CRANE FLUID SYSTEMS

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FM311 ISO 9001

- Designed and manufactured under quality management systems in accordance with BS EN ISO 9001-2008

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CRANE FLUID SYSTEMS

CHECK VALVES

C1253 / D104 / D116 / D138 / D140 / D138.PF / D142
F201 / F491 / F492 / F493 / FM469 / FM490 / FM492
CAST IRON, MALLEABLE IRON AND BRONZE
SWING CHECK AND LIFT CHECK VALVES

- Swing Check valves operate in horizontal pipelines, or in vertical pipelines provided the flow is in an upward direction. Lift check valves operate in horizontal pipelines only.
- Service temperature and pressure indicated on the identification plate or body marking should not be exceeded.
- Valves must be installed into a well-designed system and it is recommended that the system be inspected in accordance with the appropriate member state legislation.

D142 Check Valve

INSTALLATION

Preparation

- Ensure valve is suitable for service conditions e.g. pressure, temperature, service media.
- Remove dust caps/flange protectors, where fitted.
- 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.
- 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.
- 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.
- 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 piping system shall be designed to reduce the risk of fatigue due to vibration of pipes.

Valve Location

Valves should be located to ensure ease and safety of operation and access allowed for subsequent maintenance.

Layout and Sitting

These 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.

Piping Supports

The system shall be designed to prevent excessive forces. The piping supports must be carefully aligned and at the correct distance between centres for the size and type of pipe. The following publications provide details of correct spans and installation details:

BS3974, Specification for Pipe Supports (Available from BSI)

DOI Directorate of M & E Engineering Services, M & E No. 3 (Available from HMSO)

(Standards relevant at the time of design)

Flanged Joints

Bronze and cast iron flanges may be damaged by over tightening the bolts. The following procedures will reduce this risk:

– Make sure the pipe flanges are correctly aligned.

– Full-face gaskets reduce the stresses in flat face flanges and should be used with bronze flanges.

– Low strength carbon steel bolting has 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.

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 is a condition that occurs when the pipe is screwed in too far resulting in distortion of the valve seat.
- 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.

OPERATION

All 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. 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.

ROUTINE MAINTENANCE

- All check valves and non-return valves are designed to permit inspection without removing the valve body from the pipeline.
- The portion of the pipeline in which the valve is installed must be isolated before any dismantling and inspection is carried out.
- Check for leaks at the body/cap joint. To remedy:
  – Screwed in caps. – re-tighten joint. If leakage still occurs, isolate pipeline, dismantle body/cap joint, clean seating faces and remake joint. (Note: for gasketed joints use replacement gaskets).
  – Bolted cap valves – re-tighten nuts in vicinity of leak. If leakage still occurs, isolate pipeline, dismantle body/cap joint and renew cap gasket. Be careful not to over tighten bolting. If information is required relating to torque values then contact the Crane Fluid Systems Technical Department.
- On swing check valves the hinge pin plug should be inspected for wear. It should be noted that these valves are designed so that the hinge pin is a loose fit in the body and the disc a loose fit in the hinge.

GENERAL CONSIDERATIONS

- Maximum operating pressure reduces as service temperature increases. Pressure and temperature limitations are shown by the valve body marking or on the identification plate.
- 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.
- 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 must these valves be used on any group 1 gases (unless stated) or unstable fluids.

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

FIG NO.	MATERIAL	PED CATEGORY BY VALVE SIZE				PRODUCT APPLICATIONS			
		SEP Not CE Marked	1	2	3	GROUP 1 GAS	GROUP 2 GAS	GROUP 1 LIQUID	GROUP 2 LIQUID
C1253	Bronze	8-50	65-80				✓	✓	✓
D104	Bronze	15-50					✓	✓	✓
D116	Bronze	10-32	40-50	65-80			✓	✓	✓
D138/D140	Bronze	10-40	50-80				✓	✓	✓
D138.PF	Bronze	15-54							✓
D142	Bronze	15-32	40-50	65-80			✓	✓	✓
F201	Malleable Iron	15-25		32-50		✓	✓	✓	✓
F491	Cast iron	50-65	80-125	150-200			✓	✓	✓
F492	Cast iron		50-80	100-250			✓	✓	✓
F493	Cast iron	50-65	80-125	150-300			✓	✓	✓
FM469	Cast iron	50	65-125	150-300			✓	✓	✓
FM490	Cast iron	50-150	200				✓	✓	✓
FM492	Cast iron	50	65-125	150-300			✓	✓	✓

The above products are not suitable for use with unstable fluids