NIBCO INC.
WORLD HEADQUARTERS
1516 MIDDLEBURY ST.
ELKHART, IN 46516-4740
USA
PHONE: 574.295.3000
FAX: 574.295.3307
WEB: www.nibco.com

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

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MAINTENANCE GUIDELINES
FOR NIBCO®
2" THROUGH 10" CLASS 125, 150 & 250
FLANGED END OUTSIDE SCREW & YOKE (OS&Y)
CAST & DUCTILE IRON GLOBE AND ANGLE VALVES

Figure Numbers

Globe Valves:
F-718-B, Y
F-718-N
F-768-B, Y
F-738-31

Angle Valves:
F-818-B, Y
F-838-31

Special ductile iron models designated N.R. are non-return valves that prevent backflow and are not recommended for steam service. NIBCO F-869-B, -Y is recommended for steam and has separate guidelines.

*** CAUTION ***

ONLY QUALIFIED PERSONNEL SHOULD UNDERTAKE THE PROCEDURES OUTLINED BELOW. NIBCO INC., ITS AGENTS, REPRESENTATIVES AND EMPLOYEES ASSUME NO LIABILITY FOR THE USE OF THESE PROCEDURES. THESE PROCEDURES ARE OFFERED AS SUGGESTIONS ONLY.

1.0 GENERAL INFORMATION

1.1 SCOPE

These guidelines are furnished for use in the installation, operation, and maintenance of NIBCO Class 125 globe O.S. & Y. I.B.B.M., cast iron, all iron, 2" thru 10", and angle pattern 2" thru 8"; Class 250 I.B.B.M. O.S. & Y. cast iron, 2" thru 8"; and Class 150 ductile iron globe and angle valves, all with bolted bonnet, rising-stem and having handwheel operation.

1.2 GENERAL DATA

A. MANUFACTURER

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

B. FIGURE NUMBERS AND DESCRIPTIONS

Straight Pattern – Figure Number:

F-718-B, Y
F-718-N
F-768-B
F-738-31

Angle Pattern – Figure Number:

F-818-B, Y
F-838-31

DESCRIPTION (Globe Valves)

Class 125 cast iron, flanged end, rising stem valve, bolted bonnet:
B=Bronze trim, Y=Polytetrafluoroethylene (PTFE) disc.

Class 125 cast iron, flanged end, rising-stem, bolted bonnet:
N=All-Iron trim.

Class 250 cast iron, flanged end, rising-stem, bolted bonnet:
B=Bronze trim, Y=Polytetrafluoroethylene (PTFE) disc.

Class 150 ductile iron, flanged end, rising-stem, bolted bonnet: 31=Bronze trim

DESCRIPTION (Angle Valves)

Class 125 cast iron, flanged end, rising-stem, bolted bonnet:
B=Bronze trim, Y=Polytetrafluoroethylene (PTFE) disc.

Class 150 ductile iron, flanged end, rising-stem, bolted bonnet: 31=Bronze trim.

FLANGES
A.N.S.I. - B16.5
A.N.S.I. - B16.1

150 Class flanges will match up with 125 Class iron flanges

300 Class flanges will match up with 250 Class iron flanges

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 current edition of the NIBCO Bronze & Iron Valve catalog should be referred to, using the valve figure number as the guide.

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 any media, the NIBCO ***Chem-Guide*** may be consulted for specific data (or contact NIBCO Technical Services at 888-446-4226). 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 & Iron Valve catalog. This information is taken from applicable standards.

F. CODES & REGULATIONS

A valve used under the jurisdiction of the ASME boiler and pressure vessel code, the ASME 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 shell tested and seat tested at pressures in accordance with Federal Specifications and MSS-SP-85 Manufacturers Standardization Society requirements. This standard is used for testing the ductile iron valves as well.

H. PRINCIPAL DIMENSIONS

Principal dimensions of the valve are specified in the NIBCO Bronze & Iron Valve catalog.

1.3 DETAILED DESCRIPTION

The globe and angle valves listed above and covered in these guidelines are iron valves made of ASTM A-126; Grade B material for Class 125 and 250 cast iron valves and from ASTM A-395 ductile iron material for Class 150 valves.

These valves are operated with the handwheel and are used to start, stop or throttle the flow of fluids in piping systems. Globe and angle valves are rising-stem type only. When the stem rises, (about 25 % of nominal size), it also turns. Non-rising stem globe valves are not available. The disc is closed through a clockwise turning direction of the hand wheel.

The bolted-bonnet type body and bonnet connection are held together by bolts and nuts. There is a non-asbestos gasket between the body and bonnet to affect a seal. The Class 125 cast iron valves have a flat-faced flange. The Class 250 cast iron and the Class 150 ductile iron valves have raised-face flanges.

Flow-through globe or angle valves are stopped by forcing the disc down onto the valve body seat. Throttling is accomplished by carefully turning the handwheel to some position between fully opened and fully closed. The disc is either of solid bronze construction or a bronze seat ring threaded onto an iron disc. In some cases where a soft seat is desired, the disc is made out of PTFE (may not be currently available).

In the special non-return models (NR), the disc is so arranged that it travels up and down within the valve body through the use of guides on the disc itself and it is not attached to the stem.

This valve is a directional valve operated by gravity to prevent backflow. The non-return feature will only operate in the direction of the flow arrow on the side of the valve. It may also be used as a shut-off valve. This valve is not recommended for steam service.

2.0 INSTALLATION

2.1 PRELIMINARY INFORMATION

The globe valve should preferably be installed with the stem pointed vertically upward. However, it is normally acceptable to have the valve stem in a horizontal position either in vertical or horizontal piping. Although a globe 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.

N .R. modified globe valves or F-869-B, automatic steam stop check valves, operate by gravity, therefore they must be installed with the stems in the vertical position. Any deviation from vertical can cause excessive wear and/or valve malfunction.

Valves are shipped in the closed position to prevent damage to the seating surfaces. There is no internal blocking used for shipment.

2.2 HANDLING AND INSTALLATION

Each valve should only be handled with apparatus that will safely support the valve weight. Slings should never be placed around the handwheel, stem, or gland adjustment parts. 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.

Each valve should be fully opened and fully closed prior to installation, to ensure full travel of the sealing disc and operation of the stem.

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, it should be kept in the closed position and care should be taken to prevent foreign material from entering the valve. For flange bolting data, refer to appendix.

After installation, flushing to clean, and during system testing, the gland nuts should be tightened uniformly, if necessary, until leakage through packing is stopped. Tighten the nuts just enough to prevent leakage. Excessive tightening may cause difficult operation of the valve, damage the stem, and shorten packing life.

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

3.0 OPERATION

Globe valves are the valve of choice for throttling use. They can also be used for on-off service where they should be fully opened or fully closed. Tight throttling is a condition when the valve is only opened slightly or "cracked". This can cause wire drawing and/or erosion of the disc and seats. It is better to avoid tight throttling. This can sometimes be done by using a smaller valve size and opening it up further.

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 to cool and/or decontaminate before proceeding.

4.1 LEAKAGE THROUGH THE BONNET JOINT

1. Remove the handwheel from the stem.
2. Mark the body-to-bonnet flanges with a piece of chalk so they can be matched up later.
3. Remove body-bonnet nuts and bolts.
4. Carefully remove the bonnet assembly. Be careful not to nick or scratch the seating surfaces.
5. Thoroughly clean the body and bonnet internal surfaces.
6. Check the body and bonnet gasket surfaces for any scratches, gouges or other irregularities.
7. In the event the surfaces are marred, they must be filed or machined flat again. If the damage is considerable, the body or bonnet may have to be replaced. A competent

valve shop or machine shop may have to be consulted or contact NIBCO Technical Services or your nearest NIBCO representative for help. In many cases, it is less costly to replace the entire valve rather than have it repaired.

8. With the surfaces now clean and flat, place the gasket on the body and replace the bonnet. Be careful to use the chalk marks to put everything back together the same way it came apart. Always use a new, clean, fresh gasket. It does not pay to take a chance using the old gasket over again.
9. Reinstall the body-bonnet nuts and bolts then carefully check to see that the body and bonnet are in the same position as when they were separated. Make absolutely sure there is no seat contact before tightening. This could damage the seats. Follow the bolt tightening procedure in Appendix I.
10. Prior to use, pressure test the valve for leakage to see if a good joint has been made and the seats are holding.

4.2 LEAKAGE THROUGH THE VALVE SEAT

Most of the time, leakage across the valve seat is due to foreign matter lodged in the seat area or damage to the seat by passing objects. Occasionally, such foreign material can be washed away by allowing flow through the valve. In valves that are used with fluids that are contaminated and known to cause buildup, a drain can be installed at the bottom of valves so the seats can then be flushed prior to closing. 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 disc and the seat surface in the body.

Minor scratches can be corrected by polishing the disc face, but generally, if there are deep scratches in either of the sealing surfaces, the valve should be removed from the line and replaced or repaired by a competent valve shop. An acceptable method for seat renewal is as follows.

Mark the position of the disc nut in the disc with a marker. Note: the disc nut will be staked. Carefully remove the disc nut from the disc to release the stem from the disc. The disc nut unscrews by turning counter-clockwise. The disc can now be removed from the stem. Cut strips of 120 grit emery paper about 1-1/2” long and 3/8" or ½” wide. Using double-backed adhesive tape, stick strips on the body seat ring seating surface. The strips should be evenly spaced around the seat. Place the disc in the body and rotate the disc back and forth with very light pressure. The further around you can rotate, the better surface you will get. Finish up with full rotation. Examine surface periodically and the new, clean, lighter surface will be seen developing. When complete, the new surface on the disc should be all the way around and across equal to the width of the seat ring seating surface.

Repeat the previous step for renewing the body seat by placing the strips of emery and double-backed tape on the disc.

Clean thoroughly then rotate the disc once or twice lightly in the seat. A shiny line should appear all the way around on the disc and the seat ring. Repeat the above steps until this shiny line can be clearly seen. This line should be unbroken all the way around if a good seal is to be achieved. A break in the line is a place where the valve will leak.

4.3 LEAKAGE THROUGH THE STUFFING BOX

Leakage through the stuffing box packing may be stopped by tightening the packing nuts. Excessive tightening may cause difficult operation of the valve and could cause damage to the stem or packing nut; so do not over tighten. They should be just tight enough to stop the leak.

If the pack gland follower has run out of travel, isolate, depressurize, and allow valve to cool and/or decontaminate as required, 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 potentially dangerous fluids, under pressure, to injure maintenance personnel.

First, to remove the old packing, remove the handwheel, packing nuts, pack gland follower and gland. If 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. Install the new packing which may either be rope packing or cut rings. Rope packing is sometimes spiral wound around the stem and pushed into the stuffing box. If rope is used, make sure there is enough put into the packing chamber so a little bit will stick up over the top. A taper cut on the top and bottom of the rope will also allow the maximum amount in the chamber. When the packing is compressed by the gland, it should then be slightly lower than the top. If rings are used, 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. Re-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 the bonnet-body nuts and bolts, a full set of 1/2" and 3/4" drive sockets is normally used. Pipe wrenches on nuts or bolts have a definite crushing action which will deform them and are not recommended.
B. Standard packing tool can be used and/or a blunt hook is sometimes used to remove packing rings. A screwdriver to raise the packing gland (if it is in the fully down position) and generally combination box - open end wrenches are used to tighten the packing nuts.
C. Punches, hammer, pliers, files, wire brush, putty knife, emery paper, sandpaper, chalk and other tools generally contained in a good set of mechanics tools will be needed for things like cleaning up the gasket surfaces, removing pins from stem-wedge connections, etc.

6.0 SPARE PARTS

Normal spare parts to be maintained on hand are listed on the NIBCO materials list in the Bronze & Iron Valve catalog. 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 heat numbers, part numbers, and date code numbers which are generally cast into the valve body on its side. Designs have had modifications over the years which could render the parts useless if they are of a different configuration, so proper identification is very important.

7.0 MAJOR REPAIRS

For other repairs or replacement 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.

APPENDIX I

Body-to-Bonnet Bolt Installation Procedure for NIBCO Cast Iron, Alloy Iron and Ductile Iron Valves

The following procedure outlines the methods to be used in the assembly of and field installation of the body to bonnet bolts and nuts in order to assure the proper clamping stresses. The correct sequence and torque for tightening the body-to-bonnet bolts and nuts is also identified.

These instructions apply for ASTM A307 Grade B high tensile strength bolting material used on NIBCO cast iron, alloy iron, and ductile iron valve body and bonnet flange joints.

These instructions apply for non-lubricated ASTM A307 bolting materials used on NIBCO cast iron, alloy iron, and ductile iron valve body and bonnet flange joints.

1. Visually inspect all threads and remove all foreign matter such as rust, dirt, corrosion and any lubricant.

2. Clean the body gasket and bonnet gasket seating area thoroughly. The gasket seating area must be clean prior to assembly as the area becomes inaccessible after assembly. The area is to be cleaned with a suitable solvent or cleanser that can remove all dirt, grime and gasket particles.

3. The threads of the bolts and the surfaces under the bolt heads and nuts to be coated with an anti-seize compound such as Felpro, type C5A Hi-Temp Anti-seize compound or equal. The threads of the nuts should also be lubricated. Clean off excess lubricant with solvent as noted in item 2.

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4. Clean off the gasket. Make sure that no foreign particles are stuck to it that might cause a leak. Make sure the gasket is the correct size. It should fit inside the bonnet-body bolt holes.

5. Place the bonnet in position; insert the bolts and hand tighten the nuts against the body. A minimum of 2-1/2 threads should extend beyond each nut.

6. After the nuts are hand tight, follow the tightening sequence shown in the table. The sequence shown is an illustrated method only, and the actual sequence is dependent upon the total number of bolts.

7. The use of an air impact device which does not have a direct torque control is prohibited for the torquing of body-to-bonnet bolts. The use of a hand torque wrench, electronic torquing system, or power wrench with direct torque control is recommended. If such equipment is not available, the following standard wrenches may be used:

1/2” bolts	6” wrench
5/8” bolts	12” wrench
3/4” bolts	18” wrench
7/8” bolts	24” wrench
1” bolts	36” wrench

IRON VALVE BOLT TORQUE

Before tightening, make sure all surfaces that the fastener will contact are clean and dry.

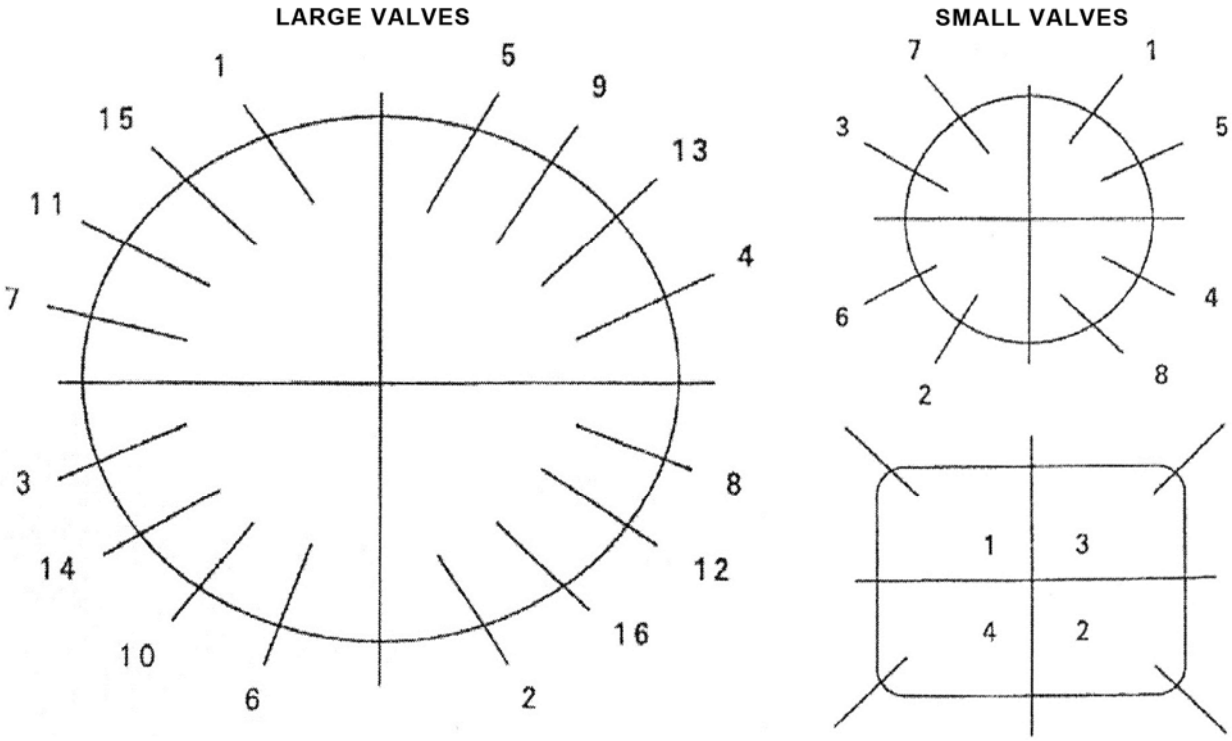
The torque tightening table listed below applies to clean, undamaged, non-lubricated threaded fasteners (lubricated threaded fasteners may require less torque – consult the fastener manufacturer for more detailed instructions).

When tightening, use the sequence chart below. Tighten in two steps.

1. Tighten fastener using about 1/2 the final torque figure.
2. Final tightening using the full torque figure. ***ASTM A307 steel only***.

Fastener Size	7/16	1/2	9/16	5/8	3/4	7/8	1	1-1/8	1-1/4	1-3/8	1-1/2
Torque in Ft. Lbs.	30	45	66	93	150	202	300	474	659	884	1057

BOLT TIGHTENING SEQUENCE



For any technical enquiries please call NIBCO Technical Services.