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MAINTENANCE GUIDELINES

FOR

NIBCO

¼" THROUGH 3" CLASS 125, 150, 200 & 300, 175 WWP

BRONZE GATE VALVES
FIGURE NUMBERS
T-103-HC, T-104-O
T-111-113
S-111-113
T-134-136
S-134-136

T-131
T-133
T-135
T-154-A

T-174-A, T-176-A
T-174-SS, T-176-SS

****** CAUTION ******

ONLY QUALIFIED PERSONNEL SHOULD UNDERTAKE THE PROCEDURES OUTLINED BELOW. 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 ¼" through 3" Class 125, 150, 300 and 175 WWP bronze gate valves, with screwed in or union bonnet, rising stem or non-rising stem and, having handwheel operation.

1.2 GENERAL DATA

A. MANUFACTURER

NIBCO INC.
1516 Middlebury St.
Elkhart, IN 46515
Phone (219) 295-3000

B. FIGURE NUMBERS AND DESCRIPTIONS

FIGURE NUMBER	DESCRIPTION (Gate Valves)
T111	Class 125 threaded end, rising stem valve, screw in bonnet
S111	Class 125 solder end, rising stem, screw in bonnet
T113	Class 125 threaded end, non-rising stem, screw in bonnet
S113	Class 125 solder end, non-rising stem, screw in bonnet
T131	Class 150, threaded end, rising stem, screw in bonnet
T134	Class 150 threaded end, rising stem, union bonnet
S134	Class 150 solder end, rising stem, union bonnet
T135	Class 150 threaded end, rising stem, union bonnet, split wedge
T136	Class 150 threaded end, non-rising stem, union bonnet
S136	Class 150 solder end, non-rising stem, union bonnet
T174A	Class 300 threaded end, rising stem, union bonnet, Ni-Alloy wedge
T176A	Class 300 threaded end, non-rising stem, union bonnet, Ni-Alloy wedge
T174SS	Class 300 threaded end, rising stem, stainless steel seat rings, union bonnet
T176SS	Class 300 threaded end, non-rising stem, stainless steel seat rings, union bonnet
T103HC	175 WWP threaded end, non-rising stem hose cap and chain
T104-O	175 WWP threaded end, OS&Y solid wedge

All 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

An aluminum identification plate is attached beneath the handwheel nut. 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 Bronze and Iron or Fire Protection 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 Bronze and Iron or Fire Protection Catalogs. This information is taken from applicable ANSI or UL/FMRC 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.

Fire Protection valves are tested in accordance with the appropriate Underwriters Laboratories (UL) and Factory Mutual Research Corp. (FMRC) specifications.

H. PRINCIPAL DIMENSIONS

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

1.3 DETAIL DESCRIPTION

The gate valve listed above and covered in these instructions are bronze valves made of ASTM B62 material for Class 125, 150, and 175 WWP valves from ASTM B61 material for Class 200 and 300 valves.

The valves are operated with the handwheel and are used to start or stop the flow of fluids in piping systems. Clockwise rotation of the handwheel closes the valve.

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 effect seals. This is strictly a metal-to-metal seal as required by standards. This general arrangement is used on the Class 125 and is also used on the Class 150 gate valves.

For the union bonnet arrangement the body has male threads, the bonnet has no threads at all, however, a threaded union nut is placed over the bonnet to fasten it to the body. The seal between the body and bonnet is also metal-to-metal without a gasket.

Flow through the valve is stopped by forcing the wedge down between the seats of the body. The wedge is a solid type and is guided through its entire travel by guides in the body.

The head of the stem on the rising stem version fits into a T-slot in the top of the wedge to allow sufficient wedge movement for effective seating with the seats of the body. On the non-rising stem version, the wedge has internal female threads and the stem has male threads which are left handed to cause the wedge to close when the handwheel is turned in a clockwise direction and the wedge to rise when it is turned in a counterclockwise direction.

All valves have back seats between the shoulder of the stem and the valve bonnet. This is a requirement of standards so that the valve may be repacked while the valve is under full pressure. Caution: This is dangerous and could result in serious injury. It is not recommended by NIBCO. In addition, standards, organizations, and governing societies today do not encourage valves to be repacked while the valve is transmitting a fluid at full pressure and/or temperature.

The stuffing box is formed by the annular space between the stem and the bonnet and is filled with non-asbestos packing. The packing is compressed in the stuffing box by a gland bushing and the packing nut drawn down against the packing by turning the nut clockwise.

2.0 INSTALLATION

2.1 PRELIMINARY INFORMATION

The gate valves should preferably be installed with the stem pointed vertically upward. However, it is normally acceptable to have the valve stem pointed in a horizontal position either in vertical or horizontal piping. Although a gate valve will function satisfactorily in an inverted position it is not generally recommended because it allows fluids to become trapped in the bonnet cavity resulting in contamination and inability to fully drain the system.

Valves are shipped in the closed position to prevent damage to the seating surfaces. There is no internal blocking used for shipment. All NIBCO 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 thrown into 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 overtightened 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 wedge should remain in the closed position.

On solder end type valves it is necessary to make sure that the valve wedge 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 type 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. It is necessary that a chain wrench rather than a pipe wrench be used to loosen the bonnet union nut. If at all possible, it is more desirable to use a socket wrench to remove the nut. The union nut, body and bonnet should all be marked so they can be returned to the same position as originally assembled. After the nut has been carefully removed or in the case of a screw in bonnet, the bonnet has been broken loose, (which may require slight impact), it is then necessary to open the wedge approximately to its halfway position before removing the bonnet assembly from the valve body. After doing this, it is important that a mark be put on the wedge and the body so that it is put back in the same position in the valve body, as it was taken out. It is vital that no nicks or scars be put on the body or bonnet sealing areas, as this will create a leak path. It is extremely important to make sure that the wedge does not fall and hit any hard surface as it is being removed from the valve. Any mark or dent may cause leakage on the delicate seating surfaces after the valve is reassembled.

The valve body should then be installed into the pipe system using the appropriate procedures as outlined in valve installation for soldered, brazed or threaded ends. When reassembling the valve the wedge should be again positioned at the approximate halfway open position. Care should also be exercised so the wedge guides are properly engaged in the body guides.

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 and on the top side of the bonnet when union nut joints are used. This gives lubrication to the joint so good tightening pressures can be applied. The chain wrench or socket wrench should be used to tighten the bonnet. Stop the union nut approximately at the same place where it was when the valve was disassembled or possibly slightly past that mark. Remember any nick on the surfaces on the bonnet sealing area assures leakage.

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

Gate valves should never be used for throttling purposes. They should be fully opened or fully closed. If the valves were only slightly opened, wire drawing an erosion of the wedge and seats would result. It is not recommended valves be tightly backseated as line contamination over a long period of time may lock up the valve causing problems when the valve has to be closed.

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 onto 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 most of the time is generally due to foreign matter lodged in the seat. Occasionally, such foreign material can be washed away by allowing flow through the valve. At times the leakage may be overcome by tightening the valve further. 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 polishing the wedge face, but generally on bronze valves if there are deep scratches in the body seats, the valve should be replaced because it is extremely difficult to repair the surfaces in the small interior of the valve body. If the wedge does have scratches it is generally acceptable to take a piece of 400 grit sandpaper, lie it upon a flat piece of glass, and slightly polish the surface of the wedge. This will remove some of the scratches and possibly reduce the amount of leakage.
FIRE PROTECTION VALVES ARE NOT RECOMMENDED FOR MAJOR REPAIR.

4.3 LEAKAGE THROUGH THE STUFFING BOX

Leakage through the stuffing box packing may be stopped by tightening the packing nut. Do not overtighten as excessive tightening may cause difficult operation of the valve and could cause damage to the stem or packing nut.

If the gland has run out of travel, isolate and depressurize the valve for repacking or the addition of more packing. Repacking of valves under pressure is not a recommended practice. This is dangerous and could result in serious injury even if the valve appears to be back-seated.

Foreign matter may have accumulated on the back seat, or by accident the stem could be knocked off the back seat position thereby allowing dangerous fluids to injure maintenance personnel.

Remove the handwheel packing nut and gland to remove the old packing. After the packing is removed, discard and do not try to put it back once it has been removed. Clean the stem and examine it for damage. On very small valves the packing is sometimes rope and is sometimes spiral wound around the stem and pushed into the stuffing box. Install the new packing which may be one piece or split rings. If it is split ring rope packing install one ring at a time with the diagonal cut in each ring being staggered 90° away from the cut in the ring below. Each ring should be firmly compressed in the stuffing box after it is placed in position before the next ring is added. Install the gland bushing and packing nut and tighten down. The packing nut should be tightened only enough to prevent leakage. Pressurize the valve and check the packing for leakage. Tighten as required.

5.0 MAINTENANCE

5.1 TOOLS AND EQUIPMENT

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

A. For removing bonnet of the union type - a chain wrench is normally used or the appropriate socket that will fit the bonnet union nut. For screw in type bonnets - generally a socket wrench or open end wrench may be used if extreme caution is used. Pipe wrenches on union nuts or screw in bonnets have a definite crushing action which will deform the component and are not recommended.

B. A Standard packing tool can be used and/or a blunt hook is generally used to remove packing rings. A screwdriver to raise the packing gland if it is in the fully down position and generally open end wrenches are used to tighten the packing nut.

C. ~~Combination oil stone, flat plate glass will be used and fine 400 grit sandpaper~~ to polish the wedge. ~~Flat plates to check high spots~~ on flat surfaces such as ~~bonnet, seal surface and wedge in conjunction with machinist blueing.~~

DOES NOT APPLY TO FIRE PROTECTION VALVES.