



Pipeline & Heating Solutions

Brass Ball Valves

Installation, Operation and Maintenance Instructions

Scope

This document applies to the following BOSS™ ball valves

FIG	Size Range	Description
966S	¼" – 2"	Threaded end, full bore, lever operated
966EXT	½" – 2"	Threaded end, full bore, extension stem, lever operated
966LS	½" – 2"	Threaded end, full bore, lockshield operated
966T	¼" – 1¼"	Threaded end, full bore, T-handle operated
967S	2½" – 4"	Threaded end, full bore, lever operated
968S	15 – 54mm	Compression end, full bore, lever operated
968LS	15 – 54mm	Compression end, full bore, lockshield operated

966S & 968S valves are available with a red, blue or yellow lever.
966EXT valves are supplied with a yellow lever only.
966LS & 968LS valves are supplied with three dust caps (red, yellow and blue).
966T valves are supplied with a red "T" handle only.
967S valves are available with a red or yellow lever.

The Pressure Equipment Directive 97/23/EC (PED) and CE Marking

The Pressure Equipment Regulations 1999 (SI 1999/2001) have now been introduced into United Kingdom law.

Valves with a maximum allowable pressure greater than 0.5 bar are covered by these Regulations. Valves are categorised according to their maximum working pressure, size and rising level of hazard.

The level of hazard varies according to the fluid being carried. Fluids are classified as Group 1, dangerous fluids or Group 2, all other fluids including steam.

Those valves identified as having increased hazard are Categorised as, I, II or III and for sizes up to and including 25mm (1") are designated SEP regardless of fluid group. Valves designated as SEP must not bear the CE mark and do not require a Declaration of Conformity.

Categories I, II and III carry the CE mark and require a Declaration of Conformity.

CE Marking and the ATEX Directive 94/9/EC

Concerning equipment and protection systems intended for use in potentially explosive atmospheres.

This has been implemented in United Kingdom law by the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmosphere Regulations 1996(SI 1996/192) and amended by The Equipment and Protective Systems (amendment) Regulations 2001 (SI2001/3766).

The regulations apply to all valves where each valve:

- has its own potential source of ignition.
- operates in a potentially explosive atmosphere created by:

- the presence of air/dust mixtures external to the valve.
- the presence of gases, vapours, mists released from the valve through leakage.

The regulations will not apply to a valve without a potential source of ignition, which operates in a dust free environment and the fluid being transported is cold, inert gas or non-flammable liquid.

The requisite level of protection for valves not exempt from the regulations is defined as Group II category 2 and shall bear the following markings:



Valve Selection

It is important that the valve selected is suitable for the required service conditions. Providing it is installed correctly it should give years of trouble-free service.

BOSS™ valves are not suitable for fatigue loading, creep conditions, fire testing, fire hazard environment, corrosive or erosive service, or for carrying fluids containing abrasive solids. There is no allowance for corrosion in the design of these valves. Designs for this valve do not allow for decomposition of unstable fluids and must not be used where this could occur and are not designed to withstand the effects of fire, wind, earthquakes and traffic loading.

When BOSS™ valves are fitted to pressure equipment or assemblies, suitable protective devices may be required.

The valves to which these Instructions apply (except 967S) have been:

- categorized in accordance with the Pressure Equipment Directive.
- designated with the requisite level of protection in the ATEX Directive as Group II Category 2 non-electrical equipment.

The ball valves referred to in this document are suitable for **Group 1 gases** (hazardous - restricted pressure rating) and **Group 1 liquids** and may also be used on **Group 2 gases** and **Group 2 liquids** but are not necessarily suitable for all gases and liquids in these groups.

However, the valves are **not suitable for steam** and **HTHW services** and are to be used for on-off duty only.

Valves tested to BS EN 331 are for 1st, 2nd and 3rd family gases.

Medium – Group 1 Gas		
PN	DN	Category
16	15 – 54mm	SEP
40	1/4" – 2"	SEP
32	1/4" – 2"	SEP

Category I requires the CE mark.

BOSS 967S

The **BOSS™ 967S ball valves** are suitable for **Group 2 liquids** (non-hazardous), are **categorised as SEP** and do not require the CE mark.

The valves are not necessarily suitable for all liquids in this group.

The valves are **not suitable for HTHW services**.

The valves are **not approved to EN331 but are suitable for gas service**

The valves are to be used for on-off duty only.

Avoiding Stress Corrosion Cracking (SCC)

BSS does not recommend the use of brass valves and fittings on chilled water applications.

SCC occurs occasionally in brass valves and fittings and almost always on chilled water service where high levels of stress in the component combined with a corrosive environment can cause cracks to propagate.

High stresses are most commonly introduced by tightening compression nuts and threaded connections and for this reason it is very important that joints are assembled exactly in accordance with these instructions.

The most common cause of SCC is the presence of condensation in chilled water systems due to inadequate vapour sealing of the insulation, and which reacts with various ammonia based gases or particles which may be present in the atmosphere or transferred to the valves through the insulation material.

The installer is reminded to ensure that on chilled water systems the insulation and vapour barriers are correctly applied and comply with the requirements of BS 5970: 2001 and BS 5422: 2009.

Pressure and Temperature Limitations – Liquids

Fig	Size Range	PN	Non-Shock at Temperature Range	Non-Shock Pressure at Max Temperature
966S	¼" - 1" 1¼" - 2"	PN40 PN32	-10°C to 120°C	10 bar at 120°C
966EXT	½" - 1" 1¼" - 2"	PN40 PN32	-10°C to 120°C	10 bar at 120°C
966LS	½" - 2" 1¼" - 2"	PN40 PN32	-10°C to 120°C	10 bar at 120°C
966T	¼" - 1" 1¼"	PN40 PN32	-10°C to 120°C	10 bar at 120°C
967S	2½" - 3" 4"	PN28 PN21	-10°C to 120°C	28 bar at 120°C 21 bar at 120°C
968S	15 - 54mm	16 Compression	-10°C to 30°C	5 bar at 120°C
968LS	15 - 54mm	16 Compression	-10°C to 30°C	5 bar at 120°C

The maximum surface temperature under normal use is given in the table. The auto-ignition temperature of a surrounding potentially explosive atmosphere must exceed the equipment surface temperature by at least 25%.

Pressure and Temperature Limitations - Gas

The valves listed above (except 967S) when used on gas service should be fitted with a yellow lever and the pressure and temperature rating is restricted to that specified in BS EN 331.

- BS EN 331 - MOP5
- Maximum temperature: -20°C to 60°C
- Maximum pressure: 5 bar
- When used for gas the PED categorisation becomes:

Medium – Group 1 Gas – 5 bar Pressure		
PN	DN	Category
16	15 – 25mm	SEP
	35 – 54mm	Cat 1
40	¼" – 1"	SEP
32	1¼" – 2"	Cat 1

Pressure / Temperature Rating

Valves must be installed in a piping system whose normal pressure and temperature do not exceed these ratings. The maximum allowable pressure in valves as specified in the standards is for non- shock conditions. Water hammer and impact should also be avoided.

If system testing will subject the valve to pressures in excess of the working pressure rating, this should be within the "shell test pressure for the body" to a maximum of 1.5 times the PN rating and conducted with the valve fully opened.

It may be hazardous to use these valves outside of their specified pressure and temperature limitations and also when not used for the correct application.

Valve Location and End of Line Service

To ensure ease of operation and adjustment, valve locations should be decided during the system design stage. To prevent imposing strain on the valve joints, pipe work and valves must be adequately supported.

Threaded end valves can be used on end of line service and it is recommended that a security plug is fitted to the outlet port.

Compression ended valves are not suitable for end of line service.

Installation

Unpack the valve and check that the flow paths and valve threads are clean and free from debris.

Check the body and lever markings to ensure that the correct valve has been selected for installation.

Any electrical component e.g. actuators, limit switches must be explosion proof and comply with the Directive and Standards as listed in BS EN 1127-1 clause 6.4.5.

Before valve installation, the pipe work to which the valve is to be connected should be inspected for cleanliness and freedom from debris.

Ball valves may be fixed in any orientation, always leaving enough space for the 90° operation of the lever handle where fitted.

BOSS™ ball valves are manufactured to high quality standards and should not be subjected to misuse.

The following should be avoided:

- Careless handling of the valve (valves should not be lifted using the lever)
- Dirt and debris entering the valve through the end ports
- Excessive force during assembly and lever operation

Adjoining pipework must be supported to avoid the imposition of pipeline stress on the valve body which may impair its performance.

BOSS™ ball valves have threaded ends to BS EN 10226-2:ISO7 Rc or Type A compression ends to BS EN 1254.

Threaded end valves

Thread sealing compounds appropriate for the application or PTFE tape may be used but excessive use should be avoided. Coarse fibrous sealing materials should be avoided if possible because with excessive use, they pack the threads and induce high stresses in female connections.

Ensure the threads are properly engaged and proceed to tighten the valve onto the pipe. 'Stilson' type wrenches should not be used. A correctly fitting spanner must be located on the end of the valve into which the pipe is being fitted. Excessive tightening force should not be used since this could overstress the valve and cause permanent damage.

Compression ended valves

Ensure that the fitting is the correct size for the pipe being used. The compression ends are suitable for copper pipe to BS EN 1057: R250 (half hard).

Cut the pipe to length, making sure that the cut is square and the pipe is not deformed. Remove any burrs from the cut ends.

Either

Insert the pipe into the fitting without removing the cone, ensuring that the cone is in the correct position and that the pipe makes firm contact with the stop in the body of the valve.

Or

Unscrew the compression nut and cone from the fitting. Slide the compression nut and cone onto the pipe and insert the pipe into the fitting as far as the stop.

In both cases, hand tighten the compression nut onto the valve. A drop of light machine oil on the threads will facilitate tightening- particularly on the larger size valves.

Then using a correctly fitting spanner further tighten the compression nut as shown in the table below:

Nominal Pipe Size	Guide to Tightening – No of turns
15mm to 28mm	¾ to 1
35mm to 54mm	1 to 1¼

Notes:

Jointing compounds or sealants are not necessary and should not be used with BOSS™ compression ended valves; the use of these materials could impair the efficiency of the joint and may contravene water regulations.

Over tightening will not produce a better joint, and may lead to problems in service.

Compression nuts are made from brass.

The valve should be operated from fully open to fully closed to test that it has been correctly installed.

Make sure that a ball valve is fully open during installation.

Operation

Lever and Tee handle ball valves

Ball valves have a quarter turn operation (clockwise to close) providing quick and positive isolation. The lever or handle will be in line with the pipeline with the valve in the open position.

Lockshield valves

Remove the plastic insert in the lockshield cap and engage the key in the cap. Turn the key clockwise to close until a firm stop is reached. Remove the key and re-fit the plastic insert.

Caution:

Rapid closure of quarter turn valves on liquid service may cause water hammer in the system.

Service applications with extremes of temperature may cause the valve to become stiff to operate.

Suitable hand protection should be worn when operating valves used in extreme temperature applications.

The valve should only be used in the fully open or fully closed position. BOSS™ ball valves are not suitable for regulating and throttling service.

Maintenance

The BOSS™ ball valve will provide a long service life and no maintenance is required.

In the unlikely event that a valve requires replacement then the following should be taken into consideration.

The valve should be at zero pressure and ambient temperature before any valve replacement is carried out and correctly fitting tools and equipment should be used for the valve replacement work. Eye protection and gloves must be worn for this operation.

Separate means of draining the pipework must be provided when carrying out any BOSS™ ball valve replacement.

As the valve is removed there will be water loss between the two isolation points, therefore unless the pipework has been drained at another location, a means of collecting the discharged water is recommended.

A full risk assessment and methodology statement must be compiled prior to any maintenance. This must include the removal of dust deposits by good housekeeping.

Maintenance - ATEX Directive

Valves within the scope of the ATEX Directive with a protection level defined as Group II category 2 will operate in Zone 1 (gases / vapours) or Zone 21 (dusts) designated in BS EN 1127-1 Explosion prevention and protection.

Tools are either 'single spark' e.g. screwdriver, spanner, impact screw driver or 'shower of sparks' e.g. sawing or grinding. Only steel 'single spark' tools are permitted in Zones 1 and 21.

Tools causing 'shower of sparks' are only permitted if:

- no hazardous explosive atmosphere is present
- dust deposits have been removed and no dust cloud is present.

The use of tools and equipment in Zone 1 and 21 should be subject to the 'permit to work' system.

A full risk assessment and methodology must be compiled prior to any maintenance. This must include the removal of dust deposits and take into account the possibility of a potential hazard arising.

Product Life Span

When a valve is properly selected for its service conditions it should give years of trouble-free service providing it is installed and operated correctly.

By not considering the compatibility of the system design and the pressure and temperature requirements the life expectancy of the valves can be adversely affected and valve failure may occur. The nature of the fluid being carried through the valve could also affect the valve performance as this could lead to premature valve failure.

There may also be interactions between metals in the pipe system and the valve which need to be considered.

Appropriate flushing and cleaning of the pipe work installation should take place when commissioning the system as this would help extend the valve life.

Please leave this Instruction Sheet for the User.

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