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INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

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Installation and Maintenance Guidelines for NIBCO® Fire Protection Valves 2” to 24” 175, 250 and 300 WWP Cast Iron, Alloy Iron and Ductile Iron Metal-Seated and Resilient Wedge Gate Valves

Figure Numbers

F-607-OTS	F-607-RWS
F-609	F-609-RWS
M-609	M-609-RWS
FM-609-RWS	F-697-O
F-607-RW	F-609-RW
M-609-RW	M-609-RW

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 24” service rated for 175, 250 and 300 WWP bolted-bonnet, solid-wedge or resilient-wedge gate valves 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

Cast Iron:

F-607-OTS WWP 175, Class 125 flanged end, rising stem, I.B.B.M., O.S.&Y.
F-609 WWP 175, Class 125 flanged end, non-rising stem, I.B.B.M.
M-609 WWP 175, mechanical end, non-rising stem, I.B.B.M.
F-697-O WWP 300, Class 250 flanged end, non-rising stem, I.B.B.M.

Ductile Iron:

F-607-RWS WWP 300, Class 125 flanged end, rising stem, I.B.B.M., O.S.&Y.
F-609-RWS WWP 300, Class 125 flanged end, non-rising stem, I.B.B.M.
M-609-RWS WWP 300, mechanical end, non-rising stem, I.B.B.M.
FM-609-RWS WWP 300, mechanical end, non-rising stem, I.B.B.M.

F-607-RW WWP 250, Class 125 flanged end, rising stem, I.B.B.M., O.S.&Y.
F-609-RW WWP 250, Class 125 flanged end, non-rising stem, I.B.B.M.
M-609-RW WWP 250, mechanical end, non-rising stem, I.B.B.M.
FM-609-RW WWP 250, mechanical end, non-rising stem, I.B.B.M.
G-607-RW WWP 250, mechanical end, non-rising stem, I.B.B.M.

ANSI B16.5 150 Class flanges will match up with
ANSI B16.1 125 Class iron flanges

ANSI B16.5 300 Class flanges will match up with
ANSI B16.1 250 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 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 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 specified for use in compliance with the ASME Boiler and Pressure Vessel Code, the ANSI 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 and seat tested at twice the WWP rating according to UL and/or FM testing guidelines.

H. PRINCIPAL DIMENSIONS

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

1.3 DETAILED DESCRIPTION

The gate valves listed above and covered in these instructions are ductile iron, cast iron, bolted bonnet, outside screw and yoke (rising stem) and inside screw (non-rising stem) valve types. The valve is operated with the handwheel. They 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 threaded and the joint is sealed with a non-asbestos gasket or O-ring. On metal-seated valves, flow through the valve is stopped by forcing the wedge down between the seat rings which are screwed into the body. The wedge is solid and is guided through its entire travel by matching guides in the body.

On resilient-seated valves, flow is stopped by forcing the rubber-encapsulated wedge against the epoxy-coated valve body. The solid-metal wedge is encapsulated with an elastomer and is guided through its entire travel by matching guides in the body.

A. RISING STEM OS & Y GATE VALVE

In NIBCO O.S.&Y. metal-seated, rising-stem valves, the bottom of the stem screws into the wedge and is prevented from unscrewing by installing a solid wedge pin.

The wedge is raised and lowered in the waterway by rotating the handwheel which is attached to the yoke bushing. The handwheel fits onto the hex end of the yoke bushing and is held on by the handwheel nut which is threaded onto the top of the yoke bushing. The inside diameter of the yoke bushing has threads that mate to the upper stem threads.

The yoke bushing is held in the top of the bonnet by the bonnet cap against the rim on the bottom of the yoke bushing. As the yoke bushing is rotated, the stem and wedge move up and down. The stem in an O.S.&Y. rising-stem gate valve does *not* turn.

The stuffing box is formed by the circular space between the stem and bonnet and is filled with non-asbestos packing. The packing is compressed in the stuffing box by the pack gland bushing and packing gland follower, which are drawn down against the packing by two gland bolts and nuts. This prevents leakage between the moveable stem and the stationary bonnet of the valve. The indicator-post flange is held in place with two screws with nuts and seals to bonnet using gasket.

Resilient-seated valves of this type do not use packing material, but seal the stem using split, flat rubber-washers. The stem seal is formed by the circular space between the stem and the indicator-post flange and is sealed with split-rubber washers. This prevents leakage between the moveable stem and the stationary bonnet of the valve.

B. NON-RISING STEM GATE VALVE

In the solid wedge or metal seated F-609 Flanged end and M-609 Mechanical joint valves the stem is one piece but has an integral shoulder on it of a larger diameter than the stem operating diameter. This shoulder is captured in a pocket or counter-bore machined into the bonnet, the stem is secured when the indicator-post flange is bolted into place. The stem is operated by the turning of the handwheel. The threads on the bottom of the stem engage the threads inside the wedge raising it up and down, when the stem is turned by the handwheel. For non-rising stem valves, the handwheels fit onto a tapered square end of the stem. The handwheel is held on by a nut screwed onto threads on the end of the stem.

Since the majority of these valves are either buried or mounted behind walls with indicator or wall-post assemblies, they do not employ a stuffing box with conventional packing, but incorporate the placement of two (2) O-ring seals

placed into machined grooves integral to the hub of the indicator-post flange. The indicator-post flange is held in place with two socket-head cap screws.

Resilient-seated valves of this type also do not use a stuffing box with conventional packing material, but seal the stem using O-rings. The O-rings are placed into a gland flange that is separate from the indicator-post flange. The gland flange also captures the integral stem collar and holds the stem in place.

2.0 INSTALLATION

2.1 PRELIMINARY INFORMATION

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. This is critical in water lines exposed to freezing temperatures.

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 be handled only 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.

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.

All valves should be fully opened and fully prior to installation into a system, to ensure the valve’s operation and function was not damaged during shipping and handling.

After installation and during system testing, the gland nuts should be tightened uniformly, if necessary, until leakage through the 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 (this applies to O.S.&Y. metal-seated gate valves only. Resilient-seated gate valves incorporate split, flat rubber-washers seals for stem sealing).

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

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 and erosion of the wedge and seats would result. It is not recommended valves be back-seated tightly, as line contamination can build up over a long period of time and may lock up the valve during operation.

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 LEAKAGE THROUGH THE BONNET JOINT

1. Remove the handwheel from the stem.

2. Mark the body – 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 wedge seats.

5. Thoroughly clean the body and bonnet joint surfaces.

6. Check the body and bonnet gasket surfaces for any scratches or gouges or other irregularities.

7. In the even the surfaces are marred, they must be filed or machine 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 again 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, and then carefully check to see that the body and bonnet are in the same position as when they were separated.

10. Pressure test the valve for leakage to see if a good joint has been made.

4.2 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. Do not over tighten. The adjustment should be just tight enough to stop the leak.

If the pack gland follower 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. Prior to proceeding to change packing, it will be necessary to shut down the piping system, remove pressure and drain, and if necessary, allow cooling and/or decontaminating before working on the valve.

For F-609 and M-609 non-rising stem metal seated gate valves, remove the square operating nut by unscrewing the nut on the top end of the stem, also unscrew the two nuts that hold the indicator-post flange in place; this will allow the indicator-post flange to be lifted or slipped off of the stem. Find the two O-ring seals on the inside of the stem-hole bore of the indicator-post flange hub and replace damaged or worn O-rings.
For rising-stem, metal-seated gate valves it is not necessary to remove the handwheel. Remove the packing nuts and bolts, slide the pack gland follower, pack gland up out of the way and keep out of the way with tape or some other convenient temporary method.

If the packing is removed, discard and do not try to put it back once it has been removed. Reusing old packing is a gamble not worth taking. Clean the stem and examine it for damage. Install the new packing, which my 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. 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 packing gland and pack gland follower, packing nuts, and tighten down. The packing nut should be tightened only enough to prevent leakage. Pressurize the valve and check the packing for leakage. Retighten as required.

For resilient-seated gate valves, follow the above and replace the O-ring or split flat rubber seals.

5.0 MAINTENANCE

5.1 TOOLS AND EQUIPMENT

Standard wrenches (adjustable, open-end, box-end, Allen) and other standard tools are suitable for servicing valves as follows:

A. For removing bonnet-body nuts and bolts full set of 1/2” and 3/4” drive sockets is normally used. Pipe wrenches used on nuts or bolts have a definite crushing action which will deform them and is not recommended.

B. A 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, 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 spare parts list.

If the bonnet or body is 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 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.

FIRE PROTECTION VALVES ARE NOT RECOMMENDED FOR ANY MAJOR REPAIRS DUE TO STRICT TESTING REQUIREMENTS OF UL AND FMRC.

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.

   NOTE: Resilient-Wedge Gate Valves use only socket head cap screws to attach bonnet to body, no nuts.

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.

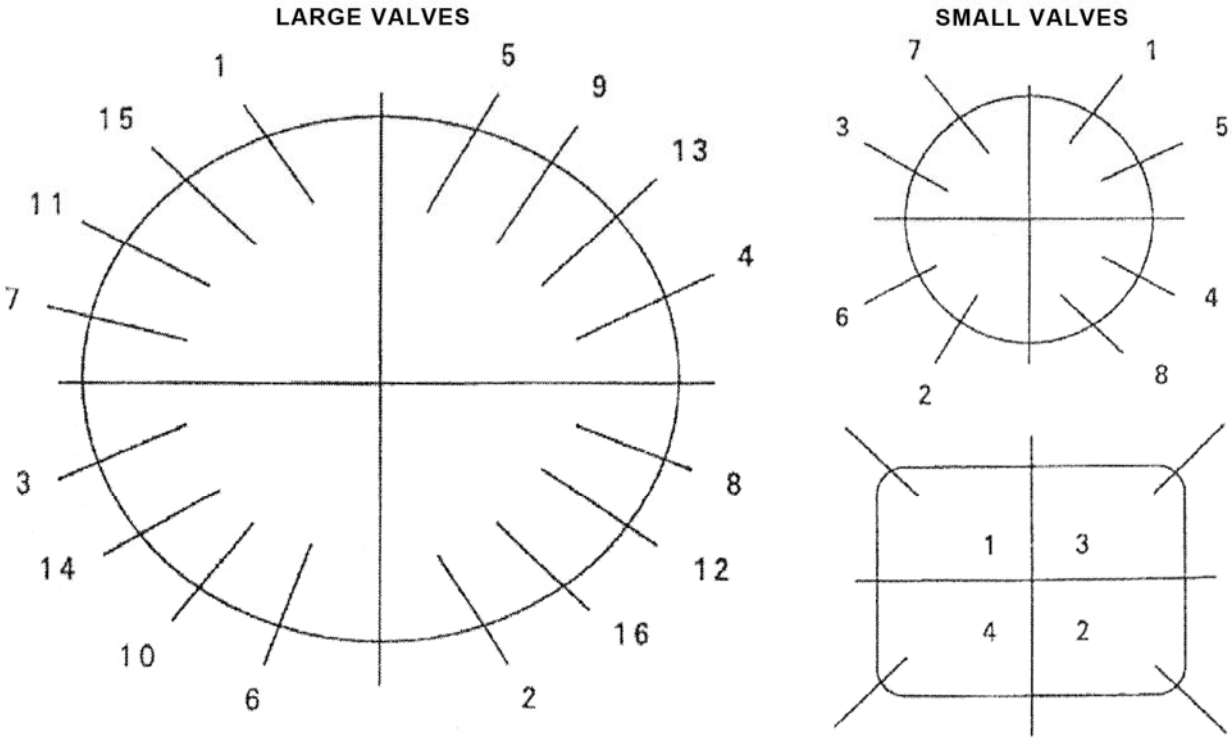
The torque tightening table listed below applies to clean, undamaged, non-lubricated threaded fasteners (lubricated threaded fasteners may require less torque – consult the fastener manufacturer for more detailed instructions).

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.