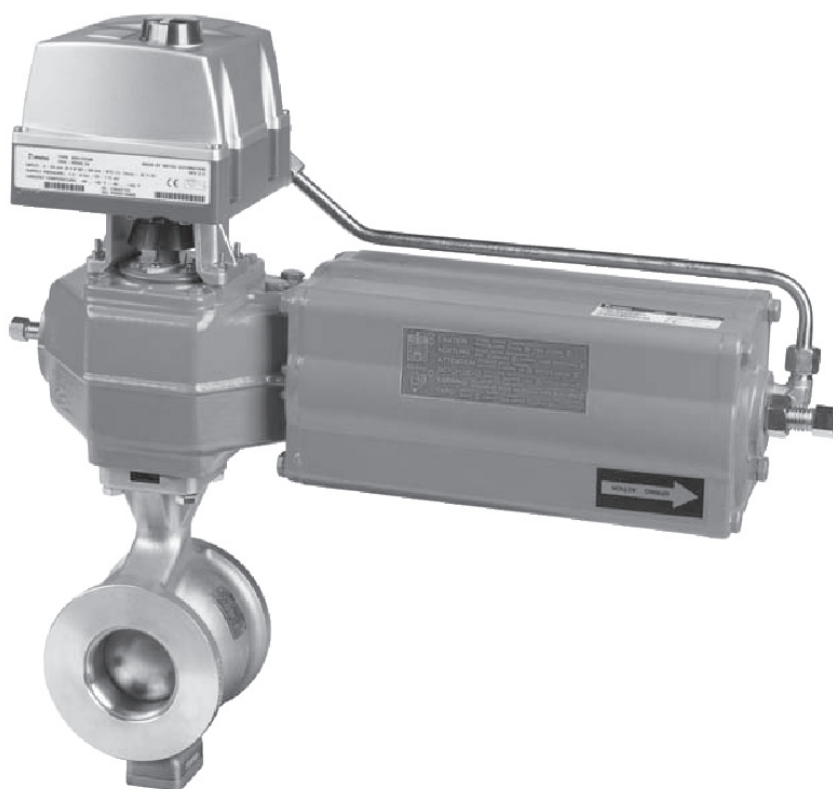


# Neles™ V-port segment valves

## Series R

Installation, maintenance and  
operating instructions



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Subject to change without notice.

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## 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 manual provides essential information on R series V-port segment valves, i.e. RA, RE and RE1-series valves. Actuators and other accessories are only discussed briefly. Refer to the individual manuals for further information on their installation, operation and maintenance.

### 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 the valve is used.

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 construction

RA, RE and RE1-series valves are V-port segment valves installed between flanges. RE series valves are flanged V-port segment valves. The body is in one part; the shaft and the segment are separate. Shaft blow-out is prevented by plates mounted against the shaft shoulder. See Figs. 1 and 2.

The valve is either soft or metal seated. Tightness derives from the spring force pressing the seat against the segment. The structure of the valve supplied may vary, depending on the customer's requirements. The detailed structure is revealed by the type code shown on the valve identification plate. The type code is explained in Section 13.

The valve is designed for both control and shut-off applications.

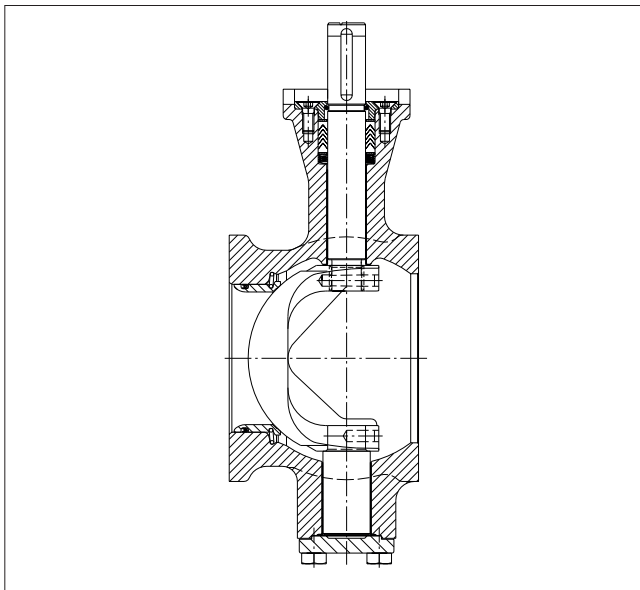


Fig. 1 Construction of a V-port segment valve, RA

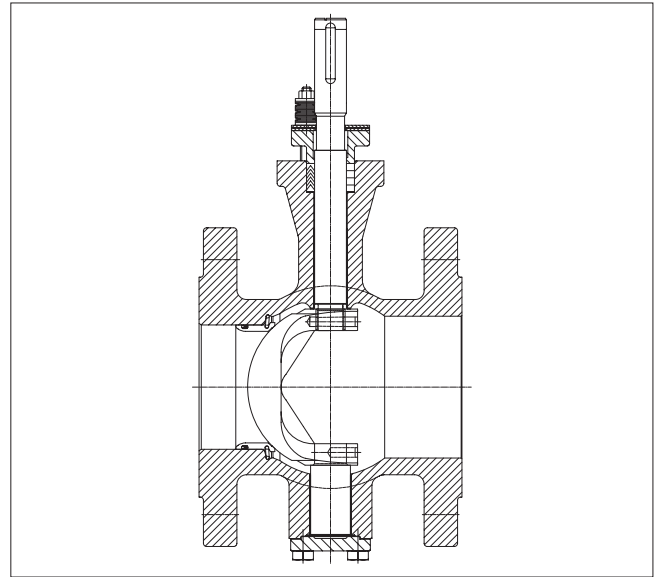


Fig. 2 Construction of a V-port segment valve, RE/RE1

## 1.3 Valve markings

Body markings are cast on the body. The valve also has an identification plate attached to it, see Fig. 3.

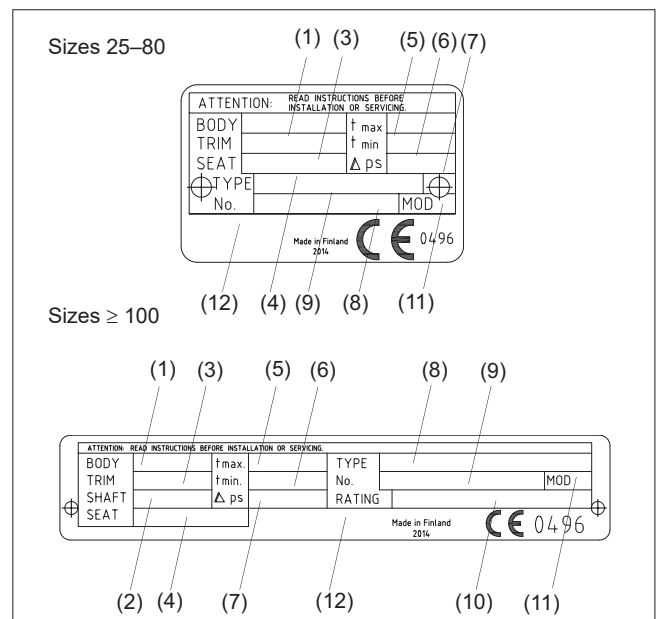


Fig. 3 Identification plate

Identification plate markings:

1. Body material
2. Shaft material
3. Segment material
4. Seat material
5. Maximum operating temperature
6. Minimum operating temperature
7. Maximum shut-off pressure differential
8. Type designation
9. Valve manufacturing parts list no.
10. Pressure class
11. Model
12. Certification and approvals, eg. CE, Atex etc.

## 1.4 Technical specifications

Initial openings (°) for RE/RA segment valves with different seats			
Size	Seat		
	S, A, U	1S	T
25	12.8	11.5	21.7
C005 25/1	9.3	N/A	14.5
C015 25/2	9.3	N/A	14.5
C05 25/3	9.3	N/A	14.5
C15 25/4	9.3	N/A	14.5
40	10.7	8.4	16.7
50	15.0	10.3	19.0
65	11.3	9.5	15.1
80	8.0	7.0	12.7
100	7.3	6.3	12.7
150	6.3	5.0	11.0
200	5.6	5.3	10.3
250	5.5	5.0	8.7
300	5.0	4.5	8.1
350	4.7	4.9	7.7
400	4.6	4.0	7.4
500	4.0	4.5	6.4
600	5.3	5.3	N/A
700	5.7	5.7	N/A
800	6.5	6.5	N/A

Face-to-face length: RA: According to Neles internal standard  
RE, RE1: acc. to IEC/EN 534-3-2

Body rating: RA: ASME Class 300 or PN 40  
RE, RE1: ASME Class 300 or PN 50/PN40  
NPS 1"-4" has option of ASME Class 600 or PN 63/PN 100

Max. pressure differential: see Figs. 6 ... 14

Temperature ranges:  
RA-series: -40 °C... +260 °C.  
RE-series: -50 °C ... +260 °C with soft bearings  
-50 °C ... +315 °C with metal bearings in sizes 2" - 10"  
-50 °C ... +425 °C with metal bearing and high temperature seats in sizes 2" - 10".

Flow direction: indicated by an arrow on the body

Dimensions: see Section 12

Weights: see Section 12

Note that max. shut-off and max. throttling pressures are based on mechanical maximum differential pressures at ambient temperature. You must always observe flowing temperature and flange rating when concluding applicable pressure values. In practice you must also check noise level, cavitation intensity, velocity, actuator load factor, etc. using Nelprof.

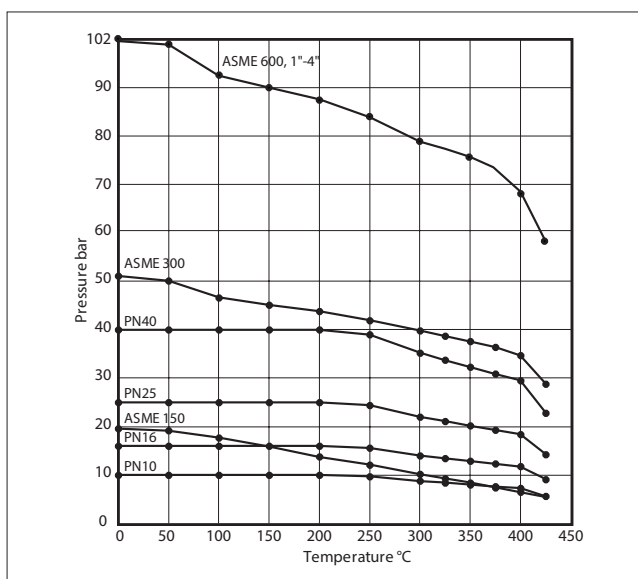


Fig. 4 Body pressure ratings, WCB

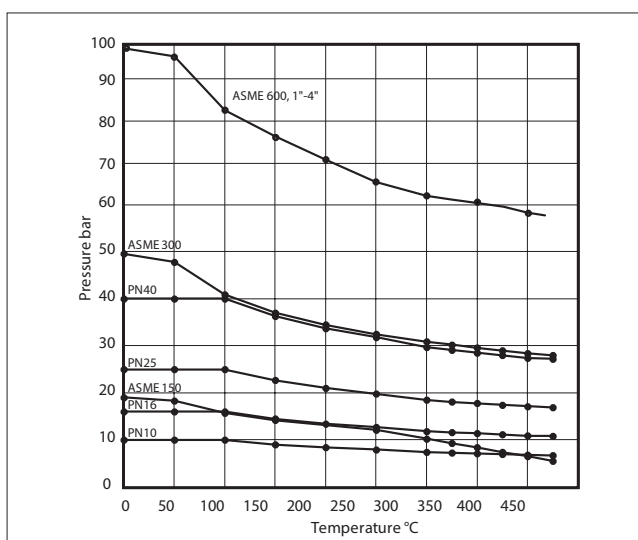


Fig. 5 Body pressure ratings, CF8M

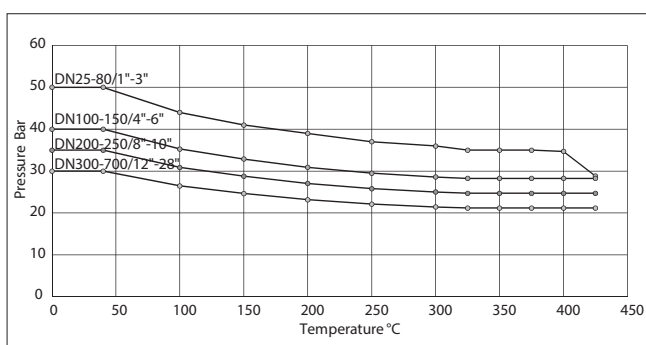


Fig. 6 Max operating pressure differential in control service, RE opening range 0 %-70 %

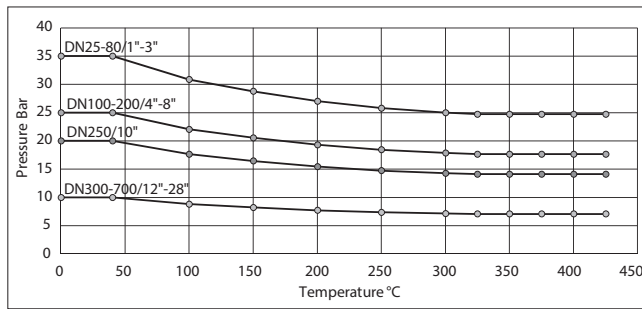


Fig. 7 Max operating pressure differential in control service, RE opening range 70 %-100 %

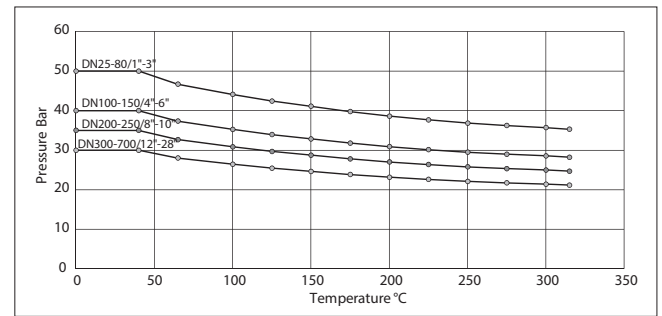


Fig. 11 Maximum pressure differentials in on-off operation, AISI 329 Shaft

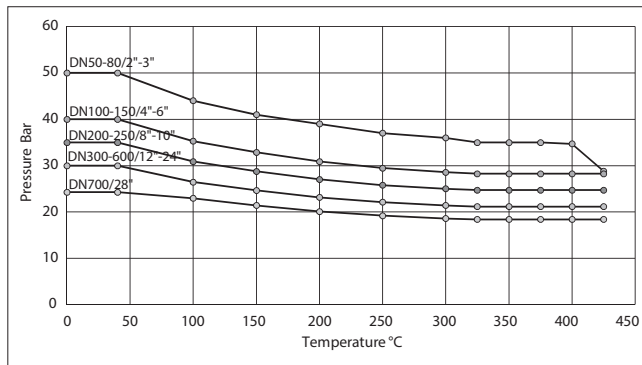


Fig. 8 Max operating pressure differential in control service, Q-RE opening range 0 %-30 %

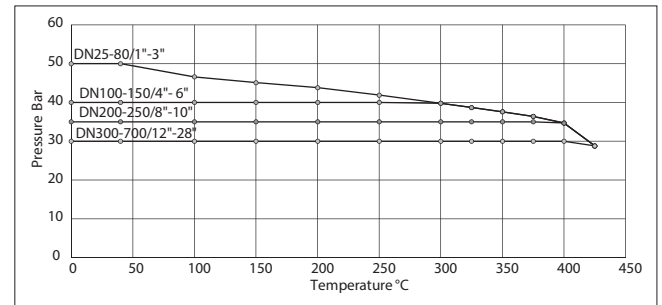


Fig. 12 Maximum pressure differentials in on-off operation, 17-4PH Shaft

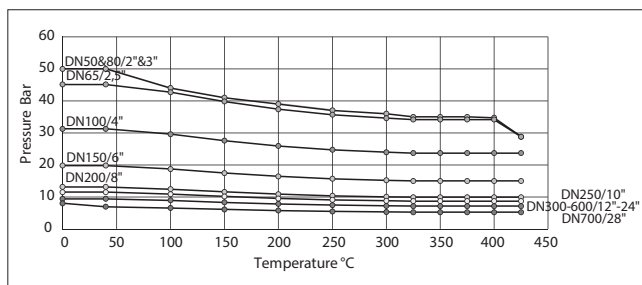


Fig. 9 Max operating pressure differential in control service, Q-RE opening range 30 %-60 %

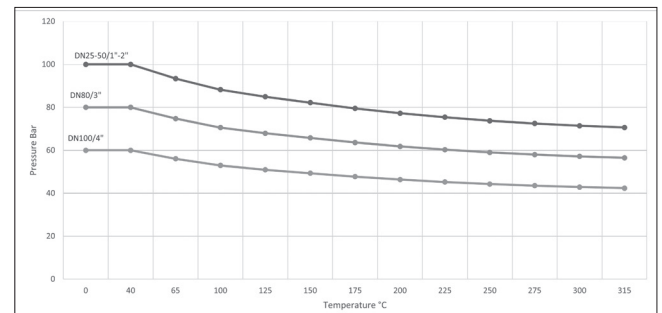


Fig. 13 Maximum pressure differentials in on-off operation, Class 600 AISI 329 Shaft.

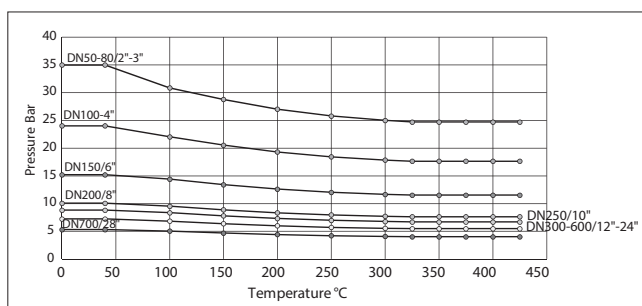


Fig. 10 Max operating pressure differential in control service, Q-RE opening range 60 %-100 %

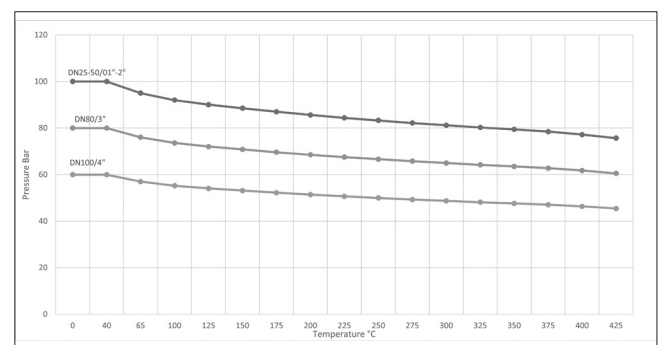


Fig. 14 Maximum pressure differentials in on-off operation, Class 600 17-4PH Shaft

## 1.5 Valve approvals

Valve meets the Fire safe requirements of ISO 10497:2010 - API 607, seventh edition.

## 1.6 CE and ATEX 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.

When applicable, the valve meets the requirements of the European Directive 2014/34/EU relating to equipment and protective systems intended for use in potentially explosive atmospheres, 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 yourself 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 segment 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 segment functions as a cutting device. The segment position may also change when the valve is moved. Close and detach the actuator pressure supply pipeline for valve maintenance. Failure to do this may result in damage or personal injury.

### CAUTION:

#### **Protect yourself from noise!**

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 software. Observe the relevant work environment regulations on noise emission.

### CAUTION:

#### **Beware of a very cold or hot valve!**

The valve body may be very cold or very hot during use. Protect yourself against cold injuries or burns.

### CAUTION:

#### **When handling the valve or the valve package, take its weight into account!**

Never lift the valve or valve package by the actuator, positioner, limit switch or their piping.

More detailed information see Instructions for lifting Neles products 10LIFT70en.

### CAUTION:

Make sure the valve is not pressurized when removing the actuator.

## ATEX/Ex Safety

### CAUTION:

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

### CAUTION!

The actual surface temperature of valve is depended on the process temperature. The protection from high or low temperature must be considered by the end user before valve is put into service.

### CAUTION!

Ensure the general process and worker protection from static electricity in the facilities.

**Note!** Within series there is possibility to Category 2, Category 3 and non-ATEX valve.

## 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 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

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

Store the valve carefully before installation, preferably indoors in a dry place.

Do not take the valve to the intended location and do not remove the flow port protectors until the valve is installed.

The valve is delivered in the closed position. A valve equipped with a spring-return actuator is delivered in the position determined by the spring.

## 3. INSTALLATION

### 3.1 General

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

**CAUTION:**

**When handling the valve or the valve package, take its weight into account!**

### 3.2 Installing in the pipeline

Flush or blow the pipeline carefully before installing the valve. Foreign particles, such as sand or pieces of welding electrode, will damage the segment sealing surface and seats.

The valve has an arrow indicating the flow direction. Install the valve in the pipeline so that the flow direction of the pipe corresponds to that marked on the valve. The mounting position does not place restrictions on operation of the valve, actuator or positioner. You should, however, avoid installing the valve so that the shaft points downwards because impurities travelling in the pipeline may then enter the body cavity and damage the gland packing. See Fig. 15.

The RA and RE1 valves should be applicable to the pipe flanges, see the chapters 12.3 & 12.4.

Choose flange gaskets according to the operating conditions.

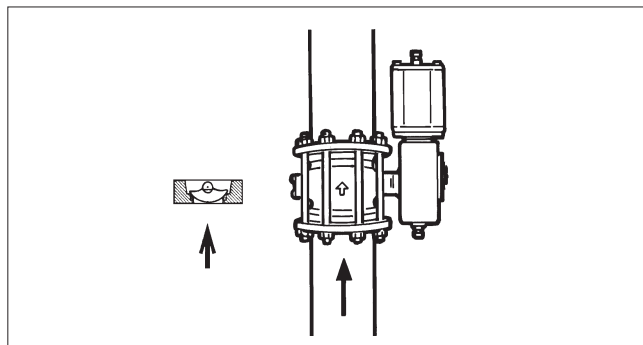


Fig. 15 Installing the valve into pipeline

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

Stress caused in the valve by pipeline vibration can be reduced by supporting the pipeline properly. Reduced vibration also helps ensure correct functioning of the positioner.

Servicing is facilitated if the valve needs no support. If necessary, you can support the valve by the body, using regular pipe clamps and supports. Do not fasten supports to the flange bolting or the actuator, see Fig. 16.

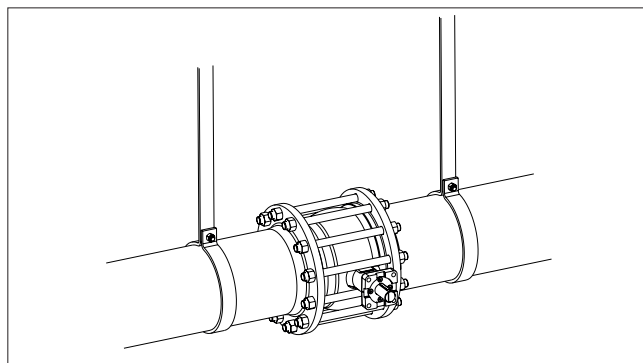


Fig. 16 Supporting the valve

### 3.3 Actuator

**NOTE:**

When installing the actuator, make sure that the valve-actuator combination functions properly. Detailed information on actuator installation is given in Section 7 or in separate actuator instructions.

The valve closed and open positions are indicated by a groove at the end of the valve shaft. The groove shows the position of the segment with respect to the flow port, see Fig. 17.

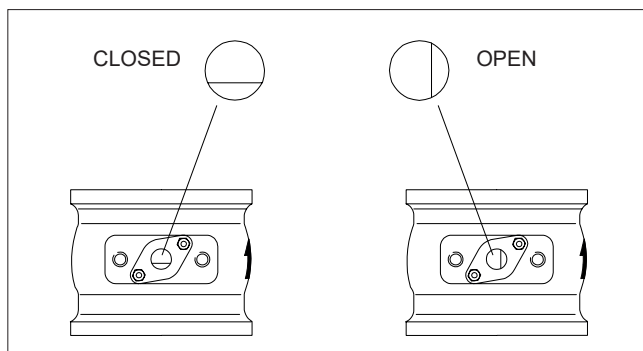


Fig. 17 Closed and open positions



If possible, install the valve so that the actuator can be disconnected without removing the valve from the piping.

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

In some cases, for instance when a large-size actuator is used or when the pipeline vibrates heavily, supporting the actuator is recommended. Contact Valmet for further information.

## 4. COMMISSIONING

Ensure that no dirt or foreign objects are left inside the valve or pipeline. Flush the pipeline carefully. Keep the valve entirely open during flushing.

Check all joints, pipings and cables.

Check that the actuator, positioner and limit switches are correctly adjusted. Refer to their installation, operation and service manuals.

## 5. MAINTENANCE

### 5.1 Maintenance general

#### 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.

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 11, 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.

## 5.2 Replacing the gland packing

#### CAUTION:

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

### RA series

In gland packing, V-ring set (20), tightness is ensured by pressure caused by the wave spring (32). See Fig. 18.

The gland packing must be replaced when leakage occurs through the gland (9).

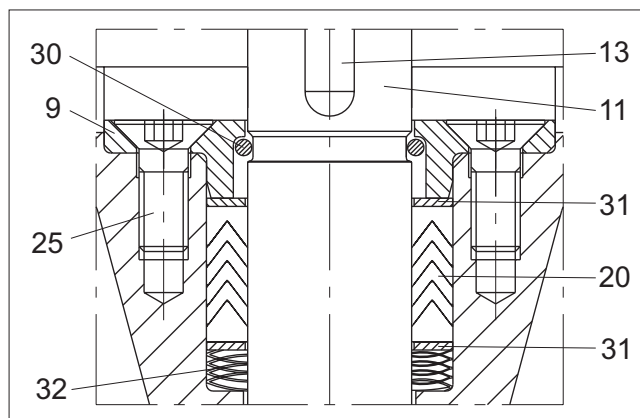


Fig. 18 Gland packing

- Make sure the valve is not pressurized.
- Remove the actuator from the valve shaft acc. to the instructions given in the actuator's manual.
- Remove the key (13) from the drive shaft (11). Unfasten the screws (25) and the gland (9).
- Remove the retainer (30) from the drive shaft. Avoid to damage the shaft's surface.
- Remove the upper sheet ring (31).
- Remove the old packing rings (20) using a pointed pin. Avoid to damage the sealing surfaces.
- Remove the lower sheet ring (31) and the wave spring (32).
- Clean the packing ring counterbore.
- Mount the spring (32) and the lower sheet ring (31) into the counterbore.
- Mount the new packing rings (20) one by one on the shaft (11) using the gland (9) as a tool. The keyway and shoulder must not damage the packing rings.
- Mount the upper sheet ring (31).
- Mount the retainer (30) in the groove of the shaft. Avoid to damage the surface of the shaft.
- Fasten the gland (9) with the screws (25) and tighten them according to the Table 1.
- Mount the key (13) on the shaft (11).



Table 1 Torques for gland screws

Thread	Torque, Nm	Width across flats
M6	8	4 mm
M8	18	5 mm
UNC 1/4	8	5/32"
UNC 5/16	18	3/16"

## RE / RE1 series

In gland packings, tightness is ensured by the contact between the gland follower and the packing rings. See Fig. 19.

The gland packing (20) must be replaced if leakage occurs even after the hexagon nuts (25) have been tightened.

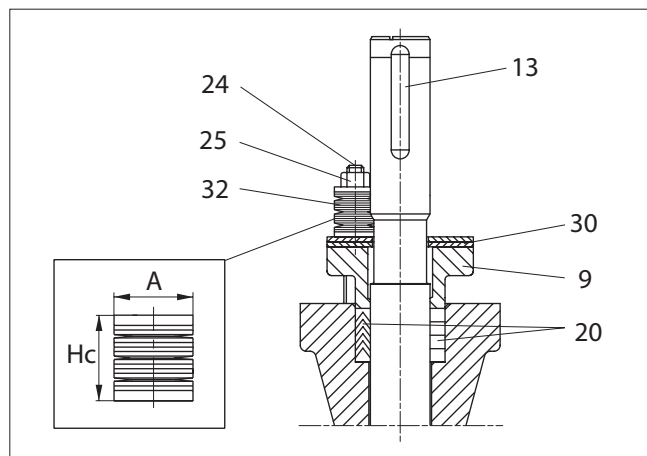


Fig. 19 Gland packing, RE/RE1

- Make sure that the valve is not pressurized.
- Detach the actuator and bracket according to the instructions in Section 5.3.
- Remove the key (13).
- Remove the hexagon nuts (25), disc spring sets (32), one stud (24), retaining plates (30) and gland follower (9).
- Remove the packing rings (20) from around the shaft using a knife or some other pointed instrument without scratching the surfaces.
- Clean the packing ring counterbore.
- Place the new packing rings (20) over the shaft (11). The gland follower may be used for pushing the rings into the counterbore. Do not damage packing rings in the shaft keyway. See Fig. 19.
- Screw down the removed stud.
- Deform the packing rings first by tightening the gland nuts (25) without disc springs to the torque Tt, see the value from Table 2.
- Remove the gland nuts and one stud. Mount the retaining plates (30) with the text UPSIDE on top and the removed stud and place the disc spring sets (32) on the gland studs. Tighten the nuts (25) so that the disc springs are compressed to the height Hc, see Table 2. Lock the nuts with locking compound e.g. Loctite 221. See Fig. 20.
- Check leakage when the valve is pressurized.

### CAUTION:

For safety reasons the retainer plates MUST always be installed according to the instructions.

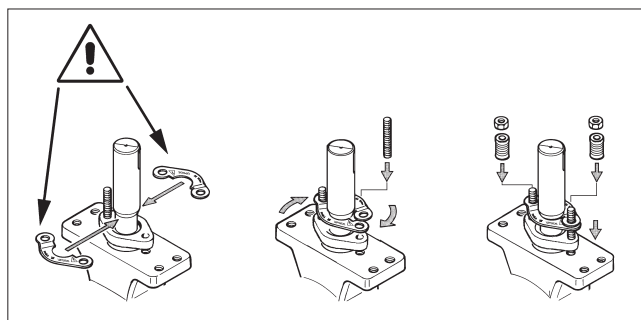


Fig. 20 Installing the retainer plates

Table 2 Tightening of the gland packing

Valve size	A (mm)	Hc (mm)	Tt (Nm)
DN 25 / 01	20	20.5	5
DN 40 / 1H	20	20.5	5
DN 50 / 02	20	20.5	5
DN 65 / 2H	20	20.5	5
DN 80 / 03	20	20.0	7
DN 100 / 04	20	20.0	7
DN 150 / 06	25	29.0	12
DN 200 / 08	25	29.0	14
DN 250 / 10	25	28.0	16
DN 300 / 12	25	28.0	18
DN 350 / 14	35.5	38.0	38
DN 400 / 16	35.5	37.0	45
DN 500 / 20	40	42.0	70
DN 600 / 24	40	41.5	90
DN 700 / 28	40	41.5	90
DN800 / 32	56	54	200

## 5.3 Detaching the actuator

### CAUTION:

When handling the valve or the valve package, take its weight into account!

### CAUTION:

Make sure the actuator is not pressurized when removing it.

### CAUTION:

Make sure the valve is not pressurized when removing actuator.

### NOTE:

Before dismantling, carefully observe the position of the valve in relation 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 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 package at the same time.

See Section 7 for details of detaching actuators.

## 5.4 Removing the valve from the pipeline

### CAUTION:

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

- Make sure that the pipeline is not pressurized and that it is empty. Also make sure that no medium is led into the pipeline while the valve is being removed or after it has been removed.
- Place the hoisting ropes carefully, unscrew the pipe flange bolts and lift the valve from the pipeline using the ropes. More detailed information see Instructions for lifting Neles products 10LIFT70en.

## 5.5 Replacing the seat

S- or U-seat (not DN25-50) can be changed as described in 5.5.1 & 5.5.2. For DN25-50 and other seats, the valve needs to be dismantled as described in 5.6.

### CAUTION:

Beware of the segment movement!

### Detaching the S- or U-seat

- The valve must be removed from the pipeline.
- Turn the segment (3) so that it does not touch the seat, Fig. 21.

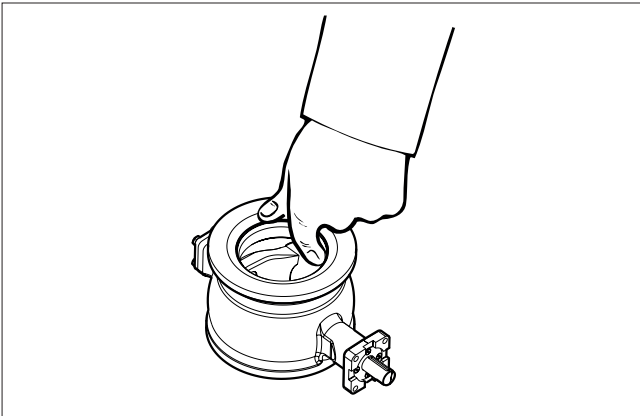


Fig. 21 Turning the ball segment

- In DN 65-100 valves (excluding the low-Cv versions), unfasten the blind flange (10) and push the segment into the back position, Fig. 22.

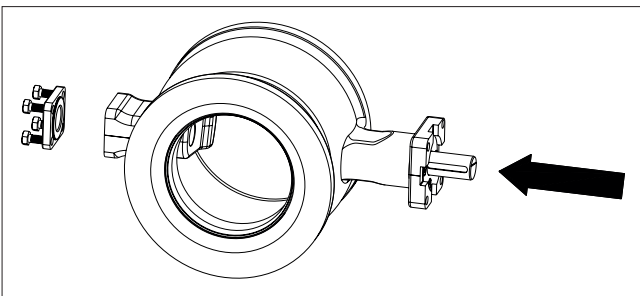


Fig. 22 Removing the blind flange

- DN 65-100 valves can be dismantled, as described in 5.6, to make the replacement of the seat easier.
- Tap the seat (4) with a soft spindle all around the circumference from the upstream side to make it fall into the body, Fig. 23.



Fig. 23 Knocking off the seat

- Turn the valve and lift the seat from the body through the downstream flow port, Fig. 24.

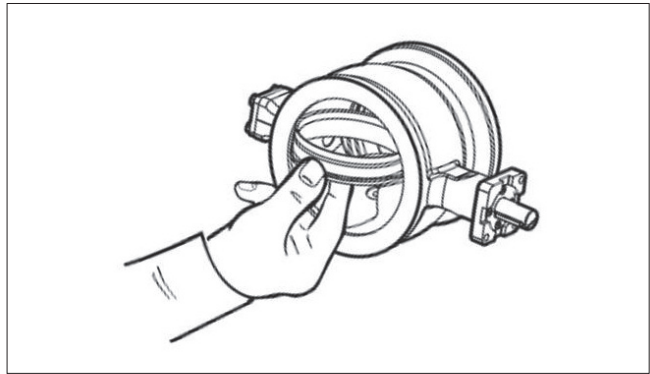


Fig. 24 Lifting the seat

### Installing the seat

The back seal (6) of the segment seat (4) is normally a lip seal. The seat is easier to install if the back seal is precompressed. An O-ring seal does not need precompression.

- Clean the flow port that houses the seat. Remove any burrs. Round off the edges using a fine abrasive paper and clean the flow port carefully, see Fig. 25. Place the back seal (6) onto the seat (4).
- Lubricate the flow port, seat (4) and back seal (6) and the lock spring (5) with a volatile lubricant, e.g. Hyprez.
- Make sure that the lubricants are compatible with the medium.
- **Only for a lip seal:** Push the seal carefully into the flow port for about 15 minutes, Fig. 26. The following work phases must be completed before the precompression is lost.

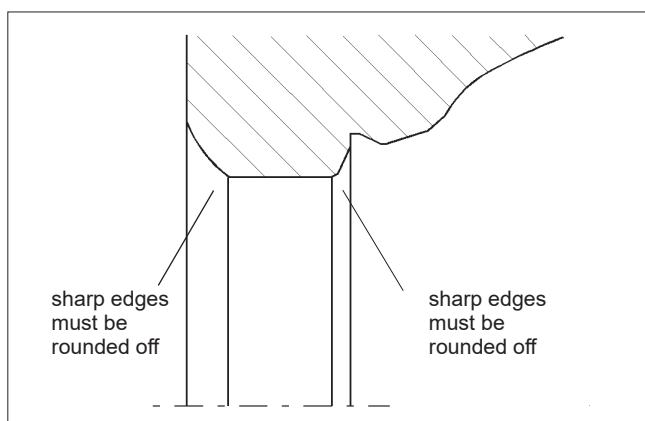


Fig. 25 Rounding the sharp edges

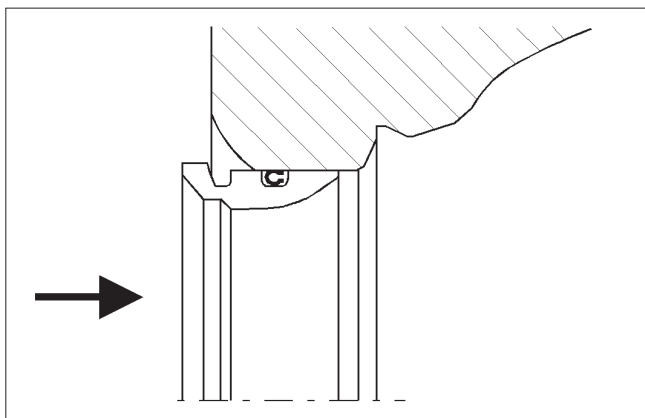


Fig. 26 Precompression of the lip seal

- Place the lock spring (5) on the seat.
- When the valve is opened, the ends of the spring must be by the V-shaped opening, see Fig. 27.

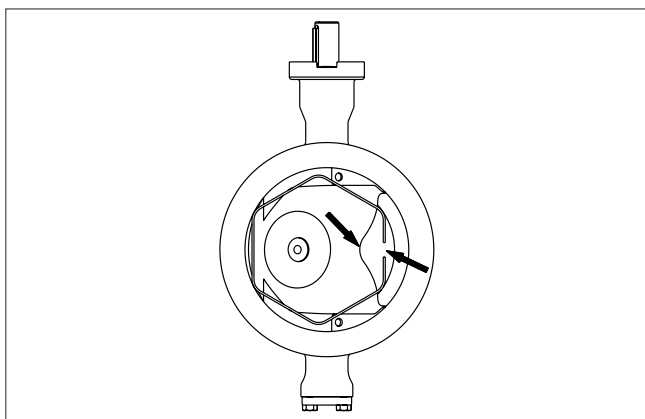


Fig. 27 Mounting the seat

- Place the seat package into the body as shown in Figs. 28 and 29.

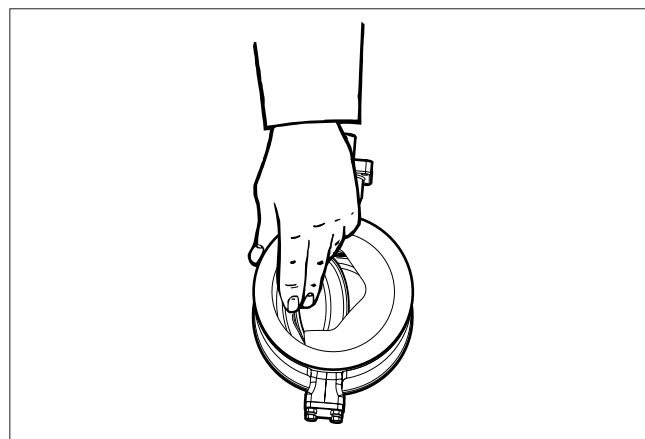


Fig. 28 Slipping the seat into the body

- Check that the spring angles extend to the control face.

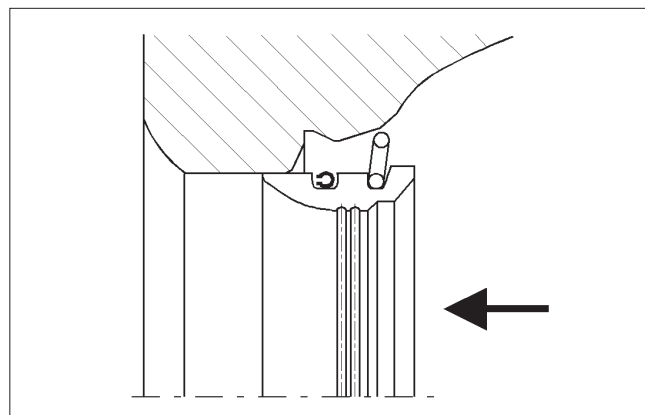


Fig. 29 Pushing the the spring angles against the control face

- Place a screwdriver on each visible spring angle one after the other and knock the spring into the groove, see Fig. 30.

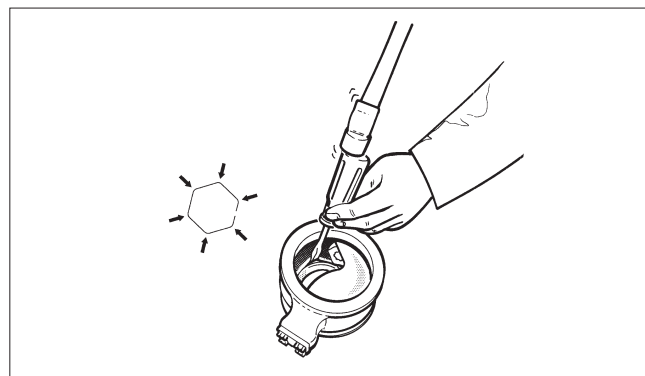


Fig. 30 Knocking the spring into the groove

- Turn the segment 180° clockwise and knock the rest of the spring angles into the groove, Fig. 31. A special tool available from the manufacturer may also be used for the work phases in Figs. 30 and 31.

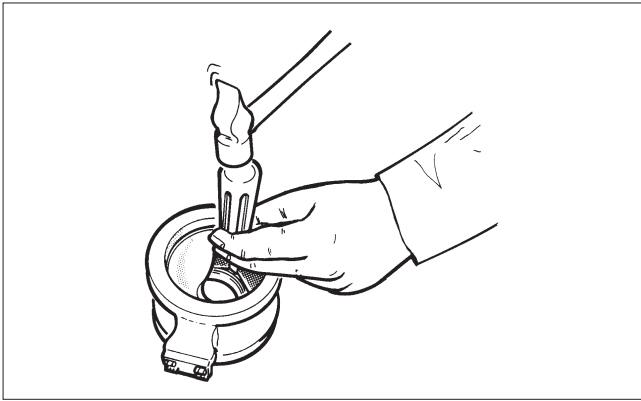


Fig. 31 Knocking the spring after turning the seat around

- Use a plastic spindle to ensure that the seat is correctly placed and can move freely, Fig. 32.

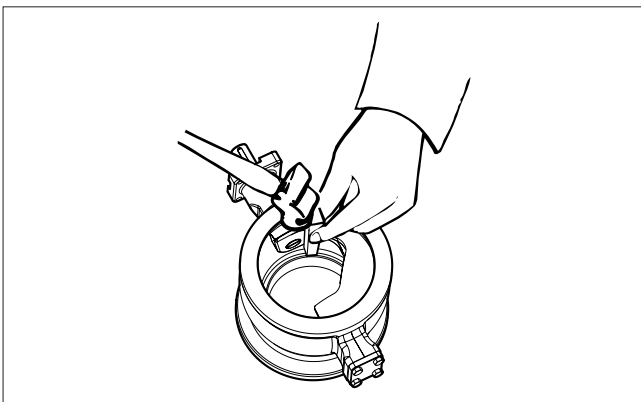


Fig. 32 Securing with a plastic spindle

## 5.6 Dismantling the valve

- Turn the valve into the closed position.
- Remove the pin lockings either by grinding or using a spindle. Detach the pins (14 and 15) by drilling, Fig. 33. Be careful not to damage the original bores. Note! The pins and the drive shaft have been secured by welding in the titanium version.
- Detach the retainer plates (30).
- Detach the gland packings (20).
- Remove the shafts (11 and 12), Fig. 34.
- Lift the segment from the body.
- Remove the bearings (16 and 17) and clean the bearing spaces.
- Remove the seat by pushing it evenly inside the body.

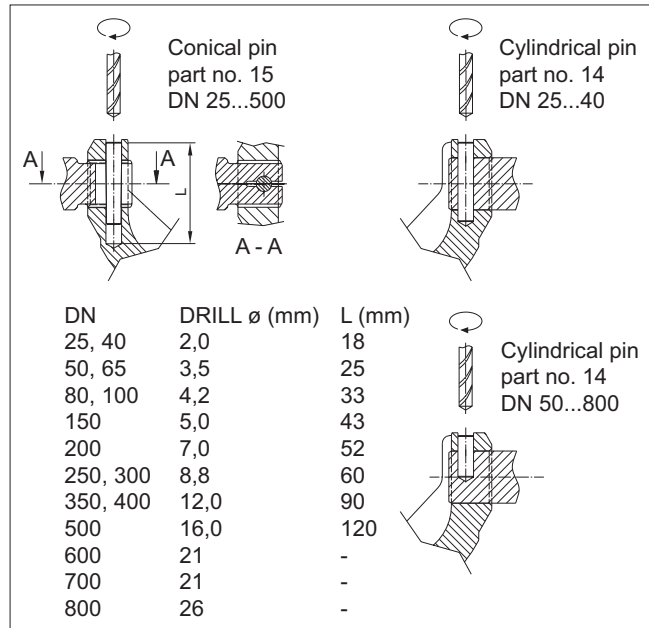


Fig. 33 Drilling the pin

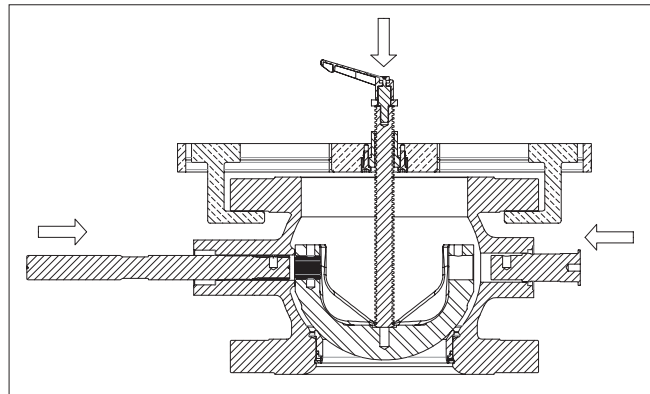


Fig. 34 Installing the shafts

## 5.7 Inspection of removed parts

- Clean the removed parts.
- See if the shafts (11, 12) and bearings (16, 17) are damaged.
- Check if the sealing surfaces of the segment and the seat (4) are damaged.
- If necessary, replace the parts with new.

## 5.8 Assembly

- The bearing material of the standard construction valves is PTFE-impregnated stainless steel net. The bearings for the high temperature valves are cobalt alloy bushings which are mounted into the body together with the shafts. High temperature is over +260 °C.
- Put the bearings (16, 17) in their places.
- Mount the S, U or T-seat as explained in 5.5.
- For A-seat (Fig. 35), mount the retaining ring (7) to the groove in Body (1). Install back seal (6), support ring (8) and spring (5) to the seat (7). Mount the assembled seat package to the body. Use a plastic spindle to ensure that the seat is correctly placed.
- Mount the segment in the body in the closed position. In the low Cv version, insert the filling ring (22) between the drive shaft (11) and segment (3). Press the segment to fit the shaft (12).

- For A-seat special compression tool is needed for compress the spring to mount the shaft and drive shaft. See Fig. 34.

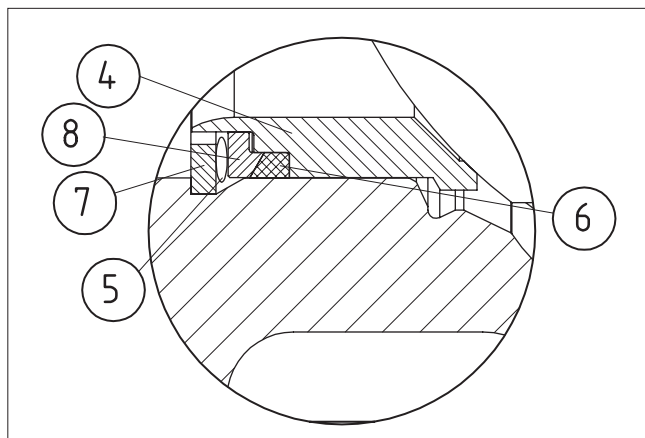


Fig. 35 A-seat

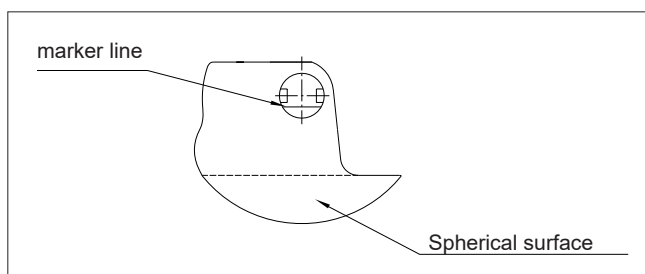


Fig. 36 Segment and shaft positions

- Install the drive shaft (11). Note the location of the pin hole and the keyway. See Figs. 37 and 38.
- High temperature-construction: Mount the bearings (16, 17 and 18) into the shafts. Spray a thin layer of dry lubricating fluid, e.g. Molykote 321R or equivalent, into the inside surface of the bushing and the shaft bearing groove. Press the bushing with a tightening ring into the shaft bearing groove and fit the shaft with the bearings carefully into the body through the tightening ring.
- Please note the depth of the hole (L) for the conical pin, Fig. 33. Use a former to check the proper shaft position of low Cv valves, see Fig. 37. Put the pins (14, 15) in their places and lock them, Fig. 38. Both pins are locked with TIG welding in the high-consistency acid-resistant version and in the standard and high-consistency titanium versions. Moreover, the drive shaft is welded to the segment in the high-consistency versions. Contact the manufacturer for more information.

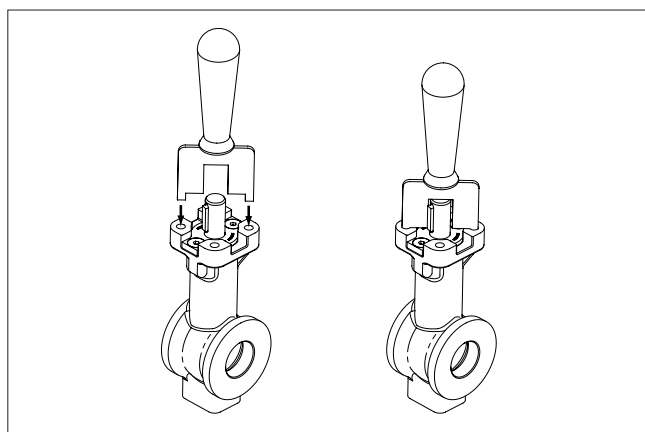


Fig. 37 Using a former to check shaft position

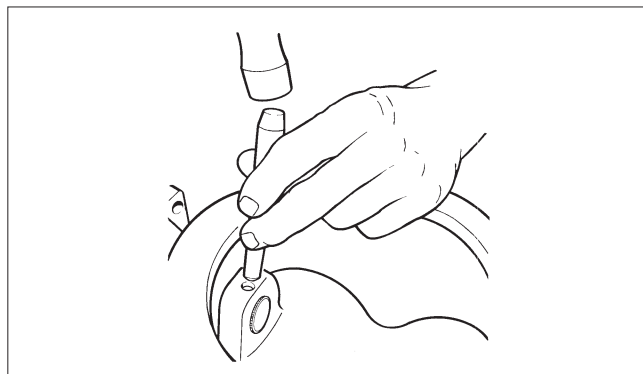


Fig. 38 Locking a pin

- Install the blind flange (10) with gaskets (19), tighten the bolts (26), see Table 3.
- Install the gland packing according to Section 5.2.

Table 3 Screw torques, Nm (for lubricated screws))

Srew	M6 / UNC 1/4	M8 / UNC 5/16	M10 / UNC 3/8	M12 / UNC 1/2	M16	M20	M24	M30
A2/A4	8.6	18	33	70	170	340	590	1200
B8M Cl.1	4.7	10	18	38	95	190	320	650
Gr.660	11	24	43	91	230	440	770	1500

## 6. 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 bore of the valve. The valve must be in the open position during the test.

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

## 7. INSTALLING AND DETACHING THE ACTUATORS

### 7.1 General

Different Neles actuators can be mounted using suitable brackets and couplings. The valve can be operated, for example, by actuators of the E, B1 or Quadra-Powr series.

### 7.2 Installing B1C actuators

### CAUTION:

Beware of the segment movement!

- Drive the actuator piston to the extreme outward position and turn the valve into the closed position, see Fig. 39.

- Clean the shaft bore and file off any burrs. Lubricate the shaft bore.
- If a coupling is needed between the actuator shaft bore and the valve shaft, lubricate the coupling and install it in the actuator.
- Fasten the bracket loosely to the valve using lubricated screws.
- Push the actuator carefully onto the valve shaft. Avoid forcing it, since this may damage the segment and seat. We recommend mounting the actuator so that the cylinder is pointing upwards.
- Align the actuator as accurately as possible using the valve as a guide. Lubricate the mounting screws. Install the washers and tighten all screws, see Table 3.
- Adjust the segment open and closed positions (limits to piston movement) by means of the actuator stop screws, see Fig. 39. The correct opening angle is 90°. The accurate position can be seen in the flow port. Check that the yellow arrow indicates the position of the segment. **Keep your fingers out of the flow port!**

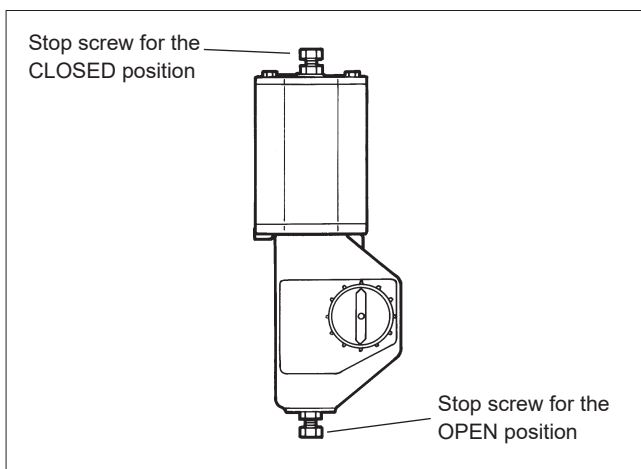


Fig. 39 Open and closed positions of a B1 actuator

There is no need to adjust the stop screw if the actuator is re-installed in the same valve. Drive the actuator piston to the housing end (open position). Turn the actuator by hand until the valve is in the open position (unless it is already open). Fasten the actuator in this position. The actuator may be installed in another position with respect to the valve by selecting another keyway in the actuator, see Fig. 40.

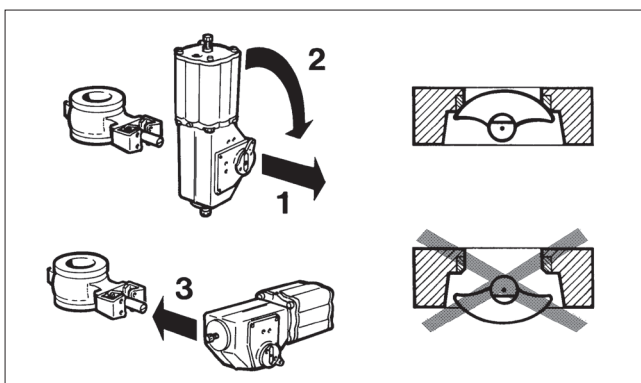


Fig. 40 Changing the actuator position

- Check the tightness of the stop screw at the end of the cylinder during cylinder operation. The threads must be sealed using an appropriate non-hardening sealant, e.g. Loctite 225.

#### CAUTION:

Actuator needs to be removed from the valve when changing the actuator position!

- Check that the actuator is functioning correctly. Check the segment flow bore position and the actuator movement relative to the valve (clockwise: close, counterclockwise: open) after installing the actuator. The valve should be closed when the piston is in the extreme outward position.
- Check that the yellow arrow indicates the position of the segment. If necessary, change the position of the arrow.

## 7.3 Installing B1J actuators

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 is between the piston and the cylinder end and pushes the piston towards the housing.

Spring-return actuators are installed in a manner similar to B1C series actuators, taking into account the following.

### Type B1J

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, see Fig. 17.

### Type B1JA

Install the actuator so that the piston is in the cylinder-end position at housing side. The cylinder must not be pressurized and the air supply connection must be open. The valve must be in the open position, see Fig. 17.

The rest of the installation procedure is the same as for B1C actuators.

## 7.4 Detaching B series actuators

#### CAUTION:

Make sure the valve is not pressurized when removing the actuator.

- Disconnect the actuator from its power source; detach the air supply pipe and control signal cables or pipes from their connectors.
- Unscrew the bracket screws.
- Detach the actuator using a suitable extractor, see Fig. 41. The tool can be ordered from the manufacturer.
- Remove the bracket and coupling, if any.

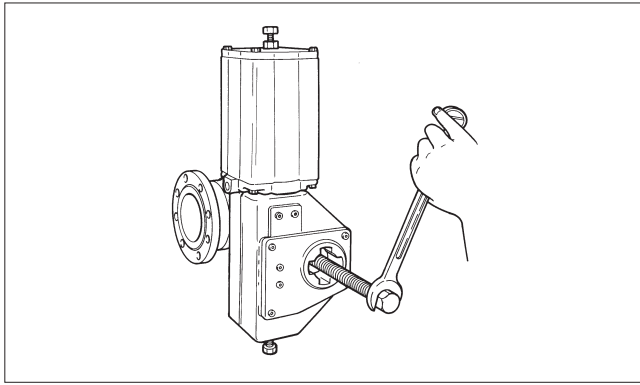


Fig. 41 Detaching an B series actuator

- The actuator must not be pressurized and the air supply connection must be open.
- Turn the valve segment to correspond to the spring operation: clockwise close, counterclockwise open. The marker line at the end of the shaft shows the position, see Fig. 17.
- Clean the actuator shaft bore and lubricate it.
- Push the actuator carefully onto the valve shaft. Avoid forcing it, since this may damage the segment and seat.
- Lubricate the actuator mounting screws and screw them in. Tighten all screws, see Table 3.

**Adjust the valve open and closed positions by means of the screws at the side of the actuator; remember to tighten the locking nuts. See Fig. 42.**

**Keep your fingers out of the flow port!**

## 7.5 Installing a Quadra-Powr™ actuator

### CAUTION:

Beware of the segment movement!

Quadra-Powr actuators may be used for spring-to-close and spring-to-open operations depending on the installation position. After selecting the desired operation, see Fig. 42 for the correct installation position.

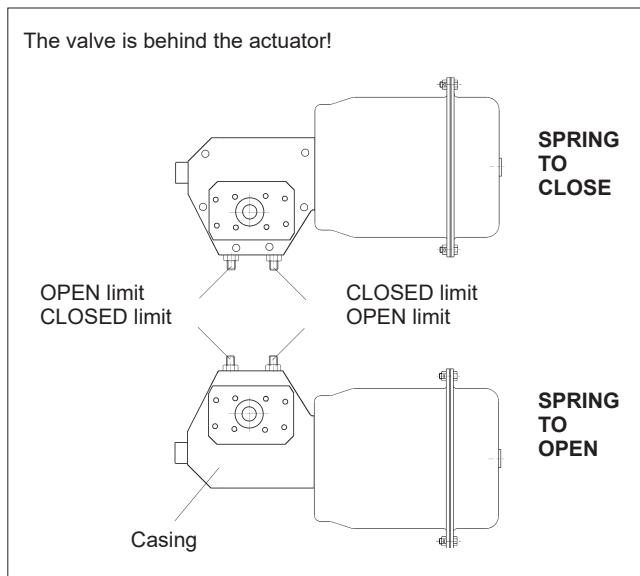


Fig. 42 Installation of a Quadra-Powr actuator and adjustment of the open and closed limits



## 8. TROUBLE SHOOTING TABLE

Table 4 lists malfunctions that might occur after prolonged use.

Table 4 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

## 9. TOOLS

In addition to standard tools the following special tools might be needed to facilitate working.

- For removal of the actuator

Product:	ID:
B1C/B1J 6	303821
B1C 8-11 / B1J 8-10	8546-1
B1C 12-17 / B1J 12-16	8546-2
B1C/B1J 20	8546-3
B1C/B1J 25	8546-4
B1C/B1J 32	8546-5
B1C 40 / B1J 322	8546-6
B1C 50	8546-7
B1C 502	8546-8

- For mounting and removal of the seat.

Product:	ID:
DN 01	273336
DN 015	273337
DN 02	273338
DN 03	273339
DN 04	273340
DN 06	273341
DN 08	273342
DN 10	273343
DN 12	273344

- Shaft position checking (low Cv valves)
  - former H069563 (Series RA)
  - former H069564 (Series RE, RE1)

These are available from the manufacturer.

## 10. ORDERING SPARE PARTS

### NOTE:

Always use original spare parts to make sure that the valve functions as intended.

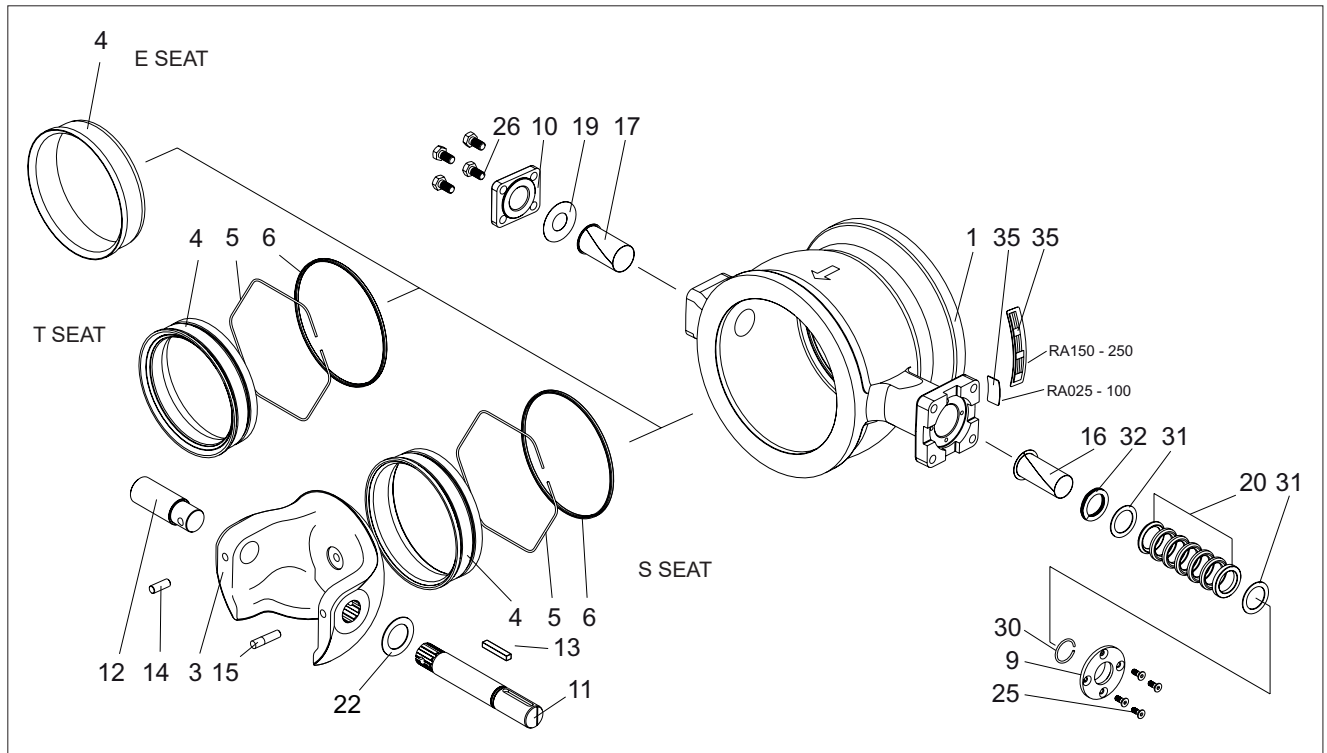
When ordering spare parts, always include the following information:

- 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.

# 11. EXPLODED VIEWS AND PARTS LISTS

## 11.1 Series RA



Item	Qty.	Description	Spare part category
1	1	Body	
3	1	Segment	3
4	1	Seat	2
5	1	Lock spring	2
6	1	Back seal	2
9	1	Gland follower	
10	1	Blind flange	
11	1	Drive shaft	3
12	1	Shaft	3
13	1	Key	3
14	1	Cylindrical pin	3 (Cat. 2 for sizes 01"-02")
15	1	Cylindrical pin	3 (Cat. 2 for sizes 01"-02")
16	1	Bearing	3
17	1	Bearing	3
19	1-2	Sealing plate	1
20	1	Packing	1
22	1	Filling ring (only in new low Cv version)	
25	2-4	Countersunk screw	
26	4	Hexagon screw	
30	2	Retainer ring	
31	2	Sheet ring	
32	1	Wave spring	
35	1	Identification plate	

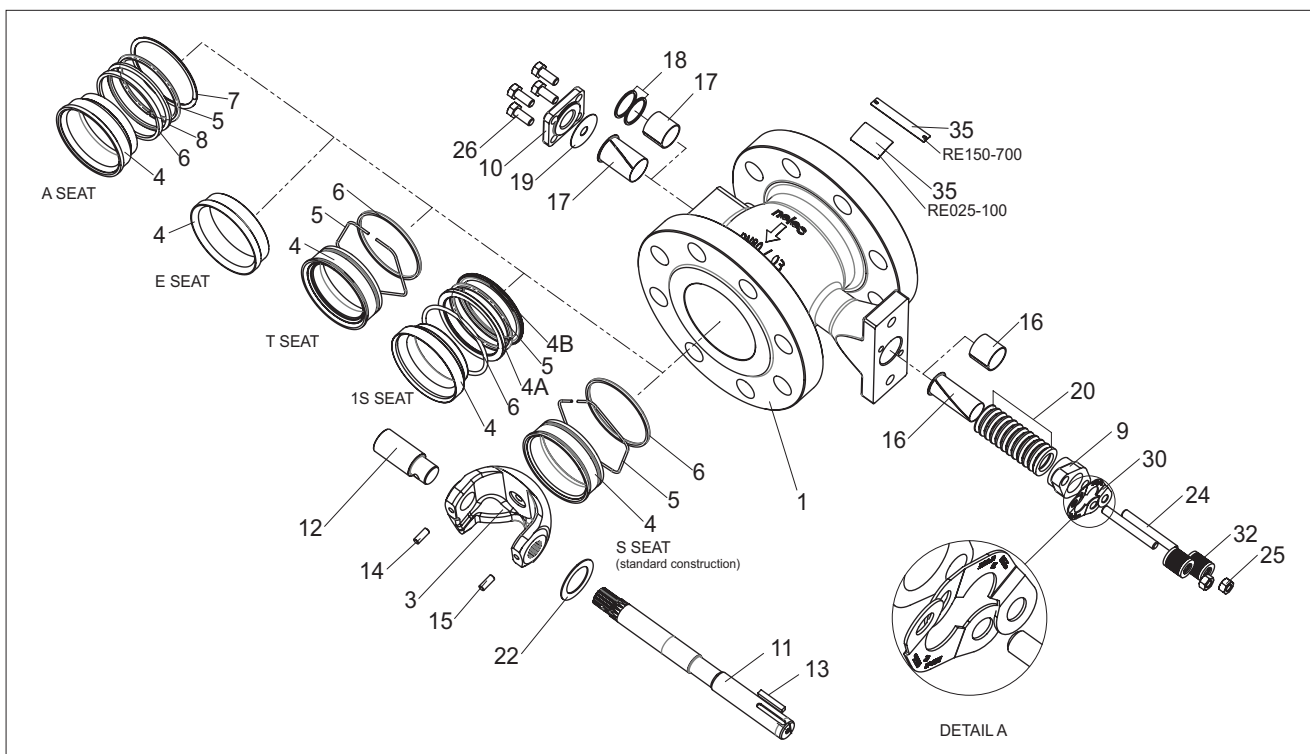
Spare part set category: Recommended soft parts, always needed for the repair. Delivered as a set.

Spare part category 2: Parts for replacing of the seat. Delivered 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.

## 11.2 Series RE



Part	Name	Stainless steel	Carbon steel	Spare part cat.
1	Body	ASTM A351 gr. CF8M	ASTM A216 gr. WCB	
3	V-port segment	AISI 329 + chromium / CG8M + chromium <sup>1)</sup>	AISI 329 + chromium / CG8M + chromium <sup>1)</sup>	3
4	Seat	AISI 316 + Cobalt based alloy / PTFE <sup>1)</sup>	AISI 316 + Cobalt based alloy / PTFE <sup>1)</sup>	2
4A	Back ring	AISI 316	AISI 316	1
4B	Support ring	AISI 316	AISI 316	1
5	Lock spring	INCONEL 625	INCONEL 625	
6	Back seal	Stainless steel + PTFE / Viton GF / Graphite	Stainless steel + PTFE / Viton GF / Graphite	
7	Retaining ring	EN 10028-1.4571	EN 10028-1.4571	1
8	Support ring	AISI 316	AISI 316	1
9	Gland follower	ASTM A351 gr. CF8M	ASTM A351 gr. CF8M	
10	Blind flange	ASTM A351 gr. CF8M	ASTM A351 gr. CF8M	3
11	Drive shaft	AISI 329 / 17-4PH <sup>1)</sup>	AISI 329 / 17-4PH <sup>1)</sup>	3
12	Shaft	AISI 329 / 17-4PH <sup>1)</sup>	AISI 329 / 17-4PH <sup>1)</sup>	3
13	Key	AISI 329	AISI 329	3
14	Cylindrical pin	AISI 329 / 17-4PH <sup>1)</sup>	AISI 329 / 17-4PH <sup>1)</sup>	3 (Cat. 2 for sizes 01"-02")
15	Cylindrical pin	AISI 329 / 17-4PH <sup>1)</sup>	AISI 329 / 17-4PH <sup>1)</sup>	3 (Cat. 2 for sizes 01"-02")
16	Bearing	PTFE + SS net / cobalt based alloy <sup>1)</sup>	PTFE + SS net / cobalt based alloy <sup>1)</sup>	3
17	Bearing	PTFE + SS net / cobalt based alloy <sup>1)</sup>	PTFE + SS net / cobalt based alloy <sup>1)</sup>	3
18	Thrust bearing	Cobalt based alloy <sup>1)</sup>	Cobalt based alloy <sup>1)</sup>	2
19	Sealing plate	Graphite / PTFE	Graphite / PTFE	1
20	Packing	PTFE/Graphite <sup>1)</sup>	PTFE/Graphite <sup>1)</sup>	1
22	Filling ring (only low Cv 1"/DN 25)	Stainless Steel AISI 316	Stainless Steel AISI 316	
24	Stud	ISO 3506 A4-80/B8M	ISO 3506 A4-80/B8M	
25	Hexagon nut	ISO 3506 A4-80/B8M	ISO 3506 A4-80/B8M	
26	Hexagon bolt	ISO 3506 A4-80/B8M	ISO 3506 A4-80/B8M	
30	Retainer Plate	AISI 316	AISI 316	
32	Spring stack	SIS 2324 & CrMo Steel + ENP	SIS 2324 & CrMo Steel + ENP	
35	Identification plate	AISI 316	AISI 316	

Spare part set category: Recommended soft parts, always needed for the repair. Delivered as a set.

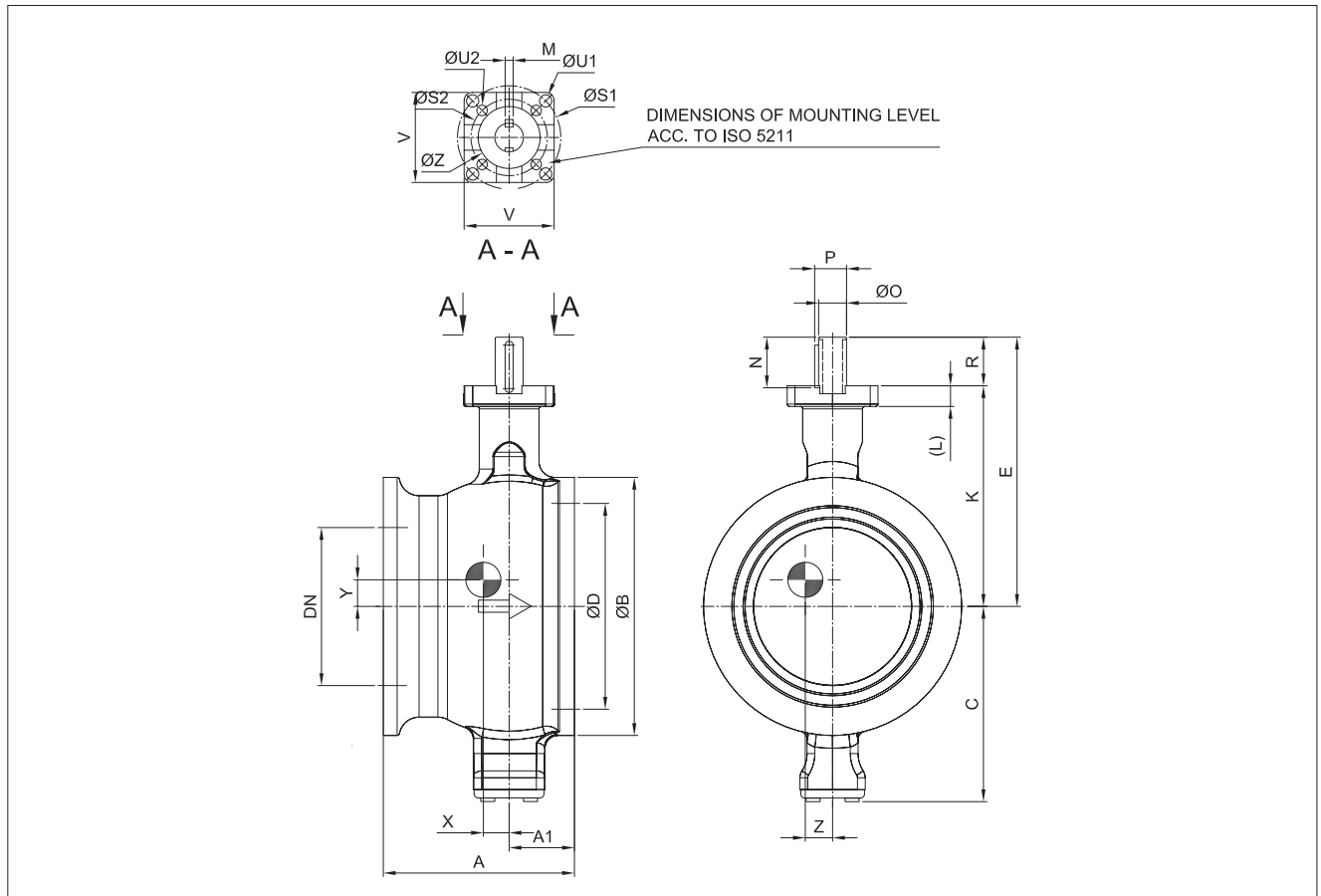
Spare part category 2: Parts for replacing of the seat. Delivered as a set.

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.

## 12. DIMENSIONS AND WEIGHTS

### 12.1 Series RA

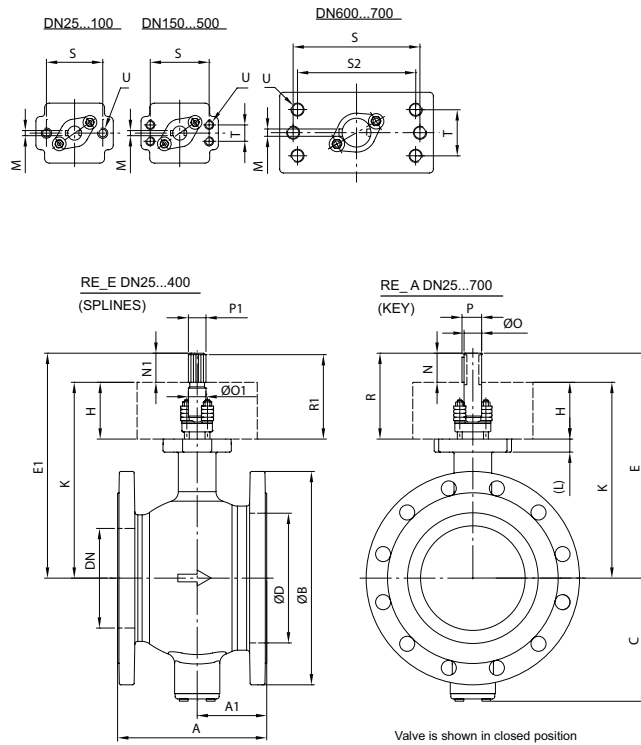


Type	DN	ISO 5211	Dimensions, mm																		kg
			A1	A	ØB	C	ØD	E	R	K	ØO	M	P	ØS1	ØS2	ØU1	ØU2	ØZ	L	V	
RA	25	F05	21	50	64	56	33	127	27	102	15	4.76	17	-	50	-	6.6	35	15.5	52	1.3
	40	F05	21	60	82	65	49	133.5	25	108.5	15	4.76	17	-	50	-	6.6	35	15.5	52	2.4
	50	F05, F07	27	75	100	91	60	144.5	25	119.5	15	4.76	17	70	50	9	6.6	55	15.5	67	3.7
	65	F05, F07	40	100	118	97	75	151	25	126	15	4.76	17	70	50	9	6.6	55	15.5	67	5.3
	80	F07, F10	38	100	130	108	89	177	35	142	20	4.76	22.2	102	70	11	9	70	16	94	6.2
	100	F07, F10	41	115	158	120	115	186	35	151	20	4.76	22.2	102	70	11	9	70	16	94	9.6
	150	F10, F12	55	160	216	174	164	244	44	200	25	6.35	27.8	125	102	14	11	85	22	114	24
	200	F10, F12	70	200	268	201	205	285	50	235	30	6.35	32.9	125	102	14	11	85	22	114	42
	250	F12, F14	82	240	324	251	259	338	61	277	35	9.53	39.1	140	125	18	14	100	26	136	68

Size	RA			Q-RA		
	X	Y	Z	X	Y	Z
150	27	17	2	24	15	1
200	39	14	3	34	12	2
250	51	12	4	43	10	2

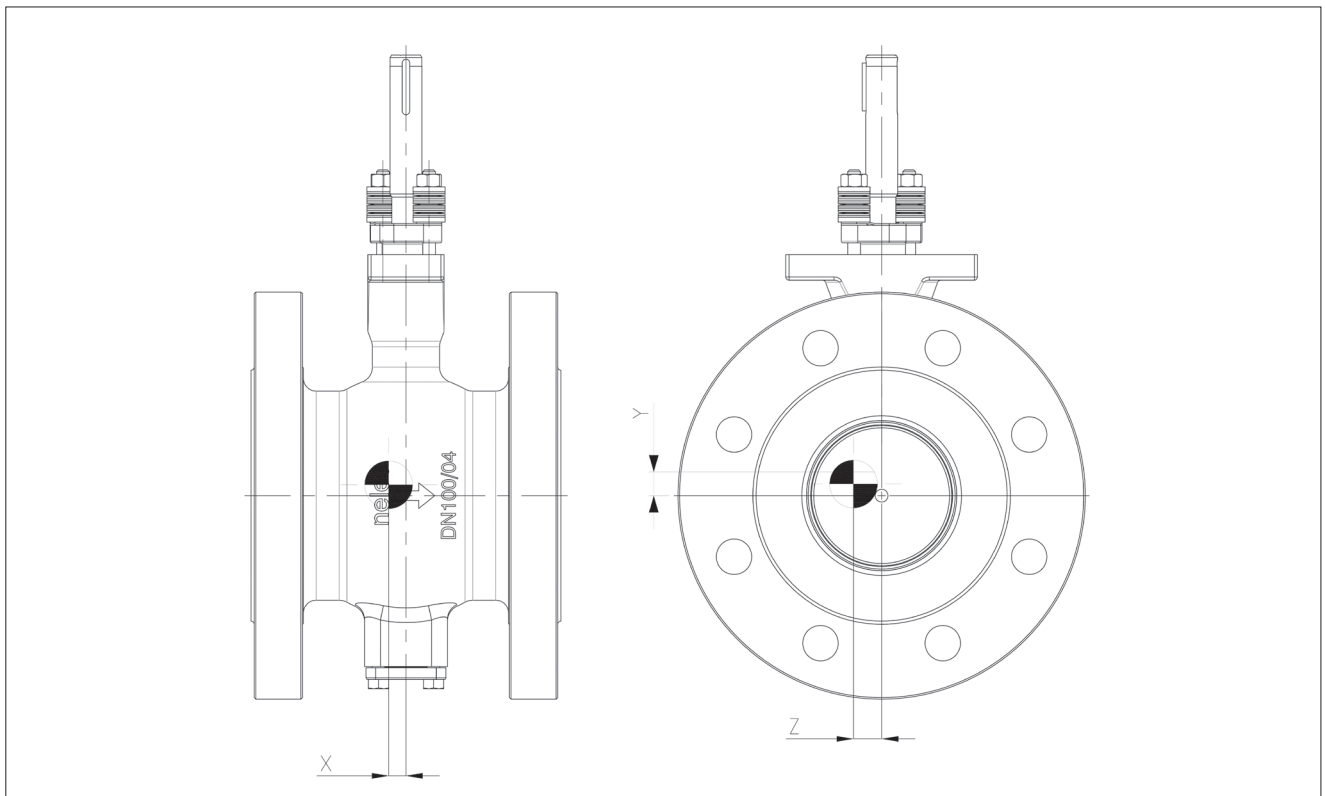
**NOTE!** Center of mass values are approximate based on 3D-models. Please be aware the actual values may vary due to manufacturing tolerances.

## 12.2 Series RE



DN / inch	Dimensions, mm										Shaft dimensions, mm										
	A1	A	C	ØD	K	S/S2	T	U	L	H	RE_A (Key)					RE_E (Splines)					
											E	R	ØO	M	P	N	E1	R1	ØO1	P1/DIN5480	N1
25 / 1"	51	102	56	33	182	70	-	M10	15.5	80	207	105	15	4.76	17	25	203	101	15	W14x1x12	20
40 / 1 1/2"	57	114	65	49	188.5	70	-	M10	15.5	80	213.5	105	15	4.76	17	25	209.5	101	15	W14x1x12	20
50 / 2"	62	124	91	60	199.5	70	-	M10	15.5	80	224.5	105	15	4.76	17	25	219.5	100	15	W14x1x12	20
65 / 2 1/2"	72.5	145	97	75	206	70	-	M10	15.5	80	231	105	15	4.76	17	25	226	100	15	W14x1x12	20
80 / 3"	82.5	165	108	89	232	90	-	M12	16	90	267	125	20	4.76	22.2	35	253	111	20	W14x1x12	20
100 / 4"	97	194	120	113	241	90	-	M12	16	90	276	125	20	4.76	22.2	35	262	111	20	W18x1x16	20
150 / 6"	114.5	229	174	164	290	110	32	M12	22	90	335	135	25	6.35	27.8	46	315	115	25	W25x1x24	25
200 / 8"	111.5	243	201	205	345	130	32	M12	22	110	395	160	30	6.35	32.9	51	370	135	30	W25x1x24	25
250 / 10"	138.5	297	251	259	387	130	32	M12	26	110	445	168	35	9.53	39.1	58	422	145	35	W34x1x32	35
300 / 12"	154	338	269	300	417	160	40	M16	26	120	485	188	40	9.53	44.2	68	452	155	40	W34x1x32	35
350 / 14"	175	400	311	350	433	160	40	M16	29	120	513	200	45	12.70	50.4	80	468	155	45	W34x1x32	35
400 / 16"	160	400	353	400	494	160	55	M20	29	140	584	230	50	12.70	55.5	90	529	175	50	W34x1x32	35
500 / 20"	233	508	420	500	615	230	90	M27	40	180	727	292	70	19.05	78.2	119	-	-	-	-	-
600 / 24"	355	610	490	600	704	330/304.7	120	M30	40	220	838	354	75	19.05	81.9	134	-	-	-	-	-
700 / 28"	295	710	539	700	768	330/304.7	120	M30	55	220	914	366	85	22.225	95.3	146	-	-	-	-	-
800 / 32"	380	840	635	800	871.5	330/304.7	120	M30	55	220	1052	402	105	25.4	114.4	180	-	-	-	-	-

DN / inch	Flange dimensions, mm, and weights											
	REC ASME 150		RED ASME 300(600)		REJ PN10		REK PN16		REL PN25		REM PN40	
	B	kg	B	kg	B	kg	B	kg	B	kg	B	kg
25 / 1"	110	3.6	124	4.9(5.2)	115	4.6	115	4.6	115	4.6	115	4.6
40 / 1 1/2"	125	4.6	155	7.5(8.5)	150	6.2	150	6.2	150	6.2	150	6.2
50 / 2"	150	7.4	165	9.5(11.4)	165	8.8	165	8.8	165	8.8	165	8.8
65 / 2 1/2"	180	13	190(-)	13(-)	185	13	185	13	185	13	185	13
80 / 3"	190	14	210	19(22.6)	200	16	200	16	200	16	200	16
100 / 4"	230	21	254(275)	29(41.4)	220	18	220	18	235	21	235	21
150 / 6"	280	39	320	54	285	37	285	37	300	42	300	42
200 / 8"	345	62	380	83	340	56	340	60	360	64	375	71
250 / 10"	405	95	445	132	395	90	405	91	425	101	450	125
300 / 12"	485	143	520	203	445	124	460	130	485	166	515	189
350 / 14"	535	194	585	290	505	174	520	182	555	248	580	275
400 / 16"	595	249	650	364	565	223	580	235	620	314	660	361
500 / 20"	700	453	775	595	670	375	715	468	730	486	755	549
600 / 24"	815	853	915	1051	780	791	840	899	845	910	890	1007
700 / 28"	925	1260	1035	1535	895	1134	910	1146	960	1243	1145	1338
800 / 32"	1060	1850	1150	-	1102	1550	1025	1570	1085	1790	-	-



## RE

Size	Class 150			Class 300			PN10			PN16			PN25			PN40		
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
3	5	15	0	3	11	0	4	13	0	4	13	0	4	13	0	4	13	0
4	8	10	0	6	7	0	9	11	0	9	11	0	8	10	0	8	10	0
6	13	15	1	10	11	1	14	16	1	14	16	1	12	14	1	12	14	1
8	23	13	2	20	10	1	24	14	2	24	13	2	23	13	2	22	12	2
10	29	10	3	25	7	2	30	11	3	30	11	3	29	10	3	26	8	2
12	39	13	3	33	8	2	41	14	3	40	14	3	36	11	3	34	9	2
14	54	11	1	45	7	2	56	12	1	56	11	1	49	9	2	47	8	2
16	69	12	5	61	8	3	70	13	5	70	13	5	64	10	4	61	8	3
20	68	20	6	59	15	4	72	23	6	67	20	6	66	19	5	62	17	5
24	109	26	9	90	17	6	115	29	10	105	24	9	104	23	8	94	19	7
28	130	26	9	115	20	7	138	29	10	137	29	10	131	27	9	126	25	8
32	130	24	11	-	-	-	142	27	13	141	27	13	132	24	11	-	-	-

## Q-RE

Size	Class 150 Q-Trim			Class 300 Q-trim			PN10 Q-trim			PN16 Q-trim			PN25 Q-trim			PN40 Q-trim		
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
3	4	14	0	3	10	0	4	13	0	4	13	0	4	13	0	4	13	0
4	7	9	0	5	7	0	8	10	0	8	10	0	7	9	0	7	9	0
6	12	14	1	9	10	1	13	14	1	13	14	1	12	13	1	12	13	1
8	21	12	1	19	9	1	22	13	1	22	12	1	21	12	1	20	11	1
10	26	9	2	23	7	1	27	9	2	26	9	2	26	9	2	24	7	1
12	34	11	2	30	8	1	35	12	2	35	12	2	32	10	2	31	8	1
14	48	10	1	42	7	2	50	10	0	49	10	0	45	8	1	43	7	2
16	66	12	4	55	7	2	69	13	5	68	12	5	60	9	3	56	7	2
20	59	18	4	53	14	3	62	20	5	58	17	4	58	17	4	55	15	4
24	96	23	7	83	15	5	101	25	8	93	21	7	93	21	7	86	17	6
28	117	23	7	106	18	5	122	26	8	121	25	8	117	24	7	114	22	6
32	129	23	11	-	-	-	140	26	13	139	26	12	131	24	11	-	-	-

**NOTE!** Center of mass values are approximate based on 3D-models. Please be aware the actual values may vary due to manufacturing tolerances

## 12.3 Suitability with different flanges, RA and RE1 valves

Flange	Valve size								
	DN 25 / 01	DN 40 / 01H	DN 50 / 02	DN 65	DN 80 / 03	DN 100 / 04	DN 150 / 06	DN 200 / 08	DN 250
ASME B16.5 Class 150	x	x	x	x	x	x	x	x	x
ASME B16.5 Class 300	x	x	x	x	x	x	x	x	-
PN 40	x	x	x	x	x	x	x	-	x
PN 25	x	x	x	x	x	x	x	x	x
PN 16	x	x	x	x	x	x	x	x	x
PN 10	x	x	x	x	x	x	x	x	x
ISO 7005 PN 20	x	x	x	x	x	x	x	x	x
ISO 7005 PN 50	x	x	x	x	x	x	x	x	-
JIS 2238 10K	x	x	x	x	x	x	x	x	x
JIS 2238 16K	x	x	x	x	x	x	x	x	x
JIS 2238 20K	x	x	x	x	x	x	x	x	x
JIS 2238 30K	x	x	x	x	x	x	x	x	x

x = suitable with this flange

- = not suitable with this flange

## 12.4 Flange ratings, RE (Class 150, 300)

Size	PN 10	PN 16	PN 25	PN 40
025*	equal to PN 40	equal to PN 40	equal to PN 40	M
040*	equal to PN 40	equal to PN 40	equal to PN 40	M
050*	equal to PN 40	equal to PN 40	equal to PN 40	M
065	equal to PN 16	K	equal to PN 40	M
080*	equal to PN 40	equal to PN 40	equal to PN 40	M
100*	equal to PN 16	K	equal to PN 40	M
150*	equal to PN 16	K	equal to PN 40	M
200	J	K	L	M
250	J	K	L	M
300	J	K	L	M
350	J	K	L	M
400	J	K	L	M
500	J	K	L	M
600	J	K	L	M
700	J	K	L	-
800	J	K	L	-

Note: Class 600 RE with full rated valve body.



# 13. EU DECLARATION OF CONFORMITY FOR ATEX APPROVED VALVES



## EU DECLARATION OF CONFORMITY for ATEX approved valves



Manufacturer:  
Valmet Flow Control Oy  
01380 Vantaa, Finland  
\*Valmet Flow Control (Jiaxing) Co., Ltd.  
Jiaxing, China  
\*) Also manufactures certain series

EU Authorised Representative: Valmet Flow Control Oy, Vanha Porvoontie 229, 01380 Vantaa, Finland. Contact details: [+358 10 417 5000](tel:+358104175000)

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Product:	Neles Segment valves
Type:	R-series (RA, RB, RE, R1, R2)
ATEX group and category:	Ex II 2 GD, II 3 GD
Ex GAS:	Ex h IIC 85°C...Tmax Gb
Ex DUST:	Ex h IIIC T85°C...T(Tmax) Db
Tmax= valve max. temperature in name plate	

### Manufacturer's certificates:

Standard / Directive	Notified Body and NoBo name	Certificate No.
ISO 9001:2015	LRQA (Certification body)	10531829
PED 2014/68/EU Module H	DNV Business Assurance Italy S.r.l. 0496	142306-2013-CE-FIN-ACCREDIA
ATEX 2014/34/EU Annex IV	DNV Product Assurance AS Norway 2460	Presafe 18 ATEX 91983Q Issue 6
ATEX 2014/34/EU Annex VIII technical files are archived by Notified Body number 0537		

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

PED 2014/68/EU	Valve
ATEX 2014/34/EU	Non-electrical equipment

### Main components:

Valve: The valve is suitable for service up to PED Cat III Valve design standard: ASME B16.34
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Installation, Maintenance and Operating instructions manual (IMO) must be followed before installation in order to ensure proper and safe mounting and usage of equipment.

The product above is manufactured in compliance with the applicable European directives and technical specifications/standards (EN10204). The product is in conformity with the customer order.

Instrumentation and accessories having equal protection concept, level and performance specification with the original can be presumed to be in conformity with this Declaration of Conformity.

Protection from e.g. static electricity caused by the process or connected equipment must be considered by the user (EN 60079-14 § 6). EN 60079-19 applies for modifications.

Non-electrical equipment is according EN 80079-37:2016 and EN 80079-36:2016. The actual surface temperature of non-electrical equipment is depended on the process and ambient conditions (EN 80079-36:2016 § 6.2.5 and 6.2.7). The protection from high or low temperature must be considered by the end user before put into service.

The product does not possess any residual risk according to hazard analysis conducted under the applicable directives providing that the procedures stated by the IMO are followed and the product is used under conditions mentioned in the technical specifications.

Documents with digital and/or e-signature conveyed by Valmet Flow Control conform to the Regulation (EU) No 910/2014 as well as the national code on e-signatures. In order to secure the integrity of the document, the authenticity of the sender, and indisputableness of the dispatch the identification is covered by individual ID codes, passwords, and by regularly changing passwords. The authorization to sign documents is based on organizational position and/or is task related. The impartial third party in the company bestows the access right with predefined authorities to particular databases.

Vantaa

10.9.2024

Juha Virolainen, Global Quality Director

## 14. TYPE CODE

### 14.1 Series RA

V-port segment valve, series RA						
1.	2.	3.	4.	5.	6.	7.
	RA	A	100	A	S	—

1.	C <sub>V</sub> -CODE FOR VALVE SIZE DN 25 (1")
STANDARD C <sub>V</sub>	
	Without sign
Q-TRIM	
Q	Low noise and anti-cavitation trim
NON-STANDARD C <sub>V</sub>	
C005-	Max. C <sub>V</sub> = 0.5
C015-	Max. C <sub>V</sub> = 1.5
C05-	Max. C <sub>V</sub> = 5.0
C15-	Max. C <sub>V</sub> = 15.0

2.	PRODUCT SERIES / DESIGN
RA	Wafer, reduced bore, Neles face-to-face length, body PN 40* / ASME Class 300**.
* DN 250 body only acc. to EN PN 40.	
**Max. shut-off pressure for trim, see Table 1.	

3.	CONSTRUCTION
A	Standard, drive shaft with keyway
Y	Special

4.	SIZE
	In millimetres: 025, 040, 050, 065, 080, 100, 150, 200, 250

5.	BODY	SEGMENT	SCREWS	SHAFT, PINS / BEARINGS
A	CF8M	AISI 329 + HCr	A2-70	AISI 329 / PTFE
C	CG8M	AISI 329 + HCr	A2-70	AISI 329 / PTFE
H (with T6 seat)	CW-6M (Hastelloy C)	CW-6M	A2-70	Hastelloy C / PVDF
S (with T2 seat)	CF8M	AISI 329	A2-70	AISI 329 / PTFE
U (with U seat)	CK3MCuN (SMO)	ASTM A351 gr. CK3MCuN + ceramic coating (TiO)	A2-70	UNS31254 / filled PTFE on SMO 254 net
Seals for above:		Gland packing: PTFE V-ring type Blind flange: PTFE		
Y	Special			

Low C<sub>V</sub> + metal seat: segment material AISI 316 + HCr.

Low C<sub>V</sub> + soft seat: segment material AISI 316 (without HCr).

6.	SEAT MATERIAL AND CONSTRUCTION
S	Stainless steel + Cobalt Hard facing, -40 °C to +260 °C. 1-way tight metal seat, for NPS 1" - 10" / DN 25 - 250
1S	Stainless steel + Cobalt Hard facing, -30 °C to +200 °C. 2-way tight metal seat, for NPS 1" - 10" / DN 25 - 250.
T2	Stainless steel with PTFE+C25, -40 °C to +260 °C.
T6	Hastelloy with Xtreme insert, -40 °C to +120 °C.
E	Cobalt based alloy, -50 °C to +260 °C. Non-tight, extremely erosive services.
U	Titanium, -40 °C to +120 °C.

7.	FLANGE FACING
STANDARD	
	Without sign: EN1092-1 Type B1 (Ra 3.2 ... 12.5) Covers: DIN2526 form C DIN2526 form D Raised face stock finished (Ra10...12.5)
NON-STANDARD	
/Y	Special

## 14.2 Series RE, RE1

V-port segment valve, series RE and RE1												
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.		12.
Q-	RE	D	A	03	D	J	J	S	T	A	/	-

1.	C <sub>V</sub> -CODE	
	<b>Standard V-port (without sign)</b>	
Q-	Q-trim, low noise and anti-cavitation trim. (for DN 50 / 2" and bigger)	
C005-	Max. C <sub>v</sub> = 0.5 (for DN 25 / 1" only)	(Not with 1S-seat)
C015-	Max. C <sub>v</sub> = 1.5 (for DN 25 / 1" only)	
C05-	Max. C <sub>v</sub> = 5 (for DN 25 / 1" only)	
C15-	Max. C <sub>v</sub> = 15 (for DN 25 / 1" only)	

2.	PRODUCT SERIES / DESIGN
RE	Flanged, one piece body, V-port segmented ball, face-to-face acc. to ISA S75.04 and IEC Part 3-2. Inch threads.
RE1	Flangeless one piece body, V-port segmented ball, face-to-face acc. to ISA S75.04 and IEC 534 Part 3-2.
RE13	Flanged body, V-port segmented ball face-to-face acc. to ASME B16.10 (spool piece constr.).

3.	PRESSURE RATING	Size range
C	ASME 150	NPS 1" - 32"
D	ASME 300	NPS 1" - 32"
F	ASME 600	NPS 1" - 4"
J	PN 10	DN 200 - DN 800
K	PN 16	DN 50 - DN 800
L	PN 25	DN 200 - DN 800
M	PN 40	DN 25 - DN 600
R	JIS 10K flanges, based on body casting of ASME 150	DN 25 - DN 800
S	JIS 16K flanges, based on body casting of ASME 300	DN 25 - DN 800
T	JIS 20K flanges, based on body casting of ASME 300	DN 25 - DN 800
Y	Special, to be specified	-

4.	CONSTRUCTION
A	Standard, (2-way tight with 1S-seat)
B	Low emission construction (ISO 15848-1; Class BH, CC-3 / temp: 260 °C, Class BH CC-2 / temp: 400 °C)
E	Drive shaft with splines to actuator
U	Protected bearings (Viton GF O- rings) (*)
V	Hydrogen Peroxide (H2O2) construction.
X	Antistatic device (*)
S	Steam jacket (for DN 25 - 50 / NPS 1" - 2") consult the factory.
Z	Oxygen construction, only for Gaseous Oxygen Service. -BAM listed non-metallic materials -Temperature: +200 °C to -50 °C -Cleaning acc. to Neles internal procedure Recommended type code: RE_Z_AJJSJG
Y	Special, to be specified

5.	SIZE	
	ASME	EN
01	ASME flanged, 150, 300 and 600	025 EN flanged, PN 40
1H	ASME flanged, 150, 300 and 600	040 EN flanged, PN 40
02	ASME flanged, 150, 300 and 600	050 EN flanged, PN 40
2H	ASME flanged, 150 and 300	065 EN flanged, PN16, 40
03	ASME flanged, 150, 300 and 600	080 EN flanged, PN 40
04	ASME flanged, 150, 300 and 600	100 EN flanged, PN 16, 40
06	ASME flanged, 150 and 300	150 EN flanged, PN 16, 40
08	ASME flanged, 150 and 300	200 EN flanged, PN 10, 16, 25, 40
10	ASME flanged, 150 and 300	250 EN flanged, PN 10, 16, 25, 40
12	ASME flanged, 150 and 300	300 EN flanged, PN 10, 16, 25, 40
14	ASME flanged, 150 and 300	350 EN flanged, PN 10, 16, 25, 40
16	ASME flanged, 150 and 300	400 EN flanged, PN 10, 16, 25, 40
20	ASME flanged, 150 and 300	500 EN flanged, PN 10, 16, 25, 40
24	ASME flanged, 150 and 300	600 EN flanged, PN 10, 16, 25, 40
28	ASME flanged, 150 and 300	700 EN flanged, PN 10, 16, 25
32	ASME flanged, 150 and 300	800 EN flanged, PN 10, 16, 25

6.	BODY MATERIALS
	STANDARD
D	ASTM A216 gr. WCB / 1-0619
A	ASTM A351 gr. CF8M / 1.4408
C	ASTM A351 gr. CG8M (for DN 25 - DN 500 / 1" - 20")
	NON STANDARD
H	H ASTM A494 gr. CW-6M (Hastelloy C)
U	ASTM A351 gr. CK3MCuN (SMO)
F	ASTM A352 gr. LCC
Y	Special

7.	SEGMENT MATERIALS
	STANDARD
J	Type AISI 329 + HCr, with seat S
S	AISI 329, with seat T2
	NON STANDARD
H	ASTM A494 gr. CW-6M (Hastelloy C), with seat T6.
U	ASTM A351 gr. CK3MCuN (SMO) + ceramic (TiO), with seat U.
T	Titanium + ceramic coating
Y	Special

8.	SHAFT AND PIN MATERIALS	BEARING MATERIALS
<b>STANDARD</b>		
J	Type AISI 329	Filled PTFE on SS 316 net, max +260 °C
<b>NON STANDARD</b>		
H	Hastelloy C	PVDF, max +120 °C
U	UNS31254	Filled PTFE on Inconel 625 net, max +260 °C
N	Nitronic 50 (XM-19)	Filled PTFE on SS 316 net, max +260 °C
S	17-4 PH	Cobalt based alloy, max +425 °C
V	Type AISI 329	Virgin PTFE on SS 316 net, max +260 °C
U	17-4 PH	Filled PTFE on SS 316 net, max +260 °C
Y	Special	

9.	SEAT DESIGN AND MATERIALS
<b>STANDARD</b>	
S	Stainless steel + Cobalt Hard facing, -50 °C to +260 °C. 1-way tight metal seat, For NPS 1" - 20" / DN 25 - 500
<b>NON STANDARD</b>	
1S	Stainless steel + Cobalt Hard facing, -30 °C to +200 °C. 2-way tight metal seat, For NPS 1" - 32" / DN 25 - 800.
U	Titanium, -50 °C to +260 °C.
T2	Stainless steel with Xtreme insert, -40 °C to +260 °C.
T6	Hastelloy with Xtreme insert, -50 °C to +120 °C.
E	Cobalt based alloy, -50 °C to +260 °C. Non-tight, extremely erosive services.
E1	Non tight metal seat for extremely erosive applications
A, A1	High temp. metal seat, -50 °C to +425 °C. ANSI cl, IV.
O	No seat
Y	Special

10.	STEM PACKING	BLIND FLANGE SEAL
<b>STANDARD</b>		
T	PTFE V- rings, live loaded	PTFE Max +260 °C
G	Graphite rings, live loaded	Graphite Max +425 °C (Fire-safe)
<b>NON STANDARD</b>		
	PTFE V- rings, without live loading	PTFE Max +260 °C
	Graphite rings, without live loading	Graphite Max +425 °C

11.	MODEL CODE
-	Version 0
A	Version A is used only with NPS02, NPS03-10 / DN50, DN80-DN250

12.	FLANGE FACING
-	EN 1092-1 Type B1 (Ra3.2-12.5) Covering: ASME B16.5 Ra 3.2 – 6.3
02	Raised face Ra 10 - 12.5

# 15. GENERAL SAFETY WARNINGS AND DISCLAIMERS

## 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

### Receive, handle 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.
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 maintained valve 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.

## 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 maintained. 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.
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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