spirax sarco

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Steam Trap International Standards

With so many steam trap manufacturers displaying a wide range of product information in many different formats it is easy to see why many purchasers and specifiers find the selection of steam traps confusing. Many customers are also under pressure to comply with local and Governmental legislation for their steam systems such as Pressurised Systems Regulations, The Factories Act, Health and Safety Executive and the European Pressure Equipment Directive 97/23/EC.
Misleading product information such as inaccurate condensate capacities are just one of the problems encountered. To make capacity figures appear higher than they really are many manufacturers supply capacities for cold water and claim they are hot water capacities. In practice hot water capacities are typically 60 - 70% lower than cold water capacities.
Products need to be clearly identified so that in the event of any problems the correct supplier can be contacted. It is hard to believe that in todays quality conscious world there are many manufacturers who only mark their products with the pipe size and direction of flow - no manufacturers identification at all.
The only safe and professional way to ensure that high quality, system safety and reliability is maintained is to install only products of proven and guaranteed quality.
The following National/International standards apply to steam traps and are intended to ensure that any purchaser/specifier has the full knowledge and confidence that the equipment used meets known legislation. The vast majority of steam trap manufacturers do not conform to these International Standards.
Spirax Sarco are always at the forefront of steam trapping developments and together with the British Standards Institute have been very active over the years, in their efforts to establish official standards for steam traps. In recent years certain British Standards have been modified to comply with both European (EN) standards and International (ISO) standards. A brief description of each is given below.

Glossary of technical terms for automatic steam traps

ISO 6552 : 1980

This standard establishes precise definitions for all technical terms and expressions used to describe steam traps under operating conditions. Only by specifying these operating conditions can a customer be confident that the steam trap will safely operate within their system.

PN	**Nominal pressure**	Permissible working pressure which is dependant on materials, design and working temperatures / pressures.
PMA	**Maximum allowable pressure (bar)**	That the shell of the trap can withstand at a given temperature.
PMO	**Maximum operating pressure (bar)**	Which is given by the manufacturer. Sometimes restricted by the pressure limitations of internal mechanisms.
PO	**Operating pressure**	Measured at the trap inlet (bar).
POB	**Operating backpressure**	Measured at the outlet of the trap (bar).
PMOB	**Maximum operating backpressure (bar)**	Maximum permissible pressure at the trap outlet allowing correct operation.
ΔP	**Operating differential pressure (bar)**	Difference between operating pressure and operating backpressure (bar).
ΔPMX	**Maximum differential pressure (bar)**	Maximum difference between operating pressure and operating backpressure.
ΔPMN	**Minimum differential pressure (bar)**	Minimum difference between operating pressure and operating backpressure.
PT	**Test pressure (bar)**	Pressure applied to the steam trap under test.
PTMX	**Maximum test pressure (bar)**	Maximum cold hydraulic test pressure the trap can withstand, with internals fitted.
TMA	**Maximum allowable temperature (°C)**	Maximum temperature to which the shell of the trap can be raised permanently, at a given pressure.
TMO	**Maximum operating temperature (°C)**	Maximum temperature for which the operation of the trap is guaranteed.
TO	**Operating temperature (°C)**	Temperature measured at the inlet of the trap being tested.

Marking of automatic steam traps

EN 26553 : 1991 ISO 6553 : 1980

Establishes certain minimum basic requirements for the marking and identification of steam traps. To conform to this standard all traps should be marked with the following :-

Manufacturer's name and/or trade mark
Maximum allowable pressure (PMA)
Maximum allowable temperature (TMA)
Indication of the flow direction

Optional markings to include:-
Nominal pressure (PN)
Maximum operating pressure (PMO) or maximum differential pressure (ΔPMX)
Shell material designation
Nominal size (DN)
Maximum test pressure (PTMX)

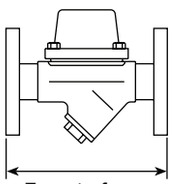
If steam traps do not have this information clearly marked on them many insurance companies may not validate or insure the steam system.

Face-to-face dimensions for flanged automatic steam traps

EN 26554 : 1991 ISO 6554 : 1980

This standard specifies face-to-face dimensions for steam traps in the size range DN15 to DN50, for pressures up to PN40. It is mainly used in European influenced markets. There are 6 series of dimensions with the most commonly used being Series 1.
The following face-to-face dimensions are specified for Series 1 steam traps:

Series 1	DN15	150 mm
	DN20	150 mm
	DN25	160 mm
	DN32	230 mm
	DN40	230 mm
	DN50	230 mm



Note: There is currently no ASTM / ASME equivalent for steam traps.

Classification of automatic steam traps

EN 26704 : 1991 ISO 6704 : 1982

Specification details the various types of operating principle for steam traps including mechanical, thermostatic and thermodynamic types.

Many manufacturers claim that a trap operates in a different manner than it actually does. This is not only confusing but may also lead to operational problems. An example is where a bimetal trap (classed as a thermostatic trap) is incorrectly claimed to be a thermodynamic trap. This implies that it discharges condensate at steam temperature when in fact it may cause subcooling by up to 40°C below steam saturation temperature. This type of trap must not be confused with a true thermodynamic steam trap with a disc.

Determination of steam loss of automatic steam traps

EN 27841 : 1991 ISO 7841 : 1988

This specifies two alternative test methods to determine the steam loss of automatic steam traps. One of these was developed as a result of the work that Spirax Sarco undertook with the National Engineering Laboratory in the UK. Steam trap buyers can now make comparisons of true steam trap losses through various types of steam traps with the assurance that the figures published are accurate and all tests are conducted in accordance with this standard. Spriax Sarco are able to undertake these tests if required. Any manufacturers test figures that are not obtained within the parameters of this standard must be treated with caution.

It is important to understand that under normal conditions steam traps do not waste steam. Wastage can only occur if there is no load (not practical even in a superheated system) or if the internals have been damaged. The following table shows the results of extensive testing to determine steam wastage from all trap types at a pressure of 5 bar g. It can be clearly seen that radiation losses from the trap surface are much greater than losses through the trap orifice!

Energy requirements of various steam traps - expressed in kg/h of steam at 5 bar

	No-load			Reasonable load		
Traps	**Through trap**	**From trap**	**Total**	**Through trap**	**From trap**	**Total**
BPT / SM	0.5	0.50	1.00	0	0.50	0.50
FT	0.0	1.40	1.40	0	1.40	1.40
IB	0.5	1.20	1.70	0	1.20	1.20
TD	0.5	0.25	0.75	0	0.25	0.25

The purpose of the above table is not to establish the fact that one type of trap is marginally more efficient than another. It is simply to show that steam traps require only a minimal amount of energy. Losses only become significant when traps are defective.
The important thing therefore is to combine selection, checking and maintenance to achieve reliability. Properly done, costs and steam wastage will be minimised.

Determination of discharge capacity of automatic steam traps

EN 27842 : 1991 ISO 7842 : 1988

Like EN 27841and ISO 7841, this specifies two alternative test methods for use by manufacturers in order to determine discharge capacity for steam traps. A manufacturer's compliance with this standard will put an end to difficulties experienced in the past over trap selection. The customer will no longer have to ask whether the capacity curves produced for any particular manufacturer of steam trap are based upon cold water or hot water condensate tests. All steam traps manufactured in the UK and France by Spirax Sarco have capacity tests conducted in accordance with this standard. By comparison some manufacturers will include the capacity of internal air vents in the overall capacity of their float traps - the air vent is only open when condensate has subcooled.

Production and performance characteristic tests for automatic steam traps

EN 26948 : 1991 ISO 6948 : 1981

This standard specifies tests which are used to ensure that the steam trap functions correctly and that the performance is acceptable for the design. The tests include product inspection, hydrostatic and operational checks. Testing of capacities and the identification of any steam losses are also discussed.

Other standards are also used in the design and manufacture of Spirax Sarco steam traps. These include :-
TRB 801 Nr45, DIN 3548, DIN 2501, DIN 3840, AD 2000-Merkblatt, EN 287, EN 288, EN 289, EN 12569, BS 5500, ASME VIII, ASME IX and TÜV.