CRANE FLUID SYSTEMS

CHECK VALVES

D104/ D116/ D138/ D135/ D140/ D138.PF/ D140W/ D142/ F493/ FM469/ FM492 CAST IRON AND BRONZE SWING CHECK & LIFT CHECK VALVES

INTRODUCTION

Check valves permit flow in one direction only and close automatically if flow reverses. They are entirely automatic in action, depending upon pressure and velocity of flow within the line.

GENERAL INSTALLATION

Preparation

- Ensure valve is suitable for service conditions e.g. pressure, temperature, service media.
- Remove dust caps/flange protectors, where fitted.
- The complete piping system must be flushed through prior to commissioning to ensure all foreign matter is removed. Subsequent valve failure is usually caused by dirt and other matter left in the pipeline.

Flanged Joints

Flanges may be damaged by over tightening the bolts. The following procedures will reduce this risk:

- Full-face gaskets reduce the stresses in flat face flanges.
- Low strength carbon steel bolting has

INSTALLATION (CONTINUED)

traditionally been used to restrict the load imposed on grey iron flanges, but should not be used for temperatures above 200°C.

- Always use the correct size and number of bolts.
- Find out the correct assembly torque for the specific gasket and conditions applicable, and use a torque wrench to achieve this. Use the correct tightening sequence.
- Do not match a flat-faced flange to a raised face flange.
- The flange gaskets should be suitable for operating conditions or maximum pressure/ temperature ratings.
- The flange gaskets should be checked to ensure freedom from defects or damage.
- Care should be taken to provide correct alignment of the flanges being assembled. A suitable lubricant on bolt threads is recommended. In assembly, flange bolts should be 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.
- Flanged joints depend on compressive deformation of the gasket material between the flange surfaces.

Threaded Joints

- The valves are supplied with taper threads and, with the use of a thread sealant will give a pressure tight seal.
- To avoid distortion of the valve, when fitting and tightening the pipe, the valve must be gripped using the flats provided at the same end as the pipe is being fitted.
- Care should be taken to avoid 'pipe ending'. This can occur if the pipework is not threaded correctly resulting in distortion of the valve seat. The use of a thread gauge is recommended to check the thread dimensions.
- The male thread on the pipe must have fully formed, undamaged threads.

Press-Fit Joints

For Press-Fit, please refer to the Geberit website www.geberit.co.uk where installation instructions for Press-Fit can be found.

Valve Location

- Valves should be located to ensure ease and safe operation of the valve.

Layout and Sitting

- Check valves may be installed in horizontal pipework and vertical pipework if the flow is in an upwards direction. **All types of check valves should maintain 6 diameters of straight lengths of pipe upstream and 3 diameters downstream to avoid premature failure of product and 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.**
- These valves must not be fitted in vertical pipelines with the flow downwards. In a horizontal pipeline the valve should be installed with the hexagon cap uppermost. The valve must be installed with the direction arrow on the body coincident with the direction of the flow in the pipeline.
- Valves must be provided with adequate support. Adjoining pipework must be supported to avoid the imposition of pipeline strains on the valve body.

INSTALLATION (CONTINUED)

Piping Supports

These must be carefully aligned and at the correct distance between centres for the size and type of pipe. Please refer to the current best practice for details of correct spans and installation details.

OPERATION

- The operating conditions shall be consistent with the requirements in the performance specification.
- The discs and associated moving parts may be in a constant state of movement if the velocity pressure is not sufficient to hold the disc in a wide open and stable position. Premature wear and noisy operation or vibration can be avoided by selecting the size of check valve on the basis of flow conditions.

INSPECTION AND MAINTENANCE

- All check valves and non-return valves permit external inspection without removing the valve body from the pipeline. If internal visual inspection is required, valve can be removed from pipeline.
- The valve should be at zero pressure and ambient temperature prior to any inspection.
- Check valves are maintenance free. For any technical queries, please contact Crane Technical Department.
- If there is a service requirement for removing the valve from the system, Maintenance Engineers & Operators should have the appropriate level of competence and are reminded to use correct fitting tools and equipment.
- Crane Fluid Systems do not offer spares for this product.
- If product is disassembled, warranty is void.

GENERAL CONSIDERATIONS

- The surfaces of valves in service may be subject to extreme temperatures; care should be taken when handling.

LIMITS OF USE

These valves have been categorised in accordance with the Pressure Equipment Directive 2014/68/EU.

The fluid to be transported is limited to those shown in the product table below. On no account can these valves be used on any unstable fluids, or for the fluids groups not specified in the product table.

Note: Valves that are classified as SEP (Sound Engineering Practice) are not CE marked and therefore do not require a declaration of conformity.

Products conforming to Cat I of the PED 2014/68/EU shall include the CE Mark.

Products conforming to Cat II and above of the PED 2014/68/EU shall include the CE Mark and applicable Notified Body Number.

LIMITS OF USE (CONTINUED)

Fig. No	Material	PED category by valve size (DN)			Product Applications			
		SEP	1	2	Group 1 Gas	Group 2 Gas	Group 1 Liquid	Group 2 Liquid
D104 / D104.AT	Bronze	15-50	-	-	-	✓	✓	✓
D116 / D116.AT	Bronze	8-32	40-50	65-80	-	✓	✓	✓
D138 / D138.AT / D140 / D140.AT	Bronze	10-40	50-80	-	-	✓	✓	✓
D135 / D135.AT	Bronze	15-50	-	-	-	✓	✓	✓
D138.PF	Bronze	15-54	-	-	-	-	-	✓
D142 / D142.AT	Bronze	8-32	40-50	65-80	-	✓	✓	✓
F493	Cast Iron	50-65	80-125	150-300	-	✓	✓	✓
FM469	Cast Iron	50	65-125	150-300	-	✓	✓	✓
FM492	Cast Iron	50	65-125	150-300	-	✓	✓	✓
D140W	Bronze	20-50	-	-	-	-	-	✓

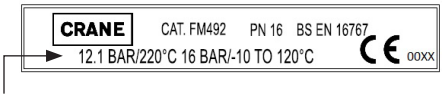
- Valves must be installed into a well-designed system and it is recommended that the system be inspected in accordance with the appropriate national and regional legislation.
- Valves must be installed by trained personnel only.
- Maximum operating pressure reduces as service temperature increases. Service temperature and pressure indicated on the identification plate or body marking should not be exceeded – please refer to example below.
- The installation should be designed to provide adequate means of draining and venting to avoid harmful effects such as water hammer, vacuum collapse, corrosion and uncontrolled chemical reactions and to permit cleaning, inspection and maintenance in the correct manner.
- Valves are not designed to operate under high shock loadings. Where pressure increases occur due to shock loading (water hammer), they should be added to the working pressure to obtain the total pressure acting on the valve. The total must not exceed the pressure rating of the valve. A pressure surge, or shock, is usually caused by the rapid closure of a check valve or quarter turn valve resulting in a sudden reduction in flow rate.
- It is the responsibility of the installer to ensure that the valves do not exceed the allowable limits of pressure. However, the equipment is designed to withstand a momentary pressure surge of up to 10% above the maximum working pressure.
- The product has not been designed to include corrosion, erosion or abrasion allowances. Any queries regarding service applications should be addressed to the Crane Fluid Systems - Technical Sales Department.

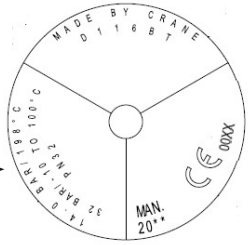
LIMITS OF USE (CONTINUED)

- The valves have been designed for loadings, appropriate to its intended use and other reasonably foreseeable operating conditions. Loadings caused by traffic, wind and earthquake have not been taken into account.
- Not suitable for fatigue loading, creep conditions, fire testing, fire hazard environment, corrosive or erosive service, transporting fluids with abrasive solids.
- The piping system shall be designed to reduce the risk of fatigue due to vibration of pipes.
- Crane valves have not been designed as fire safe valves.

INSPECTION AND MAINTENANCE

Fig. No	Maximum Operating Pressure Conditions	Maximum Operating Temperature Conditions
D104 / D104.AT	20 Bar / -10 to 100°C	9 Bar / 180°C
D116 / D116.AT	32 Bar / -10 to 100°C	14 Bar / 198°C
D138 / D138.AT	25 Bar / -10 to 100°C	10.5 Bar / 186°C
D135 / D135.AT	20 Bar / -10 to 100°C	9 Bar / 180°C
D140 / D140.AT	25 Bar / -10 to 100°C	-
D142 / D142.AT	32 Bar / -10 to 120°C	14 Bar / 260°C
D140W	25 Bar / -10 to 85°C	-
F493	13.8 Bar / -10 to 65°C	8.6 Bar / 232°C
FM469	16 Bar / -10 to 65°C	-
FM492	16.0 Bar / -10 to 120°C	12.1 Bar / 220°C





Example of Identification plates showing service pressure and temperature limitations.

STRESS CORROSION CRACKING

The use of chemicals for system dosing must be determined by the user as all aspects of the system must be established and considered, and the effect of the chemicals used (including compounds arising from chemical combinations) must also be established in order to accurately determine compatibility.

Crane (and its related brands) manufacture hardware (valves, couplings, etc) for the Building Services industry and Utilities industries. However, we are not system designers or operators and cannot make recommendations regarding chemical compatibility for the system, as a result of the above variables. Any comments from Crane regarding chemical compatibility shall relate solely to the Crane product and does not constitute a recommendation on compatibility for the wider system, resultant chemical compounds, components, substances or materials, in whole or in part.

For reference, and not exhaustive, certain austenitic stainless steels and aluminium alloys crack in the presence of chlorides, mild steel cracks in the presence of alkali and nitrates, copper alloys crack in ammoniacal solutions and iron with almost any caustic species (hydrogen presence notwithstanding).

For more information on how SCC can occur, please visit www.cranefs.com

YouTube To visit our Video Library go to:
www.youtube.com/user/CraneBSU

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