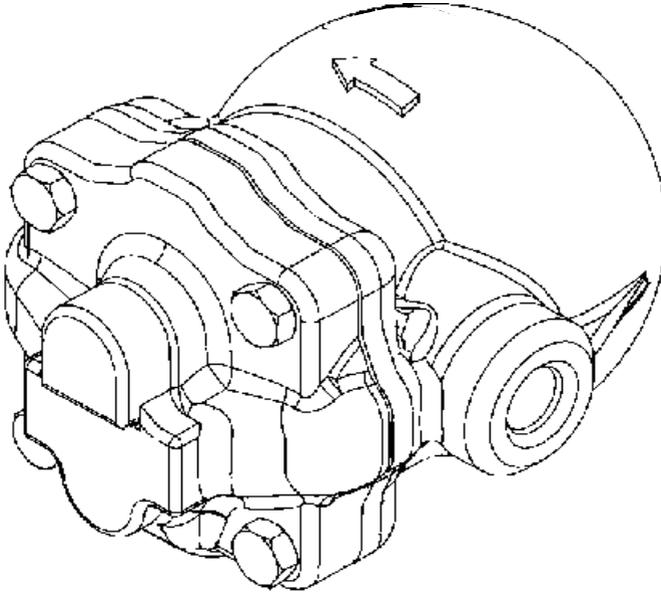


# **Installation and Maintenance Manual**

## **Single Orifice Float Trap With SLR and/or TV**

SOFT31 (DN15-25)



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PLEASE NOTE - Throughout this manual this cautionary symbol is used to describe a potential damage or injury that might occur if the safety considerations are overlooked. This symbol denotes CAUTION, WARNING or DANGER.



## 1. Preface:

This manual is intended for anyone using, commissioning, servicing, or disposing of the below mentioned products safely and efficiently.

Single Orifice Float Trap With SLR and/ or TV [SOFT31 (DN15-25)]

Sizes: DN15 (1/2"), DN20 (3/4"), DN25 (1")

PLEASE NOTE:

Throughout this manual the following cautionary symbol is used to describe a potential damage or injury that might occur if the safety considerations are overlooked.

## 2. Important Safety Notes:



Read this section carefully before installing/operating/maintaining the product. The precautions listed in this manual are provided for personnel and equipment safety. Furthermore, Forbes Marshall accepts no responsibility for accidents or damage occurring as a result of failure to observe these precautions. Note that the product is designed to perform for non-contaminated fluids only. A contamination in the form of chemical, foreign particle etc. can lead to problem with product performance and life of the product.

If these products in compliance with the operating instructions are, properly installed, commissioned, maintained and installed by qualified personnel (refer Section 2.7) the safety operations of these products can be guaranteed. General instructions for proper use of tools and safety of equipments, pipeline and plant construction must also be complied with.

### 2.1 Intended use:

Check if the product is suitable for intended use/ application by referring to the installation and maintenance instructions, name plates and technical information sheets.

- i) The product is suitable for use as defined in the technical information sheet. In case the need arises to use the product on any other fluid please contact Forbes Marshall for assistance.
- ii) Check for the suitability in conformance to the limiting conditions specified in technical information sheet of the product.
- iii) The correct installation and direction of fluid flow has to be determined.
- iv) Forbes Marshall products are not intended to resist external stresses, hence necessary precautions to be taken to minimize the same.

### 2.2 Accessibility and Lighting:

Safe accessibility and working conditions are to be ensured prior to working on the product.

### 2.3 Hazardous environment and media:

The product has to be protected from hazardous environment and check to ensure that no hazardous liquids or gases pass through the product.

### 2.4 Depressurizing of systems and normalizing of temperature:

Ensure isolation and safety venting of any pressure to the atmospheric pressure. Even if the pressure gauge indicates zero, do not make an assumption that the system has been depressurized.

To avoid danger of burns allow temperature to normalize after isolation.

### 2.5 Tools and consumables:

Ensure you have appropriate tools and / or consumables available before starting the work. Use of original Forbes Marshall replacement parts is recommended.

### 2.6 Protective clothing:

Consider for the requirement of any protective clothing for you/ or others in the vicinity for protection against hazards of temperature (high or low), chemicals, radiation, dangers to eyes and face, noise and falling objects.

### 2.7 Permits to work:

All work to be carried out under supervision of a competent person. Training should be imparted to operating personnel on correct usage of product as per Installation and Maintenance instruction. "Permit to work" to be complied with (wherever applicable), in case of absence of this system a responsible person should have complete information and knowledge on what work is going on and where required, arrange to have an assistant with his primary goal and responsibility being safety. "Warning Notices" should be posted wherever necessary.

### 2.8 Handling:

There is a risk of injury if heavy products are handled manually. Analyze the risk and use appropriate handling method by taking into consideration the task, individual, the working environment and the load.

### 2.9 Freezing:

Provision should be made to protect systems which are not self-draining, against frost damage (in environment where they may be exposed to temperatures below freezing point) to be made.

### 2.10 Returning products:

Customers and Stockist are reminded that, when returning products to Forbes Marshall they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk.

This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.

### 3. Brief Product Information:

#### 3.1 Description:

The Forbes Marshall Single Orifice Float Trap, SOFT31, is a cast iron single orifice float trap available with an integral automatic air venting facility. It is available with horizontal or vertical connections with flow downwards. As an alternative a manual needle valve can be added and used as a steam lock release.

#### 3.2 Sizes and Pipe Connection:

DN 15, 20 and 25 Screwed BSPT/NPT/BSP.

**Note:** Available with IBR certificate on request.

#### 3.3 Available Types:

SOFT31-T TV with Thermostatic air Vent (TV)

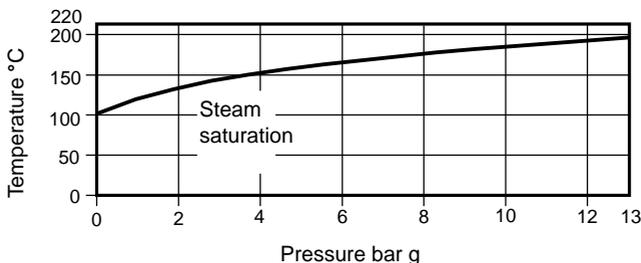
SOFT31-S with Steam Lock Release (SLR)

SOFT31-ST combined TV and SLR

#### 3.4 Limiting Conditions :

PMA Maximum allowable pressure	13 bar g at 220 °C	
TMA Maximum allowable temperature	220 °C at 13 bar g	
PMO Maximum operating pressure	13 bar g	
TMO Maximum operating temperature	220 °C at 13 bar g	
Minimum operating temperature	0 °C	
DPMX Maximum differential pressure	SOFT31-4.5	4.5 bar g
	SOFT31-10	10 bar g
	SOFT31-13	13 bar g
Cold hydraulic test pressure	26 bar g	

#### 3.5 Operating Range:



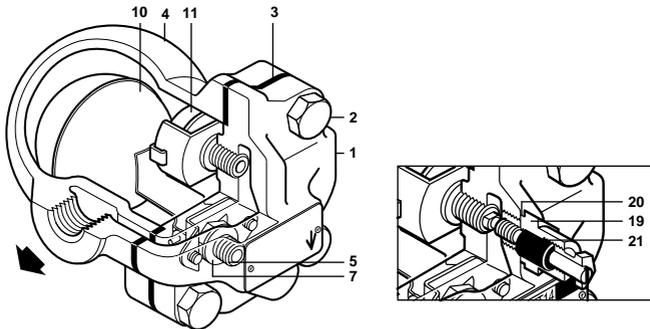


Figure1: Single Orifice Float Trap with SLR and / or TV

Material:

Sr.No	Part	Material	Standard
1	Cover	Cast iron	IS 210 FG260
2	Cover bolts	Carbon steel	ASTMA193 Gr.B7
3	Cover gasket	Asbestos free synthetic fibre	
4	Base	Cast iron	IS 210 FG260
5	Main valve seat	Stainless steel type 304	ASTM A743, Gr.CA40
6	Main valve seat gasket		
7	Main valve assembly screws	Stainless steel type 304	IS 1364
8	Ball float and lever	Stainless steel type 304	ASTM A240
9	Air vent element	Stainless steel type 316	ASTM A240
10	SLR unit	Stainless steel type 410	ASTM A276
11	SLR unit gasket	Stainless steel type 304	ASTM A240
12	Pivot frame type 304	Stainless steel	ASTM A240
13	SLR seal	Graphite	

### 3.6 Product Dimension and Drawing:

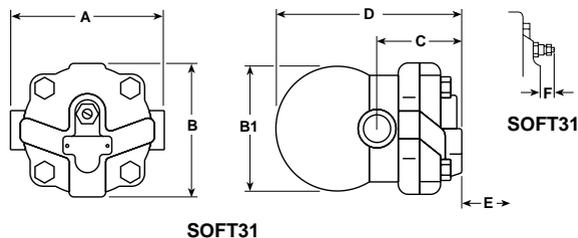


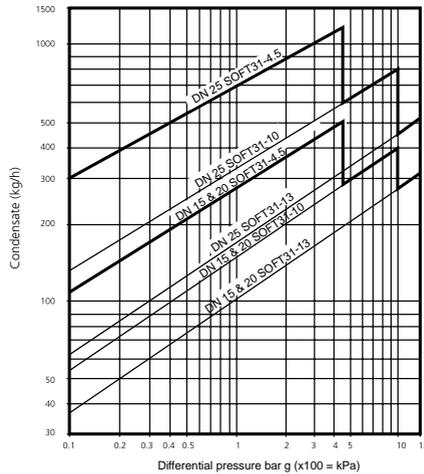
Figure 2: Dimensional Drawing of SOFT31

**Dimensions (approx.) in mm:**

Size (DN)	A	B	C	D	E	F	Wt.(kg)
15/20 (NIBR)	121	107	67	147	105	30	2.5
15/20 (IBR)	130	109	72	152	120	20	2.9
25 (IBR/NIBR)	141	109	72	160	135	20	4.0

**General Tol : ±3**

### 3.7 Capacity Chart:



#### 4. Product Working Principle: (Refer to Figure 3)

Figure 3 shows a simple float trap operational representation. A float trap works on the Buoyancy Principle. Condensate enters the trap body and raises the float (1). The position of the float (1) depends upon the level/load of condensate (flowrate). The float trap continues to discharge condensate continuously and doesn't allow back up of condensate as long as the load is within the discharge capacity. When the condensate load drops, the float (1) lowers in position and closes the outlet valve (3) with the ball (6) resting on the orifice (7).

SLR (4) is a needle valve which releases steam that can steam lock the trap during start-up or in operation if the steam reaches the trap before the condensate.

On the start up the air present in the pipeline/process equipment is released through the thermostatic vent (5).

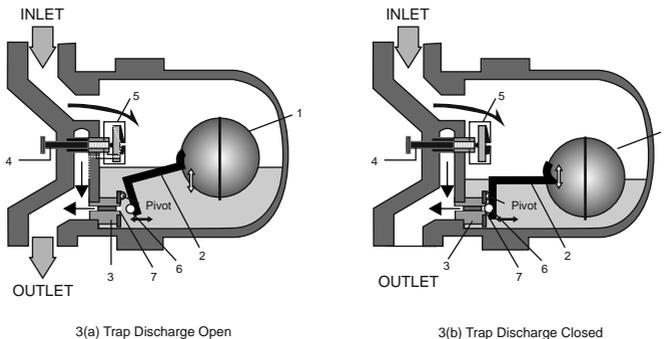


Figure 3: Single Orifice Float trap working

\*The trap in the figure 3 shows a TV+SLR assembly. SOFT31(DN15-25) also comes with only TV or SLR assembly.

**5.** Installation Guidelines: (Refer to Figure 4, 5, and 6)



*Note:* Before implementing any installations observe the "Important Safety notes" in section 2. Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended installation.

Installation checks and Steps:

1. Check the correct installation location/position and the direction of fluid flow.
2. Remove protective covers from all connections where appropriate, before installation.
3. Ensure the availability of all components as shown in Figure 5, to ensure the operation of the trap.

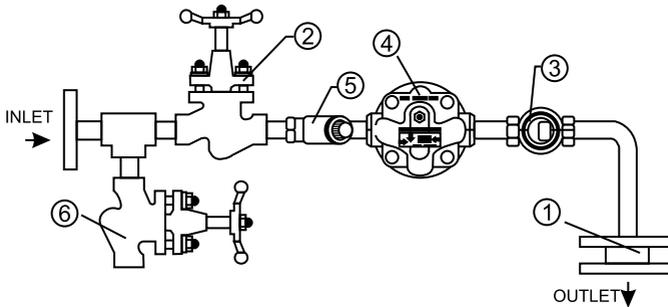


Figure 4: Single Orifice Float trap module

\*Typical/ Representative Installation and may vary based on application and site

Item No.	Description
1	Spring Loaded Check Valve
2,6	Stop Valve
3	View Glass
4	Single Orifice Float Trap
5	Strainer

4. If the trap is to discharge to atmosphere ensure it is to a safe place, the discharging fluid may be at a temperature of 100 °C (212°F).
5. Install the trap such that the arrow on the name plate points downward to achieve proper orientation of the trap.

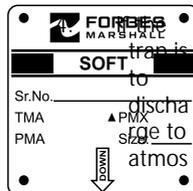


Figure 5: Single Orifice Float trap name plate

6. The arrow on the casting should be in the direction of the flow.

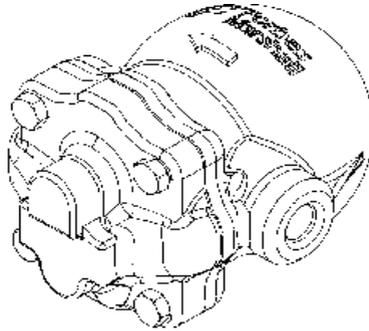


Figure 6: Cover casting with the arrow

## 6. Start-up and Commissioning:

### 6.1 Flushing of Lines (Refer to Figure 4)

As part of pre-installation all fluid handling equipment particularly piping should be thoroughly cleaned of scale and the internal debris which accumulates during construction. This is accomplished by blowing or flushing with air, steam, water and other suitable medium.

Follow these steps to carry out the flushing.

1. Close the stop valve (2) and open the bypass stop valve (6).
2. Let the condensate drain for at least 10-15 minutes or until clear condensate starts coming out, whichever is earlier.
3. Now slowly close the bypass stop valve (6) and open the stop valve (2).

### 6.2 Commissioning : (Refer to Figure 4)

After installation or maintenance ensure that the system is fully functioning by confirming condensate is passing through it.

- i) After flushing of lines is complete, ensure stop by-pass valve (6) closed and stop valve (2) opened.
- ii) Check for leaks and attend if any.

### 6.3 Setting of steam lock release (SLR) : (Refer to Figure 7)

Only SLR Assembly:

1. Loosen the gland nut (1) by one thread
2. Rotate the stem (2) in clockwise direction. This moves the stem (2) towards SLR seat.
3. Once the stem touches the SLR seat, rotate the stem (2) in anti-clockwise direction by 1/4<sup>th</sup> of a turn.



Figure 7: SLR setting for only SLR and SLR+TV configuration

SLR+TV Assembly:

Loosen the gland nut by one thread. Rotate the stem in anti-clockwise direction. This moves the stem towards thermopod. Once the stem touches the thermopod ball, rotate it further by 1/4<sup>th</sup> of a turn.

4. Check for normal discharge pattern and leaks if any.

Note: The SLR unit should only be used to prevent 'steam locking' and therefore is designed to pass a small amount of steam, it is not recommended that the SLR be left in the fully open condition as this may lead to premature trap failure and more frequent maintenance schedules.

**7.** Maintenance Guidelines:



Before undertaking any maintenance on the product it must be isolated from both supply line and return line and any pressure should be allowed to safely normalise to atmosphere. The product should then be allowed to cool. With suitable isolation repairs can be carried out with the product in the line. When re-assembling, make sure that all joint faces are clean. Once completed open isolation valves slowly and check for leaks.

7.1 Routine and preventive maintenance:

Please refer to the maintenance schedule mentioned in the table below to undertake routine maintenance of the trap.

Sr. No	Parameters to be checked	Frequency for checking and maintaining						
		Immediately	Daily	Weekly	Monthly	Quarterly	Half yearly	Annually
1	Test medium pressure SOFT31 (3.5 barg to 17.5 barg)			Y				
2	Repair / Replace SOFT31 - when testing shows leaks	Y						
3	Clean strainers of SOFT31				Y			
4	Clean internals of SOFT31					Y		
5	Visual inspection for leakages		Y					
6	Arresting any other leaks	Y						

### 7.2 Tool Kit:

To carry out any maintenance on the SOFT31 please use the tools mentioned below:

Components	Tool	Tool Size
SLR seat	Box Spanner	17 mm (A/F)
Valve seat (4.1mm ID)	Box Spanner	17 mm (A/F)
SLR Stem	Slot Screw Driver	6 mm
Gland nut	Ring Spanner	16 mm
M4 screw (valve seat) (4No)	Screw Driver	(12 inch)
M10 Bolt for outside covering	Box Spanner	17 mm (A/F)

### 7.3 Recommended tightening torques:

Components	Torque Range
SLR seat	35 Nm
Valve seat (4.1mm ID)	35 Nm
SLR Stem	40-50 Nm
M10 Bolt for outside covering	25-35 Nm

### 7.4 Maintaining / Replacing the main valve assembly : (Refer to Figure 8)

1. Unscrew cover bolts (1) and lift off the base (2).
2. Unscrew the assembly set screws (5), and dismantle the pivot frame (6).
3. Remove the main valve seat (7) along with the metal gasket (8).
4. Replace the main valve assembly (9) and the gasket (10) with a new one.
5. Refit the cover (11) by using the cover bolts (1).

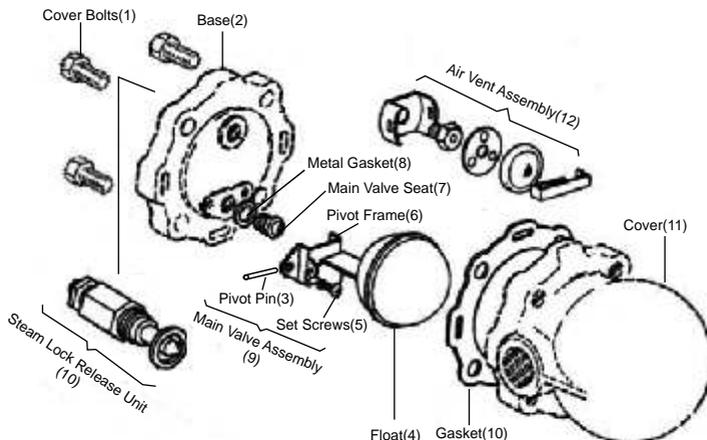


Figure 8 : Maintaining the main valve assembly

7.5 Procedure to fit the steam lock release (SLR) assembly: (Refer to Figure 9)

1. Unscrew the complete SLR assembly.
2. Remove the SLR gasket. (not shown in the figure 9.)
3. Replace the SLR assembly and gasket with new ones.
4. Reset the SLR .

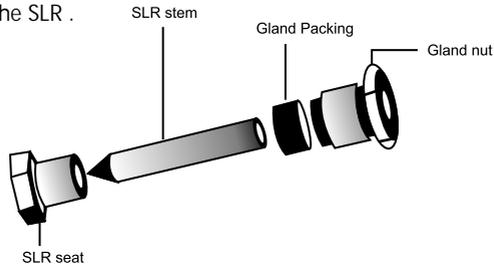


Figure 9: SLR assembly

7.6 Inspection and maintenance of air vent assembly :(Refer to Figure 10)

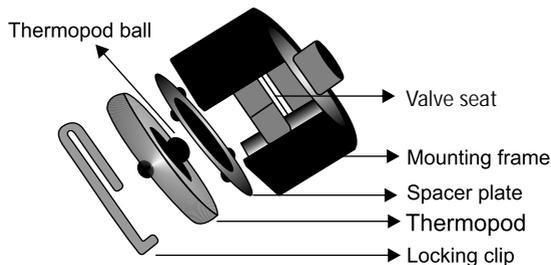


Figure10: Maintaining the air vent assembly

1. Remove locking clip, thermopod and spacer plate.
2. Fit new gasket between mounting frame and body of the trap. (not visible in the figure 11), valve seat and mounting frame.
3. Assemble spacer plate, thermopod and fit the locking clip.

7.7 Steam trap testing:

Following methods can be used to determine the operating condition of a trap and determine if its working properly:

1. Testing traps through visual inspection.
2. Testing traps using temperature gun/equipments.
3. Testing traps using sound/ultrasound
4. Testing traps through online monitoring

**8.** Troubleshooting :

If the expected performance is unachievable after the installation of the single orifice float trap, check the following points for appropriate corrective measures.

Failure Mode	Possible Cause	Remedy
Not discharging at all.	No condensate is discharged, and the surface temperature of the trap is low.	Check the installation. Check for the flow direction arrow on the cover casting and the name plate arrow on the base casting.
		Check for blockage in the strainer.
		If the actual differential pressure is higher than the design $\Delta P$ , the steam trap would have failed in closed position as the float buoyancy will not be adequate to open the valve seat.
		<b>Check for the valve and seat assembly for blockage.</b>
		Check if the ball float is punctured, if so replace it. Post replacement, check for water hammering in process to avoid reoccurrence.
	No condensate is discharged, and the surface temperature of the trap is high.	The trap is getting steam locked. Adjust the steam lock release setting by first closing it fully and then opening it by 1/4th turn.
Leaking steam.	Live steam continuously leaking through the outlet.	Check the installation. The arrow on the name plate should point downwards.
		Check valve and seat assembly for any deposition and clean it.
		i) Clean and lap the seating area. ii) Lightly stamp an SS ball on the seating area.
		Check for SLR leakage/setting check for air vent leakage.
	Steam leaking from the trap body.	Tighten the cover nuts and bolts to the recommended torque.
	Check the gasket for any possible damage and replace it if required.	

Failure Mode	Possible Cause	Remedy
Not discharging enough condensate.	Reduced condensate carrying capacity of the trap.	Check parameters and trap sizing. The trap will not discharge enough condensate if the actual size is below the recommended size based on the condensate load.
		<p>Check for back pressure and corresponding discharge capacities as per the capacity charts.</p> <ul style="list-style-type: none"> <li>i) Replace/repair the leaking and non-working traps with working traps, the leak traps may create/increase the back pressure on the other working traps connected to the same return line or,</li> <li>ii) if there are more than one trap discharging in a single condensate return line, then ensure all the traps have an NRV installed on the outlet of each trap or,</li> <li>iii) Ensure all the by-pass valve are closed, if by-pass valve is leaking or if it is kept open in closed loop condition which creates/increases back pressure on the other working traps, connected to the same return line.</li> </ul>
	Flooding of condensate.	Check whether the inlet strainer is partially blocked.
		Check thermostatic valve seat orifice for blockage. If blocked, clean and lap.
		Check main valve seat orifice for blockage. If blocked, clean and lap.

**9.** Available Spares: (Refer to Figure 8)

The spare parts available are given in the following table.

Product	SPARE TYPE	SPARE CONSIST OF	SPARE SPECIFICATION	SPARE CODE
FMSOFT31	MAIN VALVE ASSEMBLY KIT	SEAT , GASKET , PIVOT FRAME , PIN , SCREWS & FLOAT ASSEMBLY	15/20NB 4.5 BAR(G)	SPARE-1520SOFT31-4.5MVKIT
			15/20NB 10.0 BAR(G)	SPARE-1520SOFT31-10MVKIT
			15/20NB 13.0 BAR(G)	SPARE-1520SOFT31-13MVKIT
			25NB 4.5 BAR(G)	SPARE-25SOFT31-4.5MVKIT
			25NB 10.0 BAR(G)	SPARE-25SOFT31-10MVKIT
			25NB 13.0 BAR(G)	SPARE-25SOFT31-13MVKIT
	FLOAT KIT	BALL FLOAT & COVER/BASE GASKET (QTY 1 EACH )	1520NB 4.5 BAR(G)	SPARE-1520SOFT31-4.5FKIT
			15/20NB 10.0 BAR(G)	SPARE-1520SOFT31-10FKIT
			15/20NB 13.0 BAR(G)	SPARE-1520SOFT31-13FKIT
			25NB 4.5 BAR(G)	SPARE-25SOFT31-4.5FKIT
			25NB 13.0 BAR(G)	SPARE-25SOFT31-13FKIT
	AIR VENT ASSEMBLY KIT	VALVE SEAT, MOUNTING FRAME, SPACER PALTE, THREMOPOD & LOCKING CLIP	15 / 20 /25 NB	SPARE-1550SOFT-AVKIT
	GASKET KIT	COVER/BASE GASKET ( PACK OF 5 NOS. )	15/20/25NB	SPARE-1520SOFT31-GKIT
	SCREEN KIT	SCREEN ( PACK OF 5 NOS. )	15 / 20 /25 NB	SPARE-152025SOFT31-SKIT
	SLR KIT	SLR SEAT, GLAND PACKING, SLR STEM & GLAND NUT	15/20/25NB , TV+SLR COMBINATION	SPARE-152025SOFT31-SLRVKIT
			15/20/25NB , ONLY SLR COMBINATION	SPARE-152025SOFT31-SLRKIT

How to Order:

DN 15 Single Orifice Float Trap, SOFT31-T-4.5 bar g, TV, screwed BSPT

How to Order Spares:

Always order spares by using the description given in the column above and stating the size of the trap.

Example : Main valve assembly for DN 15 Single Orifice Float Trap SOFT31-T-4.5

**10.** Warranty Period:

As per the ordering information and agreements in the contract.

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DN 15 Single Orifice Float Trap, SOFT31-T-4.5 bar g, TV, screwed BSPT

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10.

Warranty Period:

As per the ordering information and agreements in the contract.

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