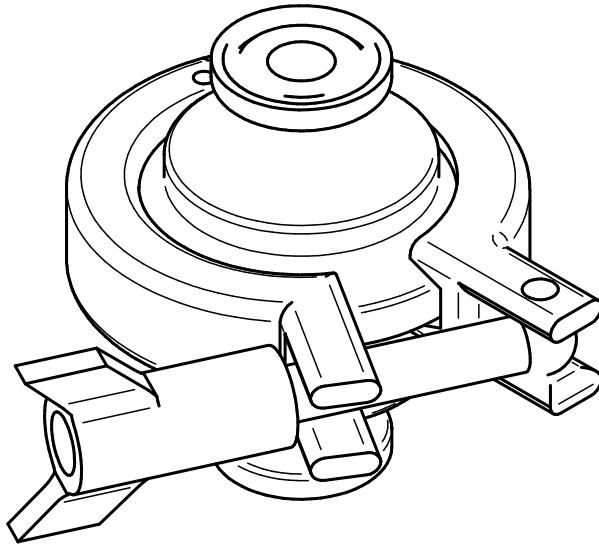


# Installation and Maintenance Manual

## Forbes Marshall Clean Steam Trap

FMCST



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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 the below mentioned products safely and efficiently.

### **Forbes Marshall Clean Steam Trap [FMCST]:**

**Size:** DN 15 ( $\frac{1}{2}$ " ), DN 20 ( $\frac{3}{4}$ " ), DN 25 (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.



This symbol denotes **CAUTION, WARNING** or **DANGER**

## 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. Safety information - Product specific:**

Provision must be made to protect products which are not self-draining against frost damage if they are inoperative in environments where they may be exposed to temperatures below freezing point. This product should not be dismantled without first releasing the compression on the control spring. This valve contains an Viton component. If the valve has been subjected to a temperature approaching 315 C (599 F), the Viton material may have decomposed and formed hydrofluoric acid. Avoid skin contact and inhalation of any dust or fumes as this acid causes deep burns and damage to the respiratory system. This valve contains a PTFE component. If PTFE is heated to its sintering temperature it gives rise to gaseous decomposition products or fumes which can produce unpleasant effects if inhaled. Smoking should therefore be prohibited in workshops where PTFE is handled and care should be taken to avoid personal contamination with PTFE particles. To enhance diaphragm life following care should be taken

1. Diaphragm water reservoir to be filled before startup.
2. Never insulate the diaphragm adaptor

## **2.11 Product Disposal:**

It is necessary to dispose this product only in accordance with local regulations at the authorized, qualified collecting point specified for equipment's and its parts—Please refer the part details mentioned in the material table of this manual. Please follow all waste disposal guidelines (Management & Handling) as published by local governing authorities in India & abroad

## **2.12 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.

**2.12 Isolation:**

Consider whether closing isolating valves will put any other part of the system or personnel at risk. Dangers might include; isolation of vents, protective devices or alarms. Ensure isolation valves are turned on and off in a gradual way to avoid system shocks.

**2.13 Pressure:**

Before attempting any maintenance consider what is or may have been in the pipeline. Ensure that any pressure is isolated and safely vented to atmospheric pressure before attempting any maintenance product. Do not assume that the system is depressurised even when a pressure gauge indicates zero.

**2.14 Temperature:**

Allow time for temperature to normalise after isolation to avoid the danger of burns and consider whether protective clothing ( including safety glasses) is required. tobacco contaminated with PTFE particles can develop 'polymer fume fever'.

If the sanitary clamp seal has been subjected to a temperature approaching 315 °C (599° F) or higher, the Viton may have decomposed and formed hydrofluoric acid. Avoid skin contact and inhalation of any fumes as the acid will cause deep skin burns and damage the respiratory system.

### 3. Brief Product Information

#### 3.1 Sizes and Pipe Connections

A) DN 15, 20, 25 sanitary clamp compatible connections as per following end connections standard

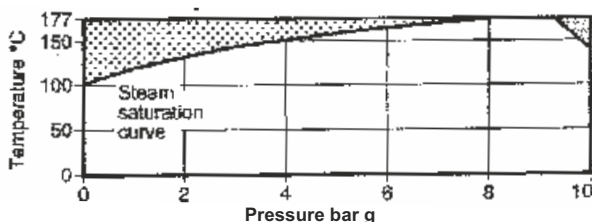
- ISO 2852

- ASME BPE


B) DN 15, 20, 25 sanitary tube end connections as per following end connections standard

- ASME BPE

#### 3.2 Operating Range



 The product must not be used in this region.

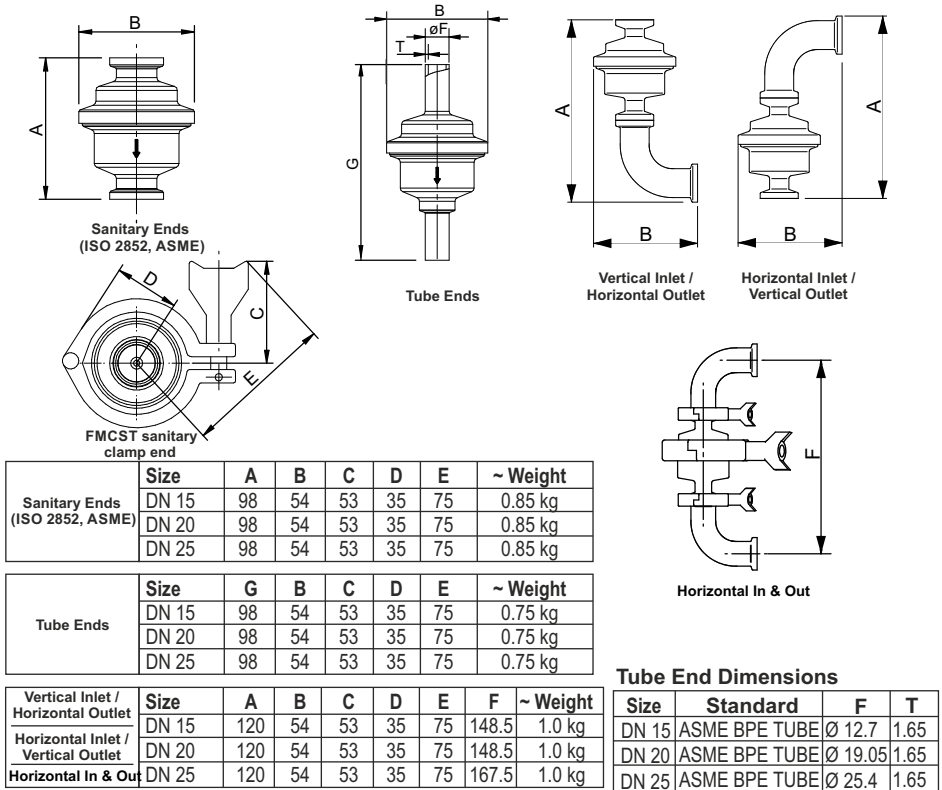
 The product should not be used in this region as damage to the internals may occur.

**Note :** For hygienic/sanitary clamp ends the maximum pressure / temperature may be restricted by the gasket or sanitary clamp used. Please consult Forbes Marshall.

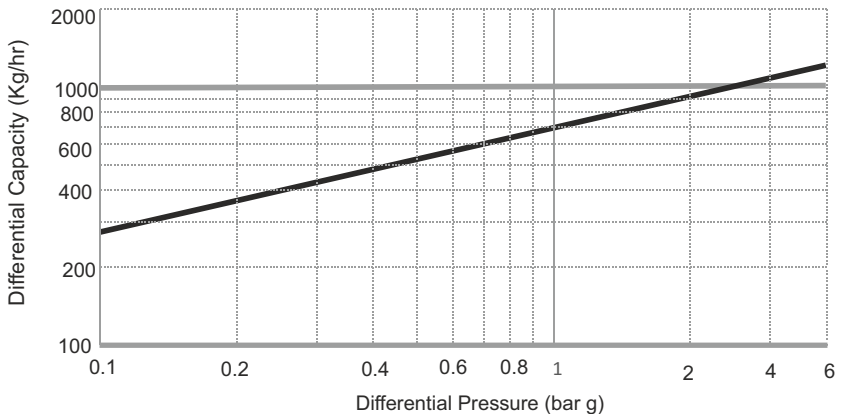
#### 3.3 Limiting conditions

Body design conditions	PN10
PMA Maximum allowable pressure @140°C	10 bar g
TMA Maximum allowable temperature @ 9.2 bar g	177°C
Minimum allowable temperature	-254°C
Maximum operating pressure for saturated steam service	
TMO Maximum operating temperature@ 6 bar g	165°C
Minimum operating temperature	0°C
PMO Maximum operating pressure	6 bar g
Maximum cold hydraulic test pressure	15 bar g

### 3.4 Product Dimension and Drawings



### 3.5 Capacity Chart



#### **4. Product Working Principle:**

The operating element is a capsule containing a small quantity of a special liquid with a boiling point below that of water. In the cold conditions that exist at start up, the capsule is relaxed. The ball is off its seat and is wide open, allowing unrestricted removal of air and other incondensables. This is a feature of all balanced pressure traps and explains why they are well suited to air venting.

As condensate passes through the balanced pressure steam trap, heat is transferred to the liquid in the capsule. The filled liquid boils before steam reaches the trap. The vapour pressure within the capsule causes it to expand and the trap shuts. Heat loss from the trap then cools the water surrounding the capsule, the fill condenses and the capsule contracts, opening the trap and releasing condensate until steam temperature approaches again at which the cycle is repeated.

#### **5. Installation Guidelines:**

Referring to the User Manual, name-plate and Technical Information sheet, check that the product is suitable for the intended installation. Check materials, pressure and temperature and their maximum values. If the maximum operating limit of the product is lower than that of the system in which it is being fitted, ensure that a safety device is included in the system to prevent overpressurisation.

Determine the correct installation situation and the direction of fluid flow.

Remove protective covers from all connections.

Check flow arrow for correct orientation. Fittings, clamps and gaskets for pipe end connections are not supplied. Do not expose the element to superheat conditions since over expansion may result.

**Caution :** Do not overtighten clamp. This may cause gasket to spread/extrude and interface with element frame. It is normally only necessary to take up slack and tighten the nut by half a turn maximum.

**Note 1 :** The body and element must be handled carefully to ensure that the machined surfaces are not damaged.

**Note 2 :** If the trap is to discharge to atmosphere ensure it is a safe place, the discharging fluid may be at a temperature of 100° C (212° F).



## **6. Start-up and Commissioning**

### **Commissioning**

After installation or maintenance ensure that the system is fully functioning. Carry out tests on any alarms or protective devices.

**Note:** As with all steam systems it is very important that the pressure is built up slowly to avoid possible damage to any sensitive equipment.

### **General Product Information**

The Forbes Marshall CST thermostatic balanced pressure steam traps are designed to remove condensate from hygienic and sanitary steam systems with minimal backing up. Applications include sterile steam barriers, block and bleed systems. Manufactured in 316L stainless steel with crevice free bodies, they are self draining and operate close to steam temperature.

## **7. Maintenance Guidelines**

Before undertaking any maintenance on the trap it must be isolated from the supply line and return line and any pressure allowed to slowly normalise to atmosphere. The trap assembly should then be allowed to cool.

**Note :** The body and element must be handled carefully to ensure that the machined surfaces are not damaged.

Remove sanitary clamps. End connection with internal seat, gasket, and element assembly can then be removed for cleaning or replacement. Reassemble using a new gasket and with the valve head in position to close onto the seat orifice. Replace and tighten sanitary clamps and put back into service. Check for leaks and retighten as necessary

## **8. Troubleshooting**

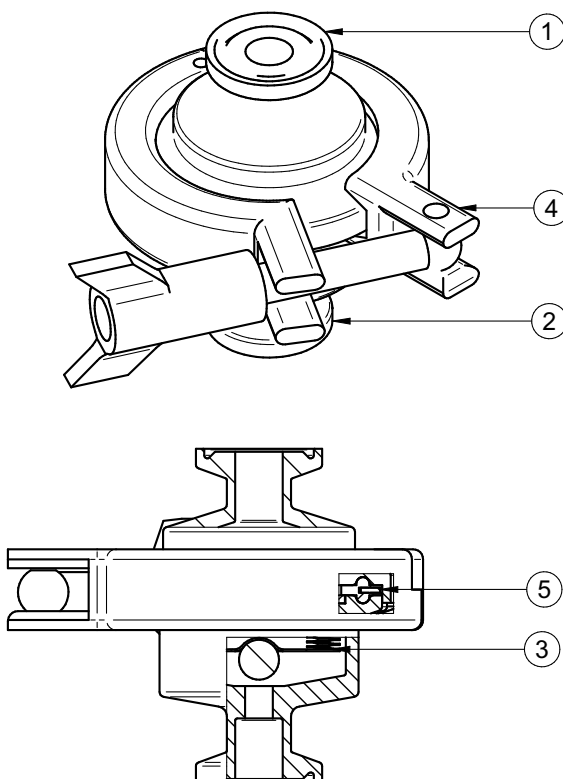
## 9. Available spares

Item	Spare Code
Element assembly	SPARE-1525FMCST-BKIT 3
Seal	SPARE-1525FMCST-SKIT 5
Clamp	SPARE-1525FMCST-CLKIT 4

### How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the size and type of trap.

Example : 1 off Element assembly for a Forbes Marshall ½" CST balanced pressure steam trap.



**10. Warranty :** as per ordering information and agreement in the contract.



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