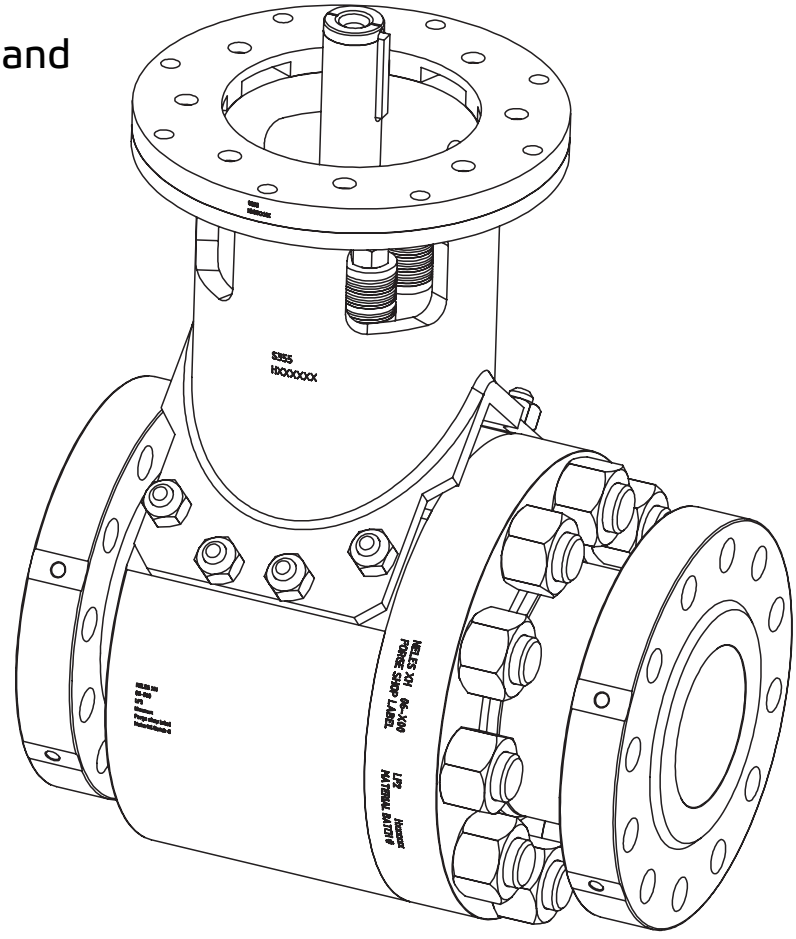
Trunnion mounted full bore Neles™ ball valve

Series XH

Installation, maintenance and operating instructions



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This product meets the requirements set by the Customs Union of the Republic of Belarus, the Republic of Kazakhstan and the Russian Federation.

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 installation, operation and maintenance manual provides essential information on trunnion mounted XH series ball valves. The actuators and instrumentation to be used with these valves are also discussed briefly. Refer to the separate actuator and control equipment instruction manuals for further information.

NOTE:
Selection and use of the valve in a specific application requires close consideration of detailed aspects. Due to the nature of the product, this manual cannot cover all the individual situations that may occur when installing, using or servicing the valve.

If you are uncertain about use of the valve or its suitability for your intended purpose, please contact Valmet for more information.

For valves in oxygen service, please see also the separate installation, maintenance and operating instructions for oxygen service (see Neles document id:10O270EN.pdf).

1.2 Valve description

Trunnion mounted XH series valves are flanged full bore ball valves. The valve body is in two parts, fastened together by body-joint bolting. The ball and shaft are separate. Shaft blowout is prevented by bonnet and a shoulder machined on the shaft, and a retainer ring inside the gland.

The valve is either soft or metal seated. Shaft torque is transmitted to the ball through a splined bore in the ball.

The valve is 1-way or 2-way tight depending on the seat construction. Tightness direction is shown with an arrow on 1-way valves.

Construction details of individual valves are included in the type code shown on the valve identification plate. To interpret the type code, please refer to the type coding key in this manual.

Trunnion mounted XH series ball valves are specially designed for demanding throttling and shut-off service with high pressure differentials.

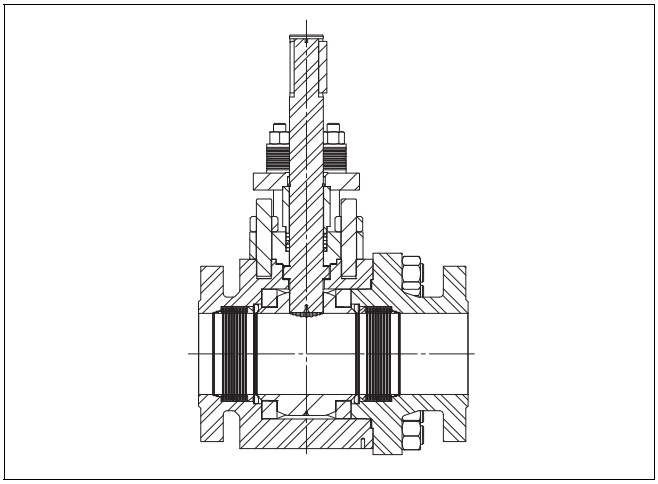


Fig. 1 Construction of a trunnion mounted XH series ball valve

1.3 Markings

Body markings are stamped on the body (see Fig. 2).

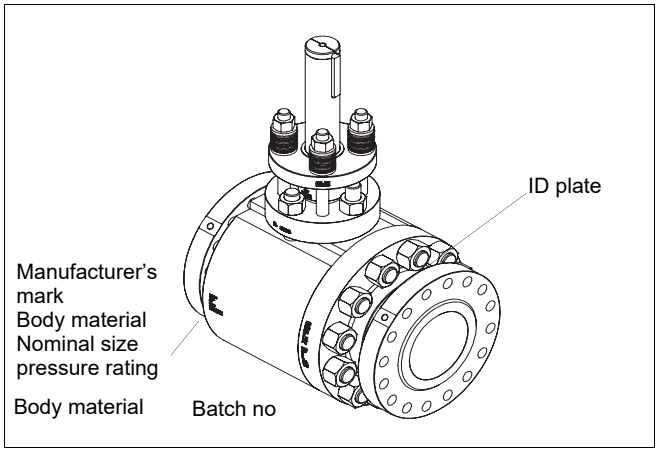


Fig. 2 Valve markings

The identification plate (Fig. 3) is attached to the flange. Identification plate markings are:

1. Body material
2. Ball material
3. Stem material
4. Seat material
5. Maximum operating temperature
6. Minimum operating temperature
7. Maximum shut-off pressure differential
8. Type code
9. Number of the list of valve manufacturing parts
10. Pressure class
11. Model

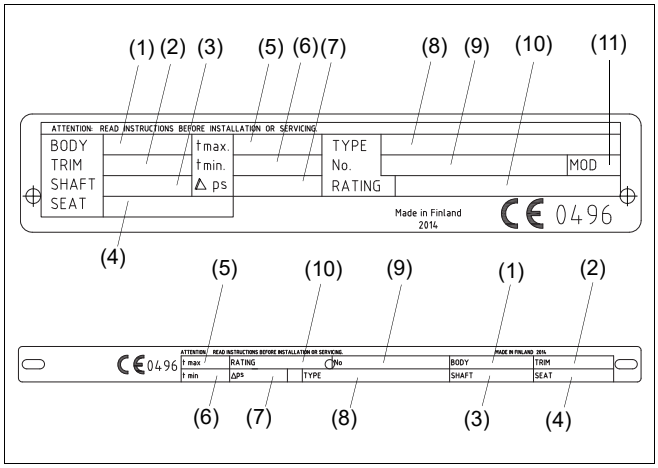


Fig. 3 Identification plate

1.4 Specifications

Face-to-face length:	ASME B.16.10 Table 4 long pattern
Body rating:	ASME Class 900
Max. pressure differential:	see Fig. 4
Temperature range:	-50°…+425 °C -58 °...+797 °F
Tightness:	Bi-directional or uni-directional depending on seat construction
metal seated	ISO 5208 Rate C or Class V
soft seated	ISO 5208 Rate B or Class VI
Dimensions:	see tables in Section 11
Weights:	see tables in Section 11

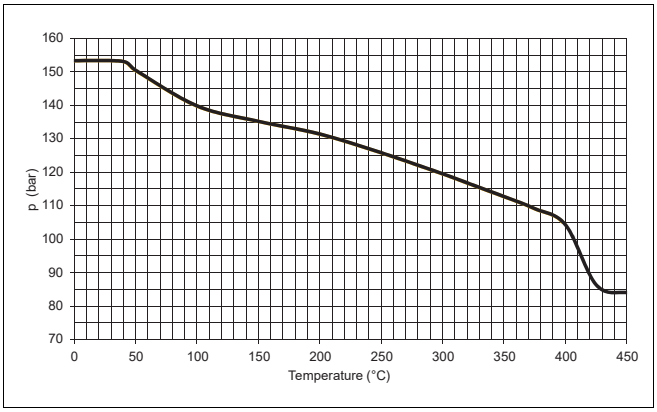


Fig. 4 Maximum allowable Δp in control service

1.5 Valve approvals

XH-series ball valves meet the requirements set by ASME B 16.34.

Fire safety characteristics are designed according to API 607 and BS 6755.

1.6 CE marking

The valve meets the requirements of the European Directive 2014/68/EU relating to pressure equipment, and has been marked according to the Directive.

1.7 Recycling and disposal

Most valve parts can be recycled if sorted according to material. Most parts have material marking. A material list is supplied with the valve. In addition, separate recycling and disposal instructions are available from the manufacturer.

A valve can also be returned to the manufacturer for recycling and disposal against a fee.

1.8 Safety precautions

CAUTION:
Do not exceed the valve performance limitations!
Exceeding the limitations marked on the valve may cause damage and lead to uncontrolled pressure release.
Damage or personal injury may result.

CAUTION:
Do not dismantle the valve or remove it from the pipeline while the valve is pressurized!
Dismantling or removing a pressurized valve will result in uncontrolled pressure release. Always isolate the relevant part of the pipeline, release the pressure from the valve and remove the medium before dismantling the valve. Be aware of the type of medium involved. Protect people and the environment from any harmful or poisonous substances. Make sure that no medium can enter the pipeline during valve maintenance.
Failure to do this may result in damage or personal injury.

CAUTION:
Beware of the ball cutting 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. Close and detach the actuator pressure supply pipeline for valve maintenance. Failure to do this may result in damage or personal injury.

CAUTION:
Beware of noise emission!
The valve may produce noise in the pipeline. The noise level depends on the application. It can be measured or calculated using the Neles Nelprof computer program.
Observe the relevant work environment regulations on noise emission.

CAUTION:
Beware of extreme temperatures!
The valve body may be very hot or very cold during use.
Protect people against cold injuries or burns.

CAUTION:
When handling the valve or the valve package, bear in mind its weight!
Never lift the valve or valve package by the actuator, positioner, limit switch or their piping. Place the lifting ropes securely around the valve body (see Fig. 6). Damage or personal injury may result from falling parts.
The weights are shown in Section 11.

CAUTION:
Lifting threads in pipe flanges are not to be used for lifting the entire valve.

CAUTION:
Follow the proper procedures when handling and servicing oxygen valves.

CAUTION:
Potential electrostatic charging hazard. Ensure the protection in the process.

1.9 Welding notes

WARNING:
Welding and/or grinding stainless steel and other alloys containing chromium metal may cause the release of hexavalent chromium. Hexavalent chromium(VI) or Cr(VI), is known to cause cancer. Be sure to use all appropriate personal protective equipment (PPE) when welding metals containing chromium.

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 or other applicable regulation.

CAUTION:
To prevent damage to the seat and seals, do not allow the temperature of the seat and body seal area to exceed 94 °C (200 °F). 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 valve closing members eg. ball or seats. This may damage critical seating surfaces and cause leaks.

2 TRANSPORTATION, RECEPTION AND STORAGE

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

Store the valve carefully. We recommend storing indoors in a dry place.

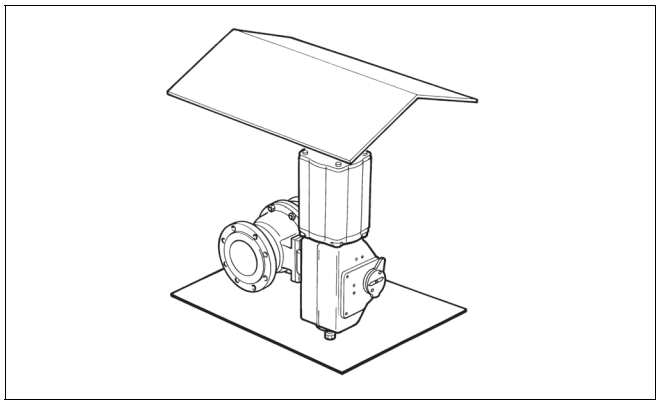


Fig. 5 Storing the valve

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

Move the valve to its intended location just before installation.

The valve is usually delivered in the open position.

3 INSTALLATION AND USE

3.1 General

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

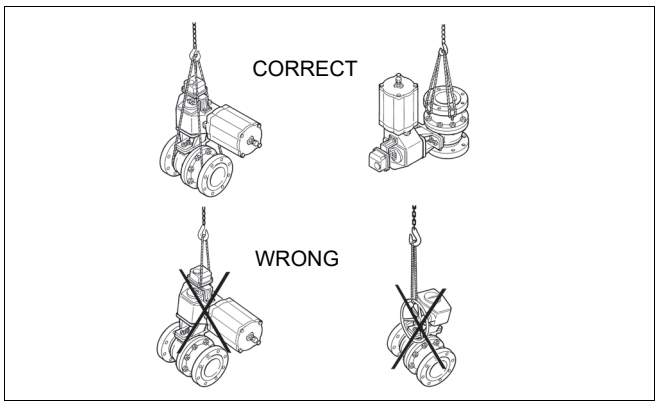


Fig. 6 Lifting the valve

3.2 Installing in the pipeline

CAUTION:
When handling the valve or the valve package as a whole, bear in mind the weight of the valve or the entire package!

Flush the pipeline carefully before installing the valve. Make sure the valve is entirely open when flushing. Foreign particles, such as sand or pieces of welding electrode, will damage the ball and seats.

NOTE:
Use screws, nuts, bolts and gaskets equivalent to the fastenings used elsewhere in the pipeline. Center the flange gaskets carefully when fitting the valve between flanges.

NOTE:
Do not attempt to correct pipeline misalignment by means of flange bolting.

The valve may be installed in any position and offers 1-way or 2-way tightness, see Sections 1.2 and 1.4. However we do not recommend installing the valve with the actuator on the underneath side because dirt in the pipeline may then enter the body cavity and damage the gland packing. The position to be avoided is shown in Fig. 7.

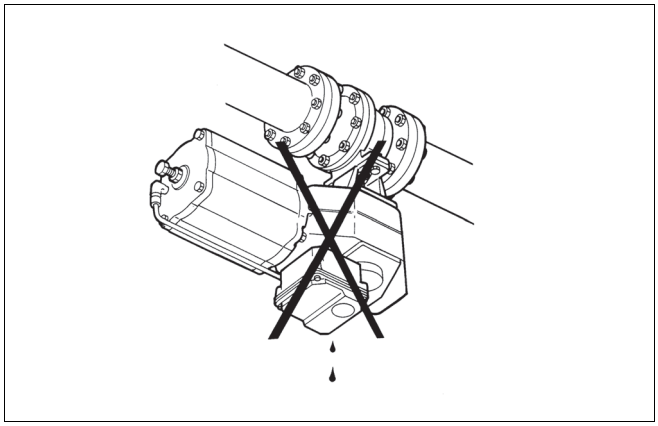


Fig. 7 Avoid this mounting position

It may be necessary to firmly support the pipeline in order to protect the valve from excess stress. Sufficient support will also reduce pipeline vibration and thus ensures proper functioning of the positioner.

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 or to the actuator, see Fig. 8.

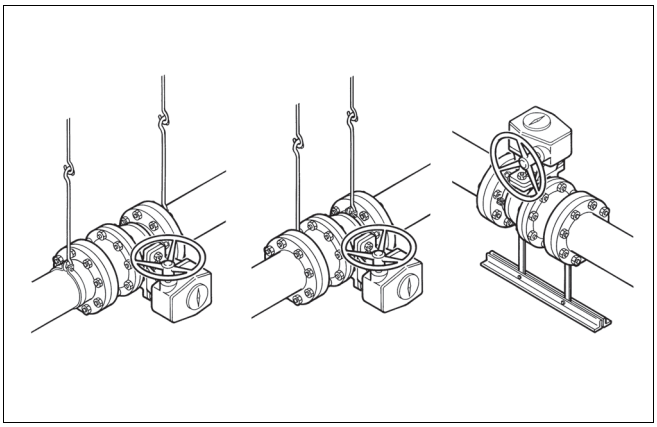


Fig. 8 Supporting the valve

Valve insulation

If necessary, the valve may be insulated. Insulation must not continue above the upper level of the valve body, see Figure 9.

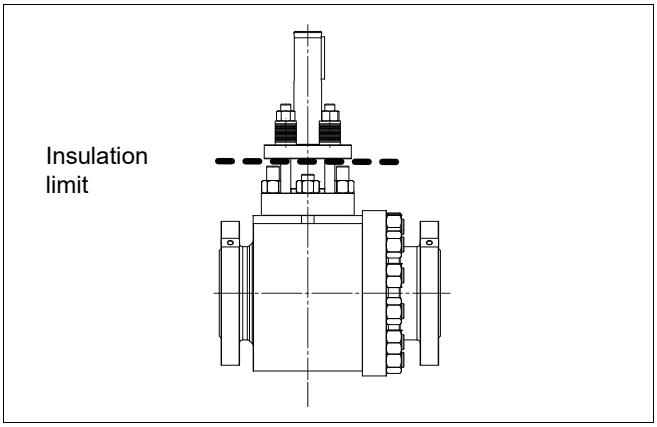


Fig. 9 Insulation of the valve

3.3 Actuator

NOTE:
When installing the actuator on the valve, make sure that the valve package functions properly. Detailed information on actuator installation is given in Section 6 or in the separate actuator instructions.

The valve open/closed position is indicated as follows:

- by an indicator on the actuator
  or
- by a groove at the end of the ball shaft (parallel to the ball flow opening).

If there is any uncertainty about the indicator, check the ball position by the groove.

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

The upright position is recommended for the actuator cylinder.

The actuator must not touch the pipeline, because pipeline vibration may interfere with its operation.

In certain cases it may be considered advantageous to provide additional support to the actuator. These cases will normally be associated with large actuators, extended shafts, or where severe vibration is present. Please contact Valmet expert for advice.

3.4 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 entirely open when flushing.

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

Check that the actuator, positioner, and switch are correctly adjusted. Actuator adjustment is explained in Section 6. To adjust the accompanying device refers to the separate control equipment instruction manuals.

4 MAINTENANCE

CAUTION:
Observe the safety precautions mentioned in Section 1.8 before maintenance!

CAUTION:
When handling the valve or the valve package as a whole, bear in mind the weight of the valve or the entire package!

4.1 Maintenance general

Although Neles valves are designed to work under severe conditions, proper preventative maintenance can significantly help to prevent unplanned downtime and in real terms reduce the total cost of ownership. Valmet recommends inspecting the valves at least every five (5) years. The inspection and maintenance interval depends on the actual application and process condition. The inspection and maintenance intervals can be specified together with your local Valmet experts. During this periodic inspection the parts detailed in the Spare Part Set should be replaced. Time in storage should be included in the inspection interval.

Maintenance can be performed as presented below. For maintenance assistance, please contact your local Valmet office. The part numbers in the text refer to the exploded view and to the parts list in Section 10, unless otherwise stated.

NOTE:
When sending goods to the manufacturer for repair, do not disassemble them. 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)).

NOTE:
In order to ensure safe and effective operation, always use original spare parts to make sure that the valve functions as intended.

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

4.2 Changing the gland packing while the valve is in the pipeline

CAUTION:
Do not dismantle the valve or remove it from the pipeline while the valve is pressurized!

In graphite gland packings, tightness is ensured by contact between the gland follower and the packing rings.

The gland packing (69) must be changed if leakage occurs even after the hex nuts (18) have been tightened.

- Make sure that the valve is not pressurized.
- Detach the actuator and bracket according to the instructions in Section 4.4.
- Remove the key (10).
- Remove the nuts (18), the disc spring sets (150) the gland (9A), retainer ring (42) and sleeve (9B).
- Remove old packing rings (69). Do not damage the surfaces of the packing ring counterbore and shaft.
- Clean the packing ring counterbore.
- Place the new packing rings (69) over the shaft (5). The gland follower may be used for pushing the rings into the counterbore. Do not damage packing rings in the shaft keyway.
- Pre-compress the packing rings first either by tightening the gland nuts (with or without disc springs) to the torque Tt or by tightening the gland with disc springs to the height H_2. See Fig. 10 and the value from Table 1.
- Carry out 3…5 operation cycles with the valve. Suitable range of movement is about 80 %.
  It is not necessary to fully close or open the valve during the operation.
- Loosen the gland nuts. Place the disc spring sets (150) on the gland studs as applicable. Retighten the nuts (18) to the torque T_t or so that the disc springs are compressed to the height H_2, see Table 1.
- If the leakage still occurs when the valve is pressurized, re-tighten the nuts but don't exceed the value in the Table 1 by 50 % or do not fully compress the disc springs.

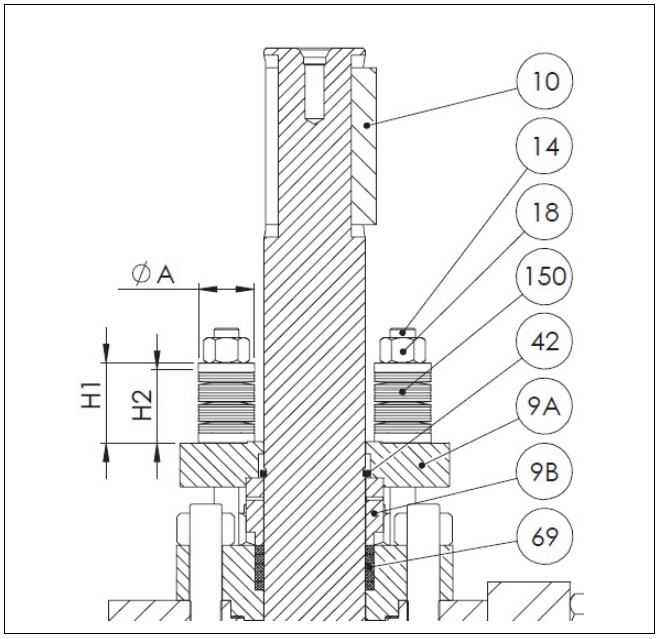


Fig. 10 Gland packing

Table 1 Tightening of gland packing

Valve size		Shaft diameter	Spring dimensions [mm]			Tightening torque [Nm]
DN	NPS	mm	A	H1	H2	T_t
50	2	25	35.5	41	37.4	90
80	3	30	40	45.5	41.5	35
100	4	45	50	59	54	80
150	6	55	50	59	54	100
200	8	85	71	73	66	240
250	10	105	80	90.3	82.7	510
300	12	120	80	90.3	82.7	570
350	14	135	100	142.8	130.2	760
400	16	150	100	163.2	153.3	1260
450	18	165	100	163.2	153.3	1380
500	20	180	100	142.8	130.2	990
600	24	220	100	163.2	153.3	1200

4.3 Repair of a jammed or stuck valve while it is in the pipeline

Jamming may be due to the ball (3) and seats (7) becoming clogged with flow medium. They may be cleaned by turning the ball to the partly open position and flushing the pipeline. If this does not help, follow the instructions in the following sections.

4.4 Detaching the actuator

CAUTION:
When handling the valve or the valve package as a whole, bear in mind the weight of the valve or the entire package!

CAUTION:
Do not detach a spring-return actuator unless a stop-screw is carrying the spring force!

NOTE:
Before dismantling, carefully observe the position of the valve with respect to the actuator and positioner/limit switch so as to make sure that the package can be properly re-assembled.

It is generally most convenient to detach the actuator before removing the valve from the pipeline. If the valve is small or if it is difficult to access, it may be more practical to remove the entire package at the same time.

- Close and detach the actuator pressure supply pipeline and remove control cables.
- Unscrew the bracket screws.
- Detach the actuator. The actuator can be removed by hand or with a special tool made for this purpose. The tool can be ordered from the manufacturer (see Section 8 “Tools”).
- Remove the bracket.

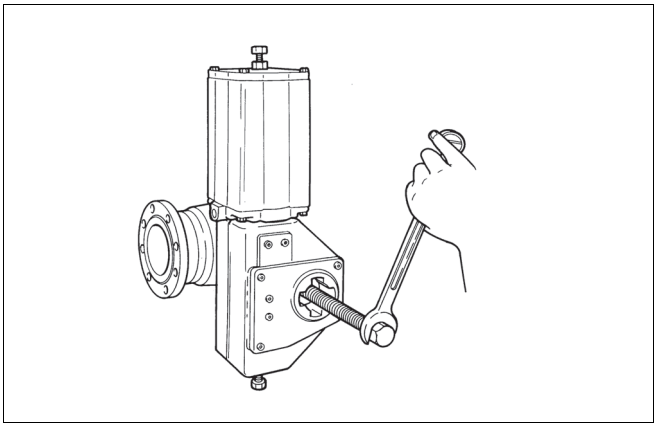


Fig. 11 Removing the actuator with an extractor

4.5 Removing the valve from the pipeline

CAUTION:
Do not dismantle the valve or remove pipeline while the valve is pressurized!

- Make sure that the valve is not pressurized and that the pipeline is empty. Make sure that the medium cannot flow into the section where servicing is to take place.
- Support the valve carefully with a hoist. Place ropes carefully and unscrew the pipe flange bolts. See that the ropes are positioned correctly, see Fig. 6. Lift valve down.

4.6 Dismantling the valve

- Place the valve in a standing position on the pipe flange end. Use a level surface that will not scratch the flanges. See that the body stud nuts (16) are facing upward.
- Mark the the body halves for correct orientation during re-assembly.
- Turn the ball to the closed position.
- Remove the key (10).
- Unscrew the gland nuts (18). Remove the disc spring sets (150), the gland (9A), retainer ring (42) and sleeve (9B)..
- Unscrew the body stud nuts (16).
- Remove the body cap (2). If the seat (7) is not lying on the ball (3), prevent the seat from falling from the body cap and detach it later. **Don’t leave your fingers between the body cap and the surface!**
  Stand the removed body cap on its pipe flange.
- Remove the seat (7) from body cap (2) if it is still in place.
- Unscrew the bonnet stud nuts (17). Remove the shaft (5) and bonnet (8). Knock the bonnet off with a piece of wood and a hammer, if needed.
- Lift the ball (3) along with the trunnion plates (89) and bearings (91, 99) out of the body (1) Handle the ball carefully and place it on a soft surface.
- Remove the seat (7) from the body (1).
- Remove the trunnion plates (89) from the hubs of the ball.
- Remove the trunnion bearings (99) and the thrust bearing (91) from each trunnion.
- Push the shaft out of the bonnet.
- Remove thrust bearings (70) from the shaft and packing rings (69) from the bonnet (8).
- Remove the body gasket (65) and the bonnet gasket (66).

4.7 Inspection of removed parts

- Clean removed parts.
- See if the shaft (5) or bearings (70, 99) are damaged.
- See if the ball (3) or seats (7) are damaged (scratched), by examining them under bright light. The ball and the seat can be replaced if necessary.
- See if the body joint sealing surfaces are damaged.

4.8 Replacing parts

We recommend that soft material parts be replaced whenever the valve is dismantled for servicing. Other parts may be replaced if necessary. Always use genuine spare parts to ensure proper functioning of the valve (see section “Ordering spare parts”).

4.9 Assembly

- Place the valve body (1) and the body cap (2) on the pipe flange end. Use a level surface that will not scratch the flanges.

R seat:

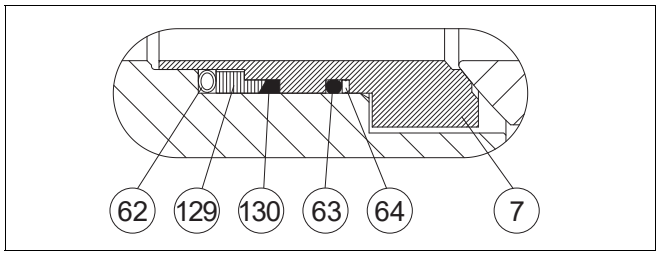


Fig. 12 S seat

- Check the sealing surfaces.
- Place the back seal (O-ring) (63) into the groove in the seat. See Figure 12.
- Place the back-up rings (64) made of PTFE strips at the side of the O-ring. To ensure that the seam becomes flexible, the strip must have slanted ends.
- For easier assembly, lubricate the O-ring and back-up ring surfaces facing the seats with silicone grease or another suitable substance. Please ensure the compatibility with the flow medium. Place the backseal (130) and ring (129) on the seat.
- Place the spring (62) on the seat (7). Connect the ends of the spring.
- Place the seats into the body and body cap by hand or if necessary, using a plastic mallet. The seat is in correct position when the spring touches the body shoulder.

F seats:

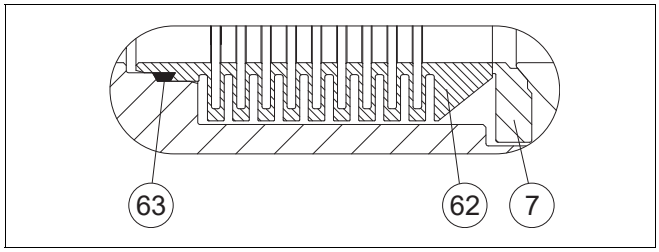


Fig. 13 F seat

- Check the sealing surfaces.
- Place the back seal (63) into the bellows (62). See Figure 13.
- Place the bellows and seat (7) into the body counterbore.

CAUTION:
Be careful not to damage the lapped surfaces of the bellows and the seat.

All versions:

- Place a trunnion bearing (99) into each trunnion plate (89) counterbore.
- Place a thrust bearing (91) over each ball trunnion.
- Fit a trunnion plate over each ball trunnion until the plate rests against the thrust bearing (91). This operation must be performed with care and without excessive force or the bearing will be damaged. It may be necessary to tap the plate on with a plastic mallet.
- Align the trunnion plates (89) relative to the ball port in the closed position.

NOTE:
The shaft will fit into the ball in one position only. There's a larger cog in the splined bore and a matching groove in the splined shaft. It is essential to note the groove's position during the next assembly step.

- With the ball (3) in the "closed" position, lower the ball/trunnion plate subassembly into the body (1). **NOTE:** This procedure is critical and careful attention is a must. The outside diameter of the trunnion plates must pilot in the body counterbore. Carefully lower the subassembly until a trunnion plate enters the counterbore (Usually one trunnion plate will enter the counterbore and the other will be out of position.) Use a plastic mallet or a block of wood to rotate the second trunnion into position. Once trunnion plates are aligned, lower the subassembly until the trunnion plates are seated in the bottom of the counterbore.
- Slide the thrust bearings (70) over the shaft (5). 2 thrust bearings are assembled over the shaft flange, and 1 below.
- Insert shaft subassembly through the bonnet (8) and install packing (69).
- Install the sleeve (9B), retainer ring (42) and gland (9A) over shaft (5) and gland studs. Install the disc springs sets (150) and the gland stud nuts (18) on studs and tighten "finger tight."
- Install the bonnet gasket (66) and the bonnet subassembly over the bonnet studs (13). Note the correct shaft position! Lubricate the threads of studs (13) and tighten the nuts (17) according to values in Table 2.
- Install the body gasket (65) in the body groove.
- Place the body cap (2) carefully over the body studs (12) and the body (1). See that the flange holes are aligned acc. to the mark made during the dismatling. Take care not to damage the body gasket and the seat (7) in the body cap.
- Fasten the body nuts (16). Tighten the nuts gradually, always switching to other side of the valve after every nut. The recommended torques is given in Table 2. The flange faces must in even contact with each other.
- Mount the key (10).
- Cycle the valve slowly a couple of times to insure correct position of the ball between the two seats.

Table 2 Recommended tightening torques of the body stud nuts

Thread	Recommended tightening torque [Nm]
3/4-10UNC	110
7/8-9UNC	180
1-8UNC	270
1 1/8-8UN	390
1 1/4-8UN	550
1 1/2-8UN	1000
1 5/8-8UN	1300
1 3/4-8UN	1600
1 7/8-8UN	2000
2-8UN	2500
2 1/4-8UN	3600
2 1/2-8UN	5000
3-8UN	8800
3 1/4-8UN	11200
3 3/4-8UN	17400

Note! Threads must be well lubricated. If studs and nuts are unlubricated and have been used before, torques must be about 50 % higher.

- Tighten the gland nuts (18) acc. to Section 4.2 . Pull on the shaft (5) while tightening to assure that shaft and thrust bearings are always in contact with the body. Check for leakage once the valve is pressurized.
- Install the valve in the pipeline as carefully and accurately as when removing it. Follow the instructions given in Section 3.

5 TESTING THE VALVE

CAUTION:
Pressure testing should be carried out using equipment conforming to the correct pressure class!

We recommend that the valve body be pressure tested after the valve has been assembled.

The pressure test should be carried out in accordance with an applicable standard using the pressure rating required by the pressure class or flange drilling of the valve. The valve must be in a half-open position during the test.

If you also want to test the tightness of the closure member, contact the manufacturer.

6 INSTALLING THE ACTUATOR

6.1 General

CAUTION:
Beware of ball cutting movement!

Different Neles actuators can be mounted using suitable brackets and couplings. The valve can be actuated by an M-handwheel operator or B1-series actuators.

6.2 Installing the M-handwheel operator

- The mark at the end of the shaft indicates the direction of the ball flow bore. Turn the valve to the closed position.
- Lubricate the grooves of the actuator and the couplings. Place the coupling on the shaft and lock it. Place the bracket on the valve and turn the lubricated screws a few times.
- Turn the actuator to the closed position and push it carefully onto the valve shaft on which the coupling has been mounted. Please note the marks on the handwheel and the coupling.
- Lubricate the actuator screws. Tighten all screws.
- Adjust the ball open and closed positions with the hexagon screws located at the side of the housing (see Figure 14). The stop-screw for the open position is nearest to the handwheel on the side of the housing and the screw for the closed position is at the opposite end. The turning directions for the handwheel are marked on the wheel.
- Check the handwheel by turning the valve to the extreme positions. The yellow arrow should indicate the direction of the ball flow bore.

6.3 Installing the B1C-series actuator

- Turn the valve to the closed position and drive actuator piston to the extreme outward position.
- File off any burrs and clean the shaft bore.

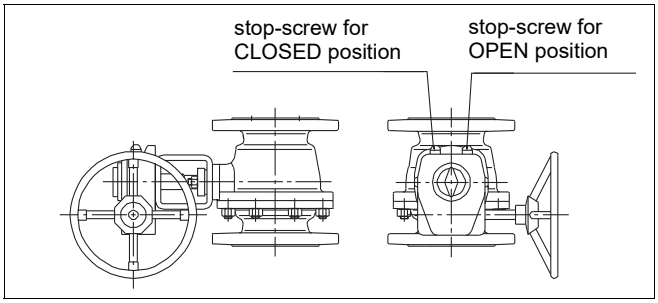


Fig. 14 Open and closed positions of the M actuator

- The line at the end of the shaft indicates the direction of the ball flow bore.
- Lubricate the actuator shaft bore. Fasten the bracket loosely to the valve.
- Slip the actuator carefully onto the valve shaft. Avoid forcing it since this may damage the ball and seats. We recommend mounting the actuator so that the cylinder is pointing upwards.
- Position the actuator parallel or vertical to the pipeline as accurately as possible. Lubricate the actuator mounting screws and then fasten all screws.

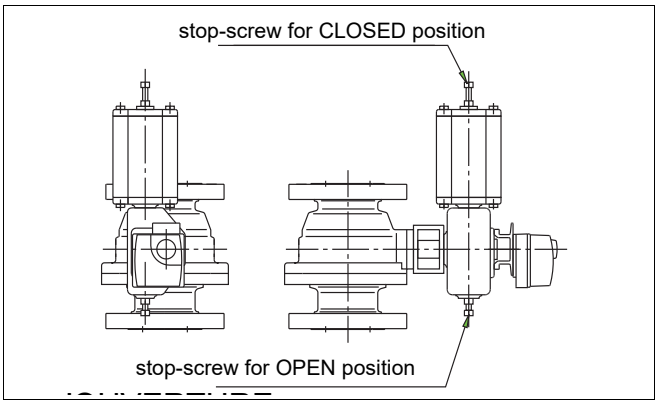


Fig. 15 Open and closed positions of the B1C/B1J actuator

- Adjust the ball open and closed positions by means of the actuator stop screws located at both ends (see Fig. 15). An accurate open position can be seen in the body flow bore. Check that the yellow arrow on the actuator indicates the ball flow opening position. **Keep fingers out of the flow bore!**

There is no need for stop screw adjustment if the actuator is re-installed in the same valve. Drive actuator piston to the housing end (open position). Turn the actuator by hand until the valve is in the open position. Fasten the actuator in this position as explained above.

- Check the stop screw thread tightness. An O-ring is used for sealing.
- Check that the actuator is functioning correctly. Drive the actuator piston to both cylinder ends and check the ball position and its movement with respect to the actuator (close: clockwise; open: counterclockwise). The valve should be closed when the piston is in the extreme outward position.
- If necessary, change the position of the actuator pointing cover to correctly indicate the valve open/closed position.

6.4 Installing the B1J-series actuator

Spring-return actuators are used in applications where valve opening or closing movement is needed in case the air supply is interrupted. The B1J type is used for spring-to-close operation; the spring pushes the piston towards the cylinder end, the extreme outward position. In turn, the B1JA type is used for spring-to-open operation; the spring pushes the piston towards the housing. Spring-return actuators are installed in a manner similar to B1C-series actuators, taking into account the following.

B1J type

- Install the actuator so that the piston is in the extreme outward position. The cylinder must not be pressurized and air supply connections must be open. The valve must be in the **closed** position.

B1JA type

- Install the actuator so that the piston is in the cylinder end position at housing side. The cylinder must not be pressurized and air supply connections must be open. The valve must be in the **open** position.

The rest of the installation procedure is the same as in Section 6.3.

6.5 Installing other makes of actuators

NOTE:
Valmet accepts no responsibility for compatibility of actuators not installed by Valmet.

Other actuators can be installed only if they have an ISO 5211 actuator connection.

7 TROUBLE SHOOTING TABLE

The following Table 3 lists malfunctions that might occur after prolonged use.

Table 3 Trouble shooting

Symptom	Possible fault	Recommended action
Leakage through a closed valve	Wrong stop screw adjustment of the actuator	Adjust the stop screw for closed position
	Faulty zero setting of the positioner	Adjust the positioner
	Damaged seat	Replace seat
	Damaged closing member	Replace the closing member
	Closing member in a wrong position relative to the actuator	Select the correct keyway in the actuator
Leakage through body joint	Damaged gasket	Replace the gasket
	Loose body joint	Tighten the nuts or screws
Irregular valve movements	Actuator or positioner malfunction	Check the operation of the actuator and positioner
	Process medium accumulated on the sealing surface	Clean the sealing surfaces
	Closing member or seat damaged	Replace the closing member or seat
	Crystallizing medium has entered the bearing spaces	Flush the bearing spaces
Gland packing leaking	Gland packing worn or damaged	Replace the gland packing
	Loose packing	Tighten the packing nuts

8 TOOLS

In addition to standard tools, the following special tools might facilitate some phases of the work.

- For removal of the actuator:
  - extractor (ID-code table in actuator's IMO).

This tool can be ordered from the manufacturer. Always give the valve type designation when ordering.

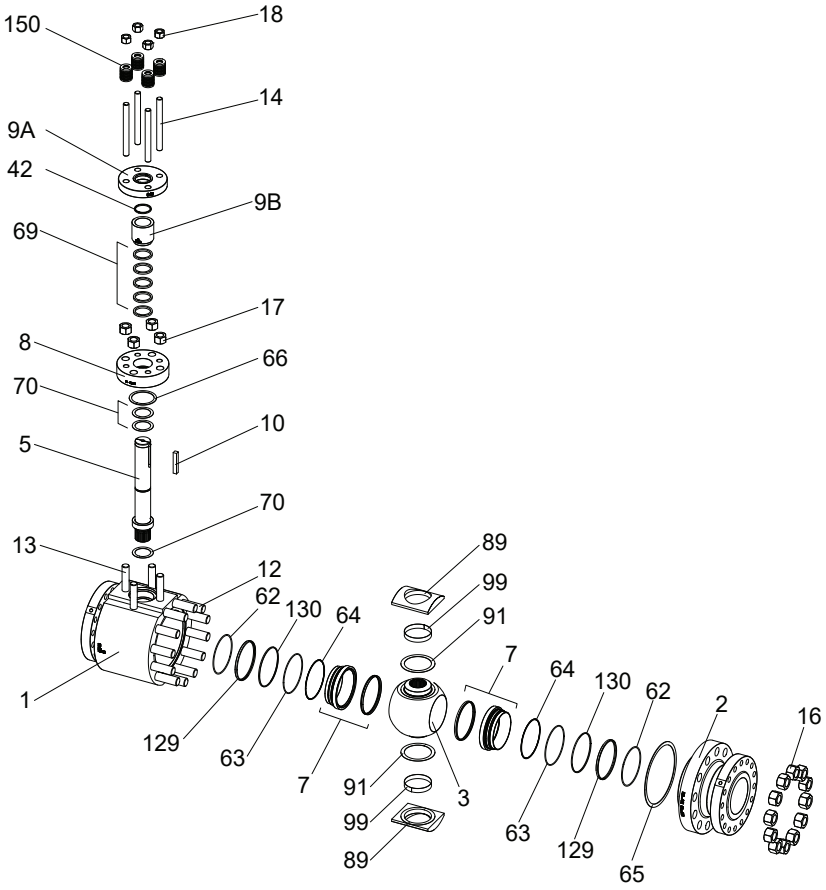
9 ORDERING SPARE PARTS

When ordering spare parts, always include the following information:

- type code, sales order number, serial number
- number of the parts list, part number, name of the part and quantity required

This information can be found from the identification plate or documents.

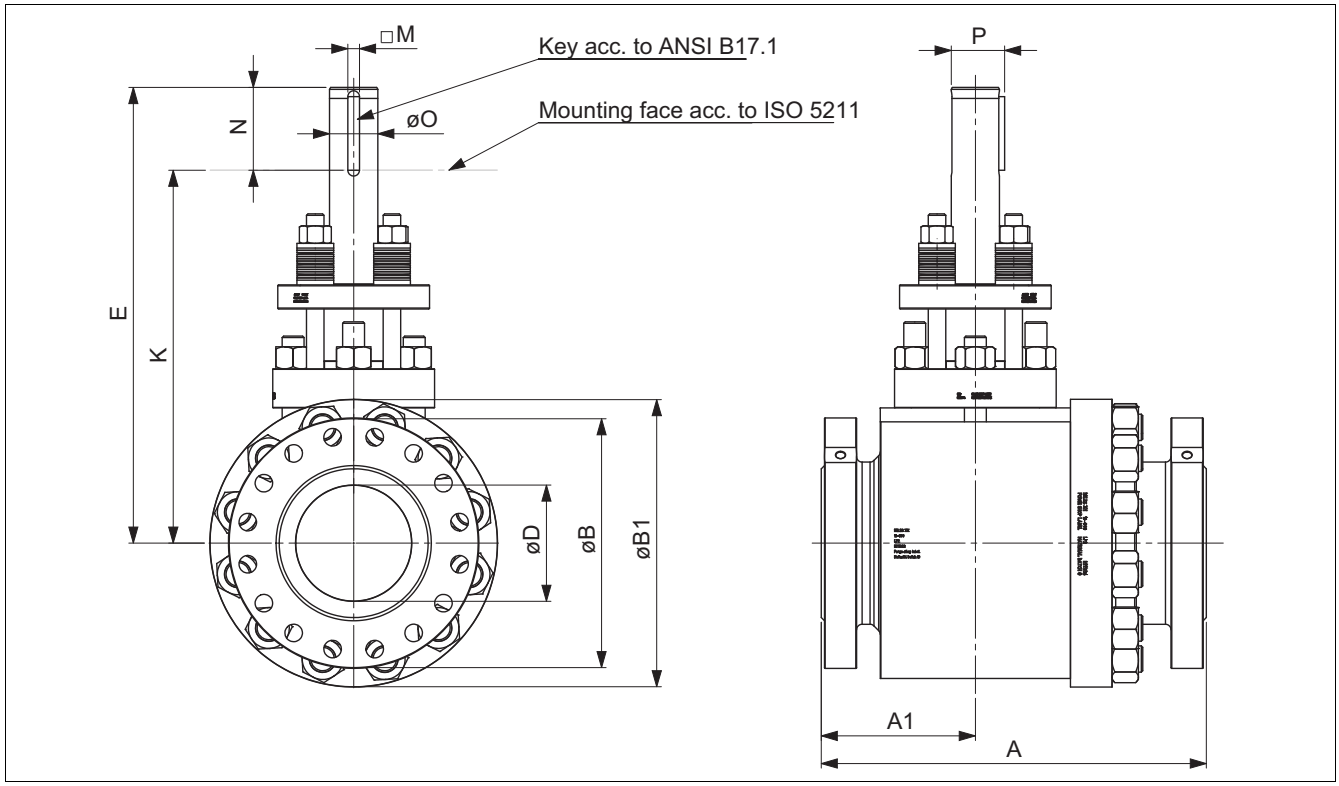
10 EXPLODED VIEW AND PARTS LIST



Item	Qty	Description	Spare part category
1	1	Body	
2	1	Bodycap	
3	1	Ball	3
5	1	Shaft	3
7	1 or 2	Ball seat	2
8	1	Bonnet	
9A	1	Gland	
9B	1	Sleeve	
10	1	Key	3
12		Stud	
13		Stud	
14		Stud	
16		Hexagon nut	
17		Hexagon nut	
18		Hexagon nut	
42	1	Retainer ring	
62	1 or 2	Seat spring	2
63	1 or 2	O-ring (B,R)	1
	1 or 2	Back seal (F)	1
64	1 or 2	Back-up ring (B,R)	1
65	1	Body gasket	1
66	1	Bonnet gasket	1
69		Packing ring	1
70	3	Thrust bearing	3
89	2	Trunnion plate	
91	2	Thrust bearing	3
99	2	Trunnion bearing	3
129	1 or 2	Ring (B,R)	2
130	1 or 2	Backseal (B,R)	1
150		Disc spring set	

Spare part (Spare Part Set): Recommended soft parts, always needed for the repair. Delivered as a set.
Spare part category 2: Parts for replacing of the seat. Available also as a set.
Spare part category 3: Parts for replacing of the closing element.
Spares for the full overhaul: All parts from the categories 1, 2 and 3.

11 DIMENSIONS AND WEIGHTS



	NPS	DN	A	A1	ØB	ØB1	ØD	E	K	M	N	O	P	Weight [kg]	Weight [kg] (with bracket & adapter)
"XHG Class 900 Raised Face"	02	50	368	144	215	225	49	353	308	6.35	46	25	27,8	130	140
	03	80	381	145	240	285	74	434	383	6,35	51	30	32,9	140	160
	04	100	457	173	290	348	100	541	462	12,70	80	45	50,4	230	250
	06	150	610	237	380	433	150	629	539	12,70	90	55	60,6	470	540
	08	200	737	303	470	508	201	847	701	22,23	146	85	94,6	850	980
	10	250	838	325	545	630	252	1045	866	25,40	180	105	116,1	1430	1640
	12	300	965	389	610	728	303	1110	905	31,75	205	120	133,8	2150	2480
	14	350	1029	416	640	804	322	1279	1054	31,75	225	135	149,0	2890	3340
	16	400	1130	443	705	922	373	1401	1153	38,10	250	150	166,6	3950	4460
	18	450	1219	504	785	1010	423	1474	1195	38,10	280	165	181,8	5020	5610
	20	500	1321	549	855	1114	471	1508	1194	44,45	315	180	199,5	6530	7390
	24	600	1549	643	1040	1300	570	1720	1350	50,80	370	220	242,4	11000	12000
"XHG Class 900 Ring Type Joint"	02	50	371	145	215	225	49	353	308	6.35	46	25	27.8	130	140
	03	80	384	146	240	285	74	434	383	6,35	51	30	32,9	140	160
	04	100	460	175	290	348	100	541	462	12,70	80	45	50,4	230	250
	06	150	613	239	380	433	150	629	539	12,70	90	55	60,6	470	540
	08	200	740	304	470	508	201	847	701	22,23	146	85	94,6	850	980
	10	250	841	327	545	630	252	1045	866	25,40	180	105	116,1	1430	1640
	12	300	968	390	610	728	303	1110	905	31,75	205	120	133,8	2150	2480
	14	350	1039	420	640	804	322	1279	1054	31,75	225	135	149,0	2890	3340
	16	400	1140	448	705	922	373	1401	1153	38,10	250	150	166,6	3950	4460
	18	450	1232	510	785	1010	423	1474	1195	38,10	280	165	181,8	5020	5610
	20	500	1334	556	855	1114	471	1508	1194	44,45	315	180	199,5	6530	7390
	24	600	1568	652	1040	1300	570	1720	1350	50,80	370	220	242,4	11000	12000

12 TYPE CODE

Trunnion mounted full bore, Neles™ ball valve, series XH											
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
XH	06	G	W	TA	AB	RX	R	N	B	F	A

1.	VALVE SERIES & STYLE & FACE-TO-FACE
XH	Full bore, trunnions, f-to-f ASME B 16.10, Table 4, long pattern, ASME 900

2.	SIZE / NPS
02	2"
03	3"
04	4"
06	6"
08	8"
10	10"
12	12"
14	14"
16	16"

3.	PRESSURE CLASS
G	ASME Class 900

4.	END CONNECTION STYLE
W	Raised face, ASME B 16.5, (Ra 3.2-6.3), standard
Z	Ring joint, ASME B16.5

5.	CONSTRUCTION & APPLICATION
TA	Standard construction. Double seated. Live loaded packing.
TZ	BAM tested non-metallic materials, for oxygen service. Double seated. Metal bearings. Live loaded graphite packing. Temperature range -50...+200C. Max pressure based on body rating. Oxygen cleaning acc. to Neles brand internal procedure T-2115 included. Constructions are not covered in ISO 15848-1 certification

6.	BODY MATERIAL
AB	ASTM A350 LF2 (CS)
S6	ASTM A351 gr. CF8M (SS)

7.	BALL / COATING & STEM MATERIAL
RX	316SS / Chrome carbide & XM-19 or 17-4PH
SL	316SS /NiBo & XM-19 or 17-4PH

8.	SEAT TYPE
B	Metal, solid proof
F	Metal, bellows
R	Metal, firesafe service

9.	SEAT MATERIAL
N	Type 316 stainless steel

10.	BEARING & SEAL MATERIAL			
	Trunnion bearing	Packings	Body gaskets	O-rings
B	PTFE / SS net	Graphite	Graphite	Viton GF
D	Cobalt based alloy	Graphite	Graphite	Viton GF

11.	BOLTING MATERIAL	
	Studs	Nuts
D*	B8M	8M
F**	L7M	2HM

12.	MODEL CODE
A	XH design version A

*) Bolting material for stainless steel body
**) Bolting material for carbon and low alloy steel body

Note: Ball material coding specifies only the type of material not grade (cast, wrought, bar, forged), which can change based on ball size or type.
E.g. "316SS" type may be A351 gr CF8M, A479 gr 316, A182 gr F316 or equivalent.
Recommended type codings for oxygen service:
XH _ GW TZ S6 RR FR DD A
XH_ GW TZ N1 NR FE DD A
XH _ GW TZ VE LR FD DD A
Constructions are not covered in ISO 15848-1 certification.

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