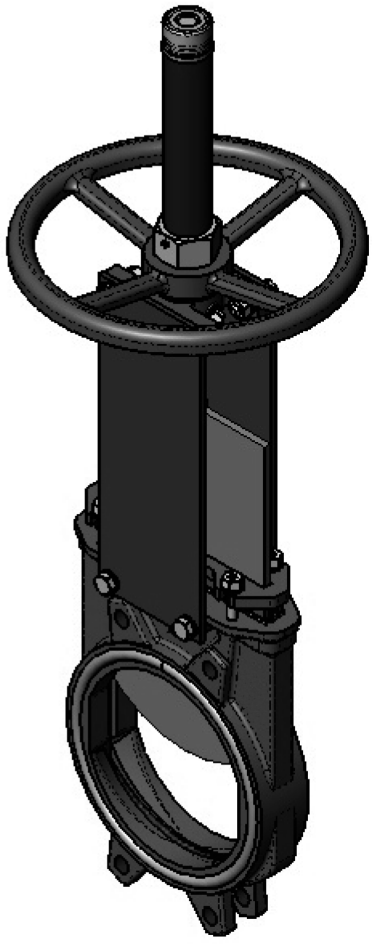
Neles™ knife gate valve, Bidirectional wafer

Series KAB

Installation, maintenance and operating instructions



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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 PRODUCT DESCRIPTION

Neles™ knife gate valves series KAB are designed and manufactured to meet strict quality standards. This manual is intended to provide advice and instructions to the installation engineers and qualified service personnel so that they can safely undertake the necessary procedures to correctly install the product and carry out the future service and maintence work.

Our certified quality management system is an assurance for you as our customers. You can rely on our products and service always fulfilling the most demanding quality and environmental standards in place today. Neles™ quality assurance system fulfils demands and instructions specified in ISO 9001 and ISO 14001.

IMPORTANT! This installation- and service instruction must be read carefully and understood prior to the installation,

use and servicing of this product.

1.1 Important information

Pictures shown in this manual are illustrative only and do not necessarily show the design of the products on the market at any given point in time. For detailed illustrations, please refer to specific assembly drawings and parts list. Specifications of the products and equipment presented herein are subject to change without notice.

1.2 General application

Knife gate valves are designed for application Group 2 liquids (Table 9 in PED). They are recommended for many industries such as:

- Mining
- Chemical plants
- Fertilizer plants
- Sewag Waste Water applications
- Pulp & Paper
- Power Generation

2 SAFETY AND RECYCLING

The product must be used in conformity with applicable practice and safety regulations and only for the type of operation that it is intended for. Use only spare parts and accessories that are recommended by the manufacturer. Every country (state) has its own safety and recycling regulations. It is the work management's and installation engineer's responsibility to know and follow these. If the recommendations in this manual diverge from those of your country's, then the local regulations shall prevail.

2.1 Safety Precautions

The product must be used in conformity with appl icable practice and safety regulations and only for the type of operation that it is intended for. Use only spare parts and accessories that are recommended by the manufacturer.

Every country (state) has its own safety regulations. It is the work management's and installation engineer's responsibility to know and follow these. If the recommendations in this manual diverge from those of your country's, then the local safety regulations shall prevail.

It is of great importance that the installation engineer is aware of the product's functions and characteristics. It is also the installation engineer's responsibility to know and follow general regulations as well as national legal requirements and provisions. It is the installation engineer's responsibility to know and follow the information given on labels, in instructions and safety regulations for the product.

Always use approved personal safety equipment. Installation engineers and other personnel who are in the working area should use at least the following safety equipment: Protective clothing, protective gloves, protective helmets, protective goggles, protective shoes, hearing protection.

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

CAUTION:

When handling the valve or the valve package, bear in mind its weight!

Never lift the valve or valve package by the actuator, positioner, limit switch or their piping. Place the lifting ropes securely around the valve body. Damage or personal injury may result from falling parts.

CAUTION:
Do not exceed the valve performance limitations!
The valve may produce noise in the pipeline. The noise level depends on the application. Observe the relevant work environment regulations on noise emission.

CAUTION:
Beware of the cutting movement!
Keep hands, other parts of the body, tools and other objects out of the open flow port. Leave no foreign objects inside the pipeline. Close and detach the actuator pressure supply pipeline for valve maintenance.
Failure to do this may result in damage or personal injury.

CAUTION:
Do not exceed the valve performance limitations!
Exceeding the limitations recommended by the supplier may cause damage and lead to uncontrolled pressure release.

2.2 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.

2.3 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: Ensure that any weld splatter does not fall onto the valve closing members. This may damage critical seating surfaces and cause leaks.

3 ASSEMBLY

THE KNIFE GATE VALVE COMPLIES WITH THE FOLLOWING:

Pressure Equipment Directive 2014/68/EU: PED Art. 4.3

3.1 Handling

When handling the equipment please pay special attention to the following points:

- **SAFETY WARNING:** Before handling the valve check that the crane to be used is capable of bearing the valve installation's weight.
- Do not lift the valve or hold it by the actuator. Lifting the valve by the actuator can lead to operating problems as it is not designed to withstand the valve's weight.
- Do not lift the valve by holding it in the flow passage area. The valve's seal is located in this area. If the valve is held and lifted by this area it can damage the surface and the seal and lead to leakage problems whilst the valve is operating.
- To prevent damage, especially to the anticorrosive protection, it is recommended to use soft straps to lift the knife gate valves. These straps must be fitted around the top of body.
- Packing in wooden boxes: If the equipment is packed in wooden boxes these must be provided with clearly marked holding areas where the slings will be placed when securing them. In the event that two or more valves are packed together, separation and securing elements must be provided between them to prevent possible movements, knocks and friction during transport. When storing two or more valves in the same box you must ensure they are correctly supported to prevent deformations. In the case of dispatches by sea we recommend the use of vacuum bags inside the boxes to protect the equipment from contact with sea water.
- Pay special attention to maintaining the correct levelling of the valves during loading and unloading as well as during transport to prevent deformations in the equipment. For this purpose we recommend the use of mounts or trestles.

3.2 Testing the valve

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

The pressure test should be carried out in accordance with an applicable standard using the pressure rating required by the pressure class or flange drilling of the valve.

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

3.3 Installation

In order to avoid personal harm and other type of damage (to the facilities, the valve, etc.) please follow these instructions:

- The staff responsible for the installation or operation of the equipment must be qualified and trained.
- Use suitable Personal Protective Equipment (PPE) (gloves, safety boots, goggles…).
- Shut off all lines that affect the valve and put up a warning sign to inform about the work being performed.
- Completely isolate the valve from the whole process. Depressurise the process.
- Drain all the line's fluid through the valve.
- Use hand tools not electric tools during the installation and maintenance, in accordance with EN13463-1(15).

Before installation, inspect the valve to ensure no damage has occurred during transport or storage. Make sure that the inside of the valve's body and, in particular the seal area, are clean. Inspect the installation's pipes and the flanges to make sure they are clean.

3.4 Aspects to be considered during assembly

- Always install the valve in the right direction in regards to the flow in the pipe. If the valve is bi-directional, the direction of the fluid does not matter, it works correctly in both directions.
- Special care must be taken to respect the correct distance (gap) between the flanges and ensure they are correctly aligned and parallel (Fig. 1).

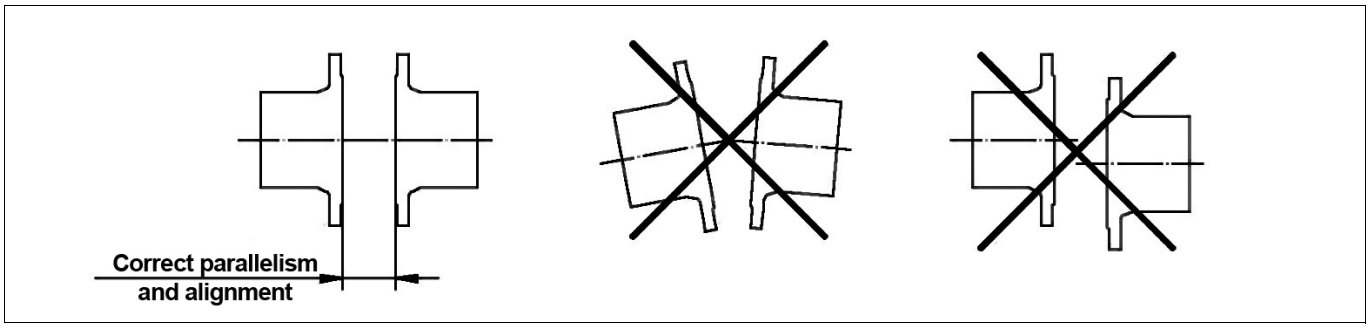


Fig. 1

- The incorrect position or installation of the flanges can cause deformations on the valve's body and this could lead to operating problems.
  It is very important to make sure that the valve is correctly aligned and parallel to the flanges to prevent leakages and avoid deformations. Ensure the valve is assembled in open position.
- The screws in the tapped blind holes will have a maximum depth (Fig. 2) and will never reach the bottom of the hole. The following table (Table 1) shows the maximum thread depth in the holes and the maximum torque to be applied to the flange screws:

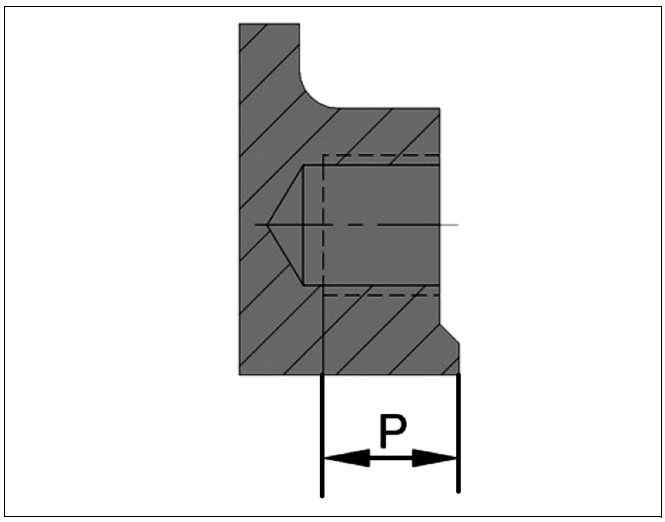


Fig. 2

Table 1

DN	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000
P	8	8	9	9	9	10	10	12	12	21	21	22	22	22	22	22	20	20
TORQUE (Nm)	25	25	30	30	30	35	35	35	40	40	50	50	50	60	65	75	85	95

The direction of the fluid and the pressure do not always coincide, but with bidirectional valves this has no influence when assembling the valve as its operation will be the same.

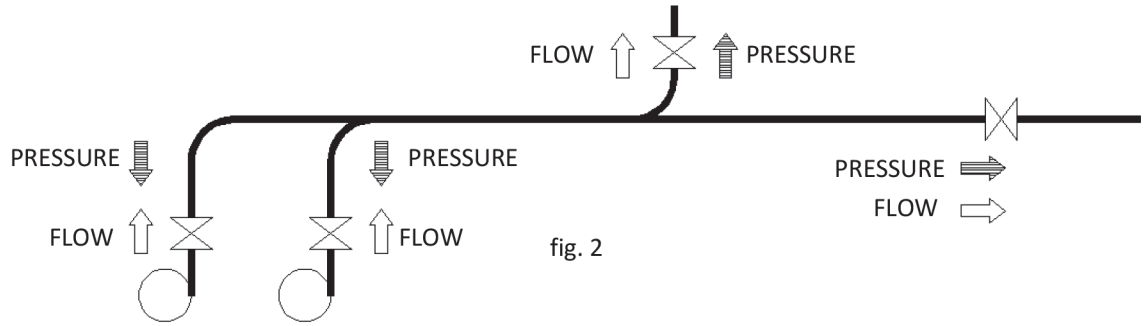


Fig. 3

- The equipment must be firmly installed in the pipe. It will be joined to the pipe with a screw joint.
- The screws and nuts to be fitted must also be suitable for the operating conditions and their measurements must in accordance with the approved plans. The screws and nuts must be fitted diametrically.
  To torque to apply to the fastening screws and nuts must be correct according to the applicable standard, we recommend the initial assembly be carried out with a low tightening torque and after all the screws are in place, the final torque is applied.
- As regards scaffolding, ladders and other auxiliary elements to be used during the assembly, follow the safety recommendations indicated in this dossier.
- Once the equipment has been assembled make sure that there are no elements, whether interior or exterior, which can interfere with the gate valve's movement.
- Make the relevant connections (electrical, pneumatic, hydraulic) in the equipment's drive system following the instructions and wiring diagrams supplied it.
- The operation of the equipment must be coordinated with the site's control and safety staff and no modifications are permitted in the equipment's external indication elements (limit switches, positioners, etc.).
- When operating the equipment follow the safety recommendations indicated in this dossier.

3.5 Assembly position (Horizontal pipe)

In horizontal pipes it is recommended that the knife gate valves be assembled in vertical position, although other assembly positions are also possible

Position 1: This is the most advisable position.

Position 8: The valve can be installed in this position but you are advised to contact the supplier if this is necessary.

Positions 2, 3, 6 and 7: For large valves (more than DN300), the maximum angle with the installation vertical is 30°. For smaller sizes the angle can be increased up to 90° (positions 4 and 5).
When it is necessary to install large valves in any of these positions, it is recommended to consult the supplier, as in these cases, due to the weight of the actuator, a suitable support must be made to prevent deformations and operating problems in the valves.

Positions 4 and 5: For smaller sized valves, the valves can be installed in these positions. To install larger valves (more than DN300) in any of these positions, please contact the supplier. In these cases, due to the weight of the actuator, a suitable support must be made to prevent deformations and operating problems in the valves.

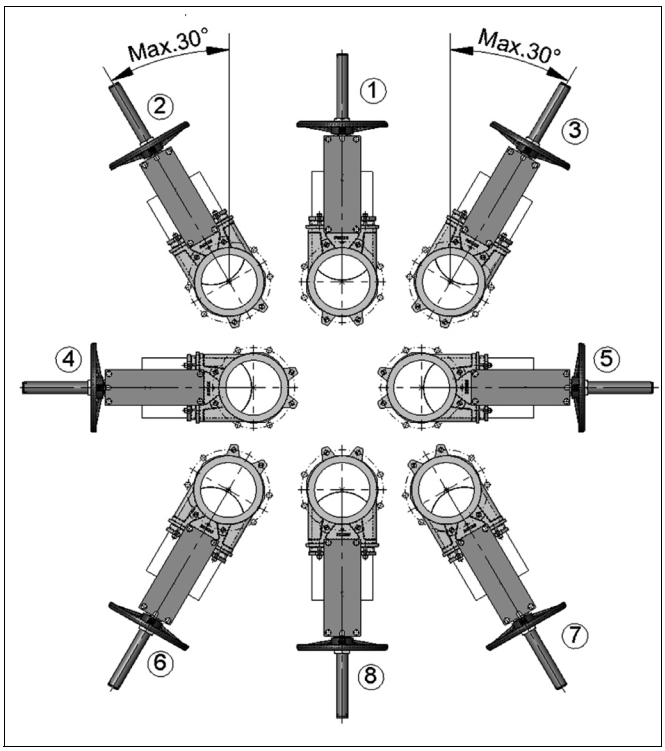


Fig. 4

3.6 Assembly positions (Vertical/Inclined pipe)

The knife gate valves can be assembled in all positions; however, certain aspects must be taken into account:

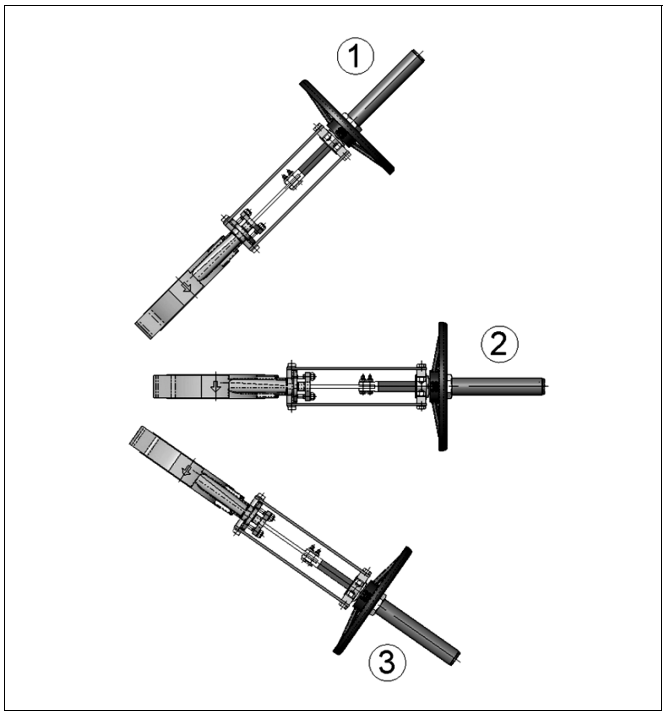


Fig. 5

Positions 1.2 and 3: In these positions, it is recommended to make a suitable support, because, due to the weight of the actuator, deformations may arise and this can lead to operating problems in the valves.

Once the valve has been installed, check that all the screws and nuts have been correctly tightened and that the whole valve action system has been correctly adjusted (electrical connections,pneumatic connections, instruments…).
All our valves are tested at its facilities, however, during the handling and transport the screws on the packing gland can come loose and must be re-tightened.
Once the valve is installed in the pipeline and it has been pressurised, it is very important to check for any leakages from the packing gland to the atmosphere.
In the event of a leakage, tighten the nuts on the packing gland crosswise until the leakage stops, ensuring that there is no contact between the packing gland and the gate.

A very high tightening torque on the packing gland's nuts can lead to problems, such as an increase in the valve's torque, reduction in the packing's working life, or the breaking of the packing gland. The tightening torques are indicated in Table 2:

Table 2

Tightening torques for packing gland screws	
DN50 to DN125	25 Nm
DN150 to DN300	30 Nm
DN350 to DN1200	35 Nm

Once the valve is installed in its place, check that the flanges and electrical and pneumatic connections are secure.If the valve has electrical accessories, earth connections must be made before operating it.

4 ACTUATOR

4.1 Handwheel (Rising or non-rising stem and stem with gear box)

To operate the valve: Turn the handwheel clockwise to close or anticlockwise to open.

4.2 Chainwheel

To operate the valve pull one of the chain's vertical drops, taking into account that locking is carried out when the chainwheel turns clockwise.

4.3 Lever

First loosen the position locking clamp located on the yoke. Once it is unlocked raise the lever to open or lower it to close. To complete the operation lock the lever again.

4.4 Pneumatic (Double and single acting)

The pneumatic actuators are designed to be connected to a 6 kg/cm² pneumatic network, although these cylinders support up to 10 kg/cm^2.

The pressurised air used for the pneumatic actuator must be correctly filtered and lubricated.

This type of actuator does not require any adjustment, due to the fact that the pneumatic cylinder is designed for the exact stroke required by the valve.

4.5 Hydraulic (Double and single acting)

The hydraulic actuators are designed to work at a standard pressure of 135 kg/cm^2.

This type of actuator does not require any adjustment, due to the fact that the hydraulic cylinder is designed for the exact stroke required by the valve.

4.6 Motorised (Rising or non-rising stem)

If the valve incorporates a motorised actuator it will be accompanied with the electric actuator supplier's instructions.

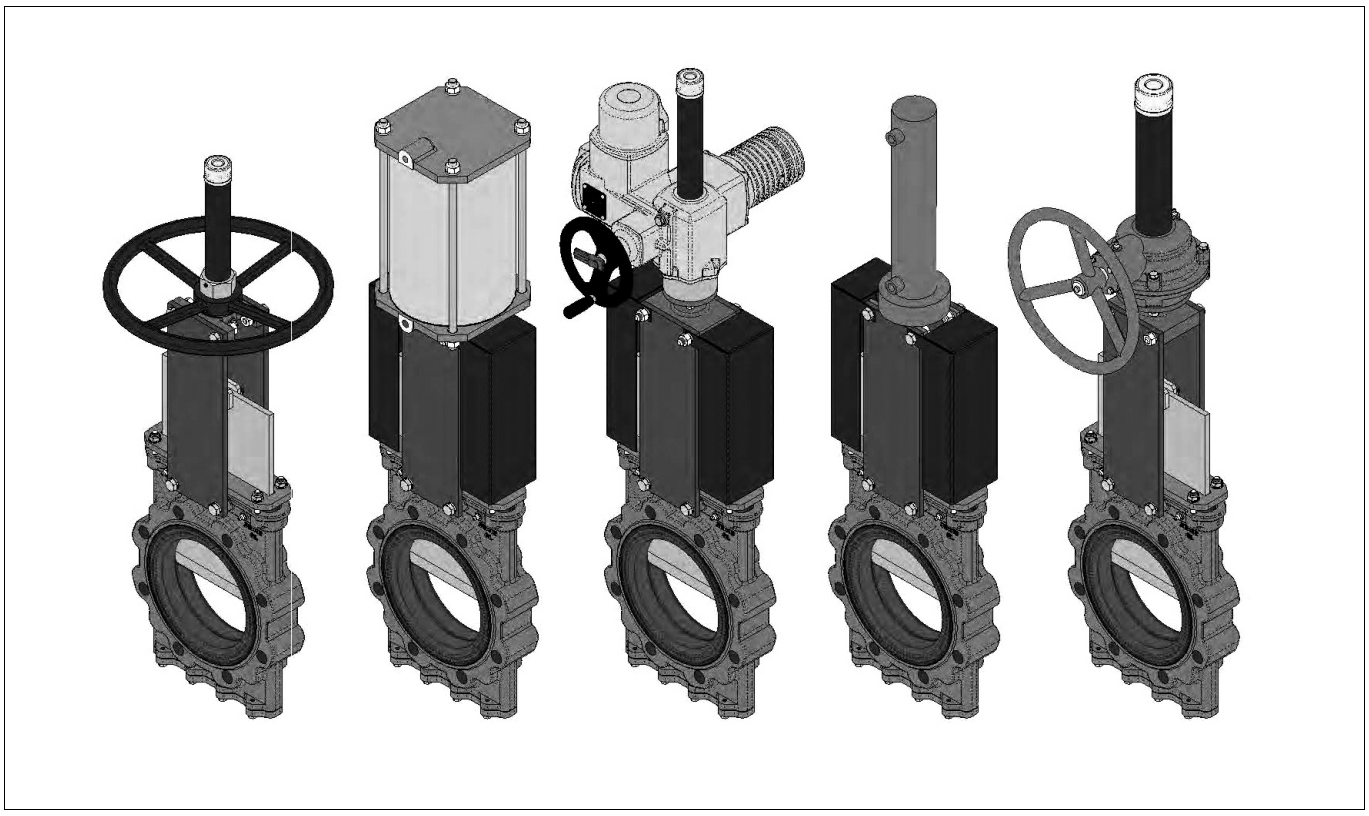


Fig. 6

5 MAINTENANCE

If the valves suffer any damage due to improper handling or without the proper authorisation, Valmet will not be responsible. The valves must not be modified except under express authorisation from Valmet.

In order to avoid personal or material damage when performing the maintenance tasks, it is recommended to follow these instructions:

- The staff responsible for the maintenance or operation of the equipment must be qualified and trained.
- Use suitable Personal Protective Equipment (PPE) (gloves, safety boots, goggles…).
- Shut off all lines that affect the valve and put up a warning sign to inform about the work being performed.
- Completely isolate the valve from the whole process. Depressurise the process.
- Drain all the line's fluid through the valve.
- Use hand tools not electric tools during the maintenance, in accordance with EN13463-1(15).

The only maintenance required in this type of valve is to change the packing's rubber joint and the rubber seals. It is recommended to carry out regular checks on the sleeves. The duration of these seals will depend on the valve's working conditions, such as: Pressure, temperature, number of operations, type of fluid and others.

5.1 Important safety aspects

- In order to work under ideal safety conditions, the magnetic and electrical elements must be in idle mode and the air tanks depressurised. The electrical control cabinets must also be out of service. The maintenance staff must be up to date with the safety regulations and work can only start under orders from the site's safety staff.
- The safety areas must be clearly marked and you must avoid placing auxiliary equipment (ladders, scaffolding, etc.) on levers or mobile parts which will lead to the movement of the gate valve.
- In equipment with spring return actuators, the gate must be mechanically locked and only unlocked when the actuator is pressurised.
- In equipment with electrical actuator, it is recommended to disconnect it from the mains in order to access the mobile parts without any risk.
- Due to its great importance, you must check that the valve's axle has no load before disassembling the actuator system.

Taking into account the recommendations indicated, below we indicate the maintenance operations carried out in this type of equipment:

5.2 Replacing the sealing joint

1. Remove the valve from the pipeline.
2. Remove the actuator and safety guards by unscrewing and removing the bolts connecting the stem to the gate and the support plate to the body.
3. Remove the packing gland (4).
4. Remove the packing (5) taking care not to damage its O-ring.
5. Remove the gate (2)
6. Clean the inside surfaces of the valve.
7. Remove the old sealing joint and clean its housing.
8. Fit a new sealing joint (3) with the same dimensions as the old one.
9. Assemble the rest of the disassembled valve following the steps in the disassembly process in the reverse order.

Note: During the assembly of the new sealing joint it is recommended to apply "Vaseline" to the seal to facilitate the assembly process and the valve's correct operation (do not use oil or grease), below (Table 3), we show details of the Vaseline used by Valmet:

Note: The numbers in brackets refer to the components list.

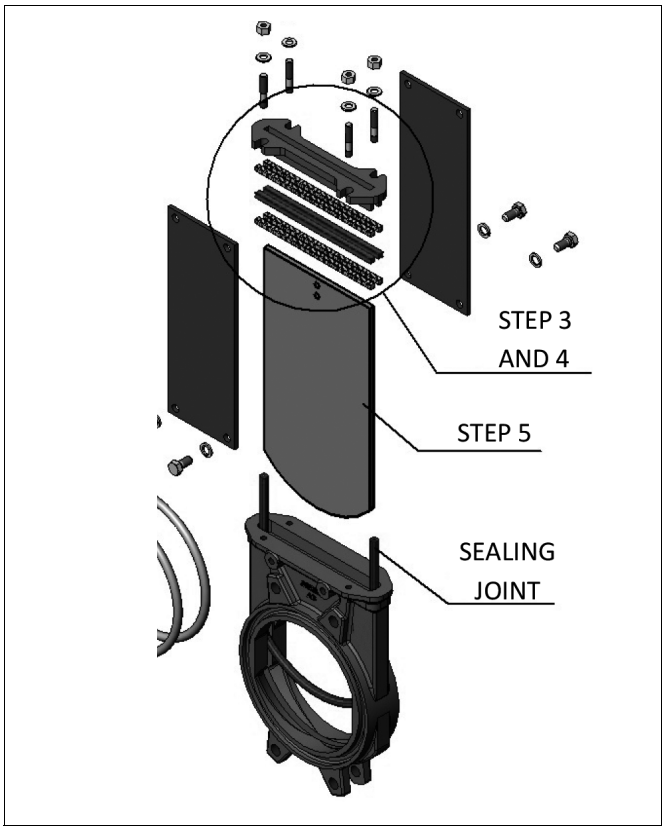


Fig. 7

Table 3

WHITE PETROLEUM JELLY		
Saybolt colour	ASTM D-156	15
Melting point (°C)	ASTM D-127	60
Viscosity at 100 °C	ASTM D-445	5
Penetration 25 °C mm/10	ASTM D-937	165
Silicone content	None	
Pharmacopeia BP	OK	

5.3 Replacing the packing

1. Make sure there is absolutely no pressure and fluid in the installation.
2. Place the valve in open position.
3. Loosen the screws that connect the stem or rod to the gate.
4. Release the connection between the support plate and the body.
5. Release and remove the packing gland (4) and the safety guards where present.
6. Remove the damaged packing (5) using a pointed tool, taking care not to damage the surface of the gate (2).
7. Carefully clean the packing box and make sure there are no metal parts inside.
8. Insert the new packing (5). During this operation it is very important for both ends to be perfectly joined. Below we show the packing dimensions (Table 4).

As standard, Neles valve packing is composed of 3 lines (2 packing lines and 1 rubber joint line in the middle).

Note: If it is not possible to place a rubber joint in the middle another packing line should be used instead.

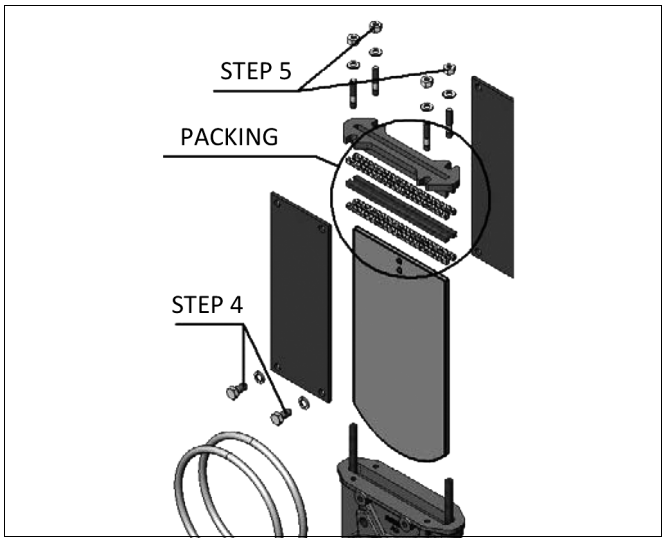


Fig. 8

Table 4

DIAMETER	PACKING	RUBBER RING
DN50	2 lines of 8 mm² x 204 mm.	1 line of 8 mm² x 204 mm.
DN65	2 lines of 8 mm² x 234 mm.	1 line of 8 mm² x 234 mm.
DN80	2 lines of 8 mm² x 264 mm.	1 line of 8 mm² x 264 mm.
DN100	2 lines of 8 mm² x 304 mm.	1 line of 8 mm² x 304 mm.
DN125	2 lines of 8 mm² x 356 mm.	1 line of 8 mm² x 356 mm.
DN150	2 lines of 8 mm² x 406 mm.	1 line of 8 mm² x 406 mm.
DN200	2 lines of 10 mm² x 516 mm.	1 line of 10 mm² x 516 mm.
DN250	2 lines of 10 mm² x 636 mm.	1 line of 10 mm² x 636 mm.
DN300	2 lines of 10 mm² x 740 mm.	1 line of 10 mm² x 740 mm.
DN350	2 lines of 10 mm² x 810 mm.	1 line of 10 mm² x 810 mm.
DN400	2 lines of 10 mm² x 928 mm.	1 line of 10 mm² x 928 mm.
DN450	2 lines of 10 mm² x 1,028 mm.	1 line of 10 mm² x 1,028 mm.
DN500	2 lines of 14 mm² x 1,144 mm.	1 line of 14 mm² x 1,144 mm.
DN600	2 lines of 14 mm² x 1,346 mm.	1 line of 14 mm² x 1,346 mm.

Note: The numbers in brackets refer to the components list.

1. Place the packing gland in its original position (step 5), making sure it does not touch the gate, carefully tighten all the screws crosswise and make sure the same distance is left between the gate and the packing gland on both sides.
2. Assemble steps 3 and 4.
3. Perform one manoeuvre slowly, stopping if any seizing occurs. If this occurs the packing gland has not been centred correctly.
4. Pressurise the valve in the line and tighten the packing gland crosswise, enough to prevent leakages to the atmosphere.

5.4 Maintenance of the pneumatic actuator

The maintenance of these cylinders is simple, if your need to replace any elements and you have any questions please consult Valmet. Below is an exploded diagram of the pneumatic actuator and a list of the cylinder's components. The top cover and the support cover are usually made of aluminium, but from pneumatic cylinders greater than Ø 200 mm, they are made of cast iron GJS-400.

The maintenance kit normally includes: The socket and its joints and the scraper, and if the customer wishes the piston is also supplied. Below we show the steps to follow to replace these parts.

1. Position the valve in closed position and shut off the pneumatic circuit pressure.
2. Loosen the cylinder air input connections.
3. Release and remove the cylinder cap (5), the cylinder tube (4) and the tie rods (16).
4. Loosen the nut (14) which connects the piston (3) and the rod (1), remove the parts. Disassemble the cir-clip (10) and remove socket (7) with its joints (8,9) .
5. Release and remove the cylinder head (2), in order to remove the scraper (6).
6. Replace the damaged parts with new ones and assemble the actuator in the opposite order to that described for the disassembly.

PNEUMATIC ACTUATOR

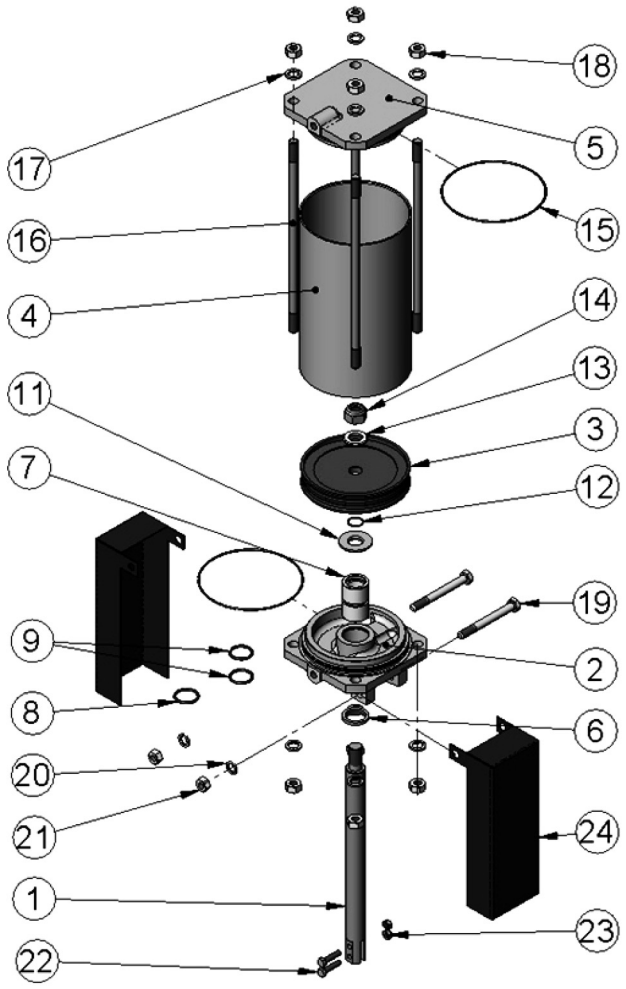


Table 5

PART NO.	DESCRIPTION	MATERIAL
1	STEM	AISI-304
2	CYLINDER HEAD	ALUMINIUM
3	PISTON	S275JR + EPDM
4	CYLINDER	ALUMINIUM
5	CYLINDER CAP	ALUMINIUM
6	SCRAPER	NITRILE
7	SLEEVE	NYLON
8	OUTSIDE O-RING	NITRILE
9	INSIDE O-RING	NITRILE
10	CIR-CLIP	STEEL
11	WASHER	ST ZINC
12	O-RING	NITRILE
13	WASHER	ST ZINC
14	SELF-LOCKING NUT	5.6 ZINC
15	O-RING	NITRILE
16	TIE RODS	F-114 ZINC
17	WASHER	ST ZINC
18	NUT	5.6 ZINC
19	SCREW	5.6 ZINC
20	WASHER	ST ZINC
21	NUT	5.6 ZINC
22	SCREW	A-2
23	SELF-LOCKING NUT	A-2
24	PROTECTION	S275JR

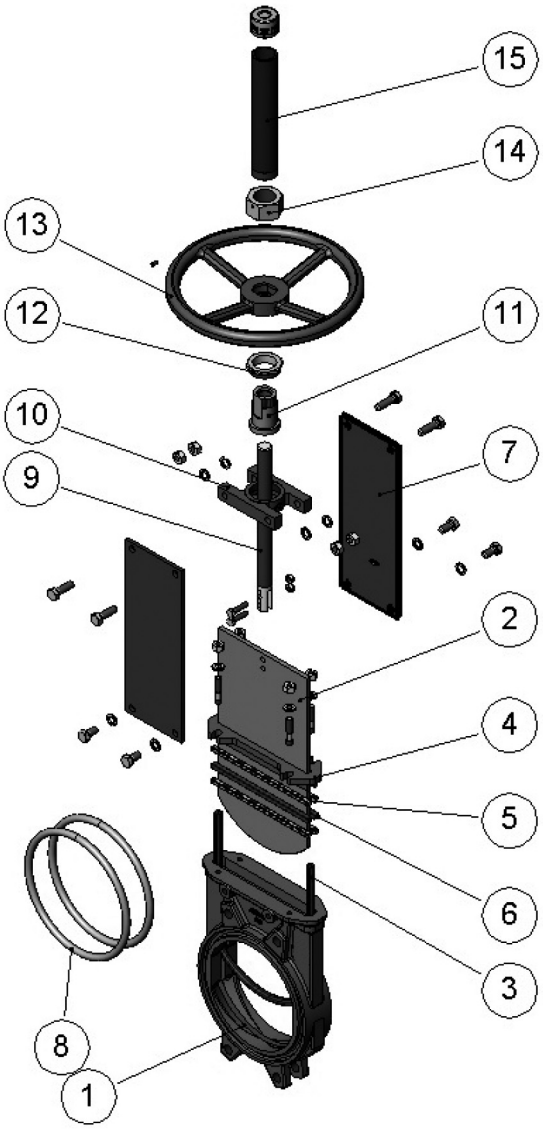
6 STORAGE

To ensure the valve is in optimum conditions of use after long periods of storage, it should be stored in a well-ventilated place at temperatures below 30 °C.

It is not advisable, but if it is stored outside, the valve must be covered to protect it from heat and direct sunlight, with good ventilation to prevent humidity. The following aspects must be considered for storage purposes:

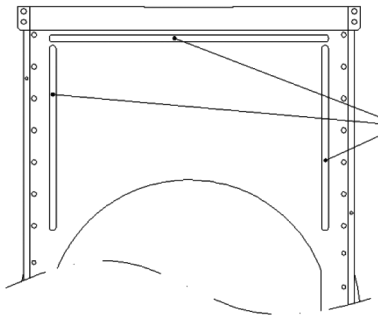
- The storage place must be dry and under cover.
- It is not recommended to store the equipment outdoors with direct exposure to adverse weather conditions, such as rain, wind, etc. Even less so if the equipment is not protected with packaging.
- This recommendation is even more important in areas with high humidity and saline environments. Wind can carry dust and particles which can come into contact with the valve's mobile parts and this can lead to operating difficulties. The actuator system can also be damage due to the introduction of particles in the different elements.
- The equipment must be stored on a flat surface to avoid deformations.
- If the equipment is stored without suitable packaging it is important to keep the valve's mobile parts lubricated, for this reason, it is recommended to carry out regular checks and lubrication.
- Likewise, if there are any machined surfaces without surface protection it is important for some form of protection to be applied to prevent the appearance of corrosion.
- Store the valves in open position to ensure that the sleeves are not deformed.

7 COMPONENTS LIST

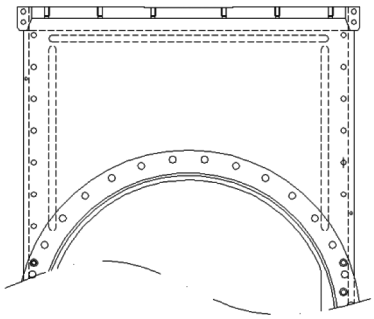


* Valves with DN greater than 600, will have 3 slides made of HD500 material, for more information please contact Valmet.

INSIDE VIEW



OUTSIDE VIEW



PART NO.	COMPONENT	MATERIAL
1	Body	CF8M
2	Gate	AISI316
3	Seat	EPDM
4	Packing gland	CF8M
5	Packing	SYNT + PTFE
6	O-ring seal	EPDM
7	Support plates	S275JR
8	O-ring	NITRILE
9	Stem	AISI303
10	Yoke	STEEL
11	Stem nut	BRONZE
12	Check nut	ST44.2 + ZINC
13	Handwheel	MODULAR CAST IRON
14	Nut	STEEL
15	Hood	STEEL

8 HOW TO ORDER

1.	2.	3.	4.	5.	6.	7.	8.
KAB	W	J	050	A	B	P	D

1.	VALVE SERIES
KAB	Knife Gate Valve, Wafer type, Bi-directional

2.	END CONNECTION
W	Wafer

3.	PRESSURE RATING
J	PN 10
C	ASME Class 150

4.	BODY SIZE		
050	DN 50	**02**	2"
065	DN 65	**2H**	2.5"
080	DN 80	**03**	3"
100	DN 100	**04**	4"
125	DN 125	**05**	5"
150	DN 150	**06**	6"
200	DN 200	**08**	8"
250	DN 250	**10**	10"
300	DN 300	**12**	12"
350	DN 350	**14**	14"
400	DN 400	**16**	16"
450	DN 450	**18**	18"
500	DN 500	**20**	20"
600	DN 600	**24**	24"

5.	BODY MATERIAL
A	CF8M

6.	KNIFE, PACKING GLAND, PACKING & SEAT MATERIALS
B	Knife: AISI 316 Packing gland: CF8M Packing: EPDM/Synthetic+PTFE Seat: EPDM

7.	ACTUATOR TYPE
P	Pneumatic
M	Manual
E	Electric

8.	ACTUATOR SPECIFICATION
D	Double acting

9.	INSTRUMENTATION CONNECTION BOX
-	No connection box
C	Connection box

SOLENOID VALVE TYPECODE

1.	2.	3.
MW	A	0242

1.	MANUFACTURER
MW	Metalwork

2.	MODEL
A	SOV35SOSOO

3.	COIL
0242	W0215000101

Other solenoid valves options on request, please consult Valmet.

LIMIT SWITCHES TYPECODE

1.	2.	3.	4.
M	TM	V	2

1.	TYPE
M	Mechanical
I	Inductive

2.	MANUFACTURER
TM	Telemecanique
PF	Pepperl-Fuchs

3.	MODEL
V	XCK-M115 (Only for Telemecanique)
A	NBB8-18GM60-US (Only for Pepperl-Fuchs)

4.	NUMBER OF SWITCHES
2	2 Pieces

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