

# Engineering Data Sheet

Document No:- 050MS0760D799 rev 2

Installation, Operation & Maintenance Instructions for  
Aquacheck Non-Return Valves

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Date 2<sup>nd</sup> February 2006

## CE MARKING AND THE PRESSURE EQUIPMENT DIRECTIVE 97/23/EC

This has been implemented in United Kingdom law by the Pressure Equipment Regulations 1999 (SI 1999/2001).

The regulations apply to all valves with a maximum allowable pressure greater than 0.5 bar. Valves with a maximum allowable pressure not exceeding 0.5 bar are outside the scope of the Directive. Valves are categorised in accordance with the maximum working pressure, size and ascending level of hazard, which is dependent on the fluid being transported. Fluids are classified as Group 1, dangerous fluids or Group 2, all other fluids including steam. Categories are SEP (sound engineering practice) and for ascending levels of hazard, I, II, III or IV. All valves designated as SEP do not bear the CE mark nor require a Declaration of Conformity. Categories I, II, III or IV carry the CE mark and require a Declaration of Conformity (Note- all valves up to and including 25mm (1") having a maximum allowable pressure greater than 0.5 bar are designated SEP regardless of fluid group.)

## PRODUCT LIFE CYCLE

The life of the valve is dependent on its application, frequency of use and freedom from misuse. Compatibility with the system into which it is installed must be considered. The properties of the fluid being transported such as pressure, temperature and the nature of the fluid must be taken into account to minimise or avoid premature failure or non-operability. A well-designed system will take into consideration all the factors considered in the valve design, but additionally electrolytic interaction between dissimilar metals in the valve and the system must be examined. Before commissioning a system, it should be flushed to eliminate debris and chemically cleaned as appropriate to eliminate contamination, all of which will prolong the life of the valve.

## LIMITS OF USE

**The valves to which these installation, operation and maintenance instructions apply have been categorised in accordance with the Pressure Equipment Directive.**

**The valves listed are intended for use on water service only and are therefore excluded from the Pressure Equipment Directive 97/23/EC Article 1 Paragraph 3.2**

Valve figure numbers and pressure ratings are given in the table below.

## Operating pressures and temperatures

Pressure Rating	Valve Fig No.	Seat Trim	Non-shock pressure - temperature range
PN16	760 & 2760	EPDM	16 bar from -10°C to 85°C
	761 & 2761	Nitrile	16 bar from -10°C to 85°C
PN25	760 & 2760	EPDM	25 bar from -10°C to 85°C
	761 & 2761	Nitrile	25 bar from -10°C to 85°C

### **Important Note:-**

**These valves have a WRAS approved epoxy coating which has a maximum temperature of 85°C which must not be exceeded.**

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Not suitable for fatigue loading, creep conditions, fire testing, fire hazard environment, corrosive or erosive service, transporting fluids with abrasive solids.

## **PRESSURE/TEMPERATURE RATING**

Valves rated at PN16 or PN25 must be installed in a piping system whose normal pressure and temperature do not exceed these ratings.

If system testing will subject the valve to pressures in excess of the working pressure rating, this should be within the test pressure for the body with the pressure applied upstream of the obturator.

The maximum allowable pressure in valves as specified in the standards is for non-shock conditions. Water hammer and impact for example, should be avoided.

If the limits of use specified in these instructions are exceeded or if the valve is used on applications for which it was not designed, a potential hazard could result.

## **LAYOUT AND SITING**

Aquacheck valves may be installed in horizontal pipework and vertical pipework if the flow is in an upwards direction. It is designed for steady flow conditions with a velocity up to 3 metres/second.

For check valves that will be fitted in turbulent flow it is recommended that 6 diameters of straight lengths of pipe upstream and 3 diameters downstream are fitted. If the valve is situated such that turbulent flow enters the valve or is situated close to reciprocating pumps then the velocity should not exceed 2 metres/second.

It should be considered at the design stage where valves will be located to give access for inspection. Valves must be provided with adequate support. Adjoining pipework must be supported to avoid the imposition of pipeline strains on the valve body.

Heavy valves may need independent support or anchorage.

**Note:-** Check valves must not be fitted in vertical pipework with the flow downwards.

## **INSTALLATION**

Unpack the valve and check the bores are clean and free from foreign material and that the disks operate smoothly.

**Note:-** The valve must be installed with the direction arrow on the body coincident with the direction of flow in the pipeline. For vertical pipework the flow direction should be upwards only.

Prior to installation, a check of the identification plate and body marking must be made to ensure that the correct valve is being installed.

Valves are precision manufactured items and as such, should not be subjected to misuse such as careless handling, allowing dirt to enter the valve through the end ports, lack of cleaning both valve and system before operation and excessive force during bolting.

All special packaging material must be removed.

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Valves must be provided with adequate support. Adjoining pipework must be supported to avoid the imposition of pipeline strains on the valve body.

When large valves are provided with lifting lugs or eye nuts, these should be used to lift the valve.

Immediately prior to valve installation, the pipework to which the valve is to be fastened should be checked for cleanliness and freedom from debris.

Valve end protectors should only be permanently removed immediately before installation. The valve interior should be inspected through the end ports to determine whether it is clean and free from foreign matter.

The mating flange (both valve and pipework flanges) should be checked for correct gasket contact face, surface finish and condition. If a condition is found which might cause leakage, no attempt to assemble should be made until the condition has been corrected.

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.

Care should be taken to provide correct alignment of the flanges being assembled. Suitable lubricant on bolt threads should be used. In assembly, bolts are tightened sequentially to make the initial contact of flanges and gaskets flat and parallel followed by gradual and uniform tightening in an opposite bolting sequence to avoid bending one flange relative to the other, particularly on flanges with raised faces.

Parallel alignment of flanges is especially important in the case of the assembly of a valve into an existing system.

Flanged joints depend on compressive deformation of the gasket material between the flange surfaces.

The bolting must be checked for correct size, length, material and that all connection flange bolt holes are utilized.

## **OPERATING**

Aquacheck valves are self-acting.

## **MAINTENANCE**

The valve should be at zero pressure and ambient temperature prior to any inspection.

Maintenance Engineers & 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.

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In systems where corrosion could be a potential hazard, wall thickness checks on the body should be made. This requires the removal of the valve from the pipeline at zero pressure. If the wall thickness has reduced by 25%, the valve must be replaced.

Aquacheck valves are maintenance free. However, if it is necessary, the elastomeric seat seal and plunger return spring may be changed.

A special tool is required for seat removal (which may be obtained from Hattersley) or the valve may be returned to Hattersley for refurbishment.

## **Seat Seal Replacement**

It is recommended that the valve is isolated from the system and the system is drained.

1. Remove the valve from the system.
2. Unbolt the Double check valve assembly. (Fig 2760 or 2761 only)
3. The seat seal retaining ring needs to be unscrewed using a special torque tool

**Note:-** During this stage lifting the plunger to open slightly will assist the removal of the retaining ring.

4. Release the plunger.
5. The seat seal and plunger are now free to be removed from the valve.
6. Disregard the old seat seal and check the plunger sealing face for damage.
7. Remove the return spring and disregard if necessary.
8. Fit the new spring if required and replace plunger into the valve.
9. With the plunger in the slightly open position, the new seal and retaining ring can now be fitted.
10. Check that the plunger is free to operate opening and returning smoothly.
11. For Fig 2760 or 2761 repeat with other check valve and re-bolt the double check valve and ensure that the assembly has both flow arrows in the same direction. (The valve with the bleed plug is upstream i.e. water flows into this valve first).
12. Check the gasket and replace if necessary also check that the flange sealing faces are clean and free from damage.
13. Re-fit the valve into the system.

## **POSITIVE ISOLATION**

Confirmation of positive isolating during back flow is achieved by removal of the central bleed screw.

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For the supply of genuine Hattersley spares, technical assistance or Hattersley ValveServe contact:

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