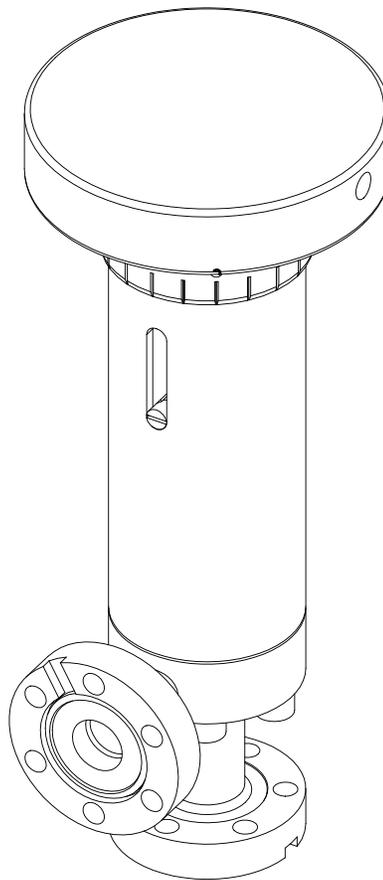


Variable leak valve with manual actuator

Series 590
DN 16 mm (I. D. $\frac{5}{8}$ ")

This manual is valid for the following product ordering numbers:

59024- . E01 -



Sample picture

Imprint

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1 Description of product

1.1 Identification of product

The fabrication number is lasered directly on the product.



XXXX-XXXX-XXXX/XXXX ←Fabrication number

Made in Switzerland

1.2 Use of product

Use product for clean and dry vacuum applications only. Other applications are only allowed with the written permission of VAT. Suitable for XHV applications.

1.3 Related documents

- Product data sheet
- Dimensional drawing

1.4 Important information



This symbol points to a very important statement that requires particular attention.

Example:



VAT disclaims any liability for damages resulting from inappropriate packaging.

1.5 Technical data

See product data sheet and dimensional drawing.

Weights of standard valve:

DN 16: 0.95 kg

Weight of special valves, see product data sheet.

2 Safety

2.1 Compulsory reading material

Read this chapter prior to performing any work with or on the product. It contains important information that is significant for your own personal safety. This chapter must have been read and understood by all persons who perform any kind of work with or on the product during any stage of its serviceable life.

	NOTICE
	<p>Lack of knowledge Failing to read this manual may result in property damage. Firstly, read manual.</p>



These Installation, Operating & Maintenance Instructions are an integral part of a comprehensive documentation belonging to a complete technical system. They must be stored together with the other documentation and accessible for anybody who is authorized to work with the system at any time.

2.2 Danger levels

	⚠ DANGER
	<p>High risk Indicates a hazardous situation which, if not avoided, will result in death or serious injury.</p>

	⚠ WARNING
	<p>Medium risk Indicates a hazardous situation which, if not avoided, could result in death or serious injury.</p>

	⚠ CAUTION
	<p>Low risk Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.</p>

	NOTICE
	<p>Command Indicates a hazardous situation which, if not avoided, may result in property damage.</p>

2.3 Personnel qualifications



WARNING

Unqualified personnel

Inappropriate handling may cause serious injury or property damage.
Only qualified personnel are allowed to carry out the described work.

3 Design and Function

3.1 Design

With handwheel:
 Type 590 ... - . E01 -

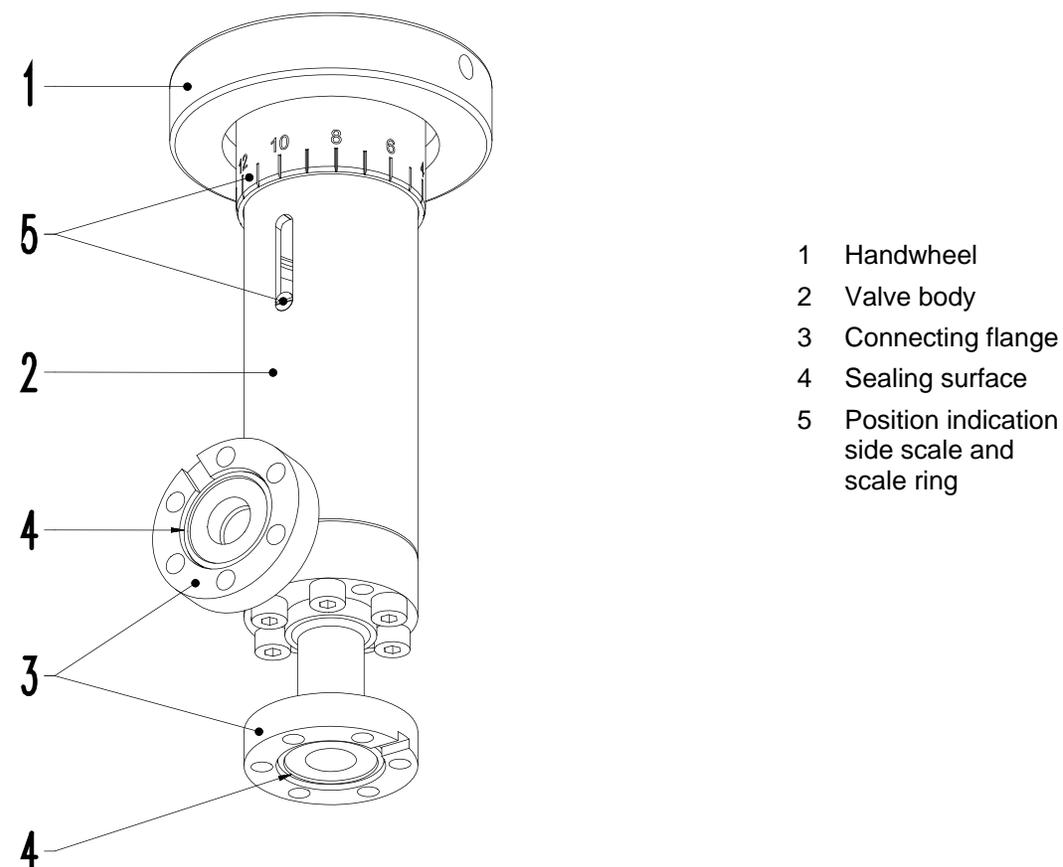


Figure 3-1

3.2 Function

Valve is closed and opened manually.

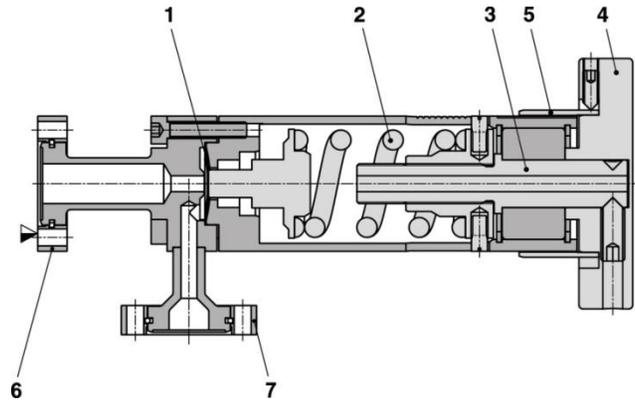


Figure 3-2

- | | | | |
|---|-----------------|---|---------------------------|
| 1 | Diaphragm | 5 | Scale |
| 2 | Pressure spring | 6 | Rotary flange / seat port |
| 3 | Spindle | 7 | Rotary flange / side port |
| 4 | Handwheel | ▼ | Valve seat side |

Further function definitions see chapter «5.1 Normal operation».

4 Installation

	⚠ WARNING
	<p>Unqualified personnel Inappropriate handling may cause serious injury or property damage. Only qualified personnel are allowed to carry out the described work.</p>

4.1 Unpacking



- Make sure that the supplied products are in accordance with your order.
- Inspect the quality of the supplied products visually. If it does not meet your requirements, please contact VAT immediately.
- Store the original packaging material. It may be useful if products must be returned to VAT.



Do not open the plastic bag before mounting into the system.

	NOTICE
	<p>Sensitive product Valve parts may get damaged.</p> <ul style="list-style-type: none">– When lifting the valve, pay attention that the valve does not touch any solid objects.– Lift valve carefully and put it down on a clean surface or mount it to a clean system.

Weight of standard valves; see chapter «1.5 Technical data».

4.2 Installation into the system

	NOTICE
	<p>Contamination</p> <p>Product may get contaminated. Always wear cleanroom gloves when handling the product.</p>

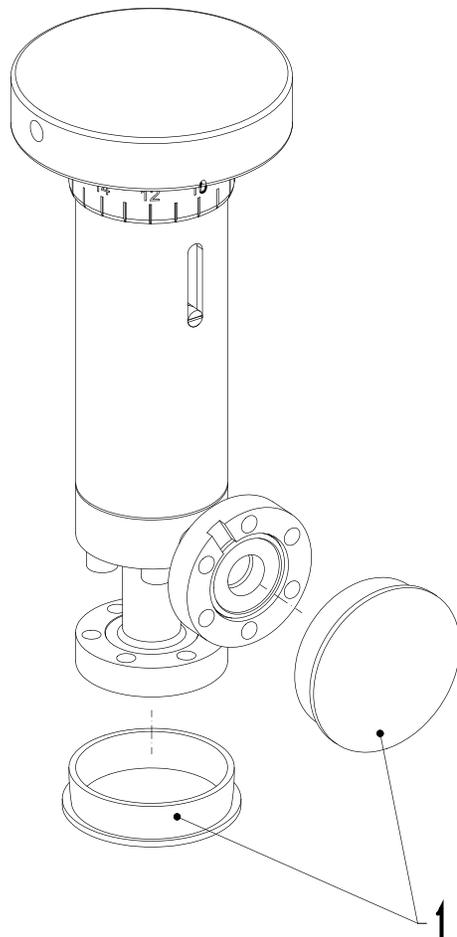
	NOTICE
	<p>Force effect from other components of the system</p> <p>Valve body may get deformed and/or malfunctions may occur.</p> <ul style="list-style-type: none"> – Do not use valve to support other components. – Make sure that forces from other components do not impair the valve; use bellows sections, for instance.

4.2.1 Preparation for installation

	⚠ WARNING
	<p>Danger of injury in case of insufficient skills</p> <p>Inappropriate handling may cause serious injury or property damage. Make sure that the valve does not topple or fall down while removing the protective covers from the flanges.</p>

	NOTICE
	<p>Sensitive product</p> <p>Valve parts may get damaged. When removing the protective covers from the flanges, be careful to avoid damage to the valve.</p>

1. Remove plastic bag.
2. Remove protective covers (1); see «Figure 4-1».



1 Protective covers

Figure 4-1



Store protective covers. They may be useful when valve needs to be repacked.

3. Clean sealing surfaces; see «Figure 3-1» on page 7, with cleanroom wiper soaked with pure alcohol (Isopropanol).
4. Clean sealing surface with clean, oil free compressed air.

4.2.2 Mounting to the system

1. Mount valve to your system by using appropriate flange screws.
2. Mount screws evenly in crosswise order until the seal touches the sealing surface.
3. Tighten all screws with the torques appropriate for the property classes of the screws.

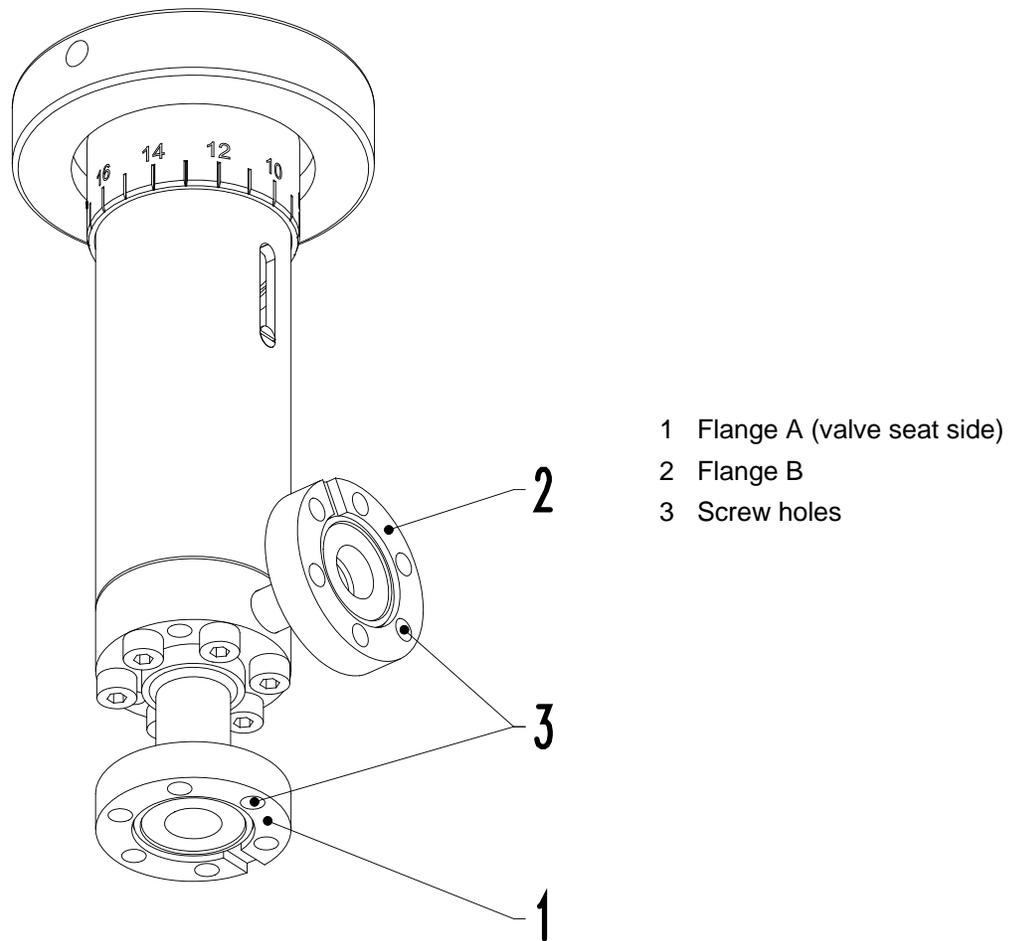


Figure 4-2

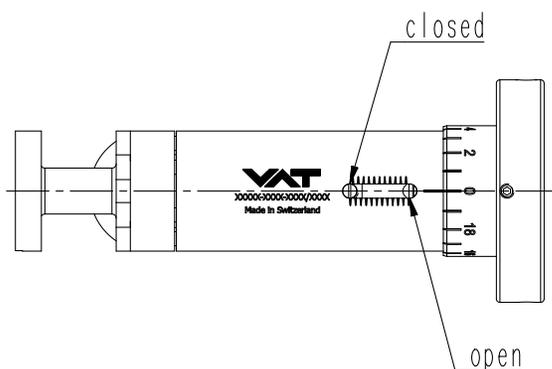
5 Operation

	 WARNING
	<p>Unqualified personnel Inappropriate handling may cause serious injury or property damage. Only qualified personnel are allowed to carry out the described work.</p>

5.1 Normal operation

Valve is closed and opened manually.

Closing: turn handwheel clockwise to the zero on the scale. The valve is completely closed when the stop is reached. A stopper is implemented in the leak valve to prevent over tightening of the seat in the closed position. Do not turn the handwheel beyond the zero on the scale.



Opening: turn handwheel counter clockwise to its stop. After 22 turns the valve is completely open when the mechanical stop is reached.

Leak rate adjustment:

- Leak rate adjustment is starting after a few turns of the handwheel in opening direction (depending on gas type, life cycles,...) Adjusting the gas flow can be done very accurately by turning the handwheel until the required leak rate is reached. Depending on the application, base pressure and different gas types, the adjustment range and accuracy can vary.
- Inserting a gas flow, by opening the valve, into a system results in a pressure rise. By closing the valve it can be found that the leak rate is higher at the same scale index of compared being opened. This is mainly given due to the additional time needed to pump the system.



For technical details, see product data sheet.

5.2 Operation under increased temperature

Maximum allowed temperature see product data sheet.

NOTICE	
	<p>Inconstant temperatures</p> <p>Performance of the valve may deteriorate.</p> <ul style="list-style-type: none"> – Actuate valve only after the bake-out temperature has been stable for two hours. – If valve must be actuated during bake-out, make sure that the heating or cooling rate does not exceed 10 °C per hour in the temperature range from 100 °C to 300 °C – Make sure that the temperature differences over the whole body do not exceed 30 °C.

5.3 Bake-out

Bake-out temperature see product data sheet.

5.4 Trouble shooting

Failure	Check	Action	See
Leak at gate	Condition of gate seal	Please contact VAT	www.vatvalve.com
	Condition of valve gate	Please contact VAT	www.vatvalve.com
Leak at body	Condition of bonnet seal and sealing surface	Please contact VAT	www.vatvalve.com

Table 5-1

If you need any further information, please contact one of our service centers. You will find the addresses on our website www.vatvalve.com.

6 Maintenance

6.1 Maintenance intervals

Under clean operating conditions the valve does not require any maintenance during specified lifetime.



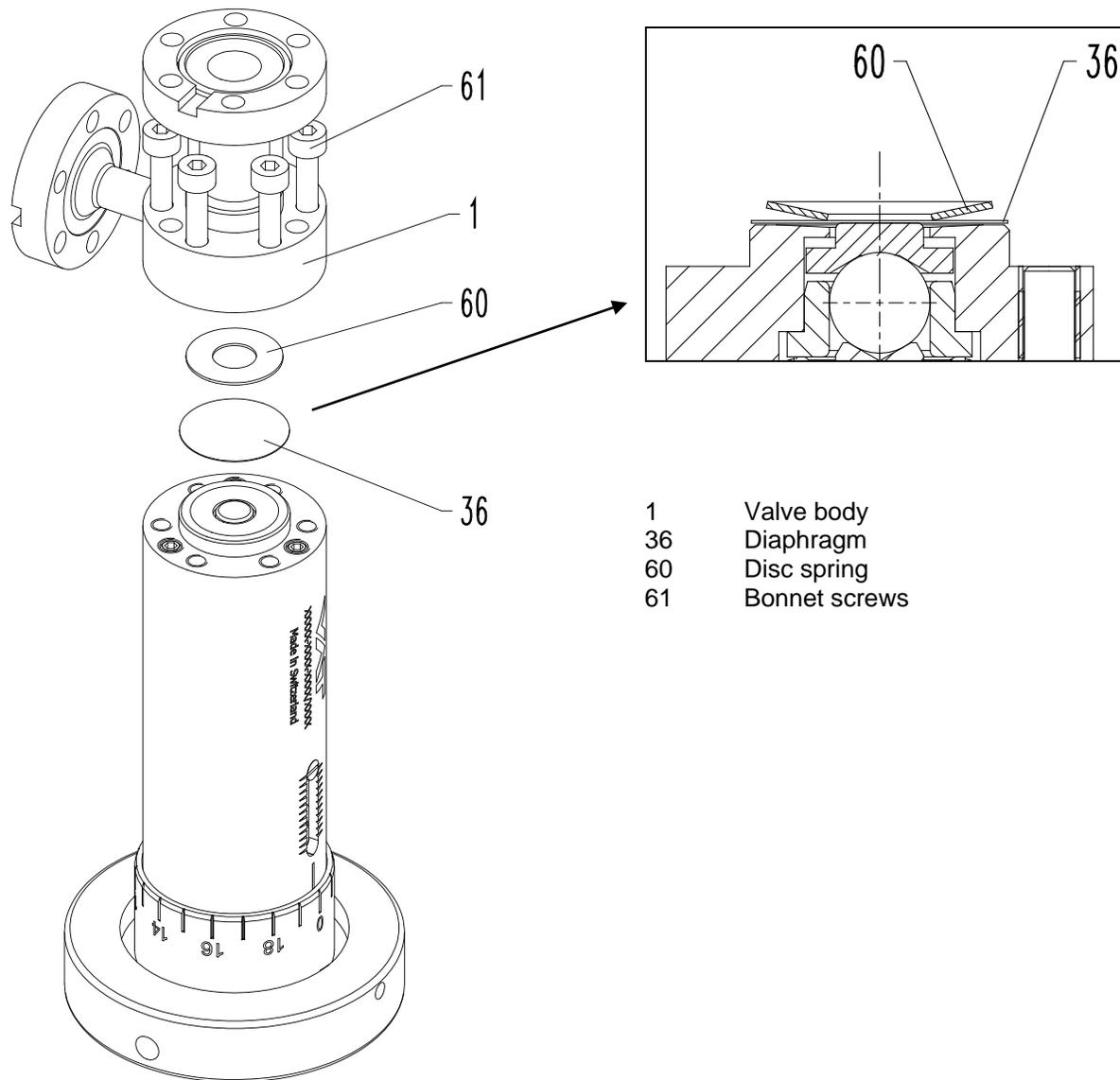
- Impacts from the process may require more frequent maintenance.
- When the valve has reached the specified lifetime; see product data sheet, we recommend to have it serviced by VAT. Please contact your nearest VAT service center to get recommendations and an offer. You will find the addresses on our website www.vatvalve.com.

7 Repairs

	<p style="text-align: center;">⚠ WARNING</p> <p>Unqualified personnel Inappropriate handling may cause serious injury or property damage. Only qualified personnel are allowed to carry out the described work.</p>
	<p style="text-align: center;">⚠ WARNING</p> <p>Danger of injury in case of insufficient skills Inappropriate handling may cause serious injury or property damage. Make sure that the valve does not topple or fall down while removing the protective covers from the flanges.</p>
	<p style="text-align: center;">NOTICE</p> <p>Contamination Product may get contaminated. Always wear cleanroom gloves when handling the product.</p>

7.1 Replacement of diaphragm

In case of a seat seal leak caused by environmental influences and no visible damage of the sealing surface at the seat, the diaphragm seal can be replaced. VAT offers a range of components; see «Table 11-1 » on page 23. The seal exchange can be carried out by the user.



- 1 Valve body
- 36 Diaphragm
- 60 Disc spring
- 61 Bonnet screws

Figure 7-1

Required material: Diaphragm

Ordering information: See chapter «11 Spare parts» on page 23 and «Figure 7-1» on page 17.

NOTICE	
	<p>Inappropriate mounting position of valve</p> <p>Maintenance may be troublesome and parts may drop down.</p> <p>Ideally dismount valve from the system and put it on a clean workbench with the actuator upwards.</p>

Procedure:

The item numbers in brackets refer to; see «Figure 7-1» on page 17.

1. Open valve completely.
2. Loosen bonnet screws (61).
3. Remove valve body (1).
4. Remove disc spring (60).
5. Exchange diaphragm (36).



Check surfaces on its cleanliness and on damages.



Make sure that the sealing surface is free of scratches.

6. Insert disc spring (60) centered to the diaphragm (36).



Make sure that the disc spring (60) is assembled in the correct direction.

7. Clean valve body (1) with pure alcohol (Isopropanol), use a cleanroom wiper. Use oil free compressed air to blow off surfaces.
8. Assemble valve body (1) with caution. Tighten all bonnet screws (61) slowly in crosswise order with the following torque:

DN 16: 3 Nm

9. Open and close valve 5 times.

Valve is ready for use.

8 Dismounting and Storage

	⚠ WARNING
	<p>Unqualified personnel Inappropriate handling may cause serious injury or property damage. Only qualified personnel are allowed to carry out the described work.</p>

	NOTICE
	<p>Contamination Product may get contaminated. Always wear cleanroom gloves when handling the product.</p>

8.1 Dismounting

1. Dismount valve according chapter «4 Installation», however in reverse order.



Observe safety instruction of chapter «4 Installation».

8.2 Storage

	NOTICE
	<p>Wrong storage Inappropriate temperatures and humidity may cause damage to the product. Valve must be stored at:</p> <ul style="list-style-type: none"> – relative humidity between 10% and 70% – temperature between +10 °C and +50 °C – non-condensing environment

	NOTICE
	<p>Inappropriate packaging Product may get damaged if inappropriate packaging material is used. Always use the original packaging material and handle product with care.</p>

1. Clean / decontaminate valve.
2. Cover all valve openings with a protective cover.
3. Pack valve appropriately, by using the original packaging material.

9 Packaging and Transport

	<p style="text-align: center;">⚠ WARNING</p> <p>Unqualified personnel Inappropriate handling may cause serious injury or property damage. Only qualified personnel are allowed to carry out the described work.</p>
	<p style="text-align: center;">⚠ WARNING</p> <p>Harmful substances Risk of injury in case of contact with harmful substances. Remove harmful substances (e. g. toxic, caustic or microbiological ones) from valve before you return the valve to VAT.</p>
	<p style="text-align: center;">NOTICE</p> <p>Inappropriate packaging Product may get damaged if inappropriate packaging material is used. Always use the original packaging material and handle product with care.</p>



- When returning products to VAT, please fill out the VAT form «Declaration of Chemical Contamination» and send it to VAT in advance. The form can be downloaded from our website www.vatvalve.com.
- If products are radioactively contaminated, the VAT form «Contamination and Radiation Report» must be filled out. Please contact VAT in advance.
- If products are sent to VAT in contaminated condition, VAT will carry out the decontamination procedure at the customer's expense.

9.1 Packaging

1. Cover all valve openings with protective covers; see chapter «4.2.1 Preparation for installation».
2. Pack valve appropriately, by using the original packaging material.



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9.2 Transport

NOTICE	
	<p>Inappropriate packaging Product may get damaged if inappropriate packaging material is used. Always use the original packaging material and handle product with care.</p>



VAT disclaims any liability for damages resulting from inappropriate packaging.

10 Disposal

	⚠ WARNING
	Harmful substances Environmental pollution. Discard products and parts according to the local regulations.

11 Spare parts

	NOTICE
	<p>Non-original spare parts</p> <p>Non-original spare parts may cause damage to the product. Use original spare parts from VAT only.</p>



- Please contact one of our service centers and specify the fabrication number of the product; see chapter «1.1 Identification of product». You will find the addresses on our website www.vatvalve.com.
- Parts may only be replaced by the VAT service staff.

Description	Item	Part No.	Quantity per valve	Repair procedure see chapter
Diaphragm	36	334578	1	«7.1 Replacement of diaphragm»

Table 11-1