

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

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Installation and Maintenance Guidelines for NIBCO[®] Bronze Swing Check Valves 1/4" to 3" Class 125, 150, 200 and 300

Figure Numbers

T-413-B,Y,W

S-413-B,Y,W

T-433-B,Y,W

S-433-B,Y

T-453-B,Y

T-453-B,Y

S-473-B,Y

T-473-B,Y

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 1/4" to 3" Class 125, 150, 200 and 300 bronze check valves, with screwed in bonnet.

1.2 GENERAL DATA

A. MANUFACTURER

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

B. FIGURE NUMBERS AND DESCRIPTIONS

Figure Number	Description (Gate Valves)
T-413	Class 125 threaded end, screw in bonnet, B – bronze disc, Y – PTFE disc, W – Buna-N disc
S-413	Class 125 solder end, screw in bonnet, B – bronze disc, Y – PTFE disc, W – Buna-N disc
T-433	Class 125 threaded end, screw in bonnet, B – bronze disc, Y – PTFE disc
S-433	Class 125 solder end, screw in bonnet, B – bronze disc, Y – PTFE disc
T-453	Class 200 threaded end, screw in bonnet, B – bronze disc, Y – PTFE disc
T-473	Class 200 threaded end, screw in bonnet, B – bronze disc, Y – PTFE disc

All threaded end preparations of valves meet American National Pipe Thread (N.P.T.) requirements.

All solder end valves meet the requirements of ANSI Standard B16.22.

C. IDENTIFICATION PLATES

Identification of the bronze swing check valves is made by checking for the name NIBCO cast onto the side of the valve body. The steam rating and WOG rating is a cross reference with the figure number listed above. These valves are directional. In order for them to function properly, they must be installed with the arrow pointing with the direction of flow. The arrow for direction of flow is cast onto the side of the body. In order to determine the type of seat that is used within the valve, it is necessary to look into its end and determine the seat type. The bronze disc will be metallic, the PTFE disc is always white in color and the Buna-N disc is black and softer than the other two.

When more detailed information is required, the NIBCO Bronze & Iron 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 Chemical Resistance Guide 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 in the Engineering section of the latest printing of NIBCO catalog. This information is taken from applicable ANSI Standards.

F. CODES & REGULATIONS

A valve used under the jurisdiction of the ASME boiler and pressure vessel code, the ANSI code for pressure piping, government or other regulations, is subject to any limitation of that code or regulation and to the applicable ANSI Standard.

G. PRODUCTION TEST PROCEDURES

Valves are pneumatically shell tested and seat tested at a pressure of 80 psi in accordance with Federal Specifications and MSS SP-80 Manufacturers Standardization Society requirements.

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 bronze valves made of ASTM B62 material for Class 125 and 150 valves and from ASTM B61 material for Class 200 and 300 valves.

Check valves are used in systems which allow flow to move freely in the direction of the arrow cast onto the side of the valve body, however, should flow reversal occur, the disc in the valve will go to the closed position and not allow flow to reverse. The primary function of a check valve is to prevent backflow.

The disc is centered over the seat in the valve by means of a hanger which is hinged by means of a pin to the main valve body. Therefore, any movement of the disc is in a true arc and the disc will always center itself over the seat in the valve body. On NIBCO bronze check valves, no control of the disc can be affected from the exterior of the valve body. Lever and weights are available only on NIBCO iron check valves.

The body and bonnet are held together by threads of the male and female type; male threads being on the bonnet section and female threads being within the body. There

are no gaskets between the body and bonnet to affect seals. This is strictly a metal-to-metal seal as required by standards. This general arrangement is used on the Class 125, 150, 200 and 300 valves.

2.0 INSTALLATION

2.1 PRELIMINARY INFORMATION

The bronze check valves may be installed in both horizontal and vertical lines with upward flow or in an intermediate position. They will operate satisfactory in a declining plane no more than 15°. Under no circumstances should the valve be installed in a horizontal line with the bonnet facing in the vertical down position, this will not only trap fluids, but it will not allow the valve to function in the check position.

NIBCO recommends that check valves should not generally be used in close proximity to reciprocating pumps and compressors. The constantly fluctuating pressure curve passes pulsations to the moving parts of the valve and severely shortens the life of the valve due to wear and causes premature failure. Loose parts can also be passed down the line which would compound the problem. Screw type and centrifugal pumps and compressors that deliver a constant pressure curve do not have this problem. In some carefully designed systems check valve have been used successfully by incorporating surge tanks, hammer arrestors and other piping modifications with the valve placed downstream from the pump. The ultimate decision for fitness of use however lies in the hand of the end user and his piping designer.

All NIBCO check valves are shipped in cardboard boxes for protection against exterior damage and accumulation of dust or dirt on the delicate seating surfaces. The boxes are not waterproof and, therefore, require that they be protected from the weather.

2.2 HANDLING AND INSTALLATION

Each valve should be handled very carefully and not dropped or exposed to a dirty environment before it is assembled into the system. Under no circumstances should the valve be installed into the line by wrenching through the valve body, this means that when a valve is being threaded onto a pipe, the wrench should be on the end where the joint is being made.

It is very important to make certain that the threads of the pipe are clean at all times and machined properly. When improperly tapered pipe is screwed into the female valve threads, the pipe can be screwed so deep that it can ruin the seats of the valve. Care should also be used to assure that the valve is not over tightened because the steel pipe is much stronger than the bronze material, therefore, the bronze will distort and cause valve malfunction or leakage at the joint. When screwing the valve onto the pipe, the disc should remain in the closed position if possible.

On solder end type valves it is necessary to make sure that the valve disc is in the open position while it is being heated for soldering into the line. The major caution here is that the valve not be overheated and that the proper amount of solder is used so that it does not flow into the valve rendering it inoperable.

Attached to this report, in the Appendix, are proper instructions for soldering, brazing and threading installation of valves.

In the event that it is necessary to remove the bonnet before the valve is put into a line either for brazing, soldering or threading in, it is always essential that the bonnet be removed with great care. The necessary steps to do this are that a good wrench with flat jaws (not a pipe wrench) of the proper size be used to loosen the bonnet. Generally it is best to loosen the bonnet with a slight impact to the wrench. After the bonnet is loosened, it is absolutely necessary to make sure that no nicks or scars be put on the body or bonnet seating surface.

When removing the disc, especially for brazing and valves which have PTFE or Buna-N discs, it is first necessary to remove the bonnet then loosen the side plug and take it out. After the hinge pin is removed the hanger and disc assembly can be taken out of the bonnet area of the valve. While the PTFE and Buna-N disc are not very susceptible to nicks, it is still wise to handle them with care so that they do not get damaged before they are put back into the valve for reassembly.

When reassembling the valve, it is important to check the interior of the valve to see that seats are totally clean and have not been damaged due to high temperature heat applied during the brazing operation. If there is doubt about how much temperature has been applied to the valve, it is a wise practice to take a flat disc and put blueing on it so that it can be determined if there are any high spots on the seat. If there are high spots, then a lapping operation should be done to bring the valve back into functional position. After the hanger and disc are put in to place, the hinge pin should then be pushed into position.

The side plug should be cleaned and reinstalled into its original position. Before putting the bonnet onto the valve, a check should be made to assure that the disc and hanger move freely.

When assembling the bonnet to the valve body, a slight amount of lubricant equivalent to about 10 weight oil should be put on the bonnet joint sealing surface of the body and the bonnet. (Some lubricants can be a serious contaminant to the line fluid. Consideration must be given to the application when any lubrication is used). This gives lubrication so that good tightening pressures can be applied. The wrench should be given a slight impact for the final tightening.

After the valve has been installed, the valve should be tested to make sure that it opens and closes easily and that the bonnet joints or pipe joints are not leaking.

3.0 OPERATION

Check valves seal adequately when the back pressure is high, but some leakage is expected when the reverse pressure is relatively low. In testing procedures, a check valve is allowed to leak 4 times as much in the reverse flow (check) position as a metal seated gate valve. In other words, the normal leakage rate for gate valves is 10cc per hour per inch of diameter; a check valve is allowed a leakage rate of 40ML per inch of diameter per hour. This is in accordance with MSS SP-80 standard for check valves. (1 ML=.35 oz.).

The check valves described in this manual are not to be used as foot valves on a pump or pressure regulating devices. Their construction is not suited to these types of requirements.

4.0 TROUBLESHOOTING

4.1 LEAKAGE THROUGH THE BONNET JOINT

If the bonnet joint leaks, the valve should be isolated and depressurized. The bonnet should be removed according to instructions in Section 2. The seating surfaces of the bonnet and body should be closely inspected. If there is any scratch or mark on these surfaces, then it is necessary that a flat surface sanding plate of 400 grit be used on the body to remove all the scratches. After the scratches are removed, blueing should be applied to a flat plate and put on the bonnet surface, if there are no high spots on the bonnet surface, then it is prepared for reassembly. On the bonnet surface, if there are scratches or nicks that are evident, it is necessary that it be indicated in a lathe and a very slight cut taken off of the bonnet sealing surface at an angle of approximately 2-1/2" tapered outward with a very fine 32 RMS finish. The two body bonnet surfaces then can be reassembled using procedures in Section 2.

4.2 LEAKAGE THROUGH THE VALVE SEAT

Leakage across the valve seat is generally due to foreign matter lodged in the seat. Occasionally, such foreign material can be washed away by allowing flow through the valve. If the leakage persists, disassemble the valve and examine the seat surface on the wedge and the seat surfaces within the body.

Minor scratches can be corrected by lapping the bronze valve disc while the disc is in the valve body. The bonnet is removed, lapping compound is put on the seating surfaces of the disc and the valve body, and on top of the disc is a screwdriver slot which can be used to twist the disc while holding a mild amount of pressure on it and lapping the surfaces. This lapping will generally remove small scratches in the seat areas and make the valve function normally. It is normally advisable to remove the hanger assembly to clean off the lapping compound and blue the surfaces to make sure there are no high spots. After this lapping operation is done, the valve can be reassembled.

In the case of rubber or PTFE seated valves, it is best to get new replacement discs and install them.

5.0 MAINTENANCE

5.1 TOOLS AND EQUIPMENT

Standard wrenches and tools are suitable for servicing valves as follows:

- A. For removing bonnet, an open end wrench of the proper size to fit the bonnet nut is required. Small wrenches are also required of the socket type to remove the side plugs. Needle nose pliers are recommended to pull the hinge pin out of the side of the valve body.
- B. Flat plate glass with 400 grit sandpaper to polish disc or bonnet sealing surface of body. Machinist blueing should be used to test for high spots on body seats and disc.

6.0 SPARE PARTS

Normal spare parts to be maintained on hand are listed on the NIBCO spare parts list.

If the bonnet or body are damaged it is normally less expensive to remove the entire valve from the line and install a new one.

When placing an order for spare parts, it is necessary to give the size, the valve figure number found on the aluminum identification plate and also the serial letter which is cast into the valve body on its side. This will be an alphabetical letter, A, B, C, D, etc. It is vital to give the serial letter because over a period of time the valve designs have had modifications which could render the parts useless if they are of a different letter series.

7.0 MAJOR REPAIRS

For other repairs or replacements not covered in the above description, contact the Technical Services Department of NIBCO INC. for special instructions. Always give the figure number and size shown on the identification plate affixed to the valve along with the general serial letter.

For any technical enquiries please call NIBCO Technical Services.