

Hopkinsons Valves

Installation, Operation & Maintenance Manual

Hopkinsons Swing Check Valve

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SAFETY

These instructions contain essential health and safety requirements concerning the safe use of the equipment.

1. For the intended purpose that was specified to Hopkinsons, e.g. location, pressure, temperature, fluid, etc.
2. When installed, operated, maintained, etc. in accordance with these instructions.

Failure to comply with these points in their entirety involves serious risk.

The manufacturer of this valve and actuator is:

WEIR VALVES & CONTROLS Ltd,
Britannia House,
Huddersfield Rd, Elland,
West Yorkshire,
HX5 9JR. England.

A nameplate is attached to the valve giving details in accordance with the valve standard to which this valve has been manufactured. It includes details

of the manufacturing contract and item number and valve figure number. The nameplate details should be quoted in their entirety in any correspondence with Weir valves & Controls, for the enquiry of spare parts or other technical information.

The following warning/instructions are attached to the valve assembly and must be observed and followed at all times.

SAFETY WARNINGS:

Beware of Hot surfaces.

Electrically isolate actuator before adjustment or maintenance to valve.

Valve must be depressurised before adjustment and maintenance.

Please refer to Weir Valves & Controls UK Ltd Publications 'SAFETY WITH VALVES' for general principles on installation, operation and maintenance. However, in all cases these Operating and Maintenance Instructions supersede any alternative information that may be given in, for example non-specific catalogues or the above mentioned general safety publications.

At all times the valve must be maintained to a safe condition and any damaged or worn parts must be replaced with the correct parts supplied by Weir Valves & Controls Ltd. Users are strongly recommended to avail themselves of the training courses provided by Weir Valves & Controls UK, who also provide on-site and off-site repairs.

We recommend that a record is kept of all work done to this equipment, including its operating history.

DESCRIPTION

The valve is a swing check valve whose purpose is to ensure that flow occurs in only one direction in the pipeline. Forward flow takes place when it moves the disc away from the seat. When flow stops, gravity causes the disc to fall back onto its seat and thus prevents

any flow in the reverse direction. This operation is entirely automatic.

In order for the valve to operate satisfactorily it must be installed so that gravity assists the disc

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back onto the seat. This entails this valve being installed in a horizontal pipeline with its bonnet being uppermost. (Occasionally a swing check valve may be equipped to work in a vertical pipe with the flow upwards, and where specified for such duties the valve will be specially configured for this purpose).

The valve must be installed the correct way round in the pipeline. The direction of flow is marked with either an arrow on the body or by an 'inlet' plate.

The valve disc is fitted with an anti-spinning device which prevents the disc from spinning and the unnecessary wear associated with this condition. However, the valve disc has a small amount of movement, thus allowing it to align itself perfectly on the seat.

INSTALLATION

It is the users responsibility to provide a safe working area, with adequate lighting and an unobstructed access, and that the position indicator is easily visible.

The valve must be suitably protected against falling objects, including rain etc., and must not be used for any purpose for which it was not designed e.g. it must not be used for standing on, securing scaffolding, welding earth returns etc.

Before installing make sure all the protection has been removed from the valve and inspect it for any damage which might have occurred during either transit or handing. Ensure the pipework into which the valve is to be fixed is square and adequately supported and that it is clean and rust free with no debris which could affect subsequent valve operation. Use suitable lifting gear to support the valve for installing.

Ensure the valve is positioned the correct way with respect to both the flow and gravity.

Weld the valve into the pipe line using an approved procedure.

Once installed, the system must only be operated so that the valve assembly is not exposed to excess conditions, water hammer,

water freezing, corrosion or abuse in any way whatsoever.

COMMISSIONING

The valve should be thermally insulated - 'lagged' - to protect operators when the valve is hot,

Commissioning involves testing the valve and the system that it is in (e.g. hydraulic testing or the pipe to valve weld, the correct operation of the valve etc.), and then equipping the valve for the start of its operational life (e.g. charging up the system to the valve). During commissioning it is sometimes necessary to bypass interlocks or safeguards on equipment in order to simulate meaningful commissioning trials. Under these circumstances the utmost care must be exercised. As Hopkinsons Ltd has not been informed of any procedure which will either interfere with this valve in order to test other plant, or to interfere with other equipment to test this valve, it is the responsibility of the user to ensure the total safety of persons and equipment.

The following items may require to be attended to during commissioning, and it must be recognised that their mention here is on the strict understanding that measures will be taken to prevent any risk.

Chemical Cleaning of Pipelines

If chemical cleaning has to be undertaken, ensure the chemicals are compatible with the materials in the valve. It is important to ensure that any chemicals used in this operation do not soak into the gland packing where they could promote corrosion of the valve stem and/or deterioration of the packing. For this reason it is recommended that the valve is first pressurised with water to 'saturate' the gland packing. Proceed with the chemical cleaning and passivation. Then with water in the valve, pressurise it several times to flush away any chemicals which may have penetrated the gland packing.

Hydraulic Testing

Test only up to the maximum hydraulic test

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pressure for the valve rating. At shell test pressure the actuator is not designed to close the valve and also the gland packing is permitted to leak at this pressure. Check for other leaks, e.g. at valve to pipe connections.

Use corrosion inhibited water for testing.

Note - Shell test pressure is 1.5 times the 'cold rating pressure' stated on the valve nameplate.

Carry out full functional testing and ensure everything is working correctly.

COMMISSIONING

Preparation for Operation

Note that when the valve enters full and proper operation this may be the first time that the valve is subjected to the most arduous combination of conditions e.g. flow, temperature (including ambient temperature), pressure, operating loads. It is therefore important that the valve is seen to operate correctly not only during 'commissioning', but also when the valve has entered 'operation'. The same is true if the valve should be subjected to any changed conditions of operation.

Commissioning and Operational Precautions

In certain circumstances it is possible that the valve is operated more frequently during commissioning than that which occurs during normal operation. Disc oscillations produced in the part open position from low flows, and from frequent start-ups produce more wear on the valve shaft than when the flow is sufficient to keep the disc in the full open position.

Routine maintenance, overhaul, etc. may therefore still be necessary and it should not be assumed that these can be neglected during commissioning and early operation.

Internal damage to the valve can also occur during this period as weld spatter, pipe scale, debris etc. is still finding its way through the system pipework. Care should be taken to ensure that no damage is done to the valve during such times.

ROUTINE MAINTENANCE

The valve required little routine maintenance.

However, the valve should be inspected externally, preferably whilst it is operating, to check for signs of seat wear or leakage etc., so that timely rectification work can be arranged.

The frequency of this inspection depends on the amount of use received by the valve, and thus it is recommended that a suitable inspection interval be taken as say six months, and that this interval is adjusted as necessary in the light of site experience.

Take care when approaching a valve, particularly if it is seen to be leaking.

The valve does not require any routine lubrication.

DISMANTLING

WARNING: Before carrying out any dismantling work on the valve, make sure there is no pressure in the pipeline, and that the valve is safe to work on.

Remove the bonnet nuts securing the bonnet to the body and withdraw the bonnet from the locating recess.

Remove the bonnet gasket.

Remove stem plug nuts and gaskets. Suitably support the disc assembly. The shaft can then be gently tapped out. If difficult use the tapped extractor hole.

Remove the disc assembly from the valve body.

These flow conditions can also promote

EXAMINATION AND COURSE OF ACTION

Visual inspection of the joint faces on the body and bonnet will reveal any major defects immediately, such as steam erosion marks etc.

If the valve has been leaking from the gasket prior to being taken out of service, then it will

probably be necessary to re-machine the sealing faces of the bonnet and possibly the body.

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The bonnet may be machined in a lathe if it is badly damaged, provided that the correct joint face configuration is maintained. This accuracy is essential for the correct sealing of the gasket. Thoroughly clean all joint faces.

MAINTENANCE OF VALVE HEAD AND SEAT FACE

It is not normally necessary to dismantle the valve disc assembly as the disc face may be lapped whilst the valve arm is still attached. Ensure the disc has a small amount of freedom on the arm. If the valve disc assembly is dismantled we recommend a new stop nut be fitted and new locking pin be welded on.

The valve head and seat must be lapped independently. No satisfactory result can be obtained by attempting to lap the valve head directly on to its seat. Suitable lapping plates for the seat can be supplied by Weir Valves & Controls Ltd : alternatively they can be readily manufactured in cast iron.

Notes on lapping procedures are contained in Hopkinsons Publication IOM-P1-R1. Maintenance of Valves and Seats.

ASSEMBLY PROCEDURE

Replace the disc assembly into the valve body and align the pivot bore in the valve body. Support in place as necessary. Insert the shaft.

Replace gasket and plug nuts on the side of valve.

Remove any supports used to hold the disc assembly.

Ensure the valve flap swings freely and that it sits correctly on the valve seat. Ensure the shaft does not rub on metal components.

Fit a new bonnet gasket in the flange recess.

Assemble bonnet on body locating the spigot into the recess and secure with nuts.

Test the valve.

PREVENTATIVE MAINTENANCE

Regularly inspect valves for signs of gland leakage. The gland packing can be tightened to prevent leakage but if a leak has persisted for some time it will have blown out some of the packing material and thus simply tightening the gland will not prevent the leakage. In addition the lack of support given to the stem by the gland packing may allow for the stem to come into contact with the metal gland parts.

Caution: Only undertake preventative maintenance when it is safe to do so. Do not over tighten gland nuts in an attempt to stop gland leaks. If the leakage cannot be controlled, then overhaul the gland at the earliest opportunity.

valve disc and seat must

