

Safety Valves

Expertise and solutions for steam, gas and liquid applications

**MECHANICAL
SOLUTIONS**



First for Steam Solutions

EXPERTISE | SOLUTIONS | SUSTAINABILITY

spirax
sarco

Spirax Sarco...the expert source for all your safety valve needs

The total solution

When system pressures mount, you can turn to Spirax Sarco for all your relief needs.

From recommendations for your OEM or plant maintenance safety valve design requirements, to safety valve selection and sizing, pressure setting, and installation and maintenance, Spirax Sarco has the products, technology and know-how to keep your systems safe.

Spirax Sarco supplies all the equipment—the strainers, pressure reducing valves, pressure gauges, ball valves, safety valves, drip pan elbows, steam traps and separators. Components can be provided separately or assembled into complete pressure reducing valve stations that incorporate every component your system requires.

Our solution benefits continue well after your systems have been equipped with reliable safety valves and related components. Each valve is protected under the Spirax Sarco warranty, and our customers have access to expert troubleshooting and free technical phone support.

When you need it. Spirax Sarco maintains deep inventories on a broad array of safety valves. Chances are excellent we have the exact valve you need in stock. Plus, our technicians complete all necessary pressure settings at our setting facilities using our own boiler and state-of-the-art test equipment. We provide fast delivery of the right solution.

Protecting people

A company's most valued asset is secure in the knowledge that their safety has been put first.

Protecting plant

Safeguard plant against major damage from excess pressure and ensure continued efficient production.

Protecting profit

Major shutdowns interfere with production and lose customers. A continuous supply of products protects a company's image and profits.

Protect your people, plant and profits

Cooling system failures, power outages or an inadvertently closed or open valve can lead to excessive pressures building in your system. When these pressures exceed a fluid, gas or steam system's designed pressure limits, employees, equipment and your company's profitability are put at risk.

Spirax Sarco's expert safety valve solutions can help protect any area where a hazardous overpressure situation could occur, in virtually any industrial process ranging from chemical, papermaking and pharmaceutical to commercial service distribution systems. For the most challenging safety valve applications, count on Spirax Sarco's expertise and solutions. Our trained technicians, distributors and industry's largest inventory of safety valve products will help keep your processing pressures under control.

Spirax Sarco safety valve solutions meet ANSI I and VIII specification.

The Range

	Steam	Compressed Air	Liquid	Other Gases	Hygienic
SV7 Series	•	•			
SVL Series	•	•	•	•	•
5601 5708	•	•			•
69L			•		



Product range

SV7 safety valves for steam and air applications

Type	Product	Sizes	Set Pressure Range	Body Material	Standards	Approvals
Steam and Air	SV73 and SV74 semi-nozzle ASME safety valve	1½" X 2½" to 6" X 8", orifice sizes J to R	*5 to 300 psig	SV73: Cast iron SV74: Cast steel	ASME I, ASME VIII and API 526 (SV74)	National Board

*Set pressures below 15 psig are not ASME coded and not certified

Spirax Sarco's SV7 safety valve series guards against excess pressure across a broad spectrum of industrial steam and air applications, including fired and unfired pressure vessels, steam systems, heat exchangers, condensate return systems, boilers, generators, and downstream pressure reducing valves and air systems.

Constructed of cast iron or cast steel with stainless steel trim, the valves have a modern design, and come in a wide range of inlet sizes and body materials. They are approved by the National Board and conform to Sections I and VIII of the ASME boiler and pressure vessel code.

SV73 specs

- 8 orifices – 13 sizes of piping options
- Top guided seating and discharge
- Full nozzle; high capacity levels
- Temperatures to 406°F
- Optional Tungsten Spring for high temperature applications

SV74 specs

- 7 orifices – 11 sizes of piping options
- Top guided seating and discharge
- Full nozzle; high capacity levels
- Temperatures to 422°F
- Optional Tungsten Spring for high temperature applications



Clean service valves

Type	Product	Sizes	Set Pressure Range	Body Material	Standards	Approvals
Clean Service	SVL481, SVL483 and SVL488 full-lift clean service valve	1" X 1" to 4" X 6"	*1.5 to 986 psig	Stainless steel	ASME Sec. VIII FDA, ASME BPE	National Board and TÜV

*Set pressures below 15 psig are not ASME coded and not certified

Spirax Sarco's SVL series of full-lift clean service safety valves fulfills hygienic and sanitary requirements primarily for the food and beverage, pharmaceutical and chemical industries. Our Clean Service product group incorporates high aseptic properties and low dead space to minimize bacteria traps and contamination. The valves offer the best cleanability (CIP, SIP or COP) of any clean service safety valve on the market. Developed in cooperation with plant engineers and service specialists, the valves come with a selection of sanitary connections.

Each Clean Service Safety Valve can be flush mounted. All wetted-part surfaces comply with European Hygienic Pipes Standard DIN 11866 and ASME BPE 2002. The valves' internal gap, crevice-free design and standard elastomer bellows protect hard-to-clean parts, while their self-draining body configuration helps prevent residue and reduces corrosion.

Spirax Sarco offers three 316L stainless steel models to satisfy most capacities and sizes:

Type 481 protects installations where Clean Service properties are required only at the valve inlet in small capacity applications. Protection of gas systems for beverage bottling is a typical example.

Type 483 is optimized for processes requiring clamp connections in medium capacity applications. Type 483 can be installed in all Clean Service areas, including bottle filling machines and fermenters.

Type 488 provides Clean Service properties for applications requiring larger capacities. It is suitable for large plants, breweries and the beverage industry.



Bronze safety and relief valves for steam, air and liquid applications

Type	Product	Sizes	Set Pressure Range	Body Material	Standards	Approvals
Steam, Air, Gas and Liquid	SV5601, SV5708, and SV69L bronze safety relief valves	1/2" X 3/4" to 3" X 3"	*5 to 250 psig, *5 to 600 psig on liquid	Bronze	ASME I, ASME VIII	National Board

*Set pressures below 15 psig are not ASME coded and not certified

Spirax Sarco's SV5601, SV5708 and SV69L Bronze Safety Relief Valve Series raise industry standards for reliability and value. The valves deliver industry's highest capacity for liquid and shatter previous industry expectations for low maintenance expenses. No other bronze safety relief valve offers a unique changeable nozzle and disc that enables users to switch from a brass to a stainless steel inlet — without buying a new valve.

The valves incorporate superior 17-7 stainless steel springs and a novel disc and seat design that provides a reliable bubble-tight seal.

SV5601 and SV5708 high capacity bronze valves is used for boilers, piping lines and vessel protection, including fired and unfired pressure vessels, steam systems, heat exchangers, condensate return systems, boilers, generators, and downstream pressure reduction and air systems. Designed and engineered for durability in heavy-duty industrial use, the valves are ASME approved and National Board flow rated for capacity. Sizes range from 1/2" to 2-1/2" and temperatures to 406°F.

The valves incorporate a pivoting ball-post design for excellent re-seating ability.

They feature a heavy-duty hood and lever mechanism, and a short, tuned blow-down that can be adjusted with a double ring to meet specific requirements.

SV5601 series is used for ASME Section I applications to pressure ratings of 250 psig. The valves are V and NB stamped for fired vessels, boilers and most areas requiring steam safety.

SV5708 series is used for ASME Section VIII applications to pressure ratings of 250 psig. The valves are UV and NB stamped for unfired vessel protection. They protect or relieve pressure for air, gas and steam applications

SV5601 and SV5708 specs:

- 6 orifices – 12 sizes of piping options
- Top guided seating and discharge
- Full nozzle; high capacity levels
- Temperatures to 406°F

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SV69L series liquid relief valves are an industry standard for liquid applications. Engineered and designed for heavy-duty industrial use, the valves are field adjustable and equipped with a single-piece enclosed bonnet to minimize leaks. The valves provide pressure regulation, continuous pressure and liquid relief, and bypass and over-protection.

Plus, they are back-pressure tested against leakage and can be cleaned and maintained by simply removing the bonnet. Each valve features metal-to-metal precision lapped seating and a sealed hex cap with an O-ring Teflon seal.

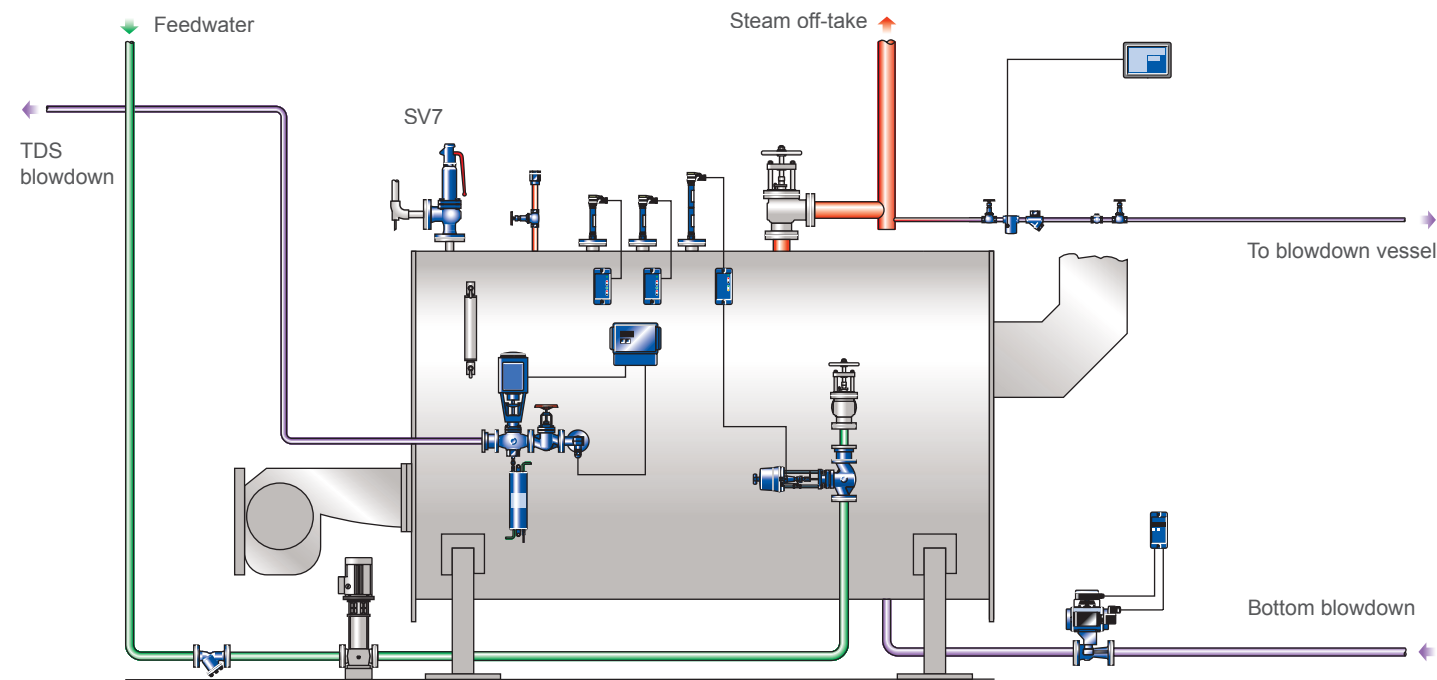
Applications include pumping stations, tanks, hydraulics, fluid lines, oil fields and piping lines.

SV69L specs

- Sizes from 1/4" to 3"
- Pressure to 600 psig
- Temperatures to 450°F
- 302 Stainless steel springs (STD)



Typical ASME I application



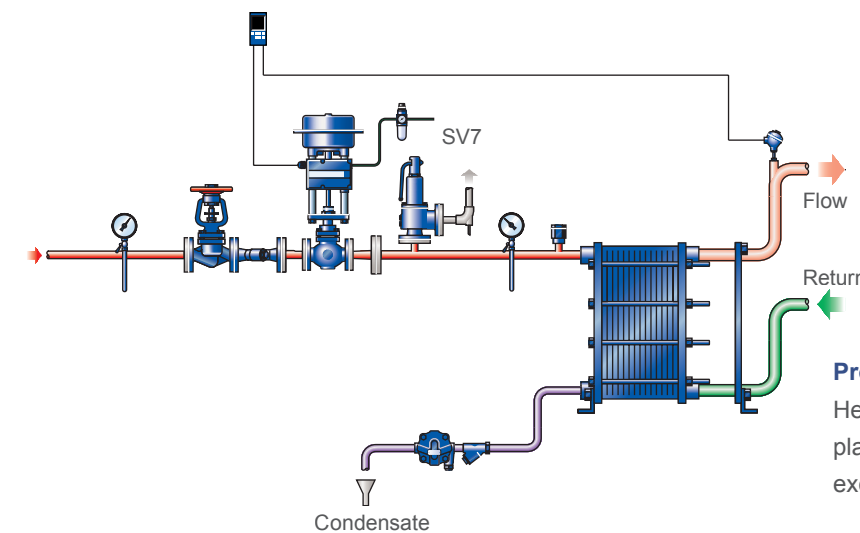
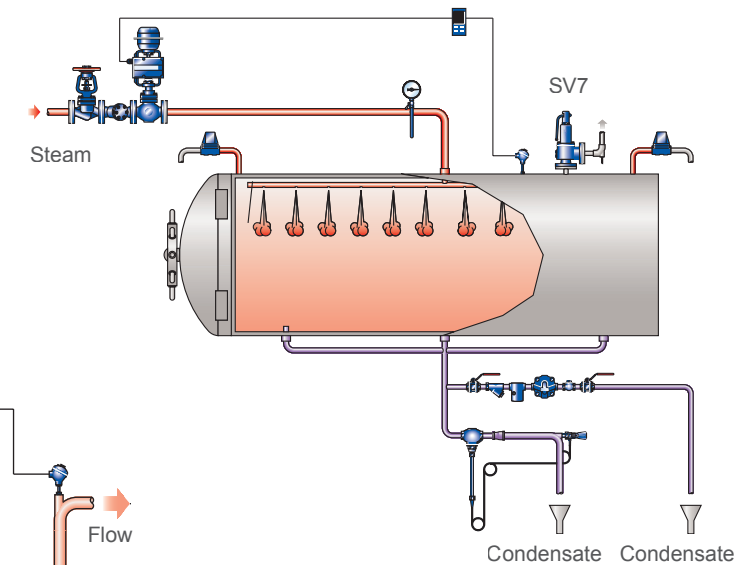
Protecting fired pressure vessels (Boilers)

SV7 is ASME I approved and satisfies National Board requirements for the protection of fired pressure vessels (boilers).

Typical ASME VIII applications

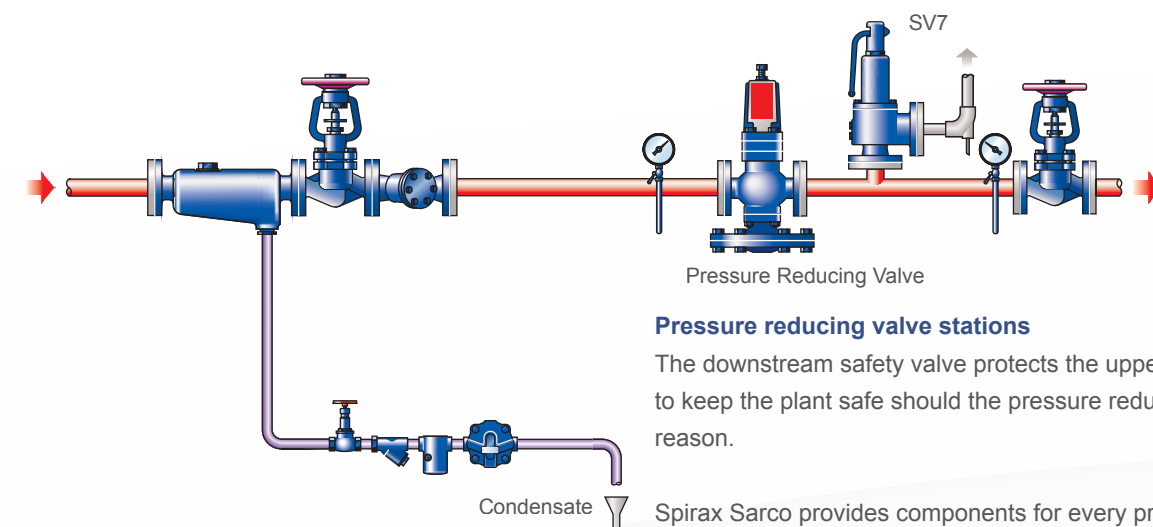
Protecting unfired pressure vessels

Canning retorts, which are used within the food industry for cooking and sterilizing, are typical examples of pressure vessels which must conform to stringent safety standards. Safety valves ensure the safe working pressure of such vessels is never exceeded.



Protecting heat exchangers

Heat exchangers are at the heart of every process plant. Safety valves protect heat exchangers from the excess of mains distribution pressure.



Pressure reducing valve stations

The downstream safety valve protects the upper limits of process pressure to keep the plant safe should the pressure reducing valve station fail for any reason.

Spirax Sarco provides components for every pressure-reducing valve station need.



Other Spirax Sarco safety valve applications:

- air service
- autoclaves
- chemical plants
- compressors
- continuous bypass duty
- critical blowdown
- food industry
- heat exchangers
- heating and ventilation industry
- pharmaceuticals
- pipeline protection
- pressure vessels
- pulp and paper mills
- receiver protection
- refineries
- steam boilers
- steam processing equipment
- steam service receivers and storage vessels
- steam thermal expansion relief tanks
- variable backpressures
- vessel protection

Selection and sizing

Safety valve selection

Proper valve selection depends on a variety of factors, ranging from an application's disposal system to the valve's construction, operating characteristics and code requirements. Spirax Sarco technicians are available to assist with both OEM and maintenance valve selection. A few valve selection basics appear below:

Disposal system	Valve Recommendation
Discharge of steam, air or non-toxic gas to the atmosphere.	Either an open or closed bonnet valve with standard lifting lever.
Discharge of gas where discharge to atmosphere is not permitted.	A closed bonnet valve and a sealing bellows or diaphragm, gas tight cap, or sealed lever.
Applications with known variable backpressure, such as common manifolds in the processing industries.	A valve with a balancing bellows type construction.

Valve construction

Safety valves for most nontoxic, non-corrosive media processed at moderate pressures are manufactured from bronze or cast iron. Applications with higher temperatures and pressures call for steel valves equipped with a separate seat ring (semi nozzle).

Particularly corrosive media or high temperatures may require special valve materials.

Operating characteristics

Performance requirements vary according to application and required standards. Steam boilers call for a National Board Section I approved safety valve. Unfired vessel applications require a National Board Section VIII approved safety valve.

Codes and standards

Safety valve applications must often conform to a particular safety valve code or standard. These include ASME and National Board standards. Ensure that the valve you select meets all requirements. Spirax Sarco technicians can provide regulatory guidance.

Sizing and selecting a valve

Safety valves are sized to meet a system's flow rate at full boiler load.

A valve's set pressure must be low enough to ensure that pressure cannot exceed a boiler, vessel or system's maximum allowable accumulated pressure. At the same time, a valve's set pressure must be higher than the normal system operating pressure to allow the valve to close.

Note: Unless operating requirements dictate otherwise, always set safety valve pressure significantly above the system's operating pressure, with plenty of margin for blow down. Avoid the temptation to set a safety valve just above the normal operating pressure, as this can lead to poor shut-off and nuisance operation.

For safety valves positioned downstream of pressure reducing valves, establish the pressure at no load.

The correct size valve can be selected once the type of safety valve, required flow, and set pressure are established. Published capacity charts are usually sufficient to select the correct size for steam and air applications. The correct size is one whose capacity just exceeds the required capacity at the desired overpressure. Where sizing charts are not available or do not cater to particular conditions, then calculate the minimum required flow area and choose a valve with a larger flow area.

Drip pan elbows

Spirax Sarco highly recommends incorporating a drip pan elbow in steam service safety valve applications. When attached to the valve outlet, the elbow collects and removes condensate, and isolates the valve from discharge piping stresses.

Elbows through 4" feature female NPT threads and connect to the valve outlet with a short nipple. The 6" and 8" elbows have integral ANSI 125 flanges and bolt directly to a valve's outlet. Select the drip pan elbow model to match the safety valve's outlet size.



Installation, operation and maintenance

Planning your installation

General guidelines for safety valve installation appear below. The installer assumes responsibility to ensure that installation meets the instructions provided with the product, ASME Codes, and jurisdictional requirements, including the European Pressure Equipment Directive.

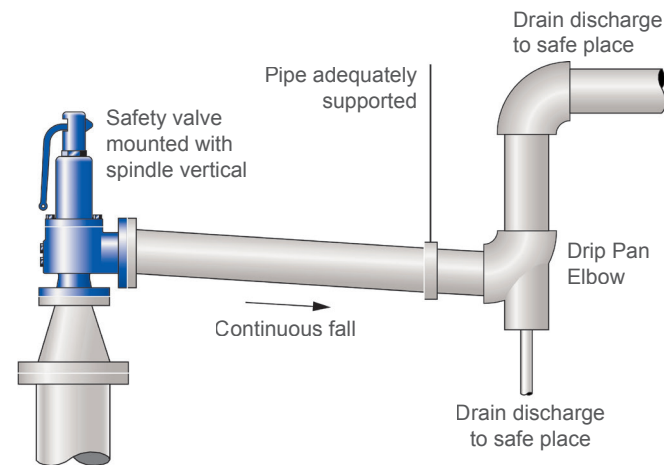
Install safety valves upright with the spindle in a vertical position.

For ASME Section I models, connect the valve to the boiler independent of any other connection and as close to the boiler or normal steam flow path as possible. There should be no unnecessary intervening pipe or fittings. Any necessary intervening pipe or fitting should be no longer than the face-to-face dimension of the corresponding tee fitting, with the same diameter and pressure rating.

For ASME Section VIII service with compressible fluids, connect the safety valve directly to the pipeline or vessel it is protecting and, if needed, in the vapor space above any contained liquid. Note: stop valves are not permitted between the vessel and safety valve or the discharge to atmosphere except per ASME Section VIII UG- 135 (e).

Safety valve discharge lines must be at least the same size as the valve outlet, and as short and direct as possible. Discharge lines prevent liquid from collecting in the valve's discharge side and must be directed to a safe discharge area. Do not plug the valve body drain and vent holes. Consider both the weight of the discharge pipe and the reaction forces generated by discharging. Adequately supported discharge piping relieves stress on the safety valve. (A drip pan elbow is recommended.)

Remember to free the valve of all packaging materials and remove dirt, sediment, and scale from mounting flanges and nozzles prior to installation. The use of proper handling equipment will help prevent damage to the flange facings or misalignment of internal components. Do not use the test lever to hoist the valve during installation.



Scheduled maintenance

Spirax Sarco safety valves are 100% tested and then sealed to prevent unauthorized adjustment or repair. All warranties are void if the seal is broken. Inspect safety valves visually at two month intervals and conduct a complete pressure test each year to help assure continued safe operation and long service life. Also, pressure test boilers and systems prior to decommissioning and conduct any necessary service or repairs.

When system pressure is at least 75% of set pressure, the valves can be operated manually with the test lever. An alternative is to increase the steam pressure until the safety valve operates. Any safety valve that fails to open at the name-plate set pressure or to open or close properly must be replaced or repaired. Do not attempt to stop leakage by compressing the spring or gagging the valve! Contact Spirax Sarco for resetting, adjustment or repairs.



Our commitment to you

Spirax Sarco test and development facilities

Our in-house dynamic test facility employs the latest rapid data capture software to record and assess the performance characteristics of each valve under development. We conduct performance testing on steam, air and water, with a maximum pressure capability of 625 psig (45 barg).

Machining, assembly, setting and shipping

Spirax Sarco products are manufactured in an ISO 9001-conforming environment. Most valves are designed and developed in-house and benefit from Spirax Sarco's continuing investments in software, equipment and training.

Our extensive 3D CAD system, for example, produces design schemes. Our state-of-the-art machining facility centers using the latest machine tool technology manufactures our component parts. Our trained assembly staff assembles sets and packs each valve for shipment.

Sizing and selection

Spirax Sarco can supply the correct valve for most pressure relief applications. Customers are invited to peruse our sales and technical support literature, which includes extensive sizing charts covering common fluids.

Help is always available for any sizing or selection task.



Quality comes as standard

Safety valves protect people, plant, and profit so there should be no compromise on quality when selecting a valve.

The SV range of safety valves from Spirax Sarco meet the exacting standards laid down by ASME Sections I and VIII, and their performance has been witnessed and approved by The National Board of Boiler and Pressure Vessel Inspectors. The quality of shut-off tightness is a critical feature of any safety valve.



Certification assures quality

All Spirax Sarco safety valves are independently approved to internationally recognized standards and compliant with European Pressure Equipment Directive 97/23/EC requirements.

Shut-off is a critical safety valve feature. Every Spirax Sarco safety valve is tested to ensure compliance with the exacting American Petroleum Institute standard API 527 Seat Tightness of Pressure Relief Valves.



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