

# Technical Manual

## Foot And Non-Return Valve



**Philmac**<sup>®</sup>

The connection you can trust.



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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#### Disclaimer

Please note that the information, opinions, recommendations and advice given in this manual are supplied only to provide an improved understanding of the technical aspects of fitting systems.

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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!



The connection you can trust.

## VALVE RANGE QUICK REFERENCE GUIDE

	Sleeve	Horizontal Float	Servo Tank	Cistern	Ball
<b>Primary Application</b>					
Stock Water	•	•	•		•
Mains Water Connection		•	•	•	•
Commercial/Industrial		•	•	•	•
Pump					•
Trough	•	•			•
Tanks		•	•	•	•
Pipes					•
<b>Features</b>					
Hot Water Application					
Potable Water Approval (4020)	•	•	•		•
Underwater installation		With Cord Attachment			
Lever length options		•			
Recycled Water Identification Option					•
<b>Technical</b>					
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)

<sup>A</sup> 400 kPa for ¾" Brass

<sup>B</sup> Shutoff pressure varies with valve size

<sup>C</sup> Screwed

<sup>D</sup> Flanged



Foot/Non-Return	Trough	High Flow Float	Air Release	Ratio	Floats
▲	▲	▲		▲	▲
				▲	▲
▲				▲	▲
▲					▲
▲	▲	▲			▲
▲			▲	▲	
					▲ (95°C Max.)
				▲	▲
	▲				
900	187	330		2260 <sup>c</sup> & 46000 <sup>d</sup>	
1400	300 <sup>A</sup>	620 <sup>B</sup>	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"

## FOOT AND NON-RETURN VALVES

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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

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

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

## BENEFITS

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### 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° 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.

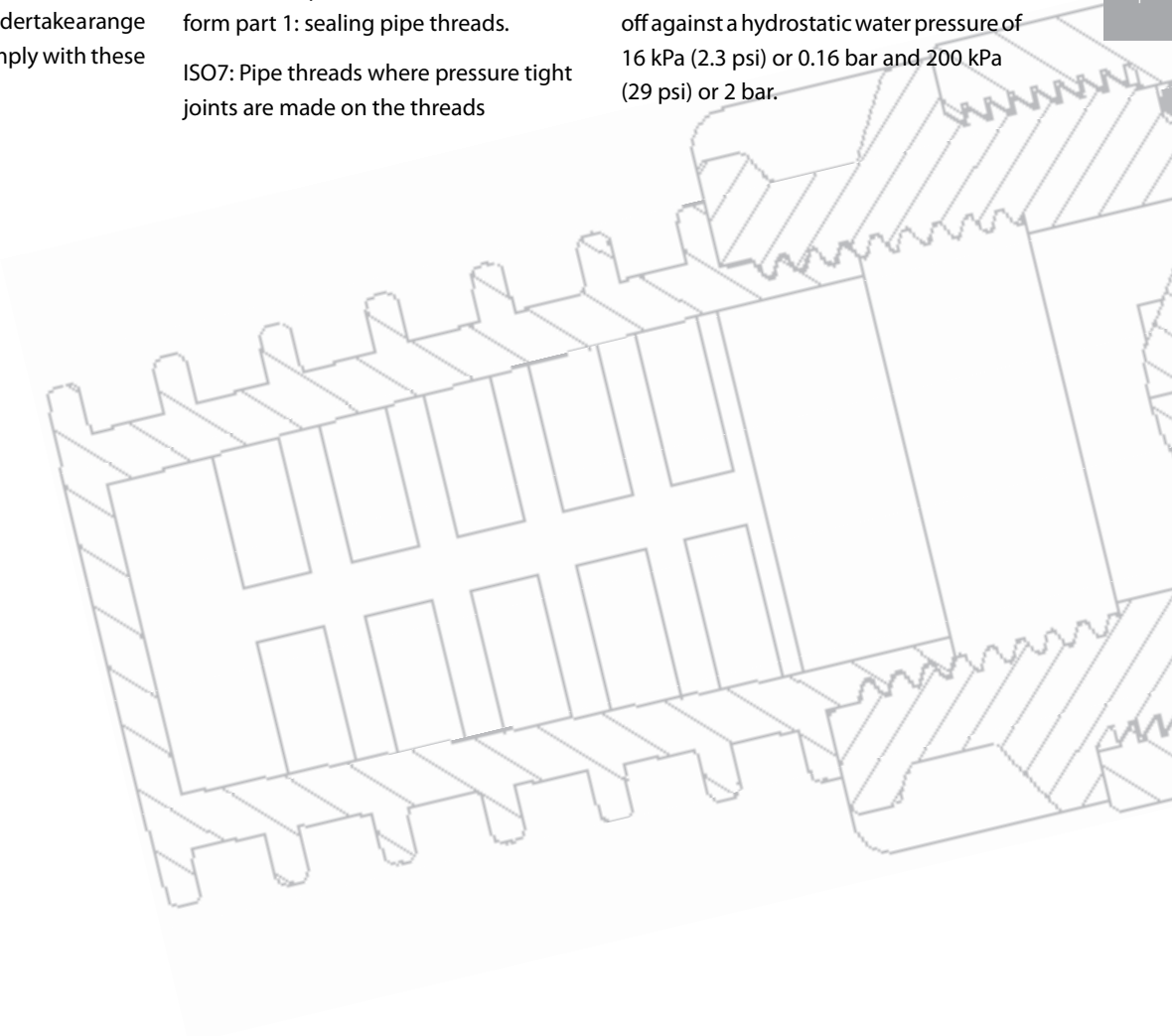
### Standards

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°C.

Maximum Operating Pressure: 1400 kPa (200 psi) at 20°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°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	

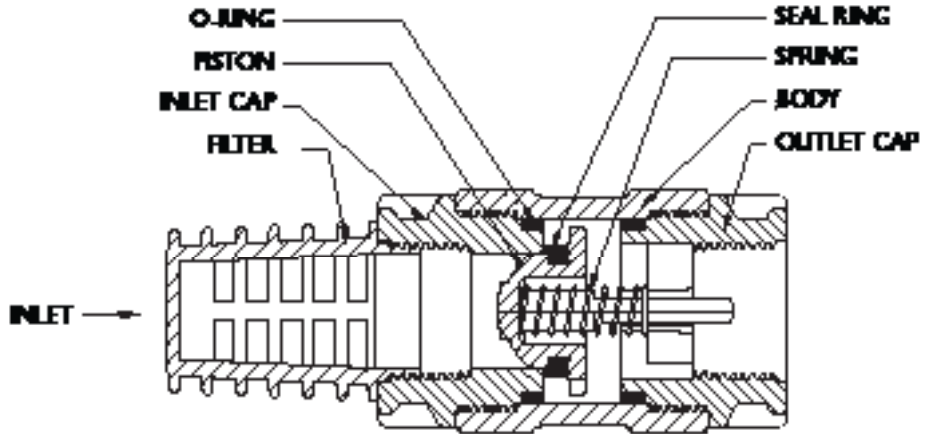
N = Not Recommended

R = Resistant

Empty Cell = No data available

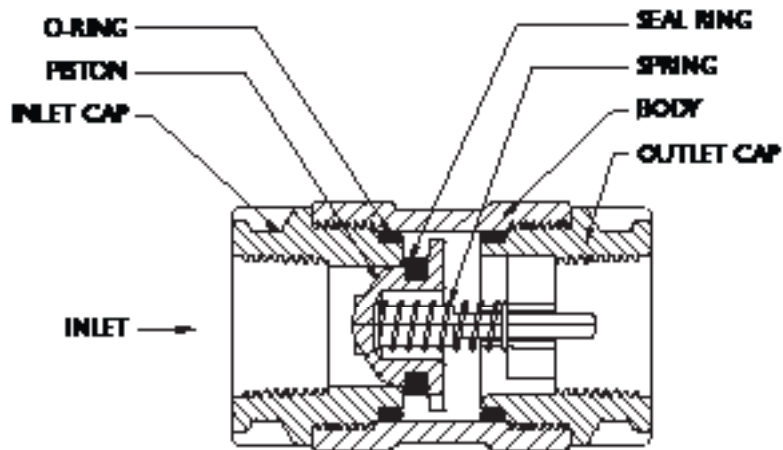
Note recommendations based on fluids at 20°C or less

FOOT AND NON-RETURN VALVES MATERIAL & COMPONENTS



Foot Valves

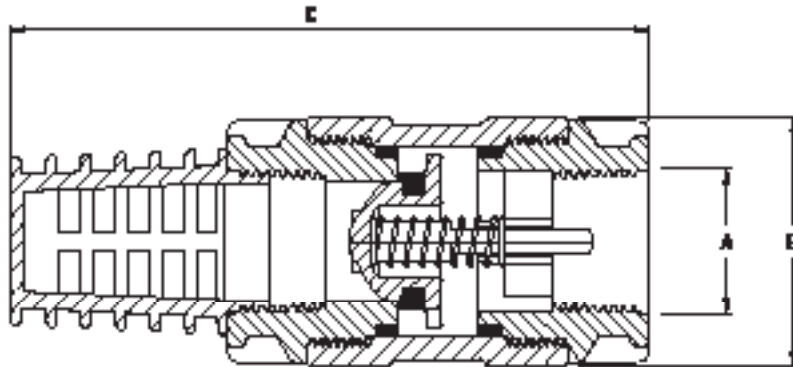
Size	Nominal Size	Part Number	Body	Inlet/Outlet	Piston	Seal Ring	O-rings	Spring	Filter
¾"	DN20	95501200	GF Nylon	GF Nylon Alloy	Acetal	Nitrile rubber	Nitrile rubber	316 S/S	Acetal
1"	DN25	95501300	GF Nylon	GF Nylon Alloy	Acetal	Nitrile rubber	Nitrile rubber	316 S/S	Acetal
1 ¼"	DN32	95501400	GF Nylon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

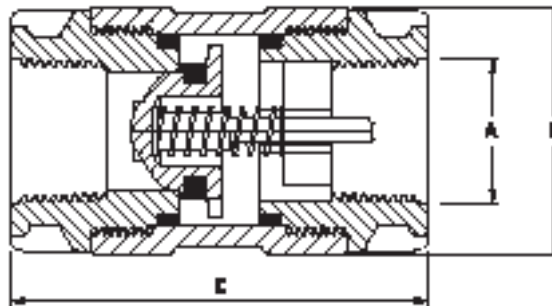
FOOT AND NON-RETURN VALVES RANGE & DIMENSIONS



Foot Valves

Size (A)	Nominal Size	Part Number	B	C
3/4"	DN20	95501200	47	127
1"	DN25	95501300	55	148
1 1/4"	DN32	95501400	62	166
1 1/2"	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
3/4"	DN20	95502200	47	84
1"	DN25	95502300	55	98
1 1/4"	DN32	95502400	62	110
1 1/2"	DN40	95502500	70	120
2"	DN50	95502600	92	150

All dimensions in millimetres unless otherwise stated

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