

April 2024

Spence™ Dura-Flo Inverted Bucket Steam Trap



Figure 1. Dura-Flo Series Inverted Bucket Steam Trap



WARNING

Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion, fire and/or chemical contamination causing property damage and personal injury or death.

Dura-Flo Inverted Bucket Steam Trap must be installed, operated and maintained in accordance with federal, state and local codes, rules and regulations and Emerson instructions.

If leak develops in the system, service to the unit may be required. Failure to correct trouble could result in a hazardous condition.

Installation, operation and maintenance procedures performed by unqualified personnel may result in improper adjustment and unsafe operation. Either condition may result in equipment damage or personal injury. Only a qualified person shall install or service the Dura-Flo Inverted Bucket Steam Trap

Introduction

Scope of the Manual

This manual provides instructions for installation, maintenance and parts ordering for the Dura-Flo Inverted Bucket Steam Trap.

Product Description

Dura-Flo Steam Trap

A steam trap is a mechanical valve which discharges condensate, undesirable air and non-condensibles from a system while trapping, or holding in, steam.

Dura-Flo Series inverted bucket traps are capable of discharging condensate, air and other non-condensable gases without loss of steam. These traps have a heavy cast iron, sealed stainless steel or repairable stainless steel body, hardened stainless steel or chrome steel valve and seat, and an all stainless steel linkage and bucket and a graphite fiber cover gasket. The repairable traps have a removable cover to allow repair or orifice change.

Dura-Flo Series

Specifications

The Specifications section gives some general specifications for the Dura-Flo Series inverted bucket steam traps. The nameplates give detailed information for a specific steam trap as built in the factory.

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| <p>Available Configurations and Sizes Cast Iron Dura-Flo Series: See Table 1 Stainless Steel Dura-Flo Series: See Table 2</p> <p>End Connection Styles Cast Iron Dura-Flo Series: NPT Stainless Steel Dura-Flo Series: NPT, UMT</p> <p>Maximum Allowable Pressure⁽¹⁾ Cast Iron Dura-Flo Series: 250 psig / 17.2 bar Stainless Steel Dura-Flo Series: See Table 3</p> | <p>Maximum Allowable Temperature⁽¹⁾ Cast Iron Dura-Flo Series: 450°F/ 232°C Stainless Steel Dura-Flo Series: 800°F/ 425°C</p> <p>Materials of Construction Body and Cover: Cast Iron or Stainless steel Bucket and Linkage: Stainless steel Valve and Seat: Hardened Chrome Steel Standpipe: Steel pipe Cover Gasket: Graphite</p> |
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1. The pressure/temperature limits in this Installation Sheet and any applicable standard or code limitation should not be exceeded.

Table 1. Cast Iron Dura-Flo Series Available Configurations

| TYPE | SIZE | | CAPACITY | ORIFICE RATINGS | FLOW |
|------|-------------|------------|------------------------------------|-------------------------------------|------------|
| | NPS | DN | | | |
| 80S | 1/2, 3/4 | 15, 20 | Low with integral strainer | 20, 80, 125, 150 | Horizontal |
| 81S | 1/2, 3/4, 1 | 15, 20, 25 | Medium Low with integral strainer | 15, 30, 70, 125, 200, 250 | |
| 82S | 1/2, 3/4 | 15, 20 | Medium with integral strainer | 15, 30, 70, 125, 200, 250 | |
| 83S | 3/4, 1 | 20, 25 | Medium High with integral strainer | 15, 30, 60, 80, 125, 180, 250 | |
| 84 | 1, 1 1/4 | 25, 32 | High | 15, 30, 60, 80, 125, 180, 250 | |
| 85 | 1 1/2, 2 | 40, 50 | Super High | 15, 30, 60, 100, 130, 180, 225, 250 | |
| 86 | 2, 2 1/2 | 50, 60 | Ultra High | | Vertical |
| 21 | 1/2 | 15 | Medium Low | 15, 30, 70, 125, 200, 250 | |
| 22 | 1/2, 3/4 | 15, 20 | Medium | 15, 30, 70, 125, 200, 250 | |
| 23 | 3/4, 1 | 20, 25 | Medium High | 15, 30, 60, 80, 125, 180, 250 | |
| 24 | 1, 1 1/4 | 25, 32 | High | 15, 30, 60, 80, 125, 180, 250 | |
| 25 | 1, 1 1/2 | 25, 40 | Super High | 15, 30, 60, 100, 130, 180, 225, 250 | |
| 26 | 1/2, 2 | 15, 50 | Ultra High | | |

Table 2. Stainless Steel Dura-Flo Series Available Configurations

| TYPE | CAPACITY | CONNECTION |
|-------------------------------|-----------------|------------|
| Sealed Steam Traps | | |
| TSBT-LS | Low Capacity | NPT |
| TSBT-MS | Medium Capacity | |
| TSBT-HS | High Capacity | |
| USBT-LS | Low Capacity | UMT |
| USBT-MS | Medium Capacity | |
| USBT-HS | High Capacity | |
| Repairable Steam Traps | | |
| TSBT-LR | Low Capacity | NPT |
| TSBT-MR | Medium Capacity | |
| TSBT-HR | High Capacity | |
| USBT-LR | Low Capacity | UMT |
| USBT-MR | Medium Capacity | |
| USBT-HR | High Capacity | |

Table 3. Stainless Steel Dura-Flo Series Maximum Allowable Pressure

| TYPE | | MAXIMUM ALLOWABLE PRESSURE | | TEMPERATURE | |
|------|------------|----------------------------|------|-------------|-----|
| | | psig | bar | °F | °C |
| LS | Sealed | 200 | 13.8 | 450 | 232 |
| | Repairable | 200 | 13.8 | 450 | 232 |
| MS | Sealed | 307 | 21.2 | 450 | 232 |
| | Repairable | 420 | 29.0 | 450 | 232 |
| HS | Sealed | 650 | 44.8 | 497 | 258 |
| | Repairable | 650 | 44.8 | 497 | 258 |

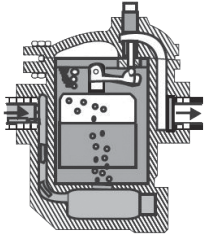


Figure 2. Dura-Flo Series Inverted Bucket Steam Trap Closed

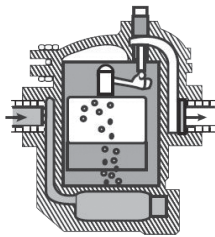


Figure 3. Dura-Flo Series Inverted Bucket Steam Trap Begins to Open

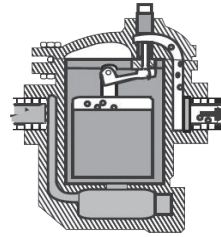


Figure 4. Dura-Flo Series Inverted Bucket Steam Trap Discharges

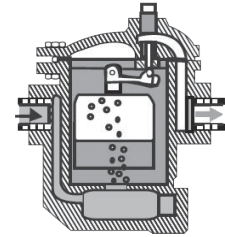


Figure 5. Dura-Flo Series Inverted Bucket Steam Trap Closes

Pressure Change Assembly (PCA) Repair Kit (For 80 and 20 Series only)

PCS Repair kits are quick, easy and economical to use for Dura-Flo Series. All items in this kit are stainless steel for corrosion resistant internal parts of steam traps. Valves and seats are hardened stainless steel for extra long life.

Principle of Operation

Dura-Flo Series

Steam entering the trap collects in the top of the bucket, floating the bucket and forcing the valve into its seat. See Figure 2.

As the condensate begins to flow into the trap, the steam and air are forced from the bucket. This causes the bucket to begin losing buoyancy, tending to pull the valve from its seat. See Figure 3.

When enough condensate has entered the trap, displacing the steam and air, the bucket drops, pulling the valve from the seat and allowing condensate and air to discharge. See Figure 4.

As the flow of condensate stops, steam enters the trap and re-floats the bucket, forcing the valve into its seat. The cycle repeats as more condensate reaches the trap. See Figure 5.

Installation

WARNING

Personal injury, property damage, equipment damage or leakage due to escaping steam or bursting of pressure containing parts may result if this equipment is over pressured or is installed where service conditions could exceed the limits given in the specifications or where conditions exceed any ratings of the adjacent

piping or piping connections. To avoid such injury or damage, provide pressure-relieving or pressure-limiting devices (as required by the appropriate code, regulation, or standard) to prevent service conditions from exceeding those limits.

- Install the traps in an accessible position and location for easy servicing. Allow vertical clearance for maintenance.
- Install the trap with the body upright so that bucket is rising and falling vertically.
- Install the inlet and outlet connections in a horizontal plane for horizontal traps and a vertical plane with inlet on the bottom for vertical traps. Avoid long lengths of horizontal piping ahead of trap.
- Pitch all horizontal inlet lines towards the steam trap to help eliminate potential water hammer problems.
- Install the trap below the drain point, so that a water seal can be maintained around the open end of the bucket.
- Install the trap below and close to equipment being drained.
- The maximum differential pressure (ΔP) stamped on product nameplate must be greater than the maximum pressure differential across the trap.
- For all models, install a strainer ahead of trap. See Figure 6.
- Install union fittings (Uniflex) and shut off valves (STV) on both sides of trap for ease of servicing and trap testing. See Figure 6.
- Install a test and pressure relief valve to ensure relief of internal pressure prior to servicing and as a visual indication of trap operation. See Figure 6.
- If there will be a pressurized return line or the trap drains to an overhead return line, install a check valve on return piping. See Figure 7.

Dura-Flo Series

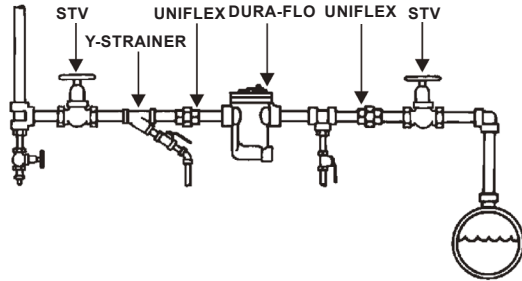


Figure 6. Dura-Flo Typical Installation

Inverted bucket traps may need to be primed before being placed into service. Use either of the following methods.

1. Remove pipe plug from trap cover. Pour water into trap until full and replace pipe plug.
2. Keep return piping valve closed until trap fills with condensate, then slowly open valve.

Maintenance



To avoid personal injury, property damage or equipment damage caused by sudden release of pressure or explosion of accumulated gas, do not attempt any maintenance or

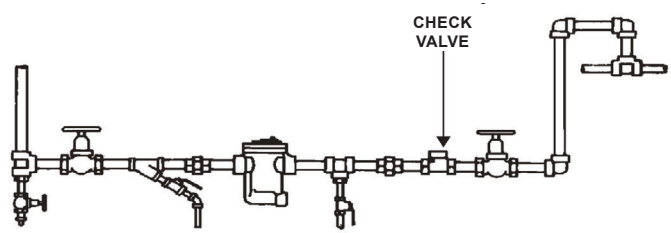


Figure 7. Dura-Flo with Pressurized Return Line Installation

disassembly without first isolating the equipment from system pressure and relieving all internal pressure from the equipment.

- Inspect the trap mechanism periodically.
- Remove all dirt on working parts.
- Replace worn parts.

Parts Ordering

When corresponding with your local Sales Office about this equipment, always reference the equipment valve size, service and serial number.

 SpenceValve.com

Emerson

Americas

McKinney, Texas 75070 USA
T +1 800 558 5853
+1 972 548 3574

Europe

Bologna 40013, Italy
T +39 051 419 0611

Asia Pacific

Singapore 128461, Singapore
T +65 6777 8211

Middle East and Africa

Dubai, United Arab Emirates
T +971 4 811 8100

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