

# Inverted Bucket Steam Traps

## Safety Information

Safe operation of these products can only be guaranteed if they are properly installed, commissioned, used and maintained by qualified personnel (see Section 1.11) in compliance with the operating instructions. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment must also be complied with.

### 1.1 Intended use

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended use/application.

- i) The products have been specifically designed for use on steam, air or water/condensate. The products' use on other fluids may be possible but, if this is contemplated, Spirax Sarco should be contacted to confirm the suitability of the product for the application being considered.
- ii) Check material suitability, pressure and temperature and their maximum and minimum values. If the maximum operating limits of the product are lower than those of the system in which it is being fitted, or if malfunction of the product could result in a dangerous overpressure or overtemperature occurrence, ensure a safety device is included in the system to prevent such over-limit situations.
- iii) Determine the correct installation situation and direction of fluid flow.
- iv) Spirax Sarco products are not intended to withstand external stresses that may be induced by any system to which they are fitted. It is the responsibility of the installer to consider these stresses and take adequate precautions to minimise them.
- v) Remove protection covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.

### 1.2 Access

Ensure safe access and if necessary a safe working platform (suitably guarded) before attempting to work on the product. Arrange suitable lifting gear if required.

### 1.3 Lighting

Ensure adequate lighting, particularly where detailed or intricate work is required.

### 1.4 Hazardous liquids or gases in the pipeline

Consider what is in the pipeline or what may have been in the pipeline at some previous time. Consider: flammable materials, substances hazardous to health, extremes of temperature.

### 1.5 Hazardous environment around the product

Consider: explosion risk areas, lack of oxygen (e.g. tanks, pits), dangerous gases, extremes of temperature, hot surfaces, fire hazard (e.g. during welding), excessive noise, moving machinery.

### 1.6 The system

Consider the effect on the complete system of the work proposed. Will any proposed action (e.g. closing isolation valves, electrical isolation) put any other part of the system or any personnel at risk?

Dangers might include isolation of vents or protective devices or the rendering ineffective of controls or alarms. Ensure isolation valves are turned on and off in a gradual way to avoid system shocks.

### 1.7 Pressure systems

Ensure that any pressure is isolated and safely vented to atmospheric pressure. Consider double isolation (double block and bleed) and the locking or labelling of closed valves. Do not assume that the system has depressurised even when the pressure gauge indicates zero.

### 1.8 Temperature

Allow time for temperature to normalise after isolation to avoid danger of burns.

### 1.9 Tools and consumables

Before starting work ensure that you have suitable tools and/or consumables available. Use only genuine Spirax Sarco replacement parts.

### 1.10 Protective clothing

Consider whether you and/or others in the vicinity require any protective clothing to protect against the hazards of, for example, chemicals, high/low temperature, radiation, noise, falling objects, and dangers to eyes and face.

### 1.11 Permits to work

All work must be carried out or be supervised by a suitably competent person. Installation and operating personnel should be trained in the correct use of the product according to the Installation and Maintenance Instructions.

Where a formal 'permit to work' system is in force it must be complied with. Where there is no such system, it is recommended that a responsible person should know what work is going on and, where necessary, arrange to have an assistant whose primary responsibility is safety.

Post 'warning notices' if necessary.

### 1.12 Handling

Manual handling of large and/or heavy products may present a risk of injury. Lifting, pushing, pulling, carrying or supporting a load by bodily force can cause injury particularly to the back. You are advised to assess the risks taking into account the task, the individual, the load and the working environment and use the appropriate handling method depending on the circumstances of the work being done.

### 1.13 Residual hazards

In normal use the external surface of the product may be very hot. If used at the maximum permitted operating conditions the surface temperature of some products may reach temperatures in excess of 300°C (572°F).

Many products are not self-draining. Take due care when dismantling or removing the product from an installation (refer to 'Maintenance instructions').

### 1.14 Freezing

Provision must be made to protect products which are not self-draining against frost damage in environments where they may be exposed to temperatures below freezing point.

### 1.15 Disposal

Unless otherwise stated in the Installation and Maintenance Instructions, this product is recyclable and no ecological hazard is anticipated with its disposal providing due care is taken.

### 1.16 Returning products

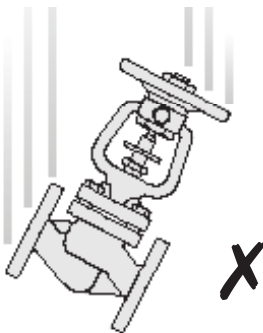
Customers and stockists are reminded that under EC Health, Safety and Environment Law, when returning products to Spirax Sarco they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk. This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.

### 1.17 Working safely with cast iron products on steam

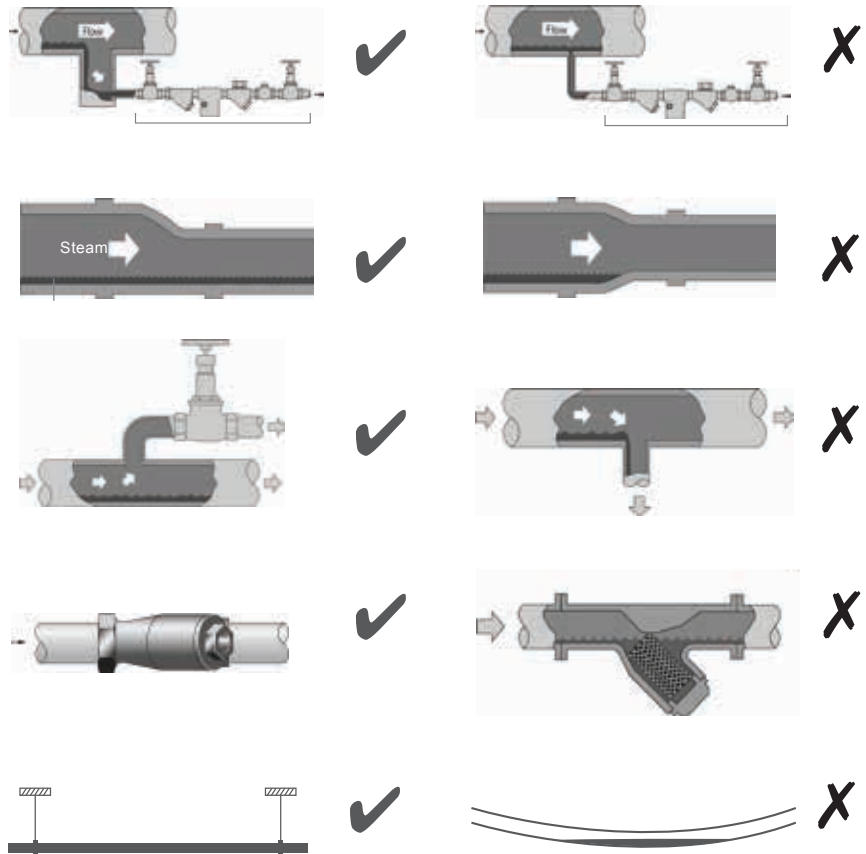
Cast iron products are commonly found on steam and condensate systems. If installed correctly using good steam engineering practices, it is perfectly safe. However, because of its mechanical properties, it is less forgiving compared to other materials such as SG iron or carbon steel. The following are the good engineering practices required to prevent waterhammer and ensure safe working conditions on a steam system.

### Safe Handling

Cast Iron is a brittle material. If the product is dropped during installation and there is any risk of damage the product should not be used unless it is fully inspected and pressure tested by the manufacturer.



### Steam Mains - Do's and Dont's:



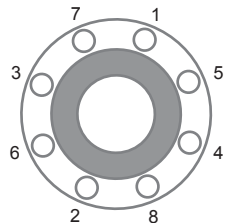
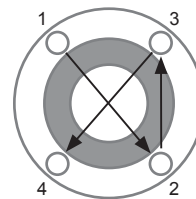
### Prevention of tensile stressing

Pipe misalignment:

Installing products or re-assembling after maintenance:



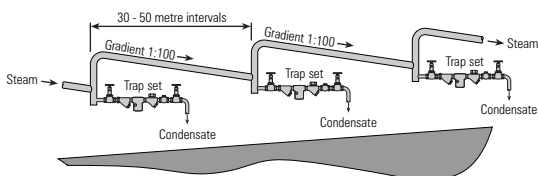
Do not over tighten.  
Use correct torque figures.



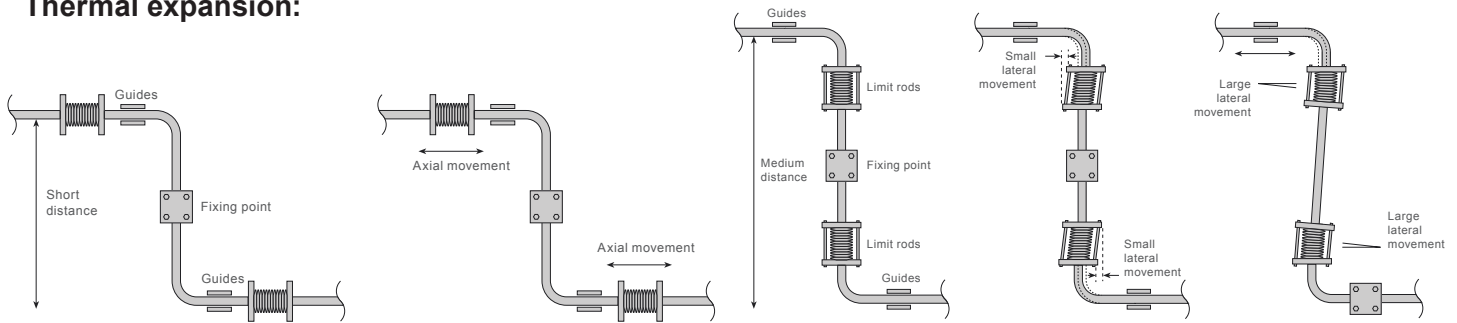
Flange bolts should be gradually tightened across diameters to ensure even load and alignment.

### Prevention of water hammer

Steam trapping on steam mains:



## Thermal expansion:



## Installation

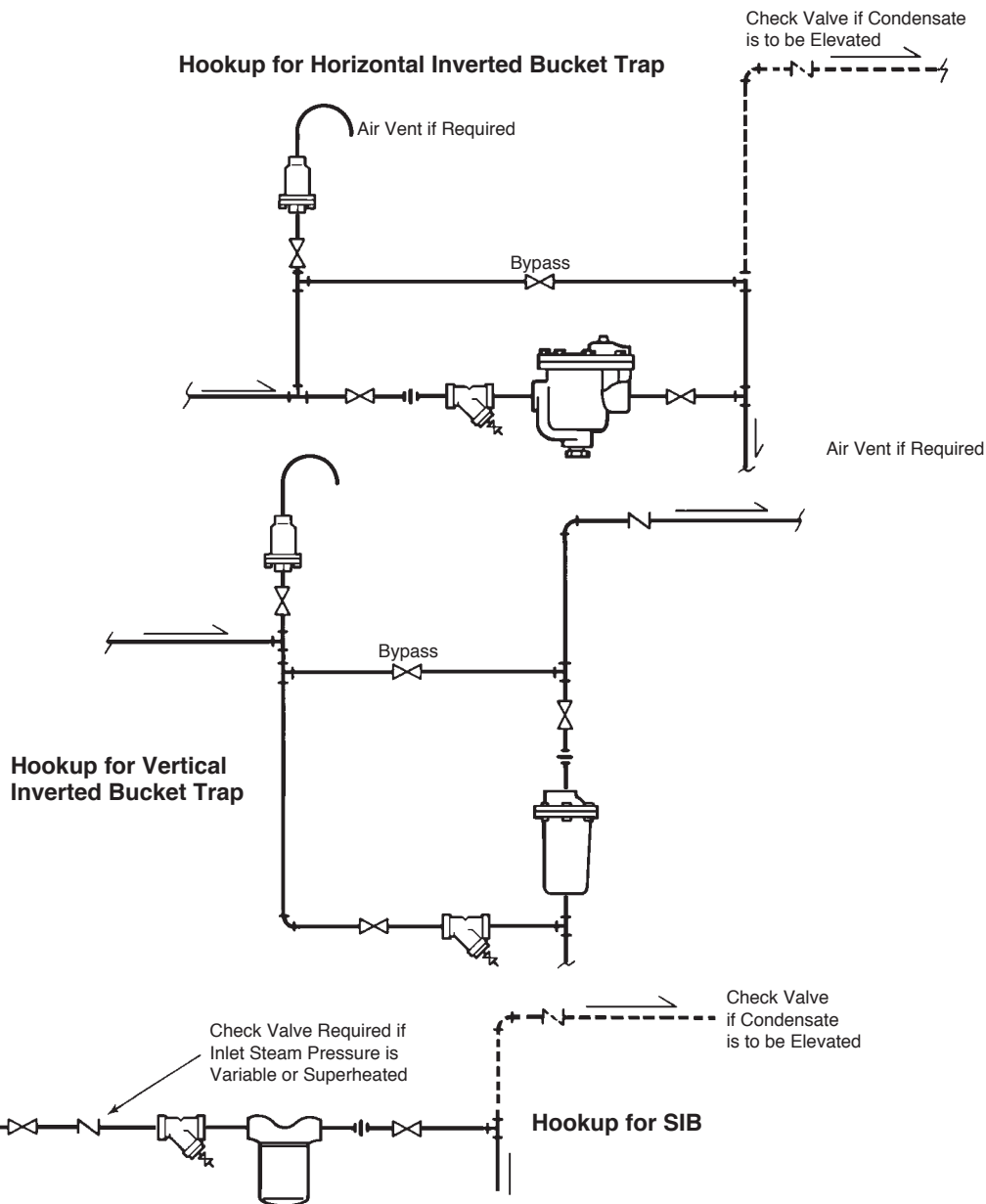
- 1.) Before installing trap, the inlet piping should be carefully blown down to remove any existing pipe debris.  
**CAUTION:** Before Installation, inspection or maintenance, ensure that the steam inlet and outlet piping valves are closed and the trap isolated to prevent personnel injury.
- 2.) Check the maximum operating pressure stamped on the nameplate. If the actual system operating pressure is greater than the maximum operating pressure of the trap, a trap having a higher operating pressure must be substituted.
- 3.) Depending upon the type, trap body pattern will require either horizontal or vertical piping. Install trap with bottom and/or arrow cast on trap pointing downward so that the inverted bucket can freely move in a vertical plane.
- 4.) Locate the trap below and close to the drain point where it is accessible for inspection and servicing. A pipeline strainer should be fitted ahead of the trap along with isolation valves and pipe unions as required by good piping practices.
- 5.) To prevent backflow, a check valve is recommended after the trap when condensate is elevated. With a modulating pressure condition, or on superheated steam service, a check valve should also be located ahead of the trap inlet to prevent prime loss.
- 6.) When draining equipment controlled by modulating valves with vacuum breakers, and whenever greater air venting capability is desired, an auxiliary thermostatic air vent should be fitted in parallel above the trap.
- 7.) Any bypass piping should have reduced capacity and be installed above the trap to reduce the chance of prime and steam loss. However, unless continuous service is necessary, bypass piping should be avoided whenever possible.
- 8.) On startup, slowly open inlet valve, then outlet valve, to establish a 'prime' or water seal around the inverted bucket inside the body. If trap does not have enough startup condensate to 'prime' itself, shut it off and manually pour water into the body. Problems with 'prime' loss may indicate that the trap is oversized for the load and it should be changed to a smaller size.

- 9.) When installed outdoors, trap will not freeze in continuous operation but can be damaged if steam pressure is lost or inadvertently turned off. To prevent freezeup damage, the body must be drained manually or can be protected automatically with a Spirax Sarco Thermoton set for 75°F opening temperature.

## Inspection and Maintenance

Spirax Sarco Inverted Bucket Traps for horizontal piping may be inspected and cleaned without removing the trap from the line. Vertical threaded body types require a union after the outlet to permit disassembly.

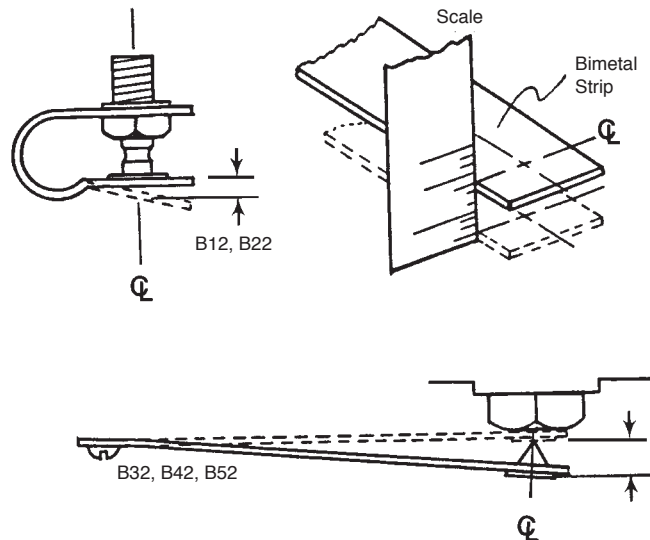
- 1.) **Flash steam** - When condensate at steam temperature is discharged to a lower pressure, part of it re-evaporates, forming flash steam. This should not be confused with live steam when inspecting the operation of steam traps.
- 2.) **To clean or inspect the trap inlet port** - Remove any obstruction or debris from the inlet cavity. If the trap is fitted with a strainer, make sure the screen perforations are clear and unobstructed.
- 3.) **To clean, inspect or replace the trap mechanism**
  - a.) Remove the cover bolts and cover.
  - b.) Remove all dirt and incrustation from the mechanism, trap body and cover. Inspect the body and cover for condensate corrosion.
  - c.) Inspect the valve head and seat for damage and/or signs of wear or wiredrawing, and replace is required. To remove the seat, detach the bucket arm by removing the pin and unscrew the seat.
  - d.) Inspect the vent hole in the bucket and make sure it is clear and fully open.
  - e.) Remove the old gasket from the cover and/or body and replace with a new gasket.
  - f.) Reinstall the cover and mechanism to the trap body and tighten the cover bolts. It is recommended that the cover bolts be retightened after the trap has been operating for a few hours to account for gasket relaxation and thermal expansion.

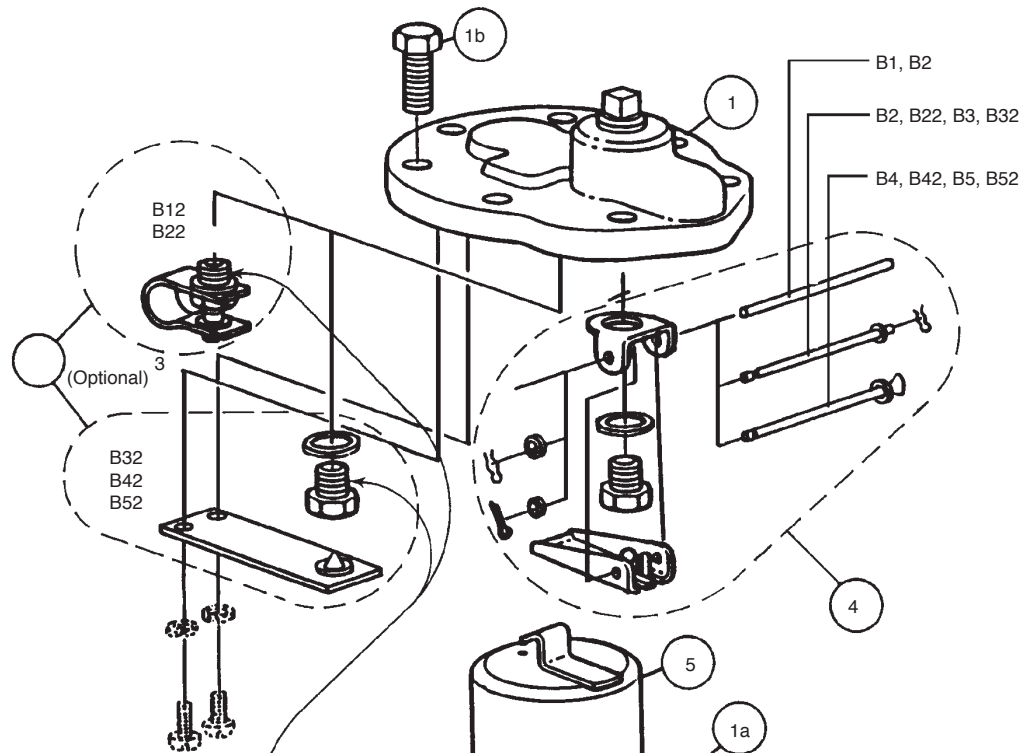


### Bucket Trap Air Vent Head Travel

When installing a bucket trap air vent, the following head travels are required when set at 70°F to 80°F ambient. The head travels are measured along the centerline of the head. The head travels are adjusted by bending the bimetallic strip.

Model	Travel	Tolerance
B12, B22	3/64"	+0.000" -1/64"
B32	3/64"	± 1/64"
B42, B52	3/32"	± 1/64"





Use high temperature adhesive/sealant on air vent seat threads (Ex. Loctite 272)

Use pipe joint compound on screen plug threads

Torque Values (Ft·lbs)	
<b>Cover Bolts</b>	<b>Size and Models</b>
11-14	1/2", 3/4" B1X or B1H Series
35-39	3/4" B2 Series
21-24	1" B3 Series
55-59	1-1/4" B4 Series
80-85	2" B5 Series
<b>Valve Seats</b>	
11-13	1/2" B1X-75, 125, 180, 250
28-31	1/2", 3/4" B1H Series; 3/4" B2-7
	125, 180, 250; 1/2", 3/4" B1X-15, 30
46-50	3/4" B2-15, 30; 1" B3-75, 125, 180
66-70	250, 1" B3-15, 30
195-205	1-1/4" B4 Series; 2" B5-75, 125, 180, 250
250-260	2" B5-15, 30
<b>Air Vent Seats</b>	
11-14	All Models
<b>Plug</b>	
28-33	1/2", 3/4" B1HS Series
28-33	3/4" B2S Series
53-58	1" B3S Series
60-66	1-1/4" B4S Series
68-75	2" B5S Series

**Note:** Traps with optional strainers use the same cover bolts and seat torque requirements

Part No.	Description
1	Cover
1a	Cover Gasket
1b	Cover Cap Screws
2	Body
3	Air vent
4	Complete Mechanism
5	Strn. Stl. Bucket
6	Strn. St. Strainer

Spirax Sarco Applications Engineering Department

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