Installation and Maintenance Manual
FMTLT61/FMAV61
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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 Angled Tracer Line Trap [FMTLT61]
Size: DN 15 (1/2") and DN20 (3/4")

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 **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

2.11 **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 Description:

3.1 Description:

The Forbes Marshall Angled Tracer Line Trap, FMTLT61, is a maintainable angled balanced pressure steam trap manufactured in stainless steel. It is corrosion resistant and easily maintainable.

3.2 Sizes and Pipe Connections:

DN 15 and DN 20
Screwed BSPT / NPT

Figure 1: Forbes Marshall Angled Tracer Line Trap

Materials

<table>
<thead>
<tr>
<th>No</th>
<th>Part</th>
<th>Material</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>Austenitic Steel</td>
<td>ASTM A 351 CF8M</td>
</tr>
<tr>
<td>2</td>
<td>Cap</td>
<td>Austenitic Steel</td>
<td>ASTM A 351 CF8M</td>
</tr>
<tr>
<td>3</td>
<td>Thermopod</td>
<td>Stainless Steel</td>
<td>—</td>
</tr>
<tr>
<td>4</td>
<td>Spring</td>
<td>Stainless Steel</td>
<td>—</td>
</tr>
<tr>
<td>5</td>
<td>Spacer Plate</td>
<td>Stainless Steel</td>
<td>ASTM A 240 SS 304</td>
</tr>
<tr>
<td>6</td>
<td>Strainer Screen</td>
<td>Stainless Steel</td>
<td>ASTM A 240 SS 304</td>
</tr>
<tr>
<td></td>
<td>0.8 mm perforations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Seat</td>
<td>Stainless Steel</td>
<td>ASTM A 276 SS431</td>
</tr>
<tr>
<td>8</td>
<td>Seat Gasket</td>
<td>Stainless Steel</td>
<td>ASTM A 240 SS304</td>
</tr>
<tr>
<td>9</td>
<td>Body Gasket</td>
<td>Exfoliated Graphite</td>
<td>—</td>
</tr>
</tbody>
</table>
3.3 Thermopod Filling for FMTLT61:

As a standard, the trap is supplied with filling “U”, which will operate approximately 24°C below steam saturation temperature. As an optional alternative the trap can be supplied with filling “C” which will operate approximately 6°C below steam saturation temperature or filling “T” which will operate approximately 12°C below steam saturation temperature.

Note: If the alternative thermopod is required this must be clearly stated on the order e.g. thermopod to have “C” or “U”

Temperature:

Allow time for temperature to normalize after isolation to avoid the danger of burns and consider whether protective clothing (including safety glasses) is required.

Caution:

The body / cover gasket contains a thin stainless steel support ring, which may cause physical injury if it is not handled and disposed carefully.

3.4 Limiting Conditions:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PMO Max operating pressure</td>
<td>21 bar g</td>
</tr>
<tr>
<td>TMO Max operating temperature</td>
<td>217 °C</td>
</tr>
<tr>
<td>Minimum operating temperature</td>
<td>0 °C</td>
</tr>
<tr>
<td>Max. cold hydraulic test pressure</td>
<td>32 bar g</td>
</tr>
</tbody>
</table>

3.5 Operating Range:

![Steam saturation curve diagram](image)

- The product **must not** be used in this region.
- The product **should not** be used in this region as damage to internals may occur.
3.6 Overall Dimensions and Weight (Approx.):

![Diagram of the product dimensions]

Dimensions (approx.) in mm

<table>
<thead>
<tr>
<th>SIZE DN</th>
<th>DIMENSIONS (mm)</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15/20</td>
<td>A 31.5  B 38   C 67  D 29  E 50</td>
<td>0.6</td>
</tr>
</tbody>
</table>

4. Product Working Principle:

Forbes Marshall Angled Tracer Line Trap works on thermostatic principle operates on the steam temperature difference from sub-cooled condensate and air. Steam increases the pressure inside the thermostatic element i.e. thermopod, causing the trap to close. As condensate and non-condensate gases surround the thermopod, the temperature begins to drop and the thermopod contracts and opens the valve.
5. **Installation Guidelines for FMTLT61:**

   ![Warning Symbol]

   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.

1. Before installing Forbes Marshall Angled Tracer Line Trap, Flush out the inlet piping to remove all dirt and oil.
2. Remove protective covers from all connections where appropriate, before installation.
3. The FMTLT61 is designed for installation in a horizontal line with the inlet at the horizontal and outlet at the bottom. Refer fig.3 for typical installation diagram.
4. Suitable isolation valves must be installed to allow for safe maintenance and trap replacement.
5. Open isolation valves slowly until normal conditions are achieved. Check for leaks and correct operation.

![Diagram of FMTLT61 Installation]

**Fig.3 Typical Installation of FMTLT61**

**Installation Guidelines for FMAV61:**

1. FMTLT61 should be installed in uppermost part of system where STEAM & AIR gets collected. Refer Fig.4 for typical installation diagram for an air vent.
2. FMAV61 is designed for installation with thermopod in horizontal position.
3. For optimum performance FMTLT61 can be fitted on Air bottles which provide collecting space for Air, and allows temperature gradient from the steam space to an air vent.
Fig. 4 FMTLT61 Installation as an Air Vent
6. **Start-up and Commissioning:**

6.1. **Flushing of lines:**

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 inlet stop valve and open the bypass stop valve.
2. Drain the condensate until clear condensate starts coming out.

Note: For a detailed procedure on flushing of lines please visit Forbes Marshall website.

6.2. **Commissioning:**

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

1. After flushing of lines is complete, ensure that bypass valve is closed and down stream stop valve is opened respectively.
2. Check for leaks and attend if any.

7. **Maintenance Guidelines:**

**Note:** Before undertaking any maintenance of the product it must be isolated from both supply line and return line and ensure pressure is normalized to atmosphere. The product should then be allowed to cool. When re-assembling ensure that all joint faces are clean.
7.1. **Routine and preventive maintenance:**

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

<table>
<thead>
<tr>
<th>No.</th>
<th>PARAMETER TO BE CHECKED</th>
<th>FREQUENCY FOR CHECKING VARIOUS PARAMETERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Immediate Daily Weekly Monthly Quarterly Half Yearly Annually</td>
</tr>
<tr>
<td>1</td>
<td>Test FMTLT61 trap</td>
<td>Y</td>
</tr>
<tr>
<td>2</td>
<td>Repair / Replace FMTLT61 - when testing shows leaks</td>
<td>Y</td>
</tr>
<tr>
<td>3</td>
<td>Clean internals of FMTLT61</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Visual Inspection for leakages</td>
<td>Y</td>
</tr>
<tr>
<td>5</td>
<td>Arresting any other leaks</td>
<td>Y</td>
</tr>
</tbody>
</table>

7.2. **Recommended tightening torques:**

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Or</th>
<th>mm</th>
<th>Nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>54.5</td>
<td>90-100</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>17</td>
<td>15-20</td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Recommended tightening torques
7.3. Procedure to fit or replace the internals set: (Refer Figure1)

1. Remove the cap (2) from body (1) using spanner.
2. Lift out the spring (4), strainer screen (6), thermopod (3), and spacer plate (5).
3. Clean the internals and seat and inlet orifice (1) using suitable cleaning liquid spray & clean with lint free cloth.
4. After cleaning fit new gasket (9) and internals with new strainer screen (6), refit the cap (2), using a little anti-seize compound on the threads.
5. Ensure that the cap (2) is tighten to the recommended torque as mention in Table 1.
6. When maintenance is complete, open isolation valves slowly until the normal pressure is obtained.
7. Checks for leaks and attend if any.

8. Troubleshooting:
   If the expected performance is not observed. Check the following points for appropriate corrective measures.

<table>
<thead>
<tr>
<th>Failure Mode</th>
<th>Possible Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>No condensate discharge (blocked)</td>
<td>Strainer screen is clogged with rust or scale</td>
<td>Clean strainer screen if screen rusted replace with new one.</td>
</tr>
<tr>
<td></td>
<td>Seat orifice is blocked</td>
<td>Clean the seat and body inlet passage and thermopod ball surface then re-assemble the Angled Tracer Line Trap.</td>
</tr>
<tr>
<td></td>
<td>Thermopod may be over extended due to excessive internal pressure caused by superheat steam making it impossible for the thermopod ball (valve head) to lift off from valve seat.</td>
<td>Replace the thermopod assembly.</td>
</tr>
<tr>
<td></td>
<td>Improper Installation.</td>
<td>Check installation with the inlet from the side and outlet at the bottom and thermopod in horizontal line.</td>
</tr>
<tr>
<td>Steam leakage or blowing from the outlet</td>
<td>Foreign material has built-up between thermopod ball (valve head) and seat orifice.</td>
<td>Clean the seat and thermopod ball surface then re-assemble the steam trap, check for further steam leak and correct operation.</td>
</tr>
<tr>
<td></td>
<td>Seat orifice damage due to wire drawing.</td>
<td>Replace thermopod &amp; seat.</td>
</tr>
<tr>
<td></td>
<td>Seat orifice and thermopod ball (valve head) does not shut-off tightly.</td>
<td>Clean both seat orifice and thermopod ball after that *seat stamping should be done.</td>
</tr>
<tr>
<td></td>
<td>Check if the thermopod is in good condition. Thermod should not be compressible when cool; any flabbiness indicates failure.</td>
<td>Replace with new thermopod assembly set.</td>
</tr>
<tr>
<td>Steam leaks from body</td>
<td>Gasket deterioration or damage.</td>
<td>Replace with new gasket.</td>
</tr>
</tbody>
</table>
Seat stamping procedure: Place valve seat on the fixture with thermopod on the valve seat (thermopod ball side resting on the valve seat orifice) and tap slightly on the center with a mallet. Due to stamping a seating surface is formed on the valve seat orifice.

Note: Never attempt to modify the product. When replacing part with new, use the spare parts listed in Section 9.

Available Spares: [Refer figure 3]

The spare parts available are shown in heavy outline. Parts drawn in broken line are not supplied as spares.

<table>
<thead>
<tr>
<th>1) Thermopod and seat assembly set</th>
<th>U fill</th>
<th>SPARE-1520FMTLT61-UTPKIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>(state thermopod filling)</td>
<td>T fill</td>
<td>SPARE-1520FMTLT61-TTPKIT</td>
</tr>
<tr>
<td></td>
<td>C fill</td>
<td>SPARE-1520FMTLT61-CTPKIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3,7</td>
</tr>
<tr>
<td>2) Screen &amp; Gasket</td>
<td></td>
<td>SPARE-1520FMTLT61-SGKIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>3) Spring</td>
<td></td>
<td>SPARE-1520FMTLT61-SKIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

Figure 3: Exploded View of Forbes Marshall Angled Tracer Line Trap

How to Order:

How to Order Spares:
Always order spares by using the description given above and stating the size and type of steam trap. Example: 1 No. Thermopod and seat assembly set for DN 15 Forbes Marshall Angled Tracer Line Trap, FMTLT61, "U" Fill

Warranty Period:
As per ordering information and agreements in the contract.