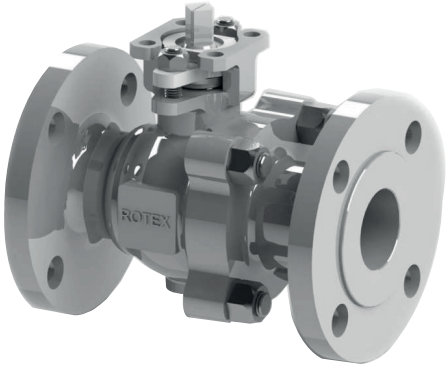
Neles™ India
Floating ball valve
DN15 – DN250
2-piece and 3-piece body configurations

Installation, maintenance and
operating instructions



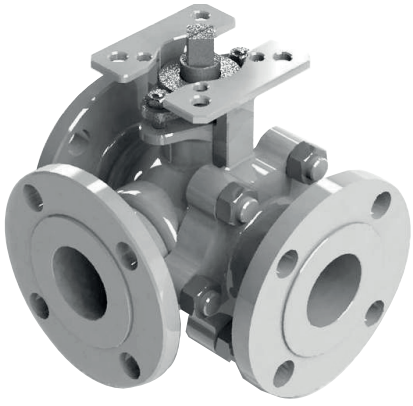


Table of contents

READ THESE INSTRUCTIONS FIRST!

These instructions provide information about safe handling and operation of the valve.

If you require additional assistance, please contact the manufacturer or manufacturer's representative.

SAVE THESE INSTRUCTIONS!

Addresses and phone numbers are printed on the back cover.

1. GENERAL

1.1 SCOPE OF THE MANUAL

This instruction manual contains important information regarding the installation, operation and maintenance of Neles India floating ball valves. Please read these instructions carefully and save them for future reference.

WARNING:

THE USE OF THE VALVE IS APPLICATION SPECIFIC. BE SURE THAT THE VALVE IS SUITABLE FOR ITS INTENDED SERVICE. IF YOU HAVE ANY QUESTIONS CONCERNING THE USE, APPLICATION OR COMPATIBILITY OF THE VALVE WITH THE INTENDED SERVICE, CONTACT VALMET FOR MORE INFORMATION.

1.2 VALVE MARKINGS

The valve has a identification plate attached to the valve body. The identification plate markings identify the size, materials of construction, pressure rating, month and year of construction, and a unique serial number for the valve.

1.3 SAFETY PRECAUTIONS

WARNING:

DO NOT EXCEED THE VALVE PERFORMANCE LIMITATIONS!

EXCEEDING THE PRESSURE OR TEMPERATURE LIMITATIONS MARKED ON THE VALVE LABEL PLATE MAY CAUSE DAMAGE AND LEAD TO UNCONTROLLED PRESSURE RELEASE. DAMAGE OR PERSONAL INJURY MAY RESULT.

WARNING:

SEAT AND BODY RATINGS!

THE PRACTICAL AND SAFE USE OF THIS PRODUCT IS DETERMINED BY BOTH THE SEAT AND BODY RATINGS. READ THE LABEL PLATE AND CHECK BOTH RATINGS. SOME SEAT MATERIALS HAVE PRESSURE RATINGS THAT ARE LESS THAN THE BODY RATING. ALL OF THE BODY AND SEAT RATINGS ARE DEPENDENT ON VALVE TYPE AND SEAT MATERIAL. DO NOT EXCEED THESE RATINGS!

WARNING:

BEWARE OF BALL MOVEMENT!

KEEP HANDS, OTHER PARTS OF THE BODY, TOOLS AND OTHER OBJECTS OUT OF THE OPEN FLOW PORT. LEAVE NO FOREIGN OBJECTS INSIDE THE PIPELINE. WHEN THE VALVE IS ACTUATED, THE BALL FUNCTIONS AS A CUTTING DEVICE. DISCONNECT ANY PNEUMATIC SUPPLY LINES, ANY ELECTRICAL POWER SOURCES AND MAKE SURE SPRINGS IN SPRING-RETURN ACTUATORS ARE IN THE FULL EXTENDED/ RELAXED STATE BEFORE PERFORMING ANY VALVE MAINTENANCE. FAILURE TO DO THIS MAY RESULT IN DAMAGE OR PERSONAL INJURY!

WARNING:

VALVE MAY BE HOT OR COLD!

THE VALVE BODY MAY BE VERY HOT OR COLD DURING USE. BE AWARE OF THE VALVE OEPRATING CONDITIONS. PROTECT PEOPLE AGAINST BURNS OR COLD INJURIES.

WARNING:

WHEN HANDLING THE VALVE OR VALVE/ACTUATOR ASSEMBLY, TAKE ITS WEIGHT INTO ACCOUNT!

NEVER LIFT THE VALVE OR VALVE/ACTUATOR ASSEMBLY BY THE ACTUATOR, POSITIONER, LIMIT SWITCH OR THEIR PIPING. PLACE LIFTING DEVICES SECURELY AROUND THE VALVE BODY. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN DAMAGE OR PERSONAL INJURY FROM FALLING PARTS (SEE **FIGURE 2**).

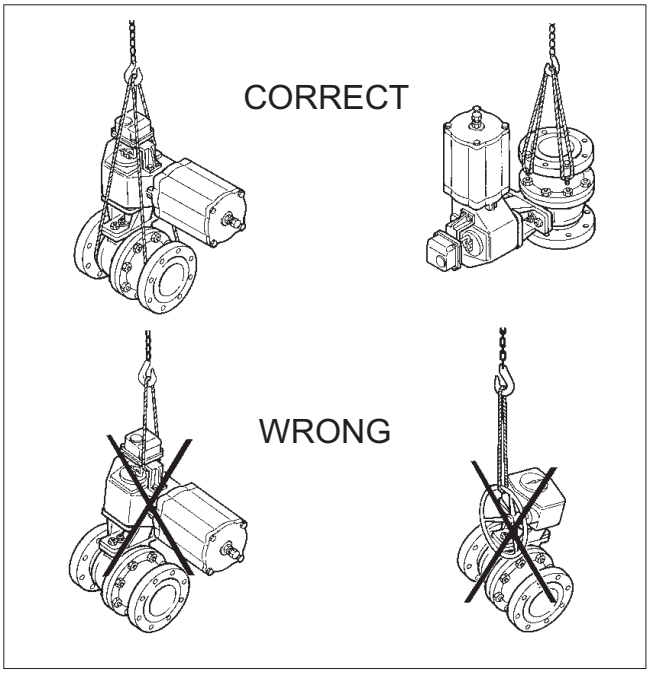


Figure 2. Lifting of the valve

2. TRANSPORTATION AND STORAGE

Check the valve and the accompanying devices for any damage that may have occurred during transport.

CAUTION: Placing the valve directly on the ground or on a concrete floor should be avoided.

Store the valve carefully. Storage indoors in a cool, dry place.

Valves are delivered with the ball port in the fully open position and ends protected with covers to avoid entry of debris and to protect flange facing.

NOTE: When the valve is delivered with a single acting pneumatic actuator mounted, where the spring closes the ball port, the valve is supplied with the ball in the closed position. Special care must be taken to avoid entry of debris which can damage the seats and ball sealing surface.

Valve open and closed position is indicated on the handle for lever operated valves, or on top of the gearbox for manually operated valves.

CAUTION: The valve shall not be stored with the ball in an intermediate position between fully open and fully closed as it can damage the seats.

Follow safety instructions for lifting and handling of the valve. To lift, place a lifting strap with a sufficient rating for the weight to be carried around the valve body or use lifting hooks (provided for valves greater than 250 kg). Special care must be taken not to damage the paint coating, lever, gearbox, actuator, or other components.

Move the valve to its intended location just before installation.

Do not remove the flow port protectors until installing the valve.

If the valve(s) are to be stored for a long duration, follow the recommendations of IMO-S1.

3. INSTALLATION

3.1 GENERAL

Remove the flow port protectors and check that the valve is clean inside. Clean valve if necessary.

Flush the pipeline carefully before installing the valve. Foreign objects, such as sand or pieces of welding electrodes, will damage the ball and seats.

3.2 INSTALLING IN THE PIPELINE

WARNING:

BEFORE INSTALLING A VALVE IN THE PIPELINE, CHECK THE IDENTIFICATION TAG AND ENSURE THAT THE INFORMATION MATCHES THE PURCAHSE AND PIPING SPECIFICATIONS. THE IDENTIFICATION PLATE ON THE VALVE PROVIDES THE NECESSARY INFORMATION.

When taking the valve from storage, carefully check to ensure that the valve was not damaged during the storage period.

Ball valves are designed for bi-directional flow unless the ball is drilled for cavity relief. When the ball has a cavity relief hole, ensure that the installation of the valve is correct with respect to the flow direction arrow marked on the valve.

The valve can be mounted in a horizontal or vertical position. When installed in a horizontal line, it is not recommended to install the valve with the stem on the underneath side because debris in the pipeline may enter the body cavity and damage the gland packing. See **Figure 3**.

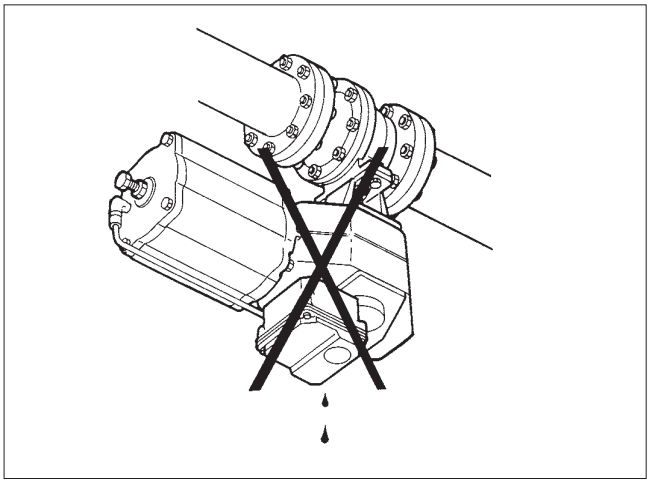


Figure 3. Avoid this mounting position

It is preferred to firmly support the pipeline to protect the valve from excessive stress and to reduce pipeline vibration. To facilitate servicing, it is preferable that the valve be supported by the body using pipe clamps and supports. Do not fasten supports to the flange bolting, body bolting, or to the actuator. See **Figure 4**.

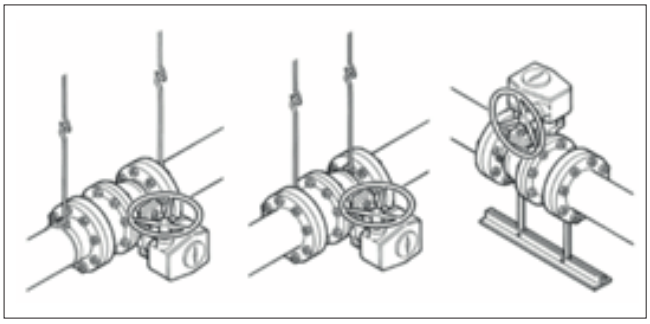


Figure 4. Supporting the valve

FLANGED VALVE INSTALLATION

WARNING:

THE VALVE SHOULD BE TIGHTENED BETWEEN FLANGES USING GASKETS AND FASTENERS COMPATIBLE WITH THE APPLICATION, AND IN COMPLIANCE WITH APPLICABLE PIPING CODES AND STANDARDS. CENTER THE VALVE AND FLANGE GASKETS CAREFULLY BETWEEN FLANGES. DO NOT ATTEMPT TO CORRECT PIPELINE MISALIGNMENT BY MEANS OF FLANGE BOLTING!

During flange bolt tightening, ensure that piping stresses are not transferred to the valve.

Excessive overtightening of flange bolting can cause damage and/ or leaks on the end flange or body joints.

WELD END VALVE INSTALLATION

NOTE: A qualified welder must do the installation welding. The welder and welding procedure should be qualified in accordance with the ASME Boiler and Pressure Vessel Code Section IX.

CAUTION: To prevent damage to the seat and seals, do not allow the temperature of the valve body seat and body seal area to exceed 200 °F (94 °C). It is recommended that thermal chalks be used to check the temperature in these areas during welding.

CAUTION: Ensure that any weld splatter does not fall onto the ball or seats. This may damage critical sealing surfaces and cause leaks.

After welding, flush the pipeline with the valve in the fully open position to remove any weld splatter. Operate the valve 3 to 4 times to ensure proper operation of the valve.

When butt welding, ensure a gap of 0.08 to 0.12 inches exists between the valve end and pipe in accordance with ASME welding standards. Tack weld the pipe to the valve end in several locations. Check for proper alignment between the pipe and valve before completing welding the pipe to the valve.

3.3 VALVE INSULATION

Ball valves do not require insulation. If desired, the valve may be insulated; however, the insulation must not continue above the upper level of the valve. See **Figure 5**.

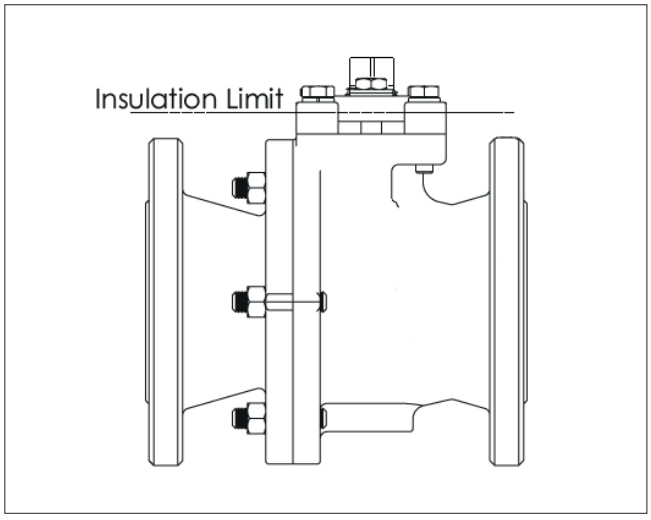


Figure 5. Insulation of the valve

3.4 ACTUATOR

WARNING:

WHEN INSTALLING AN ACTUATOR ON THE VALVE, MAKE SURE THAT THE VALVE ASSEMBLY FUNCTIONS PROPERLY. INFORMATION ON ACTUATOR INSTALLATION IS GIVEN IN SEPARATE ACTUATOR INSTRUCTIONS.

The actuator should be installed in a manner that allows plenty of room for its removal.

The actuator must not touch the pipeline, tanks, walls, or other equipment because vibration may interfere with its operation.

3.5 COMMISSIONING

Ensure that there is no dirt or foreign objects left inside the valve or pipeline. Flush the pipeline carefully. Make sure that the valve is fully open when flushing.

Ensure that all nuts, fittings, and cables are properly fastened.

If so equipped, check that the actuator positioner and/ or switch(s) are correctly adjusted. Actuator adjustment is in Section 5. To adjust any accompanying device(s) refer to the separate control equipment instruction manuals.

4. OPERATION

CAUTION: Open and close the valve slowly to avoid hammering effect from abrupt pressure changes on the valve and pipeline.

CAUTION: Do not keep the valve partially open in an intermediate position as it may damage the seat and lead to erosion of the ball and body.

For lever operated valves, the hand lever is either assembled with the valve or shipped loose depending upon the size of the valve and hand lever.

For valve operated with a gearbox, the gearbox open and closed position adjustment has been set prior to shipment from the factory. Do not disturb this adjustment. Rotation of the hand wheel in the clockwise direction closes the valve and counter clockwise rotation opens the valve (rotation direction is when facing the hand wheel end).

CAUTION: Ensure that the force applied on the hand wheel of the gearbox or lever does not exceed 360 N.

NOTE: Do not apply extra leverage using an extension pipe or pry bar. When the end stops of the lever or gearbox are reached, the valve is at its final position. Applying additional torque will not improve shut-off tightness.

The valve always closes by rotating the stem (when viewed from top) in the clockwise direction. The ball should always be rotated a full 90 degrees to the fully open or fully closed position.

5. MAINTENANCE

5.1 GENERAL

Although Neles valves are designed to work under severe conditions, proper preventative maintenance can significantly help to prevent unplanned downtime and reduce the total cost of ownership. Valmet recommends inspecting valves at least every five (5) years. The inspection and maintenance frequency depend on the actual application and process condition. Routine maintenance consists of tightening the gland flange bolts periodically to compensate for stem seal wear.

Always loosen and tighten fasteners with the appropriate wrench to avoid damaging the valve, handle, linkage, actuator, fittings or flats.

Overhaul maintenance consists of replacing seats and seals. Always replace parts with genuine and recommended parts only. These parts may be obtained from Valmet or an Authorized Valmet Distributor.

WARNING:

FOR YOUR SAFETY, IT IS IMPORTANT THE FOLLOWING PRECAUTIONS BE TAKEN PRIOR TO REMOVAL OF THE VALVE FROM THE PIPELINE OR BEFORE ANY DISASSEMBLY:

1. BE SURE YOU KNOW WHAT FLUID IS IN THE PIPELINE. IF THERE IS ANY DOUBT, DOUBLE-CHECK WITH THE PROPER SUPERVISOR.
2. WEAR ANY PERSONAL PROTECTIVE EQUIPMENT (PROTECTIVE CLOTHING OR EQUIPMENT) REQUIRED WHEN WORKING WITH THE FLUID INVOLVED.
3. DEPRESSURIZE THE PIPELINE AND CYCLE THE VALVE AS FOLLOWS:
   A. PLACE THE VALVE IN THE OPEN POSITION AND DRAIN THE PIPELINE.
   B. CYCLE THE VALVE TO RELIEVE RESIDUAL PRESSURE IN THE BODY CAVITY BEFORE REMOVAL FROM THE PIPELINE
   C. AFTER REMOVAL AND BEFORE DISASSEMBLY, CYCLE THE VALVE AGAIN SEVERAL TIMES.

NOTE: When sending the valve to the manufacturer for repair, do not disassemble. Clean the valve carefully and flush the valve internals. For safety reasons, inform the manufacturer of the type of medium used in the valve (include material safety datasheets (MSDS) for the medium).

NOTE: For safety reasons, replace pressure retaining bolting if the threads are damaged, have been heated, stretched, or corroded.

5.2 PREVENTATIVE MAINTENANCE

In order to avoid valve failure during operation, the valve should be periodically inspected thoroughly to detect the wear and/or corrosion of the ball, seats, seals and body. Whenever the valve is disassembled, it is recommended to replace the seats, gaskets, seals, and packing.

Check the electrical continuity of the valve to the pipeline.

NOTE: Before removing the valve from the pipeline, it is important to mark the relative position of the valve flange with respect to the pipeline flange and any flow direction arrow to ensure valve is reinstalled in the same position.

It is generally most convenient to detach the actuator and its auxiliary devices before removing the valve from the pipeline. If the valve package is small or if it is difficult to access, it may be more practical to remove the entire assembly.

NOTE: To ensure proper reassembly, observe the position of the actuator and positioner/limit switch with respect to the valve before detaching the actuator.

WARNING:

ALWAYS DISCONNECT THE ACTUATOR FROM ITS POWER SOURCE, PNEUMATIC, HYDRAULIC OR ELECTRICAL, BEFORE ATTEMPTING TO REMOVE IT FROM THE VALVE!

WARNING:

DO NOT REMOVE A SPRING-RETURN ACTUATOR UNLESS A STOP-SCREW IS CARRYING THE SPRING FORCE!

1. Detach the air supply, electrical supply, hydraulic supply and control signal cables or pipes from their connectors.
2. Remove the actuator mounting bracket screws.
3. Lift the actuator straight up in line with the valve stem until the connection between actuator drive and valve stem is completely disengaged.
4. Place actuator in a safe location to avoid damage or personal injury.

5.3 LUBRICATION OF GEARBOX

Gearbox is supplied fully lubricated with grease. The grease is normally suitable for -20 °C (-4 °F) to +80 °C (+176 °F). For temperatures outside this range, consult the Factory or Authorized Distributor. Grease should be changed every 3 years if operated frequently, or every 5 years if operated infrequently.

CAUTION: Disassembly of the gearbox should be done only by trained technicians.

5.4 VALVE DISASSEMBLY

NOTE: It is good practice to replace all seats and seals any time a valve is disassembled.

NOTE: Always use original OEM parts to make sure that the valve functions properly.

Numbers in ( ) refer to items shown in the exploded view.

Follow these steps to disassemble the valve:

1. Read and follow all instructions in the **WARNING** sections above before performing any work on the valve.
2. Ensure the valve is in the closed position.
3. Remove the valve from the pipeline.

4. Place the valve on a clean bench or other suitable working surface with the valve closed and in the vertical position. Take care not to damage flange facing or end conenction.
5. Secure valve to working surface to prevent movement during disassembly.
6. For gear operated valves, remove gearbox by removing the mounting nuts and studs to the bracket. Remove the bracket by removing the nuts and studs to the valve. Remove the coupling.

NOTE: Take care not to damage the stem.

7. Remove body nuts.
8. Lift end piece, body seal, body gasket, and seat from valve.
9. Close ball by rotating stem and lift ball from body.
10. Remove lower seat from valve body, being careful not to scratch the body sealing surface behind the seat.
11. Remove gland nuts, gland flange, disc spring, stem retainer 2, v-ring stem seal, stem retainer 1, and stem seal. Use caution to prevent denting or scratching the sealing surface inside the packing bore.
12. Push stem into valve body and carefully remove. Avoid denting or scratching the sealing surface on the stem.
13. Remove bottom stem washer from the body.

NOTE: Take care not to damage the ball and body sealing areas. Damage may cause leaks, even when new seats and seals are installed. Always place the ball on a clean surface and prevent it from rolling.

NOTE: After the complete disassembly of the valve, all the components should be inspected for damage or wear and stored in a clean safe place.

5.5 CHECKING PARTS

1. Clean all disassembled parts.
2. Check the stem and ball for damage. Pay particular attention to sealing surfaces.
3. Check all sealing and gasket surfaces on the body and body adaptor.
4. Replace any damaged parts.
5. Replace any fastener where the threads are damaged or have been heated, stretched or corroded.
6. Replace any parts that have scratches, gouges, or pits that will affect sealing.

NOTE: When ordering spare parts, always include the following information:

a. Valve catalog code from label plate,

b. If the valve is serialized – the serial number (stamped on the valve body or label plate),

c. From exploded view, the ballooned part number, part name and quantity required.

5.6 VALVE ASSEMBLY

NOTE: It is good practice to replace all seats and seals any time a valve is disassembled.

NOTE: Always use original OEM parts to make sure that the valve functions properly.

NOTE: All o-rings should be lightly lubricated at assembly with lubricant that is compatible with the o-ring material and media in the valve.

Numbers in ( ) refer to items shown in the exploded view.

Follow these steps to assemble the valve:

1. Clean all valve components, if not previously done.
2. Inspect all components for damage before assembling the valve. Look for damage to the sealing areas on the ball, stem, and body
3. With a brush, clean body studs and gland studs of foreign material such as paint, thread locker, grime and commodity. Inspect the threads for damage or defect with appropriate ring or plug gage. Repair any out-of-tolerance threads or replace in-kind.
4. Re-inspect all components for damage to the sealing areas, stem, body, and end piece. Replace any damaged parts.
5. Carefully clean and polish the ball sealing surface: It should be free of all scratches and grooves.
6. If the ball is slightly damaged, it may be possible to smooth the sealing surface with crocus cloth or equivalent. If deep scratches are present, replace the ball.
7. With the body cavity facing up, insert one valve seat into the body to below the stem bore. Tilt the seat into place and position so the proper surface will be in contact with the ball.
8. Place stem washer over stem and gently press into place against shoulder on stem.
9. Insert the stem into the body, being careful not to scratch the stem sealing surface; and press it gently up into the stem bore until resistance is felt from the stem washer.
10. Holding stem in place from the bottom, insert stem seal, stem retainer 1, v-ring stem seal, and stem retainer 2 with both inner and outer o-rings.
11. Install disc springs (see figure for proper orientation), gland flange, and gland flange nuts.

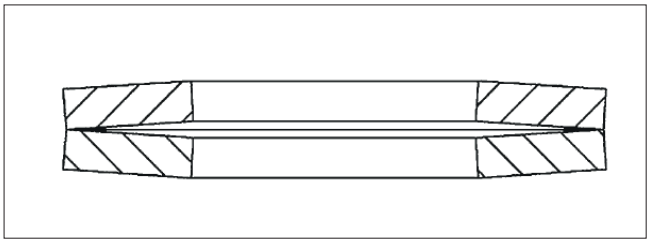


Figure 6. Proper Disc Spring Arrangement (uncompressed)

12. Tighten gland nuts evenly until stem seal is compressed and then tighten an additional ¼ turn. Visually inspect to ensure gland flange is parallel with top of actuator mounting flange.
13. Rotate the stem so the ball drive is in the closed position. Place the ball into the body cavity by partially rotating and sliding the ball onto the stem and against the seat. Make certain the stem is roughly in the middle of the ball slot.
14. Place the second seat into the end piece in the correct orientation so the proper surface contacts the ball.
15. Install the body seal and body gasket onto the end piece.
16. Carefully place the end piece on top of the body and loosely install the body nuts. Lightly lubricate stud threads and face of nut with anti-seize grease. Tighten the body nuts in an alternating sequence across the body, gradually increasing the tightening torque in multiple steps to applicable torque from **Table**.

Body Nut Tightening Torque, Nm		
Stud size	**Carbon steel Grade B7**	**Stainless steel Grade B8M**
1/4 - 20 UNC	15	12
5/16 - 18 UNC	30	25
3/8 – 16 UNC	50	40
7/16 – 14 UNC	75	65
1/2 - 13 UNC	120	100
9/16 – 12 UNC	160	150
5/8 – 11 UNC	230	200
3/4 - 10 UNC	400	370
7/8 – 9 UNC	650	500

17. After fully tightening the stem seal and body joint flange, operate valve to verify smooth operation during opening and closing.
18. If the actuator was removed, reinstall and set the actuator stops as described in the separate actuator instructions.

6. TESTING THE VALVE

WARNING:

WHEN PRESSURE TESTING, EXERCISE CAUTION AND MAKE SURE ALL EQUIPMENT USED IS IN GOOD WORKING CONDITION AND APPROPRIATE FOR THE INTENDED PRESSURE.

If the valve is to be tested prior to returning to service, make sure the test pressures are in accordance with an applicable standard.

When testing the valve for external tightness, keep the ball in the half open position.

If testing for seat tightness, please contact Valmet for advice.

WARNING:

WHEN PERFORMING ANY TESTS, NEVER EXCEED THE MAXIMUM OPERATING PRESSURE OR MAXIMUM SHUT-OFF PRESSURE LISTED ON THE IDENTIFICATION PLATE

7. ACTUATOR

WARNING:

BEFORE INSTALLING THE VALVE AND ACTUATOR, BE SURE THAT THE INDICATOR POINTER ON TOP OF THE ACTUATOR IS CORRECTLY INDICATING THE VALVE POSITION. FAILURE TO ASSEMBLE THESE PRODUCTS TO INDICATE CORRECT VALVE POSITION COULD RESULT IN DAMAGE OR PERSONAL INJURY.

CAUTION: When installing or servicing a valve/ actuator assembly, the best practice is to remove the entire assembly from service.

CAUTION: An actuator should be remounted on the valve from which it was removed. The actuator must be checked and readjusted for proper open and close position each time it is remounted.

WARNING:

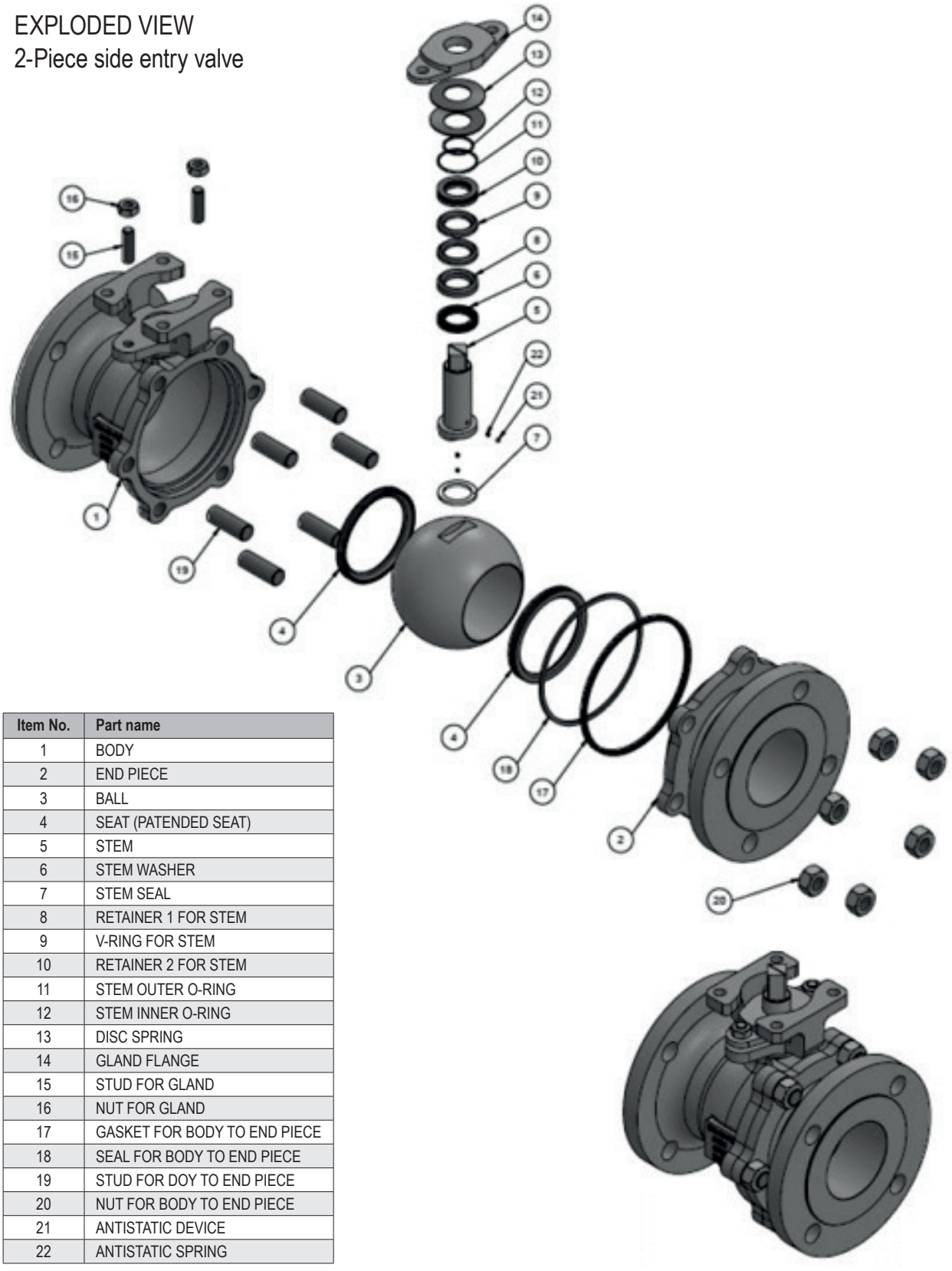
THE VALVE BODY AND MOUNTING INTERFACE HAS BEEN DESIGNED TO SUPPORT THE WEIGHT AND OPERATION OF NELES ACTUATORS AND RECOMMENDED ACCESSORIES. USE OF THIS INTERFACE TO SUPPORT ADDITIONAL EQUIPMENT SUCH AS PEOPLE, LADDERS, ETC. MAY RESULT IN THE FAILURE OF THE VALVE OR ACTUATOR AND MAY CAUSE PERSONAL INJURY.

WARNING:

BEWARE OF BALL MOVEMENT!

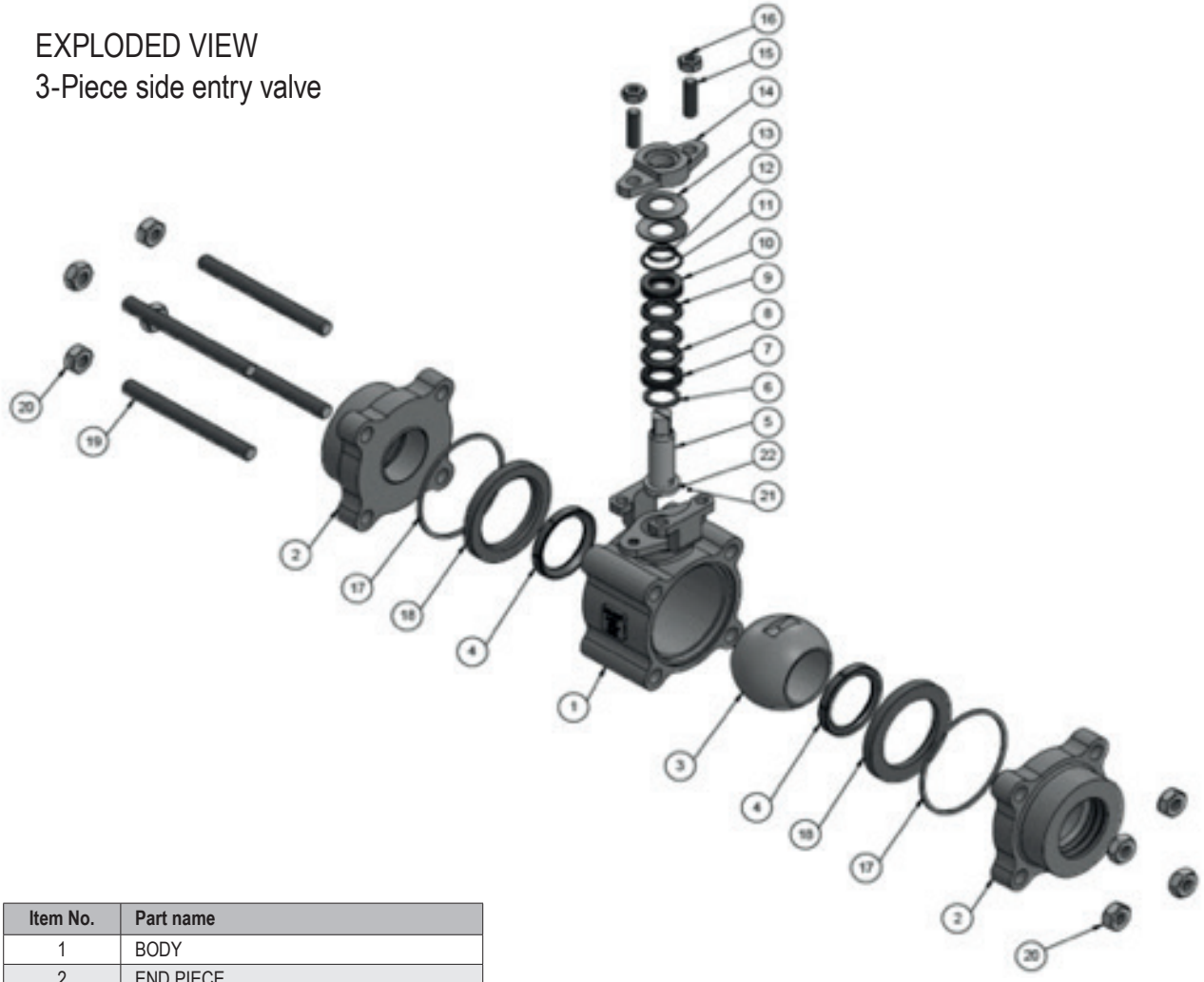
KEEP HANDS, OTHER PARTS OF THE BODY, TOOLS AND OTHER OBJECTS OUT OF THE OPEN FLOW PORT. LEAVE NO FOREIGN OBJECTS INSIDE THE VALVE OR PIPELINE. WHEN THE VALVE IS OPERATED, THE BALL FUNCTIONS AS A CUTTING DEVICE.

EXPLODED VIEW
2-Piece side entry valve

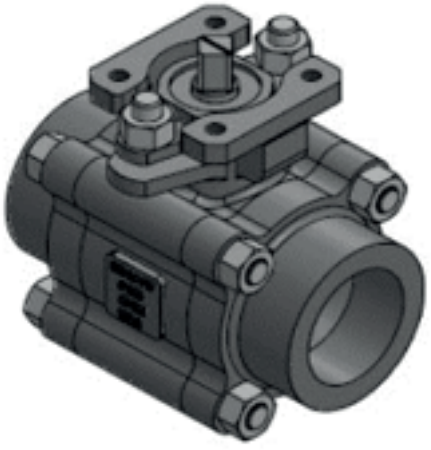


Item No.	Part name
1	BODY
2	END PIECE
3	BALL
4	SEAT (PATENDED SEAT)
5	STEM
6	STEM WASHER
7	STEM SEAL
8	RETAINER 1 FOR STEM
9	V-RING FOR STEM
10	RETAINER 2 FOR STEM
11	STEM OUTER O-RING
12	STEM INNER O-RING
13	DISC SPRING
14	GLAND FLANGE
15	STUD FOR GLAND
16	NUT FOR GLAND
17	GASKET FOR BODY TO END PIECE
18	SEAL FOR BODY TO END PIECE
19	STUD FOR DOY TO END PIECE
20	NUT FOR BODY TO END PIECE
21	ANTISTATIC DEVICE
22	ANTISTATIC SPRING

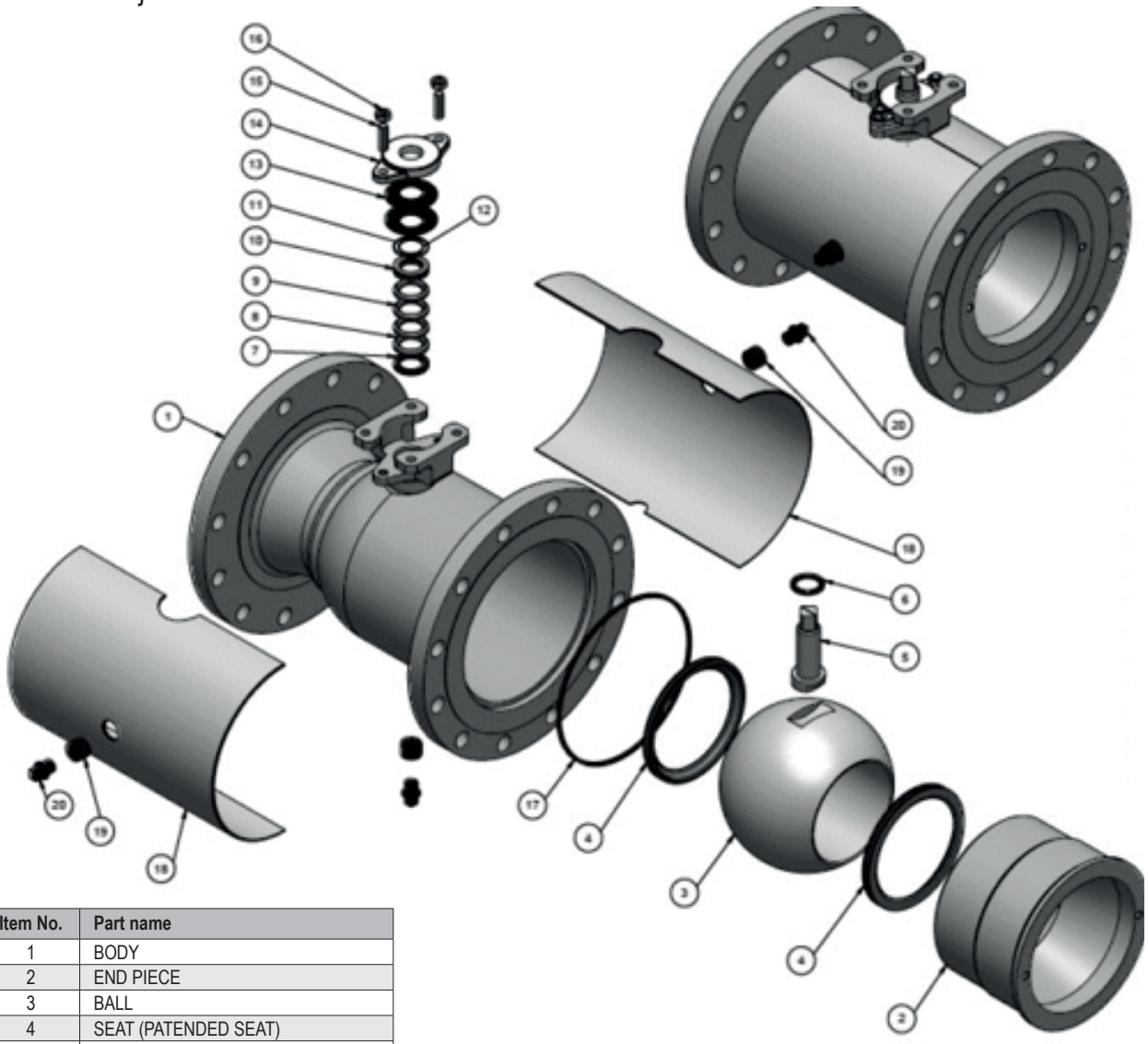
EXPLODED VIEW
3-Piece side entry valve



Item No.	Part name
1	BODY
2	END PIECE
3	BALL
4	SEAT (PATENDED SEAT)
5	STEM
6	STEM WASHER
7	STEM SEAL
8	RETAINER 1 FOR STEM
9	V-RING FOR STEM
10	RETAINER 2 FOR STEM
11	STEM OUTER O-RING
12	STEM INNER O-RING
13	DISC SPRING
14	GLAND FLANGE
15	STUD FOR GLAND
16	NUT FOR GLAND
17	GASKET FOR BODY TO END PIECE
18	METAL RING FOR BODY TO END PIECE
19	STUD FOR DOY TO END PIECE
20	NUT FOR BODY TO END PIECE
21	ANTISTATIC DEVICE
22	ANTISTATIC SPRING

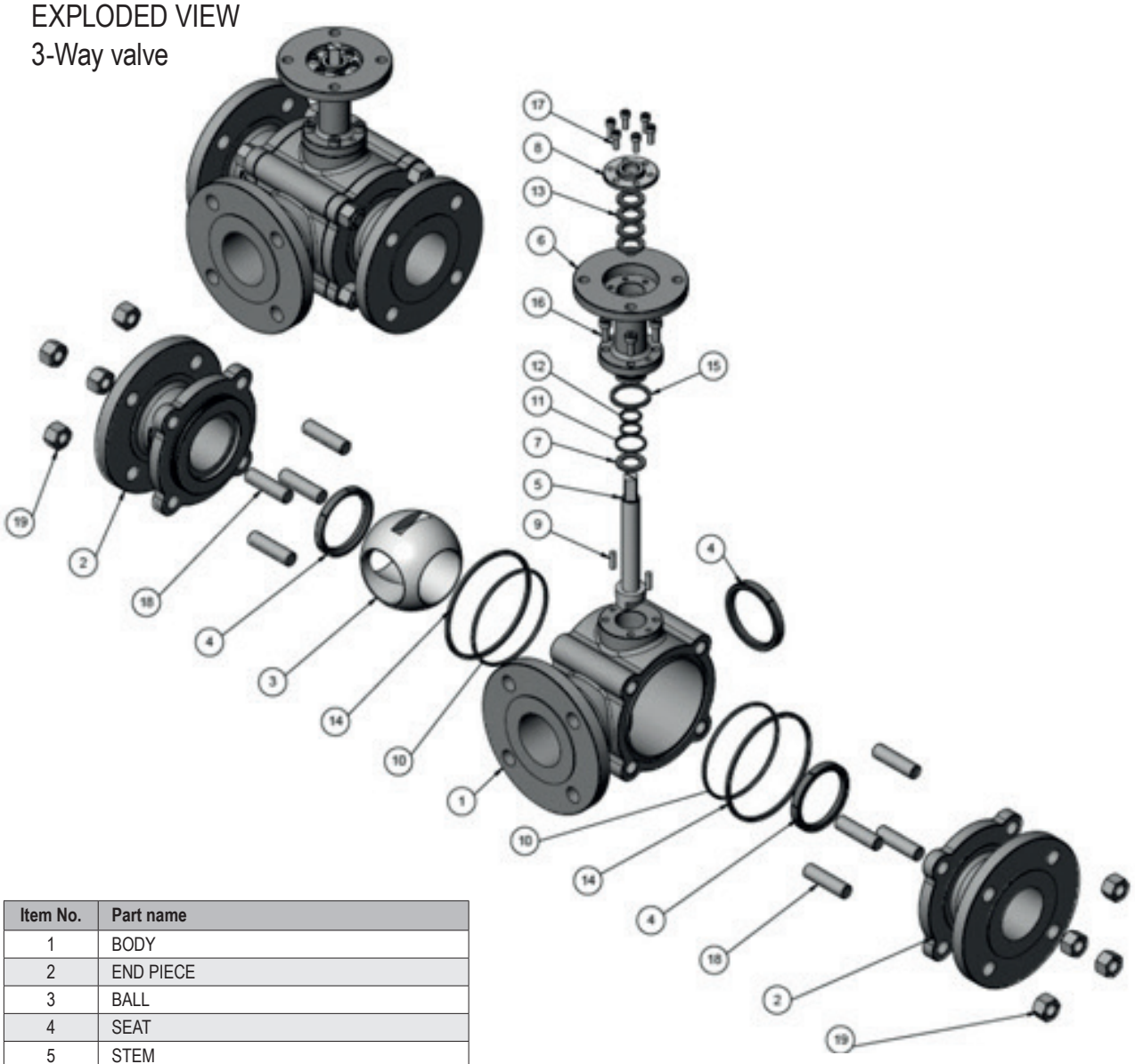


EXPLODED VIEW
Full steam jacket ball valve



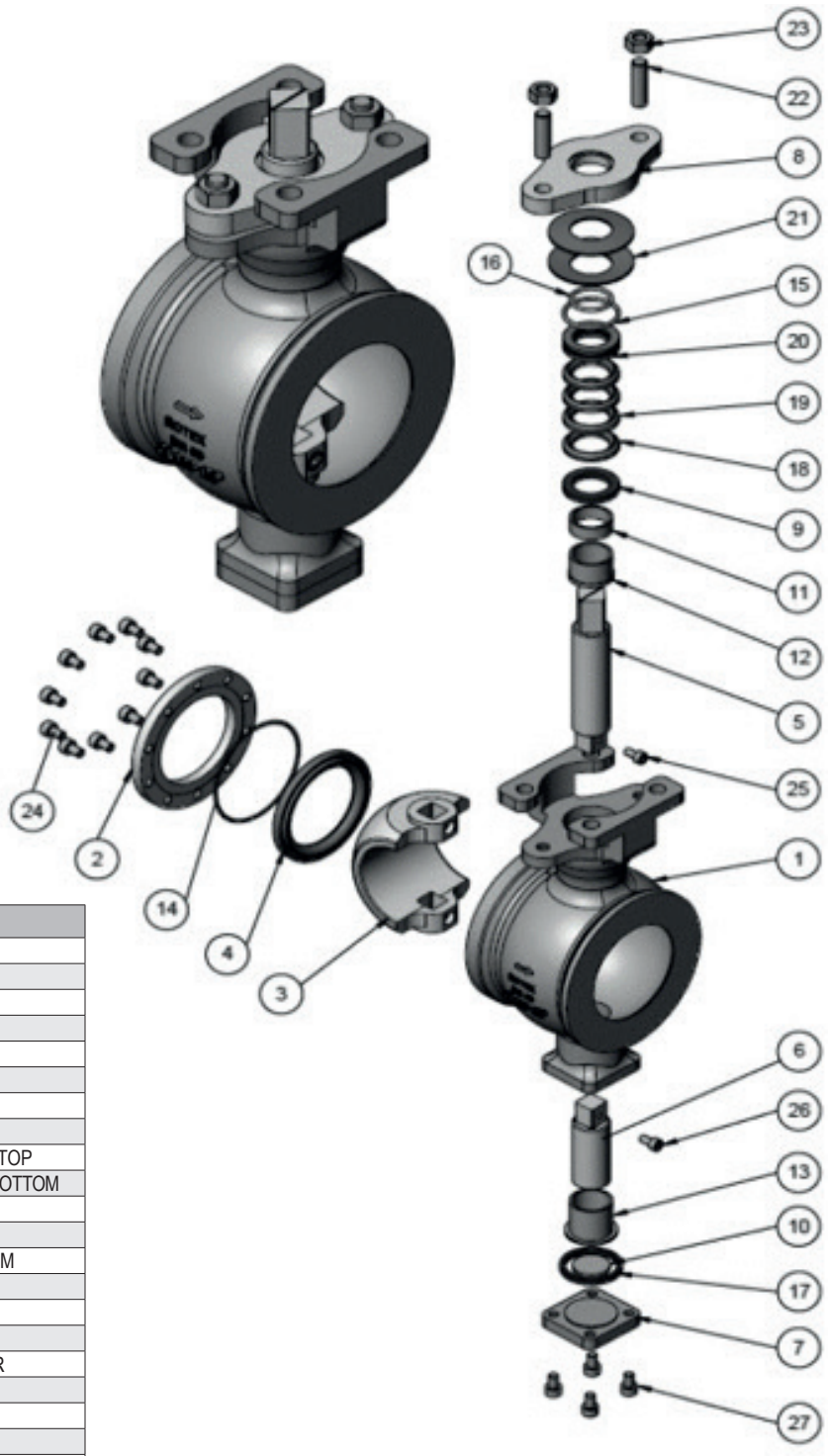
Item No.	Part name
1	BODY
2	END PIECE
3	BALL
4	SEAT (PATENDED SEAT)
5	STEM
6	STEM WASHER
7	STEM SEAL
8	RETAINER 1 FOR STEM
9	V-RING FOR STEM
10	RETAINER 2 FOR STEM
11	STEM OUTER O-RING
12	STEM INNER O-RING
13	DISC SPRING
14	GLAND FLANGE
15	STUD FOR GLAND
16	NUT FOR GLAND
17	GASKET FOR BODY TO END PIECE
18	JACKET
19	BUSH
20	PLUG

EXPLODED VIEW
3-Way valve



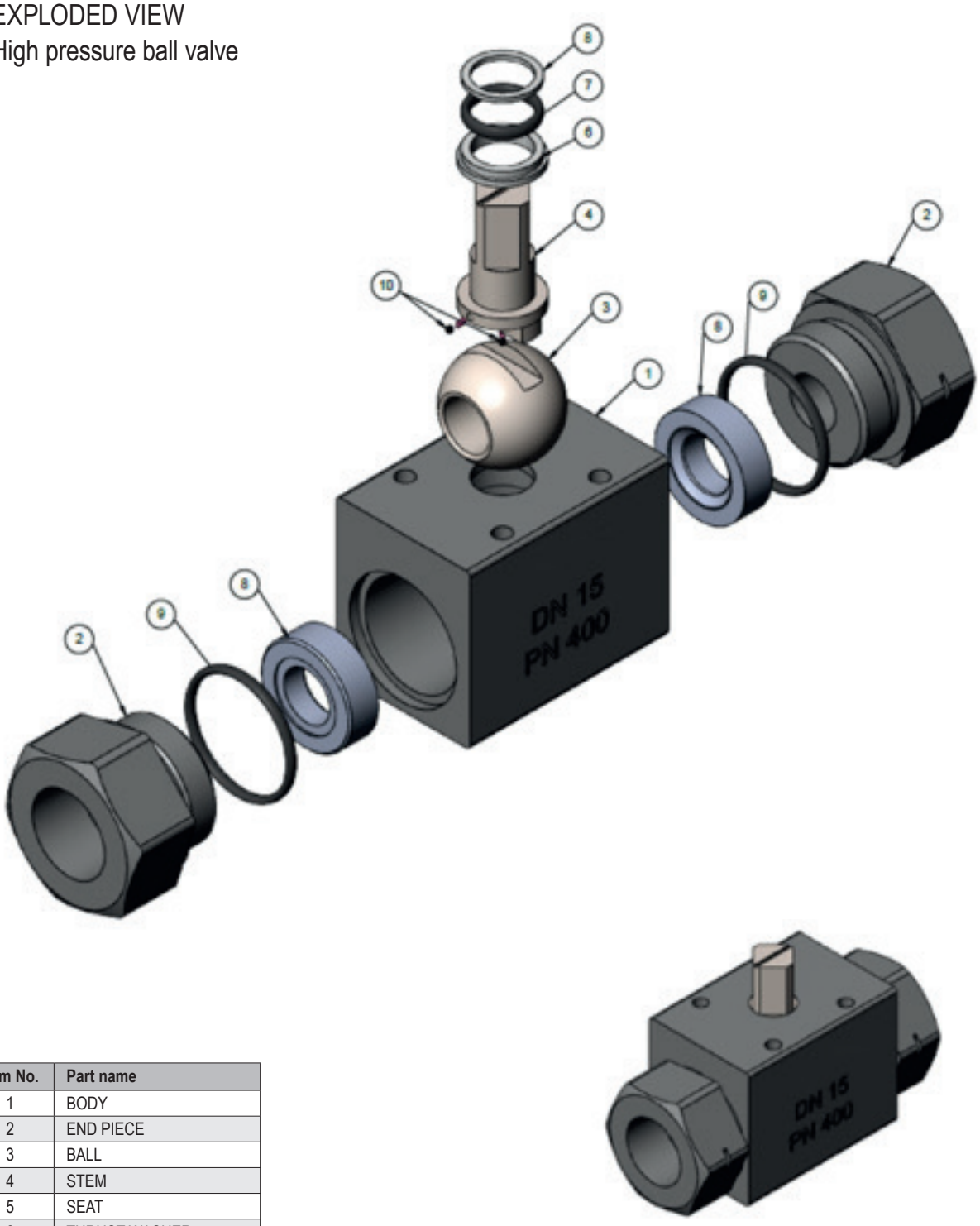
Item No.	Part name
1	BODY
2	END PIECE
3	BALL
4	SEAT
5	STEM
6	STEM EXTENSION
7	STEM WASHER
8	GLAND FLANGE
9	DOWEL PIN FOR BODY TO STEM EXTENSION
10	O-RING FOR BODY TO END PIECE
11	O-RING FOR BODY TO STEM EXTENSION
12	O-RING FOR STEM
13	GLAND PACKING
14	GASKET FOR BODY TO END PIECE
15	GASKET FOR BODY TO STEM EXTENSION
16	CAP SCREW FOR BODY TO STEM EXTENSION
17	CAP SCREW FOR GLAND
18	STUD FOR BODY
19	NUT FOR BODY

EXPLODED VIEW
Segmented ball valve



Item No.	Part name
1	BODY
2	END PIECE
3	BALL
4	SEAT
5	STEM TOP
6	STEM BOTTOM
7	BOTTOM COVER
8	GLAND FLANGE
9	THRUST WASHER FOR STEM TOP
10	THRUST WASHER FOR STEM BOTTOM
11	BEARING-1 FOR STEM TOP
12	BEARING-2 FOR STEM TOP
13	BEARING-3 FOR STEM BOTTOM
14	O-RING FOR SEAT
15	O-RING FOR STEM OUTER
16	O-RING FOR STEM INNER
17	GASKET FOR BOTTOM COVER
18	RETAINER 1 FOR STEM
19	V-RING FOR STEM
20	RETAINER 2 FOR STEM
21	DISC SPRING
22	STUD FOR GLAND
23	NUT FOR GLAND
24	CAP SCREW FOR BODY TO END PIECE
25	CAP SCREW FOR STEM TOP
26	CAP SCREW FOR STEM BOTTOM
27	CAP SCREW FOR BOTTOM COVER

EXPLODED VIEW
High pressure ball valve



Item No.	Part name
1	BODY
2	END PIECE
3	BALL
4	STEM
5	SEAT
6	THRUST WASHER
7	O-RING FOR STEM
8	BACK UP RING
9	O-RING FOR BODY
10	ANTISTATIC DEVICE

8. TROUBLE SHOOTING

The following table lists the possible malfunctions that can occur after prolonged use:

Malfunction	Probable cause	Repair
Valve will not open or close	Damaged ball surface	Replace the ball.
	Damaged seats	Replace the seats.
	Ball may not be in fully closed position	Check ball open and closed settings.
Irregular ball movement	Impurities between the ball and seats or ball and body cavity.	Flush the body cavity
		Clean the ball sealing surfaces and seats
Difficult to operate the valve	Accumulation of material in the valve body.	Flush the valve to remove debris from the body.
	Swelling seats	Install correct seat material compatible with the media.
	Corrosion between stem and valve body.	Grease the stem. If still difficult to operate, remove from service, disassemble and replace damaged parts.
	Operator not installed correctly.	Check operator.
Water hammer or noisy operation	Error in valve sizing or flow of fluid with high velocity	Confirm valve sizing with respect to flow.
	High speed of valve operation	Slow valve operating speed
Leak past the seat	Foreign material between seat and ball.	Operate several times to wipe clean. If still leaking, remove from service, disassemble and replace damaged parts.
	Valve not fully closed.	Check for fully closed position.
	Worn or damaged seats.	Disassemble the valve and replace worn parts.
	Operator stops not set properly.	Adjust stops to proper setting.
Leak around stem seal	Gland nut(s) loose	Tighten gland nut
	Damaged stem sealing surface	Replace the stem
	Worn or damaged stem seal	Replace the stem seal
Leak between body and adaptor	Worn or damage adaptor o-ring.	Disassemble the valve and replace adaptor o-ring. Check compatibility of o-ring material with the application media.
	Adaptor studs and nuts not tightened properly.	Tighten nuts to torque specified in table.

9. SERVICE / SPARE PART

We recommend that valves be directed to Valmet service centers for maintenance. The service centers are equipped to provide rapid turn-around at a reasonable cost and offer new valve warranty with all reconditioned valves.

NOTE: When sending goods to the service center for repair, do not disassemble them. Clean the valve carefully and flush the valve internals. Include the material safety datasheet(s) (MSDS) for all media flowing through the valve. Valves sent to the service center without MSDS datasheet(s) will not be accepted.

For further information on spare parts and service or assistance visit our web-site at **www.neles.com/valves**.

NOTE: When ordering spare parts, always include the following information:

a. Valve catalog code from label plate,

b. If the valve is serialized – the serial number (from label plate)

c. From exploded view, the ballooned part number, part name and quantity required

General safety warnings

Lifting

1. Always use a lifting plan created by a qualified person to lift this equipment. Lifting guidance is provided in this IMO (Installation, Maintenance and Operation manual) to assist in lifting plan development. Think about the center of gravity (CG) of the equipment being lifted. Make sure the CG is always under the central lifting point.
2. Valves may be equipped with lifting threads on the body or on the flanges. These are intended to be used with the lifting plan.
3. Use only correct and approved lifting devices. Ensure that lifting devices and straps are securely attached to the equipment prior to lifting.
4. Check, that lifting devices are not damaged and in good condition with a valid check stamp prior to use.
5. Workers must be trained for lifting and handling valves.
6. Never lift an assembly by the instrumentation (solenoid, positioner, limit switch, etc.) or by the instrumentation piping. Straps and lifting devices should be fitted to prevent damage to instrumentation and instrumentation piping. Failure to follow the lifting guidance provided may result in damage and personal injury from falling objects.

Work activities on the valve

1. Wear your personal safety equipment. Personal safety equipment includes but is not limited to protective shoes, protective clothing, safety glasses, helmet, hearing protection and working gloves.
2. Always follow the local safety instructions in addition to the Valmet instructions. If Valmet instructions conflict with local safety instructions, stop work and contact Valmet for more information.
3. Before beginning service on the equipment, make sure that the actuator is disconnected from any kind of power source (pneumatic, hydraulic, and/or electric), and no stored energy is applied on the actuator (compressed spring, compressed air volumes, etc.). Do not attempt to remove a spring return actuator unless the stop screw is carrying the spring force.
4. Make sure that there is a LOTOTO (Lock Out / Tag Out / Try Out) procedure in place for the system in which the valve is installed and strictly follow it.
5. Always make sure that the pipeline is depressurized and in ambient temperature condition before maintenance work is started.
6. Keep hands and other body parts out of the flow port when the valve is being serviced and the actuator is connected to the valve. There is a high risk of serious injury to hands and/or fingers due to malfunction if the valve suddenly starts to operate.
7. Beware of Trim (Disc, Ball or Plug) movement even when the valve is disassembled. Trim may move simply due to the weight of the part or change in position of the valve. Keep hands or other body parts away from locations where they may be injured by movement of the trim. Do not leave objects near or in the valve port which may fall in and need to be retrieved.

General disclaimers

Receiving, handling and unpacking.

1. Respect the safety warnings above!
2. Valves are critical components for pipelines to control high pressure fluids and must therefore be handled with care.
3. Store valves and equipment in a dry and protected area until the equipment is installed.
4. Do not exceed the maximum storage temperatures given in the IMO (installation, maintenance, and operating instructions).
5. Keep the original packaging on the valve as long as possible to avoid environmental contamination by dust, water, dirt, etc.
6. Remove the valve endcaps just before mounting into the pipeline.
7. FOR YOUR SAFETY IT IS IMPORTANT TO FOLLOW THESE PRECAUTIONS BEFORE REMOVAL OF THE VALVE FROM THE PIPELINE OR ANY DISASSEMBLY:
   - Be sure you know what flow medium is in the pipeline. If there is any doubt, confirm with the proper supervisor.
   - Wear any personal protective equipment (PPE) required for working with the flow medium involved in addition to any other PPE normally required.
   - Depressurize the pipeline, bring to ambient temperature, and drain the pipeline flow medium.
   - Cycle the valve to relieve any residual pressure in the body cavity.
   - After removal but before disassembly, cycle the valve again until no evidence of trapped pressure remains.
   - The valves with offset shaft (Butterfly, eccentric rotary plug) have greater trim area on one side of the shaft. This will cause the valve to open when pressurized from the preferred direction without a locking handle or an actuator installed.
   - WARNING: DO NOT PRESSURIZE THE ECCENTRIC VALVE WITHOUT A HANDLE OR AN ACTUATOR MOUNTED ON IT!
   - WARNING: DO NOT REMOVE A HANDLE OR AN ACTUATOR FROM AN ECCENTRIC VALVE WHILE PRESSURIZED!
   - Before installing the eccentric valve in or remove it from the pipeline, cycle the valve closed. Eccentric valves must be in the closed position to bring the trim within the face to face of the valve. Failure to follow these instructions will cause damage to the valve and may result in personal injury.

Operating

8. The identification plate (ID-plate, type plate, nameplate, or engraved markings) on the valve gives the information of max. process conditions to the valve.
9. (For soft seats) The practical and safe use of this product is determined by both the temperature and pressure ratings of the seat and body. Read the identification plate and check both ratings. This product is available with a variety of seat materials. Some seat materials have pressure ratings that are lower than the body ratings. All body and seat ratings are dependent on the valve type, size and material of the body and seat. Never exceed the marked rating.

10. Temperatures and pressures must never exceed values marked on the valve. Exceeding these values may cause uncontrolled release of pressure and process medium. Damage or personal injury may result.
11. The operating torque of the valve may rise over time due to wear, particles or other damage of the seat. Never exceed the actuator torque preset values (air supply, position). Application of excessive torque may cause damage to the valve.
12. Valmet valves typically are designed to be used in atmospheric conditions. Do not use valves under external pressurized conditions unless specifically designed and explicitly marked for this service.
13. Avoid Pressure shocks or water hammer. Systems with high pressure valves should be equipped with a bypass to reduce the differential pressure before opening the valve to avoid pressure shock.
14. Avoid thermal shock. High temperature, Low temperature and cryogenic valves should be operated in a way that limits the rate of increase or decrease in temperature. The valve should be thermally stabilized before being pressurized.
15. Materials of the valve are carefully selected for the process conditions. Changes to the process media can have a major impact on function and safety of the valve. Always confirm the materials are suitable for the service prior to installation.
16. As the use of the valve is application specific, several factors should be considered when selecting a valve for a given application. Therefore, some situations in which the valves are used are outside the scope of this manual.
17. It is the end user's responsibility to confirm compatibility of the valve materials with the intended service, however if you have questions concerning the use, application, or compatibility of the valve for the intended service, contact Valmet for more information.
18. Never use a valve with enriched or pure oxygen if the valve is not explicitly designed and cleaned for oxygen. Selected materials and design have a major impact on the safety to operate the valve with oxygen.
19. Valves intended for use in or with explosive atmospheres must be equipped with a grounding device and marked according ATEX (or equivalent international standards).
20. Manual handles are available for specific butterfly valve sizes and maximum line pressures. Do not operate a valve with a handle or wrench outside the size and pressure limits stated in the IMO. High line pressure may create a large enough force to pull the handle from the operator's hands. Damage or personal injury may result.

Maintenance

21. Respect the safety warnings above!
22. Plan service and maintenance actions, that spare parts, lifting devices and service personnel is available.
23. Maintain the valve within the recommended minimum maintenance intervals or within the recommended maximum operating cycles.
24. Always make sure that the valve and the pipeline is depressurized before starting any kind of maintenance work at a valve.
25. Always check the position of the valve before starting maintenance work. Follow the Lock out /tag out (LOTO) rules at the site before starting any maintenance activity.
    - See IMO for the correct stem position.
    - Consider that the positioner may give the wrong signals.
26. Sealing materials (soft sealing parts) should be changed when the valve is in maintenance. Always use original equipment manufacturers (OEM) spare parts to ensure proper performance of the repaired valve.
27. All pressure containing parts must be inspected visually for damage or corrosion. Damaged parts must be replaced.
28. Valve pressure retaining parts and all internals must be inspected for corrosion or erosion which may result in reduced wall thickness on pressure retaining parts. Damaged pressure retaining parts must be replaced with original equipment manufacturer's (OEM) replacement parts or repaired to factory specifications by an authorized Valmet service partner in order to maintain the warranty.
29. Do not use sharp tools, grinding machines, or files to work on functional surfaces such as sealing, seating or bearing surfaces as this can damage these surfaces.
30. Check the condition of sealing surfaces on the seats, trim (disc, ball, plug, etc.), body and body cap. Replace parts if there are significant wear, scratches, or damage.
31. Check the wear of bearings and bearing contact surfaces on the shaft and replace damaged parts if necessary.
32. Do not weld on pressure retaining parts without an ASME and PED qualified procedure and personnel.
33. Pressure retaining parts of valves in high temperature applications must be carefully examined for the effects of material creep and fatigue.
34. Make sure that the valve is positioned in the correct flow direction into the pipeline.
35. If the valves are marked to be suitable for explosive atmospheres, the correct function of the discharging device must be tested before returning to service.
36. Always work in a clean environment. Avoid getting particles inside the valve due to machining, grinding, or welding nearby.
37. Never store a valve in maintenance without flow port protection.
38. When pressure testing valve seats, never exceed the maximum operating pressure of the system or the maximum shut- off pressure marked on the valve identification plate.
39. Actuator mounting and unmounting:
    - Before installing the actuator on to the valve, be sure the actuator is properly indicating the valve position. Failure to assemble these to indicate correct valve position may result in damage or personal injury.
    - When installing or removing a linkage kit, best practice is to remove the entire linkage assembly, including couplings which may fall off the valve during lifting or when position changes.
    - Mounting sets have been designed to support the weight of the Valmet actuator and recommended accessories either as is or with additional actuator support. Use of the linkage to support additional equipment or additional weight such as people, ladders, etc. may result in equipment damage or personal injury.

40. The valve should be installed between flanges using appropriate gaskets and fasteners that are compatible with the application, and in compliance with applicable piping codes and standards. Center the gaskets carefully when fitting the valve between the flanges. Do not attempt to correct pipeline misalignment by means of the flange bolting.
41. Repairs on valves for special service like Oxygen, Chlorine, and Peroxide, have special requirements.
    - Parts must be cleaned appropriate to the service and protected from contamination prior to assembly.
    - Assembly areas and tools must be clean and dry to prevent contamination of the parts during assembly.
    - Test equipment must be clean and dry to prevent contamination during testing. This includes the test equipment internals that may allow particles or other contamination into the test medium during the test.
    - Lubrication shall be used only if specifically required in the instructions. Where lubrication is required, the lubricant must be approved for the service by the end user.

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