Effective Solutions

Oil & Gas Industry

First for Steam Solutions

EXPERTISE | SOLUTIONS | SUSTAINABILITY

spirax sarco

CONTENTS

Helping you choose the right solution

Project support

From Front End Engineering Design (FEED) all the way through to installation and commissioning, our global team, who are dedicated to the oil & gas industry, have the knowledge and experience to ensure that you are given all the assistance necessary to meet your goals. Whether you are bidding for, or have been awarded a contract for any given project, our team of local specialists are there to support you all the way.

We can support you in a number of ways:

- We have an extensive and high quality product range with necessary product and manufacturing approvals and customized documentation (including traceability)
- With manufacturing strategically located around the world, we have the supply capacity and agility to suit your needs, including the packaging of products
- You will have easy access to literature, sizing software and building information modelling
- Our global network of engineers and support staff are well-versed in the requirements of the oil & gas industry and are here to help you in the design of your steam systems. As steam experts we can offer package solutions that take the headache out of designing, engineering, procuring, fabricating and testing such systems.

Manufacturing capability

Our global presence allows us to work closely with you and provide the specialist knowledge and technical expertise required to deliver an effective engineered solution that satisfies your customer.

With manufacturing Centers of Excellence in UK, France, Italy, Argentina, Brazil, India, Mexico, USA and China, we are able to supply all our own products and meet your delivery requirements.

Our supply chain has the capacity and agility to meet all your needs, including the ability to provide packaged systems.

We are the first for steam solutions in the oil and gas industry:

- **Operating in 57 countries across 6 continents**
- **A global network of over 1,100 steam experts**
- **9 manufacturing sites worldwide**
- **Over 30 customer training centers across the globe**

9 LARGE manufacturing sites **IN 4 CONTINENTS**

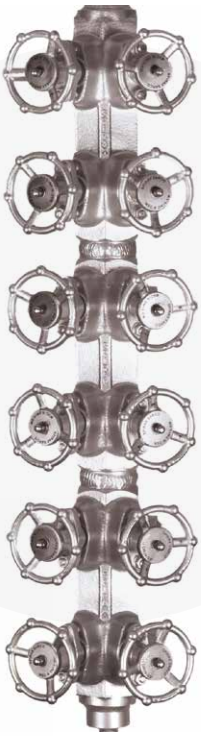
Operating in **57** countries

Packaged solutions

All our packaged solutions are supplied pre-assembled, minimizing the need for on-site fabrication and testing.

Without these packages, a number of individual components would be required to construct the solution. The on-site labor needed to procure, weld, test and inspect is expensive and after construction installation can be awkward. However, all our packaged solutions offer fast site installation with minimal hook ups.

Using our expertise in steam, we have devised many packaged solutions to ensure that all the needs of you and your customers are met. We can also customize these packages where necessary in order to match your operational requirements.



Product quality

We are globally renowned for our product innovation, reliability and performance, helping us to win numerous engineering awards.

We are continually developing and improving our product range to ensure they meet the standards you and your customers require.

ISO 9001 & ISO 14001
To ensure we consistently reach the high levels of product quality you require, we manufacture to ISO 9001 & ISO 14001 certified quality management systems.

We are also experienced in complying with global oil & gas requirements, offering a range of product testing and inspection options along with full traceability of raw materials.

Certification and documentation

Certificates of Conformity 2.1

Typical test reports (where applicable) including:

- Hydraulic test
- Steam test
- Air test.

Inspection Certificates to:

- 3.1 material ISO 10474/EN 10204
- ASME
- API

Document Control System
We have a dedicated team that can provide you with comprehensive oil & gas project documentation that complies with all legislation, customer and market requirements.

Understanding the need for this documentation to be completed promptly, with full traceability and certification, we use our ISO 9001 accredited Order Management Portal. This online quality management system efficiently manages all documentation to ensure all deadlines are met, and that projects run on time.

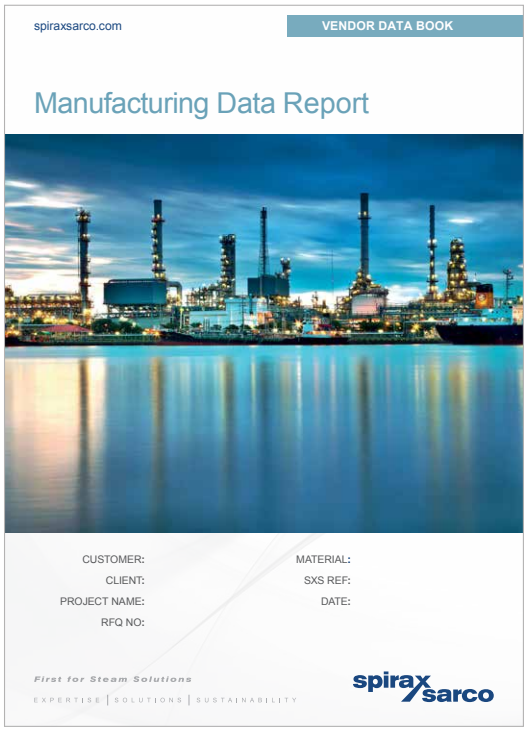
Final quality report packages
We provide fully customizable, project specific documentation packages that include:

- Drawings
- ITP/Quality control plan
- Procedures (welding, NDE, painting, packing, hydro-test)
- Reports & test certificates (welding, NDE, painting)
- 3.1 material certificates
- Installation & operation manuals
- Spare parts list

The Final Quality Report packages can be provided in both soft and hard copies, and can be presented using templates provided by you or our own Spirax Sarco branded templates. Whichever option is used, you can make unlimited revisions so that you are provided with a professionally presented package that you can issue to the End User client.

If you wish to discuss the extensive documentation options available to you, our experienced documentation team are always available and can be contacted at:

US.SpiraxInfo@us.spiraxsarco.com



Engineering a sustainable future

With over 100 years' experience in steam solutions, our brand is well-known within the oil & gas industry. We have a large installed base, giving your customers the belief we can meet their requirements.

Our wide range of products, services and engineering know-how enable us to provide you with the right solutions, not just products.

So as your customers' challenges evolve so do our products and services. Our commitment to new product development is critical to our ability to offer sustainable solutions. We have invested heavily in the past five years to ensure we can be your full service partner to support you all the way through any project, now and in the future.

Once you have completed a project, your customer can expect specialist support from our team of sales engineers. All our staff around the world can meet your customers on site requirements through our range of products and services.

Our network delivers steam and thermal energy solutions to thousands of customers worldwide

Spirax Sarco's involvement with oil, gas and petrochemical companies spans most of the production stages. Steam and hot water are a vital part of many processes from exploration and upstream production through to downstream processing and the production of feedstocks for a range of industries.

For more information, contact us at:
US.SpiraxInfo@us.spiraxsarco.com and we will connect you with a sales engineer.

1 Steam & condensate manifolds

STEAM TRACING SOLUTIONS

Our manifold configuration is a common design suitable for steam distribution, condensate removal and tracing applications.

Features include:

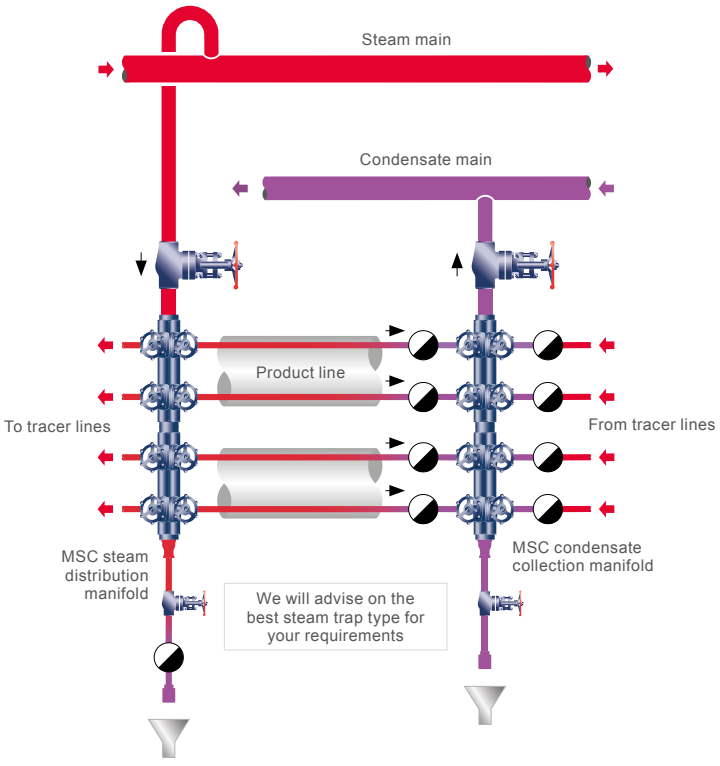
- A carbon steel body achieving ASME CLASS 300 rating, ensuring compliance with ASME piping codes
- A maximum carbon content of 0.23%, ensuring compliance with all known oil & gas specifications
- EN10204 - 3.1 certification for body and bonnet as standard

Designed for rapid heat dissipation, the piston valves have robust steel hand wheels rather than the more easily damaged cast iron type. Insulation jackets suitable for surface temperatures of either 428°F or 800°F are available to minimize radiant heat losses and further improve system efficiency.

Steam tracing using our compact dual duty manifold

Steam tracing is used primarily to maintain a reasonable product temperature and viscosity in order to simplify pumping, avoid freezing, solidification and stagnation.

Although the rates of condensate are relatively small, trap populations will be large since all tracer lines should be individually trapped. For ease of design and layout, the condensate from the traps is collected in a manifold. The steam to the tracers can be distributed utilizing a similar manifold arrangement.

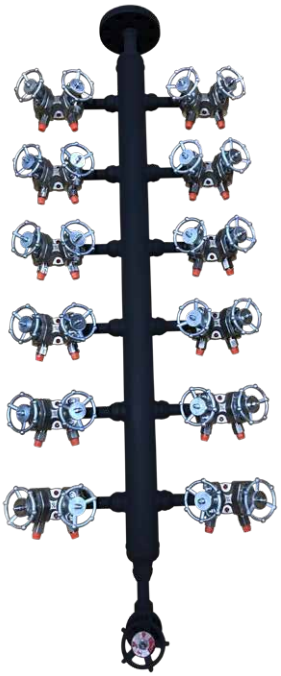


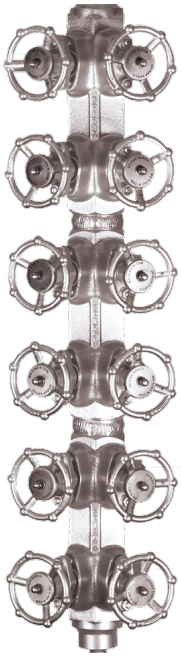
Traditionally, manifolds are custom designed to meet an appropriate piping code, then fabricated and tested on site. A number of individual components may be required to construct a manifold assembly ready for installation and the on-site labor needed to procure, weld, test and inspect them is expensive. Typically, manifolds are large, heavy and a complex piece of the tracing system. After construction insulation can be awkward because of their widely differing geometry. However, our forged MSC series manifold are pre-assembled, minimizing the need for on-site fabrication and testing.

1.1 Manifold packages

In addition to the manifold itself, these can include top and bottom isolation valves, steam traps, all interconnecting pipework / fittings and purpose made insulation jackets. These packages will be custom made to match your operational requirements.

Sizes	1½"
Body material	Carbon steel
Connections	Tracer line and drain connections ½", ¾" and 1"
Piping configuration	Vertical
Maximum Operating Pressure (PMO)	602 psi g @ 488°F
Maximum load (kg/hr)	N / A
100% cold water hydraulic test	Yes





1.2 MSC04, MSC08, MSC12 & MSC-210

The MSC manifold can be used for either steam distribution or condensate collection (MSC-210) and is manufactured from forged carbon steel, with integral piston type isolation valves. The MSC-210 is designed for ease of assembly of screwed PC3000 and PC4000 pipeline connectors.

Sizes	1½"
Body material	Carbon steel
Connections	Flanged, NPT, SW
Piping configuration	Vertical
Maximum Operating Pressure (PMO)	ASME 150 204 psi g @ 392°F ASME 300 602 psi g @ 488°F
Maximum load (kg/hr)	N / A
100% cold water hydraulic test	Yes

2 Condensate recovery

MECHANICAL, ELECTRICAL AND PUMP TRAPS

Our range of condensate recovery solutions are specifically designed to efficiently remove and recover condensate under all operating conditions.

Condensate recovery

When condensate leaves the steam trap it has typically 25% of the original heat energy within the steam.

Recovering and returning this valuable energy source:

- Cuts energy and maintenance costs
- Lowers chemical costs
- Reduces make-up water costs.

Condensate removal

Condensate removal from all heat exchange and process equipment is necessary to improve plant efficiency and provide stable operating conditions.

Efficient condensate removal prevents:

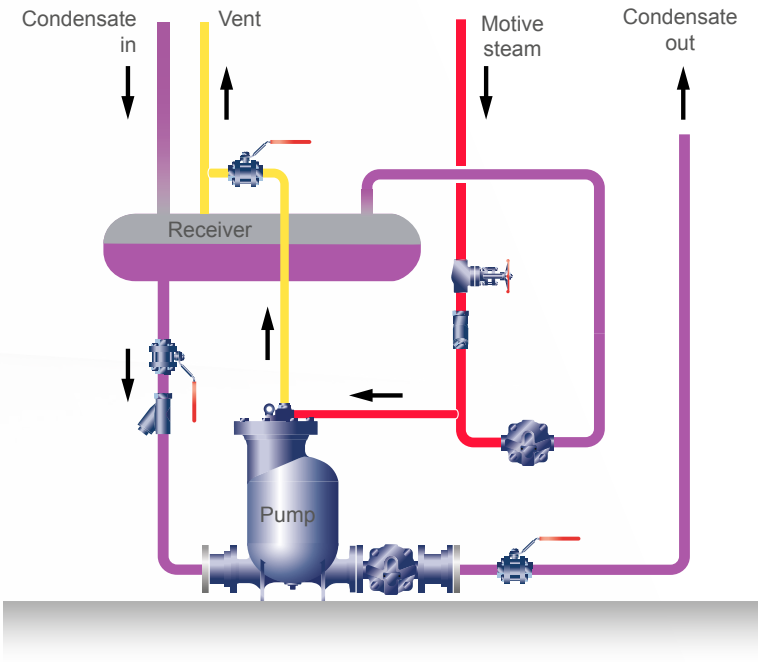
- Unstable temperature control • Product quality problems and equipment damage • Excessive corrosion of heating surfaces
- Waterhammer and noisy operation.

2.1 Pump Packages

Material of construction	Carbon steel or stainless steel
Loads	From zero to loads in excess of 100,00 lb/hr (Based on duplex PTF 4 at 100% capacity)
Pressures ranges	Typically up to 200 psi g

Pump packages utilize steam pressure to drive a pressure powered pump. This gives consistent condensate removal across all process conditions and loads. Using existing local steam services to lift the condensate, typical uses are for re-boilers, heat exchangers and return of condensate. This ensures that new heat exchangers or equipment on light loads do not suffer with condensate backing up. The benefits are:

- Increase in process stability with reliable condensate removal from heat exchange equipment
- Increase in condensate recovery leading to cost savings associated with saving water, water treatment chemicals and heat/fuel required for raising steam
- Fast site installation with minimal hook ups
- No need for electrical power
- Can drain condensate from full vacuum conditions
- Reduction in corrosion within the steam plant
- Single or multi-pump packages available.



2.2 APT14SHC

The APT14SHC automatic pump traps are flanged or screwed displacement receivers. The units are capable of automatically trapping or pumping, depending on pipeline conditions. The units are operated by steam and are used to remove condensate from the process under all operating conditions including vacuum.

Sizes	DN50 X 40 (2" X 1½")
Body material	Carbon steel
Connections	Flanged
Piping configuration	In-line horizontal
Maximum Operating Pressure (PMO)	200 psi g @ 388°F
Maximum load (kg/hr)	Trapping 19,800 lb/hr Pumping 6160 lb/hr
100% cold water hydraulic test	Yes

2.3 PTC & PTF

The Pivotrol® pump is a non-electric pump which transfers high temperature condensate or other liquids from a low point, low pressure or vacuum space to an area of higher pressure or elevation. This self-contained unit, incorporating 'PowerPivot' technology, uses steam, compressed air or any other suitable pressurized gas as the pumping force. The standard Pivotrol® PTC/PTF Pump will handle liquids from 0.9 to 1.0 specific gravity.

Sizes	2"x2" (DN50xDN50) 3"x2" (DN80xDN50)
Body material	PTC: Ductile Iron PTF: Fabricated Steel Body, ASME Code Stamped
Connections	Cover: NPT Liquid: ANSI150/NPT
Maximum Operating Pressure (PMO)	200 psi g
Maximum load (kg/hr)	17,640 lb/hr (differential pressure 190 psig)
100% cold water hydraulic test	Yes

2.4 PTF-HP

The Pivotrol® pump is a non-electric pump which transfers high temperature condensate or other liquids from a low point, low pressure or vacuum space to an area of higher pressure or elevation. This self-contained unit, incorporating 'PowerPivot' technology, uses steam, compressed air or any other suitable pressurized gas as the pumping force. The standard Pivotrol® PTF4 Pump will handle liquids from 0.9 to 1.0 specific gravity. Suitable for use in hazardous environments and volatile fluid pumping applications.

Sizes	3"x2" (DN80xDN50)
Body material	Fabricated Steel Body ASME Code Stamped Stainless Steel Internals
Connections	Inlet & Outlet: ANSI 300 flange NPT/SW Motive & Exhaust: NPT/SW
Maximum Operating Pressure (PMO)	300 psi g
Maximum load (kg/hr)	28,750 lb/hr (differential 190 psig)
100% cold water hydraulic test	Yes

2.5 PPEC

Spirax Sarco Pressure Powered Pump (TM) is a non-electric pump which transfers high temperature condensate or other liquids from a low point, low pressure or vacuum space into an area of higher pressure or elevation. This self contained unit uses steam, compressed air or any other suitable pressurized gas as the pumping force. The standard pressure powered pump will handle liquids from 0.9 to 1.0 specific gravity.

PMO	125 psig
Sizes	1" & 1 1/2"
Connections	NPT
Construction	Cast Iron Body - stainless steel internals, bronze check valves, stainless steel check valves Cast Steel Body - stainless steel internals, stainless steel check valves Cast Stainless Steel Body - stainless steel internals, stainless steel check valves
Maximum load	5100 lb/hr
100% cold water hydraulic test	Yes

3 Desuperheaters

STEAM CONDITIONING

Our desuperheaters are compact, easy to install, long lasting and designed to reduce the temperature of superheated steam to produce steam temperatures approaching saturation temperature. To cool the superheated steam, water is entrained and flashed into vapor by absorbing heat from the steam.

Desuperheaters can be used in power plants, vacuum distillation units (start-up heater), aromatics recovery unit, thermal and catalytic crackers, polymerization and olefin units.

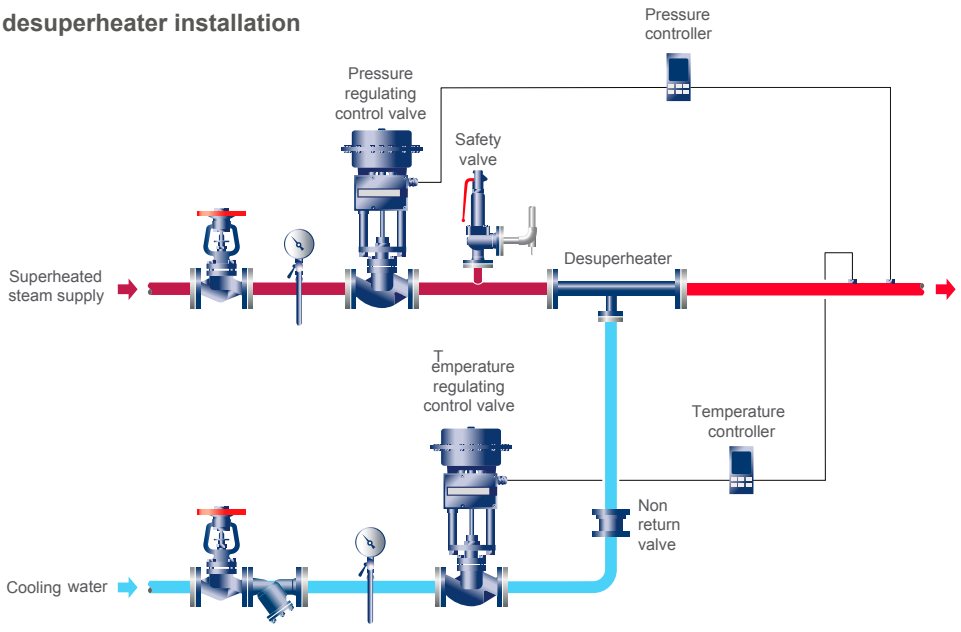
How a Venturi Desuperheater works

This type of desuperheater (known as a VTD) creates high velocity and turbulence to produce intimate contact between steam and cooling water to maximize the evaporation of water droplets. Pressurized cooling water enters the VTD through the cooling water branch; it then passes from the annulus through a series of small holes into the internal diffuser.

A calculated portion of the superheated steam enters the nozzle and is accelerated to a high velocity in the nozzle throat, dropping in pressure and creating high turbulence in this area. The jet of steam leaving the nozzle serves to atomize the incoming cooling water where it mixes, due to high turbulence, as it moves along the internal diffuser.

This steam is accelerated to the same velocity as that within the nozzle throat which serves to balance or equalize the pressure of both streams as they enter the main diffuser throat. The combined streams then pass out of the desuperheater into the discharge piping where the final desuperheating takes place.

A typical in-line desuperheater installation



3.1 Desuperheaters

Our desuperheaters can be packaged to include all control valves and ancillary equipment to make a complete desuperheater station, skid mounted ready for installation.

All our desuperheaters are custom and made to order. They are manufactured in carbon steel, stainless steel or chrome molybdenum dependent on flow conditions required and are available in the following unit types:

Spray Nozzle Desuperheater (SND) - Simple design for retrofitting into existing steam lines where relatively constant steam loads, steam temperatures and cooling water temperatures exist. Has a turn down of up to 5:1.

Spray Type Desuperheater (STD) - Simple design for use where relatively constant steam loads, steam temperatures and cooling water temperatures exist. Has a turn down of up to 5:1.

Venturi Type Desuperheater (VTD) - Suitable for most general plant applications with constant or variable load handling duties. Has a turndown of up to 10:1.

Steam Atomizing Desuperheater (SAD) - Designed for high turndown applications where auxiliary steam is available. Has a turndown of up to 50:1.

Turndown ratio is dependent on a wide variety of factors, such as, installation (horizontal or vertical), amount of residual superheat and piping. Dependent on conditions the figures given are the maximum capable. We have the sizing tools to help you calculate the turndown ratio required for your customer.

Sizes	¾" to 16" (Larger sizes are available on request)
Body material	Carbon steel Chrome molybdenum
Connections	Flanged
Piping configuration	Horizontal / vertical
Maximum Operating Pressure (PMO)	ASME 1500 / PN100
Flange Type	ASME or PN Slip on or weld neck depending on maximum operating temperature

4 Thermocompressors

ENERGY SAVING

Our Steam Jet Thermocompressors (SJT) are energy saving devices that boost low pressure steam, often waste steam, by accurately mixing with high pressure steam. This creates a usable pressure that can be recycled back into the process.

Your customers in the oil & gas industry are constantly looking for opportunities to reduce energy costs by optimising their energy consumption. For many of them this means reducing waste steam to improve steam generation efficiency and increase profitability. This is where our Steam Jet Thermocompressor can help.

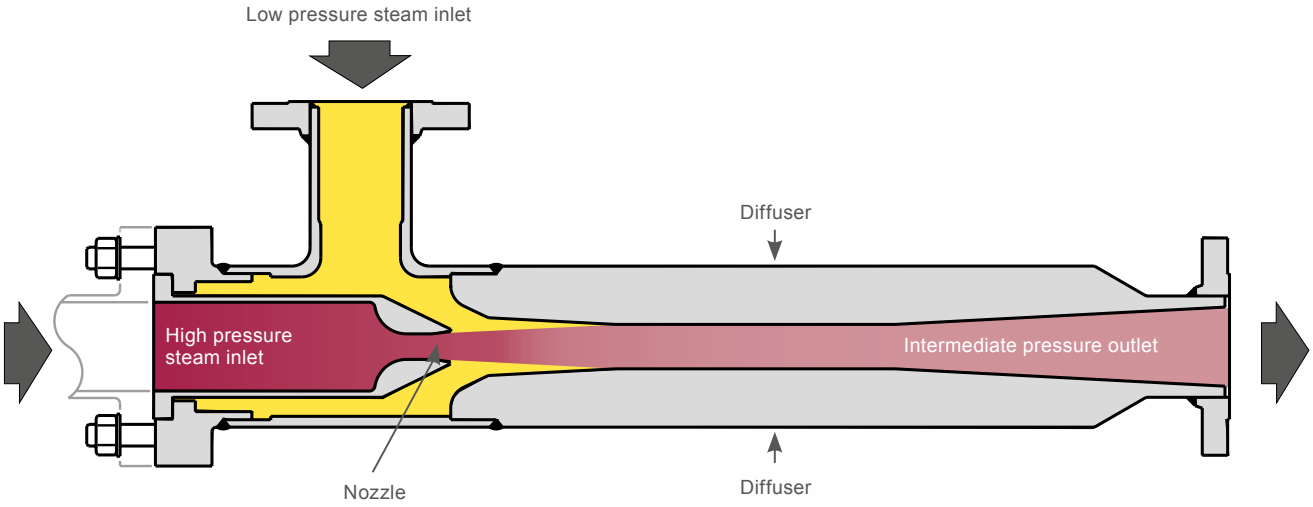
Each unit is available in many materials including carbon steel, stainless steel or chrome molybdenum and is designed specifically to suit your customer's process requirements and ensure maximum operating efficiency.

All products comply with the requirements of the American Society of Mechanical Engineers (ASME) and are CE marked where appropriate. All of our design and manufacturing processes are quality assured and certified to BS EN 9001:2000.

How a Thermocompressor works

Our Steam Jet Thermocompressor uses high pressure steam to entrain low pressure steam and discharges at a pressure that lies somewhere between the two pressures.

High pressure motive steam enters and passes through the nozzle and enters the suction chamber where it is brought in contact with the low pressure steam. This steam mixture then enters the diffuser where its kinetic energy is converted to pressure energy. The steam discharged is then put back into the process.



Please note that for clarity welds are not shown

4.1 Thermocompressor

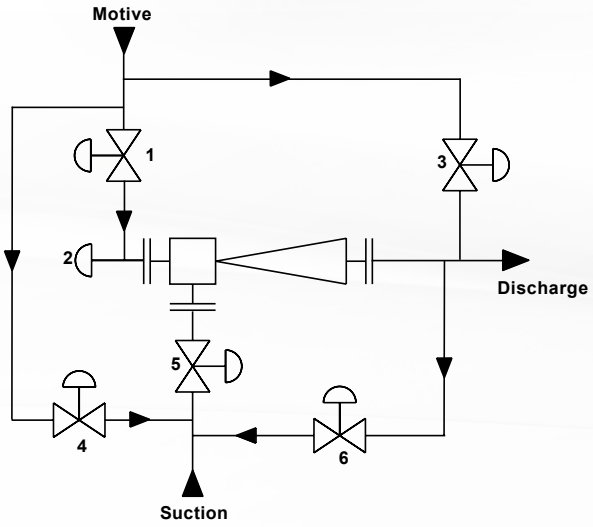
Advantages of using our Steam Jet Thermocompressor:

- It's simple, compact and lightweight construction means it's easy to install into a pipeline and enables overhead installations
- It has low capital and operating costs
- There are no moving or rotating parts
- Minimal maintenance is needed meaning the units can be installed in remote locations
- Oil free discharge ensures there is no lubrication contamination
- Suitable for hazardous areas
- Virtually silent operation

Sizes	½" - 20"
Body material	Carbon steel Stainless steel Chrome Molybdenum
Connections	ASME code, ANSI flanges
Piping configuration	Schedule 40

Control options

The schematic illustrates every possible control option that could be used to control a Steam Jet Thermocompressor.



Sonic designs:

Option 6	is usually used to maintain the Suction (LP) pressure (if required)
Options 4 or **5**	are occasionally used instead
Option 3	can be used to bypass additional steam to the discharge
Please note that you cannot choose Options 1 or 2 if the Steam Jet Thermocompressor is 'Sonic'	

Subsonic design

Option 2	can be used to control the Motive (HP) steam flow from 100% to 35%
Options 1	can be used to control the Motive (HP) steam flow from 100% to 80%
Option 3	can be used to bypass additional steam to the discharge. Options 4 or 5 or 6 are occasionally used to maintain the Suction (LP) pressure.

Most applications will only use one of the options. Some applications do not require any control. A Steam Jet Thermocompressor will always balance itself to the system pressures.

You will need to establish with your customer what parameters (pressure, flow etc.) they wish to control as this will determine what option is best for the given application. Spirax Sarco can provide assistance in selecting the best control option for the intended application to provide the optimum solution for your customer.

5 STAPS ISA100

WIRELESS STEAM TRAP MONITORING

Why monitor steam traps?

Correctly functioning steam traps are vital in maintaining the health, safety and efficiency of the steam system. Steam leaks from traps are costly in both a financial and environmental sense and therefore need prompt attention to ensure that a steam system is working at its optimum efficiency and there is no loss of production time. Blocked or failed-closed steam traps, if ignored, can lead to the eventual failure of the entire asset damaging equipment or pipeline infrastructure.

In some cases, blocked steam traps have caused the solidification of entire product lines, such as sulphur or bitumen transfer lines. In this case the whole affected section may require removal and replacement; shutting down the process for significant lengths of time at huge cost in terms of lost production output.

Why wireless monitoring?

In oil & gas facilities, manually checking a large trap population can lead to failed traps going unnoticed for an extended period of time. This increases the potential for unexpected equipment or pipeline failure leading to significant energy loss or more importantly, lengthy process downtime.

A continuous trap monitoring system allows these facilities to take proactive and preventative action to replace or repair traps as soon as a problem is reported.

Intelligent monitoring also allows customers to prioritize the maintenance of steam traps during scheduled downtime ensuring high priority processes are protected from potentially avoidable interruptions.

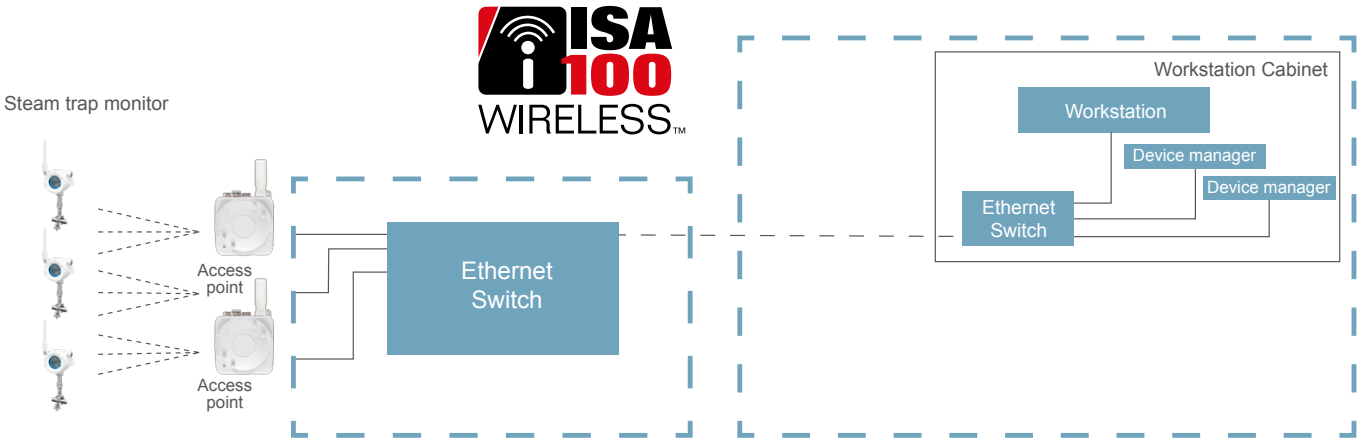
Wireless networks enable a cost effective installation and future expansion of field instrumentation devices to monitor a wide range of process variables.

How STAPS ISA100 works

The STAPS ISA100 Wireless steam trap monitor has been designed for easy, non-intrusive, clamp-on installation with accurate wireless monitoring and reporting.

Intrinsically safe, the system uses wireless communication protocol and meets the rigid ISA100.11a standards on connectivity and security.

The steam trap is monitored by an individual 'head unit'. The head unit measures both acoustic signal and temperature. This data is analyzed in the head using a powerful processor, and is periodically transmitted securely across the wireless network to either a work station or DCS without the need for any third party software.



5.1 STAPS ISA100

With lower installation costs than a wired solution and long-life battery, the STAPS ISA100 is a cost effective way to quickly detect failed open or failed closed steam traps without the need for manual inspection. The accurate diagnostic algorithm provides users with instant trap performance information and steam loss data.

Sizes	Suitable for all trap types from ½" to 4"
Temperature	Rated for 800°F pipe temperature at 158°F ambient as standard
Security	Meets the ISA100.11a standards on connectivity and security
Certification	- IECEx certification and ATEX intrinsic safety certification - IECEx certificate : IECEx SIR 15.0070X - ATEX certificate : Sira 15ATEX2197X

Steam trapping

AN INTRODUCTION

Each steam application has its own steam trap requirements. Selecting the right steam trap for your customer's application could have a significant, positive impact on their process, potentially improving efficiency, reducing energy costs and providing a safer working environment.

For example: condensate must be removed promptly from a plant where maximum heat transfer is sought at all times. The presence of excess condensate in an item of heat transfer equipment will reduce its efficiency, preventing it from achieving its maximum rated output and may also reduce its service life.

However, in other applications it may be required to hold back the condensate to extract some of its heat and thus save on steam. Furthermore, by discharging condensate well below steam temperature, flash steam losses can be reduced or avoided altogether.

THERMODYNAMIC STEAM TRAPS

Maintaining optimum process performance

Thermodynamic steam traps are the best choice for steam mains drainage and critical tracing due to their simplicity, long life and robust construction. As well as a large condensate capacity for their size, our thermodynamic traps offer a high degree of resistance to corrosive condensate.

MECHANICAL STEAM TRAPS

Maintaining optimum process performance

Mechanical steam traps are ideal for use on process applications where condensate must be removed as soon as it forms, to safeguard against temperature fluctuation which would lead to issues such as inadequate heating. Our mechanical steam trap range is adaptable to all applications where instantaneous removal of condensate is required.

THERMOSTATIC STEAM TRAPS

Utilizing heat energy in condensate

For applications where it would be desirable to make use of the heat in the condensate such as non-critical tracing, a thermostatic steam trap is an ideal solution as it will not open until the condensate temperature drops below saturated steam temperature. This allows the heat in the condensate to be utilized before it is drained off which in turn reduces flash steam losses and can help to reduce energy costs.

STEAM TRAPPING FOR LOW TEMPERATURE

Spirax Sarco has a range of steam traps available for low ambient temperature, please contact Spirax Sarco for further information on these products.


spirax sarco

6 Steam trapping

THERMODYNAMIC STEAM TRAPS

Our thermodynamic steam trap is the most advanced thermodynamic steam trap available on the market. It is extremely robust and ideally suited to the rigorous demands of any steam system.

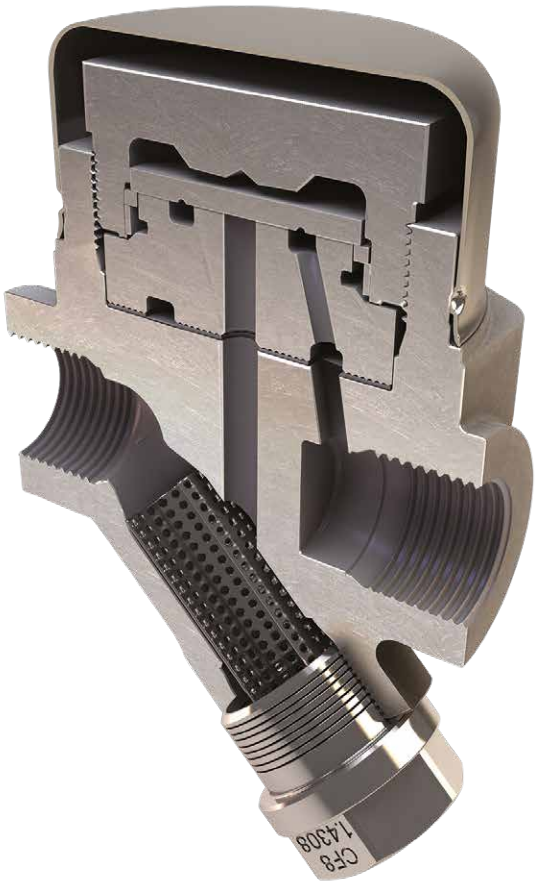
How a thermodynamic steam trap works

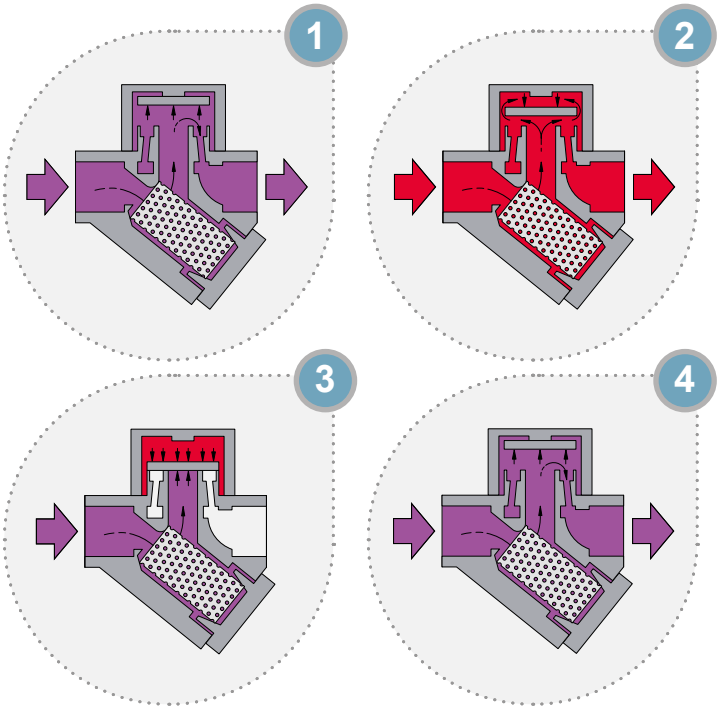
1. On start-up, incoming pressure raises the disc and cooled condensate is immediately discharged.

2. Hot condensate flowing through the trap releases flash steam. High velocity creates a low pressure area under the disc and draws it towards the seat.

3. At the same time there is a pressure build-up of flash steam in the chamber above the disc which forces it down against the pressure of the incoming condensate until it seals on the inner ring and closes the inlet. The disc also seals on the outer ring and traps pressure in the chamber.

4. Pressure in the chamber is decreased by condensation of the flash steam and the disc is raised. The cycle is then repeated.





6.1 TD120M

The TD120M is an alloy steel steam trap, incorporating a stainless steel strainer and has a replaceable seat for easy maintenance. A disc controls the condensate and it has a low capacity suitable for mains drainage. It has low capacity specifically designed for superheated mains drainage applications up to 250 bar g.

Sizes	½" to 1"
Body material	Alloy
Connections	BW / SW / flanged
Piping configuration	In-line horizontal
Maximum Operating Pressure (PMO)	3190 psi g @ 824°F
Maximum load (lb/hr)	594
100% cold water hydraulic test	Yes

6.2 TD62M & TD62LM

The TD62LM and TD62M have an integral strainer and a replaceable seat. They have been specifically designed for mains drainage applications up to 62 bar g. The TD62LM is suitable for relatively small condensate loads on superheat and mains drainage applications. An insulating cover is fitted as standard to prevent excessive heat loss when subjected to low outside temperatures.

Sizes	½" to 1"
Body material	Steel
Connections	NPT / flanged
Piping configuration	In-line horizontal
Maximum Operating Pressure (PMO)	900 psi g @ 900 °F
Maximum load (lb/hr)	TD62M = 924 TD62LM = 418
100% cold water hydraulic test	Yes

6.3 UTD52L

The UTD52L is ideal for steam main drainage and steam tracing applications, particularly where space is limited. It also has the added benefit that it can be installed in vertical or horizontal piping. Using the PC20 pipeline connector will provide an in-line strainer for added protection against dirt.

Sizes	Universal
Body material	Stainless steel
Connections	Pipeline Connector
Piping configuration	In-line
Maximum Operating Pressure (PMO)	450 psi g UTD52H + UTD52L
Maximum load (lb/hr)	UTD52H 1650 lb/hr UTD52L 660 lb/hr (@ 290 psi g)
100% cold water hydraulic test	Yes

6.4 UTD52L-HP

The UTD52L-HP is a stainless steel thermodynamic trap specifically designed for higher pressure applications.

Sizes	Universal
Body material	Stainless steel
Connections	Pipeline connector
Piping configuration	In-line
Maximum Operating Pressure (PMO)	609 psi g
Maximum load (lb/hr)	770 lb/hr
100% cold water hydraulic test	Yes

6.5 TDC46M & TDS46M

The TDC46M and TDS46M are specifically designed for low capacity applications up to 46 bar g. As standard the unit is available with either screwed, socket weld or flanged connections.

Sizes	½" to 1"
Body material	TDC46M (Carbon steel) TDS46M (Stainless steel)
Connections	BSP / NPT / SW & flanged
Piping configuration	In-line horizontal
Maximum Operating Pressure (PMO)	TDS46M 46 bar g @ 450°C TDS46M 46 bar g @ 425°C
Maximum load (kg/hr)	260 kg/hr
100% cold water hydraulic test	Yes

6.6 UTDS46M

The UTDS46M is made of stainless steel with an integral strainer and air vent. It is attached to a suitable pipeline connector by two screws for easy installation, maintenance and replacement.

Sizes	Universal
Body material	Stainless steel
Connections	Pipeline connector
Piping configuration	Horizontal / vertical
Maximum Operating Pressure (PMO)	667 psi g @ 797°F
Maximum load (lb/hr)	572 lb/hr
100% cold water hydraulic test	Yes

7 Steam trapping

BIMETALLIC THERMOSTATIC STEAM TRAPS

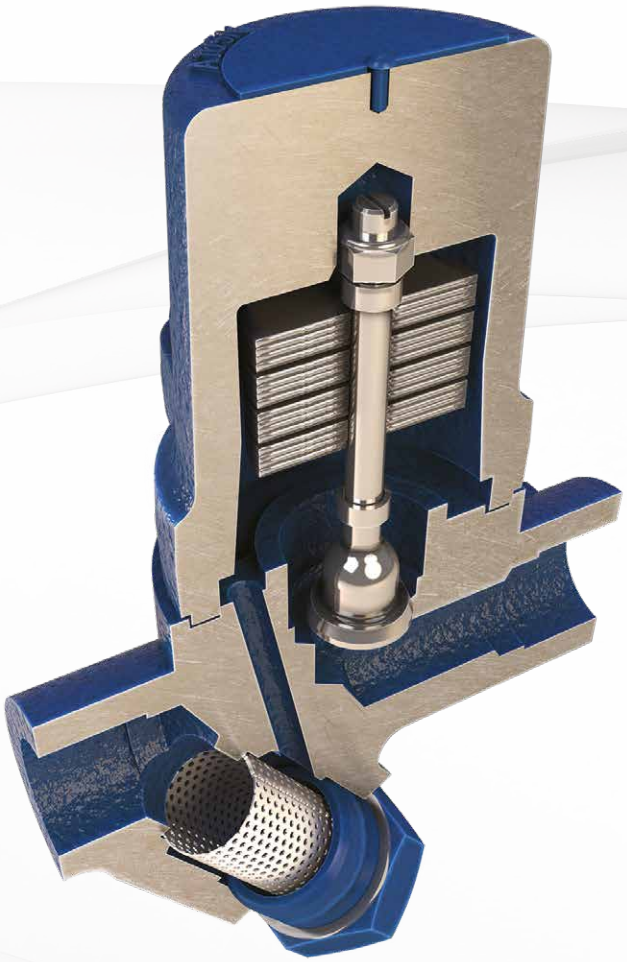
These traps are primarily used to control the release of condensate, so that its sensible heat can be utilized and energy losses caused by flash steam on discharge reduced. These factors are all important in today's energy conscious world.

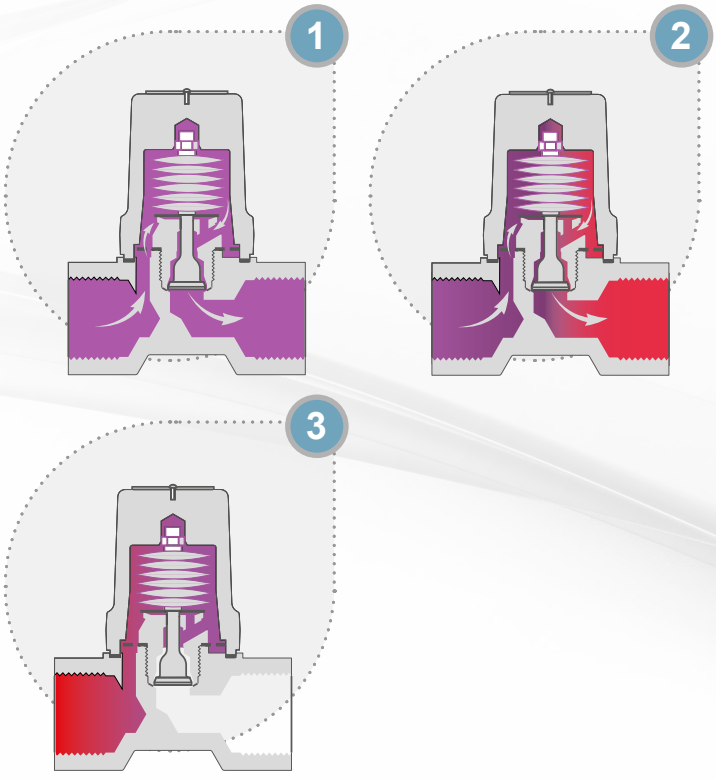
How a bimetallic thermostatic steam trap works

1. On start-up, the bimetallic element is relaxed and the valve is open. Cooled condensate, plus air, is immediately discharged.

2. Hot condensate flowing through the trap, heats the bimetallic element causing it to pull the valve towards the seat.

3. As the hot condensate is discharged and approaches steam saturation temperature the bimetallic element closes the valve. When there is no flow through the trap, the condensate surrounding the element cools causing it to relax and the upstream pressure opens the valve. Condensate is discharged and the cycle repeats.





7.1 HP45

The BK45 is made of carbon steel and designed for draining high pressure, high temperature steam lines and processes. It has a reinforced stainless steel insert within the body and can be repaired in-line. It operates with no loss of steam, and quickly drains air, non-condensable gases and large quantities of cold water on start-up.

Sizes	½", ¾" and 1"
Body material	Carbon steel
Connections	NPT, SW, BW, Flanged
Piping configuration	In-line horizontal
Maximum Operating Pressure (PMO)	600 psi g
Maximum load (lb/hr)	1200 lb/hr
100% cold water hydraulic test	Optional

7

7.2 SM Series (80,100,150)

The Spirax Sarco SM bimetallic steam trap range are made of forged alloy steel, and designed for draining high pressure, high temperature steam lines and processes. They are designed for high pressure steam, have a reinforced stainless steel insert within the body and can be repaired in-line. They operate with no loss of steam, and quickly drain air, non-condensable gases and large quantities of cold water on start-up.

	SM80	SM100	SM150
Sizes	½", ¾" and 1"	½", ¾" and 1"	½", ¾" and 1"
Body material	Alloy steel	Alloy steel	Alloy steel
Connections	SW, BW	SW, BW	SW, BW
Piping configuration	In-line horizontal	In-line horizontal	In-line horizontal
Maximum Operating Pressure (PMO)	1160 psi g @ 885°F	1450 psi g @ 885°F	2175 psi g @ 885°F
Maximum load (lb/hr)	1760 lb/hr	1760 lb/hr	1760 lb/hr
100% cold water hydraulic test	Optional	Optional	Optional

7.3 SMC32Y & SMC32

The SMC32Y and SMC32 are designed for installation in any horizontal or vertical position. They are made from carbon steel, easily maintained and recyclable. The SMC32 has an integral flat strainer screen and the SMC32Y has an integral cylindrical Y-type strainer and optional blowdown valve.

	SCM32Y
Sizes	½", ¾", and 1"
Body material	Carbon steel
Connections	NPT, SW, Flange ANSI 150 & 300
Piping configuration	In-line horizontal
Maximum Operating Pressure (PMO)	450 psi g
Maximum load (lb/hr)	1980 lb/hr
100% cold water hydraulic test	No (option)

7.4 USM21

The USM21 is a pre-set, maintenance free sealed stainless steel steam trap. It has been designed for applications such as steam tracing and steam mains drainage. When installed with a suitable pipeline connector, the USM21 can easily be removed with minimum system downtime.

Sizes	Universal
Body material	Stainless steel
Connections	Pipeline Connector
Piping configuration	In-line
Maximum Operating Pressure (PMO)	305 psi g @ 752°F
Maximum load (kg/hr)	990 lb/hr
100% cold water hydraulic test	Yes

8 Steam trapping

INVERTED BUCKET STEAM TRAPS

Our inverted bucket steam traps employ a well-proven principle which relies on the difference in density between steam (a vapor) and condensate (a liquid). They have a robust design and incorporate a simple density sensitive bucket and lever mechanism.

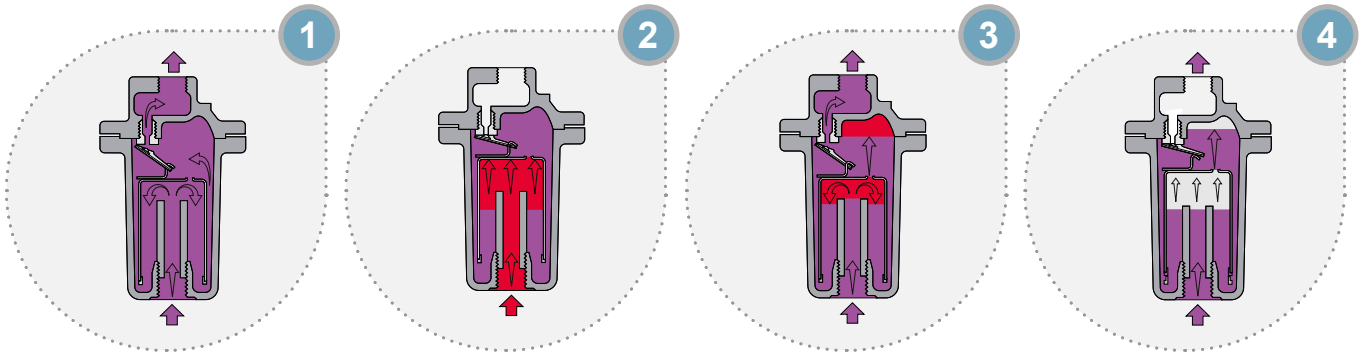
How an inverted bucket steam trap works

1. As condensate reaches the trap it forms a water seal inside the body. The weight of the bucket keeps the valve off its seat. Condensate can then flow around the bottom of the bucket and out of the trap.

2. When steam enters the underside of the bucket it gives it buoyancy and the bucket rises. This positions the lever mechanism such that the main valve 'snaps' shut due to flow forces.

3. The bucket will lose its buoyancy as the enclosed steam condenses due to radiation losses and steam escapes through the vent hole. Once this happens the weight of the bucket will pull the valve off its seat and the cycle is then repeated.

4. Any air reaching the trap will also give the bucket buoyancy and close the valve preventing condensate flow. The small vent hole positioned at the top of the bucket will bleed air into the top of the trap. Because the vent hole at the top of the bucket is small in diameter it will vent air very slowly. Where the venting of air may be a particular problem, this can be overcome simply by fitting an external air vent in parallel.



8.1 SIB30/SIB30H

The SIB30 and SIB30H are stainless steel sealed inverted bucket steam traps. They are non-adjustable and require no maintenance. They are supplied with a specified pressure range assembly depending on the required operating pressure differential. As standard, traps for 45 bar g are also provided with an inbuilt check valve.

Sizes	½" and ¾"
Body material	Stainless steel
Connections	BSP or NPT, SW & flanged
Piping configuration	In-line horizontal
Maximum Operating Pressure (PMO)	435 psi g
Maximum load (lb/hr)	SIB30 - 638 lb/hr SIB30H - 990 lb/hr
100% cold water hydraulic test	No

8.2 UIB30/UIB30H

The UIB30 and UIB30H are sealed inverted bucket steam traps for either horizontal or vertical installation. Designed for higher capacities, when installed with a suitable pipeline connector, the UIB can easily and simply be removed without breaking into the pipeline, thus reducing system downtime.

Sizes	Universal
Body material	Stainless steel
Connections	Pipeline connectors
Piping configuration	In line horizontal or vertical
Maximum Operating Pressure (PMO)	435 psi g @ 455°F
Maximum load (lb/hr)	UIB30 638 lb/hr UIB30H 990 lb/hr
100% cold water hydraulic test	No

8.3 IBV Series

The IBV series are manufactured using alloy steel and carbon steel (including A350 LF2) for the body and cover; with internal components being made of stainless steel. It is suitable for use with saturated and superheated steam and in high pressure and high temperature applications. The IBV is fully automatic and has been designed in such a way that there is minimal friction from mechanism movement; valve closure is immediate, without any steam loss and the discharge action is positive with no equivocal phases.

	Series Z	Series C	Series C-LF2
Sizes	½" to 3"	½" to 3"	½" to 3"
Body material	Alloy steel	Carbon steel	Carbon steel
Connections	SW, BSP, NPT & flanged	SW, BSP, NPT & flanged	SW, BSP, NPT & flanged
Piping configuration	In-line vertical	In-line vertical	In-line vertical
Maximum Operating Pressure (PMO)	1793 psi g @ 621°F	1687 psi g @ 613°F	1687 psi g @ 613°F
Maximum Load (lb/hr)	30,800 lb/hr	30,800 lb/hr	30,800 lb/hr
100% cold water hydraulic test	Yes	Yes	Yes

8.4 SCA Series

The SCA Series is a carbon steel inverted bucket steam trap, with in-line connections and an integral strainer. The complete unit is readily maintainable and they are suitable for a wide range of pressures.

Sizes	½" to 1"
Body material	Carbon steel
Connections	SW, BSP, NPT & flanged
Piping configuration	In-line horizontal
Maximum Operating Pressure (PMO)	604 psi g @ 489°F
Maximum load (lb/hr)	1320 lb/hr
100% cold water hydraulic test	Yes

9 Steam trapping

BALANCED PRESSURE THERMOSTATIC STEAM TRAPS

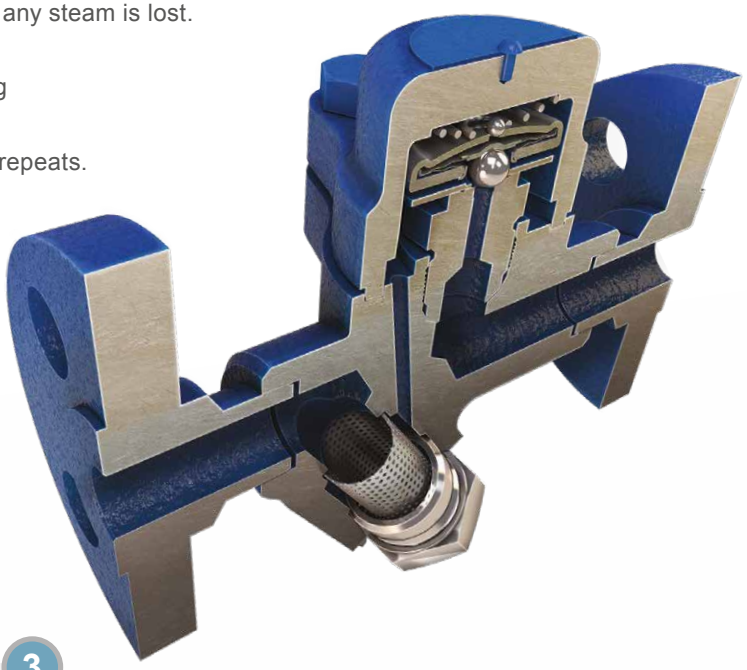
We have been manufacturing balanced pressure thermostatic steam traps for over 70 years. Continuous investment in product development has resulted in a world leading design.

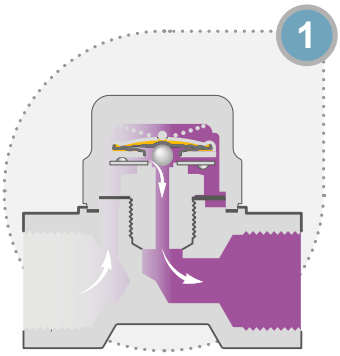
How a balanced pressure thermostatic steam trap works

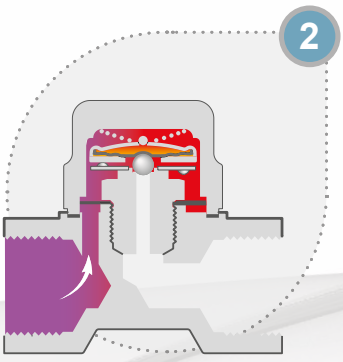
1. On start-up, cold air and condensate enter the trap. As the capsule is also cold, the valve is open and the air and condensate are discharged.

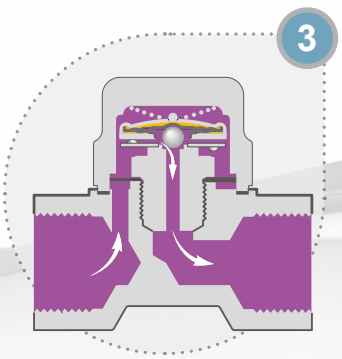
2. The capsule warms up as the condensate approaches steam temperature. Its liquid filling boils, and the resultant vapor pressure acting on the diaphragms pushes the valve head towards the seat, fully closing at the selected discharge temperature before any steam is lost.

3. As the condensate within the trap cools, the vapor filling condenses and the internal capsule pressure falls.
The valve reopens, discharges condensate and the cycle repeats.









9.1 BPC32Y

The BPC32Y is made of carbon steel with straight connections and has an integral cylindrical Y-type strainer. It has been designed for installation in any position, horizontal or vertical. The 'Y' pattern configuration allows the strainer screen to be easily removed for ease of inspection and maintenance.

Sizes	½" to 1"
Body material	Carbon steel
Connections	SW, NPT, BSP, BW & flanged
Piping configuration	In-line horizontal
Maximum Operating Pressure (PMO)	464 psi g @ 538°F
Maximum load (lb/hr)	3960 lb/hr
100% cold water hydraulic test	Optional

9.2 BPC32YF

The BPC32YF has an integral cylindrical Y-type strainer and has flanged straight connections. It is a carbon steel bodied and maintainable steam trap.

Sizes	DN15, DN20 and DN25
Body material	Carbon steel
Connections	Flanged
Piping configuration	In-line horizontal
Maximum Operating Pressure (PMO)	464 psi g @ 538°F
Maximum load (lb/hr)	3960 lb/hr
100% cold water hydraulic test	No

9.3 MST21

The MST21 has been designed for relatively small condensate loads and for installation in a vertical line with the outlet at the bottom to ensure self-draining. It is manufactured in stainless steel and is easily maintained.

Sizes	¼", ⅜" and ½"
Body material	Austenitic stainless steel (303)
Connections	BSP or NPT
Piping configuration	Vertical
Maximum Operating Pressure (PMO)	305 psi g @ 455°F
Maximum load (lb/hr)	990 lb/hr
100% cold water hydraulic test	Yes

9.4 UBP32

The UPB32 is a sealed, low maintenance stainless steel steam trap for use with pipeline connectors. It is suitable for operating pressures up to 32 bar g. It can also be supplied with an inbuilt check valve (UBP32CV).

Sizes	Universal
Body material	Austenitic stainless steel (304 grade)
Connections	Pipeline Connector
Piping configuration	In line horizontal/vertical
Maximum Operating Pressure (PMO)	464 psi g @ 462°F
Maximum load (lb/hr)	1320 kg/hr
100% cold water hydraulic test	Yes

10 Steam trapping

BALL FLOAT MECHANICAL STEAM TRAPS

Ball float (FT) mechanical steam traps have an integral air vent as standard and the options of a manually adjustable needle valve (SLR - steam lock release mechanism) and drain cock tapping. The FT range is adaptable to all applications where ball float traps are recommended and instantaneous removal of condensate is required.

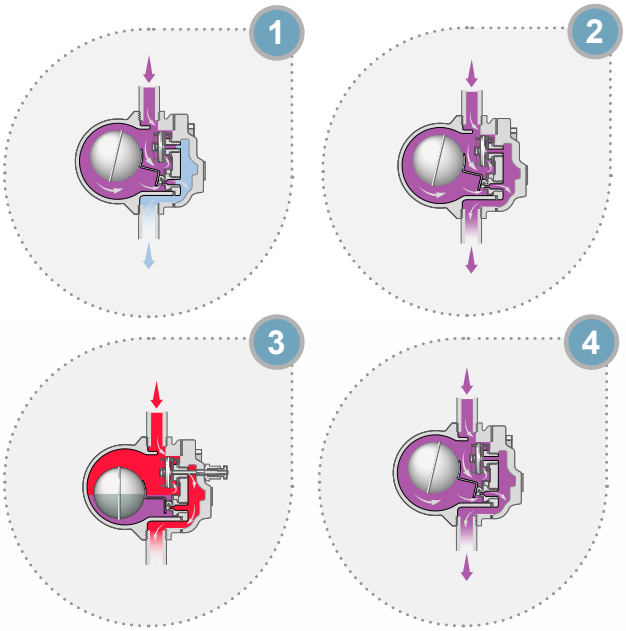
How a ball float mechanical steam trap works

1. On start-up a thermostatic air vent allows air to bypass the main valve (1) which would otherwise be unable to escape (a condition known as 'air-binding').

2. As soon as condensate reaches the trap, the float is raised and the lever mechanism opens the main valve. Hot condensate closes the air vent but continues to flow through the main valve.

3. When steam arrives the float drops and closes off the main valve, which remains at all times below the water level, ensuring that live steam cannot be passed.

4. As the steam condenses, the float rises allowing condensate to be released.



10.1 FTB-125 & FTB-200

The cast steel FTB series contains a float valve mechanism which modulates to discharge condensate continuously at steam temperature. Typical applications for the FTB-125 & FTB-200 are process heat exchange equipment, particularly when controlled by a modulating temperature control valve; unit heaters and air heating coils.

Sizes	2-1/2"
Body material	Cast steel
Connections	NPT, SW
Piping configuration	In-line horizontal
Maximum Operating Pressure (PMO)	FTB-125: 125 psig, FTB-200: 200psig
Maximum Load (lb/hr)	FTB-125: 100,000 lb/hr FTB-200: 69,400 lb/hr

10.2 FT450

The cast carbon steel FT450 contains a float which modulates to match load and discharges condensate continuously at steam temperature, while non-condensable gases are released by a separate internal thermostatic air vent.

Sizes	¾, 1" 1½", 2", 3" and 4"
Body material	Cast carbon steel
Connections	SW/flanged
Piping configuration	In-line horizontal
Maximum Operating Pressure (PMO)	450 psi g
Maximum load (lb/hr)	220,000 lb/hr
100% CWT	Yes

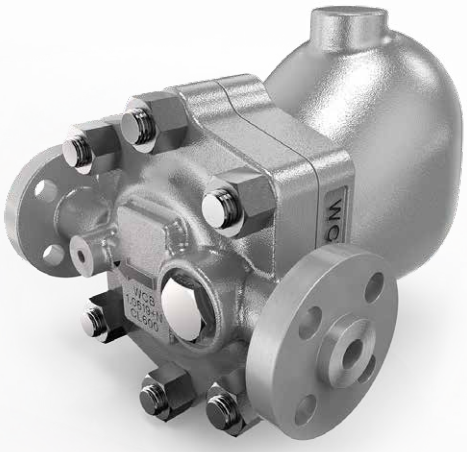
10.3 FTC80

As standard, the FTC80 ball float steam trap is supplied with a right to left (R-L) flow configuration and horizontal connections with the provision to add an air venting option. It has been designed for floor mounting and is suitable for most high-pressure process and drainage applications. It's simple robust ball float mechanism ensures excellent resistance to waterhammer. All internals are easily accessible for in-line maintenance and a drain port allows full body drainage. It has a large maintainable strainer screen that extends service intervals and is located in an accessible flanged chamber.

Sizes	1½" and 2"
Body material	Cast steel
Connections	SW/flanged
Piping configuration	In-line horizontal
Maximum Operating Pressure (PMO)	1160 psi g @ 563°F
Maximum Load (lb/hr)	13,310 lb/hr
100% cold water hydraulic test	Yes

10.4 FTC62 / FTS62

The ideal solution for applications that require fast and efficient condensate removal, our new FT62 high pressure float trap is highly reliable and robust. With features such as integral air vent and strainer the FT62 has been designed specifically for drainage of high pressure process applications.



	FTC62	FTS62
Sizes	½", ¾" and 1"	½", ¾" and 1"
Body material	Carbon steel	Stainless steel
Connections	NPT, SW, Flanged	SW, BSP, NPT & flanged
Piping configuration	In-line horizontal	In-line horizontal
Maximum Operating Pressure (PMO)	NPT/SW: 1160 psig @ 465F, Flanged: 915 psig @ 536F	915 psi g @ 536°F
Maximum load (lb/hr)	2646 lb/hr	2640 lb/hr
100% cold water hydraulic test	Yes	Yes

11 Liquid drainers

BALL FLOAT LIQUID DRAINERS

We offer a wide range of liquid drainers that are available to remove liquid from air and gas systems, they reduce corrosion and will improve system efficiency.

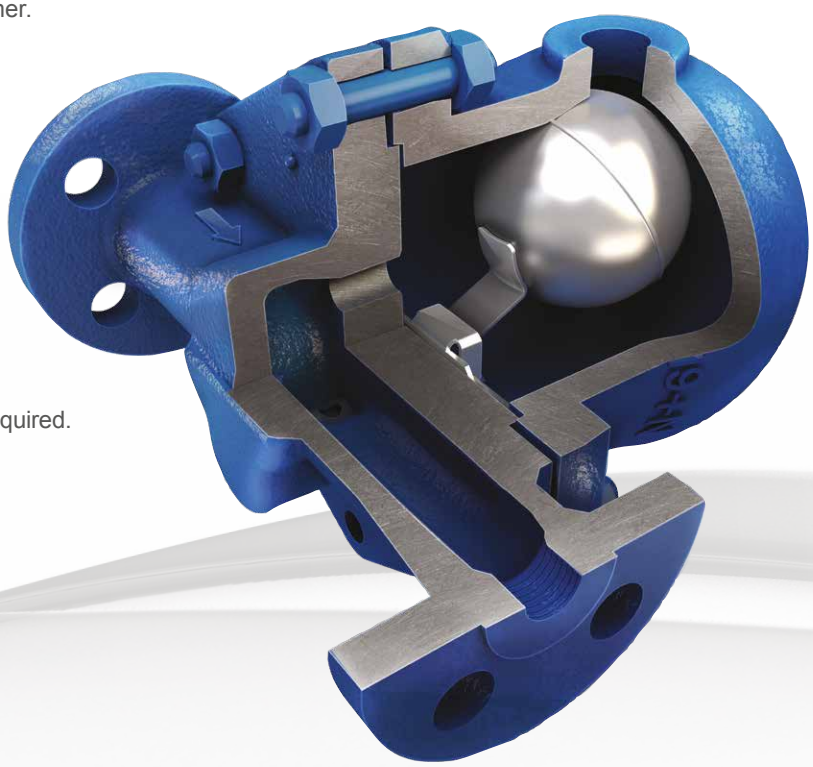
Our liquid drain traps can handle liquids with a specific gravity as low as 0.5, and they are available in a wide variety of sizes, end connections and construction materials.

How a liquid drainer works

What's unique about all ball float drainers is the self-aligning main valve assembly, which is resistant to waterhammer.

Such attention to detail ensures complete shut-off at all pressures, and reliable operation providing extended product life and minimal maintenance requirements.

With drain cock and balance pipe tappings, together with the choice of body materials, our ball float liquid drainer range is adaptable to all applications where these are recommended and where instantaneous removal of condensate is required.



11.1 CAS14 & CA46S

The CAS14 & CA46S are stainless steel ball float liquid drainers, which discharges continuously in direct response to variations in liquid flow rate, assuring thorough drainage of the system. The CAS14 & CA46S are typically used in process applications requiring an austenitic stainless steel liquid drain trap.

	CAS14	CA46S
Sizes	1/2", 3/4", 1"	1/2", 3/4", 1"
	CA46S-4.5 & CA45S-21: 1 1/2", 2"	
Body material	Stainless Steel	Stainless Steel
Connections	NPT, SW	ANSI 150, ANSI 300
Piping configuration	In-line horizontal	In-line horizontal
Maximum Operating Pressure (PMO)	200 psig	304 psig
Maximum load (lb/hr)	900	N/A
100% cold water hydraulic test	Yes	Yes

11.2 FA-30, FA-75, FA-150

The FA-30,75,150 are float operated liquid train traps, which discharge continuously in direct response to variations in liquid flow rate. Typical applications for the FA-30,75,150 include receiver and air line drainage.

Sizes	3/4", 1", 1-1/2", 2"
Connections	NPT
Construction	cast iron body, stainless steel internals

Max operating pressure	FA-30: 30psig, FA-75: 75psig, FA-150: 150 psi g
Maximum load:	??
100% cold water hydraulic test	Yes

11.3 FA450

The FA450 is a float-operated liquid drain trap which discharges continuously in direct response to variations in liquid flow rate, ensuring thorough drainage of the system.

Sizes	3" and 4"
Body material	Carbon steel
Connections	NPT, SW, flanged
Piping configuration	In-line horizontal
Maximum Operating Pressure (PMO)	450 psi g
Maximum load (lb/hr)	220,000 lb/hr
100% cold water hydraulic test	Yes

12 UNIVERSAL CONNECTORS

SOLUTIONS & TRAP STATIONS

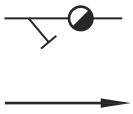
In steam and condensate systems, damage to a plant is frequently caused by pipeline debris such as scale, rust, jointing compound, weld metal and other solids which may find their way into the pipeline system.

We have developed a range of products that will help to maximize the safety and efficiency of your customer's steam and condensate system, including pipeline connectors and isolation valves.

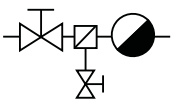
Pipeline connectors

PC10HP
up to 928 psi g @ 536°F

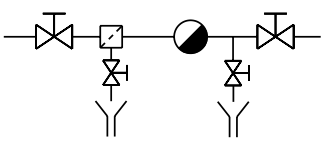
PC20
up to 464 psi g @ 462°F



PC3000 series
up to 900 psi g @ 534°F



PC4000 series
up to 900 psi g @ 534°F

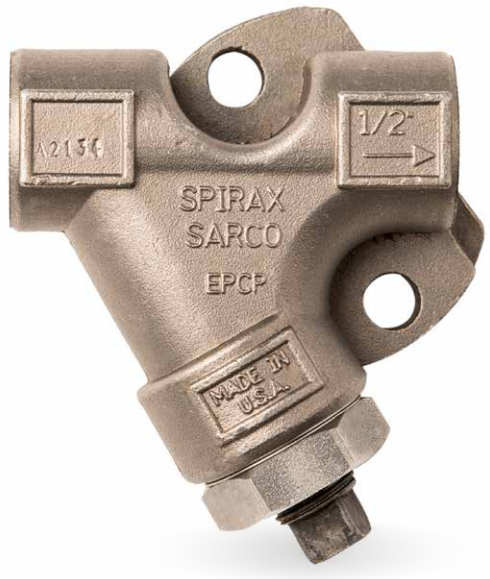


Steam trap connectors

12.1 PC10HP

The PC10HP is designed for use with swivel connector steam traps. The principle being that the pipeline connector can be fitted into the pipeline, either horizontally or vertically. The steam trap can be fitted afterwards to the connector and can be rotated to ensure that the trap is in the horizontal plane.

Sizes	DN15, DN20 and DN25
Body material	Austenitic stainless steel type 304
Connections	BSP, NPT AND SW
Piping configuration	In-line horizontal
Maximum Operating Pressure (PMO)	900 psi g @ 536°F
Maximum load (lb/hr)	N/A
100% cold water hydraulic test	Optional



12.2 PC20

The PC20 range of pipeline connectors are designed to give a universal flow direction when used with the following pipeline connector steam traps: UTD30, UTDS46M, UBP21, UBP32, UFT14, UFT32, UIB30 and UIB30H. The integral strainer screen provides protection for the selected steam trap where system conditions require. There is also an optional blowdown valve which can be used periodically to remove any pipeline debris.

Sizes	DN15, 20 and 25
Body material	Austenitic stainless steel
Connections	BSP, NPT AND SW
Piping configuration	In-line horizontal
Maximum Operating Pressure (PMO)	464 psi g @ 462°F
Maximum load (lb/hr)	N/A
100% cold water hydraulic test	Yes

12.3 PC3000

The PC3000 pipeline connector has an integral piston type stop valve which isolates upstream of the steam trap. It was designed for use with swivel connector steam traps, however, it is also available with connections for draining upstream pipework and venting the pipework immediately upstream of the steam trap.

	PC3000	PC3000C
Sizes	DN15, DN20	DN15, DN20
Body material	Austenitic stainless steel	ASTM A105N & A350 LF2 carbon steel
Connections	SW, NPT, BSP	SW, BSP, NPT
Piping configuration	In-line horizontal	In-line horizontal
	Consult Spirax Sarco for other piping configuration	
PMO Maximum Operating Pressure (for saturated steam service)	900 psi g @ 534°F	1160 psi g @ 563°F
Maximum load (lb/hr)	N/A	N/A
100% cold water hydraulic test	Yes	Yes

12.4 PC4000

The PC4000 pipeline connector is specifically for use with swivel connector steam traps. It has two integral stop valves which isolate upstream and downstream of the steam trap. The stop valves are piston type. It is available with connections for the draining of pipework, venting upstream and trap testing downstream of the steam trap.

A 10 year warranty is offered for the trap station and attached trap. This warranty is valid for properly sized, selected and installed traps, free of dirt, debris, and corrosion.

	PC4000	PC4000C
Sizes	DN15, DN20	DN15, DN20
Body material	Austenitic stainless steel	ASTM A105N & A350 LF2 carbon steel
Connections	SW, NPT and BSP	SW, BSP, NPT
Piping configuration	In-line horizontal	In-line horizontal
	Consult Spirax Sarco for other piping configuration	
PMO Maximum Operating Pressure (for saturated steam service)	900 psi g @ 534°F	1160 psi g @ 563°F
Maximum load (lb/hr)	N/A	N/A
100% cold water hydraulic test	Yes	Yes

12.5 BDV1 & BDV2

The BDV depressurisation valves are designed to drain, blowdown, purge and vent, or depressurize pipework. The BDV1 provides discharge through the valve, generally to be used as a drain or for line depressurization, where discharge is directed to grade and/or atmosphere.

The BDV2 provides side connection discharge, generally being used as a vent for top pipe mounting or for line depressurization, to ensure discharge is piped to grade and/or atmosphere.

Both valves can be fitted to PC3000 and PC4000.

Sizes	BDV1 ⅜" and ½" BDV2 ⅜", ½"
Body material	Stainless steel
Connections	BSP, NPT, SW
Piping configuration	N/A (Fitted to product)
Maximum Operating Pressure (PMO)	1233 psi g
Maximum load (lb/hr)	N/A

12.7 FLASH RECOVERY VESSELS

Flash Recovrey Vessels separate flash steam from condensate. The flash steam is piped away from the top of the vellel where the remaining condensate drains from the bottom of the vessel to a steam trap.

Sizes	6",8", 12", 16"
Body material	Mild Steel
Connections	ANSI 150 RF & NPT
Maximum Operating Pressure	150 psi g

12.8 FIG 34

The Fig 34 is an integrally flanged Y-type strainer designed to remove rust, scale and other debris from the pipeline.

Sizes	1/2" to 2", 3", 4", 6", 8"
Body material	Carbon Steel
Connections	ANSI 150 & ANSI 300
Maximum saturated steam pressure	ANSI 150: 190 psi g, ANSI 300: 435 psi g
Standard stainless steel screen	1/2"-3": 1/32", 4"-8": 1/8"

12.9 CT

The CT strainer is a carbon steel Y-type strainer designed for higher pressure applications. The CT strainer complies with ASME B31.3 - Chemical Plant and Refinery Piping standards.

Sizes	1/2" to 2"
Body material	Carbon Steel
Connections	NPT
Max saturated steam pressure	984 psi g
Standard stainless steel screen	20 mesh

Separators

12.10 S4A

The S4A is a fabricated steel separator used to improve the quality of steam or compressed air within the distribution system or n the supply inlet to equipment. The S4A is typically used on steam mains as a trip station ahead of steam pressure reducing or temperature control valves.

Sizes	½" – 18"
Body material	Fabricated steel
Connections	½"-2": NPT, SW; 2 ½"-6": ANSI 150 or ANSI 300; 8" – 18": ASNI 150, ANSI 300, ANSI 600
Maximum Operating Pressure	½"-2": 600 psi g; 2 ½"-6": 150/300 psi g; 8"-18": 150/300/600 psi g
Max steam flow	22,000 lb/hr (up to 6"), 670,080 (up to 18")

12.11 S5

The S5 is a carbon steel baffle type separator used for the removal of entrained liquids in steam, compressed air ad gas systems.

Sizes	½" to 2"
Body material	Carbon Steel
Connections	NPT, SW, BW, Flanged ANSI 150 or ANSI 300
Max operating pressure	ASME 150: 218 psi g; NPT, SW, BW, ASME 300: 600 psi g
Max steam flow	22,000 lb/hr

12.12 S6

The S6 is an austenitic stainless steel baffle type separator used for the removal of entrained liquids in steam, compressed air ad gas systems.

Sizes	½" to 2"
Body material	Stainless Steel
Connections	NPT, SW, BW, Flanged ANSI 150 or ANSI 300
Max operating pressure	ASME 150: 165 psi g; ASME 300: 405 psi g; NPT, SW, BW: 495 psi g
Max steam flow	22,000 lb/hr

Bellows Sealed Stop Valves

12.13 BSA3T

The BSA3T is a low maintenance, flanged in-line Bellows Sealed Isolation Valve for use on steam, condensate, gas and other fluid applications where zero emissions from the stem seal are important. The BSA3T is fitted with a throttling valve plus that allows close control when opening the valve.

Sizes	½" – 8"
Body material	Cast Steel
Connections	ANSI 150 and ANSI 300
Body Design	ANSI 300

12.14 A3S

The A3S is a Class 800 bellows sealed isolation valve used on steam, gas, liquid, condensate and water systems. The metallic bellows replaces the conventional stem packing and acts as an impervious barrier between the fluid and environment. This design guarantees zero emissions from the stem seal.

Sizes	½" – 2"
Body material	Forged Steel
Connections	NPT, SW
Body Design	ANSI Class 800

Check Valves

12.17 DCV4

The DCV4 Wafer Check Valve is designed to be fitted between ANSI flanges. It is suitable for use on a wide range of fluids for applications in process lines, hot water systems, steam and condensate systems.

Sizes	½", ¾", 1", 1 ½", 2", 3", 4"
Body material	Austenitic Stainless Steel
Connections	ANSI 150 or ANSI 300
Standard Internals	Disk: Metal-Metal Seat; Spring: Stainless Steel
Maximum Operating Pressure	725 psi g

12.18 DCV10

The DCV 10 disc check valve has been designed specifically for use with Spirax Sarco's APT14HC and APT14SHC automatic pump traps. The check valve ensures the correct flow of condensate and other suitable fluids through these condensate pups and also prevents reverse flow.

Sizes	1 ½"
Body material	Austenitic Stainless Steel
Connections	ANSI 150 and ANSI 300
Max Operating Pressure	718 psi g at 32F

12.19 SDCV44

A range of austenitic stainless steel split disc check valves in a wafer pattern suitable for fitting between ANSI Class 150 and Class 300 flanges. Their function is to prevent reverse flow on a wide variety of fluids for applications in process lines, hot water systems, steam and condensate systems.

Sizes	2", 3", 4"
Body material	Austenitic Stainless Steel
Connections	ANSI 150 and ANSI 300
Max Operating Pressure	720 psi g

13 Air eliminators

AUTOMATIC AIR & GAS VENT

Our range of air eliminators provide a complete solution that helps reduce noise, corrosion and the maintenance costs. They can be used to help prevent:

- The build-up of air and gases in liquid systems
- Air locks that inhibit both the filling of systems and the priming of pumps
- Inaccuracies in meter readings and in the operation of regulating valves.

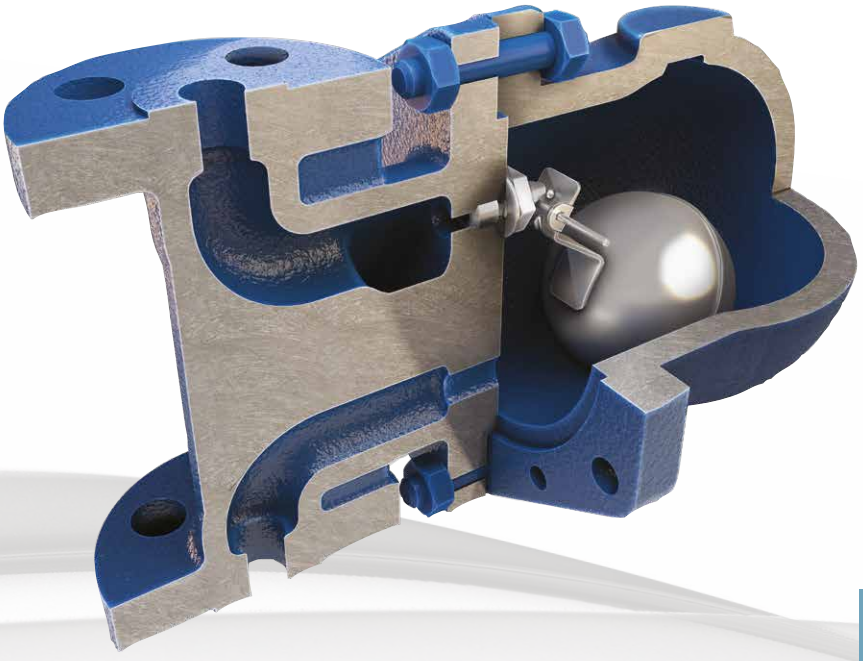
How air eliminators work

Our automatic air and gas vents use a simple float and lever valve assembly, which opens to air and gases, and closes tightly against water or liquids.

At start-up, the vent is open to allow gases to pass through the main valve. As soon as liquid reaches the vent the float is raised and the lever mechanism closes the valve. When more gases reach the vent it displaces the liquid and the float falls, opening the valve. After the gas is discharged the liquid level rises to replace the gas and the valve closes.

The check valve is essential where there is a possibility of the system operating under negative head conditions. It will prevent air being drawn back into the system.

Once fitted, our automatic air and gas vents require no adjustment, either on start-up or under running conditions. Operation is automatic over a variety of light or heavy duty applications.



13.1 AE44S

The AE44S is a stainless steel float type automatic air and gas vent for liquid systems.

Sizes	DN15, DN20 and DN25
Body material	Carbon steel
Connections	Flanged, BSP, NPT
Piping configuration	In-line vertical
Maximum Operating Pressure (PMO)	580 psi g (max 464 psi g differential pressure)
Maximum load (lb/hr)	43 cfm
100% cold water hydraulic test	Yes

13.2 AE50S

The AE50S is a stainless steel automatic air and gas vent. It is maintenance free and designed for use on liquid systems.

Sizes	Inlet - ¾" female Outlet - ½" female
Body material	Austenitic stainless steel
Connections	BSP or NPT
Piping configuration	Vertical
Maximum Operating Pressure (PMO)	600 psi g @ 86°F
Maximum load (lb/hr)	25 cfm
100% cold water hydraulic test	Yes

		APPLICATION											
		MAINS DRAINAGE				CRITICAL TRACING		NON CRITICAL TRACING		INSTRUMENT TRACING	PROCESS		
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		APPLICATION											
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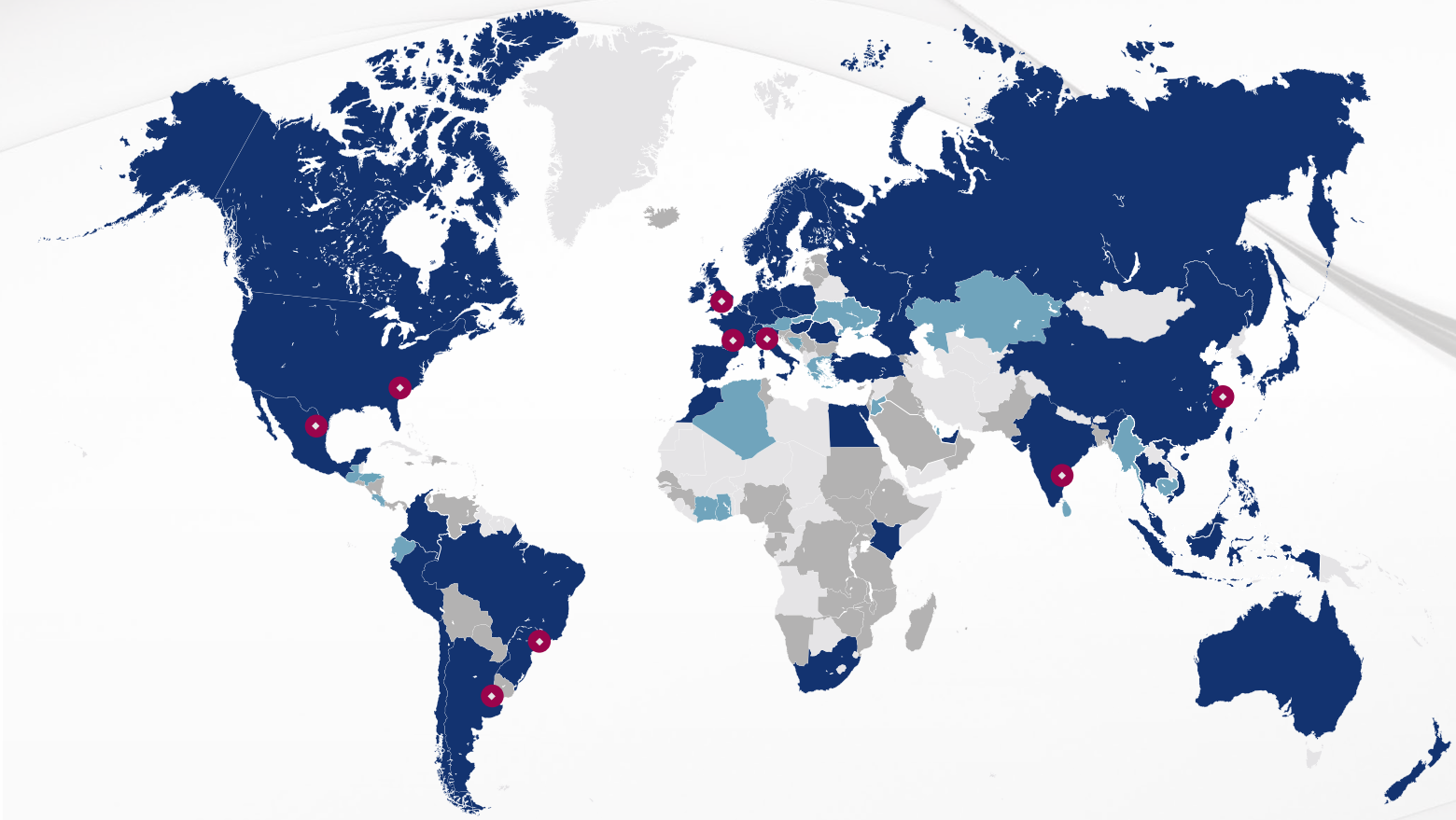
44	PC3000C/4000C		•	•	•	•	•	•	•				
45	BDV1/2		•	•	•	•	•	•	•				



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