

Engineering Data Sheet

Document No:- 050M00870D799 rev 3

Installation, Operation & Maintenance Instructions for
Fig 870 series Wafer Thin Check Valves

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Date 18th October 2002

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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.

Nitrile and Viton trim products are categorised for Group 1 Liquid but are not necessarily suitable for all fluids in this group. Refer to Hattersley Technical Application Engineers for advice. Codes of practice, specifications and regulations should be referred to for specific guidance for valve selection on hazardous service.

Fluid Fig No.	Group 1 Liquid		
	PN	DN	Category
871(Nitrile) 4872(Viton)	16	50	SEP
		65-200	I *
		250-300	II *
	25	350-600	III *
		50-125	I *
		150-250	II *
		300-600	III *

* Categories I, II and III require CE mark

EPDM trim products are categorised for Group 2 fluids i.e. non-hazardous and on no account must these valves be used on any Group 1 fluids.

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Fluid	Group 2 Liquid Only		
Fig No.	PN	DN	Category
5870 (EPDM)	16	50-300	SEP
		350-600	I *
	25	50-200	SEP
		250-600	I *
	40	50-200	SEP
		250-600	I *

* Category I requires CE mark

Operating pressures and temperatures

PN 16 rated valves

Valve Fig No.	Seat Trim	Non-shock pressure at temperature range	Non-shock pressure at max. temperature
5870	EPDM	16 bar from -10°C to 120°C	16 bar at 120 °C
871	Nitrile	16 bar from -10°C to 90°C	16 bar at 90 °C
4872	Viton	16 bar from -10°C to 200°C	16 bar at 200 °C

PN 25 rated valves

Valve Fig No.	Seat Trim	Non-shock pressure at temperature range	Non-shock pressure at max. temperature
5870	EPDM	25 bar from -10°C to 120°C	25 bar at 120 °C
871	Nitrile	25 bar from -10°C to 90°C	25 bar at 90 °C
4872	Viton	25 bar from -10°C to 200°C	25 bar at 200 °C

PN 40 rated valves

Valve Fig No.	Seat Trim	Non-shock pressure at temperature range	Non-shock pressure at max. temperature
5870	EPDM	40 bar from -10°C to 120°C	40 bar at 120 °C
871	Nitrile	40 bar from -10°C to 90°C	40 bar at 90 °C
4872	Viton	40 bar from -10°C to 200°C	40 bar at 200 °C

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

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PRESSURE/TEMPERATURE RATING

These valves must be installed in a piping system whose normal pressure and temperature do not exceed the above 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

The valve is not recommended for fitting to pipelines with pulsating flow or close to reciprocating pumps.

The Fig 870 series check valves may be installed in horizontal pipework and vertical pipework if the flow is in an upwards direction.

Swing check valves having 6 diameters of straight lengths of pipe upstream and 3 diameters downstream are suitable for velocities up to 3 metres/second. 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 maintenance and repair.

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 disk operates smoothly.

These valves are WaferThin pattern and are designed to fit between flanges, locating within the flange bolting.

A stainless steel eyebolt is provided for ease of installation.

For horizontal pipework the valve must be installed with the eyebolt uppermost to the pipework. This eyebolt should be as near vertical as possible.

When installed, the valve body should be vertical. Any misalignment of valve flanges or non-horizontal pipework declining from upstream to downstream may prevent the valve from closing correctly under very low back pressure.

For vertical pipework the eyebolt can be in any orientation.

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

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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.

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.

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.

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.

Packaging 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 faces of the valve and of the adjoining 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 operating 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 and centralising the valve within the flange bolting. Ensure that the interbolt gasketry is also centralised and does not protrude into the pipe bore

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 pipe flange relative to the other.

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

The WaferThin check valve is self-acting.

MAINTENANCE

The WaferThin check valves are maintenance free.

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Inspection

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 programme 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 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.

The valves are maintenance free, however, if it is necessary to change the elastomer trim material the following procedure should be followed.

Seat Seal Replacement

1. Place the check valve with the inlet flange face on a clean bench or desk.
2. Hold the disk vertically upwards (i.e. open).
3. Using a sharp pointed tool (a small screwdriver, compass or scissors point) pierce 'O' ring seal and lever out from the groove.
4. Place the new 'O' ring onto the groove and slowly press into the groove using a blunt tool (Starting at the hinge side and then working on opposite sides each time, this will prevent the 'O' ring stretching).
5. If the elastomer trim material has been changed on new valves, new valve and box labels will be needed.

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

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