (10%)	N
Hydrochloric acid (30%)	N
Kerosene	R
Lubricating oils (not synthetic)	R
Magnesium nitrate	
Magnesium sulphate	R
Mineral oils	R
Nitric acid (10%)	N
Nitric acid (40%)	N
Olive oil	
Orange juice	
Petrol	
Phosphoric acid (85%)	N
Drinking water	R
Potassium chloride	N
Potassium nitrate	R
Potassium sulphate	N
Sodium bicarbonate	N
Sodium hypochlorite (<10%)	N
Sulphuric acid (10%)	
Sulphuric acid (30%)	
Urea	
Zinc nitrate	
Zinc sulphate	R

N = Not Recommended
R = Resistant
Empty Cell = No data available

Note recommendations based on fluids at 20^0 C or less

MARK II SERVO TANK FILLING VALVES MATERIAL & COMPONENTS

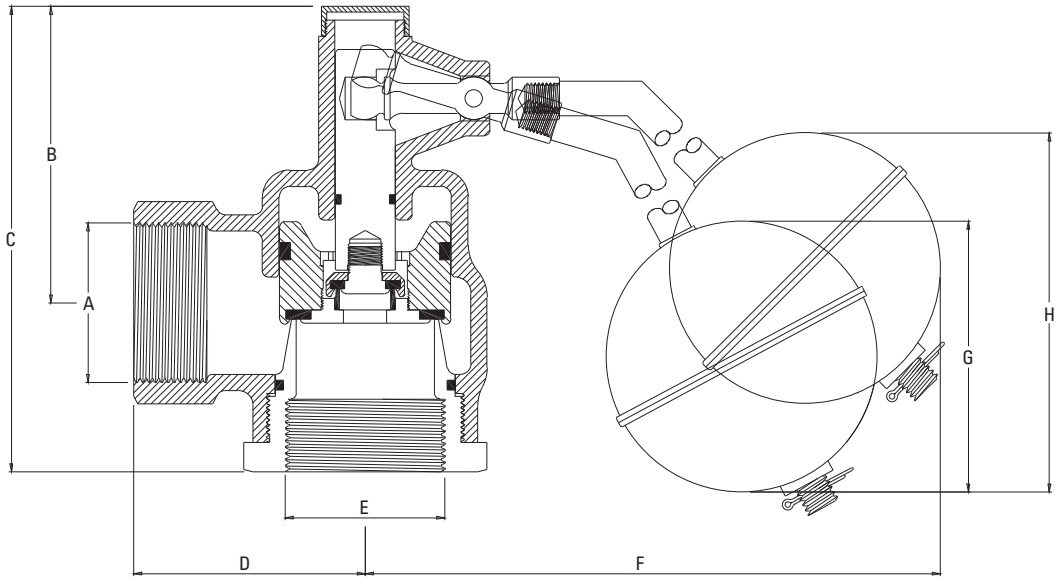


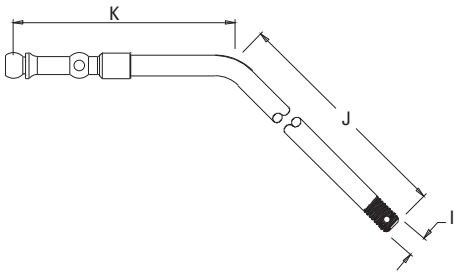
Servo Tank Filling Valve

Size	Nominal Size	Part Number	Body	Body Cap	Pivot Pin	Cam	Lever	Cotter Pin	Seat Bottom
1½"	DN40	90381500	Gun Metal	DZR brass	DZR brass	DZR brass	DZR brass	DZR brass	DZR brass + 316 S/S
2"	DN50	90381600	Gun Metal	DZR brass	DZR brass	DZR brass	DZR brass	DZR brass	DZR brass + 316 S/S
3"	DN80	90381700	Gun Metal	DZR brass	DZR brass	DZR brass	DZR brass	DZR brass	DZR brass + 316 S/S

Size	Nominal Size	Part Number	Piston - Main	Piston	Seat Retainer	Screw Retainer	Seat Seal	O-ring	Split Ring
1½"	DN40	90381500	DZR brass	DZR brass	DZR brass	DZR brass	Nitrile rubber	Nitrile rubber	Polyethylene
2"	DN50	90381600	DZR brass	DZR brass	DZR brass	DZR brass	Nitrile rubber	Nitrile rubber	Polyethylene
3"	DN80	90381700	DZR brass	DZR brass	DZR brass	DZR brass	Nitrile rubber	Nitrile rubber	Polyethylene

MARK II SERVO TANK FILLING VALVES RANGE & DIMENSIONS





Size (A)	Nominal Size	B	C	D	E	F	G	H	I	J	K
1 ½"	DN40	110	165	70	1½"	760	255	260	½" BSW	750	135
2"	DN50	110	170	80	2"	890	255	260	½" BSW	860	135
3"	DN80	145	225	110	3"	1040	255	410	½" BSW	1000	135

All dimensions in millimetres unless otherwise stated

CISTERN VALVES

Philmac's plastic cistern valve is a compact unit offering easy installation and operation guaranteeing constant water level is maintained.

The simple design and features of the cistern valve ensures the filling of the tank is slow and controlled avoiding water hammer. The valve also includes a built-in reservoir tube (baffle) ensuring a silent operation.

Philmac's robust cistern valves are manufactured from high grade quality materials providing corrosion and impact resistance.

APPLICATIONS

Industrial: Commercial airconditioning units and toilet cisterns.

BENEFITS

Fast and Easy Installation

- **Easy Disassembly:** The valve has been designed for easy replacement of the rubber seal without having to un-install the valve. Simply remove the pivot pin and the lever assembly then unscrew the pillar cap and remove the plunger/seal.
- **Minimum Space Required for Installation:** Based on a compact body design the valve is perfect for tight applications such as a small cistern.
- **BSP Inlet Threads:** The Plumbing and Irrigation sectors use British Standard Pipe (BSP) threads as a standard. Philmac also uses these thread types across the valve range to ensure compatibility with other threaded fittings and make installation easy.

Complete Security

- **Reliable Operation:** Consistent high quality injection moulded plastic bodies plus plastic and brass engineered components means years of reliable operation.
- **Corrosion Resistant:** The body, cap and piston are manufactured from plastic. The seal and O-ring are manufactured from Nitrile rubber. The lever assemblies and pivot pins are manufactured from DZR brass ensuring all components used have a high degree of corrosion resistance.
- **Positive Shut-Off:** The action between the lever assembly and piston ensures the piston provides a complete seal against the water inlet and prevents unwanted loss of water.
- Approvals: All valves comply with Australian Standard ATS 5200.016 which means that the valves meet performance requirements for backflow prevention, back siphonage and endurance testing, as well as material construction requirements.

High Performance

- **Manufactured from advanced thermoplastic materials:** Philmac's cistern valve bodies are manufactured from lightweight high performance thermoplastic material which has excellent impact, UV and corrosion resistance. The material is non-toxic and taint free.
- **Manufactured from DZR brass:** Philmac cistern valves also utilise a brass lever assembly. These are manufactured from dezincification resistant (DZR) brass which means the brass is resistant in soil and water environments to corrosion involving the loss of zinc leaving a residue of spongy or porous copper.
- **High pressure shutoff:** Cistern valves are rated to a pressure of 1400 kPa (200 psi) or 14 bar (static shutoff). This is based on using the recommended float (ball) size.
- **Quiet operation:** A built-in reservoir tube (noise baffle) minimises noise for a quiet operation.

STANDARDS & TESTS

Philmac's range of sleeve valves are designed to comply with the following standards and undertake a range of tests to ensure they comply with these standards.

Standards

ATS 5200.016: Technical specifications for plumbing and drainage products – cistern inlet valves.

AS1722.1: Pipe threads of Whitworth form part 1: sealing pipe threads.

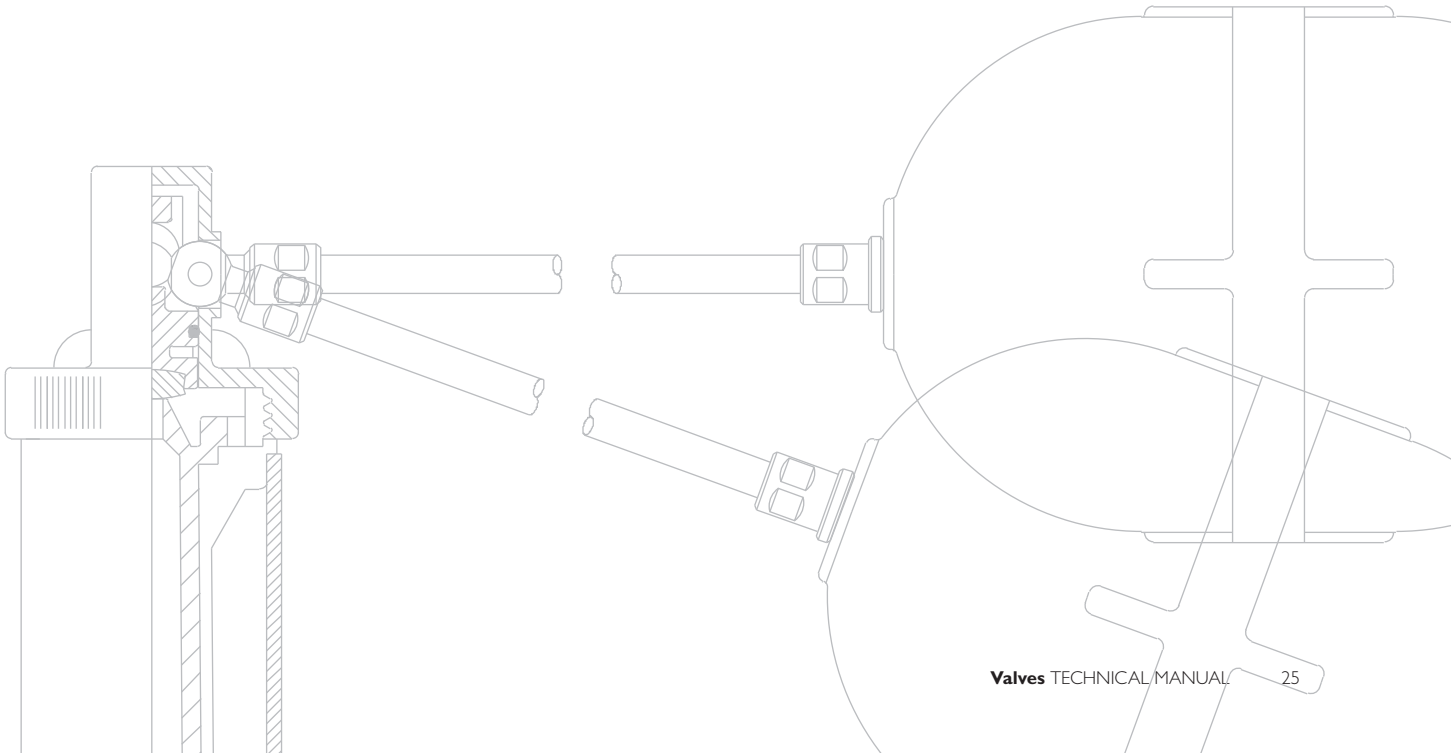
ISO7: Pipe threads where pressure tight joints are made on the threads.

Tests

Shut Off Test: Valves are tested for shut off against a hydrostatic water pressure of 2000 kPa (290 psi) or 20 bar.

Endurance Test: Operating mechanisms are subjected to 50,000 cycles. This simulates opening and closing operations during the design service life of the valve.

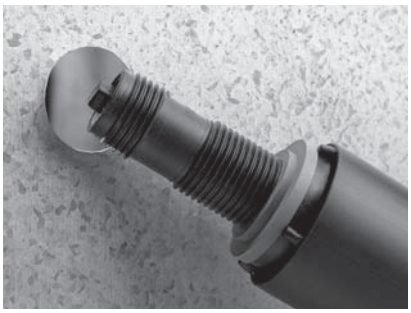
Backflow Prevention / Back Siphonage: The valve is tested to show that no cistern water can return into the main supply.



CISTERN VALVES OPERATION & INSTALLATION INSTRUCTIONS

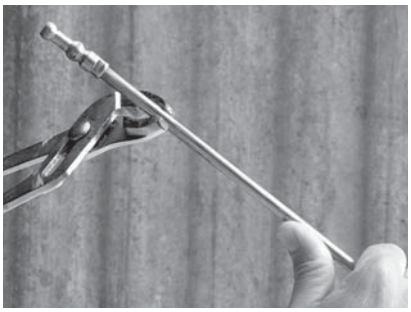
The Philmac cistern valves operate by opening and closing a plunger against a seat through the action of a lever arm attached to a float. The lever arm is interconnected to the plunger via a cam. As the water level drops, the float and lever arm move in a downward direction allowing the plunger to move away from the seat, which opens the valve. When the water level rises, the float and lever arm move in an upward direction and the plunger moves towards the seat until it sits firmly against the seat and shuts the valve off.

1. Insert the cam end of the lever assembly into the valve plunger recess. This may require rotation of the plunger to align it to the correct position. Align the cam hole with the valve housing and insert the pivot pin then flare the ends to secure.



2. Remove the back nut from the bottom of the valve and insert the threaded section of the valve into the base of the cistern or small tank. Ensure the stem sleeve is in direct contact with the base of the tank so that it seals and prevents water from leaking.

3. Screw the back nut onto the thread and tighten.



4. Where necessary bend the lever arm to adjust the water level. This can be done by removing the lever arm assembly by first straightening the tabs on the end of the pivot pin with a pair of pliers then slide it out.

By using a pair of multi-grips or equivalent the lever can then be bent to the necessary angle.

Adjust the lever arm and then refit. Once the correct lever arm angle is achieved ensure the pivot pin tabs are flared outward by using a small screwdriver.

SYSTEM DESIGN CONSIDERATIONS

Threads: All threads are BSP (Whitworth form).

Maximum Operating Pressure: 1400 kPa (200 psi) or 14 bar.

Operating temperature: Connection is cold water (less than 20^{0}C) rated.

Float (ball): Plastic – cold water rated

Weathering: All plastic materials used contain pigments to provide excellent protection against degradation from ultra-violet (UV) radiation. However long-term continuous exposure to UV is not recommended and plastic components should ideally be protected. Brass components are UV resistant.

Air Gap: When connecting to drinking water the installation should comply with the relevant air gap standards to prevent back siphonage.

Flow Rates (L/min)

Inlet Pressure (kPa)	Flow Rate
25	2.2
50	3.1
75	3.9
100	4.5
150	5.6
200	6.4
250	7.1
300	7.8
400	9.2
500	10.4

CHEMICAL RESISTANCE

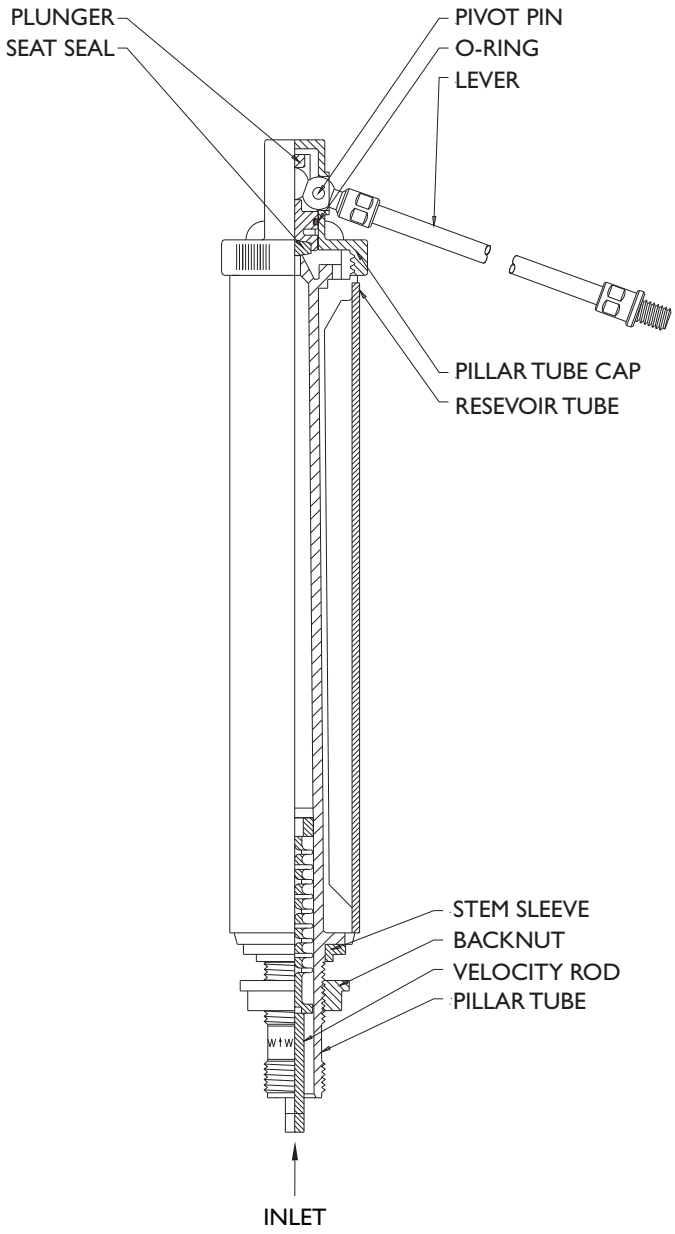
Philmac's cistern valve has been designed to convey water. However there may be occasions where the water contains chemicals and/or alternative fluids need to be controlled. The following table is provided as a **guide only** for the compatibility of various chemicals to Philmac's cistern valve. The mixing together of chemicals may affect the compatibility.

Chemical	Cistern
Acetic acid (10%)	R
Acetic acid (50%)	N
Alcohol (ethanol)	N
Ammonium nitrate	R
Antifreeze	R
Brine	R
Calcium carbonate	R
Calcium chloride	R
Calcium nitrate	R
Calcium sulphate	
Chlorine water	N
Citric Acid	R
Copper Sulphate >5%	N
Diesel (fuel)	R
Ethyl alcohol (ethanol)	N
Hydrochloric acid (10%)	N
Hydrochloric acid (30%)	N
Kerosene	N
Lubricating oils (not synthetic)	R
Magnesium nitrate	R
Magnesium sulphate	R
Mineral oils	R
Nitric acid (10%)	N
Nitric acid (40%)	N
Olive oil	R
Orange juice	R
Petrol	R
Phosphoric acid (85%)	N
Drinking water	R
Potassium chloride	R
Potassium nitrate	R
Potassium sulphate	
Sodium bicarbonate	
Sodium hypochlorite (<10%)	N
Sulphuric acid (10%)	N
Sulphuric acid (30%)	N
Urea	R
Zinc nitrate	N
Zinc sulphate	

N = Not Recommended
R = Resistant
Empty Cell = No data available

Note recommendations based on fluids at 20^0 C or less

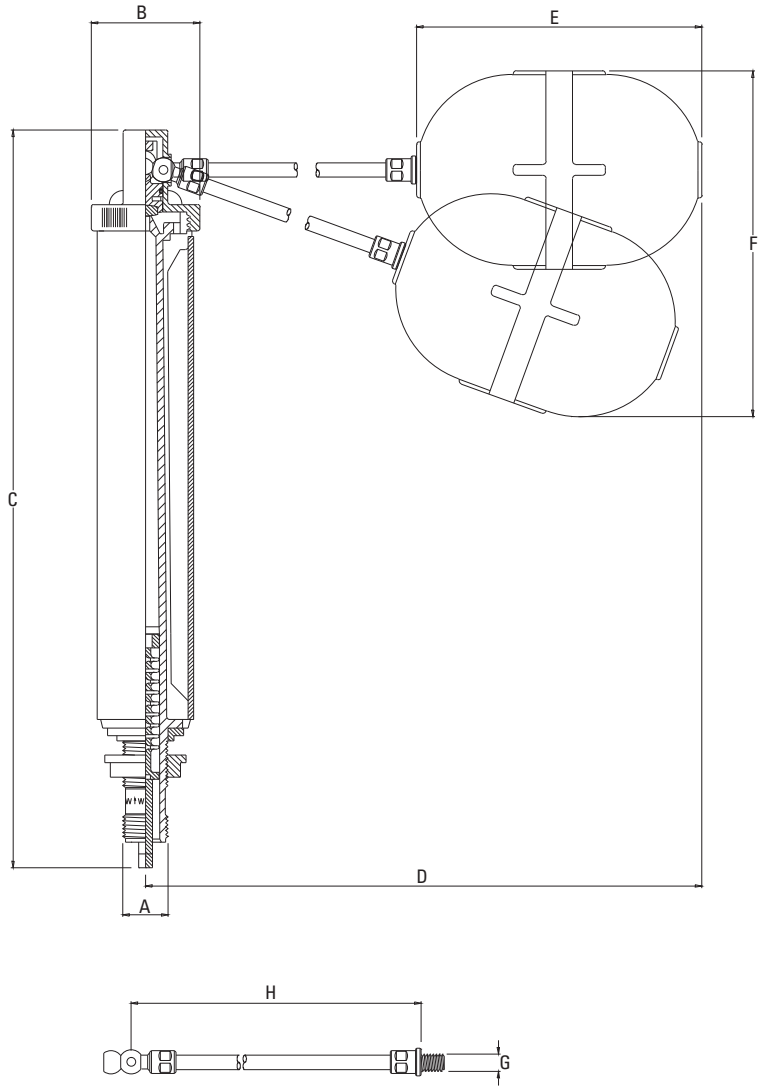
CISTERN VALVES MATERIAL & COMPONENTS



Size	Nominal Size	Part Number	Pillar Tube	Pillar Tube Cap	Reservoir Tube	Velocity Rod
½"	DN20	91152700	GF Nylon	GF Nylon	Polypropylene	GF Nylon

Backnut	Seat Seal	Plunger	Pivot Pin	O-ring	Lever Assembly	Stem Sleeve
GF Acetal	Nitrile rubber	GF Acetal	DZR brass	EPDM rubber	DZR brass	Rubber

CISTERN VALVES RANGE & DIMENSIONS



Size (A)	Nominal Size	B	C	D	E	F	G	H
½"	DN15	48.5	336	395	100	130	5/16" BSW	272

All dimensions in millimetres unless otherwise stated

BLUE HANDLED BALL VALVES

The Philmac blue handled ball valve has been servicing the Rural, Irrigation and Plumbing industries for over 20 years. With the Watermark approval and suitable for drinking water, this is an extremely versatile valve.

Their distinctive blue easy grip handle is recognised in the market as the industry standard providing users with the confidence of a strong, reliable and robust product.

This Australian made blue handled ball valve is based on a simple on/off action and is quick and easy to install allowing the user full control of water distribution.

With the increasing importance of water management Philmac has expanded their range to include a purple handle recycled water ball valve.

APPLICATIONS

Agriculture: Stock troughs and water tanks.
Irrigation: Master valves, field valves, isolating valves, water tanks
Plumbing: Isolating valves
Municipal: Main stop and curb stop valves

BENEFITS

Fast and Easy Installation

- **Multi-directional Flow:** The blue handled valves have been designed to work in either direction to ensure easy installation and eliminate the need to look for identification marks.
- **BSP Inlet Threads:** The Rural, Irrigation and Plumbing sectors use British Standard Pipe (BSP) threads as a standard. Philmac also uses these thread types across the valve range to ensure compatibility with other threaded fittings and make installation easy.
- **Easy Grip T-handle:** The blue handle has been ergonomically designed to allow it to be gripped easily and avoid slippage.
- **Multi-position Installation:** The blue handled valves can be installed in any orientation to assist with all types of installations.

Complete Security

- **Reliable Operation:** Consistent high quality injection moulded plastic bodies and components plus Nitrile O-rings and a stainless steel screw means years of reliable operation.
- **Corrosion Resistant:** with a plastic body and components, nitrile O-rings and a 316 stainless steel handle screw, the components used all have a high degree of corrosion resistance.
- **Positive Open-Close:** The blue handle only rotates through 90° between fully open and fully closed before resting against a stop to ensure there is no guesswork required as to whether it is open or closed.
- **Visual Indicator:** When in the closed position the blue handle sits at 90° to the body and when in the open position sits in-line with the body clearly indicating whether the valve is open or closed.
- **Approvals:** All blue handled valves comply with Australian/New Zealand Standard 4020 which means the valves are suitable for use with potable (drinking) water.

High Performance

- **Manufactured from advanced thermoplastic materials:** Philmac blue handled ball valves are manufactured from lightweight high performance thermoplastic materials which have excellent impact, UV and corrosion resistance. The material is non-toxic and taint free.
- **High pressure shutoff:** Blue handled ball valves are rated to a pressure of 1400 kPa (200 psi) or 14 bar (static shutoff) at 20° Celsius to meet the requirements of high pressure systems.

Complete Coverage

- **Wide range:** The range of blue handed ball valves is comprehensive and includes sizes from ½" to 2" (DN10 to DN50). In addition the whole range is available with optional purple handles for use with recycled water.

STANDARDS & TESTS

Philmac's range of blue handed ball valves are designed to comply with the following standards and undertake a range of tests to ensure they comply with these standards.

Standards

AS/NZ 4020: Testing of products for use in contact with drinking water.

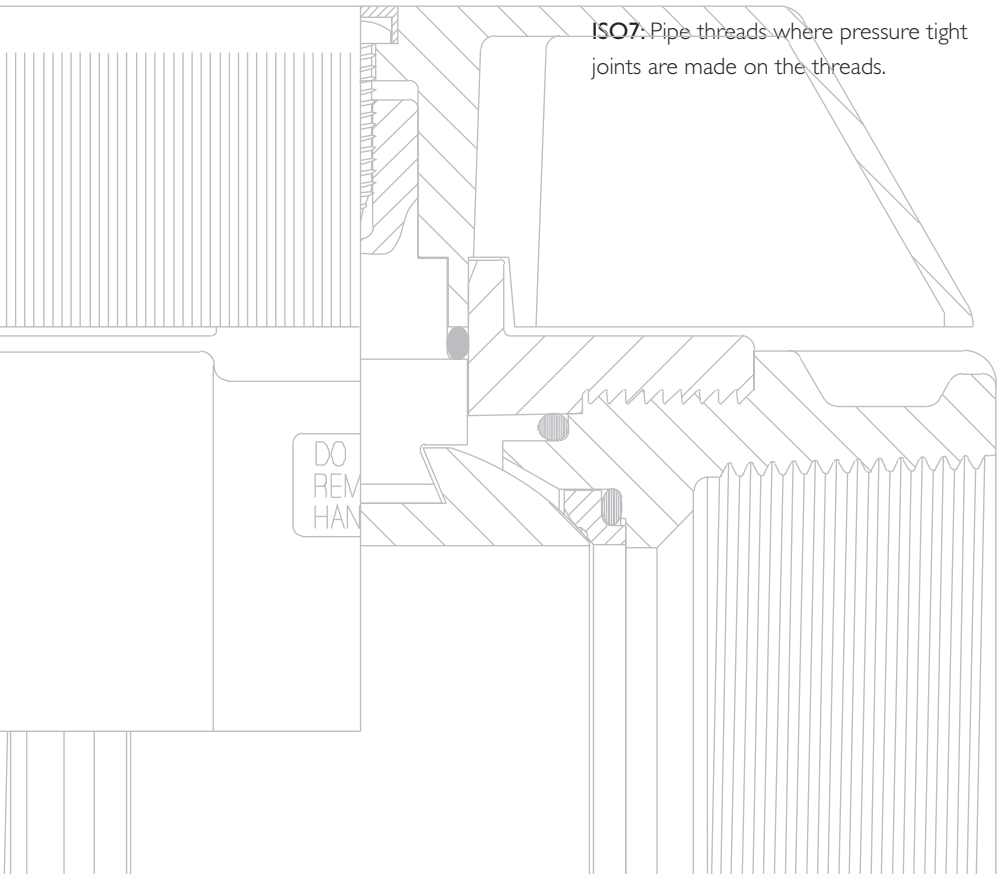
AS 1722.1: Pipe threads of Whitworth form part 1: sealing pipe threads.

ISO7: Pipe threads where pressure tight joints are made on the threads.

Tests

Shut Off Test: Blue handled ball valves are tested for shut off against a hydrostatic water pressure of 2000 kPa (290 psi) or 20 bar.

Strength Test: Blue handled ball valves are tested for adequate strength for their intended application.



BLUE HANDLED BALL VALVES OPERATION & INSTALLATION INSTRUCTIONS

Philmac blue handled ball valves operate by using a handle to turn a ball located in a body through 90°. The ball has a hole through the centre of it which allows water to pass through when in the open position.

To turn the valve on, the blue handle needs to be turned 90° until the blue handle sits in-line with the body of the valve. To turn the valve off rotate the handle through 90° until it is at right angles to the valve body. Care should be taken when closing the valve. It should not be closed too quickly or water hammer may result.

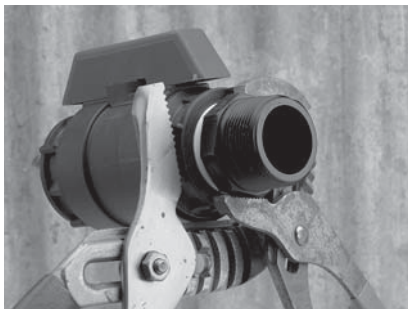
Philmac blue handled ball valves are sold in the open position with the blue handle directly in line with the body. This protects the ball and ensures no scoring has occurred, therefore every valve arrives in excellent condition.

They have been designed for water to flow through in either direction and for this reason there is no specific inlet or outlet. In some instances it may be appropriate to mark the direction of water flow where it may not be obvious in which direction the water flows.

Ball (Female Inlet/Outlet)

1. Apply PTFE tape or approved sealant to the male thread the blue handled ball valve is to be screwed in too. Sufficient tape needs to be applied to ensure a watertight seal

2. Screw onto a male thread or screw male thread into the valve by hand until firm



3. Using a pipe wrench or multigrips on the end caps only, further screw the blue handled ball valve into the male thread until tight. Where necessary ensure the male thread is held stationary to avoid it from moving. Do not use pipe wrench or multi-grips on the body of the blue handled ball valve.

SYSTEM DESIGN CONSIDERATIONS

Threads: All threads are BSP (Whitworth form).

Maximum Operating Pressure: 1400 kPa (200 psi) or 14 bar.

Sealing threads: Philmac recommends sealing threads with PTFE tape. Other approved sealants for plastic materials can be used providing the sealant does not enter the valve where it may cause damage.

Operating temperature: Connection is cold water (less than 20^0C) rated.

Weathering: All plastic materials used contain pigments to provide excellent protection against degradation from ultra-violet (UV) radiation. However long-term continuous exposure to UV is not recommended and plastic components should ideally be protected.

Pressure Loss (kPa)

Flow Rate (L/s)	Inlet Size					
	½" (DN15)	¾" (DN20)	1" (DN25)	1 ¼" (DN32)	1 ½" (DN40)	2" (DN50)
1	14	14	10	*	*	*
1.5	27	27	11	*	*	*
2	44	44	13	6	*	*
2.5	64	64	16	8	*	*
3	89	89	20	11	5	*
4	-	-	33	19	8	*
5	-	-	50	28	13	*
6	-	-	72	39	18	6
7	-	-	99	51	23	8
8	-	-	-	65	30	10
9	-	-	-	81	37	12
10	-	-	-	98	45	15
12	-	-	-	-	63	20
14	-	-	-	-	83	26
16	-	-	-	-	-	33
18	-	-	-	-	-	40
20	-	-	-	-	-	49
22	-	-	-	-	-	58
24	-	-	-	-	-	67
26	-	-	-	-	-	78
28	-	-	-	-	-	89

* Denotes pressure loss too small to accurately measure but can be assumed to be 5 kPa or less.

CHEMICAL RESISTANCE

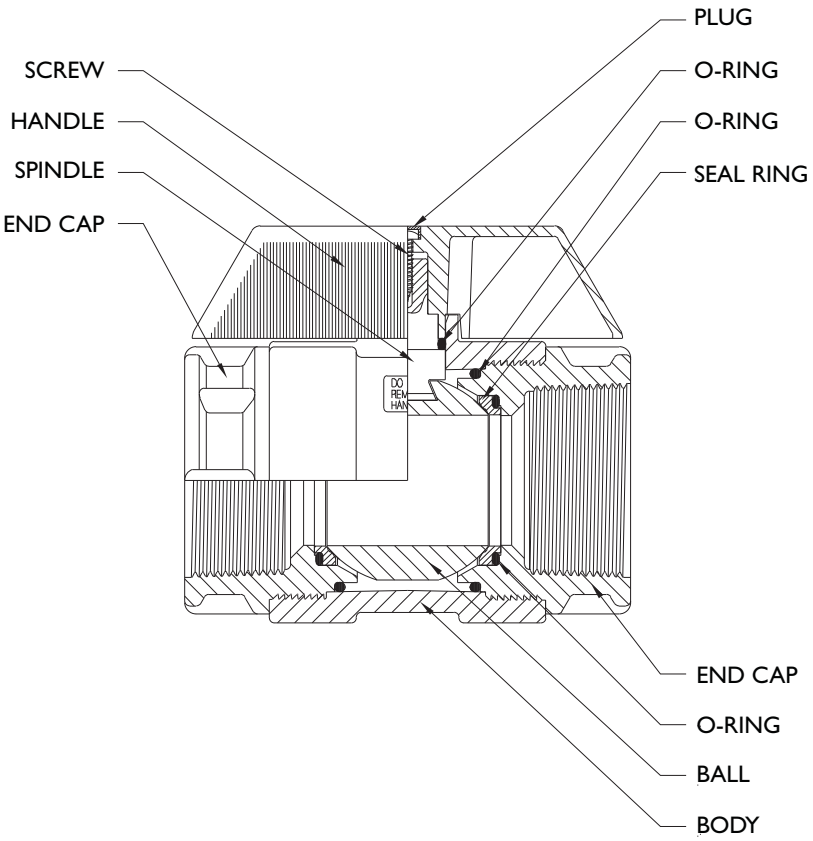
Philmac's blue handled ball valves are primarily designed to convey water. However there may be occasions where the water contains chemicals and/or alternative fluids need to be controlled. The following table is provided as a **guide only** for the compatibility of various chemicals and alternative fluids to Philmac blue handled ball valves. The mixing together of chemicals may affect the compatibility. **Philmac blue handled ball valves are NOT suited for acids.**

Chemical	Compatibility
Acetic acid (10%)	R
Acetic acid (50%)	N
Alcohol (ethanol)	N
Ammonium nitrate	R
Antifreeze	R
Brine	R
Calcium carbonate	R
Calcium chloride	R
Calcium nitrate	R
Calcium sulphate	
Chlorine water	N
Citric Acid	R
Copper Sulphate >5%	N
Diesel (fuel)	N
Ethyl alcohol (ethanol)	N
Hydrochloric acid (10%)	N
Hydrochloric acid (30%)	N
Kerosene	R
Lubricating oils (not synthetic)	R
Magnesium nitrate	R
Magnesium sulphate	R
Mineral oils	R
Nitric acid (10%)	N
Nitric acid (40%)	N
Olive oil	R
Orange juice	
Petrol	R
Phosphoric acid (85%)	N
Drinking water	R
Potassium chloride	R
Potassium nitrate	R
Potassium sulphate	
Sodium bicarbonate	
Sodium hypochlorite (<10%)	N
Sulphuric acid (10%)	N
Sulphuric acid (30%)	N
Urea	R
Zinc nitrate	N
Zinc sulphate	

N = Not Recommended
R = Resistant
Empty Cell = No data available

Note recommendations based on fluids at 20^0 C or less.

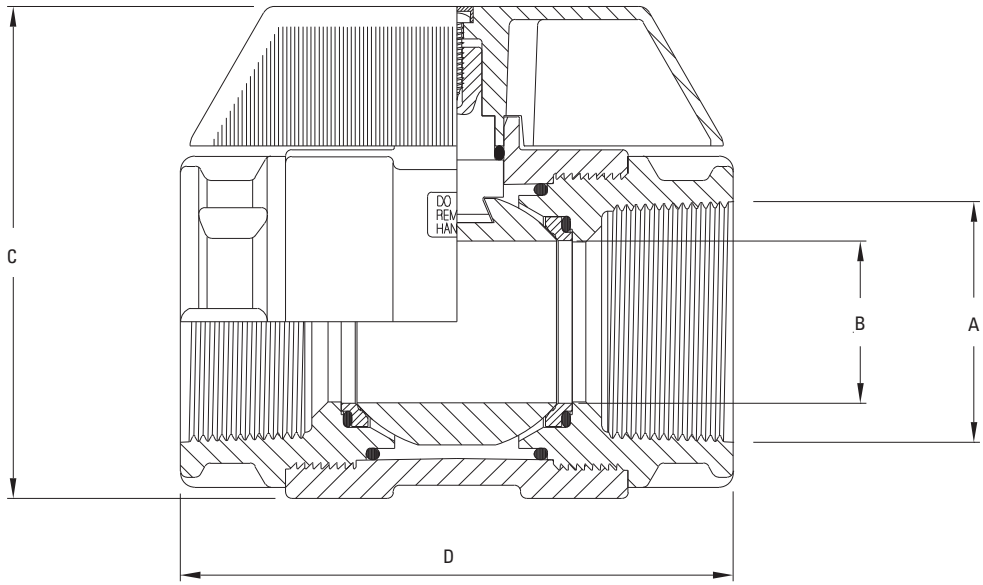
BLUE HANDLED BALL VALVES MATERIAL & COMPONENTS



Blue Handled Ball Valve

Size	Nominal Size	Part Number	Body	End Cap	Seal Ring	Ball	Spindle	Screw	Handle	O-rings
½"	DN15	95500100	GF Nylon	GF Nylon Alloy	Polypropylene + PTFE	Polypropylene + PTFE	Nylon or Acetal	316 S/S	GF Nylon	Nitrile rubber
¾"	DN20	95500200	GF Nylon	GF Nylon Alloy	Polypropylene + PTFE	Polypropylene + PTFE	Nylon or Acetal	316 S/S	GF Nylon	Nitrile rubber
1"	DN25	95500300	GF Nylon	GF Nylon Alloy	Polypropylene + PTFE	Polypropylene + PTFE	Nylon or Acetal	316 S/S	GF Nylon	Nitrile rubber
1 ¼"	DN32	95500400	GF Nylon	GF Nylon Alloy	Polypropylene + PTFE	Polypropylene + PTFE	Nylon or Acetal	316 S/S	GF Nylon	Nitrile rubber
1 ½"	DN40	95500500	GF Nylon	GF Nylon Alloy	Polypropylene + PTFE	Polypropylene + PTFE	Nylon or Acetal	316 S/S	GF Nylon	Nitrile rubber
2"	DN50	95500600	GF Nylon	GF Nylon Alloy	Polypropylene + PTFE	Polypropylene + PTFE	Nylon or Acetal	316 S/S	GF Nylon	Nitrile rubber

BLUE HANDLED BALL VALVES RANGE & DIMENSIONS



Size (A)	Nominal Size	Part Number	B	C	D
½"	DN15	95500100	16.1	72	79
¾"	DN20	95500200	16.1	72	86
1"	DN25	95500300	20	82	98
1 ¼"	DN32	95500400	26	91	110
1 ½"	DN40	95500500	32	101	120
2"	DN50	95500600	40	119	136

All dimensions in millimetres unless otherwise stated

FOOT AND NON-RETURN VALVES

The Australian made Philmac foot and non-return valves are manufactured from the highest quality materials to ensure years of reliable service.

Based on the simple movement of a piston, both valves are designed to allow water to flow in one direction only to avoid loss of water, prevent backflow and ensure pipelines do not drain. The non-return valve is designed to keep pumps primed. The foot valve is designed with a filter to prevent debris into the pipeline and pump.

Backed by a full range of spare parts, Philmac's commitment to customer service and over 20 years in the field this indestructible valve is one that you can rely on and trust.

APPLICATIONS

Agriculture: Foot valves on pumps. Non-return on elevated pipelines.
Irrigation: Foot valves on pumps. Non-return on rising mainlines.

BENEFITS

Fast and Easy Installation

- **Multi-position Installation:** The valves have been designed to work in either a vertical (with water moving in an upwards direction) or horizontal position for flexible installation.
- **BSP Inlet Threads:** The Rural and Irrigation sectors use British Standard Pipe (BSP) threads as a standard. Philmac also uses these thread types across the valve range to ensure compatibility with other threaded fittings and make installation easy.
- **Flow Identification:** The body is clearly marked with an arrow to indicate the direction of flow of water.

Complete Security

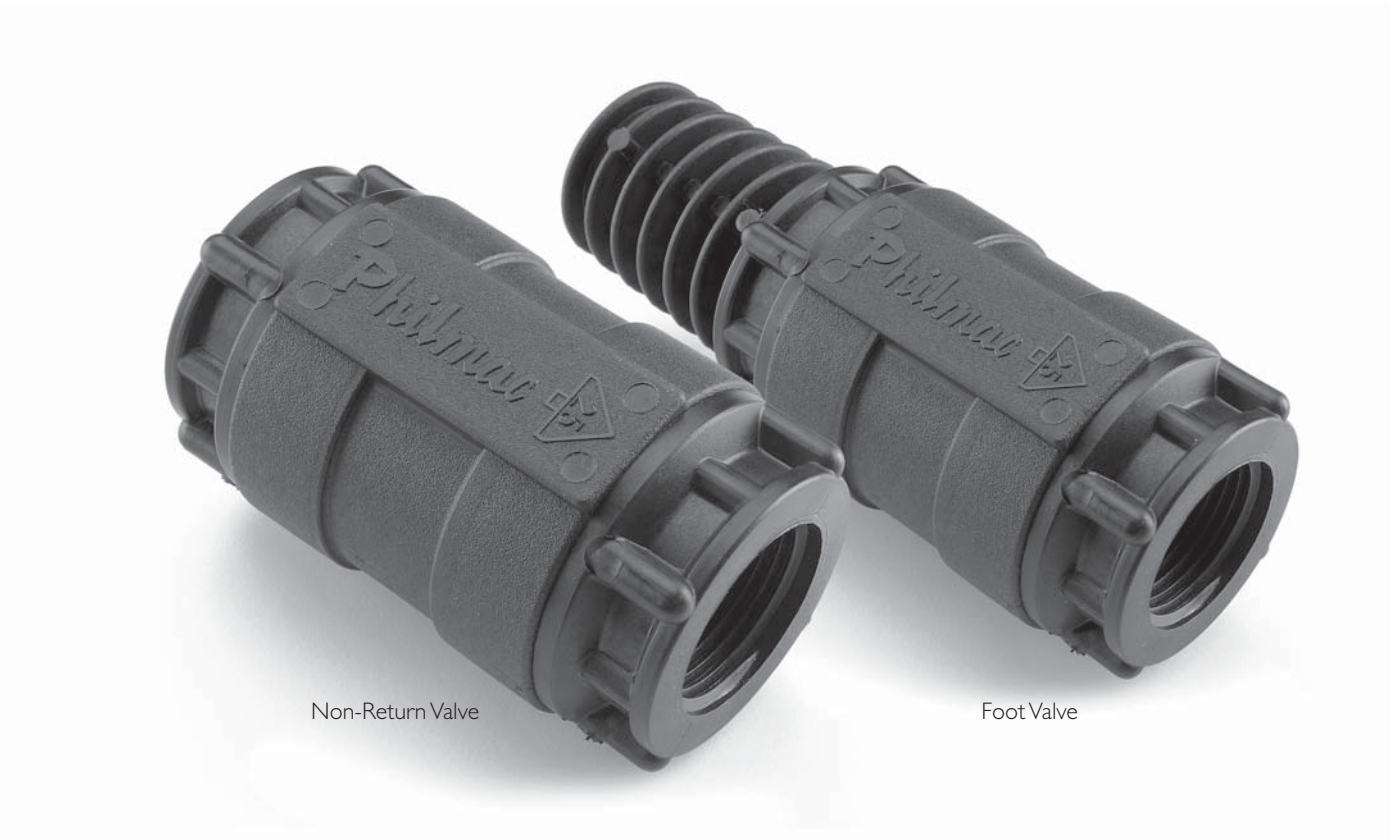
- **Reliable Operation:** Consistent high quality injection moulded plastic bodies and components plus Nitrile O-rings and a stainless steel spring means years of reliable operation.
- **Corrosion Resistant:** with a plastic body and components, nitrile O-rings and a 316 stainless steel spring, all components are made from high quality corrosion resistant materials.
- **Protective Screen:** A screen is fitted as standard to the foot valve to minimise the entry of large objects which may cause the piston to jam and leave the valve in an open position.

High Performance

- **Manufactured from advanced thermoplastic materials:** Philmac foot and non-return valves are manufactured from lightweight high performance thermoplastic materials, which have excellent impact, UV and corrosion resistance. The material is non-toxic and taint free.
- **High pressure rating:** Foot and non-return valves are rated to a pressure of 1400 kPa (200 psi) (static shutoff) at 20^0 Celsius to meet the requirements of high pressure systems.
- **Low pressure shutoff:** Foot and non-return valves are designed to seal off at 20 kPa of pressure making them well suited to gravity feed systems.

Complete Coverage

- **Wide range:** The range of foot and non-return valves is comprehensive and includes sizes from ½" to 2" (DN10 to DN50).



Non-Return Valve

Foot Valve

STANDARDS & TESTS

Philmac's range of foot and non-return valves are designed to comply with the following standards and undertake a range of tests to ensure they comply with these standards.

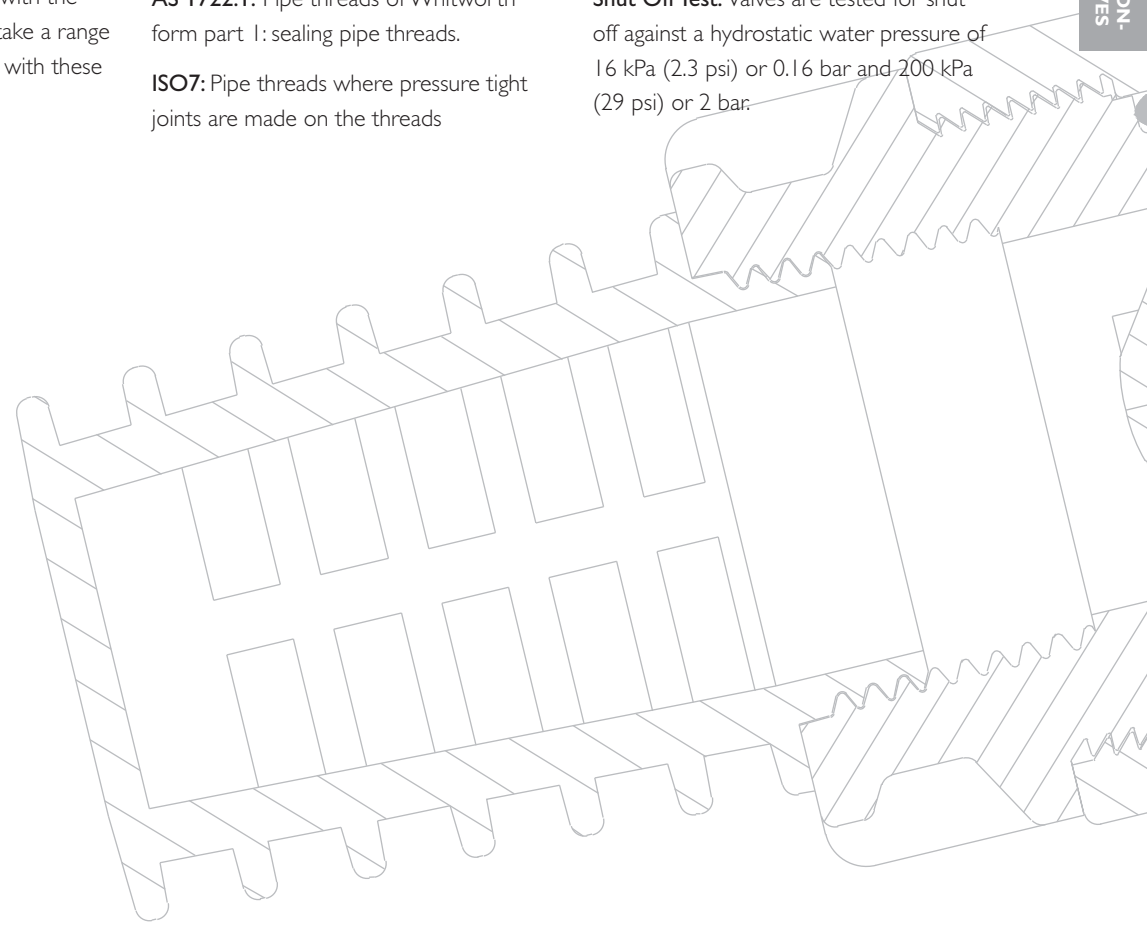
Standards

AS 1722.1: Pipe threads of Whitworth form part 1: sealing pipe threads.

ISO7: Pipe threads where pressure tight joints are made on the threads

Tests

Shut Off Test: Valves are tested for shut off against a hydrostatic water pressure of 16 kPa (2.3 psi) or 0.16 bar and 200 kPa (29 psi) or 2 bar.



FOOT AND NON-RETURN VALVES OPERATION & INSTALLATION INSTRUCTIONS

Philmac's foot and non-return valves have been designed to allow water to flow in one direction only. The direction of water flow is clearly marked by an arrow on the body of the valve. Under no flow conditions the spring assisted piston sits in the closed position.

Philmac foot and non-return valves can be connected to both plastic and metal threaded fittings. PTFE tape or an approved sealant is required.

1. Apply PTFE tape or approved sealant to the male thread the non-return/ foot valve is to be screwed into. Sufficient tape needs to be applied to ensure a watertight seal.

2. Screw the valve onto male thread by hand until firm. Confirm the correct orientation of the valve by checking the water direction arrow is pointing downstream.

3. Using a pipe wrench or multigrips on the end caps only, further screw the non-return/foot valve into the male thread until tight. Where necessary ensure the male thread is held stationary to avoid it from moving. Do not use pipe wrench or multi-grips on the body of the non-return/foot valve.

SYSTEM DESIGN CONSIDERATIONS

Minimum Sealing Pressure: 20 kPa (3 psi) or 2 m or 0.2 bar of head at 20^{0}C.

Maximum Operating Pressure: 1400 kPa (200 psi) at 20^{0}C.

Threads: All threads are BSP (Whitworth form).

Sealing threads: Philmac recommends sealing threads with PTFE tape. Other approved sealants for plastic materials can be used providing the sealant does not enter the valve where it may cause damage.

Operating temperature: Connection is cold water (less than 20^{0}C) rated.

Weathering: All plastic materials used contain pigments to provide excellent protection against degradation from ultra-violet (UV) radiation. However long-term continuous exposure to UV is not recommended and plastic components should ideally be protected.

Pressure Loss (kPa) – Foot Valves

Flow Rate (L/s)	Inlet Size				
	¾″ (DN20)	1″ (DN25)	1 ¼″ (DN32)	1 ½″ (DN40)	2″ (DN50)
0.5	22	20	*	*	*
1	36	23	13	*	*
1.5	58	32	14	*	*
2	88	48	16	13	*
2.5	124	70	20	14	*
3	-	99	25	15	10
4	-	-	39	21	10
5	-	-	59	32	12
6	-	-	85	47	12
7	-	-	116	68	13
8	-	-	-	92	17
9	-	-	-	122	22
10	-	-	-	-	30
11	-	-	-	-	39
12	-	-	-	-	49
13	-	-	-	-	62
14	-	-	-	-	76
15	-	-	-	-	92
16	-	-	-	-	110

* Denotes pressure loss too small to accurately measure

Pressure Loss (kPa) – Non-Return Valves

Flow Rate (L/s)	Inlet Size				
	¾″ (DN20)	1″ (DN25)	1 ¼″ (DN32)	1 ½″ (DN40)	2″ (DN50)
0.5	15	18	*	*	*
1	27	20	15	*	*
1.5	49	24	17	*	*
2	80	30	18	13	*
2.5	121	38	19	13	*
3	-	48	22	13	10
4	-	74	32	15	10
5	-	108	46	21	10
6	-	-	66	30	10
7	-	-	91	42	11
8	-	-	121	57	14
9	-	-	-	75	18
10	-	-	-	97	24
11	-	-	-	-	30
12	-	-	-	-	38
13	-	-	-	-	47
14	-	-	-	-	57
15	-	-	-	-	69
16	-	-	-	-	81
17	-	-	-	-	95

* Denotes pressure loss too small to accurately measure

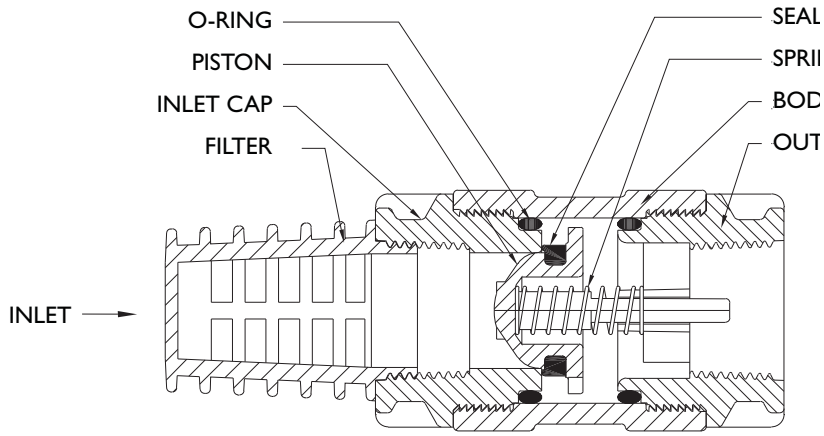
CHEMICAL RESISTANCE

Philmac's foot and non-return valves are primarily designed to convey water. However there may be occasions where the water contains chemicals and/or alternative fluids need to be controlled. The following table is provided as a **guide only** for the compatibility of various chemicals to Philmac foot and non-return valves. The mixing together of chemicals may affect the compatibility. **Philmac foot and non-return valves are NOT suited for acids.**

Chemical	Compatibility
Acetic acid (10%)	R
Acetic acid (50%)	N
Alcohol (ethanol)	N
Ammonium nitrate	R
Antifreeze	R
Brine	R
Calcium carbonate	R
Calcium chloride	R
Calcium nitrate	R
Calcium sulphate	
Chlorine water	N
Citric Acid	R
Copper Sulphate >5%	N
Diesel (fuel)	R
Ethyl alcohol (ethanol)	N
Hydrochloric acid (10%)	N
Hydrochloric acid (30%)	N
Kerosene	R
Lubricating oils (not synthetic)	R
Magnesium nitrate	R
Magnesium sulphate	R
Mineral oils	R
Nitric acid (10%)	N
Nitric acid (40%)	N
Olive oil	R
Orange juice	R
Petrol	R
Phosphoric acid (85%)	N
Drinking water	R
Potassium chloride	R
Potassium nitrate	R
Potassium sulphate	
Sodium bicarbonate	
Sodium hypochlorite (<10%)	N
Sulphuric acid (10%)	N
Sulphuric acid (30%)	N
Urea	R
Zinc nitrate	N
Zinc sulphate	

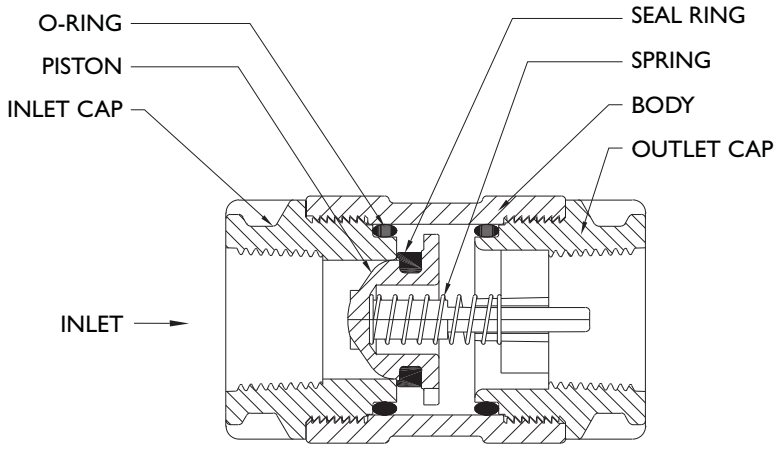
N = Not Recommended
R = Resistant
Empty Cell = No data available
Note recommendations based on fluids at 20^0 C or less

FOOT AND NON-RETURN VALVES MATERIAL & COMPONENTS



Foot Valves

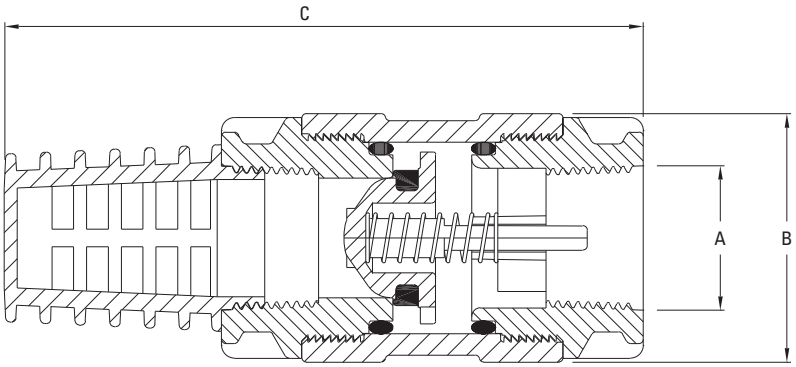
Size	Nominal Size	Part Number	Body	Inlet/Outlet	Piston	Seal Ring	O-rings	Spring	Filter
¾"	DN20	95501200	GF Nylon	GF Nylon Alloy	Acetal	Nitrile rubber	Nitrile rubber	316 S/S	Acetal
1"	DN25	95501300	GF Nylon	GF Nylon Alloy	Acetal	Nitrile rubber	Nitrile rubber	316 S/S	Acetal
1 ¼"	DN32	95501400	GF Nylon	GF Nylon Alloy	Acetal	Nitrile rubber	Nitrile rubber	316 S/S	Acetal
1 ½"	DN40	95501500	GF Nylon	GF Nylon Alloy	Acetal	Nitrile rubber	Nitrile rubber	316 S/S	Acetal
2"	DN50	95501600	GF Nylon	GF Nylon Alloy	Acetal	Nitrile rubber	Nitrile rubber	316 S/S	Acetal



Non-Return Valves

Size	Nominal Size	Part Number	Body	Inlet/Outlet	Piston	Seal Ring	O-rings	Spring
¾"	DN20	95501200	GF Nylon	GF Nylon Alloy	Acetal	Nitrile rubber	Nitrile rubber	316 S/S
1"	DN25	95501300	GF Nylon	GF Nylon Alloy	Acetal	Nitrile rubber	Nitrile rubber	316 S/S
1 ¼"	DN32	95501400	GF Nylon	GF Nylon Alloy	Acetal	Nitrile rubber	Nitrile rubber	316 S/S
1 ½"	DN40	95501500	GF Nylon	GF Nylon Alloy	Acetal	Nitrile rubber	Nitrile rubber	316 S/S
2"	DN50	95501600	GF Nylon	GF Nylon Alloy	Acetal	Nitrile rubber	Nitrile rubber	316 S/S

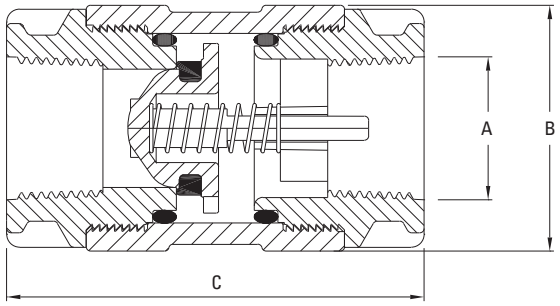
FOOT AND NON-RETURN VALVES RANGE & DIMENSIONS



Foot Valves

Size (A)	Nominal Size	Part Number	B	C
¾"	DN20	95501200	47	127
1"	DN25	95501300	55	148
1 ¼"	DN32	95501400	62	166
1 ½"	DN40	95501500	70	185
2"	DN50	95501600	92	224

All dimensions in millimetres unless otherwise stated



Non-Return Valves

Size (A)	Nominal Size	Part Number	B	C
¾"	DN20	95502200	47	84
1"	DN25	95502300	55	98
1 ¼"	DN32	95502400	62	110
1 ½"	DN40	95502500	70	120
2"	DN50	95502600	92	150

All dimensions in millimetres unless otherwise stated

RATIO PRESSURE REDUCING VALVES

Philmac's ratio pressure reducing valves are designed to control service line pressure in fixed head water systems and have been doing so for over 40 years.

Their simple yet effective operation means they can protect downstream pipe work, fittings and appliances from the effects of excess water pressure. With a fixed non-adjustable ratio it means the valve does not require adjusting and is tamper proof.

Ratio valves are manufactured from high grade materials to provide reliable operation and a high level of corrosion resistance. Not only are spare parts available but these valves are backed by a full maintenance service.

Philmac's range of ratio valves are designed to handle situations where reliable, controlled high pressure operation is essential.

APPLICATIONS

Agriculture: Water tanks and troughs on high pressure systems.
Plumbing: Water supply for fire and potable water from top of buildings down.
Mining: Water supply down mineshafts.

BENEFITS

Fast and Easy Installation

- **Minimum Space Required for Installation:** Ratio valves have a compact body design which makes them perfect for tight applications such as fire services They can be installed in any orientation.
- **BSP Inlet Threads:** The Industrial and Plumbing sectors use British Standard Pipe (BSP) threads as a standard. Philmac also uses these thread types across the screwed ratio valve range to ensure compatibility with other threaded fittings and make installation simple.
- **Flanged Inlet/Outlet:** To make installation easy Philmac also offer a flanged ratio valve. The standard drill hole pattern is Table E, however to assist with different installations they are also available with DIN, ANSI 150, Table C/D/F/H, JIS or BS4504 Table II drill hole patterns. Other flange patterns can be supplied on request.
- **Serviceable:** The valves have been designed to be fully serviced and repair kits containing all the seals, o-rings and instructions are readily available. Philmac also offers a servicing facility where the valves are fully disassembled, cleaned, all parts are checked dimensionally and replaced as necessary. The valve is then reassembled with new seals and o-rings and tested to ensure it works at its designated ratio.

Complete Security

- **Warranty:** For peace of mind the flanged ratio valves carry a five (5) year warranty on materials and workmanship when used with potable water.
- **Simple Sealing Action:** Because the valve relies on only one moving part it means high reliability and shutoff when required. There are no internal ports which can become blocked or springs that can become corroded.
- **Maintained Pressure:** Under no flow conditions the downstream pressure is maintained because the valve remains closed and it will not open until the downstream pressure drops when installed in a fixed head system.
- **Corrosion Resistant:** With a DZR brass body (screwed) or bronze body (flanged), 316 stainless steel seat and piston, DZR brass or gunmetal components, nitrile O-rings and seals ensures years of reliable operation.
- **Approvals:** All valves comply with Australian/New Zealand Standard 4020 which means the valves are suitable for use with drinking water.
- **Tamper Proof:** There are no external regulators or pilot tubes which can be tampered with so once the valve is installed it will continue to operate at its pre-set ratio.

High Performance

- **Manufactured from DZR brass:** The brass components in Philmac screwed ratio valves are manufactured from dezincification resistant (DZR) brass. This means the brass is resistant in soil and water environments to corrosion involving the loss of zinc leaving a residue of spongy or porous copper.
- **Manufactured from Gunmetal:** The flanged ratio valves are manufactured from a cast gunmetal to provide overall strength in particular the flange of the valve.
- **High pressure shutoff:** Ratio pressure reducing valves are rated to a pressure of 3500 kPa (500 psi) or 35 bar (static shutoff) at 20^0 Celsius to meet the requirements of high pressure systems.
- **High Flow Rates:** Due to the internal design, when the valve is fully open it is allows full flow of water.

Complete Coverage

- **Wide range:** The range of ratio pressure reducing valves is comprehensive and includes screwed sizes from ½" to 2" (DN15 to DN50) and flanged sizes from 2" to 6" (DN50 to DN150). Some body sizes are available with different flange sizes (refer to the section on Dimensions).

STANDARDS & TESTS

Philmac's range of ratio valves are designed to comply with the following standards and undertake a range of tests to ensure they comply with these standards.

Standards

AS/NZ 4020: Testing of products for use in contact with drinking water.

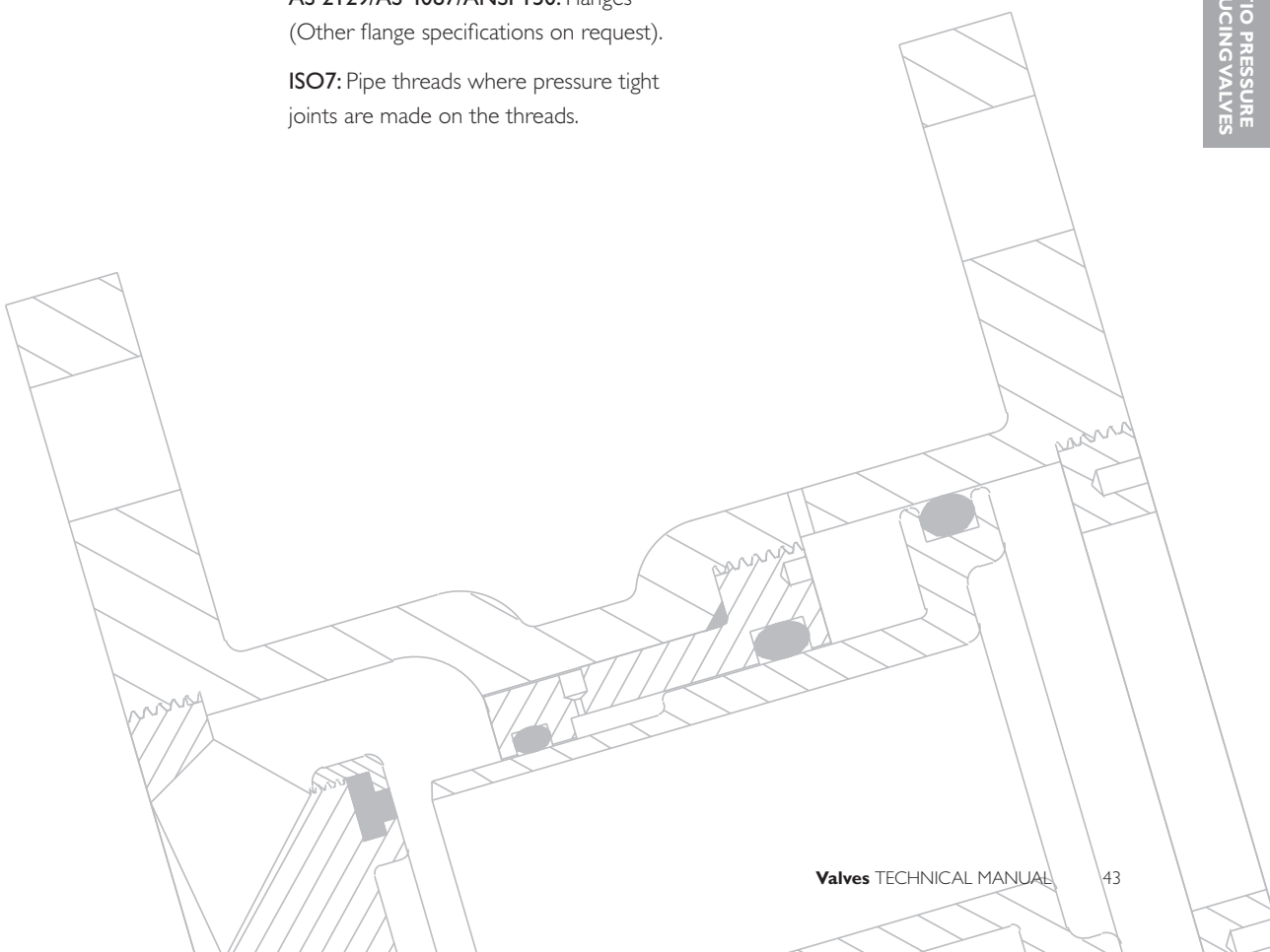
AS 1722.1: Pipe threads of Whitworth form part 1: sealing pipe threads..

AS 2129/AS 4087/ANSI 150: Flanges (Other flange specifications on request).

ISO7: Pipe threads where pressure tight joints are made on the threads.

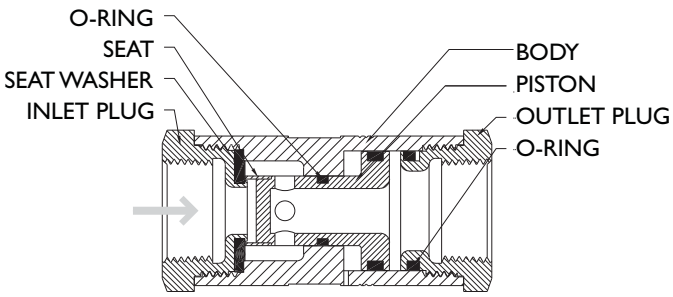
Tests

Shut Off Test: Valves are tested for shut off against a hydrostatic water pressure of 3500 kPa (500 psi) or 35 bar.

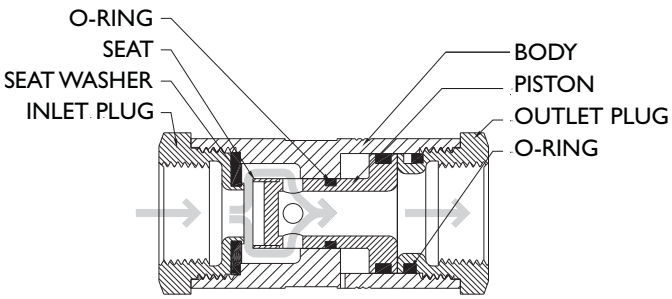


RATIO PRESSURE REDUCING VALVES OPERATION & INSTALLATION INSTRUCTIONS

CLOSED (No Flow)



OPEN (Flow)



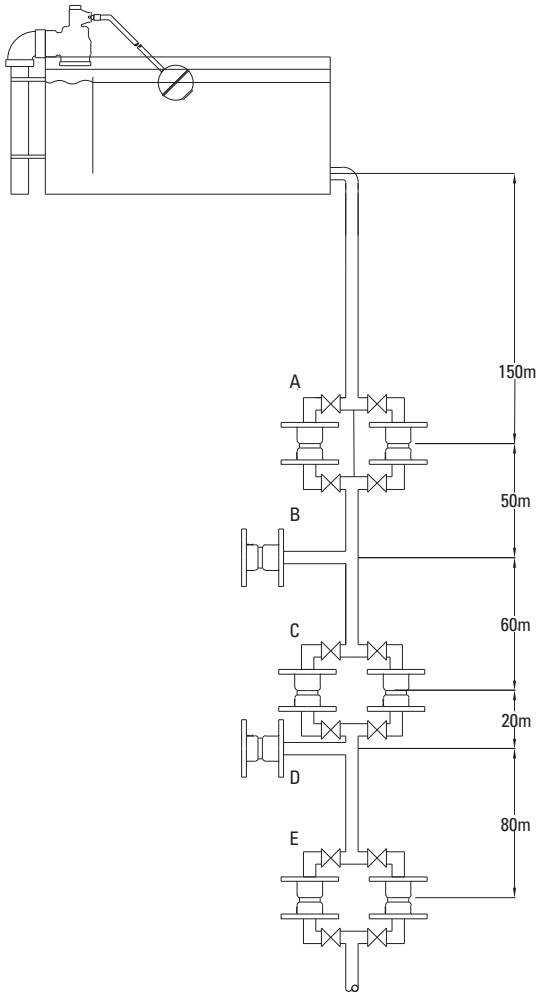
The valve operates on the principle of differing surface areas. In the example of a 2:1 screwed-ratio valve the upstream piston surface area is half that of the downstream surface area. Other ratios are obtained by altering the area relationship of the valve.

Under no flow conditions the piston is closed to ensure the downstream pressure does not exceed the prescribed ratio.

The schematic diagram shows an example installation and how ratio valves effectively reduce pressure to ensure the rating of pipework is not exceeded. Pressure after the valves will vary depending on ratio being used. Water is fed by gravity from a header tank into the system. Each flanged ratio valve should have an isolating valve installed both upstream and downstream to allow it to be removed for servicing.

From the tank to the first ratio valve the pressure will increase to approximately 1500 kPa at point A if we assume the tank is 3 metres high (150 m drop + 3 m tank height x 9.8). After the ratio valve the pressure will drop to 500 kPa (1500 ÷ 3) if we assume a 3:1 ratio is being used. Pressure will then build up to approximately 990 kPa (50 m x 9.8 plus the starting pressure of 500 kPa) at point B and 1580 kPa at point C as water moves down the pipe.

After point C the pressure will drop to approximately 395 kPa (1580 ÷ 4) if we assume a 4:1 ratio valve is being used. At point D the pressure will increase to approximately 590 kPa and approximately 1375 kPa at point E.



RATIO PRESSURE REDUCING VALVES OPERATION & INSTALLATION INSTRUCTIONS

Valves must be installed according to the direction of flow as indicated on the valve. They can be installed vertically or horizontally but it is important that the breather hole is visible. It is critical that the breather hole kept free from obstructions and if buried the hole must be protected from blockage.

Screwed Version

1. Apply PTFE tape or approved sealant to the thread ensuring sufficient is applied to ensure a watertight seal.

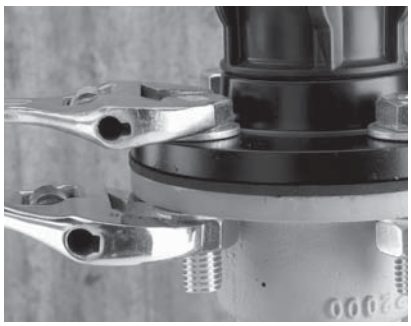
2. Screw into male thread by hand until firm.

3. Using a pipe wrench or multigrips on the hex end of the valve, screw it into the male thread until tight. Where necessary ensure the male thread is held stationary to avoid it from moving.

Flanged Version

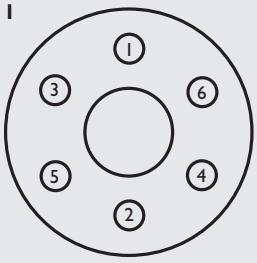
1. Ensure a gasket is used between the flange of the ratio valve and the flange to which it is to be fitted.

2. Fit the correct size and length bolts to each hole in the flange and hand tighten them.



3. Tighten the bolts with a spanner ensuring the bolts are torqued up correctly in an appropriate sequence.

FIGURE 1



Note: When assembling a flanged adaptor, position the gasket and loosely assemble the fitting. Tighten bolts gradually in sequence shown numerically in Figure 1, to ensure even compression around the flange. Ensure washers are used under bolt heads and nuts.

SYSTEM DESIGN CONSIDERATIONS

Minimum Inlet Pressure: 200 kPa (29 psi) or 2 bar on screwed range and 300 kPa (43 psi) or 3 bar on flanged range

Maximum Inlet Pressure: 3500 kPa (500 psi) on 35 bar.

Threads: All threads on the screwed ratio valves are BSP with a Whitworth form.

Flanges: All flanges on the flanged ratio valves are drilled according to Table E. Dimensions as per AS2129. Other flange types are available on request including DIN, ANSI 150, Table C/D/F/H, JIS or BS4504 Table II.

Sealing threads: Philmac recommends sealing threads with PTFE tape. When being fitted to a metal thread an approved metal sealant can be used.

Operating temperature: Connection is cold water (less than 20^{0}C) rated.

Weathering: All non-ferrous materials are protected from the affects of UV.

Pressure Reduction: The inlet pressure is reduced as per the ratio of the valve and will hold the downstream pressure to with +/- 5% of the inlet pressure.

Ratios: Screwed – 2:1 & 3:1
Flanged – 3:2, 2:1, 3:1, 4:1 & 5:1

Isolating valves: An isolating valve should be installed both upstream and downstream of a ratio valve to allow it to be removed for servicing. Consideration should be given to installing two valves in parallel to allow one to be removed for servicing.

Flow Rates* (L/min) - Screwed

Inlet Pressure (kPa)	Inlet Size				
	½″ (DN15)	¾″ (DN20)	1″ (DN25)	1 ½″ (DN40)	2″ (DN50)
200	25	30	75	375	530
300	30	35	95	470	660
500	40	45	125	605	850
1000	55	65	175	660	1205
1500	70	80	210	1050	1480
2000	80	90	245	1215	1705
2500	85	100	275	1355	1910
3000	95	110	300	1485	2090
3500	100	120	325	1605	2260

* Theoretical maximum water flow rate when outlet is open ended

Flow Rates* (L/min) - Flanged

Inlet Pressure (kPa)	Inlet Size			
	2″ (DN50)	3″ (DN80)	4″ (DN100)	6″ (DN150)
300	1350	3100	5650	13400
500	1700	4000	7100	17500
1000	2500	5600	10000	24800
1500	3000	6900	12000	30000
2000	3500	7900	14000	34700
2500	3800	8800	15700	38700
3000	4200	9700	17300	42500
3500	4600	10500	18600	46000

* Theoretical maximum water flow rate when outlet is open ended

CHEMICAL RESISTANCE

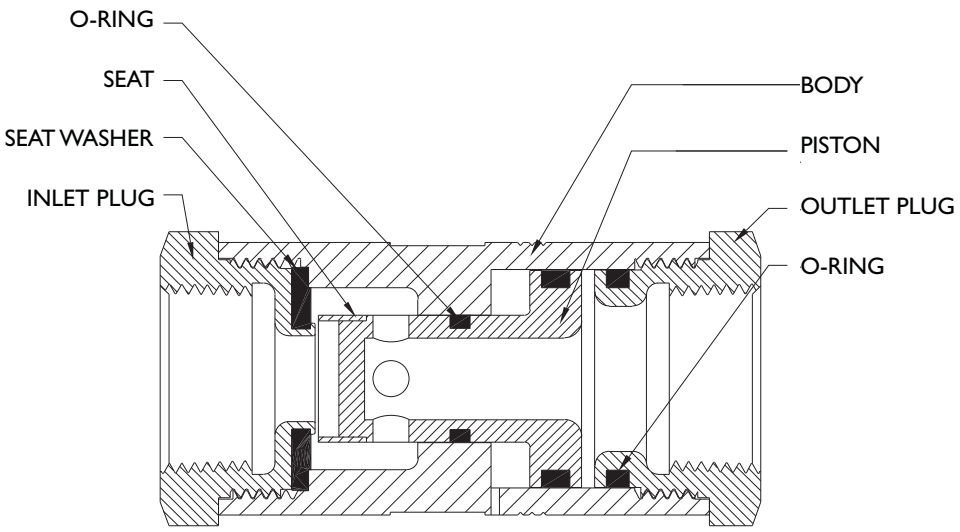
Philmac's ratio pressure reducing valves are primarily designed to convey water. However there may be occasions where the water contains chemicals and/or alternative fluids need to be controlled. The following table is provided as a **guide only** for the compatibility of various chemicals and/or alternative fluids to Philmac ratio valves. The mixing of chemicals may affect the compatibility.

Chemical	Ratio valve
Acetic acid (10%)	N
Acetic acid (50%)	N
Alcohol (ethanol)	N
Ammonium nitrate	N
Antifreeze	R
Brine	N
Calcium carbonate	
Calcium chloride	N
Calcium nitrate	
Calcium sulphate	
Chlorine water	N
Citric Acid	N
Copper Sulphate >5%	N
Diesel (fuel)	R
Ethyl alcohol (ethanol)	N
Hydrochloric acid (10%)	N
Hydrochloric acid (30%)	N
Kerosene	R
Lubricating oils (not synthetic)	R
Magnesium nitrate	
Magnesium sulphate	R
Mineral oils	R
Nitric acid (10%)	N
Nitric acid (40%)	N
Olive oil	
Orange juice	
Petrol	
Phosphoric acid (85%)	N
Drinking water	R
Potassium chloride	N
Potassium nitrate	R
Potassium sulphate	N
Sodium bicarbonate	N
Sodium hypochlorite (<10%)	
Sulphuric acid (10%)	
Sulphuric acid (30%)	
Urea	
Zinc nitrate	
Zinc sulphate	R

N = Not Recommended
R = Resistant

Empty Cell = No data available
Note recommendations based on fluids at 20^0 C or less

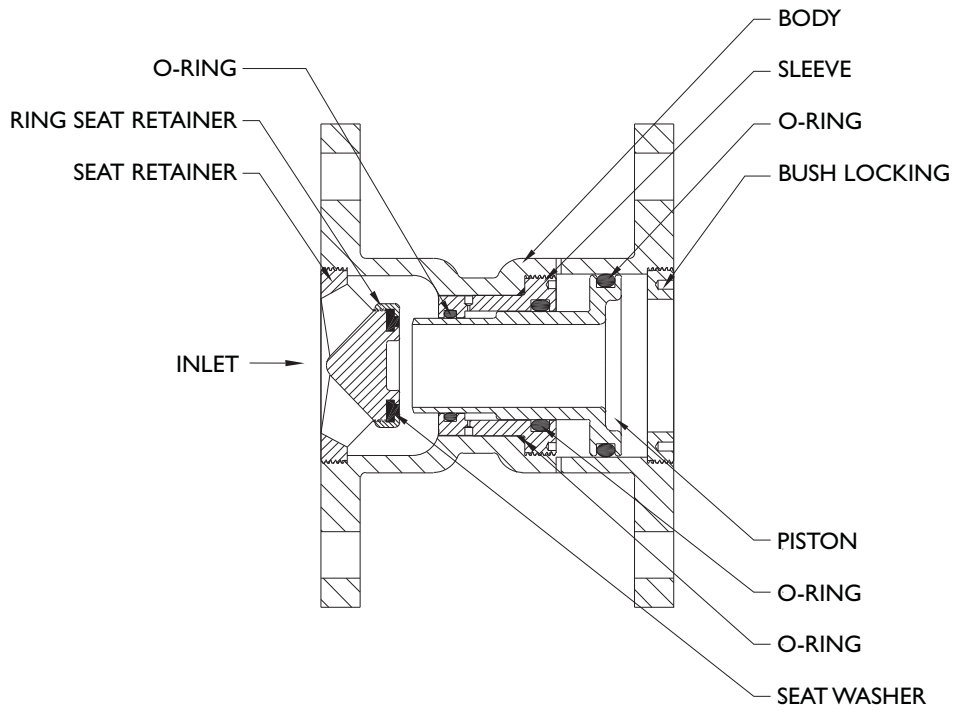
RATIO PRESSURE REDUCING VALVES MATERIAL & COMPONENTS



Screwed Ratio Valves

Size	Nominal Size	Part Number	Ratio	Body	Inlet Plug	Outlet Plug	Piston	Seat	Seat Seal	O-Ring
½"	DN15	90222100	2:1	DZR brass	DZR brass	DZR brass	DZR brass	316 SS	Nitrile rubber	Nitrile rubber
		90223100	3:1							
¾"	DN20	90222200	2:1	DZR brass	DZR brass	DZR brass	DZR brass	316 SS	Nitrile rubber	Nitrile rubber
		90223200	3:1							
1"	DN25	90222300	2:1	DZR brass	DZR brass	DZR brass	DZR brass	316 SS	Nitrile rubber	Nitrile rubber
		90223300	3:1							
1 ½"	DN40	90222500	2:1	DZR brass	DZR brass	DZR brass	DZR brass	316 SS	Nitrile rubber	Nitrile rubber
		90223500	3:1							
2"	DN50	90222600	2:1	DZR brass	DZR brass	DZR brass	DZR brass	316 SS	Nitrile rubber	Nitrile rubber
		90223600	3:1							

RATIO PRESSURE REDUCING VALVES MATERIAL & COMPONENTS



Flanged Ratio Valves

Body Size	Flange Size	Table Pattern	Body	Sleeve	Piston	Ring Seat Retainer	Bush Locking	Seat Retainer	Seat Seal	O-ring
2" (50)	2" (50)	D/E	Gunmetal LG2	Gunmetal	316 S/S	Gunmetal	Gunmetal	Gunmetal	Nitrile rubber	Nitrile rubber
2" (50)	2 ½" (65)	D/E	Gunmetal LG2	Gunmetal	316 S/S	Gunmetal	Gunmetal	Gunmetal	Nitrile rubber	Nitrile rubber
3" (80)	3" (80)	D/E	Gunmetal LG2	Gunmetal	316 S/S	Gunmetal	Gunmetal	Gunmetal	Nitrile rubber	Nitrile rubber
3" (80)	4" (100)	E	Gunmetal LG2	Gunmetal	316 S/S	Gunmetal	Gunmetal	Gunmetal	Nitrile rubber	Nitrile rubber
4" (100)	4" (100)	E	Gunmetal LG2	Gunmetal	316 S/S	Gunmetal	Gunmetal	Gunmetal	Nitrile rubber	Nitrile rubber
4" (100)	6" (150)	E	Gunmetal LG2	Gunmetal	316 S/S	Gunmetal	Gunmetal	Gunmetal	Nitrile rubber	Nitrile rubber
6" (150)	6" (150)	E	Gunmetal LG2	Gunmetal	316 S/S	Gunmetal	Gunmetal	Gunmetal	Nitrile rubber	Nitrile rubber

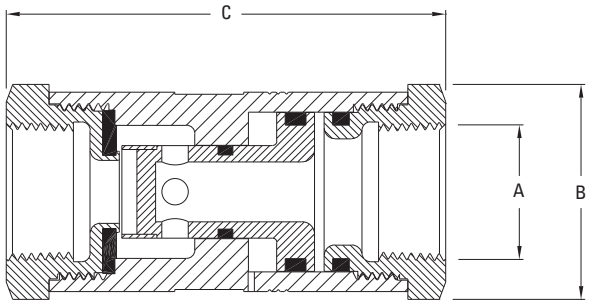
NOTE: Part numbers and ratios are not shown due to the number of variations available.

RATIO PRESSURE REDUCING VALVES RANGE & DIMENSIONS

Screwed Ratio Valve

Size (A)	Nominal Size	B	C
½"	DN15	38	80
¾"	DN20	45	96
1"	DN25	51	107
1 ½"	DN40	95	155
2"	DN50	118	160

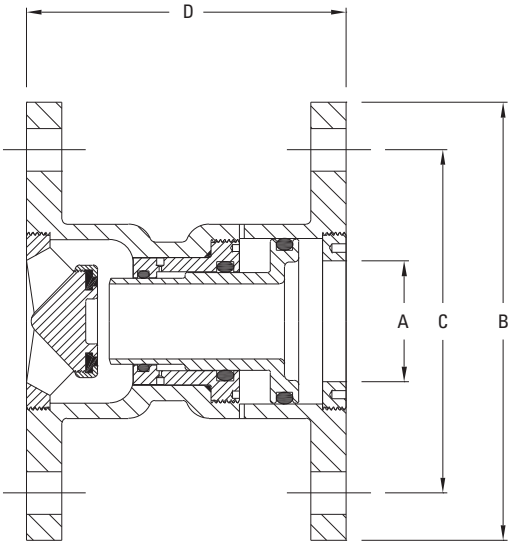
All dimensions in millimetres unless otherwise stated



Flanged Ratio Valve

Body Size (A)	Nominal Body Size	Flange Size	Nominal Flange Size	B*	C*	D
2"	DN50	2"	50	150	114	135
2"	DN50	2 ½"	65	165	127	135
2"	DN50	3"	80	185	146	135
3"	DN80	3"	80	185	146	155
3"	DN80	4"	100	215	178	200
4"	DN100	4"	100	215	178	200
4"	DN100	6"	150	280	235	230
6"	DN150	6"	150	280	235	230

* Dimensions based on a Table E flange configuration
All dimensions in millimetres unless otherwise stated



TROUGH VALVES

Philmac's unique and compact trough valve is essentially a float valve but has been designed specifically for stock troughs. The valve hugs the trough wall and has no long lever arm, virtually eliminating the risk of damage caused by stock. By using a cord/float attachment, stock are no longer able to damage levers or manipulate flow.

The extensive range includes quality brass valves and high impact, UV resistant polypropylene valves. The brass version comes with a stainless steel seat ensuring longevity of the product.

This Australia made product is not only robust but versatile as it can be installed in a horizontal or vertical position within the trough.

APPLICATIONS

Agriculture: Stock troughs and tanks.

BENEFITS

Fast and Easy Installation

- **Multi-position Installation:** The valves have been designed to work in either a vertical or horizontal position for flexible installation.
- **BSP Inlet Threads:** The Rural, Irrigation and Plumbing sectors use British Standard Pipe (BSP) threads as a standard. Philmac also uses these thread types across the valve range to ensure compatibility with other threaded fittings and make installation easy.
- **Cord Attachment:** The cord is easily attached to the float and therefore adjustment of the cord is a quick and simple process.

Complete Security

- **Reliable Operation:** Consistent high quality injection moulded plastic bodies or machined brass plus a stainless steel lever arm and stainless steel seat (brass version) means years of reliable operation.
- **Corrosion Resistant:** Manufactured with plastic, stainless steel and brass components which all have a high degree of corrosion resistance ensuring the longevity of the valve in harsh agricultural conditions.
- **Lever Damage:** Stock can no longer stampede/damage lever or force unnecessary water out of valve, as the float operates independently of the small lever on the valve.

High Performance

- **Manufactured from advanced thermoplastic materials:** Philmac plastic trough valves are manufactured from lightweight high performance thermoplastic materials, which have excellent impact, UV and corrosion resistance.
- **Low pressure shutoff:** Trough valves are designed to seal off with very low pressure providing there is water in the tank to provide upthrust on the float.

Complete Coverage

- **Wide range:** The range of trough valves is comprehensive and includes sizes ¾", 1" and 1¼" (DN20, 25 and 32).

STANDARDS & TESTS

Philmac's range of trough valves are designed to comply with the following standards and undertake a range of tests to ensure they comply with these standards.

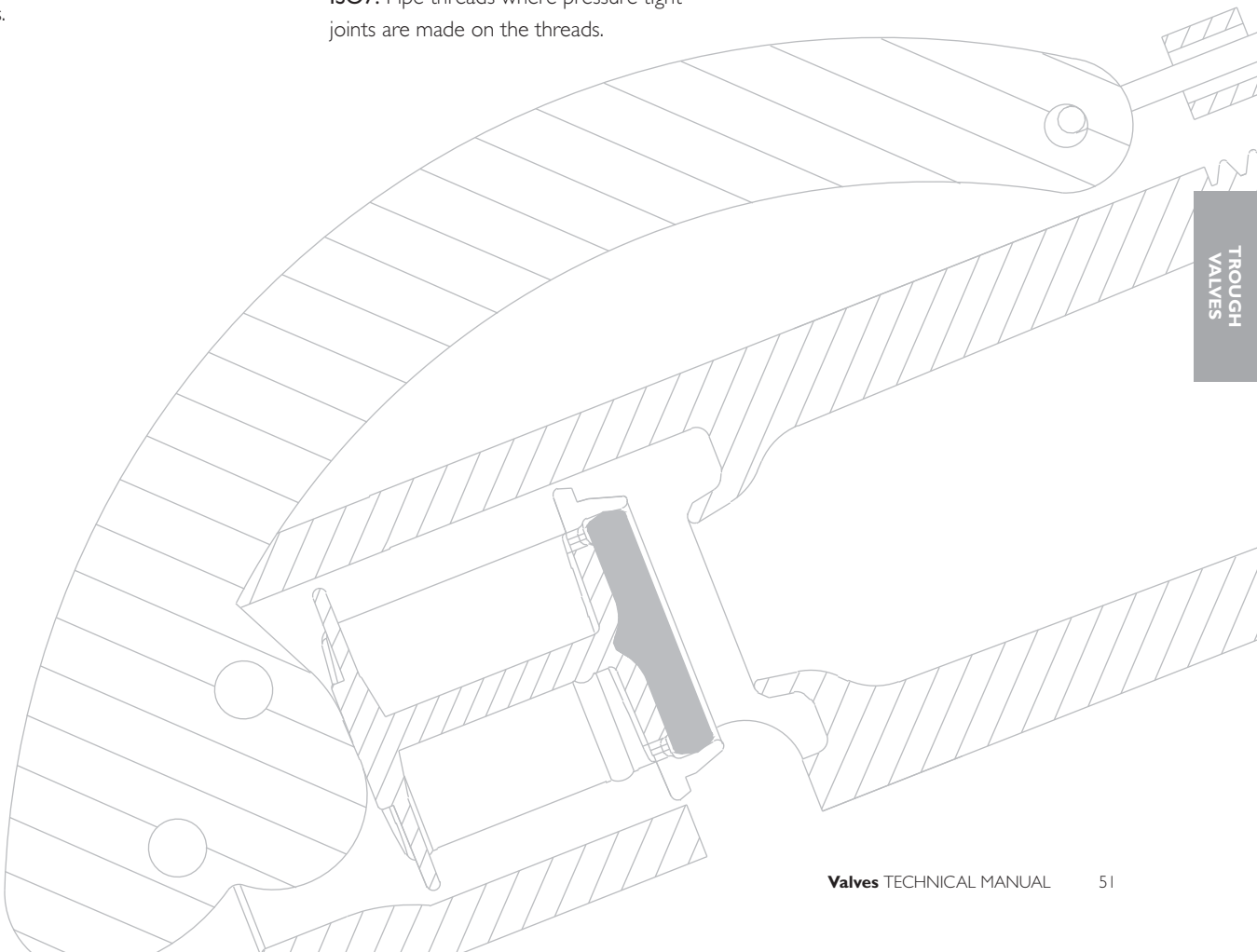
Standards

AS 1722.1: Pipe threads of Whitworth form part 1: sealing pipe threads.

ISO7: Pipe threads where pressure tight joints are made on the threads.

Tests

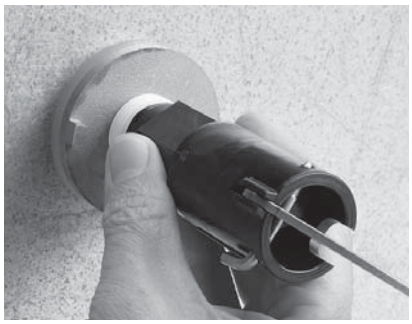
Shut Off Test: Valves are tested for shut off against a hydrostatic water pressure of 300 kPa (43 psi) or 3 bar.



TROUGH VALVES OPERATION & INSTALLATION INSTRUCTIONS

The Philmac trough valves operate by opening and closing a plunger against a seat through the action of a lever attached to a float. As the water level drops, the float and lever move in a downward direction and the plunger moves away from the seat opening the valve. When the water level rises, the float and lever move in an upwards direction and the plunger moves towards the seat until it sits firmly against the seat and shuts the valve off.

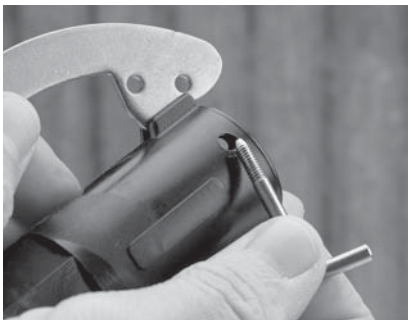
1. Apply PTFE tape or approved sealant to the thread ensuring sufficient is applied to ensure a watertight seal.



2. Screw into female thread by hand until firm.

3. Using a pipe wrench or multigrips on the body of the valve screw it into the female thread until tight. Where necessary ensure the female thread is held stationary to avoid it from moving.

Conversion for Overhead Entry

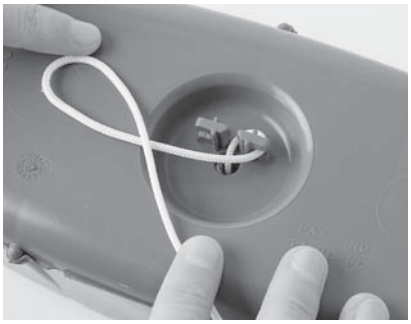


1. For overhead installation the lever needs to be relocated by unscrewing the pin from the body.

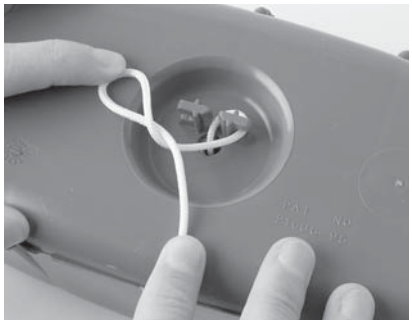
2. Rotate the lever by 180° and reinsert the pin through the lower hole (upper hole is for the standard installation). (Refer page 54 for pin locations).

3. Installation position.

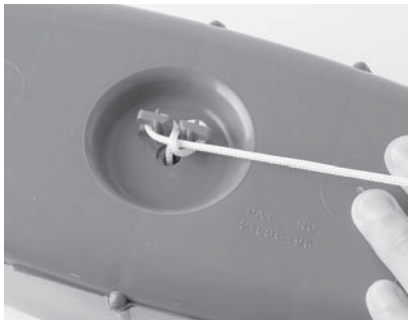
Setting the Float



1. Insert the cord through bottom hole of the float, ensure the top of the float is BELOW the rim of the trough then place the cord around the right hand lug. Make a loop.



2. Twist the loop.



3. Place it over the left hand lug and pull tight.

SYSTEM DESIGN CONSIDERATIONS

Maximum Operating Pressure: 400 kPa (58 psi) (¾" brass only) and 300 kPa (43 psi) at 20^{0}C.

Threads: All threads are BSP (Whitworth form).

Sealing threads: Philmac recommends sealing threads with PTFE tape. Other approved sealants for plastic or brass materials can be used providing the sealant does not enter the valve where it may cause damage.

Operating temperature: Connection is cold water (less than 20^{0}C) rated.

Weathering: All plastic materials used contain pigments to provide excellent protection against degradation from ultra-violet (UV) radiation. However long-term continuous exposure to UV is not recommended and plastic components should ideally be protected.

Flow Rates (L/min)

Inlet Pressure (kPa)	Inlet Size					
	¾" Brass (DN20)	¾" Plastic (DN20)	1" Plastic (DN25)	1" Brass (DN25)	1 ¼" Brass (DN32)	1 ¼" Plastic (DN32)
25	32	33	33	37	57	60
50	38	42	42	48	70	76
75	46	49	49	58	85	92
100	53	57	57	67	99	108
150	64	70	70	83	121	132
200	74	82	82	96	140	154
250	83	91	91	106	157	172
300	91	100	100	114	175	187
400	106	-	-	-	-	-

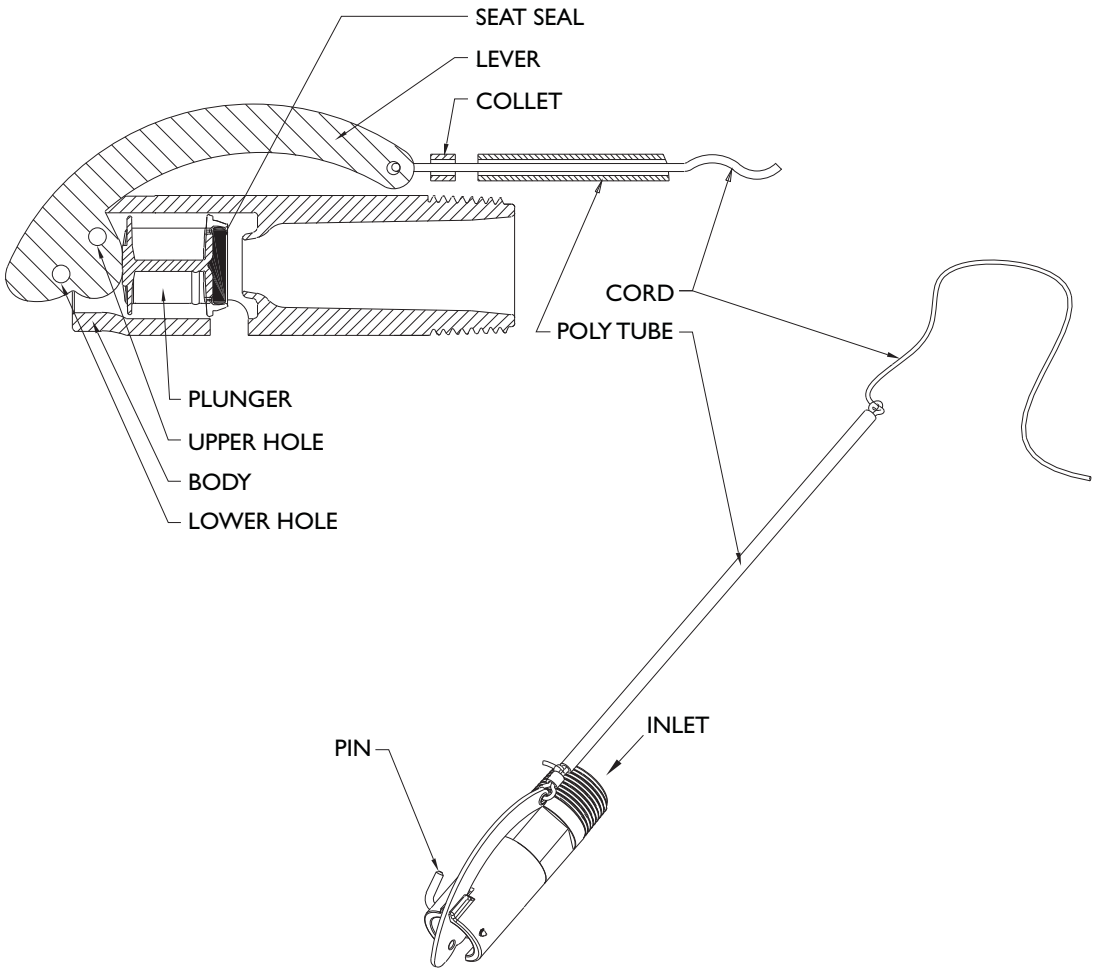
CHEMICAL RESISTANCE

Philmac's trough valves are primarily designed to convey water. However there may be occasions where the water contains chemicals and/or alternative fluids need to be controlled. The following table is provided as a **guide only** for the compatibility of various chemicals and/or alternative fluids to Philmac trough valves. The mixing together of chemicals may affect the compatibility.

Chemical	Compatibility	
	Trough Valve - Plastic	Trough Valve - Brass
Acetic acid (10%)	R	N
Acetic acid (50%)	N	N
Alcohol (ethanol)	N	N
Ammonium nitrate	R	N
Antifreeze	R	R
Brine	R	N
Calcium carbonate	R	
Calcium chloride	N	N
Calcium nitrate	N	
Calcium sulphate	N	
Chlorine water	N	N
Citric Acid	N	N
Copper Sulphate >5%	N	N
Diesel (fuel)	R	R
Ethyl alcohol (ethanol)	N	N
Hydrochloric acid (10%)	N	N
Hydrochloric acid (30%)	N	N
Kerosene	R	R
Lubricating oils (not synthetic)	R	R
Magnesium nitrate	R	
Magnesium sulphate	R	R
Mineral oils	R	R
Nitric acid (10%)	N	N
Nitric acid (40%)	N	N
Olive oil	N	
Orange juice	R	
Petrol	R	
Phosphoric acid (85%)	N	N
Drinking water	R	R
Potassium chloride	R	R
Potassium nitrate	R	R
Potassium sulphate	R	
Sodium bicarbonate	R	
Sodium hypochlorite (<10%)	N	N
Sulphuric acid (10%)	N	N
Sulphuric acid (30%)	N	N
Urea	R	R
Zinc nitrate		N
Zinc sulphate	N	

N = Not Recommended
R = Resistant
Empty Cell = No data available
Note recommendations based on fluids at 20^0 C or less

TROUGH VALVES MATERIAL & COMPONENTS



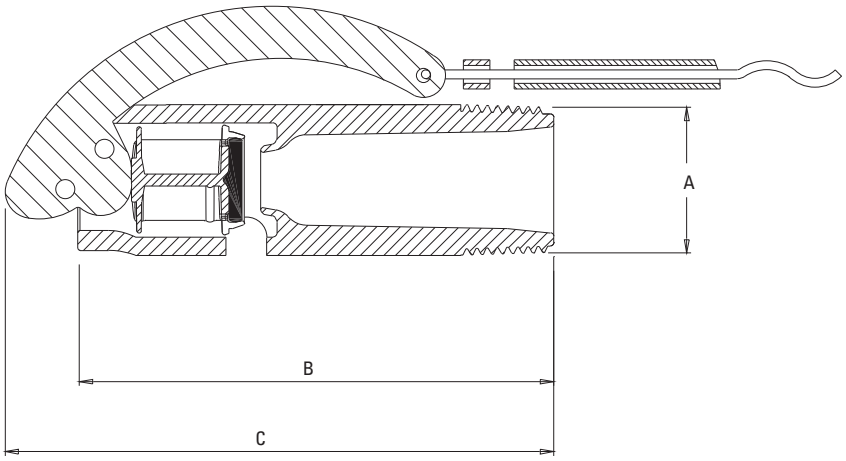
Trough Valves - Plastic

Size	Nominal Size	Part Number	Body	Seat	Plunger	Seat Seal	Pin	Lever	Collet	Cord	Poly Tube
¾"	DN20	AQ400P	Acetal	Acetal	Acetal	Nitrile rubber	316 S/S	316 S/S	Polyprop-ylene	Polyester	Polyprop-ylene
1"	DN25	AQ500P	Acetal	Acetal	Acetal	Nitrile rubber	316 S/S	316 S/S	Polyprop-ylene	Polyester	Polyprop-ylene
1 ¼"	DN32	AQ600P	Acetal	Acetal	Acetal	Nitrile rubber	316 S/S	316 S/S	Polyprop-ylene	Polyester	Polyprop-ylene

Trough Valves - Brass

Size	Nominal Size	Part Number	Body	Seat	Plunger	Seat Seal	Pin	Lever	Collet	Cord	Poly Tube
¾"	DN20	AQ100P	Acetal	316 S/S	Acetal	Nitrile rubber	316 S/S	316 S/S	Polyprop-ylene	Polyester	Polyprop-ylene
1"	DN25	AQ200P	Acetal	316 S/S	Acetal	Nitrile rubber	316 S/S	316 S/S	Polyprop-ylene	Polyester	Polyprop-ylene
1 ¼"	DN32	AQ300P	Acetal	316 S/S	Acetal	Nitrile rubber	316 S/S	316 S/S	Polyprop-ylene	Polyester	Polyprop-ylene

TROUGH VALVES RANGE & DIMENSIONS



Size (A)	Nominal Size	Part Number	B	C
¾"	DN20	95501200	47	127
1"	DN25	95501300	55	148
1 ¼"	DN32	95501400	62	166

All dimensions in millimetres unless otherwise stated

HIGH FLOW FLOAT VALVE

Philmac's high flow float valves have been developed to meet the industry demand for a high capacity valve. Based on a simple movement of a flapper, the valves can deliver high volumes of water in a short period of time.

Their compact design means they are quick and easy to install and ensure a constant water level is maintained in the trough.

With a heavy duty brass construction Philmac's range of high flow float valves are designed to handle the most demanding livestock and agricultural situations.

APPLICATIONS

Agriculture: Stock troughs.

BENEFITS

Fast and Easy Installation

- **Easy Disassembly:** The valves have been designed for easy replacement of the rubber seal. Simply remove the cotter pins and clevis pins to access the flapper and seal.
- **BSP Inlet Threads:** The Rural, Irrigation and Plumbing sectors use British Standard Pipe (BSP) threads as a standard. Philmac also uses these thread types across the valve range to ensure compatibility with other threaded fittings and make installation easy.

Complete Security

- **Reliable Operation:** Consistent high quality brass bodies plus a stainless steel seat and brass components means years of reliable operation.
- **Corrosion Resistant:** Manufactured using rubber, stainless steel and brass components ensures the valves have a high corrosion resistance, providing years of reliable operation.

High Performance

- **Low pressure shutoff:** High flow float valves are designed to seal off with very low pressure providing there is water in the tank to provide upthrust on the float.
- **High pressure shutoff:** Some versions of the high flow float valves are designed to seal off with high pressure making the valve suitable for a wider range of applications.

Complete Coverage

- **Wide range:** The range of high flow float valves is comprehensive and includes sizes from 1" to 2" (DN25 to DN50).

STANDARDS & TESTS

Philmac's range of high flow float valves are designed to comply with the following standards and undertake a range of tests to ensure they comply with these standards.

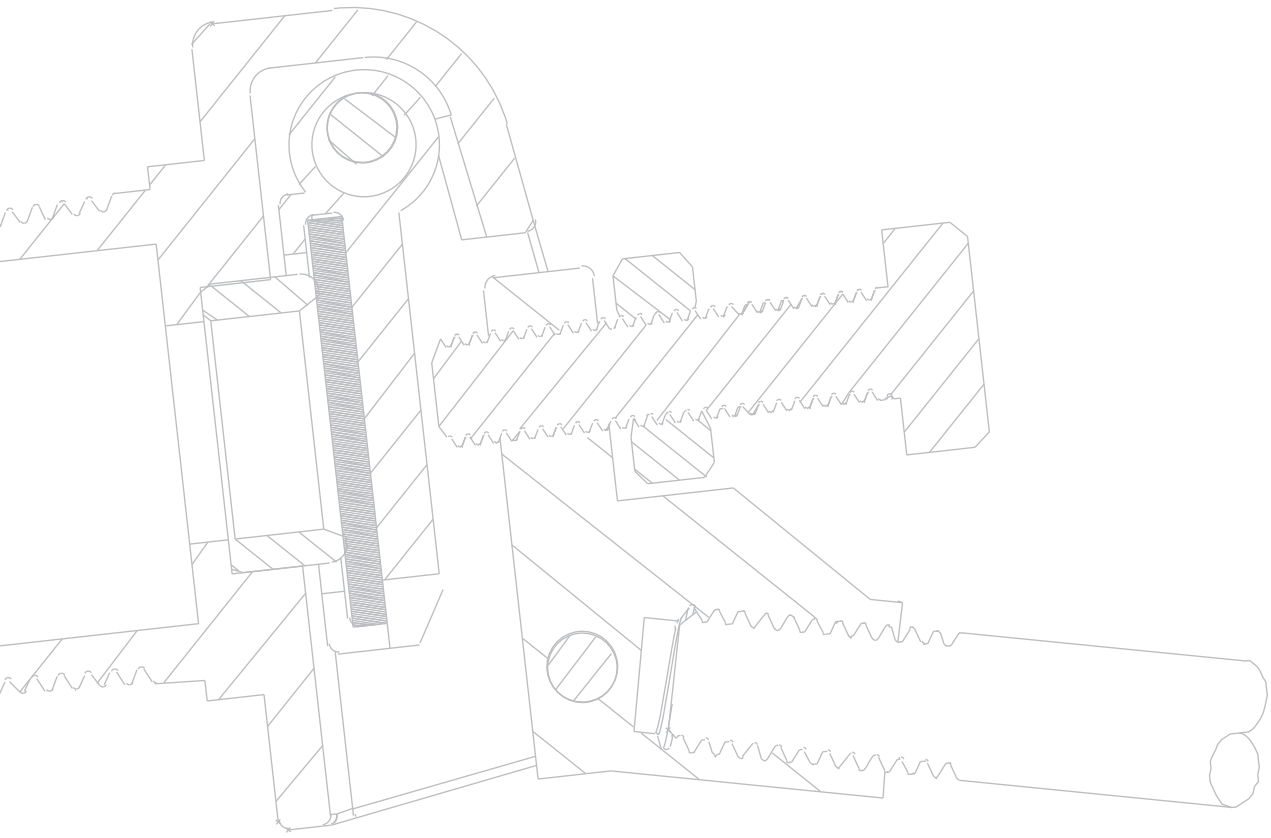
Standards

AS 1722.1: Pipe threads of Whitworth form part 1: sealing pipe threads.

ISO7: Pipe threads where pressure tight joints are made on the threads.

Tests

Shut Off Test: Valves are tested for shut off against their maximum shut off pressure.

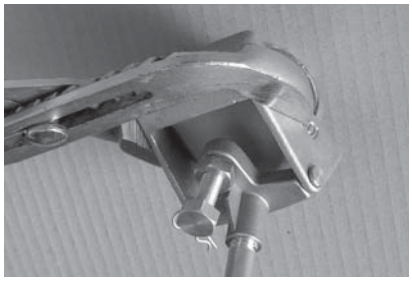


HIGH FLOW FLOAT VALVE OPERATION & INSTALLATION INSTRUCTIONS

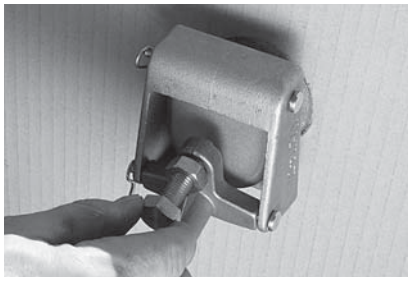
The Philmac high flow float valves operate by opening and closing a flapper against a seat through the action of a cam/lever attached to a float. As the water level drops, the float and lever move in a downward direction and allow the flapper to move away from the seat opening the valve. When the water level rises, the float and lever move in an upwards direction and the flapper moves towards the seat until it sits firmly against the seat and shuts the valve off.

Top - Side Entry

1. Apply PTFE thread tape or approved sealant to the inlet thread and screw the valve into the tank outlet.



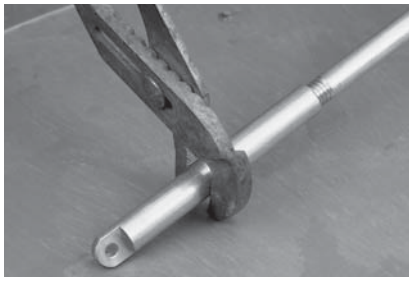
2. Tighten the body using a pair of multigrips or a spanner. Ensure the body is in an upright position so that the lever arm moves in a vertical direction.



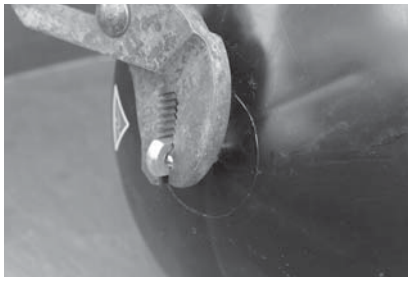
3. Adjust the float level by screwing the adjusting bolt in or out of the cam. Screwing the bolt out lifts the water level, screwing it in lowers the water level. Once the correct level is found ensure the nut is tightened to stop the adjusting bolt from moving.

Bottom - Side Entry

1. Remove the clevis pin and slide the cotter pin out from the cam/arm assembly.



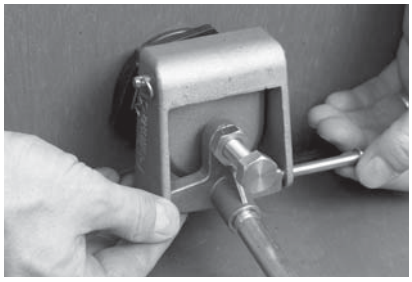
2. Screw the arm extension onto the lever using PTFE tape or approved sealant.



3. Screw the float adaptor into the float (ball).

4. Cut the stainless steel jack chain to the required length and fit it to both the arm extension and the float adaptor. It may be better to leave the chain slightly longer as it can subsequently be cut to the exact length after a trial fitting. If necessary adjust the length of the jack chain to ensure the trough has the required level of water.

5. Apply PTFE thread tape or approved sealant to the inlet thread on the valve and screw it into the tank outlet. Tighten the body using a pair of multigrips or spanner.



5. Re-attach the lever arm assembly to the body by re-inserting the clevis pin and fitting the cotter pin. Adjust the float level by screwing the adjusting bolt in or out of the cam as per the top installation.

SYSTEM DESIGN CONSIDERATIONS

Maximum Operating Pressure: At 20^{0}C
1" – 620 kPa (90 psi) or 6.2 bar
1¼" – 620 kPa (90 psi) or 6.2 bar
1½" LP – 205 kPa (30 psi) or 2 bar
1½" HP – 620 kPa (90 psi) or 6.2 bar
2" LP – 105 kPa (15 psi) or 1 bar
2" HP – 485 kPa (70 psi) or 4.8 bar.

Threads: All threads are BSP (Whitworth form).

Sealing threads: Philmac recommends sealing threads with PTFE tape. Other approved sealants for brass materials can be used providing the sealant does not enter the valve where it may cause damage.

Operating temperature: Connection is cold water (less than 20^{0}C) rated.

Weathering: Brass components are UV resistant

Flow Rates (L/min)

Inlet Pressure (kPa)	Inlet Size				
	1" & 1 ¼" (DN25 & DN32)	1½" HP* (DN40)	1½" LP** (DN40)	2" HP* (DN50)	2" LP** (DN50)
15	-	-	175	-	177
25	100	108	219	100	225
50	115	126	294	132	330
75	144	159	-	160	-
100	168	174	-	186	-
150	205	222	-	234	-
200	235	258	-	249	-
250	265	288	-	258	-
300	290	300	-	276	-

* HP denotes high pressure version
** LP denotes low pressure version

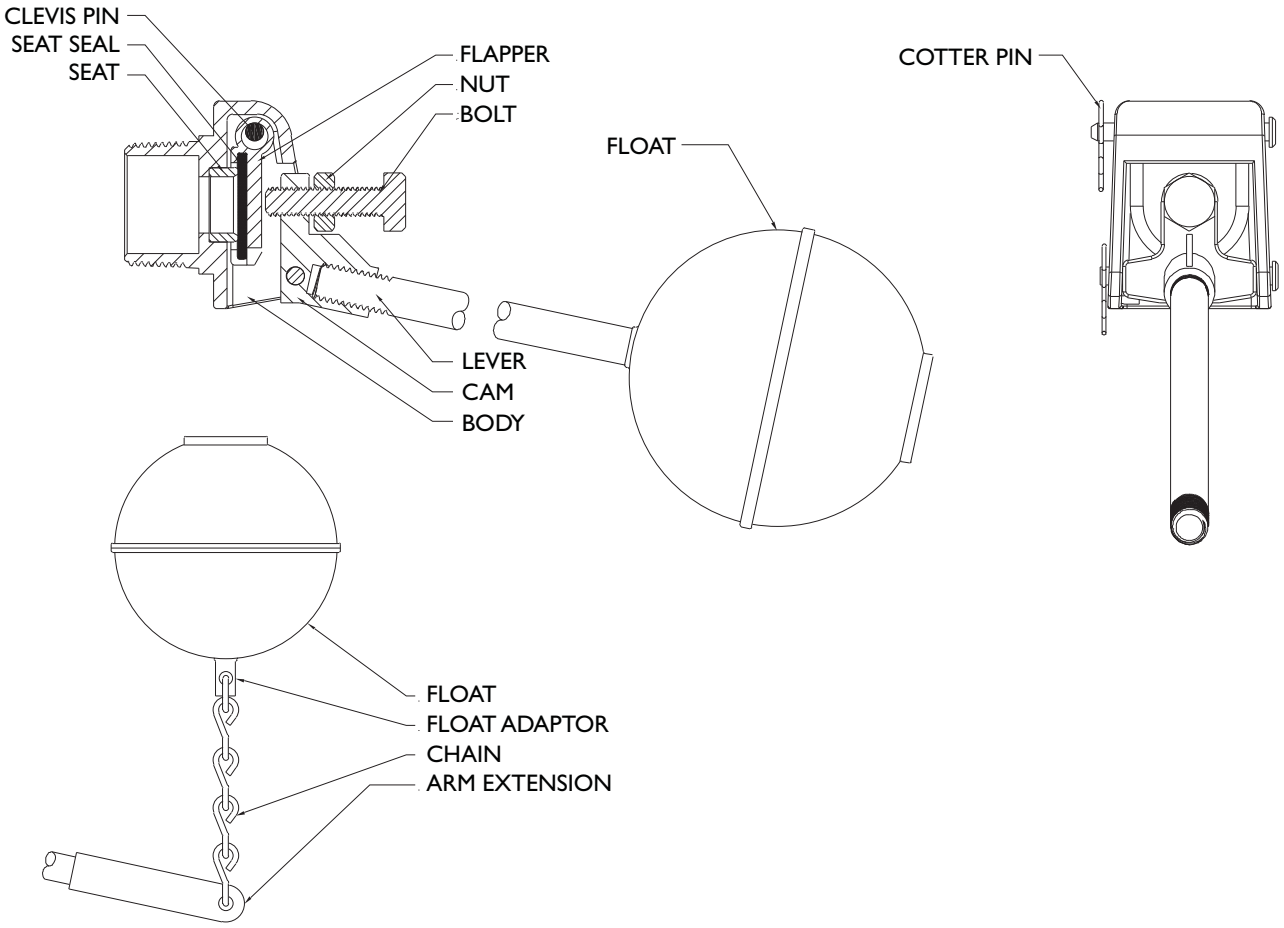
CHEMICAL RESISTANCE

Philmac's high flow float valves are designed to convey water for stock. However there may be occasions where the water contains chemicals and/or alternative fluids need to be controlled. The following table is provided as a **guide only** for the compatibility of various chemicals and/or alternative fluids to Philmac high flow float valves. The mixing together of chemicals may affect the compatibility.

Chemical	Compatibility
Acetic acid (10%)	N
Acetic acid (50%)	N
Alcohol (ethanol)	N
Ammonium nitrate	N
Antifreeze	R
Brine	N
Calcium carbonate	
Calcium chloride	N
Calcium nitrate	
Calcium sulphate	
Chlorine water	N
Citric Acid	N
Copper Sulphate >5%	N
Diesel (fuel)	R
Ethyl alcohol (ethanol)	N
Hydrochloric acid (10%)	N
Hydrochloric acid (30%)	N
Kerosene	R
Lubricating oils (not synthetic)	R
Magnesium nitrate	
Magnesium sulphate	R
Mineral oils	R
Nitric acid (10%)	N
Nitric acid (40%)	N
Olive oil	N
Orange juice	
Petrol	
Phosphoric acid (85%)	N
Drinking water	R
Potassium chloride	N
Potassium nitrate	R
Potassium sulphate	N
Sodium bicarbonate	N
Sodium hypochlorite (<10%)	N
Sulphuric acid (10%)	
Sulphuric acid (30%)	
Urea	
Zinc nitrate	
Zinc sulphate	R

N = Not Recommended
R = Resistant
Empty Cell = No data available
Note recommendations based on fluids at 20^0 C or less

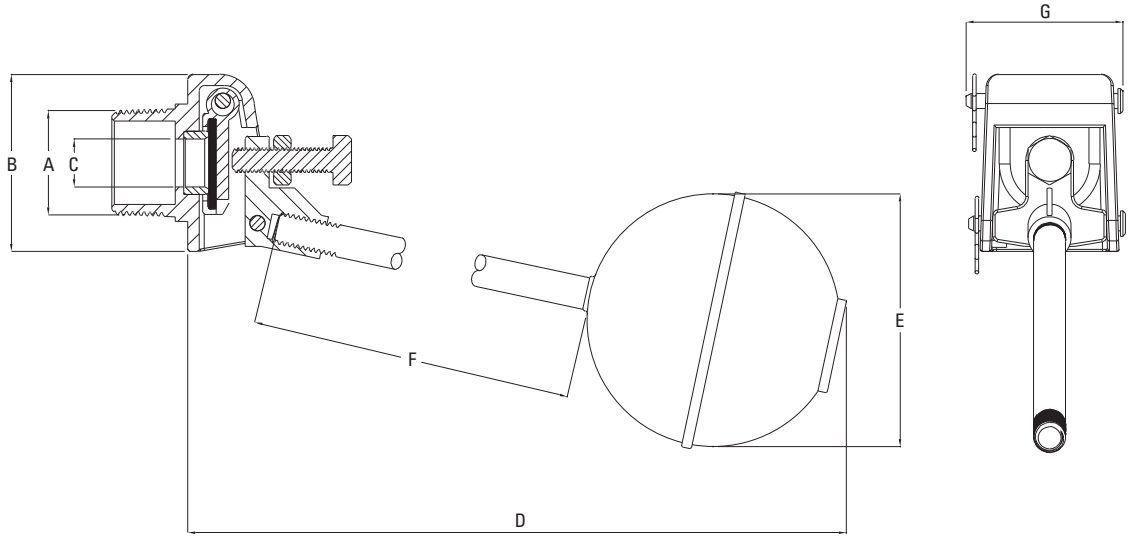
HIGH FLOW FLOAT VALVE MATERIAL & COMPONENTS



Size	Nominal Size	Part Number	Body	Seat	Seat Seal	Flapper	Clevis Pins	Cotter Pins
1"	DN25	90322300	Brass	316 S/S	Brass	Brass	316 S/S	316 S/S
1 ¼"	DN32	90322400	Brass	316 S/S	Brass	Brass	316 S/S	316 S/S
1 ½" LP	DN40	90322500	Brass	316 S/S	Brass	Brass	316 S/S	316 S/S
1 ½" HP	DN40	90322501	Brass	316 S/S	Brass	Brass	316 S/S	316 S/S
2" LP	DN50	90322600	Brass	316 S/S	Brass	Brass	316 S/S	316 S/S
2" HP	DN50	90322601	Brass	316 S/S	Brass	Brass	316 S/S	316 S/S

Size	Nominal Size	Nut & Bolt	Cam	Lever	Adaptor	Float Adaptor	Chain	Float
1"	DN25	Brass	Brass	Brass	Brass	Brass	316 S/S	Polyethylene
1 ¼"	DN32	Brass	Brass	Brass	Brass	Brass	316 S/S	Polyethylene
1 ½" LP	DN40	Brass	Brass	Brass	Brass	Brass	316 S/S	Polyethylene
1 ½" HP	DN40	Brass	Brass	Brass	Brass	Brass	316 S/S	Polyethylene
2" LP	DN50	Brass	Brass	Brass	Brass	Brass	316 S/S	Polyethylene
2" HP	DN50	Brass	Brass	Brass	Brass	Brass	316 S/S	Polyethylene

HIGH FLOW FLOAT VALVE RANGE & DIMENSIONS



Size (A)	Nominal Size	B	C	D*	E	F	G
1"	DN25	70	19	615	225	370	63
1¼"	DN32	70	19	615	225	370	63
1½" LP	DN40	80.5	37	618	225	370	78
1½" HP	DN40	80.5	19	618	225	370	78
2" LP	DN50	90	47	619	225	370	85
2" HP	DN50	90	19	619	225	370	85

All dimensions in millimetres unless otherwise stated
* Approximate. It will vary depending on how the bolt is adjusted.

AIR RELEASE VALVES

Australian made, Philmac air release valve offers solutions to the agricultural and irrigation industry by providing an economic and reliable solution for removing air from a pipeline.

These valves play a vital role in the performance of a pipe system as they ensure air is dispelled from the system at start up and allow full flow of water through the pipe. This prevents air gaps which restrict flow of water, and protect against the formation of a vacuum during drainage which can collapse the pipe.

A simple and effective design, with longevity of service, Philmac's air release valve is designed for harsh outdoor conditions.

APPLICATIONS

Agriculture: Installation on elevated pipelines.
Irrigation: Installation on elevated pipelines.

BENEFITS

Fast and Easy Installation

- **Single-position Installation:** The valves have been designed to work in a vertical position to maximise the discharge of air.
- **BSP Inlet Threads:** The Rural, Irrigation and Plumbing sectors use British Standard Pipe (BSP) threads as a standard. Philmac also uses these thread types across the valve range to ensure compatibility with other threaded fittings and make installation easy.
- **Flow Identification:** The body is clearly marked with an arrow to indicate the directional flow of the air.
- **Outlet:** The outlet is fitted with a protective cap which can be removed to access a 1" BSP thread. This allows a pipe to be connected so that any water that escapes when purging air can be directed away from the valve.

Complete Security

- **Reliable Operation:** Consistent high quality injection moulded plastic bodies and components plus Nitrile O-rings and a stainless steel spring means years of reliable operation.
- **Corrosion Resistant:** Manufactured using a plastic body and components, nitrile O-rings and a 316 stainless steel spring ensures the valve has a high degree of corrosion resistance.

High Performance Materials

- **Manufactured from advanced thermoplastic materials:** Philmac air release valves are manufactured from lightweight high performance thermoplastic materials, which have excellent impact, UV and corrosion resistance. The material is non-toxic and taint free.
- **High pressure rating:** Air release are rated to a pressure of 1400 kPa (200 psi) (static shutoff) at 20^0 Celsius to meet the requirements of high pressure systems.

STANDARDS & TESTS

Philmac's range of air release valves are designed to comply with the following standards and undertake a range of tests to ensure they comply with these standards.

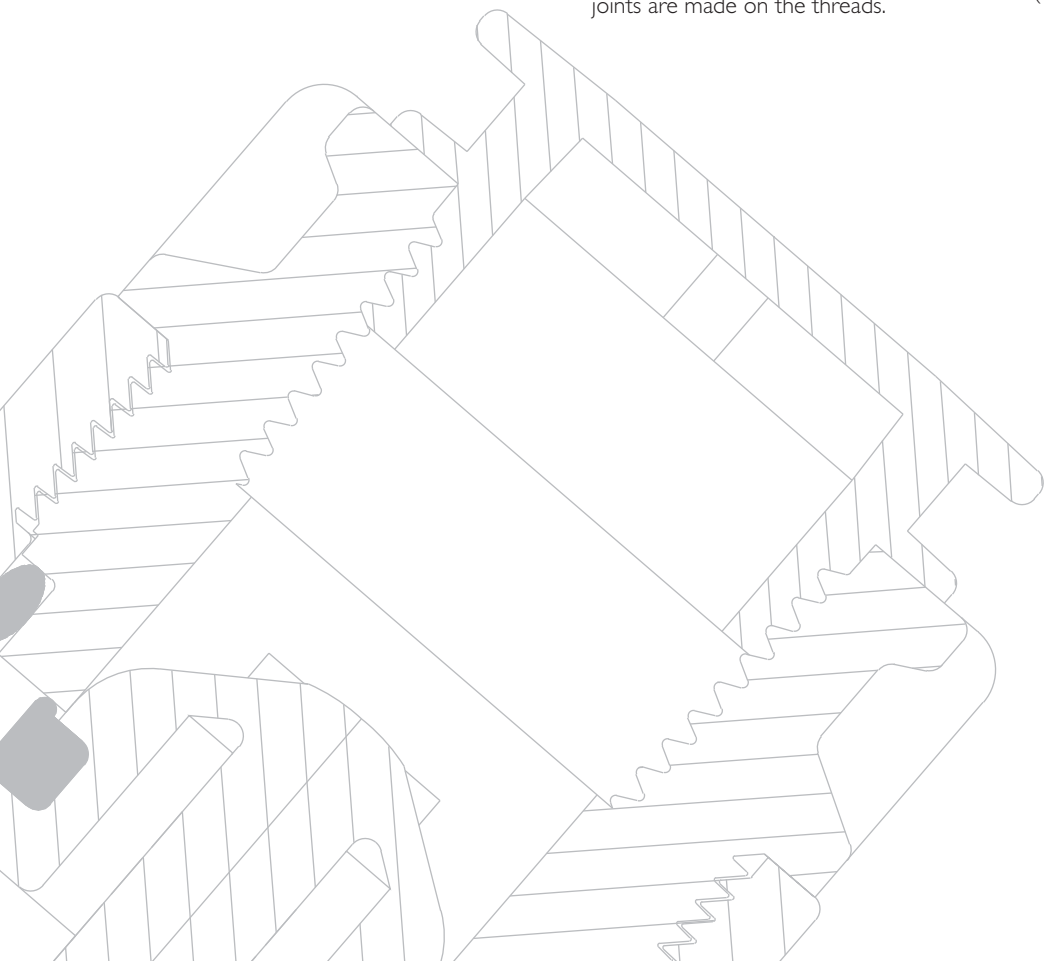
Standards

AS 1722.1: Pipe threads of Whitworth form part 1: sealing pipe threads.

ISO7: Pipe threads where pressure tight joints are made on the threads.

Tests

Shut Off Test: Valves are tested for shut off against a hydrostatic water pressure of 16 kPa (2.3 psi) or 0.16 bar and 200 kPa (29 psi) or 2 bar.



AIR RELEASE VALVES OPERATION & INSTALLATION INSTRUCTIONS

The Philmac air release valve has been designed to allow air to be discharged from pipelines during filling to ensure there are no air pockets which reduce the flow of water. The valve is a kinetic type of valve which means it will expel air when a pipeline is filled but once sealed will expel no more air while the system remains pressurised.

They also admit air into pipelines during drainage to prevent possible pipe collapse due to a vacuum. The direction of air flow is clearly marked by an arrow on the body of the valve.

Philmac's air release valve can be connected to both plastic and metal threaded fittings. PTFE tape or an approved sealant is required.

1. Apply PTFE tape or approved sealant to the male thread the air relief valve is to be screwed into. Sufficient tape needs to be applied to ensure a watertight seal.

2. Screw onto a male thread or screw male thread into the valve by hand until firm.

3. Using a pipe wrench or multigrips on the end caps only, further screw the air relief valve into the male thread until tight. Where necessary ensure the male thread is held stationary to avoid it from moving.

SYSTEM DESIGN CONSIDERATIONS

Minimum Sealing Pressure: 20 kPa (3 psi) or 2 m or 0.2 bar of head at 20^{0}C.

Maximum Operating Pressure: 1400 kPa (200 psi) at 20^{0}C.

Threads: All threads are BSP (Whitworth form).

Sealing threads: Philmac recommends sealing threads with PTFE tape. Other approved sealants for plastic materials can be used providing the sealant does not enter the valve where it may cause damage.

Operating temperature: Connection is cold water (less than 20^{0}C) rated.

Weathering: All plastic materials used contain pigments to provide excellent protection against degradation from ultra-violet (UV) radiation. However long-term continuous exposure to UV is not recommended and plastic components should ideally be protected.

CHEMICAL RESISTANCE

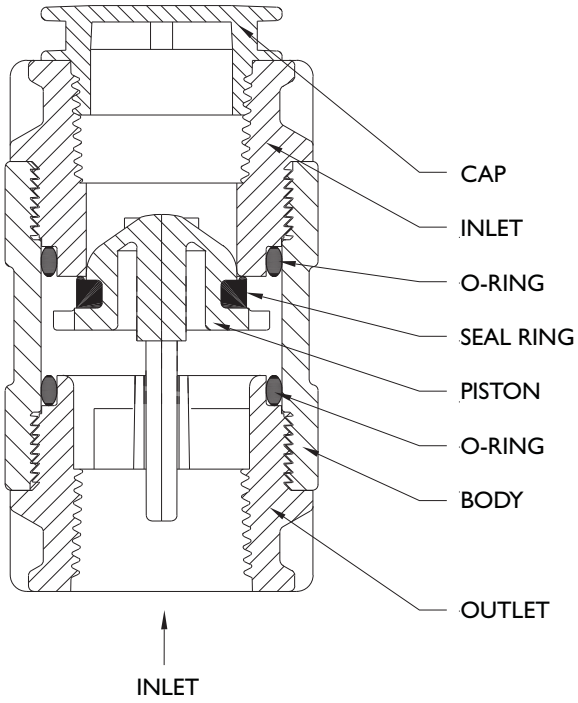
Philmac's air release valve is primarily designed to expel air from water pipelines. However there may be occasions where the water contains chemicals and/or alternative fluids need to be controlled. The following table is provided as a **guide only** for the compatibility of various chemicals and/or alternative fluids to the Philmac air release valve. The mixing together of chemicals may affect the compatibility. The **Philmac air release valve is NOT suited for acids.**

Chemical	Compatibility
Acetic acid (10%)	R
Acetic acid (50%)	N
Alcohol (ethanol)	N
Ammonium nitrate	R
Antifreeze	R
Brine	R
Calcium carbonate	R
Calcium chloride	R
Calcium nitrate	R
Calcium sulphate	
Chlorine water	N
Citric Acid	R
Copper Sulphate >5%	N
Diesel (fuel)	R
Ethyl alcohol (ethanol)	N
Hydrochloric acid (10%)	N
Hydrochloric acid (30%)	N
Kerosene	R
Lubricating oils (not synthetic)	R
Magnesium nitrate	R
Magnesium sulphate	R
Mineral oils	R
Nitric acid (10%)	N
Nitric acid (40%)	N
Olive oil	R
Orange juice	R
Petrol	R
Phosphoric acid (85%)	N
Drinking water	R
Potassium chloride	R
Potassium nitrate	R
Potassium sulphate	
Sodium bicarbonate	
Sodium hypochlorite (<10%)	N
Sulphuric acid (10%)	N
Sulphuric acid (30%)	N
Urea	R
Zinc nitrate	N
Zinc sulphate	

N = Not Recommended
R = Resistant

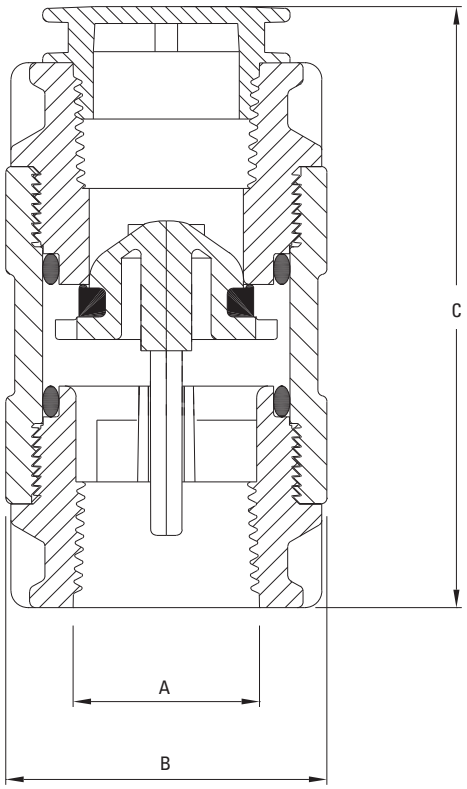
Empty Cell = No data available
Note recommendations based on fluids at 20^0 C or less

AIR RELEASE VALVES MATERIAL & COMPONENTS



Size	Nominal Size	Part Number	Body	Inlet/Outlet	Piston	Seal Ring	O-rings	Cap
1"	DN25	95503300	GF Nylon	GF Nylon Alloy	Acetal	Nitrile	Nitrile rubber	Nylon

AIR RELEASE VALVES RANGE & DIMENSIONS



Size (A)	Nominal Size	Part Number	B	C
1"	DN25	95503300	57.5	107.6

All dimensions in millimetres unless otherwise stated

FLOATS (BALLS) & ACCESSORIES

Philmac has been manufacturing a range of floats and accessories for over 40 years to support its extensive range of valves. The offering available includes stainless steel, copper and plastic floats (balls) for hot and cold water applications.

Floats are manufactured from high grade materials to ensure they are reliable and provide a high level of corrosion resistance. The materials are non-toxic and taint free and suitable for drinking water as well as sterile applications (stainless steel).

Philmac floats and accessories have been designed for use with the range of float valves and are widely used in a number of industries such as agricultural, plumbing, industrial and commercial.

APPLICATIONS

Agriculture: Stock troughs and water tanks.
Plumbing: Hot and cold water storage tanks for domestic and industrial applications
Industrial: Dishwashers and hospital sterilisers

BENEFITS

Fast and Easy Installation

- **Underwater Installation:** By using the float attachment cord the ½", ¾" and 1" horizontal float and sleeve valves can be installed underwater
- **BSP Threads:** The Plumbing and Irrigation sectors use British Standard Pipe (BSP) threads as a standard. Philmac also uses these thread types across the float and accessory range to ensure compatibility with other threaded fittings and make installation easy.

Complete Security

- **Reliable Operation:** Consistent high quality injection moulded plastic, spun copper or spun stainless steel floats means years of reliable operation.
- **Corrosion Resistant:** The floats are manufactured from plastic, copper or stainless steel. Accessories are manufactured from DZR brass or polyester. These materials all offer a high degree of corrosion resistance.

High Performance Materials

- **Manufactured from advanced thermoplastic materials:** Philmac plastic floats are manufactured from lightweight high performance thermoplastic materials, which have excellent impact, UV (cold water only) and corrosion resistance. The material is non-toxic and taint free.
- **Manufactured from copper:** Philmac brass floats are manufactured from spun copper and sealed with a rubber gasket (cold water) or soldered (hot water) to ensure all applications have a high performance float.
- **Manufactured from stainless steel:** Philmac stainless steel floats are manufactured from spun stainless steel and sealed with by welding which means they perform according to their application.
- **Manufactured from DZR brass:** Philmac float valve accessories are manufactured from dezincification resistant (DZR) brass, which means the brass is resistant in soil and water environments to corrosion involving the loss of zinc leaving a residue of spongy or porous copper.

Complete Coverage

- **Wide range:** The range of floats is comprehensive and includes plastic from 3" to 9" (DN80 to DN225), copper from 3" to 10" (DN80 to DN255) and stainless steel in 5" and 8" (DN125 and DN200).

STANDARDS & TESTS

Philmac's range of floats and accessories are designed to comply with the following standards and undertake a range of tests to ensure they comply with these standards.

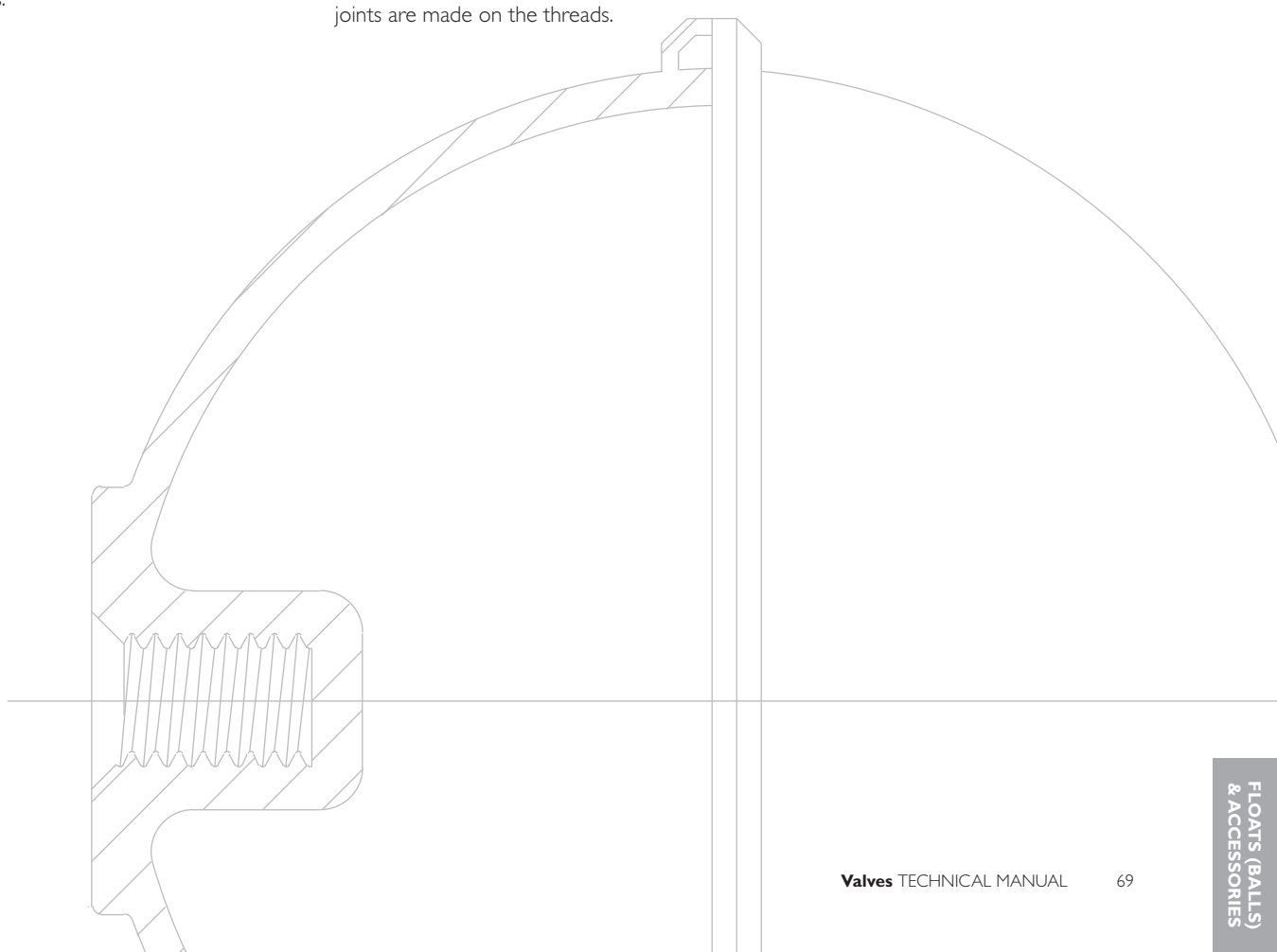
Standards

AS1722.1: Pipe threads of Whitworth form part 1: sealing pipe threads.

ISO7: Pipe threads where pressure tight joints are made on the threads.

Tests

Leak Test: Hot water floats are tested against leakage by submersing them in a bath of hot water.



FLOATS (BALLS) & ACCESSORIES OPERATION & INSTALLATION INSTRUCTIONS

Floats (Balls)

1. Thread the float (ball) onto the lever arm of ⅜" and ½" valves and tighten fully to the flange on the adaptor.

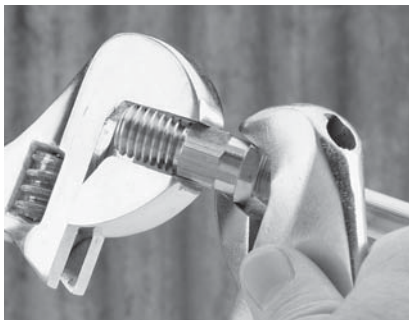
2. For ¾", 1" and 1¼" valves tighten the nut against the float (ball) to lock it in place.

3. For 2" valves tighten the nut against the copper float (ball) to lock it in place.

Threaded Adaptor - for fitting 8″ (200mm) Plastic Float

1. For 1½" valves with a ⅜" (10mm) thread on the lever first remove the lever lock nut, then apply PTFE tape or an appropriate locking compound to the thread on the lever.

2. Screw the lever into the recessed female thread of the adaptor with a spanner.



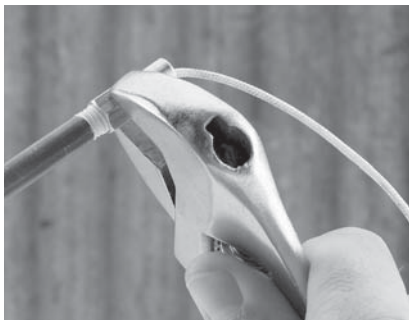
3. For 2" valves with a ½" thread on the lever, screw the adaptor on to the thread until tight then tighten the lock nut against the adaptor with a spanner.

NOTE: Fitting an 8" plastic float to a Philmac 2" brass horizontal float valve will reduce its standard shutoff pressure.

4. Screw the male end of the adaptor into the 8" (200mm) float (ball) and tighten fully using a spanner.

Float Attachment Cord

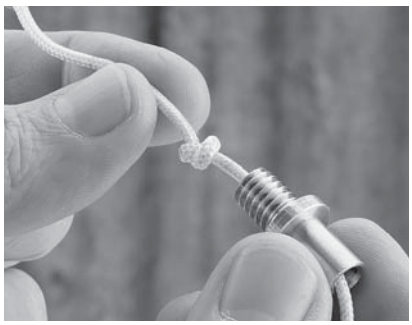
1. Where a lever lock nut is not fitted apply a small amount of PTFE tape or an appropriate locking compound to the thread on the lever.



2. Screw the female end of the float attachment cord into the lever and tighten up using a spanner or equivalent.

3. Where the lever lock nut is fitted, tighten it against the female end of the float attachment cord.

4. Screw the male end into the appropriate sized float (ball) and hand tighten to the flange.



5. Check the float is at the correct level. If not, pull the cord through the female and re-do the knot making the cord shorter in length.

6. Re-check and if suitable tighten the female end with a pair of pliers or multigrips so the flange is hard up against the float (ball).

SYSTEM DESIGN CONSIDERATIONS

Threads - All threads are BSP (Whitworth form).

Plastic Floats – Manufactured from polypropylene or polyethylene

Copper Floats – Manufactured from copper with a nitrile rubber seal (cold water) or soft soldered (hot water) between the halves. Bosses are silvered soldered.

Stainless Steel – Manufactured from 316 stainless steel and welded together.

Hot Water Applications: Specific plastic floats (3" and 4"), soldered copper and stainless steel can be used in hot water which has a maximum temperature of 95°C.

CHEMICAL RESISTANCE

Philmac's float valves are primarily designed to convey water. However there may be occasions where the water contains chemicals and/or alternative fluids need to be controlled. The following table is provided as a **guide only** for the compatibility of various chemicals to Philmac's floats. The mixing together of chemicals may affect the compatibility.

Polypropylene / Polyethylene

Chemical	Polypropylene	Polyethylene	Copper	Stainless Steel
Acetic acid (10%)	R	R	R	R
Acetic acid (50%)	R	R	R	R
Alcohol (ethanol)	R	R	R	R
Ammonium nitrate	R	R	N	R
Antifreeze	N			R
Brine	R	R	R	R
Calcium carbonate	R			R
Calcium chloride	R	R	R	R
Calcium nitrate	R	R		R
Calcium sulphate	R			R
Chlorine water	N	N	N	N
Citric Acid	R	R	N	R
Copper Sulphate >5%	R	R		R
Diesel (fuel)	R	N		R
Ethyl alcohol (ethanol)	R	R	R	R
Hydrochloric acid (10%)	R	R	N	N
Hydrochloric acid (30%)	N	R	N	N
Kerosene	R	R	R	R
Lubricating oils (not synthetic)	R	R	R	R
Magnesium nitrate	R	R	R	R
Magnesium sulphate	R	R	R	R
Mineral oils	R	R	R	R
Nitric acid (10%)	R	R	N	R
Nitric acid (40%)	R	N	N	R
Olive oil	R	R		R
Orange juice	R	R		R
Petrol	R	R		R
Phosphoric acid (85%)	R	R	N	N
Drinking water	R	R	R	R
Potassium chloride	R	R	R	R
Potassium nitrate	R	R	R	R
Potassium sulphate	R	R	R	R
Sodium bicarbonate	R	R	R	R
Sodium hypochlorite (<10%)	R	R		N
Sulphuric acid (10%)	R	R		R
Sulphuric acid (30%)	R	R		N
Urea	R	R		R
Zinc nitrate	R	R		R
Zinc sulphate	R	R	R	R

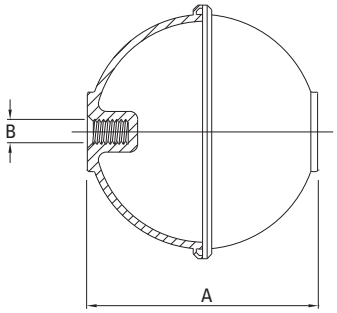
N = Not Recommended
R = Resistant
Empty Cell = No data available
Note recommendations based on fluids at 20^0 C or less

FLOATS (BALLS) & ACCESSORIES RANGE & DIMENSIONS

Plastic Floats

Size (A)	Nominal Size	Part Number	Water Temperature	B
3"	80	90499100	Hot	5/16" BSW
		90499300	Cold	
4"	100	90499400	Cold	5/16" BSW
		90499500	Hot	
6"	150	90499600	Cold	5/16" BSW
7"	175	90499700	Cold	3/8" BSW
8"	200	90499800	Cold	3/8" BSW
9"	225	90499900	Cold	½" BSW

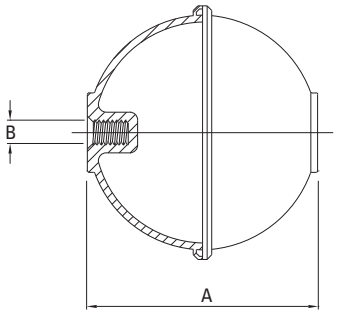
All dimensions in millimetres unless otherwise stated



Copper Floats

Size (A)	Nominal Size	Part Number	Water Temperature	B
3"	80	90161400	Cold	5/16" BSW
4 ½"	115	90161700	Cold	5/16" BSW
		90162800	Hot	
5"	125	90161500	Cold	5/16" BSW
6"	150	90161800	Cold	5/16" BSW
		90162900	Hot	
7"	175	90161900	Cold	3/8" BSW
		90163000	Hot	
8"	200	90162100	Cold	3/8" BSW
		90163100	Hot	
10"	255	90162300	Cold	½" BSW Tube
		90163200	Hot	

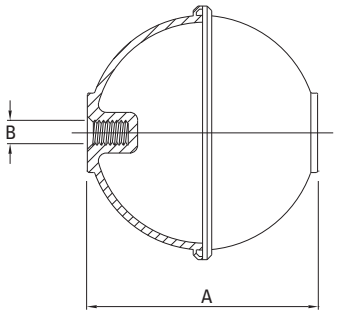
All dimensions in millimetres unless otherwise stated



Stainless Steel Floats

Size (A)	Nominal Size	Part Number	Water Temperature	B
5"	125	90164500	Hot & Cold	5/16" BSW
8"	200	90164800	Hot & Cold	3/8" BSW

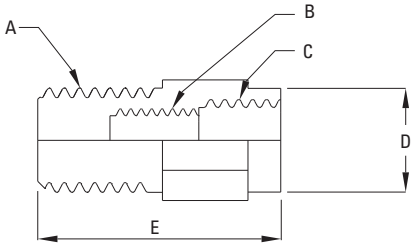
All dimensions in millimetres unless otherwise stated



Adaptor

A	B	C	D	E
5/8" BSW	3/8" BSW	½" BSW	15.8	37

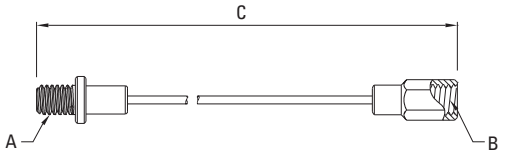
All dimensions in millimetres unless otherwise stated



Float Cord Attachment

Part Number	A	C	C
90171800	5/16" BSW	5/16" BSW	400

All dimensions in millimetres unless otherwise stated



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