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OPERATION AND MAINTENANCE MANUAL

INTRODUCTION

This document presents information which should give help and general guidance to the users of valves supplied by TT Valves (UK) Ltd. It does not make reference to specific applications but is presented to make users more aware of some of the problems which may arise.

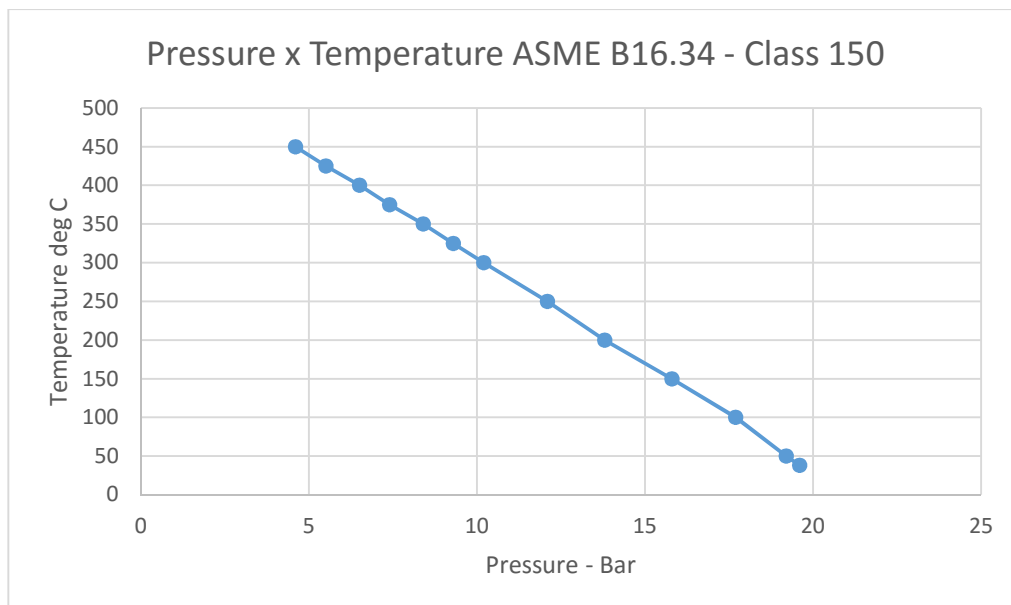
Temperature Limitations – Pressure Equipment Directive

It must be noted that valves manufactured by TT valves UK are constructed with Pressure Temperature limitations as specified in ASME B16.34 and valve designs have been assessed against the requirements of the Pressure Equipment Directive using this standard. When supplied in accordance with the ratings set down in ASME B16.34 the Pressure temperature details listed in ASME B16.34 apply.

Valves are supplied, undrilled and drilled in accordance with other drilling standards.

NOTE THAT THESE VALVES WILL BE LIMITED BY THE PRESSURE TEMPERATURE CONSTRAINTS AS SPECIFIED IN ASME B16.34

VALVES DRILLED TO SUIT PN16 FLANGES SHOULD NOT EXCEED 141 DEG C WORKING TEMPERATURE.



Installation

Before fitting a valve into an installation it is important to check the following, and establish that the valve is in a satisfactory condition:-

- 1) Unpack valve and check that any identification plates, direction of rotation of handwheel markings etc. are in compliance against specifications etc.
- 2) Be aware of pressure temperature limitations. Pay particular attention to flange ratings which may reduce the maximum working pressure of the valve.
- 3) Note that when large valves are provided with lifting lugs or eye nuts, these should be used to lift the valve. Valves should NOT be lifted using the handwheel or stem. Valves should be lifted using a sling around Body / Bonnet flange rim, the yoke or lifting eyes only.
- 4) Valves must be provided with adequate support. Adjoining pipework must be supported to avoid the imposition of pipeline strains on the valve body, which would impair its performance.
- 5) Take note of special warning tags or instructions which may be attached to the valve.



- 6) All valves are supplied with ports sealed and the seals must not be removed until immediately prior to the valves being installed.
- 7) Check the valve for 'direction of flow' arrow and install the valve in accordance with this instruction. If for some reason the marks have been obliterated, it should be noted that, in the case of globe and piston check valves, these are fitted with flow to the underside of the seat and will flow out from the topside of the seat. On swing check valves visual examination through the ports will show direction of flow. Gate valves are normally bi-directional, but please see note 14 for exception.
- 8) As far as is possible, inspect the valve interior and ascertain that it is free from foreign matter i.e. packing materials or blocks which are used to prevent damage in transit.
- 9) Immediately prior to valve installation, the pipework to which the valve is to be fastened should be checked for cleanliness and freedom from debris.
- 10) The mating flange (both valve and pipework flanges) should be checked for correct gasket contact face, surface and condition. If a condition is found which might cause leakage, no attempt to assemble should be made until the condition has been corrected.
- 11) The Gasket should be suitable for operation conditions or maximum pressure/temperature ratings. The gaskets should be checked to ensure freedom from defects or damage.
- 12) Valves supplied with grease nipples to lubricate the yoke sleeve should be checked and greased if necessary.
- 13) If valves have been supplied in a degreased condition and sealed in polythene bags, then care must be taken during installation that they are handled in such a way that they do not become contaminated.
- 14) Wedge gate valves could have a direction of flow arrow if fitted with a wedge having a bleed hole. This would mean that the valve would be unidirectional and would seal on the downstream face, relieving pressure to the upstream side of the valve.
- 15) Gate valves may be installed in:
 - a) Horizontal pipework, stem vertical with the valve upright. (Preferred installation orientation)
 - b) Vertical pipework with stem horizontal.

Gate valves should not be installed in horizontal pipework with the stem horizontal as this may impair sealing performance.
- 16) Valves that are installed in end of line service, must be fitted with a blind flange. The obturator should not be the sole means of isolation.
- 17) We recommend the use of Washers for the installation of valves with special paint finishes to prevent damage.

Operation - Piston Check and Swing Check Valves

The operator has no control over their function and they will open or close automatically, initiated by the pressure differential.

In the event that Swing Check valves have been fitted with an Outside Lever and weight, it must be noted that during operation the lever can move suddenly and without warning. Injury may occur.

Operation - Gate and Globe Valves

All valves supplied by TT Valves (UK) Ltd. close in a clockwise direction and open anti-clockwise. Gate valves are unsuitable for throttling purposes and it is recommended that they only be used fully open or fully closed (isolating service), as restriction to flow may cause rapid deterioration of the seating faces.

Operation - Handwheel Operated Valves

Whilst we appreciate that the use of wheel keys or other means of effecting operation are employed we would warn against excessive leverage being applied to the handwheel rim which could cause damage to the screw mechanism or, in extreme cases, damage to the seats.

Valves must never be used for services in excess of those laid down in the relevant standards.

Maintenance

The frequency depends on the operating conditions and it is difficult to lay down a procedure to cover all applications.

Valves supplied with grease nipples should be checked and repacked with grease on a regular basis. Grease should be selected to ensure lubrication at the design temperatures of the system. Ensure a suitable bearing grease is selected for actuated valves, increased bearing temperatures can occur during valve operation with an actuator. Incorrect grease selection or inadequate maintenance may result in premature wear of bearings or drive bushes.

However, valves which are not operated for long periods may suffer, to some degree, a loss of lubricant on threads, ageing of packing and possible build up of granular solids etc. on moving parts.

Valves which are frequently in operation could suffer by their continuous use and experience wear and tear on gland boxes and moving parts.

Therefore, in general, valves which are not in regular operation should be periodically partially or full cycled, and valves in continuous use should be checked for tell-tale signs of damage.

Should maintenance be required, and before removing valves from a pipework system, it will be necessary to open or partially open the valves and flush the system to remove all traces of dangerous fluids.

Maintenance Engineers and Operators are reminded to use correct fitting tools and equipment.

A full risk assessment and methodology statement must be compiled prior to any maintenance. The risk assessment must take into account the possibility of the limits of use being exceeded whereby a potential hazard could result. A maintenance program should therefore include checks on the development of unforeseen conditions which could lead to failure. In systems where corrosion could be a potential hazard, wall thickness checks on the body and bonnet should be made. This requires either the removal of the valve from the pipeline or removal of the bonnet with the system at zero pressure. If the wall thickness has reduced by the valve must be replaced.

Where valves have split body design, the bolting on the connecting flanges of the body halves must not be inadvertently removed.

It is essential to recognize the danger associated with the removal of the stem packing gland with pressure in the pipework system. The use of the backseat should not be regarded as a feature which will allow the repacking of the stuffing box whilst the valve is under pressure. This is recognized as a dangerous practice.

Repacking of the stuffing box should never be attempted under pressure if the fluid is dangerous due to high temperature, high pressure or chemical composition.

Site Maintenance

The following notes are supplied as an aid to site maintenance of valves supplied by TT Valves (UK) Ltd. However, valves repaired on site by personnel outside our control do not carry our product warranty, and under no circumstances are we liable for and direct, indirect, special or consequential damages resulting from any cause whatsoever.



When carrying out any maintenance work we would respectfully suggest that the following guidelines are closely adhered to:

1. It is our recommendation that lines are drained and pressures are reduced to atmospheric before any maintenance work commences.
2. Check and be aware of all plant safety instructions and precautions.
3. Use experienced and fully trained personnel.
4. Where feasible, remove valve from use but first make sure that it has been flushed clean of all traces of dangerous fluids.
5. Check that correct replacement parts together with any special tools are available to complete the site work.
6. Pressure test the valve before re-installing.

Replacement / Maintenance of Gland Packing

Stem sealing on valves supplied by TT Valves (UK) Ltd. is achieved by filling a cylindrical chamber with packing material which can be compressed by the gland bolting, arrangement. Some valves are fitted with a lantern ring which necessitates a deep stuffing box.

This should be noted if maintenance is required and a complete packing change effected as there will be packing rings below the lantern ring.

It is preferable to remove the valve from the line (see notes on page 1.) and follow the sequence set out below:-

- 1) Packing grades can be obtained in spirals or preformed rings. If spirals are used, the stem should be measured to obtain the length of packing required and the ends cut at 45°, using a sharp knife.
- 2) After the removal of the old packing check that the stuffing box is clean and that the surfaces are undamaged. ,
- 3) Insert new rings and press down making sure that joints are staggered at 120°.
- 4) Rotate stem to ensure it can be revolved freely.
- 5) If a lantern ring is fitted it must be correctly positioned below the inlet connection, thus allowing for compression of the bottom rings.
- 6) The gland follower/gland flange arrangement should be positioned by finger tightening the nuts and making sure that they are aligned centrally. This will ensure that binding/scoring of the stem does not result.
- 7) Tighten the gland nuts until the packing offers moderate resistance and then check spindle rotation.
- 8) In the unlikely event that the Gland packing leaks, we recommend that the packing is balanced using the following procedure.
 - a) Loosen the Gland bolts by one complete turn
 - b) Cycle the valve from fully closed to fully open 6 times.
 - c) Tighten the Gland bolts
 - d) Cycle the valve to closed and tighten the gland bolts again.

Replacement of Bonnet Gasket

Valves supplied by TT Valves (UK) Ltd. would normally be fitted with 1.6mm sheet gaskets spiral wound or oval joint rings-. On bolted bonnet gate/globe valves, part open valve then remove studbolts and nuts to gain access to bonnet gaskets. On check valves just remove studbolts and nuts.

Should problems be experienced with the removal of bolting due to seizure of nuts on studbolts, various methods to free the nuts can be used. An application of penetrating oil to the threads may, prove successful, but, should this fail, heat could be applied or, as a last resort, it may be necessary to use a hack saw, cutting torch, or cold chisel.

Having removed the bolting and gasket, examine the gaskets jointing faces and check for damage. If their condition is acceptable, fit the new gasket and re-tighten the bolting following the established procedure. If damage has occurred to-jointing faces, re-machining of the locations will be required, but it should be noted that original fitting tolerances should be maintained.

Renewable Seats

Some valves supplied by TT Valves (UK) Ltd. are supplied with renewable seats. We feel that their removal/refurbishment is not a 'site' task due to the need for careful extraction (possible, after a considerable in-service period), re-grinding or re-machining. We recommend that valves requiring such maintenance are returned to our workshops.

Note

Should you have any queries regarding the use or maintenance of valves supplied by TT Valves (UK) Ltd., please contact our Technical Department or our Distributor in the UK, Messers D & D International Valves Ltd. Bury St. Edmunds. Suffolk. for further information.