Flowrox™ heavy duty pinch valves
Open Valve (PV)
Enclosed Valve (PVE)
Enclosed/Sealed Valve (PVE/S)

Installation, maintenance and operating instructions

These instructions must be read carefully and understood prior to the installation, use, and servicing of this product.

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READ THESE INSTRUCTIONS FIRST!

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

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 EU Declaration of Conformity For ATEX approved valves

Manufacturer / EU Authorised Representative:
Valmet Flow Control Oy
Marssitie 1
53600 Lappeenranta
Finland

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

Product:	Flowrox Pinch Valves
Type:	PV-, PVE-, PVE/S-series
ATEX group and category:	II 2 GD
Ex GAS:	Ex h IIB 80°C Gb
Ex DUST:	Ex h IIIB T80°C Db

Manufacturer's certificates:

Standard / Directive	Notified Body	Certificate No.
ISO 9001:2015	LRQA	10531829
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:

ATEX 2014/34/EU	Non-electrical equipment
Machinery 2006/42/EC Annex IIB	Valve

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 and EN 80079-36. The actual surface temperature of non-electrical equipment is depended on the process and ambient conditions (EN 80079-36 § 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.

On behalf of Valmet Flow Control Oy
In Vantaa, 11th June 2024

Riku Salojärvi
Head of Operations

2 General

2.1 General safety instructions for PV & PVE valves

In this manual, the following symbols are used to highlight the parts requiring particular attention:

Hazard severity panels.

	**⚠ DANGER!**
	DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
	**⚠ WARNING!**
	WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	**⚠ CAUTION!**
	CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

SYMBOL	DESCRIPTION
	Risk to personal safety: Neglecting the safety measures can cause serious personal injury or death.
	Electrical safety: Neglecting the safety measures can cause serious personal injury or death.
	Crushing hazard
	Mandatory action symbol: Obey these instructions to prevent machine malfunctions.

SYMBOL	DESCRIPTION
	Read the operation and maintenance instructions: Read and understand the operation and maintenance instructions before using the product.
	Forbidden action symbol.

ATEX /Ex Safety

	**⚠ CAUTION!**
	Ensure the general process and worker protection from static electricity in the facilities
	**⚠ CAUTION!**
	Potenial electrostatic charging hazard, do not rub surface with dry cloth.
	**⚠ WARNING!**
	Avoid impact on other light or rusty metal while lifting.
	**⚠ WARNING!**
	The valve installation, connection, startup and maintenance must be carried out when there is no risk of an explosive atmosphere.
	**⚠ WARNING!**
	The valve installation, connection, start-up and maintenance carried out by qualified personnel. Use the right equipment, and PPE.

⚠ WARNING!

Always use correct sleeve materials which are conductive or static dissipating in potentially explosive atmosphere.

⚠ WARNING!

An earth connection is externally available on the valve's flanges. These external earth connections must connected to other process components using an equipotential bonding conductor with a minimum cross-sectional area of 4 mm².

Ensure that the connection is established prior to initiating the operation of the valve.

⚠ WARNING!

The actuator must not exceed a speed of 1 m/s

Prevent accidents and ensure the valve's appropriate operation by complying with the installation, safety, and maintenance instructions in this manual.

Installation and maintenance of the valve must be carried out by persons with appropriate training. Electrical installation work of the actuator must be performed by a qualified electrician.

Access to the IOM-manual must be guaranteed at all times at the place of operation of the valve. It is required to observe the IOM-manual in all work tasks for the valve.

Use personal protective equipment (PPE) when performing any checks or maintenance operation for the valve (goggles, helmet, clothing and gloves).

Always follow the factory safety regulations.

In case of any discrepancies between translations, the English version shall prevail.

See appendix C - General safety warnings.

3 Introduction

The Flowrox PV, PVE and PVE/S heavy duty pinch valves are designed for shut-off and control applications involving abrasive or corrosive slurries, powders or granular substances.

3.1 Intended use

Open type PV.

The open body is available in diameters starting from 80mm.

The open body construction is designed for applications with:

- Low pressures
- Low temperatures
- Non-hazardous media

The open body construction is light and simple, which makes it easy to access for service. The open body also tolerates misalignment and vibration.

Enclosed type PVE.

The valve sleeve is covered by the body housing and thus protected from the environmental impacts and sunlight.

- Body construction prevents leakage of flowing media to the environment
- The valve body can be equipped with a gauge indicating pressure changes inside the body

PVE/S

PVE/S includes extra stem and body seals to provide a secondary containment of the fluid in the valve and to prevent leakage to the outside environment.

3.2 Valve markings

Flowrox valve name plates or identification plates are shown in Figure 1.

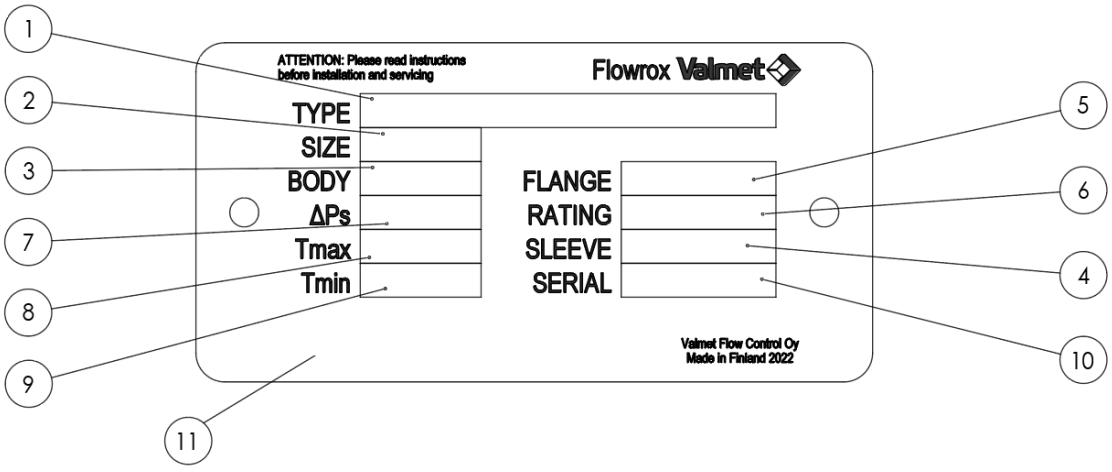


Figure 1. Tag plate

1. Type designation
2. Size
3. Body material
4. Sleeve material
5. Flange drilling
6. Pressure rating
7. Maximum shut-off pressure differential
8. Maximum temperature
9. Minimum temperature
10. Serial number
11. Certification and approvals, eg. CE, ATEX etc.

3.3 Mechanical structure

Flowrox valves are made of three main components:

- flanged valve sleeve
- valve body, either open PV or enclosed PVE
- actuator and actuator control components, if applicable

The valve sleeve is the only part of the valve which is in contact with the medium flowing in the pipeline.

All valve bodies are flange ended. The standard flange drillings can be made to meet all standards (e.g. DIN, ANSI, BS, AS, JIS).

The face to face dimensions of Flowrox valves are according to ANSI/ISA 75.10.02:

- 165 mm (6.5 in) for valves DN25....D65 (1 in ... 2.5 in)
- 2 ½ times the nominal diameter for valves DN80 (3 in) and bigger

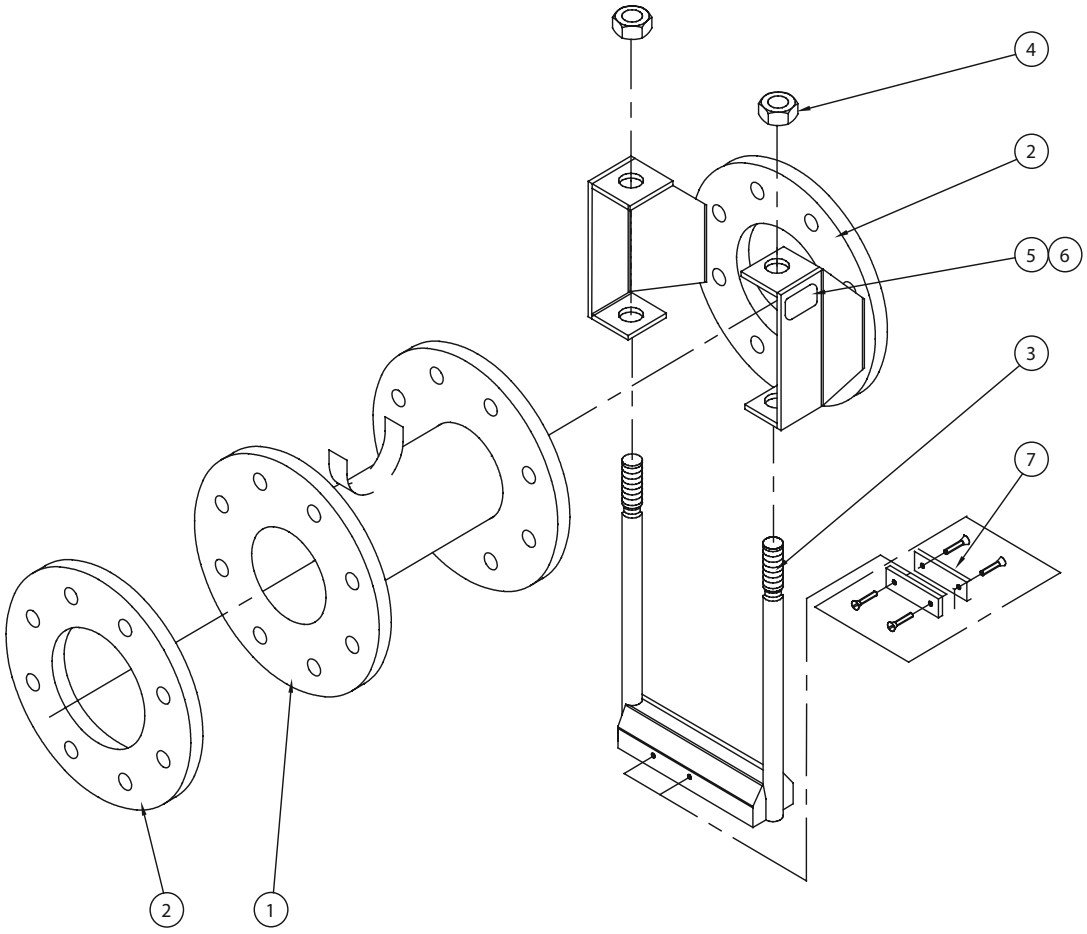


Figure 1. Exploded view of PV valve

Part	Description	Part	Description
1	Sleeve	5	Tag plate
2	Body	6	Hammerdrive screwt
3	Lower pinch bar	7	Fixing set
4	Hex nut		

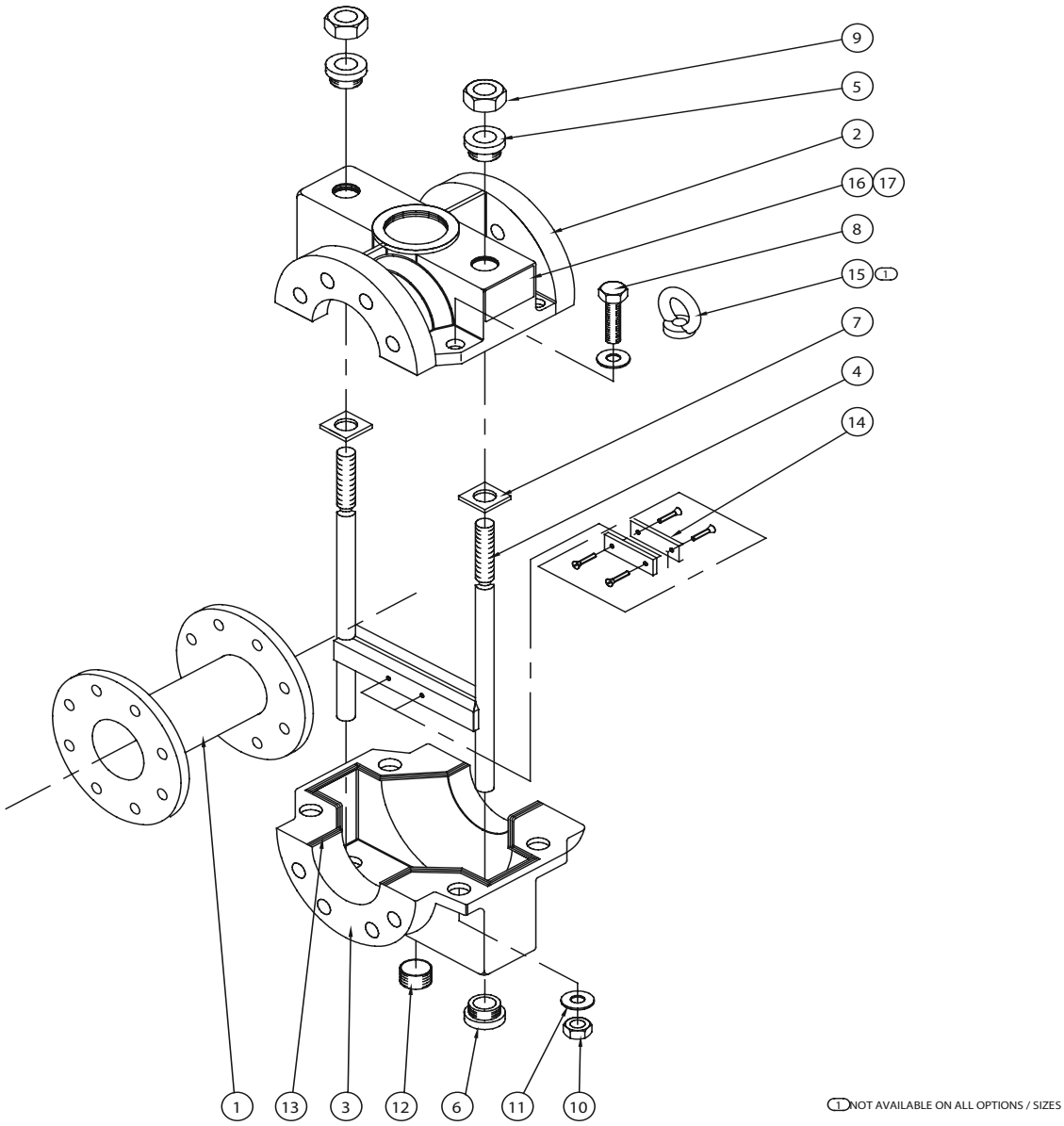


Figure 2. Exploded view of PVE valve

Part	Description	Part	Description
1	Sleeve	**10**	Hex nut
2	Upper body	**11**	Washer
3	Lower body	**12**	Plug
4	Lower pinch bar	**13**	Sealing strip
5	Threaded bushing	**14**	Fixing set
6	Threaded bushing	**15**	Lifting eye nut
7	Guide plate	**16**	Tag plate
8	Hex screw	**17**	Hammer drive screw
9	Hex nut		

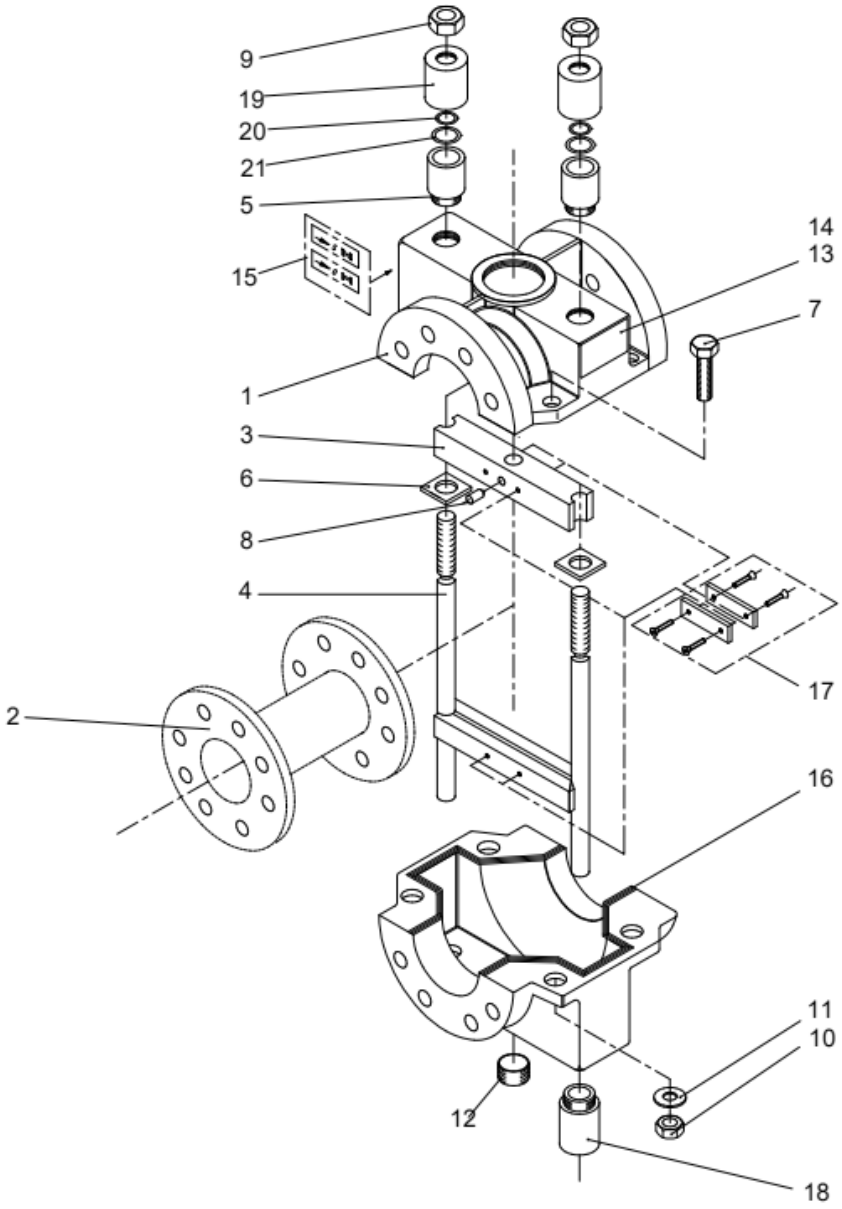
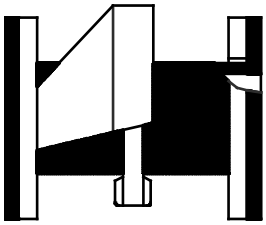


Figure 3. Exploded view of PVE/S valve

Part	Description	Part	Description
1	Valve body	12	Plug
2	Sleeve	13	Tag plate
3	Upper pinch bar	14	Drive screw
4	Lower pinch bar	15	Sticker
5	Bushing	16	Sealing
6	Guide plate	17	Fixing set
7	Hex screw	18	Bushing
8	Set screw	19	Cover bushing
9	Hex nut	20	Sealing
10	Hex nut	21	Sealing
11	Washer		

Open body valve PV

In the open body model the body and the actuator are connected only to one of the end flanges (*Figure 5*). The construction allows a slight deviation in the pipe angle and the valve can act as a vibration absorber.



	Note that in case of a sleeve breakage, the flowing liquid will leak into the environment.

Enclosed body valve PVE

The body of the enclosed model prevents excessive leakage of flowing media to the environment (*Figure 6*). The lower part of the body has a plug, which can be opened to check for sleeve failure.

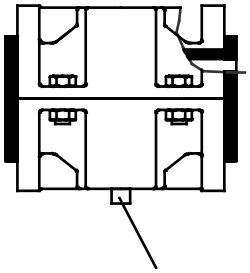


Figure 4. plug

Enclosed/Sealed body valve PVE/S

The PVE/S includes extra stem and body seals to provide a secondary containment of the fluid in the valve and to prevent leakage to the outside environment from the valve body. The lower part of the body has a plug, which can be opened to check for sleeve failure.

	⚠ **CAUTION!**
	Harmful substance hazard. In case of a sleeve failure, slight leakage will occur through the bushings. If you open the plug for checking, be careful as the medium may flow out.

	Changing the sleeve at appropriate intervals prevents leakages.

Actuators

Manual

Manual gear operated valves are closed by turning clockwise.

Pneumatic

The pneumatic actuator is designed for a nominal supply of 6 bar. Use correct sized pneumatic hoses to ensure sufficient air flow.

The air must be clean, dry, lubricated and properly filtered. An air quality of minimum requirement to ISO 8573-1:2010 [7:4:4] is recommended. If any component used on the valve has a stricter requirement (pressure rating, air quality), the stringent shall prevail.

	⚠ **CAUTION!**
	Noise hazard. Pneumatic actuator noise level can exceed 85 dB and cause an injury. Use ear protectors when working near the valve.

	⚠ **ATEX WARNING!**
	The actuator must not exceed a speed of 1 m/s

Hydraulic

Hydraulic actuators have a nominal supply pressure of 150 bar (2250 psi). The recommended hydraulic fluid is mineral oil. For more information, refer to OEM datasheet.

Electric

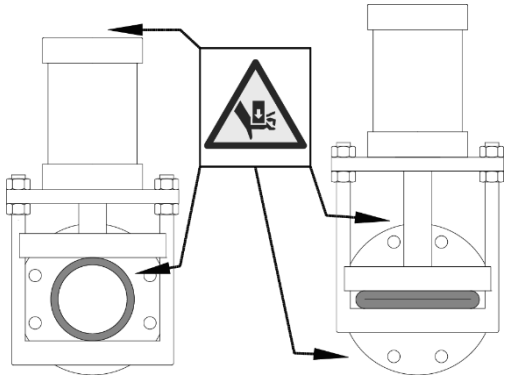
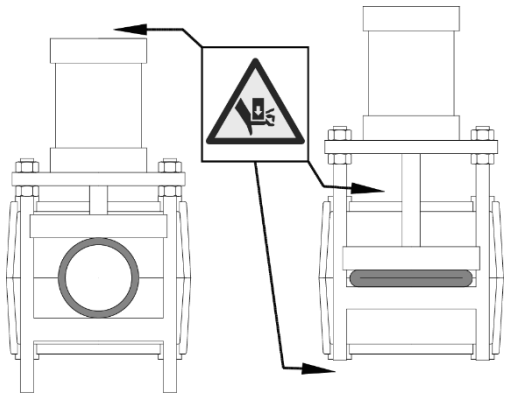
Electric actuators have open/close limit switches preset at the factory. A separate instruction from the actuator manufacturer is always included in the shipment.

Consult the manufacturer's instructions on actuator requirements or/and limitations. If actuator is changed or valve needs adjustment, follow the Maintenance instructions.

Make sure that the 3-phase electrical connection is done correctly. If the connection is done wrong, the limit or torque switches will not trigger as designed. This will allow the actuator to move beyond limits and cause damage to the valve.

3.4 Valve function

	⚠ WARNING!
	Crushing and cutting hazard. Do not put your hands or fingers between the moving parts when the valve cycles. Do not energize the actuator before the valve is properly attached to the pipeline. Disconnect and de-energize the actuator before installation and maintenance work.

Note the dangerous places (see *Figure 7* and *Figure 8*)! When the pinch valve closes, two pinch bars, moved by the actuator, squeeze the sleeve, closing on the centre line. When the valve is fully closed, the actuator is raised one half of the valve diameter. The actuator raises in all models (PV, PVE and PVE/S) 0.5 x valve nominal diameter (measure X). In the open model the space between the pinch bars, the space between the upper pinch bar and fixing plate of the actuator and the space below the lower pinch bar.	
	Figure 5. PV open model
In the enclosed model the space between the valve body and the fixing plate of the actuator and the ends of the guide bars of lower pinch bar below the valve body.	
	Figure 6. PVE enclosed model

Regarding the actuators, follow the instructions of the manufacturer.

	Note the possible remote control of automatic valves and turn it off before starting maintenance.

3.5 Recycling and disposal

Most valve parts can be recycled. Separate recycling and disposal instructions are available from the manufacturer. A valve can also be returned to the manufacturer for recycling and disposal for a fee.

3.6 Use in potentially explosive conditions

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.

If any questions concerning the use, application, or compatibility of the valve for the intended service, contact Valmet for more information.

4 Transportation, Storage and Lifting

4.1 Receiving

Check the condition of the valve package on arrival. If it shows signs of transport damage, check the operation of the valve carefully. Normally, a visual inspection of the valve is sufficient. However, if valve has been damaged during transport, contact your nearest Valmet Flow Control Oy sales office immediately.

4.2 Storage

The sleeves must be stored as follows:

- The storing temperature should not exceed +25°C (+77°F), preferably below +15°C (+59°F) but not under +5 °C (+41 °F). Keep the storage temperature as constant as possible.
- Store the sleeves in a dry place. Prevent water from condensing on sleeve surfaces.
- Avoid ultraviolet light. Protect the sleeves against straight sunlight. Use warehouse instead of storing outside.
- Remove all equipment generating ozone from the room where sleeves are stored. Minimize the store room ventilation.
- Store sleeves so that they are free from tension. Sleeves should be stored in vertical position on smooth support. Do not store sleeves one on top of another.
- Keep the sleeves off the chemical effect of solutions, semi-solids, impurities and solvent vapours during storing.
- Try to keep the storing time of sleeves as short as possible. Always use first the material which has been longest in stock.

4.3 Lifting

Lift the valves securely from the body (part 1 in Mechanical structure) and use existing lifting eyes when available. When lifting eyes are not available use lifting slings to lift the valve. When lifting, fasten the lifting slings to the valve as shown.

	⚠ ATEX WARNING!
	Avoid impact on other light or rusty metal while lifting.

Note the centre of gravity and support the valve to avoid it from turning around. In some models the centre of gravity is located towards the actuator.

Do not attach lifting equipment to the valve bore or actuator as they can get damaged.

	Lifting equipment must be used for valves weighing over 25 kg (55lb).

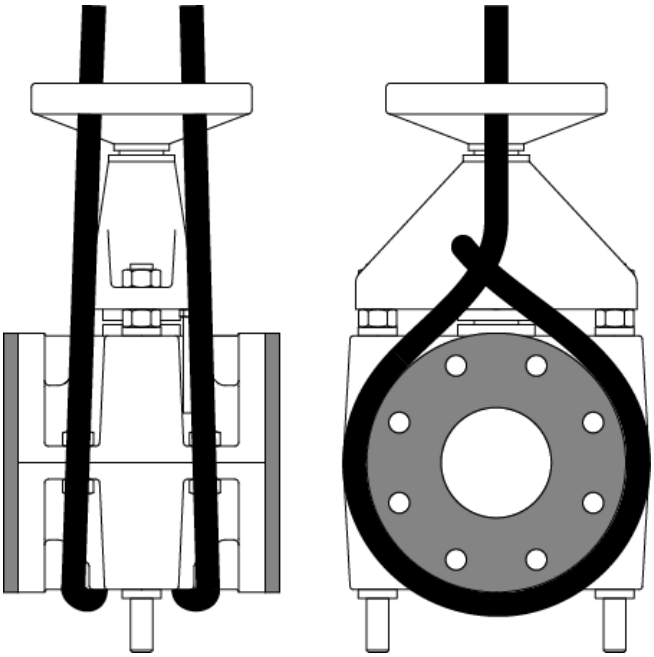


Figure 7. Lifting PVE manual valve

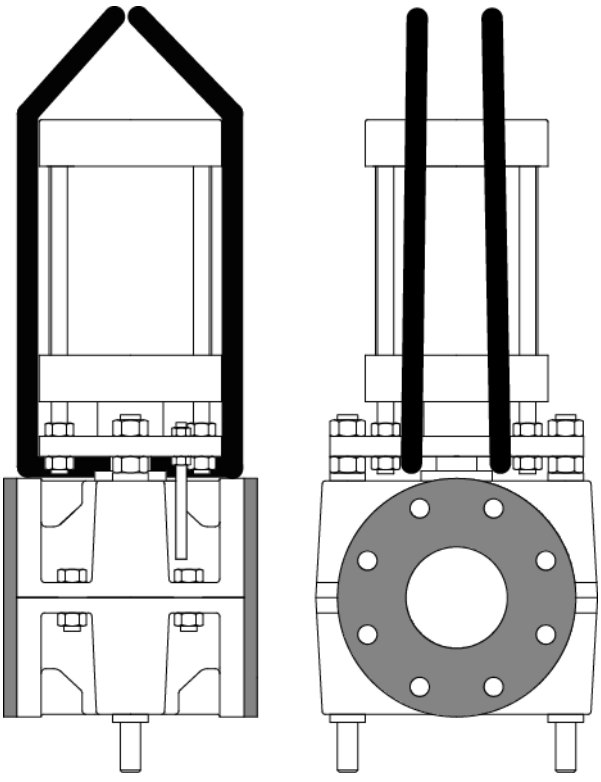


Figure 8. Lifting PVE Pneumatic valve

5 Installation

	⚠ **ATEX WARNING!**
	The valve installation, connection, startup and maintenance must be carried out when there is no risk of an explosive atmosphere.

5.1 Open body model (PV)

The sleeve has not been designed to withstand axial forces. The pipes must therefore be supported properly so that neither tension nor compression is caused. Use cross-tightening for flange bolts. Do not overtighten bolts.

Make sure that no inappropriate items get between the pinch bars and the sleeve.

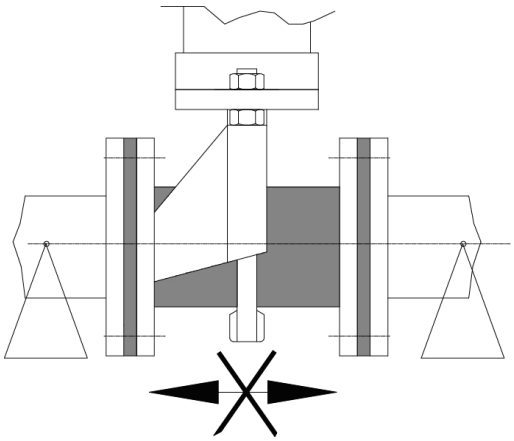


Figure 9.

If possible, protect the sleeve from direct sunlight. Direct sunlight and UV light deteriorate certain rubber qualities; this must also be considered during normal use.

A lengthwise angle deviation of max. 5º in the pipe is allowed (*Figure 12*).

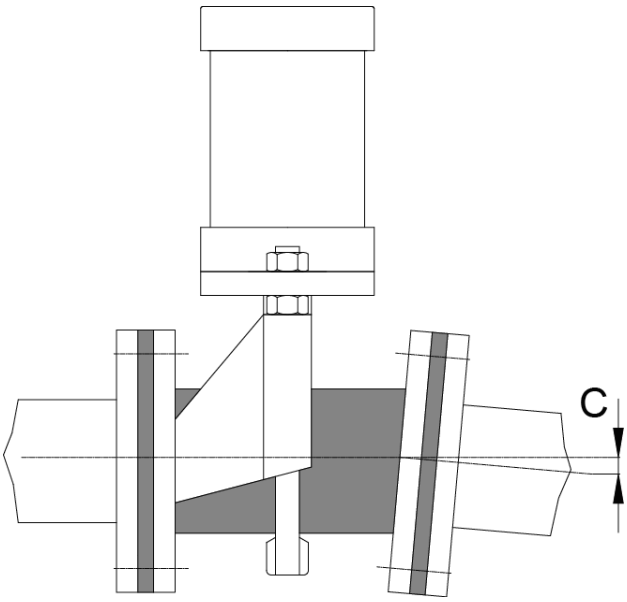


Figure 10.

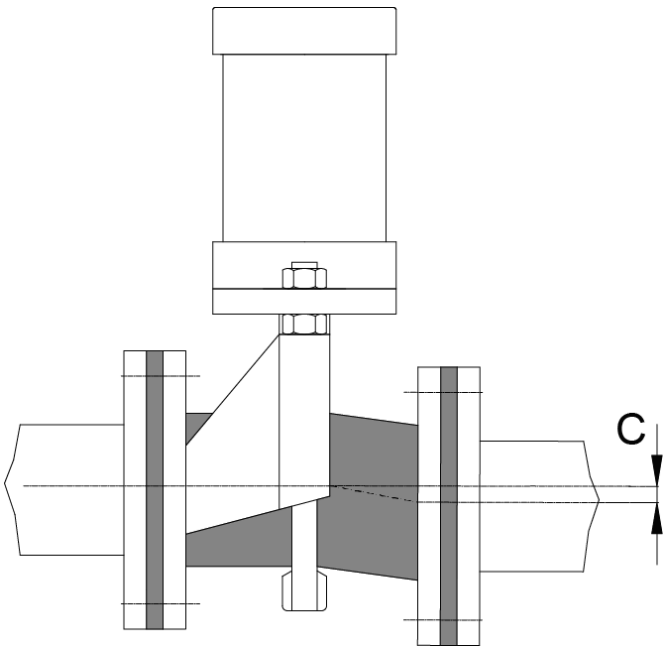


Figure 11.

Deviation in the centre line of the pipe (C), (*Figure 13*):

Size DN (in)	Dimension
PV 80…100 (3…4)	max. 5 mm (0.2 in)
PV 125...250 (5...10)	max.10 mm (0.4 in)
PV 300…500 (12…20)	max. 15 mm (0.6 in)
PV 550…1000 (22…40)	max. 20 mm (0.8 in)

5.2 Enclosed body model (PVE and PVE/S)

Make sure that no inappropriate items get between the valve body and the actuator.

5.3 All models (PV, PVE and PVE/S)

The actuator in all models (PV, PVE and PVE/S raises) 0.5 x valve nominal diameter. Allow enough headroom for installation and operation.

The valve nominal size means the inner diameter of the sleeve. The pipe inner diameter should match this diameter as closely as possible. Whenever possible, install the actuator in a vertical position. Valve can be assembled either way in terms of flow direction.

If the valve must be installed horizontally, the actuator must be supported to ensure the smooth operation, especially if the actuator is heavy. Install a sliding surface under the actuator (Figure 14).

The support can be fixed on the wall (1), on the floor (2) or the pipeline (3).

The valve can be installed in either way depending on the flow direction.

When installing the valve to the pipeline, it must be in the open position. Tighten the flange bolts smoothly crosswise.

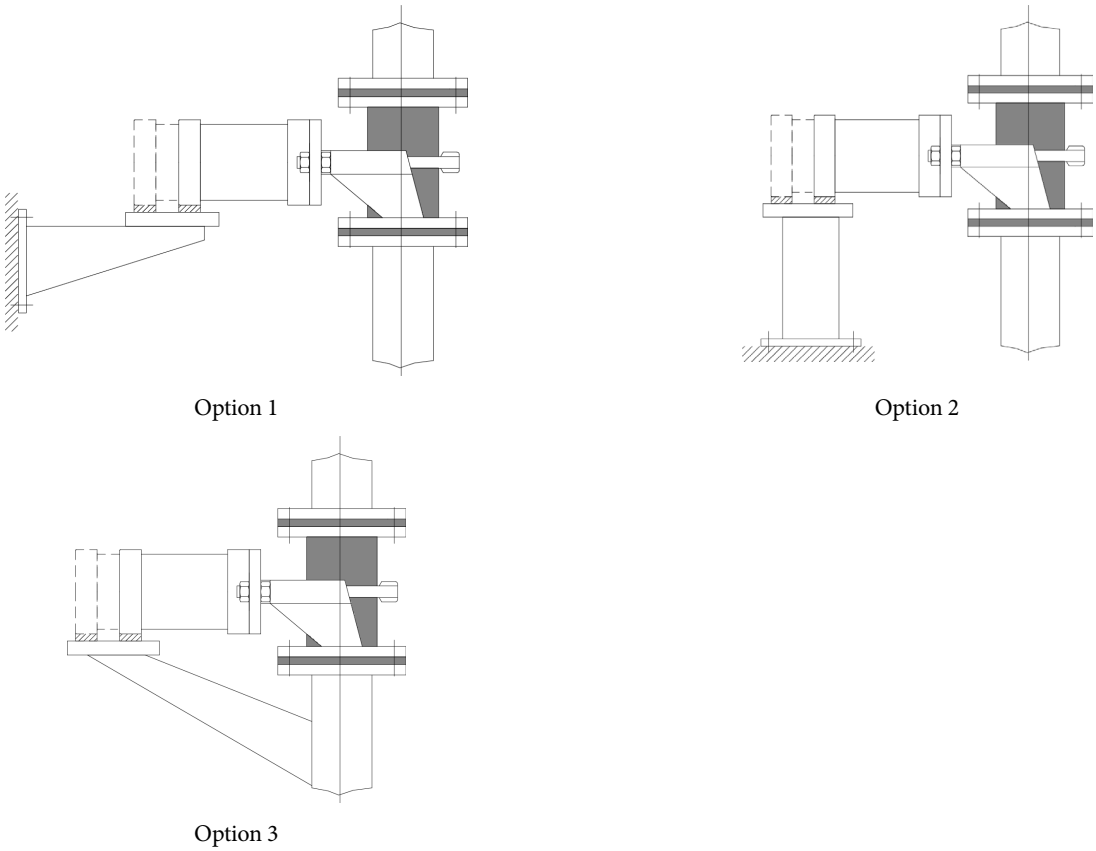
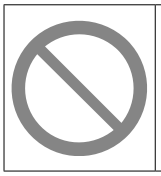


Figure 12. Support options.



Do not fasten actuator or any part of it to support.

Do not step on valves installed in horizontal position.

Recommended flange compression values are shown in the table.

Valve size (DN)	Flange type 1 mm (in)	Flange type 3 mm (in)
25 - 65 (1" - 2.5")	1.5 (0.06)	2 (0.08)
80 -100 (3" - 4")	2 (0.08)	2.5 (0.10)
125 - 150 (5" - 6")	2.5 (0.10)	3 (0.12)
200 (8")	3 (0.12)	3.5 (0.14)
250 - 700 (10" - 28")	-	3.5 (0.14)
750 - 1000 (30" - 40")	-	4 (0.16)

The sleeve sealing performance depends on several factors including media temperature, flange alignment, sleeve material and allowed tolerances. If leakage is detected, tighten the flange bolts reasonably until leakage is decreased to an acceptable minimum.

6 Operation

6.1 First use

Flowrox valves are normally delivered fully assembled and ready to use. Check the condition of the valve visually.

After installation to the pipeline, check that all connections are leak-proof.

⚠ ATEX WARNING!

An earth connection is externally available on the valve's flanges. These external earth connections must connected to other process components using an equipotential bonding conductor with a minimum cross-sectional area of 4 mm².

Ensure that the connection is established prior to initiating the operation of the valve.

6.2 During operation

During the operation the valve does not normally require any maintenance. The sleeve change is described in 7.2.

To ensure smooth operation, it is recommended to perform routine maintenance and replace worn parts.

Regarding the actuators, follow the instructions of the manufacturer.

Note the valve functions, see 3.4.

7 Maintenance

The sleeve is the only part of the valve which is in contact with the medium flowing in the pipeline. With regular sleeve changing, the likelihood of malfunctions in the process decreases. Wear resistance of the sleeve depends on the circumstances of the process and may vary a lot.

If there is a flow through closed valve or leakage through bushings (PVE) or through damaged sleeve (PV), change the sleeve immediately.

7.1 Scheduled maintenance

Include the valves in your factory maintenance program.

Maintenance tasks and service intervals are offered as a guideline in our Maintenance Recommendation as service intervals will vary with the applications.

⚠ ATEX WARNING!

The valve installation, connection, startup and maintenance must be carried out when there is no risk of an explosive atmosphere.

	⚠ WARNING!
	The valve installation, connection, start-up and maintenance carried out by qualified personnel. Use the right equipment, and PPE.

	For safety reasons, make sure that the nature of the medium is known or informed prior to any maintenance activity.

	⚠ CAUTION!
	Harmful substance hazard. The process medium can be corrosive or harmful. PVE: In case of a sleeve failure, slight leakage can occur through bushings. PV: In case of a sleeve breakage, the flowing liquid will leak into the environment. Make sure the process medium is led to a safe location.

7.2 Changing the valve sleeve

Spare parts

Note:

Use original spare parts to ensure that the valve functions as intended.

	⚠ ATEX WARNING!
	Always use correct sleeve materials which are conductive or static dissipating in potentially explosive atmosphere.

To ensure correct and quick delivery of spare parts, the order must contain at least the following information:

- The serial number (found in the name plate)
- Valve type code as in type plate (example: PVE0100B025M00AGN1CA)
- Spare part name and quantity (example: Sleeve, 1 piece) You can order the spare parts from VALMET offices, distributors or agents. Contact information is available at www.valmet.com/flowcontrol.
- It is recommended to keep one sleeve as a spare part at your factory warehouse. For part numbers refer to Mechanical structure.

	Control the valve functions (see 3.4) and follow the instructions for adjusting of valve (7.3) to prevent accidents and to ensure the correct operation of the valve.

Changing the valve sleeve in open model valve (PV)

See *Figure 2* for part numbers.

1. Depressurize and drain the pipeline.
2. Open the valve and detach it from the pipeline.
3. If the valve is equipped with opening tags, loosen the fixing screws (8 pcs) at the pinch bars and pull out the opening tags (*Figure 15.*).

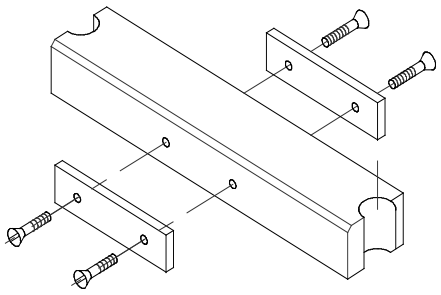


Figure 13.

4. Remove the broken sleeve by bending the rubber flange of the sleeve and by wrenching it with a pry bar or bending iron.
5. Put in the new sleeve by pressing the rubber flanges on the opposite sides together and push its edge as far as possible through the steel flange.
6. Wrenching the rest of the sleeve through the flange with a pry bar / bending iron (*see Figure 16.*).

	The rubber flange of the sleeve allows bending. Do not damage the sleeve with a sharp tool.

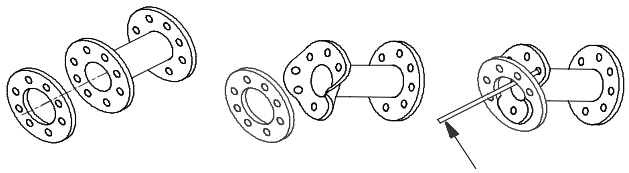


Figure 14.

7. After putting in the new sleeve, fix the opening tags to the pinch bars. The excessive length of the tags can be cut away.
8. Adjust the pinch bars before installing to the pipeline.

	At sleeve change, it is always important to check and adjust the position of the pinch bars. See 7.3.

Changing valve sleeve of Enclosed model valve PVE

See *Figure 3* for part numbers.

1. Depressurize and drain the pipeline.
2. Open the valve and detach it from the pipeline.
3. Open the screws (7.) between the valve body halves and detach the lower part of the body. If the valve has opening tags, detach them (17.) from upper (3.) and lower pinch bars (4.), 8 pcs screws (Figure 15).
4. Take out the damaged sleeve and put in a new one. If the sleeve is stiff, detach the lower pinch bar.
5. Clean all the parts which have been in contact with the process medium.
6. Put in a new sleeve. Remember to fix the opening tags if applicable.
7. Check the body sealing (16.) between the body halves and the condition of the bushings (5.).

A worn sealing or worn bushings can cause leakage to the environment in the event of a sleeve breakage.

8. Assemble the valve and adjust the pinch bars before installing the valve to the pipeline.

Changing valve sleeve of Enclosed/Sealed model valve PVE/S

See *Figure 4* for part numbers.

1. Depressurize and drain the pipeline.
2. Open the valve and detach it from the pipeline.
3. Open the screws (part 7) between the valve body halves and detach the lower part of the body.
4. If the valve has opening tags (part 17), detach them from both upper and lower pinch bars, 8 pcs screws.
5. Take out the damaged sleeve and put in a new one. If the sleeve is stiff, loosen nuts (part 9) and take the sleeve out. If it is still impossible to remove the sleeve, detach the lower pinch bar by pulling it smoothly out and ensuring not to damage the seals (part 20, 21) with threads of lower pinch bar.
6. Clean all the parts which have been in contact with the process medium.
7. Put in a new sleeve. Remember to fix the opening tags if applicable.
8. Check the condition of the side bushings (parts 5). Replace the body sealing (part 16) between the body halves and the seals (part 20, 21) and the seal in the center bushing (part of actuator). A worn sealing and/or worn bushings may cause leakage to the environment in the event of a sleeve breakage.
9. Assemble the valve and adjust the pinch bars before installing the valve to the pipeline.

	At sleeve change, it is always important to check and adjust the position of the pinch bars. See 7.3.

7.3 Adjusting the valve

After every sleeve change, the closing of the valve has to be checked and adjusted. A wrong adjustment may shorten the lifetime of the sleeve and cause leakage from the valve when the actuator is in the closed position.

	⚠ **WARNING!**
	Crushing and cutting hazard. Do not put your hands or fingers between the moving parts when the valve cycles. Do not energize the actuator before the valve is properly attached to the pipeline. Disconnect and de-energize the actuator before installation and maintenance work.

	The settings of electric actuators do not need to be readjusted. Adjustment should be done mechanically.

Before reinstallation of the valve into the pipeline:

1. Close the valve with the actuator.
2. Adjust the pinch bars parallel to each other with the nuts, which are on both sides of actuator fixing plate (*Figure 17*, nuts 1 and 2). From one end of the sleeve an even, narrow light strip should be visible on the whole squeezed section of the sleeve or symmetrically on both sides (*Figure 17* and *Figure 18*, dimension X).
3. Tighten both nuts (1) equally so, that the strip of light disappears (*Figure 19*). Loosen the lower nuts (2) if necessary.
4. Set the lower nuts (*Figure 20*, nut 2) Y mm from the attachment plate (see the dimensions Y in Table 2).

5. When the nuts (nut 1) on the upper side of the attachment plate are tightened, the lower pinch bar rises and causes a sufficient squeeze on the sleeve to close the flow against the pressure in the pipeline.
6. After this has been done, open the valve and it is ready to be installed to the pipeline.

If the valve is hand wheel operated, it is enough to check that the pinch bars are parallel, and the light slit is shown (*Figure 17* and *Figure 18*, dimension X).

A sufficient squeeze is achieved by turning the hand wheel 1/3...3/4 rounds after the valve feels tight.

Table 1. Tightening values for manual valves

Pipeline pressure	Needed rotations
1 bar (15 psi)	appr. 1/3 of a hand wheel rotation
PN 10 bar (150 psi)	appr. 1/2 of a hand wheel rotation
PN 25 bar (375 psi)	appr. 3/4 of a hand wheel rotation

If the valve is supplied with a reduction gear, the number of rotations is multiplied by the gear ratio.

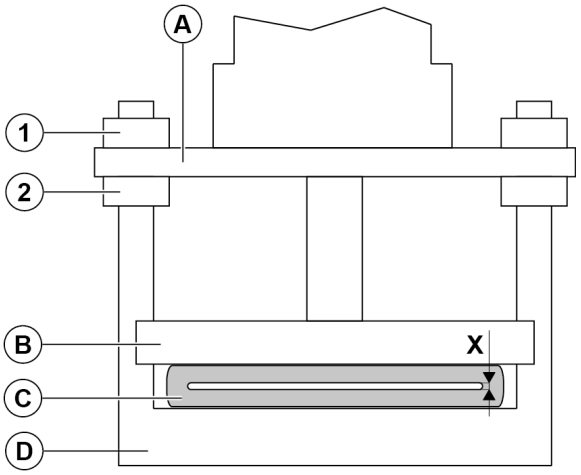


Figure 15.

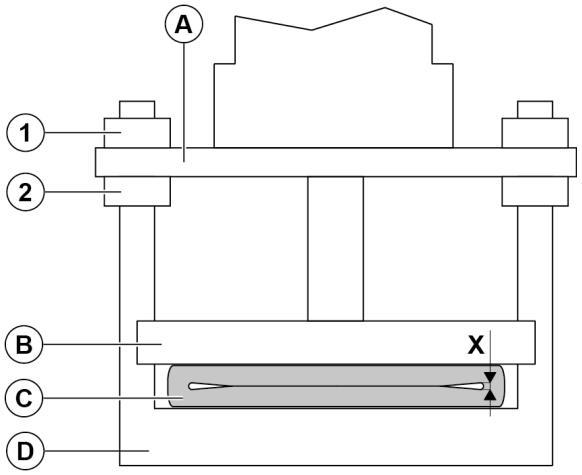


Figure 16.

Part	Description	Part	Description
A	Attachment plate	C	Sleeve
B	Upper pinch bar	D	Lower pinch bar

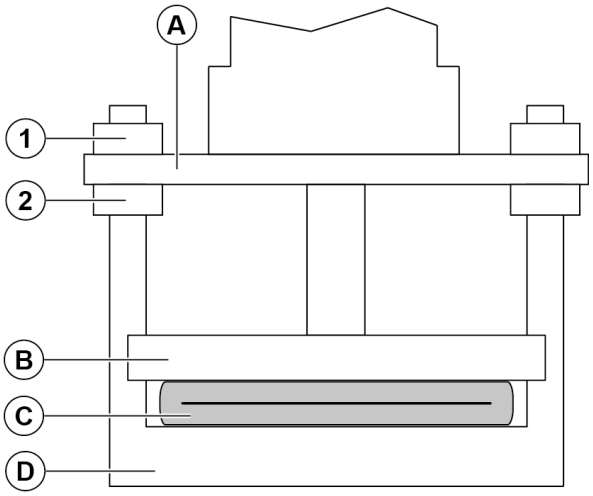


Figure 17.

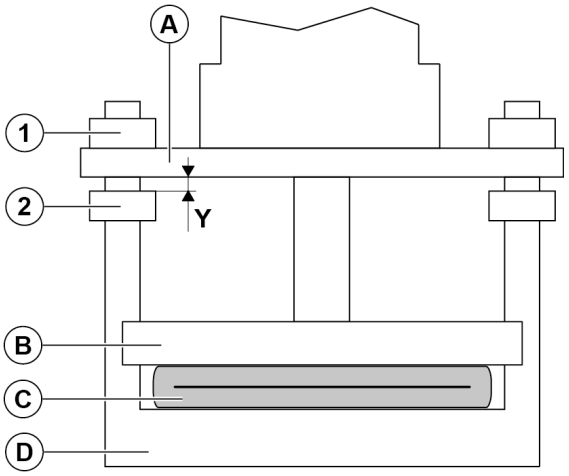


Figure 18.

Table 2. Dimension Y mm (in)

VALVE SIZE mm (in)	PRESSURE CLASS (Bar)		
	1	6…10	16…25
25…100 (1…4)	1,5 (0.06)	2.5 (0,10)	3.5 (0,14)
125…250 (5…10)	2,0 (0,08)	3.0 (0,12)	4.0 (0,16)
300…500 (12…20)	3,0 (0,12)	4.0 (0,16)	
550…(22…)	4,0 (0,16)		

Use the tightening torques on the table if no specific torque is given.

Table 3. General tightening torques for screws

Size	Tightening torques Nm (ft-lbs) ±5%	
	Bolt strength class (lubrication conversion factor 0,86) MoS2	
	8.8	A4-80
M6	8 (6)	8 (6)
M8	21 (15)	19 (14)
M10	40 (30)	38 (28)
M12	70 (51)	65 (48)
M16	169 (125)	161 (119)
M20	331 (244)	313 (231)
M24	572 (422)	541 (399)
M27	827 (610)	782 (577)
M30	1127 (831)	1067 (787)
M33	1522 (1123)	1437 (1060)
M36	1961 (1446)	1858 (1370)

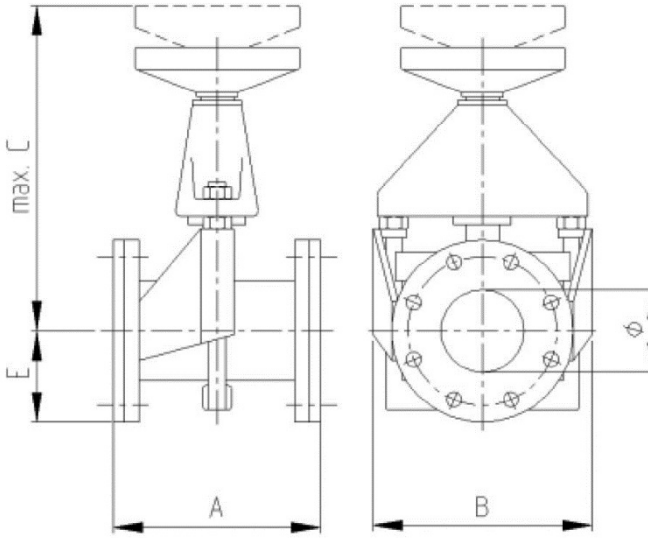
7.4 Troubleshooting

PROBLEM	POSSIBLE REASON	ACTION
Valve leaks into the environment.	1. Sleeve breakage. 2. End flanges loosely tightened.	1. Change and make adjustment of sleeve 2. Tighten the flange end screws
Leakage or flow through the valve when valve should be closed.	Sleeve breakage.	(models PVE, PVS): check by the plug - change and make adjustment of sleeve
	Sleeve is not closed with sufficient squeeze.	Manual valves - turn the hand wheel more tight. Pneumatic and hydraulic. actuators - check the supply pressure for cylinder; if the pressure is too low, the sufficient squeeze for the sleeve cannot be reached. Check the compactness of the cylinder seals.
	Wrong adjustment of the sleeve.	Make the adjustment
Shorter lifetime of the sleeve than before.	Sleeve is not closed with sufficient squeeze.	Manual valves - turn the hand wheel more tight. Pneumatic and hydraulic actuators - check the supply pressure for cylinder; if the pressure is too low, the sufficient squeeze for the sleeve cannot be reached. Check the compactness of the cylinder sealings.
	Wrong adjustment of the sleeve.	Make the adjustment.
	1. Pneum. valves: wrong adjustment of the end cushioning in front end-block of cylinder. 2. Wrong adjustment of the pneum. spring.	1. End cushioning in front end-block of cylinder should be fully open. 2. Check adjustment of pneumatic spring .
	Changes in customer process e.g. composition of medium / temperature flow capacity	Check the best rubber quality with Valmet Flow Control Oy. Select another valve size with Valmet Flow Control Oy (particularly valves with positioners).
Sleeve is flapping and/or flow capacity is not sufficient.	Vacuum or pressure shocks in pipeline, rubber has hardened and does not open totally.	Check that the opening tags are fixed.

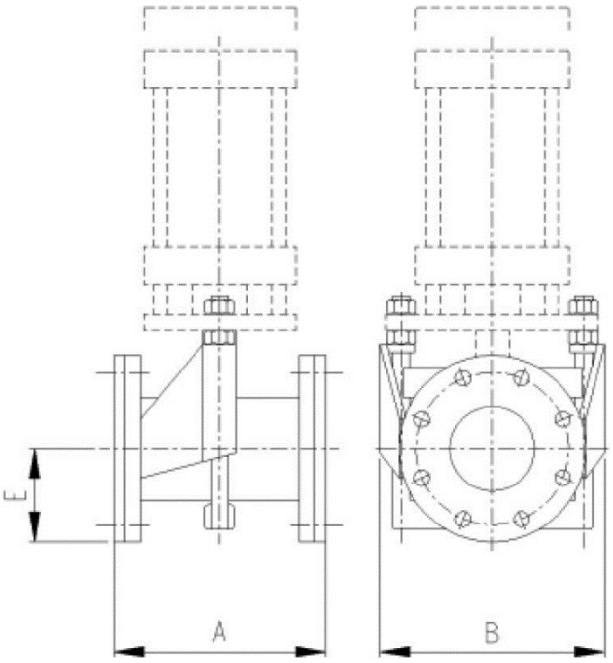
In case you cannot find the solution to your problem in the above table, please turn to the nearest Valve Flow Control Oy representative. The serial number and type identification of the valve in question will help getting the prompt answer.

APPENDIX A: Dimensions

PV valve, Manual actuator



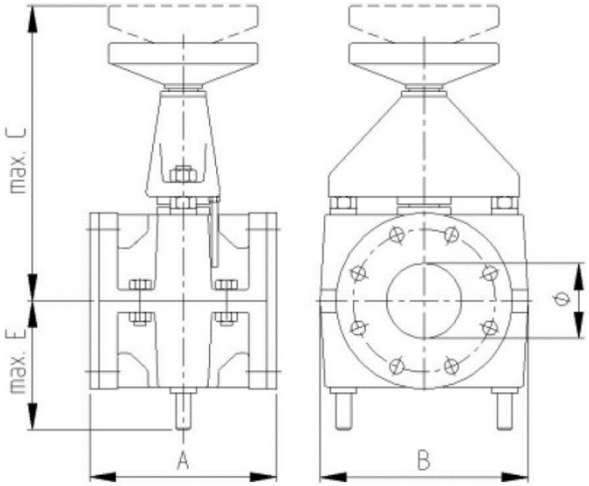
PV valve, Pneumatic actuator



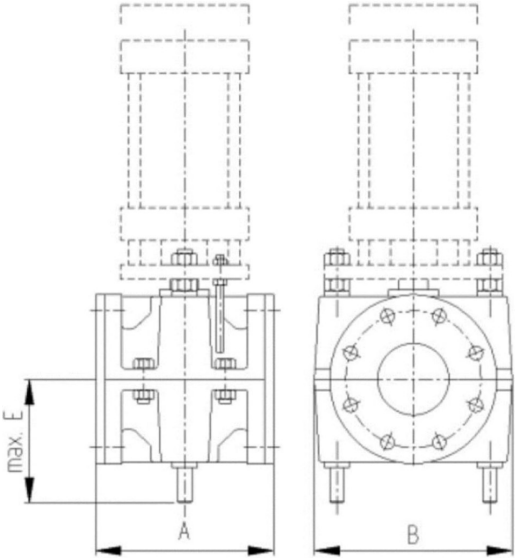
Valve size (PV) M&A	PN (bar)	A	B	C	E	Weight Manual valves (kg)	Weight Automatic valves (kg)
80	1-25	200	235	370	100	22	14
100	1-25	250	265	410	110	29	16
125	1-25	310	325	465	135	46	23
150	1-16	375	381	560	143	67	36
200	1-16	500	461	690	170	88	47
250	1-10	625	545	865	210	137	85
300	1-6	750	704	1020	250	167	100

Valve size (PV) M&A	PN (psi)	A	B	C	E	Weight Manual valves (lb)	Weight Automatic valves (lb)
3	15-375	7.9	9.3	14.6	3.9	49	31
4	15-375	9.8	10.4	16.1	4.3	64	36
5	15-375	12.2	12.8	18.3	5.3	102	51
6	15-240	14.8	15.0	22.0	5.6	148	80
8	15-240	19.7	18.1	27.2	6.7	194	104
10	15-145	24.6	21.5	34.1	8.3	302	188
12	15-90	29.5	27.7	40.2	9.8	368	221

PVE valve, Manual actuator



PVE valve, Pneumatic actuator



Valve size (PVE) M&A	PN (bar)	A	B	C	E	Weight Manual valves (kg)		Weight Manual valves (kg)	
						FE	AL	FE	AL
25	1-25	165	125	255	87	11	7	8	4
32	1-25	165	140	260	90	14	9	10	5
40	1-25	165	180	265	105	16	9	12	6
50	1-25	165	190	280	120	18	9	13	7
65	1-25	165	210	310	136	22	12	17	9
80	1-25	200	245	370	155	36	17	27	13
100	1-25	250	278	410	175	46	25	33	17
125	1-25	310	340	465	210	74	41	48	25
150	1-16	375	400	560	240	106	74	75	43
200	1-10	500	480	690	295	159	-	119	-
250	1-6	625	570	865	380	213	-	161	-
300	1	750	720	1020	445	279	-	212	-

Valve size (PVE) M&A	PN (psi)	A	B	C	E	Weight Manual valves (lbs)		Weight Automatic valves (lbs)	
						FE	AL	FE	AL
1	15-375	6.5	5.0	10.1	3.4	25	16	18	9
1.25	15-375	6.5	5.5	10.2	3.5	31	20	22	11
1.5	15-375	6.5	7.1	10.4	4.1	36	20	27	14
2	15-375	6.5	7.5	11	4.7	40	20	29	16
2.5	15-375	6.5	8.3	12.2	5.4	49	27	38	20
3	15-375	8	9.6	14.6	6.1	80	38	60	29
4	15-375	10	10.9	16.1	6.9	102	55	73	38
5	15-375	12.2	13.4	18.3	8.3	163	91	106	55
6	15-240	14.8	15.7	22	9.4	234	163	166	95
8	15-150	19.7	18.9	27.2	11.6	351	-	263	-
10	15-90	24.6	22.4	34.1	15	470	-	355	-
12	15	29.5	28.3	40.2	17.5	615	-	468	-

APPENDIX B: Type Code

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
PVE	0100			B025	L	00	A	G	N	1	A	A

1. Sign	Valve series
PV	Pinch valve open model
PVE	Pinch valve Enclosed model
PVE/S	Pinch valve Enclosed/Sealed model
PVS	Pinch valve Sealed model

2. Sign	Body size	
0025	DN 25	1"
0032	DN 32	1- 1/4"
0040	DN 40	1- 1/2"
0050	DN 50	2"
0065	DN 65	2- 1/2"
0080	DN80	3"
0100	DN100	4"
0125	DN125	5"
0150	DN150	6"
0200	DN200	8"
0250	DN250	10"
0300	DN300	12"
0350	DN350	14"
0400	DN400	16"
0450	DN450	18"
0500	DN500	20"
0600	DN600	24"

3. Sign	Pressure class PN
/	Only if reduced port valve required (control valves only)
-	Blank

4. Sign	Sleeve reduction (reduction up to two sizes)	
0015	DN 15	1/2"
0020	DN 20	3/4"
0025	DN 25	1"
0032	DN 32	1- 1/4"
0040	DN 40	1- 1/2"
0050	DN 50	2"
0065	DN 65	2- 1/2"
0080	DN 80	3"
0100	DN 100	4"
0125	DN 125	5"
0150	DN 150	6"
0200	DN 200	8"
0250	DN 250	10"
0300	DN 300	12"
0350	DN 350	14"
0400	DN 400	15"
0500	DN 500	20"
-	Blank no reduction	

5. Sign	Pressure rating
B001	1 BAR
B006	6 BAR
B007	7 BAR (Only AS Table D and BS Table D)
B010	10 BAR
B014	14 BAR (Only AS Table E and BS Table E)
B016	16 BAR
B020	20 BAR
B025	25 BAR
B040	40 BAR
B064	64 BAR
B100	100 BAR
B00Y	Special

For further information on the new type code on valve and actuators, see the product Technical bulletin.

6. Sign	Flange drilling
J	PN 10 EN 1092
K	PN 16 EN 1092
L	PN 25 EN 1092
M	PN 40 EN 1092
C	ASME B16.5 Class 150
D	ASME B16.5 Class 300
B	BS TABLE D
A	AS TABLE D
E	AS TABLE E
R	JIS 10K
S	JIS 16K
Y	Other

7. Sign	Body material
00	Grey Cast iron EN 1561-GJL-250
02	AISI 316 (EN 1.4408 / A351 CF8M)
03	Aluminum AlSi12
04	Welded steel
05	Polyurethane
06	Polyamide
YY	Other

8. Sign	Sleeve material
A	SBRT Styrene Butadiene, Flowrox™ Blend
B	EPDM Ethylene Propylene
C	NR Natural Rubber
D	NBR Nitrile
E	CSM Chlorosulfonated Polyethylene (Hypalon®)
F	EPDMB Green Liquor Sleeve Flowrox™ Blend
G	CR Chloroprene
H	IIR Butyl
I	NRF Natural Rubber Foodstuff (No FDA approval)
J	NBRF Nitrile Foodstuff (No FDA approval)
K	HNBR Hydrogenated Nitrile

9. Sign	Sleeve type
G	General (Full Bore)
	For control application
C	Conical even DN>=80
S	Conical straight outer surface 80>DN

10. Sign	Sleeve features/options
A	Flowrox SensoMate sleeve
B	PU-Lining inside the sleeve (Available only with SBRT)
C	Suction sleeve (For negative pressure)
N	NONE

11. Sign	Bushing material
1	UHMWPE (RCH1000) –50 °C to 80 °C
2	Stainless steel (AISI 316) –50 °C to 160 °C
3	Polyamide (PA6G30F) –30 °C to 120 °C
4	PE-1000-AST –50 °C to 80 °C (For EX-areas)
N	None (Applies to PV Series)
Y	Other

12. Sign	Fasterners material
A	FEZN (Standard)
C	All Stainless steel, A4
Y	Other

13. Sign	Bushing material
A	Standard EN 1092-1/A Flat Face
B	EN 1092-1/B1 Raised Face (Only Certain size and pressure rating)
R	ASME B16.5 RF, Raised Face (Only Certain size and pressure rating)

APPENDIX C: 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 ~~point~~ 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 which are intended for use 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 Disc & Ball movement even when the valve is disassembled. Discs and balls 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

General disclaimers

Recieve, 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 THE FOLLOWING PRECAUTIONS BE TAKEN PRIOR TO REMOVAL OF THE VALVE FROM THE PIPELINE OR BEFORE ANY DISASSEMBLY:Be sure you know what fluid 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 fluid involved in addition to any other PPE normally required.
- Depressurize the pipeline, bring to ambient temperature, and drain the pipeline fluid.
- 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 butterfly valve's offset shaft creates greater disc 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 BUTTERFLY VALVE WITHOUT A HANDLE OR AN ACTUATOR MOUNTED ON IT!
- WARNING: DO NOT REMOVE A HANDLE OR AN ACTUATOR FROM A BUTTERFLY VALVE UNDERPRESSURE!
- Before you install the butterfly valve in or remove it from the pipeline, cycle the valve closed. Butterfly valves must be in the closed position to bring the disc 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

1. The type plate (nameplate, or engraved markings) on the valve gives the information of max. process conditions to the valve.
2. (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 type 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.
3. Temperatures and pressures must never exceed values marked on the valve. Exceeding these values may cause uncontrolled release of pressure and process fluid. Damage or personal injury may result.
4. The operating torque of the valve may rise over time due to wear, particles or other damage the seat. Never exceed the actuator torque preset values (air supply, position). Application of excessive torque may cause damage to the valve.
5. 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.
6. 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.
7. 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.
8. 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.
9. As the use of the valve is application specific, a number of factors should be taken into account when selecting a valve for a given application. Therefore, some situations in which the valves are used are outside the scope of this manual.
10. 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.
11. 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.
12. Valves intended for use in or with explosive atmospheres must be equipped with a grounding device and marked according ATEX (or equivalent international standards).
13. Manual handles are available for specific butterfly valve sizes and maximum line pressures. Do not operate a valve with a handle or wrench outside the size and pressure limits stated in the IMO. High line pressure may create a large enough force to pull the handle from the operator's hands. Damage or personal injury may result.

Maintenance

1. Respect the safety warnings above!
2. Plan service and maintenance actions, that spare parts, lifting devices and service personnel is available.Maintain the valve within the recommended minimum maintenance intervals or within the recommended maximum operating cycles.

3. Always make sure that the valve and the pipeline is depressurized before starting any kind of maintenance work at a valve.
4. 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.
5. 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.
6. All pressure containing parts must be inspected visually for damage or corrosion. Damaged parts must be replaced.
7. Valve pressure bearing parts and all internals must be inspected for corrosion or erosion which may result in reduced wall thickness on pressure bearing parts. Damaged pressure bearing 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 warrantee.
8. 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.
9. Check the condition of sealing surfaces on the seats, closure device (disc, ball, cage, plug, etc.), body and body cap. Replace parts if there are significant wear, scratches, or damage.
10. Check the wear of bearings and bearing contact surfaces on the shaft and replace damaged parts if necessary.
11. Do not weld on pressure bearing parts without an ASME and PED qualified procedure and personnel.
12. Pressure bearing parts of valves in high temperature applications must be carefully examined for the effects of material creep and fatigue.
13. Make sure that the valve is positioned in the correct flow direction into the pipeline.
14. 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.
15. Always work in a clean environment. Avoid getting particles inside the valve due to machining, grinding, or welding nearby.
16. Never store a maintained valve without flow port protection.
17. 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.
18. 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. Use of the linkage to support additional equipment or additional weight such as people, ladders, etc. may result in equipment damage or personal injury.
19. 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.
20. 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 fluid 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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