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INSTALLATION – OPERATION – MAINTENANCE MANUAL

ARTT. 0040 – 0042 – 0070 DOUBLE THREADED STEM GATE VALVE

ART. 0072 THREADED/FLANGED STEM GATE VALVE

ARTT. 0074 - 0075 DOUBLE FLANGED STEM GATE VALVE



ISTR 0040_EN

EDITION 1/2019

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1. Description of the operating principles

Brass gate with a vertically moving (wedge) gate, specifically designed for use in agriculture and industry on tankers and vacuum truck vehicles used for sewage transport and treatment. These can also be used in other fields such as in the presence of dense, granular and/or farinaceous liquids.

The gate is used exclusively as a cut off shutter. Closure is obtained by inserting a disc with sloped faces (wedge) into its corresponding seat formed inside the gate body. The vertical movement to close the gate is activated by manual opening levers or by hydraulic, pneumatic or electric actuators. The connection between the opening rod and the wedge gate is obtained with a fork coupling including a locking clamp.

The upper part (head), has the function of containing the wedge gate when the valve is open and provides a point of attachment for levers and actuators.

1.1 Type of products

ITEM 0040 – 0070

Double threaded stem gate valve (GAS thread) female - female.

ITEM 0041 – 0071

Double threaded stem gate valve (NPT thread) female - female.

ITEM 0042

Double threaded heatable stem gate valve (GAS thread) female - female

ITEM 0043

Double threaded heatable stem gate valve (NPT thread) female - female

ITEM 0072

Threaded/flanged stem gate valve (GAS thread)

ITEM 0073

Threaded/flanged stem gate valve (NPT thread)

ITEM 0044 – 0050 – 0074 – 0075

Double flanged stem gate valve

Information on the DN's available, manual opening devices and applicable hydraulic, pneumatic and electric actuators can be found in the company catalogue or on the website www.metaltecnicazanolo.com.

1.2 Key of symbols



This symbol draws attention to additional information and/or instructions to be followed in the event that the gate valve is employed in potentially explosive atmospheres.



This symbol draws attention to important information and/or instructions to prevent serious injuries to the operator and/or serious damages to the system and the environment.

1.3 Marking and certifications

1.3.1 Pressure Equipment Directive (2014/68/CE)

Gate valves are considered pressure vessels. Therefore they are subject to the PED (2014/68/CE). PED equates valves to pipes. The applicable compliance assessment scheme is Table No 9, "pipe as per art. 3, paragraph 1, letter c, point 2, second dash". It refers to "pipes for liquids having a vapour pressure at the maximum allowable temperature of not more than 0.5 bars above normal atmospheric pressure (1013 mbars), within the limits below:

group 2 fluids, when PS is more than 10 bars, DN (NPS) is more than 200 and PS x DN (NPS) is more than 5,000 bars.

In particular, these gate valves are subject to Article 3, Section 3, thus they do not require CE marking.

1.3.2 ATEX Directive (94/9/CE)



The gates covered by this manual are not suitable to meet the requirements of Directive 94/9/EC for protection against explosion.

1.3.3 Machinery Directive (2006/42/CE)

Gate valves with hydraulic or pneumatic actuators are considered machinery, thus they are subject to Directive 2006/42/EC. Gate valves meet the minimum safety requirements required by the directive.

2. Handling

The indications below must be followed when handling the products:

- Use personal protective equipment (gloves, safety glasses, safety shoes, etc.)
- handle gate valves that weigh more than 20 Kg by means of cranes, hoists or forklifts with the proper slings. If necessary, use the proper eyebolts screwed into the threaded holes on machine body.
- Handle the gate valves with care to prevent impacts and damages. Handle taking care not to cause any impacts or damages to the gate valve.

3. Gate selection and installation

Before installing, please note the following:

- The metal gate seal does not ensure a perfect seal when it is closed. Therefore, its field of application is almost exclusively for the treatment of sewage slurry and other dense liquids.
- In all cases where a high degree of seal must be guaranteed, the use of blade gates such as articles 0080 - 0090 - 0100 (and related variants) are recommended. The technical specifications and data for these articles can be found in the company catalogue or on the website at www.metaltecnicazanolo.com.
- The choice of the gate must be made according to the characteristics of the plant and the type of slurry to be handled. The following table provides a preliminary general indication of the suitability of the different gates.

articolo	internal volume	slurry characteristics					level of seal
		liquid	dense	very dense	short fibres	long fibres	
0030*	medium	✓	✓	✓			+++
0040 0044	large	✓	✓	✓	✓	✓	+++
0050	large	✓	✓	✓	✓	✓	+++
0070 0074	medium		✓	✓	✓		++
0075	medium small		✓	✓	✓		+ / +++

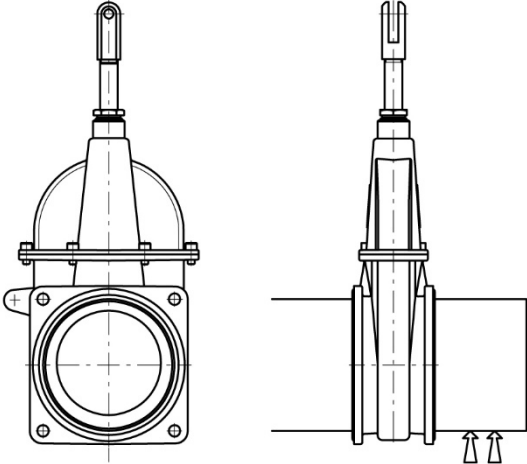
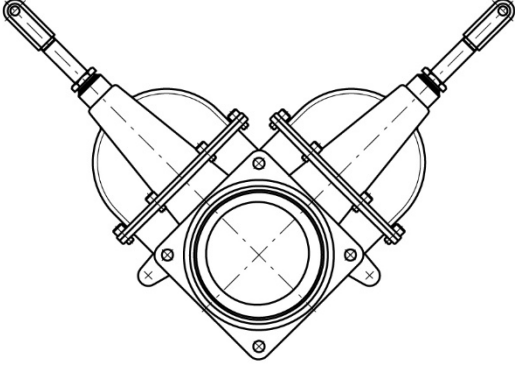
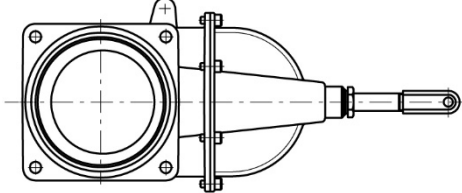
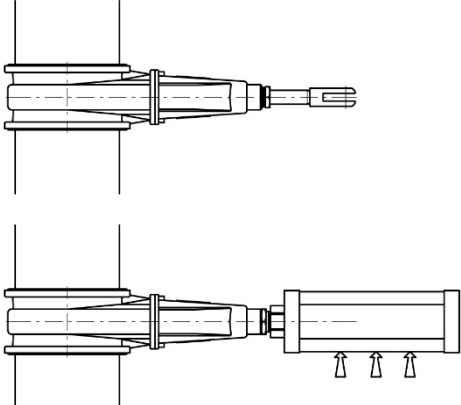
* item. 0030 lever gate valve – see sheet

The indications below must be followed during installation:

- handle the gate valves complying with the instructions under 2 “Handling”
- check the valve for overall integrity and internal part cleaning
- check that there is the proper space between the connecting flanges of the two pipe sections. Also check that the flanges are parallel and properly aligned. Otherwise, during assembly gate valve body may suffer heavy stresses that would negatively affect gate valve proper operation.
- When installing threaded gates, check in advance that the thread of the connection pipe conforms to the reference standards and that the thread does not present any flaws and/or accumulations of zinc plating.
- In the case of sleeves with tapered threads (NPT), consider that excessive forcing when screwing the pipe down can generate strong stresses on the structure of the gate.
- During installation, gate valves must feature the proper support. The two pipe sections must be properly supported, too, in order to prevent gate valve body from suffering system stress.
- Plunger gates are bidirectional; check the position of installation considering that, if possible, it would be better to install the gate valve vertically on horizontal pipes. However, the gate valve can be installed inclined on horizontal pipes. If there is no possibility that the liquid being handled will solidify inside the gate, it is possible to install it horizontally on vertical pipes and horizontally on horizontal pipe (this latter installation position can generate interference between the wedge and the internal wall of the gate, use only in extreme cases).

Any other different position of installation may require specific measures to be undertaken and may cause use restrictions. Therefore, these cases are to be assessed with Metaltecnica Technical Department.

Tab.1 diagram of the position of installation

	
<p>Vertical gate valve on horizontal pipes.</p> <p>The two pipe sections must be properly supported in order to prevent gate valve body from suffering system stress.</p>	<p>Inclined gate valve on horizontal pipes</p> <p>The two pipe sections must be properly supported in order to prevent gate valve body from suffering system stress.</p>
	
<p>Horizontal gate valve on vertical pipes</p> <p>The two pipe sections must be properly supported in order to prevent gate valve body from suffering system stress.</p>	<p>Horizontal gate valve on vertical pipes.</p> <p>Provide the proper supporting frame for the gate valve and/or the hydraulic or pneumatic actuators.</p>

- Place the fixing screws and tighten them alternatively and uniformly as follows: tighten one screw, than the diametrically opposed one and so on for all the screws.
- Once the gate valve has been installed, check that all the accessories -such as hydraulic actuators, pneumatic actuators, manual control levers- are properly connected.
- Before gate valve commissioning, carry out some no-load opening and closing cycles checking proper operation and seal.
- ⚠ Before disassembling the gate valve from the system for maintenance and/or replacement purposes, the electrical supply and the hydraulic and pneumatic feed must be disconnected, releasing the pressure of the lines and of the gate valve itself.

4. Gate valve actuation

Supplied gate valves can be actuated as follows:

a. Leve di apertura manuale (artt. 0929 – 0930)

Gate valve manual model, complete with the fork for lever connection to stem end. This gate configuration is suitable for the application of levers for manual opening. For technical details of the levers, see the relevant technical data sheet.

b. Single-acting or (items 0500 - 0510) or double-acting hydraulic actuator (item 0550)

Gate valves can be supplied with single- or double-acting hydraulic cylinders. As for the technical details and conditions for operation of the hydraulic cylinders, please refer to the relevant datasheets. Information on the installation, use and maintenance is included in manual ISTR 0500_IT. The following points (4.1 – 4.2) describe the procedure for cylinder assembly onto the gate valve.

c. Double-acting pneumatic actuator (item 0570) and double-acting magnetic pneumatic actuator (item 0571)

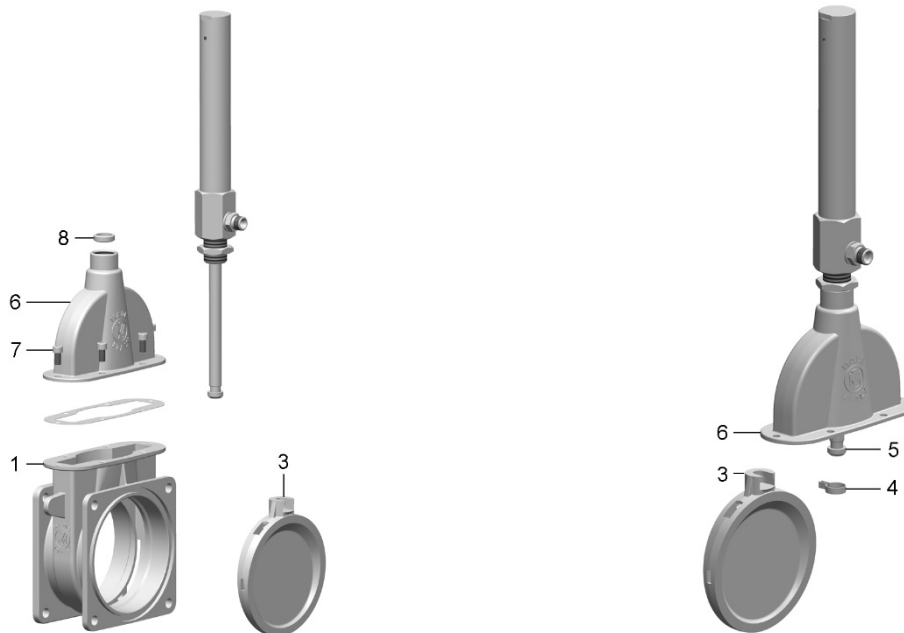
Gate valves can be supplied with double-acting pneumatic cylinders, both standard and magnetic. As for the technical details and conditions for operation of the pneumatic cylinders, please refer to the relevant datasheets. Information on the installation, use and maintenance is included in manual ISTR 0500_IT. The following points (4.1 – 4.2) describe the procedure for cylinder assembly onto the gate valve.

d. Electric linear actuator (item 0610 – item 0612)

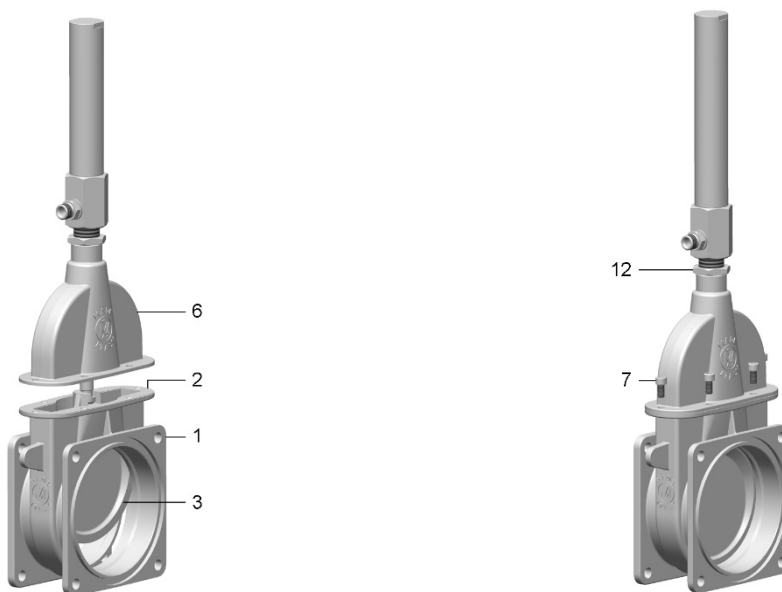
Some types of gates can be supplied with electric linear actuators. For technical details and operating conditions of the electric actuators, see the relevant technical data sheet.

4.1 Procedure for the assembly of gate valve-cylinder items 0500-0510

The procedure below shows how to assemble a cylinder item 0500 - 0510 on a disassembled gate valve (item 0074) (pre-arranged for cylinder assembly).



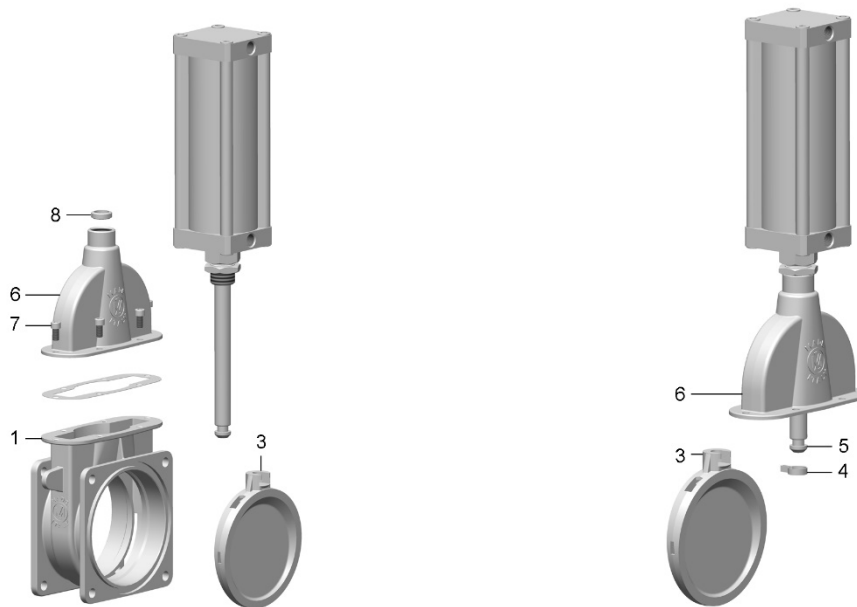
- Unscrew the screws (7) and remove the head (6) from the body (1)
- Insert the gasket (8) (only 1 ring) in head top seat (6)
- Screw the cylinder to the head (6)
- Fit the steel locking clamp (4) to the end of the cylinder rod (5) and slide the assembly into the wedge tang (3). Fold back the ends of the clamp (see section 7.2.1)



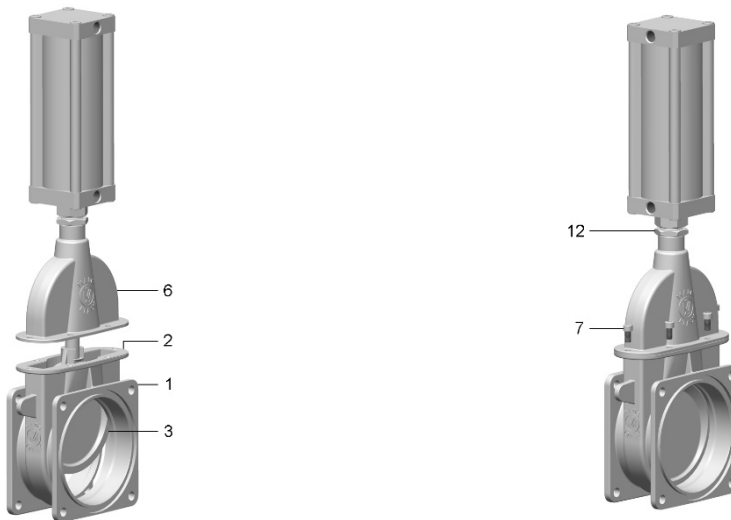
- Position the gasket (2) on body upper part (1) and then insert the wedge tang (3) inside the body
- Then partially tighten the screws (7) to the body (1) so as to avoid blocking the head on the body
- Tighten the cylinder onto the head and avoid pressing the gasket too much. To obtain a correct sealing, screw the cylinder manually until it touches the gasket and then rotate again by 90° with a hex wrench. Pressing the gasket too much may block stem movement
- Tighten the screws (7) in several steps screwing them one by one alternatively until they stop, allowing the components to be correctly fastened
- Secure the cylinder onto the head by unscrewing the ring (12) until it stops against the head
- Connect the cylinder to the hydraulic line and carry out some opening and closing cycles before installing the gate valve

4.2 Procedure for the assembly of gate valve-cylinder items 0550 – 0570 – 0571

This procedure explains how to assemble the cylinders items 0550 - 0570 (and their different models) on a disassembled gate valve (item 0074) (prearranged for cylinder assembly)



- a) Unscrew the screws (7) and remove the head (6) from the body (1)
- b) Insert the gasket (8) (only 1 ring) in head top seat (6)
- c) Pull the stem completely out from the cylinder and then screw the cylinder to the head (6) by 8-10 mm.
- d) Fit the steel locking clamp (4) to the end of the cylinder rod (5) and slide the assembly into the wedge tang (3). Fold back the ends of the clamp (see section 7.2.1)



- e) Put the gasket (2) on body top surface (1) and then insert the wedge tang (3) into the body
- f) Push the head-cylinder assembly towards the body until the head fully (or almost fully) stops against the body. During this stage, cylinder stem will return inside the cylinder, thus making this procedure easier
- g) Partially tighten the screws (7) to the body (1) so as to avoid blocking the head (6) on the body
- h) Tighten the cylinder onto the head and avoid pressing the gasket too much. To obtain a correct sealing, screw the cylinder manually until it touches the gasket and then rotate again by 90° with a hex wrench. Pressing the gasket too much may block stem movement
- i) Tighten the screws (7) in several steps screwing them one by one alternatively until they stop, allowing the components to be correctly fastened
- j) Secure the cylinder onto the head by unscrewing the ring (12) until it stops against the head
- k) Connect the cylinder to the hydraulic line (item 0550) or to the pneumatic line (item 0570) and carry out some opening and closing cycles before installing the gate valve

5. Size - materials – operating conditions

The technical information on the overall sizes, the material used and the operating conditions are available in the company catalogue or on our web-site www.metaltecnicazanolo.com. The technical data sheets for each item can be requested to the Metaltecnica's technical office.

6. Limits of use

- Gate valves cannot be used under pressure and temperature conditions other than those indicated in the specific datasheets.
- Gate valves cannot be used with group 1 fluids (97/23/EC DIR) or with fluids whose chemical composition is not compatible with gate valve material.
- Gate valves cannot be used in food field.
- Gate valves cannot be used in the potential explosive atmosphere.

7. Maintenance

The gate valve only requires few and simple maintenance procedures, which must be carried out by qualified operators using proper personal protective equipment.

7.1 Ordinary maintenance

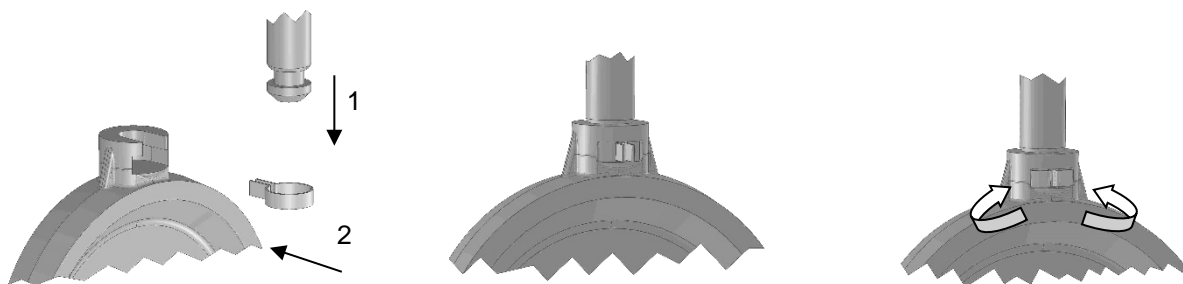
- Periodically check that no fluid is leaking between body and head, near the upper stuffing box (manual model), and that no oil is leaking from hydraulic actuators.
- To ensure the perfect and constant operation of the gate valve, it is necessary to periodically clean the internal parts, especially when expecting prolonged periods during which the gate valve will not be used.
- In order to avoid wedge blockage, the scheduled maintenance tables shall include, at regular intervals, some opening and closing cycles of the normally closed gate valves and of the valves actuated manually by the lever, especially if thick fluids or liquids that tend to encrust are used.

7.2 Extraordinary maintenance

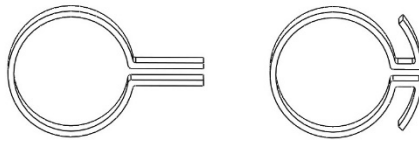
Basically, extraordinary maintenance operations are those reported below:

7.2.1 Replacement of gate wedge worn

The clamping system between the gate wedge and rod (patented by Metaltecnica) is based on the use of a special stainless-steel clamp, whereby wedge flaps no longer need to be warped. In order to fasten the gate rod (or cylinder rod) to the wedge, it is only required to fit the clamp into the rod end, insert the rod/clamp assembly into the wedge base in order for the clamp ends to go through the opening at the back of the base, then widen and bend the clamp ends into the proper locations (see figures below).



Upon completion of the assembly operations the clamp will look as shown below and will keep the rod fastened to the wedge with the proper clearance.



Clamp before assembly

Clamp after assembly

Should it be required to disassemble the wedge from the rod, just straighten clamp ends in order to separate the components. In order to reassemble them, you can either use the same clamp, provided that it is undamaged, or a new clamp (as recommended).

7.2.3 Kit gaskets replacement procedure for pneumatic and hydraulic actuators

For hydraulic and pneumatic actuators maintenance, please refer to the installation - use - maintenance manual ISTR 0500_IT

8. Storage

When storing before installing or in the event of long-term storage, it is recommended to store the gate valves in a cool (maximum 40°C), well-ventilated place, away from direct sunlight or other heat sources and keep it dry.

9. Decommissioning

Before being decommissioned, the gate valves must be disassembled from the system following the procedure below:

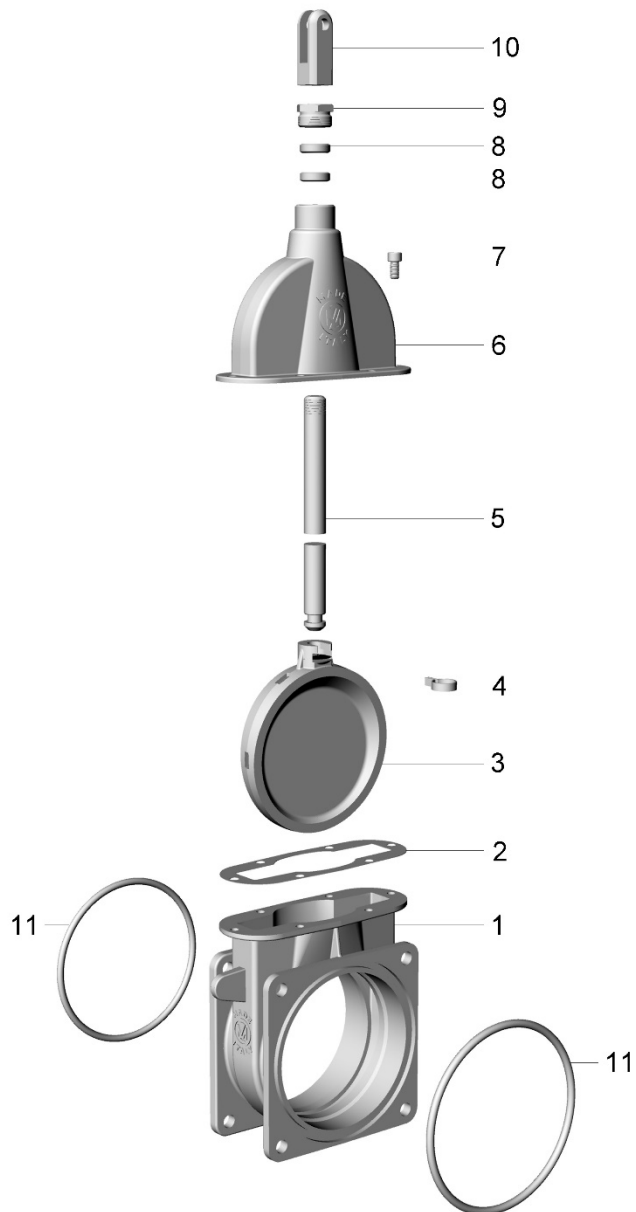
- Open the gate valve and empty the pipes on which it is assembled.
- Cut off any power supply, pneumatic or hydraulic feed
- Disassemble the gate valve by using suitable personal protective equipment (gloves, safety glasses, safety shoes, etc.)
- Clean the gate valve in order to avoid leaks of the treated fluid which may cause damages to persons, property and environment. For the same reason, the hydraulic oil of the hydraulic cylinder, if any, must be carefully removed.
- After the cleaning, recyclable materials (metal parts, plastic parts) must be separated from special waste (P.T.F.E. gaskets, rubber parts, etc.) according to the local existing law.



The scrapping of assembled and not cleaned gate valves can cause emissions and damages to the environment.

10. List of components

Below is an example of general part list. It refers to item 0074. The exploded diagrams of the spare parts of all gate valve types and of the relevant actuators can be requested from Metaltecnica Technical Department.



Pos.	Denomination
1	Body
2	Guarnital
3	Gate wedge
4	Locking clamp
5	Stem
6	Head
7	Screw
8	Gasket
9	Nut
10	Fork
11	O ring