INSTALLATION AND OPERATING MANUAL FORGED VALVES

INSTALLATION INSTRUCTIONS

GENERAL GUIDELINES :

- Ensure that the valves to be used are appropriate for the conditions of the installation (type of fluid, pressure and temperature).
- Be sure to have enough valves to be able to isolate the sections of piping as well as the appropriate equipment for maintenance and repair.
- Ensure that the valves to be installed are of correct strength to be able to support the capacity of their usage.
- **Installation of all circuits should ensure that their function can be automatically tested on a regular basis (at least two times a year).**

INSTALLATION INSTRUCTIONS :

- **Before installing the valves, clean and remove any objects from the pipes** (in particular bits of sealing and metal) which could obstruct and block the valves.
- **Ensure that both connecting pipes on either side of the valve (upstream and downstream) are aligned (if they're not, the valves may not work correctly).**
- **Make sure that the two sections of the pipe (upstream and downstream) match, the valve unit will not absorb any gaps. Any distortions in the pipes may affect the tightness of the connection, and the working of the valve and can even cause a rupture.** To be sure, place the kit in position to ensure the assembling will work.
- **During the welding operation, for S.W. types half open the valve and do not exceed 350-400°C**
- The theoretical lengths given by ISO/R7 for the tapping are typically longer than required, the length of the thread should be limited, and **check that the end of the tube does not press right up to the head of the thread.**
- **Never use a vice to tighten the fixings of the valve.**
- **If sections of piping do not have their final support in place, they should be temporarily fixed. This is to avoid unnecessary strain on the valve.**
- **It may be necessary to screw the packing gland during use according to the type of use.**
- **Do not use a tool to shut the valve**
- **Fluids in the valve must not contain solid objects (it could damage the seat)**
- It's recommended to operate the valve (open and close) 1 to 2 times per year

For an installation in ATEX area, check the conductivity between the valve, the upstream pipe, and the downstream pipe and make sure the pipe is connected to the earth.

FORGED STEEL GATE, GLOBE & CHECK VALVES, API 602 AND #2500 ASME B16.34

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

TABLE OF CONTENTS:

IN ACCORDANCE TO LAW N. 257 OF 12 MARCH 1992, ALL VALVES MANUFACTURED BY OMB VALVES S.P.A (OR PROVIDED BY OMB VALVES S.P.A. PLANTS LOCATIONS) ARE WITHOUT ANY ALTERATIONS AND CONTAIN ONLY ORIGINAL SPARE PARTS, AND DO NOT CONTAIN ANY HAZARDOUS MATERIAL.OMB VALVES ARE MADE SOLELY FROM ENVIRONMENTALLY FRIENDLY MATERIALS. AFTER VALVES LIFE CYCLE OPERATION, THE VALVES CAN BE FULLY RECYCLED AS METAL WASTE.

SECTION A

SAFETY INSTRUCTIONS & WARNINGS

GENERAL WARNINGS ⚠

- Please read these safety warnings, cautions, and Instructions carefully before using the product. These instructions cannot cover every installation and situation. For more specific information, please ask for OMB supporting procedures.

- Do not install, operate, or maintain these products without being fully trained and qualified in valve, and accessory installation, operation, and maintenance.

- To avoid personal injury or property damage, it is important to carefully read, understand, and follow all of the contents of the associated instruction manual, including all safety cautions and warnings.

- If you have any questions concerning installation, or use of this product, contact **OMB Customercare Service** before proceeding.

- These valves are intended for a specific range of service conditions--pressure, pressure drop, process and ambient temperature, temperature variations, process fluid, and possibly other specifications. Do not expose the product to service conditions or variables other than those for which the valves were intended to be used.

- If you are not sure what these conditions or variables are, contact **OMB Customercare Service** for assistance. Provide the Valve Code, Job No. and all other relevant information that you have available.

- All valves must be inspected periodically and maintained as required. The schedule for inspection can only be determined based on the severity of your service conditions. Your installation might also be subject to inspection schedules set by applicable governmental codes and regulations, industry standards, company standards, or plant standards.

- In order to avoid increasing dust explosion risk, periodically clean dust deposits from all equipment. When equipment is installed in a hazardous area location, prevent sparks by proper tool selection and avoiding other types of impact energy.

- Proper care must be taken to avoid generation of static electricity on the non-conductive external surfaces of the equipment.

SPARE PARTS WARNINGS ⚠

- Whenever ordering spare parts for each valves, always specify the serial number/CV code of the Valve and provide all other relevant information that you can, such as product size, material, OMB Job. No, and general service conditions.

- **USE ONLY ORIGINAL OMB REPLACEMENT (SPARE) PARTS. COMPONENTS, THOSE ARE NOT SUPPLIED BY OMB MUST NOT, BE USED IN ANY OMB PRODUCT, UNDER ANY CIRCUMSTANCES. USE OF COMPONENTS NOT SUPPLIED BY OMB VOID YOUR WARRANTY, ALSO AFFECT THE PERFORMANCE OF THE PRODUCT, AND COULD CAUSE PERSONAL INJURY AND PROPERTY DAMAGE.**

INSTALLATION WARNINGS ⚠

- Personal injury or equipment damage caused by sudden release of pressure or bursting of parts may result if the valve assembly is installed where service conditions could exceed the limits given on the appropriate nameplates, or the mating pipe flange rating.

- Use pressure-relieving devices as required by government or relevant industry codes and good engineering practices. If you cannot determine the ratings and limits for the valves, **contact OMB Valves Customercare** before proceeding.

- To avoid personal injury, always wear protective gloves, clothing, and eyewear and/or every required PPE when performing any installation operations.

- If lifting the valve, use a nylon sling to protect the surfaces. Carefully position the sling to prevent damage to the actuator tubing and any accessories. Be sure to use adequately sized lift and chains or slings to handle the valve.

- Personal injury could result from packing leakage. Valve packing was tightened before shipment; however, the packing might require some readjustment to meet specific service conditions**.**

- When ordered, the valve configuration and construction materials were selected to meet particular pressure, temperature, pressure drop and controlled fluid conditions. Responsibility for the safety of process media and compatibility of valve materials with process media rests solely with the purchaser and end-user.

- To avoid possible personal injury and because some valve/trim material combinations are limited in their pressure drop and temperature ranges, do not apply any other conditions to the valve without first contacting OMB Customercare Service.

- Ensure that the valve and adjacent pipelines are free of foreign material that could damage the valve seating surfaces.

MAINTENANCE WARNINGS ⚠

To avoid personal injury or property damage from sudden release of process pressure or bursting of parts. Before performing any maintenance operations:

- Always wear appropriate personal protection devices (DPI) during valve inspection, operation and maintenance.
- Disconnect any operating lines those providing air pressure, electric power, or a control signal to the actuator. Be sure the actuator cannot suddenly open or close the valve.
- Completely shut off the process to isolate the valve from process pressure. Do not remove the actuator from the valve while the valve is still pressurized.
- Relieve process pressure from both sides of the valve. Drain the process media from both sides of the valve.
- The valve-packing box might contain process fluids that are pressurized, even when the valve has been removed from the pipeline. Process fluids might spray out under pressure when removing the packing hardware or packing rings, or when loosening the packing box pipe plug. Cautiously remove parts so that fluid escapes slowly and safely. This point is critical for very High Pressure Valves, class above 2500 and could cause injury, damage or death
- Many valve parts those are moving can injure you by pinching, cutting, or shearing. To help prevent such injury, stay away of any moving part.
- Never apply pressure to a partially assembled valve.
- To avoid personal injury or property damage caused by uncontrolled movement of a valve bonnet, loosen the bonnet by following these instructions: Do not remove a stuck bonnet by pulling on it with equipment that can stretch or store energy in any other manner. The sudden release of stored energy can cause uncontrolled movement of the bonnet.
- As you remove parts, such as valve shafts, other parts, such as disks can fall from the valve body. To avoid injury from falling parts, be sure to support parts as you disassemble the valve.
- Check with your process or safety engineer for any additional measures that must be taken to protect against process media.
- Do not attempt to remove the body-connectors bolts while the valve is under pressure.
- Always perform maintenance process at completion of line depressurization. Failure to do so may cause serious personal injury and/or equipment damage.
- Always keep valve's pressure under ASME B16.34 limit (as specified on each valve's nameplate). Even a limited time of overpressure may cause an unexpected leakage and internal valve's damage.
- To preserve valve's integrity always keep valve's temperature under ASME B16.34 limit (as specified on each valve's nameplate). In case of fire or high temperature always avoid overpressure, this may cause an unexpected valve's leakage and internal valve's damage.
- Overpressure is always a source of potential hazard; always perform a visual check for unexpected leakage or physical damage in case valve's working pressure overstep specified pressure limit, even for a limited time. If required, perform valve's maintenance operations.
- Corrosion is always a source of potential hazard; always avoid unexpected valve's leakage (due to overpressure, fire, ecc.) and keep valve's external surfaces periodically checked for corrosion damage.

WARRANTY LIMITED

OMB VALVES S.P.A warrants that the licensed embodied in the products will execute the valves manufactured by OMB VALVES S.P.A, or services provided by OMB VALVES S.P. A, will be free from defects in materials or workmanship, under normal use and care until the expiration of the applicable warranty period. Valves are warranted for the agreed period of time between OMB and customer (written by OMB on contract). Buyer agrees that OMB has no liability for Resale Products beyond making a reasonable commercial effort to arrange for procurement and shipping of the Products. If buyer discovers any warranty defects and notifies OMB Valves Customercare Service thereof in writing during the applicable warranty period, OMB shall correct any errors, repair or replace those are found by OMB in the scope of services. All replacements or repairs necessitated by inadequate maintenance, normal wear and usage, unsuitable power sources or environmental conditions, accident, misuse, improper installation, modification, repair, storage or handling, or any other cause that is not the fault of OMB are not covered by this limited warranty and shall be at purchaser's expense. OMB shall not be obligated to pay any costs or charges incurred by purchaser except agreed upon in writing in advance by OMB. All costs of dismantling, re-installation, freight, the time and expenses of OMB's Technicians and representatives for site travel, and diagnosis under this warranty clause shall be paid by purchaser unless accepted in writing by OMB. This limited warranty is the only warranty made by OMB valves S.p.A Headquarter and can be amended only in a writing signed by OMB.

THE WARRANTIES AND REMEDIES SET ABOVE ARE EXCLUSIVE. THERE ARE NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, EXPRESSED OR IMPLIED, FOR PARTICULAR PURPOSE OR ANY OTHER MATTER WITH RESPECT TO ANY OF THE PRODUCTS OR SERVICES.

SECTION B

GENERAL VALVE OPERATION INFORMATION

FOR ANY UNCLEAR INFORMATION IN THIS MANUAL PLEASE CONTACT OMB VALVES CUSTOMERCARE DEPARTMENT FOR ASSISTANCE:

EMAIL: customercare@ombvalves.com
TEL: +39 035 04 38 711

OMB VALVES S.P.A TECHNICAL SUPPORT TEAM INCLUDES EXPERIENCED ENGINEERS AND TECHNICIANS , PROFESSIONALLY TRAINED AND HIGHLY QUALIFIED TO OPERATE ON-SHORE AND OFF-SHORE SERVICES. OUR STAFF ARE READY AND AVAILABLE IN OMB VALVES S.P.A HEADQUARTER TO BE PRESENT IN YOUR SITE AND PROVIDE REQUIRED TECHNICAL SERVICE AND INFORMATION TO PROTECT YOUR SYSTEM.

1. INTRODUCTION AND THEORY OF OPERATION

Gate Valves: Gate valves are designed to close off or open up the flow in a pipeline. The wedge/Gate is designed to stop flow completely and form a tight seal against pressure in either direction. The wedge is completely out of the flow stream in the open position. Gate valves are not designed for throttling use.

Limitation:
- Not recommended to use for flow regulation or throttling.
- Must not use for slurries or fluids containing solids that can build up in valve cavities.

Globe Valves: Globe valves are designed to close off, open up or throttle the flow in a pipeline. The disc is designed to stop flow completely and form a tight seal with pressure under the disc.

Limitation:
- Not use if full flow at minimal pressure drop is required.
- Must not be used for slurries or fluids containing solids that can build up in valve cavities.

Check Valves: Swing check valves are designed to open by the system pressure in a line. The normal direction of flow in the line will open the valve, and any attempt by the flow to reverse will close the valve completely. The check valve typically does not require any outside force or signal to operate properly. Check valves allow flow in one direction only.

Limitation:
- Must be installed the same direction that shows with an arrows on the body.
- Must not be used for slurries or fluids containing solids that can build up in valve cavities.

2. PRESSURE AND TEMPERATURE RATING

Pressure and temperature rating of the valve shall be properly selected for the service requirement. Valves shall not be used for different services than specified on purchasing order at first place.

If system testing will subject the valve to a pressure in excess of its working pressure rating , then the intended testing pressure and a statement explaining whether the test pressure is through the opened valve or a differential across the closed valve, should be noticed to OMB in advance at the time of purchasing.

Note: Ask OMB Customercare for valves pressure/temperature rating.

3. FIRE SAFETY

All metal-to-metal seat OMB gate, globe and check valves are inherently fire-safe design and come standard with graphite packing and gasket.

Note: Customer should indicate on their purchasing order when requires fire-safe design.

4. THROTTLING SERVICE

Valves used to control the rate of fluid flow subject to severe fluid turbulence, which can have the effect of creating a high-energy conversion within the valve and piping system. This energy conversion is usually indicated by high noise levels. The possibility exists for mechanical damage to the valve and piping system. **OMB S.p.A** should be consulted on proper valve selection for throttling applications.

5. TEMPERATURE CHANGES

Forged steel expands with rising temperatures and contracts with falling temperatures. In general, increasing temperature causes a decrease of mechanical strength, which is regained on return to a lower temperature. A condition of non-uniform temperature in a structure may cause significant thermal stresses or distortion with possible adverse effect on valve performance.

6. TRAPPED PRESSURE

When a closed valve containing liquid is heated (e.g., from process Condition, radiation or solar heating) the cavity pressure will increase due to volumetric expansion or vaporization of the liquid. Conversely, cooling an un-drained cavity below the freezing point may also result in volumetric expansion of the media. These expansions can result in extremely high pressures occurring in the valve.

7. MATERIAL COMPATIBILITY

It is important that Forged steel valves and lubricants be chemically compatible with the other piping system components, line fluids and the environment. Guidance should be obtained from **OMB Customercare Service** whenever there appears to be reason for such concern.

8. IDENTIFICATION

All OMB valves are identified with metal tag that is attached to the handwheel include all identification details such as Identification Number, Marking, Size, Pressure Class and material and OMB Job. No to be referred during maintenance or ordering spare parts.

*Fig.1 – Example of Nameplate for **Gate and globe** Valves up to DN50 as per API 602 & ASME B16.34*

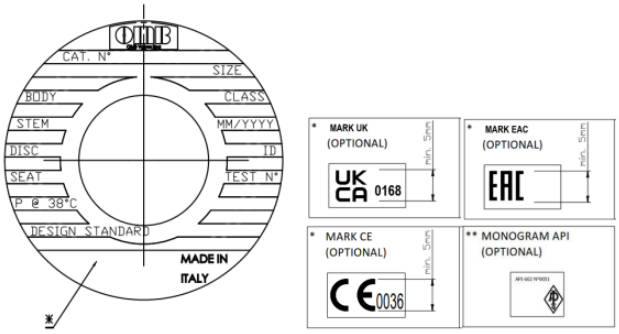
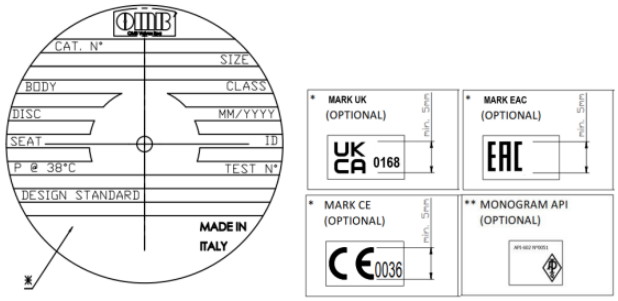


*Fig.2 – Example of Nameplate for **Check Valves** up to DN50 as per API 602 & ASME B16.34*



SECTION C

HANDLING AND STORAGE

1. HANDLING

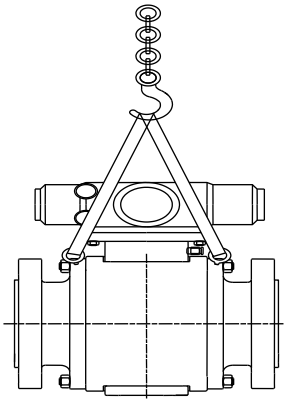
OMB valves shall be handled in appropriate way and with care to avoid any damages. Valves shall not to be thrown or dropped; handwheel and stems, in particular, should not be used as lifting or rigging points for valves.
For valves over 25 kg special handling lever operation required for OMB valve depends on the weight of the valve and especially for actuated valves. Lifting points are designed on the body of valves close to neck of the End Flange for lifting or moving purpose. Crane wire/rope must be placed around the body or lifting hooks.

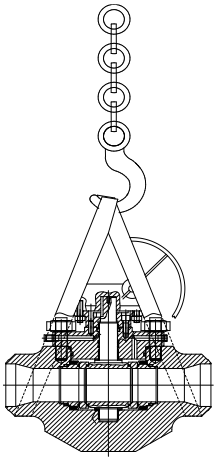
Notes:

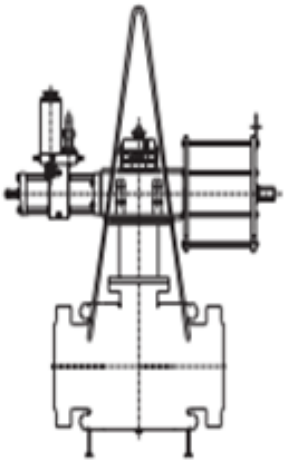
- It is highly recommended to keep them in the shipping containers before the valves are to be installed;
- For any doubts, ask OMB Customercare Service support. Damaged or imperfection valves due to the inappropriate storage process will not be under cover of OMB warranty.

For valves over 25 kg:

- Valves must have enough distance from the ground to not to drag on the floor while moving. (At least 0.5 meter from the ground)
- Crane rope must not slug around the actuator or gear unit-lifting hook to not to damage the gearbox or actuator.
- Properly supporting and securing the valve before moving must be considered to avoid physical damage to the valve, which may consequently result in personal injury, damage or death.
- During handling always use soft-straps to avoid any damage of machined components.
- Vent and Darin are welded and are supported on the body of the valve, it is highly recommended to inspect the valve for any possible physical damage in that area.







2. STORAGE

To care the valve between the times it received in the site and installed on the system. Indoor-Storage of valves is always recommended.

- Valves must be protected from rain and snow whilst moving to storage area.
- Valve end protectors should not be removed unless necessary for inspection and installation.

- Storage building must be provided by weather control, heating, cooling, temperature and humidity control.
- Valves must be placed on pallets to permit air circulation but they must not exposure to outside environment, dust, physical damage and forces.
- Storage area must be fire-resistant, ventilated and drained equipped and not subjected to flooding.

OMB Supporting Procedures:

PCQ0110100 - Long-Term/Short Term Indoor storage procedure
PCQ0110200 - Long-Term/Short Term Outdoor storage procedure

SECTION D

INSTALLATION AND MAINTENANCE

WARNINGS ⚠

REPAIRING THE VALVES ON THE FIELD WITHOUT OMB AUTHORIZATION AND/OR OMB TECHNICAL ASSISTANCE AND SPECIFIC SPARE PARTS WILL NOT COVER BY WARRANTY AND OMB IS NOT RESPONSIBLE FOR CONSEQUENTIAL DAMAGES.

- No alteration or modification should be made to any OMB valve, except as sanctioned and/or authorized by OMB S.P.A.
- Only qualified and experienced person must carry out operation.
- Personal protective equipment (PPE) must be worn during maintenance process.
- Installation, operation and maintenance of valves may involve proximity to fluids at extreme pressures and temperatures; every precaution should be taken into attention to prevent injury to personnel during the performance of any procedure consequently.
- Valves must NOT be installed immediately after welding. Shall wait until they completely cool down.
- Special knowledge of design and material is required for Oxygen service operation to prevent serious injury, or property damage.
- Before connecting valves to the source service, ensure existing pressure in the line is no greater than the maximum rated pressure of the valve.
- DO NOT attempt to remove the body-connectors bolts while the valve is under pressure.
- Ensure pressure of the system is completely released before tightening fittings.
- In case of leakage or malfunctioning, valves must be taken out of service immediately.
- Before starting maintenance process, ensure that the actuator (if any) is not connected to the electrical or pneumatic line.
- Bill of material and assembly drawing is required in advance of maintenance procedure.
- Maintenance instruction must be followed properly to avoid valve damage and personal injury.
- All valve parts and components must be free from dirt or dust in advance of assembly process.
- Before valves disassembly make sure, there is no pressure in the line and/or that the parts to be disassembled will not damage the line in any way.
- When fitting Threaded End valves into the line, never hold either the HandWheel or the yoke whilst screwing in and tightening, always hold the BODY.

- Improper repairs can cause damage and personal injury or death.

- Disconnect the actuator (if any) from any electrical/pneumatic/hydraulic lines to avoid accidental operation of the actuator. (For any actuator disassembly, please follow the actuator manufacturer's instructions and in case of any doubts ask for technical assistance.)

1. INSPECTION

- Nameplate specifications and all attached documents must be checked to be matched with ordered valve description in advance of installation. DO NOT install, or attempt to use, any valve that is not properly identified with material and pressure class.

- Ensure bolts and nuts and hand wheels are not over tightened and are as specified torque value at section E of this manual, to avoid leakage, damage and personal injury.

- Visual inspection of the valve to ensure it is free from any surface damage or possible damages cause by transportation.

- Inspect both ports to be completely clean and free from any obstruction, dirt, rust, sandblast or foreign/residual material, which can cause damage or seat leakage.

- DO NOT change the valve position from open to close before being sure that it's bore is completely cleaned, otherwise, it may damage to the valve seat.

- Remove the end caps only when ready for installation. (Remove caps before placing the valve in line).

- Ensure the valve is installed in accessible location for any further operative action on it.

- For valve with gear, correct gear material must be selected regarding the environmental operation condition. (offshore/onshore)

- Properly installed valves in constant use for particular service application are expected to have a long service life if adequate attention given to the specific components and parts in finish surfaces for proper operation and maintenance of valves throughout their service life. Under normal conditions, maintenance is limited to the complete replacement of the packing and gasket during the life of the valve whenever the valve has been disassembled. However sometimes it is necessary to repair or replace valve internals.

2. TOOLS FOR MAINTANANCE

Standard tools and appropriate wrench for removal or replacement of seats are required for valve repair or maintenance.

3. ROUTINE MAINTENANCE

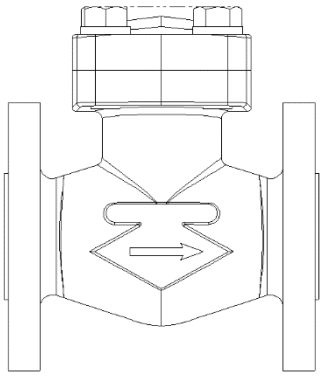
Inspection of the functionality of installed valves in one position by controlling lubrication, stem packing and stem threads, bonnet joint, seat and the end connections, surface corrosion of moving parts, leakage (especially on check valves), stem seals for high pressure and temperature operated valves. To avoid any possible malfunctioning of the installed valves, it is highly recommended to do the inspection every 2 days, or maximum every 2 months.

4. LUBRICATION

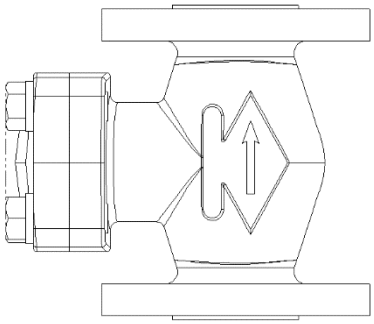
The valves are supplied with the stem threads engaging the yoke nut greased with BLASOLUBE 301 (see the SMDS on OMB web site (www.ombvalves.com) or equivalent grade. These components should be kept constantly lubricated, maximum every 2 months by applying the grease directly on the stem when the valve is in the open position or through the grease injector in the yoke nut when provided.

5. DIRECTION

Check and Globe valves are supplied with an arrow stamped on the body, which indicates flow direction. While ensured the inlet end is fitted against line pressure; the direction arrow may be embossed or stamped on the valve body. Cryogenic Gate Valves are unidirectional due to the hole drilled on upstream side of gate. These valves are supplied with HP marking on SS tag plate attached to the body, which indicates flow direction. When fitting ensure inlet end is fitted against line pressure.



Horizontal Flow Direction



Vertical Flow Direction

6. ACTUATOR SETTING INSTRUCTIONS

The torque and end- run micro switches and the various cabling setting must be in accordance with actuator manufacturer instructions.

7. ASSEMBLY AND DISASSEMBLY

THREADED END VALVES:

- Threaded end valves are disassembled by loosening the thread bolt. (If permitted apply few drop of oil to thread helps loosen the bolt).
- For Threaded End Valves, it is important to ensure about tight sealing.
- Thread connection on valve and pipe must be checked to be correct, clean and without any imperfection.
- Internal length of the thread in the valve end and its distance with the seat and plug must be considered to avoid any possible damage could cause by pipe end to seat or wedge/disc whilst assembling.
- If no requirement for dry seal threading specified, using appropriate thread sealant tape or pipe dope or compound is recommended.
- Thread must be accurately aligned at the point of assembly.

FLANGED JOINT VALVES:

- For Flanged Joint Valves, safe sealing depends on the tension created in fasteners which clamp the joint components together , applied force must be great enough to resist failure of the seal but do not damage the fasteners , joint components and gasket.
- Flange facing must be check to assure they are clean and free from radial groove cut or dent across the face.
- Bolting size, length and material must be check.
- Gasket material must be checked, also ensure that they are free from any imperfection or damage.
- Flange to be assembled must be aligned correctly. It must be considered accurately parallel whilst the valve is assembling into the system.
- Torque wrench shall be used for final tightening of flange bolting.
- Using torque wrenches is highly recommended to ensure the correct bolt tightening and loading.

WELDED END VALVES:

- All types of valves supplied by OMB and manufactured with Screwed Ends, Socket Weld Ends (S.W.E.), and Butt Weld Ends (B.W.E.) have good welding properties.
- Welding end surface must be inspected before welding to be clean and have correct dimension.
- Socket weld and butt weld end valves shall be temporarily fitted in line, and the ends tack-welded to the piping for alignment and adjustment of pipe and valve end.
- Socket weld valve should be lightly closed prior to welding. Welding should be done in horizontal or flat position. If required vertical welding, upward progress should carry out.
- Carefully lift out the center section, making sure that the seats and body seals are held in position. Place the center section in a clean area where it will not be damaged, and complete the welding of the end caps to the piping.
- Weld thickness of Butt weld valves must be approximately equal to that of the pipe.
- Finished weld must be inspect and properly clean.

OMB Supporting Procedure:

SV-014-PWHT API 602 Forges Steel Valves Procedure

CAUTION

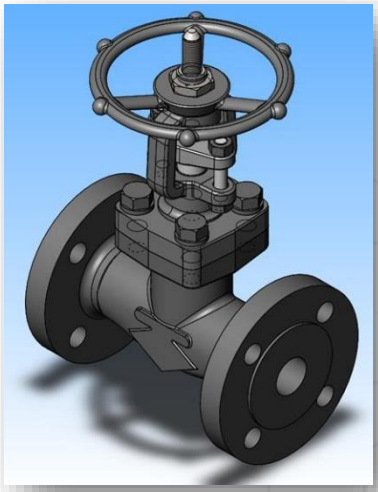
- Before starting disassembly be sure enough, space is available to proceed the operation freely.
- Segregate different components in accordance with their materials of construction (metal, graphite, plastic, electrical, etc.)
- Bodies, bonnets, wedges gland flanges and Handwheels are in forged steel materials, and the remaining components such as stems, seats, glands and bolting are in steel bars.
- Gaskets and packings are composed of graphite or PTFE materials.
- Standard gaskets used in bolted bonnet valves are spiral wound type in stainless steel 316 and pure graphite.
- Standard packing is composed of a series of rings of pure graphite. The sets can be supplied with two anti-extrusion rings, top and bottom, manufactured in braided graphite. Both internal and external rings are treated with a passive corrosion inhibitor.
- Bonnet-type small valves are simply disassembled by unscrewing the union nut or bonnet.
- Bolted-bonnet valves are disassembled by removing bonnet nuts, stud bolts and/or turning cover/screw cap, counter-clockwise until cap is removed.

I.GATE VALVES

Gate OS&Y - Bolted Bonnet Square - Gasket Joint
Gate OS&Y - Cryogenic - Ext Bonnet 250mm - Union Body-Extension Bolted
Gate OS&Y - Bolted Bonnet - Round Oval Ring Joint
Gate OS&Y - Union Welded Full Penetration -Smooth Finish
Gate OS&Y - Cryogenic - Ext Bonnet 250mm - Union Bonnet Gasket Joint
Gate OS&Y - Pressure Seal - Union Bonnet Gasket Joint

Supporting OMB Procedures:

Gate Valve- Bellows Seal - Welded Bonnet - Full Penetration



DISASSEMBLY

- Valves must be in half-open position.
- Loosen and remove gland nuts (5) and stud nuts (37).
- Remove bonnet (13) using strap or appropriate device, lift up and away from Body (18) with care; ensure wedge (17) is not damaged.
- Remove the wedge (17) from the Stem (12). While holding the stem (12) turn the handwheel (3) in a clockwise direction to draw out the stem (12).
- Remove gland (8) and gland flange (6).
- Remove the old gasket (35) and clean the gasket contact surface to be free from any residual material and damaged or scratched.
- Remove the packing (9) using an appropriate tools with care to ensure no damage to the stuffing box surface.
- Remove the yoke nuts (4) and handwheel (3).

REASSEMBLY

- Clean all parts thoroughly. Seating surfaces shall be lubricated (type of lubricant must be advised by OMB).
- Correct new gasket (35) must be chosen and Install.
- Ensure that the body (18) seats correctly on the gasket (35) all the time.
- Install new packing (9). (If applicable).
- Install gland (8) and gland flange (6).
- Install stem (12) into bonnet (13) assembly.
- Reinstall gland nuts (5).
- Replace wedge (17) onto stem (12).
- Install bonnet (13) and wedge (17) assembly into the body.
- Reinstall and studs (36) stud nuts (37).
- First take up bolts with hand force, and then use the recommended torque by OMB to be tightened completely

1	WHEELNUT/LEVERNUT
G002	NAMEPLATE
3	HANDWHEEL
4	YOKE NUT
5	GLAND NUT
6	GLAND FLANGE
7	GLAND STUD
8	GLAND
9	PACKING
12	STEM
13	BONNET
15	SEAT
17	WEDGE
18	BODY
35	RING JOINT/GASKET
36	STUDS
37	STUD NUT

SEAT REPLACEMENT:

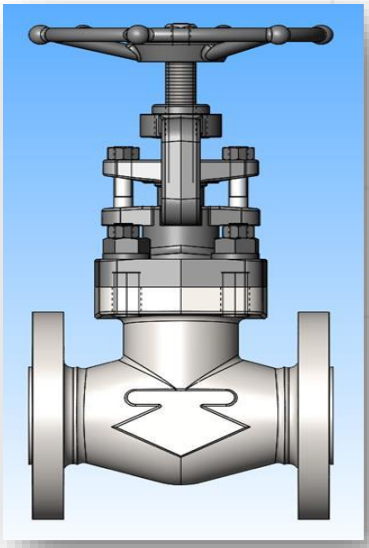
- Depressurize the system; ensure that there is no pressure trapped inside the valve.
- Remove valves bonnet(13) and its subassemblies.
- Body(18), seat rings, wedge(17) and gland nuts (5) inspected to be clean, free from any residual material and damaged or scratched.
- If the wedge (17) is damaged seriously, it should be replaced.
- If seat rings are seriously damaged, valve must be taken out from the line to be repaired
- Ask OMB advise for correct seat rings selection according to the working pressure and the valve size.

II. GLOBE VALVES/STOP CHECK VALVES(Y-Pattern)

Globe OS&Y - Bolted Bonnet - Round Oval Ring Joint
Globe OS&Y - Bolted Bonnet Square - Gasket Joint
Globe OS&Y - Union Welded Full Penetration
Globe OS&Y - Union Body-Extension Bolted
Globe OS&Y - Pressure Seal - Union Bonnet Gasket Joint
Globe Angle OS&Y - Bolted Bonnet Square - Gasket Joint
Globe Y Pattern OS&Y - Bolted Bonnet Square - Gasket Joint
Globe Y Pattern OS&Y - Pressure Seal - Union Bonnet Gasket Joint

Supporting OMB Procedures:

Globe OS&Y - Bellows Seal - Bolted Bonnet-Extension
Globe Y Pattern OS&Y - Bellows Seal - Welded Bonnet - Screw and Seal Weld

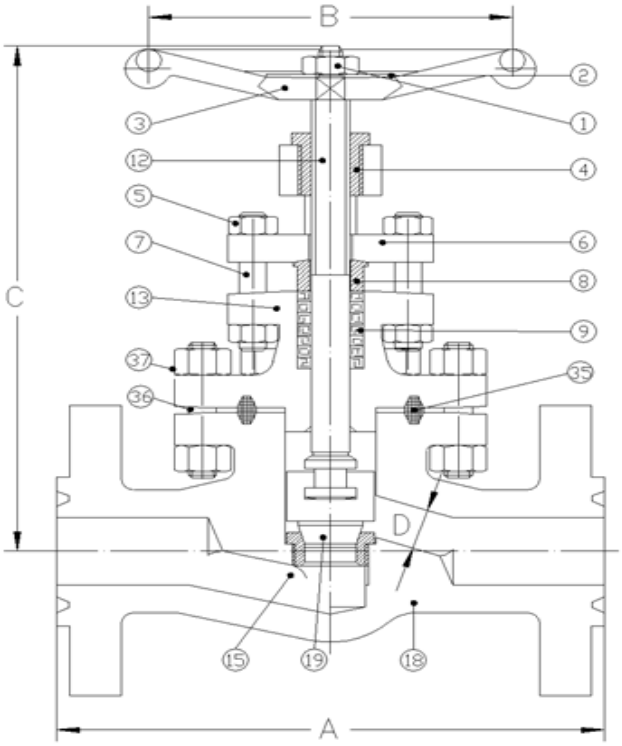


DISASSEMBLY

- Valves must be in half-open position.
- Loosen and remove gland nuts (5) and stud nuts (37).
- Remove bonnet (13) using strap or appropriate device, lift up and away from Body (18) with care; ensure disc/piston (19) is not damaged.
- Remove the wheelnut (1) from Handwheel (3)
- Remove the stem (12) by turning and extract it from yoke nut (4).
- Remove gland (8) and gland flange (6).
- Remove the old gasket (35) and clean the gasket contact surface to be free from any residual material and damaged or scratched.
- Remove the packing (9) using an appropriate tools with care to ensure no damage to the stuffing box surface.

REASSEMBLY

- Clean all parts thoroughly. Seating surfaces shall be lubricated (type of lubricant must be advised by OMB).
- Correct new gasket (35) must be chosen and Install.
- Ensure that the body (18) seats correctly on the gasket (35) all the time.
- Install new packing (9). (If applicable).
- Install gland (8) and gland flange (6).
- Install stem (12) into bonnet (13) assembly.
- Reinstall gland nuts (5).
- Replace disc (19) on to stem (12).
- Install bonnet (13) and disc (19) assembly into the body.
- Reinstall studs (36) stud nuts (37).
- First take up bolts with hand force, and then use the recommended torque by OMB to be tightened completely.



1	WHEELNUT/LEVERNUT
G002	NAMEPLATE
3	HANDWHEEL
4	YOKE NUT
5	GLAND NUT
6	GLAND FLANGE
7	GLAND STUD
8	GLAND
9	PACKING
12	STEM
13	BONNET
15	SEAT
18	BODY
19	DISC \ PISTON
35	RING JOINT/GASKET
36	STUDS
37	STUD NUT

SEAT REPLACEMENT:

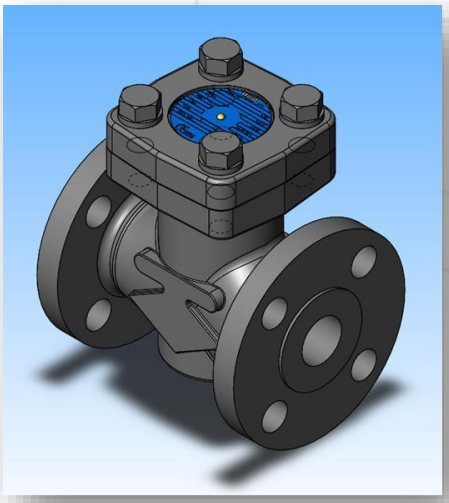
- Depressurize the system; ensure that there is no pressure trapped inside the valve.
- Remove gland nuts (5), bonnet (13), and Handwheel (3) and screw stem (12) down out of bonnet (13).
- Body(18), seat rings, disc/piston (19) and gland nuts (5), must be inspected to be clean, free from any residual material, rust and damage or scratch.
- If the disc/piston (19) is damaged seriously, it should be replaced.
- If there is rust, it must be clean properly, rusting cause an improper operation for the valve.
- If the disc/piston (19) is the loose type, secure to stem (12) with ordinary insulation tape, which is strong enough to hold in place for the grinding required.
- Seat must be lapped
- Reassemble the valve and test and place back to the line.

III.CHECK VALVES

Check Ball - Bolted Bonnet Square - Gasket Joint
Check Piston - Bolted Bonnet Square - Gasket Joint
Check Swing - Bolted Bonnet Square - Gasket Joint
Check Swing - Pressure Seal - Union Bonnet Gasket Joint

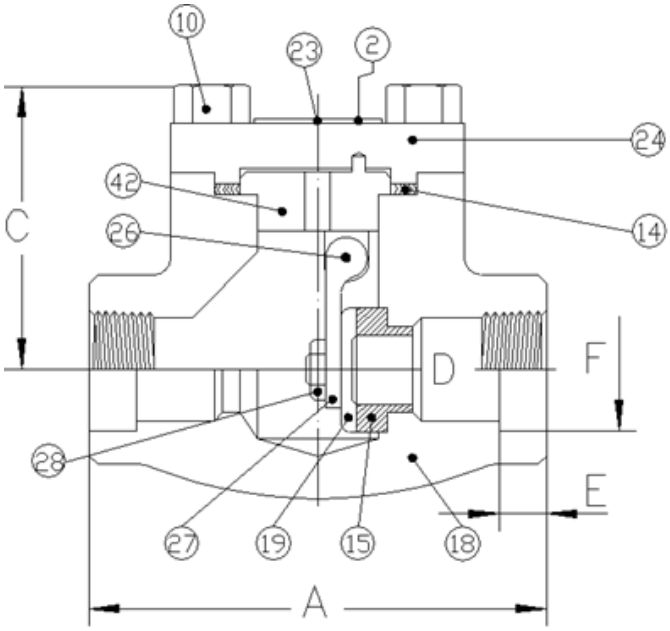
Supporting OMB Procedures:

Check Vertical (UV Model) - Union Bonnet Ground Joint



DISASSEMBLY

- Valves must be in half-open position.
- Loosen and remove bolts (10).
- Remove bonnet (24).
- Remove the old gasket (14) and clean the gasket surface.
- Remove the disc nut (28) and Disc (19) assembly with special care to not to be damaged.
- Remove the hinge (27) mount assembly from the valve.
- If necessary, remove the pin (26) from the hinge (27).



REASSEMBLY

- Clean all parts thoroughly.
- Reinstall the Hinge (27)/Disc (19) with special care to be taken to the locking devices on the disc(19)and disc nuts (28)
- Correct new gasket (35) must be chosen and Install
- First take up bolts with hand force, and then use the recommended torque by OMB to be tightened completely.

G002	NAMEPLATE
10	BOLTS
2014	SPIRAL WOUND GASKET
15	SEAT
18	BODY
19	DISC \ PISTON
23	RIVET
24	BONNET
26	PIN
27	HINGE
28	DISC NUT
42	GUIDE

SEAT REPLACEMENT:

- Depressurize the system; ensure that there is no pressure trapped inside the valve.
- Remove valves bonnet (24) and it's subassemblies.
- Body (18), seat ring, disc, piston or ball (19) inspected to be clean, free from any residual material and damage or scratches.
- If there is rust, it must be clean properly, rusting cause an improper operation for the valve.
- If the seat is damaged seriously, it should be lapped and replaced.
- Reassemble the valve, test, and place back in the line.
- **Check Valves Cracking pressure must be advised by OMB Valves S.p.A.**

SECTION E

BOLTING SEQUENCES AND TORQUE VALUES

1. TORQUE VALUES FOR BONNET BOLTING

wherever energy flows	OMB VALVES S.P.A. Con Socio Unico – ELLEN GROUP Via Europa, 7 24069 Cenate Sotto Bergamo, Italy www.ombvalves.com	OTMENGAG015	R. 04 07/06/2022		Pag. 1
		ADVISED BOLT TIGHTENING SI	R. 03 30/03/2017		
			R. 02 17/03/2016		Created: Ing. D. Barcella
			R. 01 28/10/2014		Approved: Ing. C. Sana
		OMB PROPERTY. All right reserved	R. 00 05/06/2012	R. 05 01/09/2023	

Diametro [inch]	Unit	3/8	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	4
n° thread/inch		16	13	12	11	10	9	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
N09811	[N*m]	9	19	27	37	64	102	152	221	307	413	540	694	868	1073	1307	1874	2595	3466	4515	5757	7172	10804
B8M-Cl.1 / B8-Cl.1 / B8C-Cl.1 / B8MA-Cl.1A / B8A-Cl.1A / N08800	[N*m]	10	23	32	44	77	123	183	265	368	495	648	833	1041	1287	1569	2249	3102	4158	5418	6909	8607	12965
B8M-Cl.2	[N*m]	30	72	101	140	245	328	488	574	797	825	1079	1388	1736	2146	2614	3748	5169	6931	9029	11515	14344	21609
B8-Cl.2 / B8I-Cl.2	[N*m]	32	76	107	148	258	328	488	574	797	825	1079	1388	1736	2146	2614	3748	5169	6931	9029	11515	14344	21609
F51	[N*m]	21	50	69	96	167	267	397	574	797	1073	1403	1805	2256	2789	3399	4873	6720	9010	11738	14969	18648	28092
F53	[N*m]	26	61	85	118	206	328	488	706	981	1320	1727	2221	2777	3433	4183	5997	8271	11089	14447	18424	22951	34574
B7 / L7 / B16	[N*m]	33	80	112	155	270	429	639	925	1285	1727	2261	2894	3636	4493	5476	7851	10828	13168	17156	21878	27255	41057
B7M / L7M / F53 / F55	[N*m]	25	61	85	118	206	328	488	706	981	1320	1727	2221	2777	3433	4183	5997	8271	11089	14447	18424	22951	34574
660-Gr.D / F53-H3 / S20910-Y>723	[N*m]	33	80	112	155	270	431	641	927	1288	1733	2267	2915	3645	4506	5490	7871	10856	14594	18962	24181	30123	45379
660-Gr.A / 660-Gr.B / 660-Gr.C	[N*m]	27	65	91	125	219	349	519	750	1042	1403	1835	2360	2951	3648	4444	6372	8788	11782	15350	19575	24386	36735
N06600 / N08825	[N*m]	11	27	37	52	90	144	214	309	429	578	756	972	1215	1502	1830	2624	3619	4851	6321	8060	10041	15126
N10276	[N*m]	13	31	44	60	106	168	250	362	503	677	885	1138	1423	1759	2144	3073	4239	5683	7404	9442	11762	17719
N06625	[N*m]	19	46	64	89	155	246	366	530	736	990	1295	1666	2083	2575	3137	4498	6203	8317	10835	13818	17213	25931
N05500	[N*m]	29	69	96	133	232	369	519	750	1042	1403	1835	2360	2951	3648	4444	6372	8788	11782	15350	19575	24386	36735
N09925	[N*m]	35	84	117	162	283	451	671	971	1349	1815	2375	3054	3818	4720	5752	8246	11373	15247	19865	25332	31558	47540
API6A-N07718 / S20910-Y>827	[N*m]	38	92	128	177	309	492	732	1059	1472	1980	2591	3332	4166	5150	6275	8996	12407	16633	21671	27635	34427	51861
B637 N07718	[N*m]	48	114	160	221	386	615	915	1324	1839	2475	3238	4164	5207	6437	7843	11244	15508	20792	27088	34544	43033	64827
S20910	[N*m]	17	42	59	81	142	226	336	485	674	908	1187	1527	1909	2360	2876	4123	5686	7624	9932	12666	15779	23770
S21800	[N*m]	16	38	53	74	129	205	305	441	613	825	1079	1388	1736	2146	2614	3748	5169	6931	9029	11515	14344	21609

APPLY FOR LUBRICATED BOLTS

Diametro [inch]	Unit	3/8	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	4
n° Thread/Inch		16	13	12	11	10	9	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
N08811	[N*m]	5	11	16	22	38	60	90	129	178	238	310	395	494	608	739	1055	1448	1935	2514	3198	3977	5969
B8M-Cl.1 / B8-Cl.1 / B8C-Cl.1 / B8MA-Cl.1A / B8A-Cl.1A / N08800	[N*m]	6	14	19	26	46	72	108	155	213	285	372	474	593	730	887	1266	1738	2322	3017	3838	4772	7163
B8M-Cl.2	[N*m]	18	43	60	83	145	193	288	336	462	476	619	789	988	1217	1479	2109	2897	3871	5029	6397	7954	11938
B8-Cl.2 / B8T-Cl.2	[N*m]	19	45	64	88	153	193	288	336	462	476	619	789	988	1217	1479	2109	2897	3871	5029	6397	7954	11938
F51	[N*m]	12	29	41	57	99	157	234	336	462	618	805	1026	1285	1582	1922	2742	3766	5032	6538	8316	10340	15520
F53	[N*m]	15	36	51	70	122	193	288	413	569	761	991	1263	1581	1947	2366	3164	4345	5806	7543	9595	11930	17908
B7 / L7 / B16	[N*m]	20	48	67	92	160	253	376	540	745	996	1297	1653	2069	2549	3097	4416	6068	7354	9555	12154	15112	22683
B7M / L7M / F53 / F55	[N*m]	15	36	51	70	122	193	288	413	569	761	991	1263	1581	1947	2366	3375	4635	6193	8046	10235	12726	19101
660-Gr.D / F55-HS / S20910-Y>725	[N*m]	20	47	67	92	160	253	378	542	747	999	1301	1658	2075	2555	3105	4430	6083	8128	10561	13433	16703	25071
660-Gr.A / 660-Gr.B / 660-Gr.C	[N*m]	16	38	54	74	130	205	306	439	605	809	1053	1342	1680	2069	2514	3586	4925	6580	8549	10875	13521	20295
N06600 / N08825	[N*m]	7	16	22	31	53	84	126	181	249	333	434	553	692	852	1035	1477	2028	2709	3520	4478	5568	8357
N10276	[N*m]	8	18	26	36	63	99	148	212	292	390	508	647	810	998	1213	1730	2375	3174	4124	5245	6522	9790
N06625	[N*m]	11	27	38	53	92	145	216	310	427	571	743	947	1186	1460	1775	2531	3476	4645	6035	7676	9544	14326
N05500	[N*m]	17	41	57	79	137	217	306	439	605	809	1053	1342	1680	2069	2514	3586	4925	6580	8549	10875	13521	20295
N09925	[N*m]	21	50	70	96	168	265	396	568	782	1046	1363	1737	2174	2677	3253	4641	6373	8515	11064	14073	17498	26265
API6A-N07718 / S20910-Y>827	[N*m]	23	54	76	105	183	290	432	620	854	1142	1487	1895	2372	2921	3549	5063	6953	9289	12069	15352	19089	28652
B637-N07718	[N*m]	29	68	95	131	229	362	540	774	1067	1427	1858	2368	2964	3651	4436	6328	8691	11612	15087	19191	23861	35815
S20910	[N*m]	10	25	35	48	84	133	198	284	391	523	681	868	1087	1339	1627	2320	3187	4258	5532	7037	8749	13132
S21800	[N*m]	10	23	32	44	76	121	180	258	356	476	619	789	988	1217	1479	2109	2897	3871	5029	6397	7954	11938

APPLY FOR FLUOROPOLYMER-COATED BOLTS

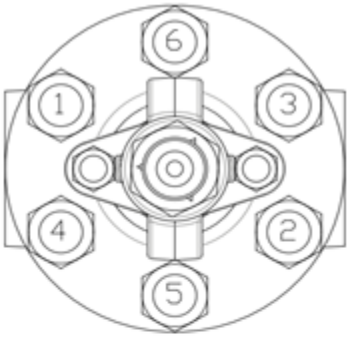
Diametro [mm]	Unit	M4	M5	M6	M8	M10	M12	M14	M16	M18	M18	M20	M22	M24	M27	M30	M33	M36	M39	M42	M45	M45	M48	M56	M64
pitch		0,7	0,8	1	1,25	1,5	1,75	2	2	2	2,5	2,5	2,5	3	3	3,5	3,5	4	4	4,5	3	4,5	3	3,5	6
N09911	[N*m]	0,7	1,2	2,1	4,9	9,2	16	25	39	55	52	72	99	126	192	246	333	427	550	690	894	845	1016	1630	2451
B8M-Cl.1 / B8-Cl.1 / B8C-Cl.1 / B8MA-Cl.1A / B8A-Cl.1A / N08800	[N*m]	0,8	1,5	2,5	5,8	11	19	30	46	66	63	88	119	151	219	296	399	512	660	815	1072	1014	1219	1956	2941
B8M-Cl.2	[N*m]	2,5	4,8	7,9	18	35	60	95	145	210	199	235	317	402	474	641	666	854	1099	1359	1787	1689	2032	3259	4902
B8-Cl.2 / B8T Cl.2	[N*m]	2,6	5,0	8,3	19	37	63	100	152	221	210	235	317	402	474	641	666	854	1099	1359	1787	1689	2032	3259	4902
F51	[N*m]	1,7	3,3	5,4	13	24	41	65	99	143	136	191	258	326	474	641	865	1110	1429	1767	2323	2196	2641	4237	6372
F53	[N*m]	2,1	4,0	6,7	15	30	51	80	122	177	168	235	317	402	583	788	1065	1367	1759	2175	2859	2703	3251	4889	7353
B7 / L7 / B16	[N*m]	2,8	5,3	8,7	20	39	67	105	160	232	220	308	416	527	765	1035	1398	1794	2309	2854	3753	3547	4267	6845	9914
B7M / L7M / F53 / F55	[N*m]	2,1	4,0	6,7	15	30	51	80	122	177	168	235	317	402	583	788	1065	1367	1759	2175	2859	2703	3251	5215	7843
660-Gr.D / F55-HS / S20910-Y>725	[N*m]	2,8	5,3	8,7	20	39	67	105	160	232	220	308	416	527	765	1035	1398	1794	2309	2854	3753	3547	4267	6845	10294
660-Gr.A / 660-Gr.B / 660-Gr.C	[N*m]	2,2	4,3	7,1	16	32	54	85	130	188	178	249	337	427	619	838	1132	1452	1869	2311	3038	2872	3454	5541	8333
N06600 / N08825	[N*m]	0,9	1,8	2,9	6,7	13	22	35	53	77	73	103	139	176	255	345	466	598	770	951	1251	1182	1422	2282	3431
N10276	[N*m]	1,1	2,1	3,4	7,9	15	26	41	63	90	86	120	163	206	299	404	546	700	901	1114	1465	1385	1666	2673	4020
N06625	[N*m]	1,6	3,0	5,0	12	22	38	60	91	132	126	176	238	301	437	591	799	1025	1319	1631	2144	2027	2438	3911	5882
N05500	[N*m]	2,4	4,5	7,5	17	33	57	90	137	199	189	264	357	427	619	838	1132	1452	1869	2311	3038	2872	3454	5541	8333
N09925	[N*m]	2,9	5,5	9,2	21	41	70	110	168	243	231	323	436	552	802	1084	1465	1879	2419	2990	3931	3716	4470	7170	10784
API6A-N07718 / S20910-Y>827	[N*m]	3,2	6,1	10	23	44	76	120	183	265	252	352	476	603	874	1183	1598	2050	2638	3262	4289	4054	4877	7822	11765
B637-N07718	[N*m]	3,9	7,6	12	29	56	95	150	229	331	315	440	595	753	1093	1478	1997	2562	3298	4077	5361	5068	6096	9778	14706
EN 3506 A4 70	[N*m]	1,7	3,3	5,4	13	24	41	65	99	144	137	191	259	328	475	643	869	1115	1435	1359	1787	1689	2032	-	-
S20910	[N*m]	1,4	2,8	4,6	10,6	20,4	34,9	54,9	83,8	121	115	161	218	276	401	542	732	939	1209	1495	1966	1858	2235	3585	5392
S21800	[N*m]	1,3	2,5	4,2	9,6	18,5	31,7	49,9	76,2	110	105	147	198	251	364	493	666	854	1099	1359	1787	1689	2032	3259	4902
EN 20898-1 8.8	[N*m]	2,4	4,7	7,7	17,9	34,4	58,8	93	141	205	195	272	368	466	676	915	1236	1585	2040	-	-	-	-	-	-

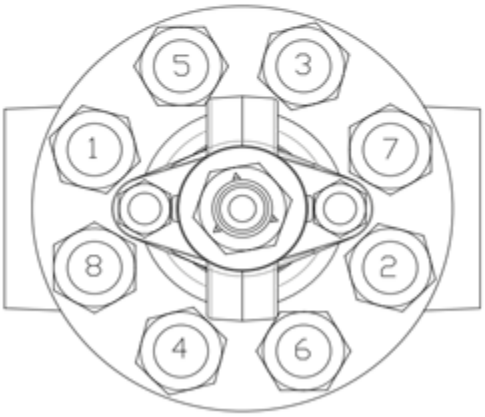
APPLY FOR LUBRICATED BOLTS

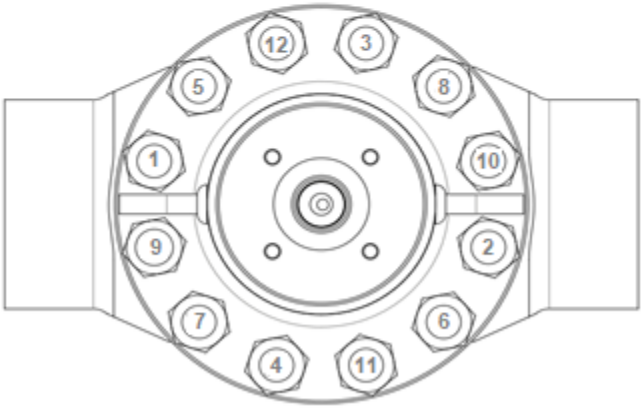
Diametro [mm]	Unit	M4	M5	M6	M8	M10	M12	M14	M16	M18	M18	M20	M22	M24	M27	M30	M33	M36	M39	M42	M45	M45	M48	M56	M64
pitch		0,7	0,8	1	1,25	1,5	1,75	2	2	2	2,5	2,5	2,5	3	3	3,5	3,5	4	4	4,5	3	4,5	5	5,5	6
N08811	[N*m]	0,4	0,7	1,2	2,9	5,5	9,4	15	22	32	31	43	58	74	107	145	194	250	320	397	507	491	593	947	1419
RRM-Cl.1 / RR-Cl.1 / RRC-Cl.1 / RRMA-Cl.1A / RRA-Cl.1A / N08800	[N*m]	0,5	0,9	1,5	3,5	6,6	11	18	27	39	37	52	70	89	128	174	233	300	384	477	609	590	711	1136	1703
B8M-Cl.2	[N*m]	1,5	2,8	4,7	11	21	36	57	85	123	119	139	186	237	277	377	389	500	640	794	1014	983	1185	1894	2839
B8-Cl.2 / B8T-Cl.2	[N*m]	1,6	3,0	5,0	12	22	38	59	90	129	125	139	186	237	277	377	389	500	640	794	1014	983	1185	1894	2839
F51	[N*m]	1,0	1,9	3,2	7,9	14	25	39	58	84	81	113	151	193	277	377	505	651	833	1033	1319	1277	1541	2462	3691
F53	[N*m]	1,3	2,4	4,0	9,2	18	30	48	72	103	100	139	186	237	341	463	622	801	1025	1271	1623	1572	1897	2840	4258
B7 / L7 / B16	[N*m]	1,6	3,1	5,2	12	23	40	62	94	135	131	182	244	311	448	608	816	1051	1345	1668	2130	2063	2490	3977	5394
B7M / L7M / F53 / F55	[N*m]	1,3	2,4	4,0	9,2	18	30	48	72	103	100	139	186	237	341	463	622	801	1025	1271	1623	1572	1897	3030	4542
660 Gr.D / F55 HS / S20910 Y>725	[N*m]	1,6	3,1	5,2	12	23	40	62	94	135	131	182	244	311	448	608	816	1051	1345	1668	2130	2063	2490	3977	5962
660 Gr.A / 660 Gr.B / 660 Gr.C	[N*m]	1,3	2,5	4,2	10	19	32	51	76	110	106	147	197	252	363	492	661	851	1089	1350	1725	1670	2015	3219	4826
N06600 / N08825	[N*m]	0,5	1,0	1,7	4,0	7,7	13	21	31	45	44	61	81	104	149	203	272	350	448	556	710	688	830	1326	1987
N10276	[N*m]	0,6	1,2	2,0	4,7	9,1	15	24	37	53	51	71	95	122	175	237	319	410	525	651	832	806	972	1553	2328
N06625	[N*m]	0,9	1,8	3,0	6,9	13	23	36	54	77	75	104	139	178	256	348	466	600	768	953	1217	1179	1423	2272	3407
N05500	[N*m]	1,4	2,7	4,5	10	20	34	54	81	116	112	156	209	252	363	492	661	851	1089	1350	1725	1670	2015	3219	4826
N09925	[N*m]	1,7	3,3	5,5	13	24	42	65	99	142	137	190	255	326	469	637	855	1101	1409	1748	2232	2162	2608	4166	6245
API6A-N07718 / S20910-Y>827	[N*m]	1,9	3,6	6	14	27	45	71	108	155	150	208	279	356	512	695	933	1201	1537	1907	2435	2358	2845	4545	6813
B637-N07718	[N*m]	2,4	4,5	7	17	33	57	89	135	193	187	260	348	445	640	869	1166	1501	1921	2383	3043	2948	3556	5681	8517
EN-3506 A4-70	[N*m]	1,0	2,0	3	8	14	25	39	59	84	82	113	152	193	278	378	507	653	836	794	1014	983	1185	-	-
S20910	[N*m]	0,9	1,6	3	6	12	21	33	49	71	69	95	128	163	235	319	427	550	704	874	1115,9	1080,8	1304,0	2083,0	3122,7
S21800	[N*m]	0,8	1,5	2	6	11	19	30	45	64	62	87	116	148	213	290	389	500	640	794	1014	983	1185	1894	2839
EN 20898-1 8.8	[N*m]	1,5	2,8	5	11	21	35	55	83	120	116	161	216	275	396	538	721	929	1189	-	-	-	-	-	-

APPLY FOR FLUOROPOLYMER-COATED BOLTS

2. TORQUE SEQUENCES







SECTION F

SUPPORTING PROCEDURES & STANDARDS

1. OMB IOM MANUALS

IOM-Bellows Seal Valves
IOM-Eco-L Valves
IOM-Gear and Actuated Valves
IOM-Extended Bonnet/Lantern Ring Vacuum Service Valves
IOM-Y-Pattern Globe and Check Valves
IOM-Instrumentation –Needle Valves
IOM-Self Closing (Spring Operated) Globe Valves
IOM-Angle Valves
IOM-Urea Service Valves
IOM-Chlorine Service Valves
IOM-Soft Seat Insert Valves
IOM-Pressure Seal Valves from ½"Upwards
IOM-Through Conduit Gate Valves (TCGV)
IOM-Top Entry Ball Valve (BTE)
IOM-Side Entry Ball Valves (BSE)
IOM-Trunnion Ball Valves
IOM-Modular Valves (Double Block and Bleed –DBB)
IOM-Exotics Valves

2. SPECIAL SERVICE APPLICATION PROCEDURES

SV-001-Bellows Seal Valves Specification
SV-002-Hydrogen Service-Testing Procedure
SV-003-Oxygen Service Condition
SV-004-Lantern Ring Vacuum Service Procedure
SV-005-Actuators Selection Procedure (Pneumatic, Hydraulic and Electronic)
SV-006-Chlorine Service Features
SV-007-Steam System Service Procedure
SV-008-Cryogenic and Low Temperature Service Procedure
SV-009-Sour Oil and Gas Service Procedure
SV-010-High Temperature and High Pressure Service Procedure
SV-011-Alkylation Service Procedure
SV-012-Packing Replacement and Adjustment Procedure
SV-013-Chevron Packing Replacement and Adjustment Procedure
SV-014-PWHT API 602 Forges Steal Valves Procedure

3. STANDARDS

American Petroleum Institute (API)
API RP 574-Inspection practices for piping system components
API 589-Fire test for evaluation of valve stem packing
API RP 591-Process valve qualification procedure
API 594-Check valves-flanged, lug, wafer & butt-welding
API 597-Steel ventori gate valves, flanged, butt-welding ends
API 598-Valve inspection & testing
API 599-Metal plug valves - flanged, welding ends
API 601-Metallic gaskets for raised-face pipe flanges & flanged connections (double-Jacketed corrugated & spiral wound)
API 600-Bolted bonnet steel gate valves for petroleum & natural as industries "ISO adoption from ISO 10434"
API 602-Steel gate, globe, & check valves for sizes DN100 and smaller for the petroleum & natural gas industries
API 603-Corrosion-resistant, bolted bonnet gate valves-flanged & butt-weld ends
API 604-Ductile Iron Gate valves, flanged ends
API 605-Large-diameter carbon steel flanges (replaced by ANSI/ASME B16.47)
API 606-Compact steel gate valves, extended body (included in API 602) "ISO adoption from ISO 10497-5"
API 607-Fire test for soft-seated quarter-turn valves "ISO adoption from ISO 10497-5"
API 608-Metal ball valves, flanged, threaded, & welding ends
API 609-Butterfly valves-double flanged, lug- & wafer-type
API RP 941-Steel for hydrogen service at elevated temperatures & pressures in petroleum refineries & petrochemical plants
API RP 520 Part 1 - Sizing, selection & installation of pressure relieving devices in refineries
API RP 520 Part 2 - Sizing, selection & installation of pressure relieving devices in refineries devices in refineries
API Spec 6A-Specification for wellhead & Christmas tree equipment
API Spec 6D-Specifications for pipeline valves
API Spec 14D-Specifications for wellhead surface safety valves & underwater safety valves for offshore service
API 5B -Threading, gauging thread inspection of coring, tubing, & line pipe threads
API 6AM-Material toughness
API 6FA- Fire test for valves
API 6FC - Fire test for valves with backseats
API 6FD - Specification for fire test for check valves
APIQ1-Specification for quality programs for the petroleum, petrochemical, & natural gas
American Society of Mechanical Engineers (ASME)
ASME Code - Boiler & pressure vessel code
ASME A13.1- Scheme for the identification of piping systems
ASME B1.1-Unified inch screw threads, UN, & UNR thread form
ASME B1.5- ACME screw threads
ASME B1.7M-Nomenclature, definitions, & letter symbols for screw threads
ASME B1.8 - Stub ACME screw threads
ASME B1.12 - Class 5 interference - fit thread
ASME B1.20.1 - Pipe threads, general purpose, inch
ASME B1.20.3 - Dry-seal pipe threads, inch
ANSI/ASME B16.1 - Cast iron pipe flanges & flanged fittings
ANSI/ASME B16.5-Pipe flanges & flanged fittings
ASME B16.9 - Factory made wrought steel buttwelding fittings
ANSI/ASME B16.10-Face-to-face & end-to-end dimensions of valves
ASME B16.11 - Forged fittings, socket welding & threaded
ASME B16.20 - Metallic gaskets for pipe flanges: ring joint spiral wound & jacketed
ASME B16.21- Non-metallic flat gaskets for pipe flanges
ASME B16.25 - Butt-welding ends
ANSI/ASME B16.33 - Manually operated metallic gas valves for use in gas piping systems up to 125 PSI (sizes NPS 1/2" through 2")
ANSI/ASME B31.1- Power piping
ANSI/ASME B31.3- Process piping
ANSI/ASME B16.34-Valves flanged, threaded & welding end
ANSI/ASME B16.36-Orifice flanges
ANSI/ASME B16.38- Large metallic valves for gas distribution
ANSI/ASME B16.42-Ductile iron pipe flanges & flanged fittings: classes 150 & 300
ANSI/ASME B16.47- Large diameter steel flanges
ASME B31.4-Pipeline transportation systems for liquid hydrocarbons & other ammonia & alcohols
ANSI/ASME B31.8- Gas transmission & distribution piping systems
ANSI/ASME B36.10-Welded & seamless wrought steel pip
ANSI/ASME B36.19- Stainless steel pipe
ANSI FCI-2- Control valve seat leakage
American Society for Testing and Materials (ASTM)
British Standards Institute (BS)
BS 1414 - Gate, wedge & double disk valves: steel
BS 1868 - Check valves: steel
BS 1873 - Globe & check valves: steel
BS 2080 obsolete - Flanged & butt-weld end steel valves
BS 6755 p.1 steel valves testing. **BS 6755 p.2**
BS 5152 - Globe & check: cast iron
BS 5153 - Check: cast iron

BS 5159 - Ball: cast iron & carbon steel
BS 5160 - Globe & check: steel
BS 5163 - Gate, wedge & double disk: cast iron
BS 5351 - Ball: steel
BS 5352 - Globe & check: steel
BS 5840 - Valve mating details for actuator operation
BS 6364 - Cryogenic
BS 6683 - Guide: installation & use of valves
BS 6755 Part 1- Specification for production pressure testing requirements
BS 6755 Part 2 - Specification for fire type-testing requirements
BS EN 19 - Marking of general purpose industrial valves

International Organization for Standardization

ISO 5211/1- Industrial valves- part-turn actuator attachments
ISO 5211/2-Part-turn valve actuator attachment-flange & coupling performance characteristics
ISO 5752-Metal valves for use in flanged pipe systems face-to-face & center-to-face dimensions
ISO 9000-Quality management systems and fundamentals & vocabulary
ISO 10012-1- Quality assurance requirements for measuring equipment

Manufacturers Standardization Society

SP 6-Standard finishes for contact faces of pipe flanges & connecting-end flanges of valves & fittings
SP 25-Standard marking system for valves, fittings, flanges & unions
SP 42-corrosion resistant gate, globe, angle, & check valves with flanged & butt-weld ends.
SP 44 - Steel pipeline flanges
SP 45-Bypass & drain connections
SP 51-Class 150/w corrosion resistant cast flanges & flanged fittings
SP 53-Quality standard for steel castings & forgings for valves, flanges, & fittings & other piping components: magnetic particle exam method
SP 54-Quality standard for steel castings for valves, flanges, & fittings and other piping components: radiographic examination method
SP 55-Quality standard for steel castings for valves, flanges other piping Components-visual method for evaluation of surface irregularities
SP 60-Connecting flange joint between tapping sleeves & tapping valves
SP 61-Pressure testing of steel valves
SP 65-High pressure chemical industry flanges & threaded stubs for use with lens gaskets
SP 67-Butterfly valves
SP 69- ANSI/MSS edition pipe hangers & supports, selection & application
SP-70-Cast Iron Gate valves, flanged & threaded ends
SP-71-Gray iron swing check valves, flanged & threaded ends
SP 72 Ball valves with flanged or butt-welding ends for general service
SP-79-Socket-welding reducer inserts
SP-81-Stainless steel, bonnet-less, flanged knife gate valves
SP 82-Valve pressure testing methods
SP 84-Valves - socket welding & threaded ends
SP 85 -Cast iron globe & angle valves, flanged & threaded ends
SP 86- Guidelines for metric data in standards for valves, flanges, fittings & actuators.
SP 91-Guidelines for manual operation of valves
SP 92- MSS valve user guide
SP 93- Quality standard for steel castings & forgings for valves, flanges & fittings & other piping components- liquid penetrant exam method
SP 94 - Quality standard for ferritic & martensitic steel castings for valves, flanges, & fittings and others piping components - ultrasonic exam method
SP 96- Guidelines on terminology for valves & fittings
SP 98 - Protective coatings for the interior of valves, hydrants, & fittings
SP 99-Instrument valves
SP 110- Ball valves threaded, socket welding, solder joint, grooved, & flared ends
SP 117 - Bellows seals for globe & gate valves
SP 118 - Compact steel globe and check valves-flanged, flangeless, threaded & welding ends (chemical & petroleum refinery service)
SP 120- Flexible graphite packing system for rising stem steel valves (design requirements)
SP 121- Qualification testing methods for stem packing for rising stem steel valves

National Association of Corrosion Engineers (NACE)

MR0175 - Sulfide stress cracking resistant metallic materials for oil field equipment
MR0103 - Materials resistant to Sulfide Street cracking in corrosive petroleum refining environment.

NOTE: Latest Edition and Revision of all above standards are applicable.

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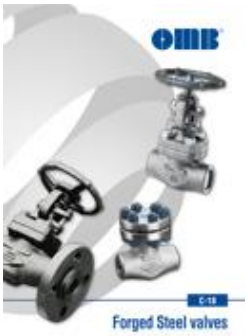

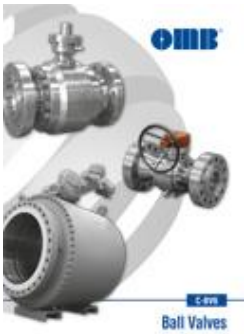

The OMB Valves group, headquartered in Cenate Sotto, Bergamo, Italy, is a diversified manufacturer of valves for the energy industries. OMB is a globally recognized manufacturer of forged steel valves for the oil and gas industry. The group operates four plants in Italy (OMB, Fluicon and Calobri), one in OMK Korea one in Singapore and one in Stafford, Texas. OMB has direct presence in UK, Japan, Korea, China and Canada with its own subsidiaries and a distribution network which covers all the major oil producing countries. The OMB group has knowledge and experience in design and manufacture of valves for the hydrocarbon and petrochemical processing plants, oil and gas off-shore and on-shore production and transportation and the energy industry.

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