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INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

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Installation and Maintenance Guidelines for NIBCO® Twin Disc Check Valves 2” to 36” 150 CWP, 250 WWP and CWP 14” & 16” 200 WWP FM Cast Iron and Ductile Iron

Figure Numbers

W920W-LF*
KW900W-LF*

*Weighted average lead content ≤ 0.25%

CAUTION: Only qualified personnel should undertake the procedures outlined in this document. NIBCO INC., its agents, representatives and employees assumes no liability for the use of these procedures. These procedures are offered as suggestions only.

1.0 GENERAL INFORMATION

1.1 SCOPE

These instructions are furnished for use in the installation, operation and maintenance of NIBCO 2” to 36” service rated for 150 CWP, 250 WWP and CWP twin disc check valves. Also 200 WWP KW-900-W-LF* 14” & 16”.

1.2 GENERAL DATA

A. MANUFACTURER

NIBCO INC.
1516 Middlebury Street
Elkhart, IN 46516
Phone: (574) 295-3000

B. FIGURE NUMBERS AND DESCRIPTIONS

Cast Iron:

KW900W-LF* 14” and 16”, Wafer style, rubber seat, spring actuated, FM
W920W-LF* 14”-36”, Wafer style, rubber seat, spring actuated
*Weighted average lead content ≤ 0.25%

Ductile Iron:

KW900W-LF* 2” -12”, Wafer style, rubber seat, spring actuated. UL/FM
W920W-LF* 2”-12”, Wafer style, rubber seat, spring actuated
*Weighted average lead content ≤ 0.25%

The above listed valves will match up with ASME B16.1 125 Class iron flanges

C. IDENTIFICATION PLATES

An aluminum identification plate is attached to the body of the valve. This identification plate gives the figure number of the valve, some general information about the trim and location of NIBCO’s corporate offices.

When more detailed information is required, the NIBCO catalog should be referred to using the valve figure number as the guide.

D. SERVICE

When installing valves for service in corrosive media, the NIBCO ChemGuide may be consulted for specific data or contact can be made with NIBCO Technical Services. It is, however, the obligation of the user to make the ultimate decision of fitness for use.

E. PRESSURE TEMPERATURE RATINGS

Pressure and temperature ratings may be found listed on the cut sheet for these valves. This information is taken from applicable ASME standards.

F. CODES & REGULATIONS

A valve specified for use in compliance with the ASME Boiler and Pressure Vessel Code, the ASME B31.1 code for Power Piping, or other set of regulations so-specified is subject to the limitations and restrictions of said-regulations as mandated by the authority having jurisdiction.

G. PRODUCTION TEST PROCEDURES

Valves are hydrostatically shell tested at twice the WWP rating according to and/or FM 1230 testing guidelines.

H. PRINCIPAL DIMENSIONS

Principal dimensions of the valve are specified in the appropriate catalog.

1.3 DETAILED DESCRIPTION

The check valves listed above and covered in these instructions are ductile iron and cast iron, twin disc style and spring assisted. They utilize a rubber seat and a bronze or ductile iron disc. The valves are certified lead free*. They are used to stop the backflow of fluids in piping systems.

*Weighted average lead content ≤ 0.25%

2.0 INSTALLATION

2.1 GENERAL INFORMATION

1. Do not use a lift check or other style of valve, where the closure member remains in the waterway containing highly viscous media.

2. Only UL/FM listed/approved valves are tested bubble tight.

3. Use a spring-assisted double-disc check valve on the discharge side of the pump.

4. The size of a check valve shall be determined by the specified pressure drop (0.5 psi for swing checks, 3.0 psi for linear lift checks), not on pipe size.

5. Check valves shall be installed at least 5 pipe diameters (mild velocity and turbulence) to 10 pipe diameters (high velocity and turbulence) from the pump or other sources of turbulence.

6. Do not install check valves in systems with pulsating pressures.

7. Check valves need a significant pressure differential across the disc in the closed position to open properly.

2.2 HANDLING INFORMATION

Each valve should be handled only with apparatus that will safely support the valve weight. First raise the valve to the vertical position and block it. Reposition the slings and lift the valve vertically. Remove the expendable end protectors, if present, and install the valve according to the piping layout.

For installation of valves into pipelines, flange bolting and gaskets, are governed by the applicable code for pipeline specification. While the valve is being installed care should be taken to prevent foreign material from entering the valve.

CAUTION: Care should be taken during handling, installation, and operation to prevent personal injury and damage to valve components, especially seating surfaces.

2.3 INSTALLATION PREPARATION

The installation of the valve is important for its proper operation. The **flow arrow** on the valve body must point in the direction of flow when the system is in operation. The valve can be installed in horizontal lines with the disc hinge pin in the vertical position, or in vertical lines with upward flow.

The valve should be installed between standard flanges that correspond to the dimensions given in ASME B16.1 for 125# flanges or to those given in ISO 7005 for PN10 and PN16 flanges (See Table 1). Special integrally-cast locating tabs are provided around the exterior to enable the valves to fit between these different bolt patterns. The number of tabs varies by valve size. (Note: for some sizes tabs are not provided because the desired universal fit is accomplished without them)

The gasket can be rubber or compressed non-asbestos fiber. Ring gaskets are appropriate for this wafer style check valve, but full-face flange gaskets are preferred. The studs or bolts used should span the full length of the valve for wafer style and flanges for flange style.

Five to ten diameters of straight pipe upstream of the valve are recommended to prevent turbulent flow streams through the valve, which can cause vibration, contamination and wear.

When mating the check valve with butterfly isolation valves, the isolation valve must be installed at least one diameter downstream of the check valve, because, in most sizes, the check valve discs extend beyond the downstream flange face and may interfere with the operation of adjacent valves. In these sizes, a short run of pipe or spacer is needed between the check valve and the isolation valve.

2.4 INSTALLATION PROCEDURE

1. Place the valve between mating flanges.
    a. NPS 10 - 12 (DN 250-300) valves are provided with a lifting eyebolt to aid in this process
    b. NPS 14 - 36 valves have a tapped hole for insertion of a lifting eye to assist in installation.
2. Lubricate the flange bolts or studs and insert them around the flange.
3. Lightly turn bolts or nuts until gaps are eliminated.
4. The tightening of the bolts and nuts should then be done in graduated steps using the cross-over tightening method.
5. Recommended lubricated torques using resilient gaskets are listed in Table 1. Recommendations are made without warranty. Installer must verify proper bolt selection and strength for each specific application.

If leakage occurs, allow gaskets to absorb fluid and check torque and leakage after 24 hours. Do not exceed bolt rating or crush gasket more than 50 % of its thickness.

Table 1 – Flange/Bolt Torque Data

Size	Flange Class	Bolt Size	Qty	Torque
NPS 2	ASME B16.1 125	5/8 in.	4	25-75 ft-lb
DN 50	ISO 7005 PN16	M16	4	40-120 N-m
NPS 2-1/2	ASME B16.1 125	5/8 in.	4	25-75 ft-lb
DN 65	ISO 7005 PN16	M16	4	40-120 N-m
NPS 3	ASME B16.1 125	5/8 in.	4	25-75 ft-lb
DN 80	ISO 7005 PN16	M16	8	40-120 N-m
NPS 4	ASME B16.1 125	5/8 in.	8	25-75 ft-lb
DN 100	ISO 7005 PN16	M16	8	40-120 N-m
NPS 5	ASME B16.1 125	¾ in.	8	40-120 ft-lb
DN 125	ISO 7005 PN16	M16	8	40-120 N-m
NPS 6	ASME B16.1 125	¾ in.	8	40-120 ft-lb
DN 150	ISO 7005 PN16	M20	8	65-200 N-m
NPS 8	ASME B16.1 125	¾ in.	8	50-120 ft-lb
DN 200	ISO 7005 PN10	M20	8	65-200 N-m
DN 200	ISO 7005 PN16	M20	12	65-200 N-m
NPS 10	ASME B16.1 125	7/8 in.	12	60-160 ft-lb
DN 250	ISO 7005 PN10	M20	12	65-200 N-m
DN 250	ISO 7005 PN16	M24	12	100-300 N-m
NPS 12	ASME B16.1 125	7/8 in.	12	65-160 ft-lb
DN 300	ISO 7005 PN10	M20	12	80-200 N-m
DN 300	ISO 7005 PN16	M24	12	125-300 N-m
NPS 14	ASME B16.1 125	1 in.	12	80-250 ft-lb
NPS 16	ASME B16.1 125	1 in.	16	90-250 ft-lb
NPS 18	ASME B16.1 125	1-1/8 in.	16	100-350 ft-lb
NPS 20	ASME B16.1 125	1-1/8 in.	20	120-350 ft-lb
NPS 24	ASME B16.1 125	1-1/4 in.	20	150-500 ft-lb
NPS 30	ASME B16.1 125	1-1.4 in.	28	180-500 ft-lb
NPS 36	ASME B16.1 125	1-1/2 in.	32	250-650 ft-lb

3.0 APPLICATION

The check valve is an automatic shut-off valve. Under pressure and flow, the closure mechanism opens allowing the media to flow freely. When the flow and pressure stops, the closure mechanism returns automatically to the closed position, preventing the media from returning upstream. The most common installation is at the pump. A check valve may be installed on the suction side of the pump to maintain the pump's prime in the event of a pump shutdown. A check valve will be used commonly on the discharge of the pump to prevent backflow from the downstream system, when the pump shuts off.

Check valves are used to prevent contaminated media in branches from flowing back into the main trunk line. The most common example is the use of backflow-prevention devices installed on any connection to a city water main. The backflow prevention device, a special form of check valve, prevents possibly contaminated water at a facility from flowing into the city water system when there is a sudden loss of water pressure in the main utility line.

There are several other applications for check valves, but the purpose is always the same.

Check valves rely on backpressure to affect a seal. The greater the backpressure the tighter the seal, but there is normally no stem to add mechanical pressure to guarantee the tightness of the seal. NIBCO tests each valve for bubble tight seal. UL 312 requires bubble tight seal. An elastomeric-sealing surface does not necessarily provide a bubble tight seal. Some backflow should always be expected through a check valve.

4.0 TROUBLESHOOTING

Prior to doing any work on any NIBCO valve, it will be necessary to shut down the piping system, remove pressure and drain, and if necessary, allow cooling and/or decontaminating before proceeding.

4.1 TURBULENCE

Laminar flow is straight, non-disturbed flow through a straight pipe. Turbulent flow results when the direction is changed or something in the media path disrupts the flow. Turbulence is found at the discharge side of pumps, elbows and valves. Check valves should be installed downstream from the source of the disturbance a minimum of 5 pipe diameters (mild velocity and turbulence) to ten pipe diameters (high velocity and turbulence).

4.2 PULSATING PRESSURE

Most valve catalogs will have a footnote advising against using check valves on reciprocating pumps and air compressors. Actually the check valve should not be used in any application with pulsating pressures - rapidly rising and falling pressures. The rapid fluctuation in pressure results in the disc constantly moving, thus prematurely

wearing out the valve. This wear will quickly become severe. Special lift checks with a piston-controlled poppet are used for these applications.

4.3 BACK PRESSURE

The nominal size of the upstream, as well as the downstream, piping must be considered when choosing and installing check valves. If the differential pressure upstream and downstream is minimal, when the disc or poppet tries to open it will begin to flutter. Pressure will build up until the disc rises off the seat. The pressure is immediately equalized, and the disc slams back into the closed position. The fluttering continues until the disc or seat is so damaged that the valve no longer holds back flow. The flutter is noisy and, as in any piping application, noise is not desirable. You should look downstream to the main header, or other sources, for a strong backflow.

5.0 MAINTENANCE

NIBCO twin disc check valves are not repairable in the field.