

Neles™ ceramic ball valves

Series E2 and E6

Installation, maintenance and
operating instructions

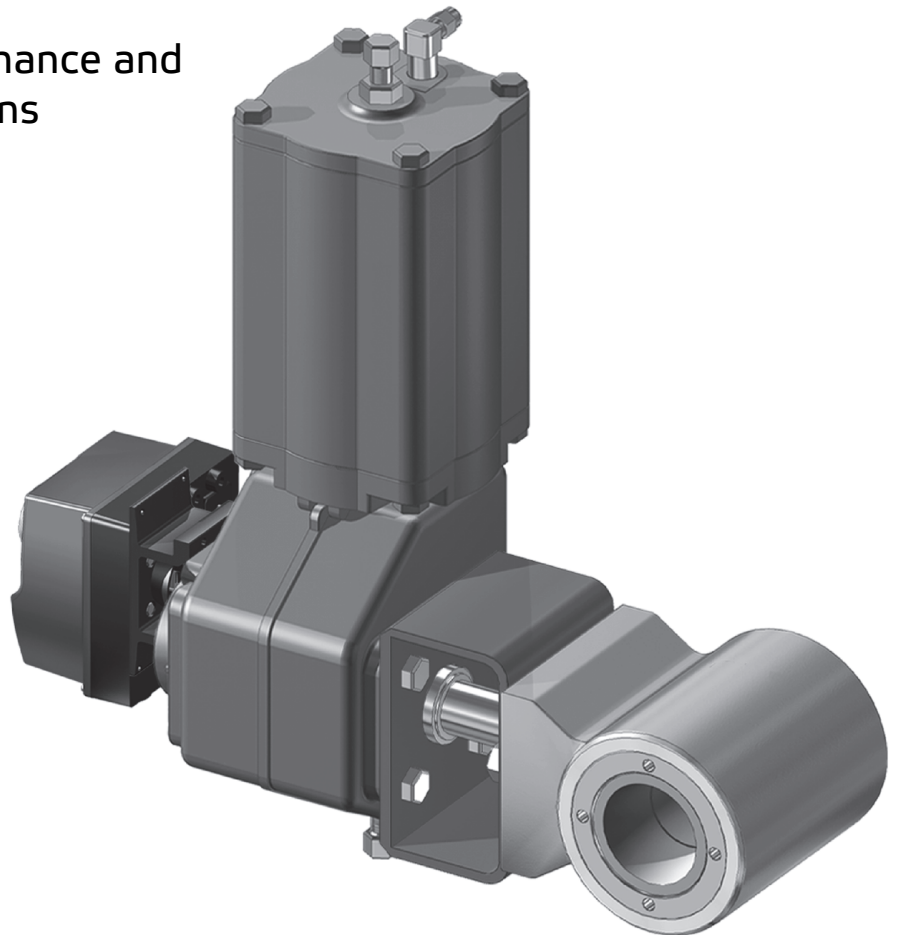


TABLE OF CONTENTS

GENERAL	3	TROUBLE SHOOTING TABLE	11
Valve description	3	TOOLS	11
Valve markings	3	ORDERING SPARE PARTS	11
Technical data	3	EXPLODED VIEWS AND PARTS LIST	12
CE marking	3	DIMENSIONS AND WEIGHTS	13
Recycling and disposal	3	TYPE CODE	16
Safety precautions	4		
Welding notes	4		
TRANSPORTATION, RECEPTION AND STORAGE	5		
INSTALLATION AND USE	5		
Valve insulation	7		
MAINTENANCE	8		
Maintenance general	8		
Changing the gland packing, A-construction	8		
Changing the gland packing, H-construction	9		
Changing the gasket of the gland packing	9		
Changing the bearing, A-construction and H-construction	9		
Changing the ceramic parts	10		
Detaching and installing the actuator	10		

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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 Valve description

Neles™ E2 ceramic ball valve is a flangeless (wafer type), and Neles™ E6 is a single flange (lug type) reduced-bore valve specially designed for control of erosive media.

The body and shaft are metal, while the trim is ceramic. There are no separate ball seats; instead, the seating surfaces are directly ground into the ceramic bushings. The insert retaining ceramic parts is attached to the body with threaded joint. The flow medium comes into contact with the metallic valve body. Note this when the valve is used for aggressive media.

Rotation transmission between shaft and ball takes place through a slot head. Axial bearings are located outside the valve, under the actuator mounting piece.

The valve is usually equipped with an actuator. (For details, see type-specific instructions.

1.2 Valve markings

The markings stamped on the body indicate the

- body material
- nominal size
- pressure rating

The valve also has an identification plate, the type of which depends upon the size of the valve. See Figure 1.

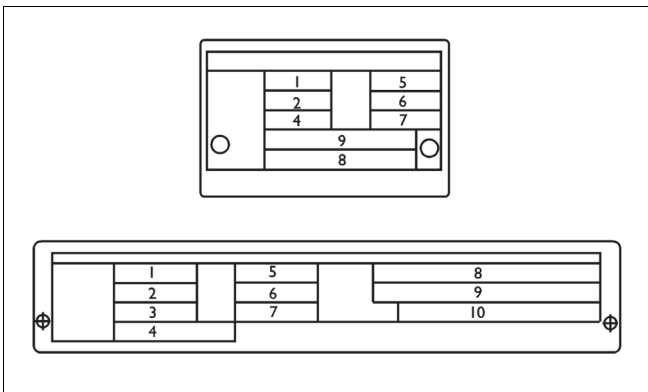


Fig. 1 Alternatives for identification plate

The different sections of the identification plate give the following informations:

1. body material
2. trim material
3. shaft material
4. seat material
5. highest operating temperature
6. lowest operating temperature
7. maximum shut-off pressure differential
8. type designation
9. number in manufacturer's list
10. pressure class

The type designation is defined in the type code, see Section 10.

1.3 Technical data

Face-to-face length:	IEC 534-3-2 / ISA S75.04
Body pressure rating:	ASME Class 300
Max. diff. pressure/ temperature:	in control applications ASME Class 150 in shut-off applications ASME Class 300, see Figure 2 For NPS 8/DN 200 the maximum differential pressure is limited to 20 bar.
Max. oper. temp.:	A-construction: +200 °C (+392 °F) H-construction: +450 °C (+842 °F)
Direction of flow:	insert on upstream side
Characteristic curve:	equal percentage
Tightness class:	10 x ISO 5208 Rate D
Media:	not for inflammable media
Dimensions:	see Section 9
Weights:	see Section 9

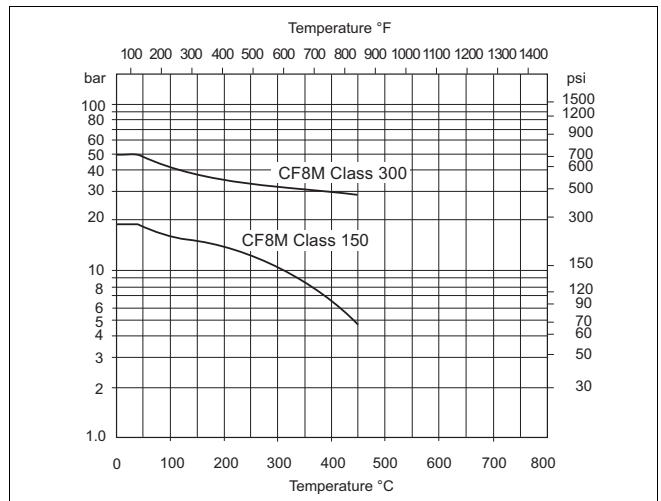


Fig. 2 Pressure-temperature diagram

1.4 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.

1.5 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.

1.6 Safety precautions

CAUTION:

Due to the nature of ceramic material used in valve internals, the valve might cause an ignition of explosive gas mixtures. Valve internals, when operating against each other may cause sufficient heat to ignite the gaseous mixture inside the valve. Therefore the safe use of the valve must be assessed when used in potentially explosive and flammable applications. According to the Hazard Analysis the valve is not creating an ignition risk to its environment outside the valve. For further information, please contact Valmet business.

CAUTION:

Composite material (MMC) option in erosion proofing parts is electric conductive and offer ATEX compatible construction in E2/E6 series valve.

CAUTION:

Do not exceed the valve performance limitations!

Exceeding the limitations marked on the valve body 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 if the valve is pressurized!

Damage or personal injury may result. Dismantling a pressurized valve will cause uncontrolled pressure release. Always isolate the required part of the pipeline, release the pressure from the valve and remove the medium before dismantling the valve. Be aware of the medium type. Protect people and equipment in the area from any harmful or poisonous medium. If the valve is actuator operated, close and detach the actuator pressure supply pipeline.

CAUTION:

Be aware of the ball cutting movement!

When the valve is actuated, the ball functions as a cutting device. Do not stick your hand or other body parts into the open flow port. Prevent foreign objects from being left inside the pipeline. If the valve is actuator operated, close and detach the actuator pressure supply pipeline.

CAUTION:

Be aware of noise emission!

Depending on the application the valve may cause noise emission during use. The noise level can be measured with equipment designed for this purpose or by using the Neles Nelprof software. Pay attention to work environment legislation concerning noise emission.

CAUTION:

Be aware of extreme temperatures!

During use the valve body may be very cold or very hot. If extreme temperatures occur, protect people from frost injuries or burns.

NOTE:

Do not drop, knock or hit the valve!

Internal parts of the valve are made of ceramic material. Although the material is robust, it will not tolerate impact as metals do.

NOTE:

Media which may solidify should not be allowed to stand in the ball valve. Wash such media from the valve using a suitable arrangement. Cycle a valve few times when washing.

CAUTION:

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

1.7 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 chucks 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

Valves are delivered in the usual Valmet packaging, unless otherwise agreed with the customer.

Make sure that the valve and any possible accessories have not been damaged during transport.

Do not remove the bore protectors before installation.

Store the valve with care, preferably indoors and in a dry environment.

Take the valve to the installation site only just before installation.

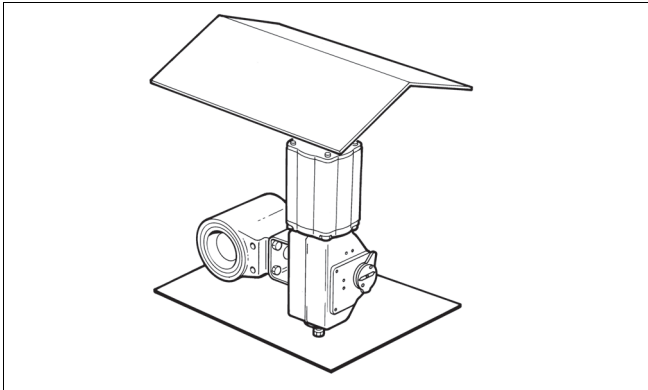


Fig. 3 Storage of the valve

NOTE:

Ceramic valves must be handled with particular care.

3 INSTALLATION AND USE

Remove the bore protectors and check that the valve is clean. Also ensure that the pipeline is clean.

The pipeline must be firmly supported so that the valve is not subjected to additional strain.

The valves can be installed between the following flanges:

- EN PN 10, 16, 25, 40
- ASME 150, 300
- ISO 7005 PN 20, PN 50
- JIS 10 K, 16 K, 20 K, 30 K

In some valve sizes the body of the valve has thread fillets for the two flange screws located closest to the shaft. Size NPS 8 / DN 200 has thread fillets for all flange screws. See Figure 4 and Tables 1 to 3. All other dimensions are shown in Section 9.

The valve is tight in both directions and may be installed in any position. It must not, however, be installed in such a way that the actuator is below the valve (see Figure 5).

The actuator must not come into contact with the pipeline, as vibrations in the pipeline might damage the actuator and its performance.

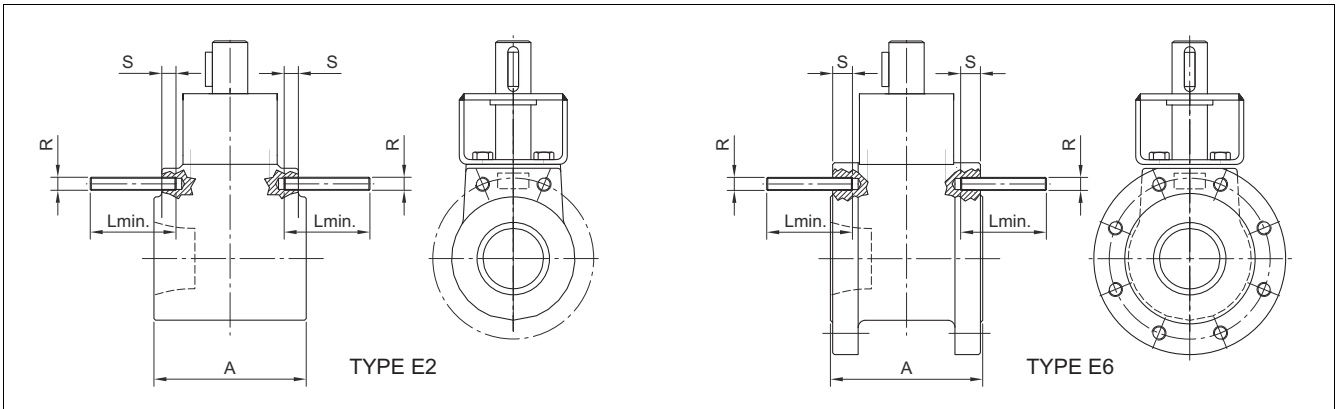


Fig. 4 Flange drilling / neck bolting

Table 1 Flange drilling / neck bolting, dimensions in mm. ASME 150 / ISO 7005 PN 20. ASME 300 / ISO 7005 PN 50

TYPE	Face-to-face A	ASME 150 / ISO 7005 PN 20					ASME 300 / ISO 7005 PN 50				
		Number of flange bolts *)	Number of neck bolts **)	Bolt size R	Depth of neck bolt drilling S	Length of neck bolts Lmin	Number of flange bolts *)	Number of neck bolts **)	Bolt size R	Depth of neck bolt drilling S	Length of neck bolts Lmin
E2_025/E2_01	102	4	-	-	-	-	4	-	-	-	-
E2_040/E2_1H	114	4	-	-	-	-	4	-	-	-	-
E2_050/E2_02	124	4	-	-	-	-	8	2	5/8" UNC / M16	17.0	70
E2_080/E2_03	165	4	-	-	-	-	8	2	3/4" UNC / M20	20.0	85
E2_100/E2_04	194	8	2	5/8" UNC / M16	17.0	75	8	2	3/4" UNC / M20	20.0	90
E6_025/E6_01	102	4	-	1/2" UNC / M12	-	-	4	-	5/8" UNC / M16	-	-
E6_040/E6_1H	114	4	-	1/2" UNC / M12	-	-	4	-	3/4" UNC / M20	-	-
E6_050/E6_02	124	4	-	5/8" UNC / M16	-	-	8	2	5/8" UNC / M16	28.5	75
E6_080/E6_03	165	4	-	5/8" UNC / M16	-	-	8	2	3/4" UNC / M20	28.5	85
E6_100/E6_04	194	8	2	5/8" UNC / M16	29.5	80	8	2	3/4" UNC / M20	29.5	90
E6_150/E6_06	229	8	2	3/4" UNC / M20	28.5	80	12	2	3/4" UNC / M20	28.5	95
E6_200/E6_08	243	8	8	3/4" UNC / M20	28.5	80	12	12	7/8" UNC / M24	28.5	95

*) total number / flange

**) number of neck bolts / flange

Table 2 Flange drilling / neck bolting, dimensions in mm. EN PN 10, 16, 25, 40

TYPE	Face-to-face A	EN PN 10					EN PN 16					EN PN 25					EN PN 40				
		Number of flange bolts *)	Number of neck bolts **)	Bolt size R	Depth of neck bolt drilling S	Length of neck bolts Lmin	Number of flange bolts *)	Number of neck bolts **)	Bolt size R	Depth of neck bolt drilling S	Length of neck bolts Lmin	Number of flange bolts *)	Number of neck bolts **)	Bolt size R	Depth of neck bolt drilling S	Length of neck bolts Lmin	Number of flange bolts *)	Number of neck bolts **)	Bolt size R	Depth of neck bolt drilling S	Length of neck bolts Lmin
E2_025/E2_01	102	4	-	-	-	-	4	-	-	-	-	4	-	-	-	-	4	-	-	-	-
E2_040/E2_1H	114	4	-	-	-	-	4	-	-	-	-	4	-	-	-	-	4	-	-	-	-
E2_050/E2_02	124	4	-	-	-	-	4	-	-	-	-	4	-	-	-	-	4	-	-	-	-
E2_080/E2_03	165	8	2	M16	17.0	65	8	2	M16	17.0	65	8	2	M16	17.0	70	8	2	M16	17.0	70
E2_100/E2_04	194	8	2	M16	17.0	65	8	2	M16	17.0	65	8	2	M20	20.0	75	8	2	M20	20.0	75
E6_025/E6_01	102	4	-	M12	-	-	4	-	M12	-	-	4	-	M12	-	-	4	-	M12	-	-
E6_040/E6_1H	114	4	-	M16	-	-	4	-	M16	-	-	4	-	M16	-	-	4	-	M16	-	-
E6_050/E6_02	124	4	-	M16	-	-	4	-	M16	-	-	4	-	M16	-	-	4	-	M16	-	-
E6_080/E6_03	165	8	2	M16	28.5	70	8	2	M16	28.5	70	8	2	M16	28.5	75	8	2	M16	28.5	75
E6_100/E6_04	194	8	2	M16	29.5	70	8	2	M16	29.5	70	8	2	M20	29.5	80	8	2	M20	29.5	80
E6_150/E6_06	229	8	2	M20	28.5	75	8	2	M20	28.5	75	8	2	M24	28.5	85	8	2	M24	28.5	85
E6_200/E6_08	243	8	8	M20	28.5	75	12	12	M20	28.5	75	12	12	M24	28.5	85	12	12	M27	28.5	85

*) total number / flange

**) number of neck bolts / flange

Table 3 Flange drilling / neck bolting, dimensions in mm. JIS 16 K, 20 K, 30 K

TYPE	Face-to-face A	JIS 10 K					JIS 16 K - 20 K					JIS 30 K				
		Number of flange bolts *)	Number of neck bolts **)	Bolt size R	Depth of neck bolt drilling S	Length of neck bolts Lmin	Number of flange bolts *)	Number of neck bolts **)	Bolt size R	Depth of neck bolt drilling S	Length of neck bolts Lmin	Number of flange bolts *)	Number of neck bolts **)	Bolt size R	Depth of neck bolt drilling S	Length of neck bolts Lmin
E2_025/E2_01	102	4	-	-	-	-	4	-	-	-	-	4	-	-	-	-
E2_040/E2_1H	114	4	-	-	-	-	4	-	-	-	-	4	-	-	-	-
E2_050/E2_02	124	4	-	-	-	-	8	2	M16	17.0	65	8	2	M16	17.0	70
E2_080/E2_03	165	8	2	M16	17.0	65	8	2	M20	20.0	75	8	2	M20	20.0	80
E2_100/E2_04	194	8	2	M16	17.0	65	8	2	M20	20.0	75	8	2	M22	22.0	90
E6_025/E6_01	102	4	-	M16	-	-	4	-	M16	-	-	4	-	M16	-	-
E6_040/E6_1H	114	4	-	M16	-	-	4	-	M16	-	-	4	-	M20	-	-
E6_050/E6_02	124	4	-	M16	-	-	8	2	M16	28.5	70	8	2	M16	28.5	70
E6_080/E6_03	165	8	2	M16	28.5	70	8	2	M20	28.5	75	8	2	M20	28.5	80
E6_100/E6_04	194	8	2	M16	29.5	70	8	2	M20	29.5	80	8	2	M22	29.5	90
E6_150/E6_06	229	8	2	M20	28.5	75	12	2	M22	28.5	85	12	2	M24	28.5	95
E6_200/E6_08	243	12	12	M20	28.5	75	12	12	M22	28.5	85	12	12	M24	28.5	95

*) total number / flange

**) number of neck bolts / flange

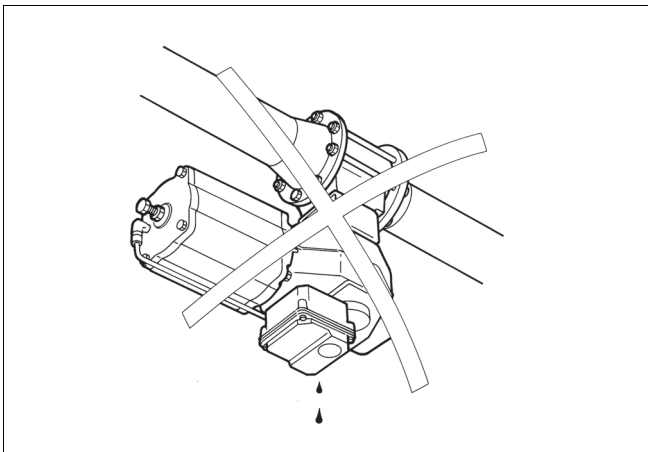


Fig. 5 Avoid this mounting position

To facilitate easy maintenance, the actuator should be installed in such a way that there is plenty of room for removing it.

The screws, nuts and washers used should be equivalent to the fastenings used elsewhere in the pipeline.

Pay particular attention when centring the flange gasket. The inside diameter of the gasket should be acc. to the nominal size of the valve, i.e. the gasket covers the insert (6) and the rim of the ceramic bushing (3).

NOTE:

An eccentric flange gasket may cause premature body wear, particularly with media containing particles.

The pipeline should be flushed carefully before use. The valve should be kept entirely open during flushing.

3.1 Valve insulation

If necessary, the valve may be insulated. Insulation must not continue above the upper level of the valve body, see Figure 6.

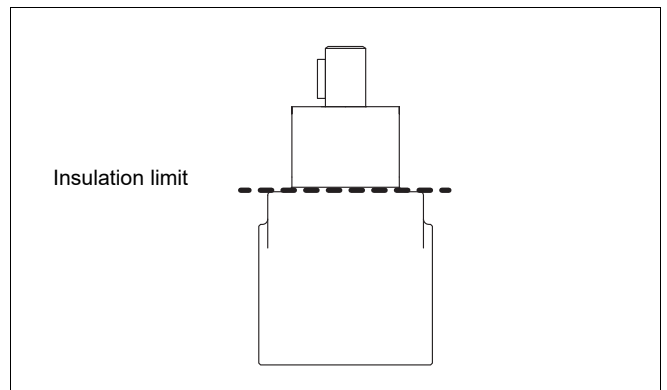


Fig. 6 Insulation of the valve

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, A-construction

The component numbers given in brackets refer to the diagram and component list given in Section 8.1. See also Figure 7.

Disassembly

CAUTION:

Do not detach or disassemble a pressurized valve! This warning also applies to individual components (13).

1. Detach the air supply conduit from the actuator. Also detach any cables preventing the removal of the actuator.
2. Remove the actuator from the bracket (5) by unscrewing the fixing screws. Pull the actuator from the shaft (4). Detaching the actuator is described in more detail in Section 4.7.1.
3. Detach the key (20) from the shaft.

4. Detach the bracket (5) from the body (1) by opening the screws (13) M12 or M16.
5. Detach the bearing (8), the axial bearing (7) and the lock ring (19).
6. Loosen the strain ring (9) with a special opener tool - code F14096 - specified infos see table 4.
7. Pull the shaft (4), and lift it and gland bushing (10) and parts (11, 12, 17) out of the valve body.
8. Pull the gland bushing off the shaft while rotating. Now the gland packing may be disassembled.
9. Remove the gasket (16) between the gland bushing and the body from the valve body.

Replacing parts

The gland packing set includes the V-ring set (11) and the spring (12). Replace both parts at the same time.

NOTE:

Replace the gasket (16) between the gland bushing (10) and the body (1) whenever the strain ring has been loosened. Leakage of the V-ring set (11) and leakage of the gasket (16) may cause similar symptoms.

The O-ring (17) should be replaced if it is damaged. The main purpose of the O-ring is to protect the shaft from erosive media, such as sludge, and it therefore does not need to be changed regularly.

Assembly

1. Apply silicon grease to the O-ring (17) and install it into the gland bushing (10) cavity.

NOTE:

Make sure you do not damage the O-ring with the shaft keyway and the shaft shoulder.

2. Slip the gland bushing (10) onto the shaft (4).
3. Install the spring (12) into the bottom of the gland bushing (10). Before installation, the spiral should be completely compressed once, for example in a vice. This will make installation of the strain ring easier, since the working height of the spiral is roughly 0.6 x the free height of the spring.
4. Once the spiral is in place, slip the sheet ring (15) into position. After this, install the V-ring (11) onto the shaft, one by one.

NOTE:

Make sure you do not damage the gland packing rings with the shaft keyway or shaft shoulder.

The order from bottom to top of the different rings is as follows:

- base ring
 - angle rings
 - saddle ring
5. Place the gasket (16) into the valve body.
 6. Insert the shaft together with the gland bushing back into the valve body.
 7. The shaft joint on the ball has been shaped in such a way that the shaft only fits seat when it is in the correct position. Check the direction of the bore by observing the indicator line at the top of the shaft, and take the position of the keyway into account when you install the actuator.
 8. Lubricate the thread of the strain ring with, for example, Molykote. Then fasten the strain ring (9). When correctly fastened, the ring shoulder must be at least on a level with the body, or 0.1 mm below it. The tightening torques are given in Table 4. The shoulder of the strain ring must not remain above the surface level of the body.

Table 4 Tightening torques of strain ring

Nominal size DN	Thread	Torque Nm	Tool DIN 1810A	Opener tool's codes
25/20	M39 x 1.5	190	34-36	H099326
40/32	M45 x 1.5	250	40-42	H099327
50/40	M50 x 2	320	45-50	H099328
80/65	M64 x 2	340	58-62	H099329
100/80	M75 x 2	560	68-75	H099330
150/100	M95 x 2	1330	80-90	H099331
200	M95 x 2	1330	80-90	H099331

9. Make sure that the bracket (5) is not carrying the weight of the valve because this would have an immediate effect on the bearing clearance.
10. Install the lock ring (19), the axial bearing (7) and the bearing (8) onto the shaft.
11. Attach the bracket to the valve body. While fastening the screws, make sure that the hole in the bracket is properly centered in relation to the shaft. For the correct tightening torques, see Table 5.
12. Install the actuator. See Section 4.7.2.

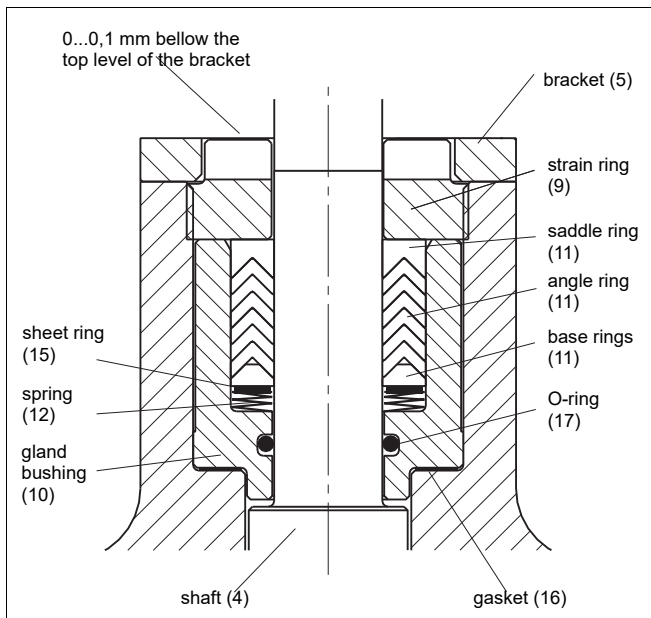


Fig. 7 Sealing of the shaft, A-construction

Table 5 Tightening torques of bracket screws

Nominal size DN	Thread	Torque Nm	Tool size
25/20, 40/32, 50/40	M12	80	19
80/65, 100/80, 150/100, 200	M16	190	24

4.3 Changing the gland packing, H-construction

CAUTION:

Do not detach or disassemble a pressurized valve! This warning also applies to individual components (13).

The part numbers in this section refer to the diagram and part list in Section 8.2 .

1. Unfasten the nuts (24) of the gland (22) and lift up the gland.
2. Remove the old packing rings (11) by using, for example, a sharp pricker.
3. Install the new packing rings.
4. Place the nuts on the studs and tighten the gland packings while the valve is not pressurized, see Table 6.
5. Retighten if necessary.

Table 6 Tightening torques of gland nuts

Nominal size DN	Thread	Torque Nm	Tool size
25	M12	16	19
40	M12	20	19
50	M12	31	19
80	M16	53	24
100	M16	85	24
150, 200	M16	100	24

4.4 Changing the gasket of the gland packing

In an H-construction valve, changing the gland packing does not require unfastening the strain ring, and this does not entail changing the gasket (16).

When the gasket (16) needs to be changed, this can be done by following the same instructions that were given for the A-construction. Note that there is no O-ring in the H-construction.

4.5 Changing the bearing, A-construction and H-construction

1. Detach the actuator from the bracket, see Section 4.7.1.
2. Detach the bracket (5) from the valve body (1) by unscrewing fixing screws (13) M12 or M16 and detach the key from the shaft.
3. Detach and change the bearing (8).
4. Attach the bracket to the valve, see Table 5.
5. Install the actuator, see Section 4.7.2.

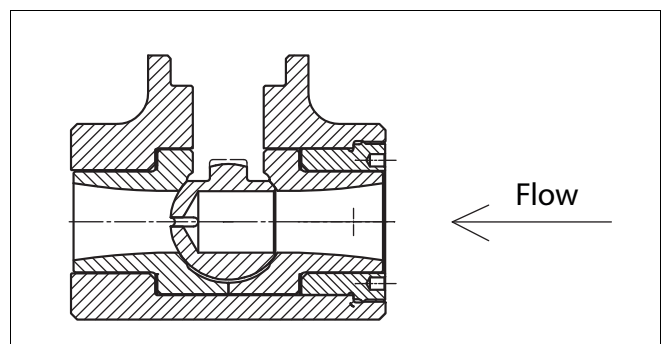


Fig. 8

4.6 Changing the ceramic parts

Changing the ceramic parts, ball (2) and bushings (3) requires special tools. It is highly recommended that this work is done by the Valmet service organisation.

Disassembly

1. Detach the actuator from the valve, see Section 4.7.1.
2. Detach the key (20), fixing screws (13), bracket (5), axial bearing (7), bearing (8) and lock ring (19).
3. Fasten the valve firmly into a vice the insert (6) pointing upwards.
4. Fasten the special tool, Table 7, to the insert and turn it open without removing it.
5. Remove the strain ring (9) with a special tool, Table 4. See also Sections 4.2.1, 4.3 and 4.4.
6. Pull the shaft (4) with gland bushing (10) out of the body.
7. Remove the insert (6) and detach the ceramic parts, bushing (3), ball (2) and bushing (3), from the body.
8. Remove the gasket (25) between the insert and body (8"/DN 200 only).

NOTE:

Replace the gasket (25) between the insert (6) and the body (1) whenever the insert has been loosened.

Assembly

1. Apply Molykote 312R lubricant to the threads of the insert (6).
2. Turn the insert into metal-to-metal contact with the body (without ceramic parts) and draw a mark with a felt tip pen to the body and insert seam.
3. Remove the insert.
4. Install the sheet rings (14) on the bushings (3).
5. Place the ball (2) between the bushings (3).
Mounting a LowCv valve, when ball is open the groove must be on the valve's exhaust side. Fig. 7A
6. Push the ceramic parts as a package into the body. Please note the position of the shaft slot.
7. Install the gasket (25) on the body (1) (8"/DN 200 only).
8. Turn the insert (6) lightly into the body.
9. Push a assembly guide tool, Table 7, through the gland bore into the slot of the ball. Make sure that the tool is properly engaged with the ball. The tool will keep the bushings (3) in place during the tightening of the insert (6).

Table 7 Assembly guide tool

Nominal size	Tool
1" / DN 25	280139
1.5" / DN 40	280140
2" / DN 50	280141
3" / DN 80	280142
4" / DN 100	280143
6" / DN 150	280529
8" / DN 200	H136723

10. Fasten the valve firmly into a vice the insert (6) pointing upwards and tighten the insert evenly using a special tool 1...2 mm past the mark made earlier. See Table 8.

Table 8 Tightening torques of insert

Nominal size DN	Thread	Max. torque Nm *	Insert removing tool
25/20	M52 x 1,5	60	279922
40/32	M70 x 2	120	279921
50/40	M85 x 2	240	279921
80/65	M115 x 2	440	279920
100/80	M140 x 2	770	279920
150/100	M200 x 3	1450	H136725
200	M250 x 3	2000	H136724

*) Graphite lubricant applied to the threads

11. Remove the assembly guide tool from the gland bore and mount the shaft (4). See Sections 4.2.3, 4.3 and 4.4 for details of gland packing assembly. Tighten the strain ring (9) according to Table 4.

4.7 Detaching and installing the actuator

Detaching from the valve

1. Detach the air supply tube from the actuator. Also detach any cables preventing the removal of the actuator.
2. Detach the actuator from the bracket (5) by unscrewing the fixing screws.
3. Pull the actuator off the shaft by using a special extraction tool, Figure 8. Prevent the shaft from pressing the ceramic ball when removing, e.g. by gripping the shaft with self-locking pliers (don't damage the shaft) .

NOTE:

Make a note of the mutual position of the valve and the actuator. This will enable you to keep the operating direction unchanged during reassembly. Also make a note of the position of the actuator (valve open/closed).

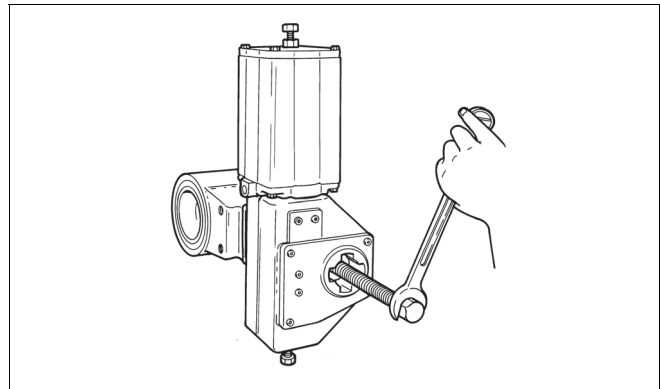


Fig. 9 Removal of the actuator with an extractor

Installation onto the valve

Clean the shaft boring of the actuator. Lubricate the shaft boring and the valve shaft with, for example, Cortec® VCI 369 anticorrosive agent.

The installation position of the actuator is determined as follows:

- The B1C-actuator is installed in such a way that the piston is in the extreme outward position when the valve is closed.
- The B1J/B1JA-actuator is installed in one of two positions, depending on the function required (spring opens/spring closes).
- The actuator mounted the valve before is installed in the same position.
- Carefully insert the actuator over the valve shaft and make sure the shaft does not press the ceramic ball, use e.g. self-locking pliers (don't damage the shaft).

NOTE:

Do not strike at the actuator during installation because this might damage the ceramic parts.

- Make sure that the actuator is straight in relation to the valve.
- Insert and tighten the fixing screws.

- Check to see that the limiter screws of the open and closed position are properly adjusted.

NOTE:

The actuator has an arrow indicating the flow direction. Make sure that this arrow is in the correct position in relation to the bore.

NOTE:

The position of the ball is indicated by means of a groove at the top of the shaft, which shows the direction of the bore.

More information concerning the actuator is available in the installation, operation and maintenance instructions given for the model in question.

5 TROUBLE SHOOTING TABLE

The following Table 9 lists malfunctions that might occur after prolonged use.

Table 9

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

6 TOOLS

In addition to the usual standard tools, the following special tools might be needed:

- Unfastening/tightening the strain ring:
 - special tool, see Table 4
- Removing the actuator:
 - extractor tool 303821 (BC/BJ 6)
 - extractor tool 8546-1 (BC/BJ 8-11)
 - extractor tool 8546-2 (BC/BJ 12-17)
- Unfastening/tightening the insert:
 - special tool, see Table 7
- Assembling the ceramic parts:
 - assembly guide, see Table 8

The special tools are available from the manufacturer.

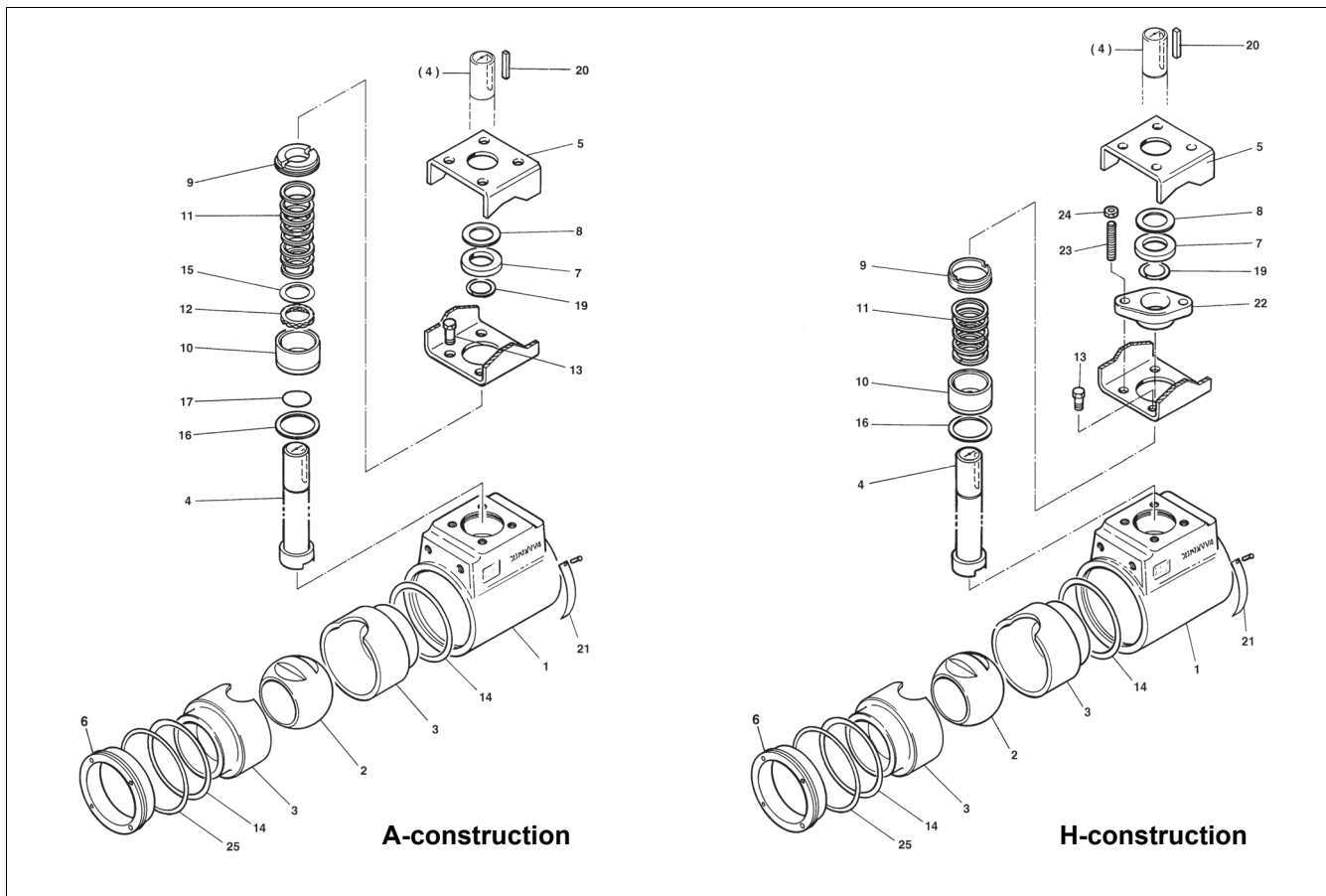
7 ORDERING SPARE PARTS

When ordering spare parts, always include the following information:

- type code, sales order number, serial number (stamped on a valve body)
- 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.

8 EXPLODED VIEWS AND PARTS LIST



Item	Qty	Description	Spare part category
1	1	Body	
2	1	Ball	3
3	2	Bushing	2
4	1	Shaft	3
5	1	Bracket	
6	1	Insert	
7	1	Axial bearing	3
8	1	Bearing	1
9	1	Strain ring	
10	1	Gland bushing	
11	1	V-ring set	1
12	1	Spring (A-construction only)	
13	4	Hexagon screw	
14	2	Sheet ring	1
15	1	Sheet ring (A-construction only)	3
16	2	Gasket	1
17	1	O-ring (A-construction only)	1
19	1	Lock ring	
20	1	Key	
21	1	Identification plate	
22	1	Gland (H-construction only)	
23	2	Stud (H-construction only)	
24	2	Hexagon nut (H-construction only)	
25	1	Plate ring (8" / DN 200 only)	1

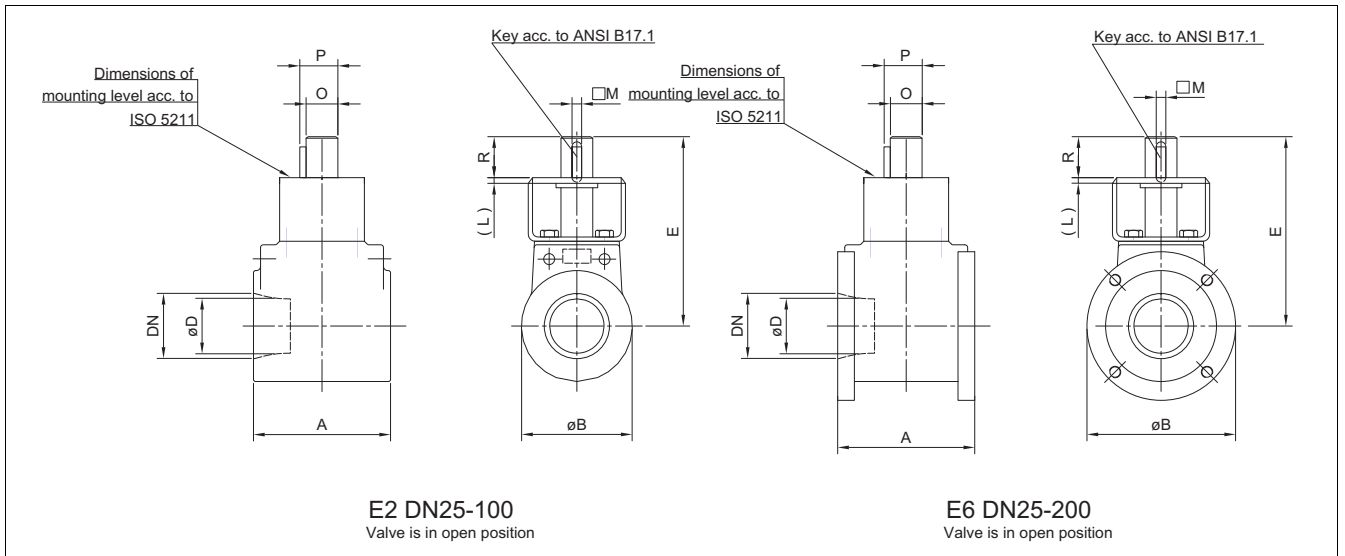
Spare part (Spare Part Set): Recommended soft parts, always needed for the repair. Delivered as a set.

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.

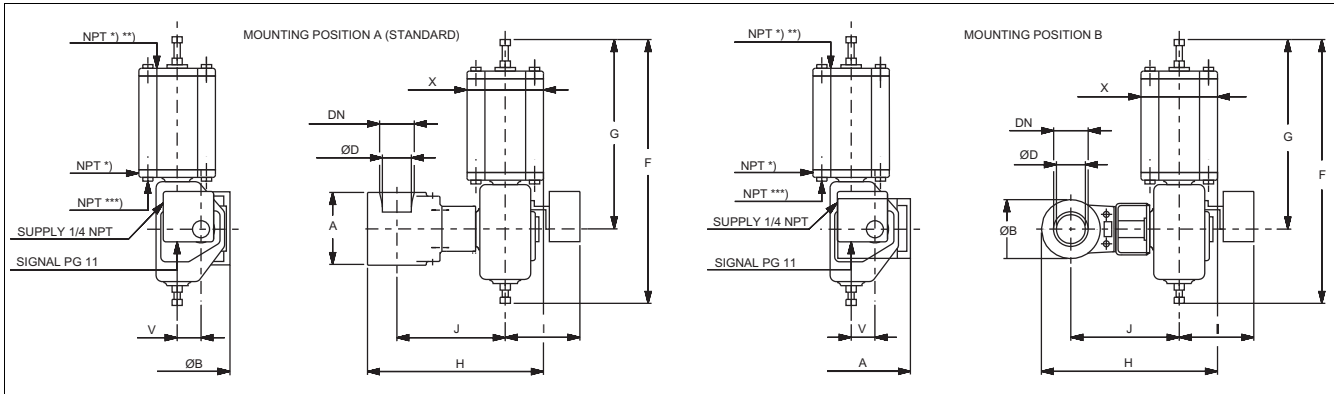
Spares for the full overhaul: All parts from the categories 1, 2 and 3.

9 DIMENSIONS AND WEIGHTS



Dimensions, mm													
DN	A	E2	E6	E	ø D	L	O	P	R	M	Mounting face	Weight, kg	
		ø B	ø B									E2	E6
25	102	63.5	130	181	20	8	15	16.9	25	4.76	F07	5	7
40	114	82	160	186	32	8	20	22	35	4.76	F07	7	11
50	124	100	165	202	40	8	25	27.7	46	6.35	F07/F10	10	14
80	165	132	210	256	65	10	35	39	58	9.53	F12	19	27
100	194	157	254	282	80	10	40	44.5	68	9.53	F12/F14	30	45
150	229	-	325	363	100	12	55	60.5	90	12.7	F14	-	105
200	243	-	380	391	135	12	55	60.5	90	12.7	F16	-	330

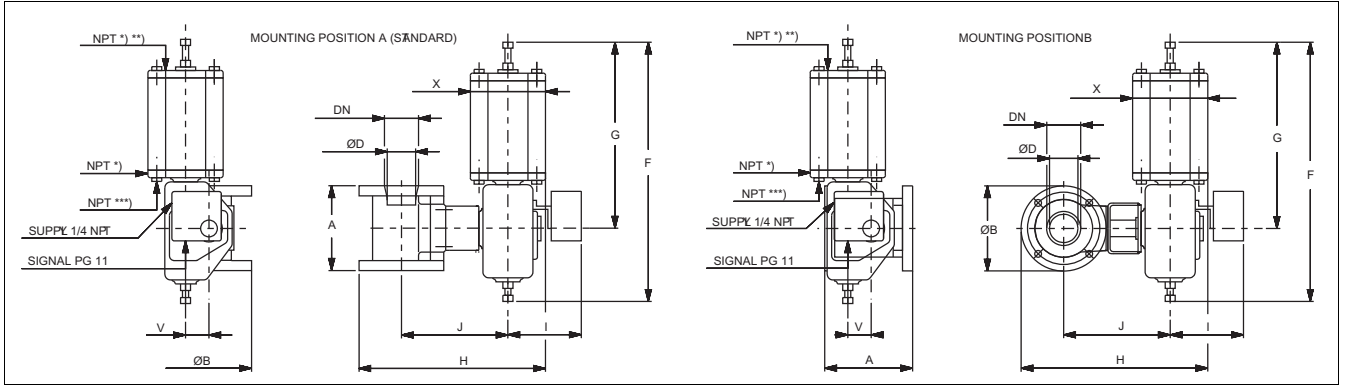
Dimensions, inch													
NPS	A	E2	E6	E	Ø D	L	O	P	R	M	Mounting face	Weight, lb	
		Ø B	Ø B									E2	E6
1	4.02	2.50	5.12	7.13	0.79	0.31	0.59	0.67	0.98	3/16	F07	11	15
1 1/2	4.49	3.23	6.30	7.32	1.26	0.31	0.79	0.87	1.38	3/16	F07	15	24
2	4.88	3.94	6.50	7.95	1.57	0.31	0.98	1.09	1.81	1/4	F07/F10	22	31
3	6.50	5.20	8.27	10.08	2.56	0.39	1.38	1.54	2.28	3/8	F12	42	60
4	7.64	6.18	10.00	11.10	3.15	0.39	1.57	1.75	2.68	3/8	F12/F14	66	99
6	9.02	-	12.80	14.29	3.94	0.47	2.17	2.38	3.54	1/2	F14	-	231
8	9.57	-	14.96	15.39	5.31	0.47	2.17	2.38	3.54	1/2	F16	-	728



Valve type	Dimensions, mm					Cv 90°	Weight kg	Actuator type	Dimensions, mm					NPT	Weight kg
	DN	Ø D	A	Ø B	K				F	G	J	V	X		
E2 025	25	20	102	64	155	61	5	B1C 6/15	400	260	283	36	90	1/4	9
								B1J6, B1JA6 /15	485	368	273	36	110	3/8	13
								B1J6, B1JA6 /15	560	420	279	43	135	3/8	22
E2 040	40	32	114	82	151	160	7	B1C 6 /20	400	260	283	36	90	1/4	11
								B1J 6, B1JA6 /20	485	368	273	36	110	3/8	15
								B1J8, B1JA8 /20	560	420	279	43	135	3/8	24
E2 050	50	40	124	100	160	240	10	B1C 9 /25	455	315	279	43	110	1/4	20
								B1J 10 /25	650	490	290	51	175	3/8	40
								B1JA 8 /25	560	420	279	43	135	3/8	27
E2 080	80	65	165	132	198	640	19	B1C 13 /35	635	445	316	65	175	3/8	50
								B1J12, B1JA12/35	800	620	316	65	215	1/2	76
E2 100	100	80	194	157	214	800	30	B1C 13/40	635	445	316	65	175	3/8	61
								B1J16, B1JA16/40	990	760	351	78	265	1/2	130

Valve type	Dimensions, inch					Cv 90°	Weight lbs	Actuator type	Dimensions, inch					NPT	Weight lbs
	Size	Ø D	A	Ø B	K				F	G	J	V	X		
E2 01	1	0.80	4.08	2.56	6.20	61	11	B1C 6/15	15.75	10.24	11.14	1.42	3.54	1/4	20
								B1J6, B1JA6 /15	19.09	14.49	10.75	1.42	4.33	3/8	28
								B1J6, B1JA6 /15	22.05	16.54	10.98	1.69	5.31	3/8	48
E2 1H	1 1/2	1.28	4.56	3.28	6.04	160	15	B1C 6 /20	15.75	10.24	11.14	1.42	3.54	1/4	24
								B1J 6, B1JA6 /20	19.09	14.49	10.75	1.42	4.33	3/8	33
								B1J8, B1JA8 /20	22.05	16.54	10.98	1.69	5.31	3/8	52
E2 02	2	1.60	4.96	4.00	6.40	240	22	B1C 9 /25	17.91	12.40	10.98	1.69	4.33	1/4	44
								B1J 10 /25	25.59	19.29	11.42	2.01	6.89	3/8	87
								B1JA 8 /25	22.05	16.54	10.98	1.69	5.31	3/8	59
E2 03	3	2.60	6.60	5.28	7.92	640	41	B1C 13 /35	25.00	17.52	12.44	2.56	6.89	3/8	109
								B1J12, B1JA12/35	31.50	24.41	12.44	2.56	8.46	1/2	166
E2 04	4	3.20	7.76	6.28	8.56	800	65	B1C 13/40	25.00	17.52	12.44	2.56	6.89	3/8	133
								B1J16, B1JA16/40	38.98	29.92	13.82	3.07	10.43	1/2	283

See Tables 1 to 3 for flange bolting dimensions



Valve type	Dimensions, mm					Cv 90°	Weight kg	Actuator type	Dimensions, mm					NPT	Weight kg
	DN	Ø D	A	Ø B	K				F	G	J	V	X		
E6 025	25	20	102	130	155	61	7	B1C 6/15	400	260	283	36	90	1/4	9
								B1J6, B1JA6 /15	485	368	273	36	110	3/8	13
								B1J6, B1JA6 /15	560	420	279	43	135	3/8	22
E6 040	40	32	114	160	151	160	11	B1C 6 /20	400	260	283	36	90	1/4	11
								B1J 6, B1JA6 /20	485	368	273	36	110	3/8	15
								B1J8, B1JA8 /20	560	420	279	43	135	3/8	24
E6 050	50	40	124	165	160	240	14	B1C 9 /25	455	315	279	43	110	1/4	20
								B1J 10 /25	650	490	290	51	175	3/8	40
								B1JA 8 /25	560	420	279	43	135	3/8	27
E6 080	80	65	165	210	198	640	27	B1C 13 /35	635	445	316	65	175	3/8	50
								B1J12, B1JA12/35	800	620	316	65	215	1/2	76
E6 100	100	80	194	254	214	800	45	B1C 13/40	635	445	316	65	175	3/8	61
								B1J16, B1JA16/40	990	760	351	78	265	1/2	130
E6 150	150	100	229	325	273	1530	105	B1C 20	840	575	385	97	215	1/2*	178
								B1J20, B1JA20/55	1200	935	358	97	395	3/4**	280
E6 200	200	135	243	380	300	2200	330	B1C 25/55	1075	725	448	121	265	1/2*	461
								B1J 25/55	1490	1140	448	121	505	3/4**	680
								B1JA 25/55	1490	1140	448	121	505	3/4***	680

Valve type	Dimensions, inch					Cv 90°	Weight lbs	Actuator type	Dimensions, inch					NPT	Weight lbs
	Size	Ø D	A	Ø B	K				F	G	J	V	X		
E6 01	1	0.79	4.02	5.12	6.10	61	15	B1C 6/15	15.75	10.24	11.14	1.42	3.54	1/4	20
								B1J6, B1JA6 /15	19.09	14.49	10.75	1.42	4.33	3/8	28
								B1J6, B1JA6 /15	22.05	16.54	10.98	1.69	5.31	3/8	48
E6 1H	1 1/2	1.26	4.49	6.30	5.94	160	24	B1C 6 /20	15.75	10.24	11.14	1.42	3.54	1/4	24
								B1J 6, B1JA6 /20	19.09	14.49	10.75	1.42	4.33	3/8	33
								B1J8, B1JA8 /20	22.05	16.54	10.98	1.69	5.31	3/8	52
E6 02	2	1.57	4.88	6.50	6.30	240	31	B1C 9 /25	17.91	12.40	10.98	1.69	4.33	1/4	44
								B1J 10 /25	25.59	19.29	11.42	2.01	6.89	3/8	87
								B1JA 8 /25	22.05	16.54	10.98	1.69	5.31	3/8	59
E6 03	3	2.56	6.50	8.27	7.80	640	59	B1C 13 /35	25.00	17.52	12.44	2.56	6.89	3/8	109
								B1J12, B1JA12/35	31.50	24.41	12.44	2.56	8.46	1/2	166
E6 04	4	3.15	7.64	10.00	8.43	800	98	B1C 13/40	25.00	17.52	12.44	2.56	6.89	3/8	133
								B1J16, B1JA16/40	38.98	29.92	13.82	3.07	10.43	1/2	283
E6 06	6	3.94	9.02	12.80	10.75	1530	229	B1C 20	33.07	22.64	15.16	3.82	8.46	1/2*	388
								B1J20, B1JA20/55	47.24	36.81	14.09	3.82	15.55	3/4**	610
E6 08	8	5.31	9.57	14.96	11.81	2200	719	B1C 25/55	42.32	28.54	17.64	4.76	10.43	1/2*	1005
								B1J 25/55	58.66	44.88	17.64	4.76	19.88	3/4**	1482
								B1JA 25/55	58.66	44.88	17.64	4.76	19.88	3/4***	1482

See Tables 1 to 3 for flange bolting dimensions

10 TYPE CODE

Neles™ ceramic ball valve, series E2						
1.	2.	3.	4.	5.	6.	7.
	E2	L	A	100	X	Z

1.	CV-VALUE OF THE VALVE DN 25
-	Standard, without sign
C05-	Maximum C _v 5
C15-	Maximum C _v 15

2.	SERIES / CHARACTERISTICS
E2	End entry, wafer type, reduced bore, seat supported
E6	End entry, lug type, reduced bore, seat supported

3.	PRESSURE RATING
C	ASME Class 150
D	ASME Class 300
J	PN 10
K	PN 16
L	PN 25
M	PN 40
R	JIS 10K
S	JIS 16K
T	JIS 20K
X	ISO PN 20
Z	ISO PN 50

4.	CONSTRUCTION
A	Standard, V-ring gland packing
H	High temperature (over +200 °C / +392 °F). Graphite gland packing (max. +450 °C / +842 °F)

5.	SIZE		5.
	ASME	EN and JIS	
01	1"	25 mm	025
1H	1 1/2"	40 mm	040
02	2"	50 mm	050
03	3"	80 mm	080
04	4"	100 mm	100
06*	6"	150 mm	150*
08*	8"	200 mm	200*

*) Series E6 only.

6.	METAL PARTS			
	Body	Shaft	Screws	Other
X	CF8M	XM-19	A2-70	316SS

7.	Erosion proof material (ball and bushings)
Z	Zirconiumoxide, Mg-PSZ ceramic (Not Atex compatible)
M1	MMC = Composite material for erosion (Atex compatible)
M2	MMC2 = Composite material for erosion -corrosion (Atex compatible)

Subject to change without prior notice.

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