

# RT25 CHECK VALVES

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

---



## GENERAL INFORMATION

- These instructions must be carefully read before performing any work involving VALSTEAM ADCA products. Failure to observe these instructions may result in hazardous situations.
- These instructions describe the entire life cycle of the product. Keep them in a location that is accessible to every user and make these instructions available to every new owner of the product.
- Current regional and plant safety regulations must be considered and followed during installation, operation, and maintenance work.
- The images shown in these instructions are for illustration purposes only.
- For problems that cannot be solved with the help of these instructions, please contact VALSTEAM ADCA or its representative.

### VALSTEAM ADCA ENGINEERING S.A

Zona Ind.da Guia  
Pav.14 - Brejo  
3105-467 Guia, Pombal  
PORTUGAL  
quality@valsteam.com

We reserve the right to change the design and material of this product without notice.

# CONTENT

<b>1. SAFETY INFORMATION</b>	<b>4</b>
1.1. Explanation of symbols	4
1.2. Intended use	4
1.3. Qualification of personnel	5
1.4. Personal protective equipment	5
1.5. The system	5
1.6. ATEX	6
1.7. General safety notes	6
<b>2. PRODUCT INFORMATION</b>	<b>8</b>
2.1. Principle of operation	8
2.2. Certification	9
2.3. Product identification	9
2.4. Technical data	9
<b>3. TRANSPORT, STORAGE AND PACKAGING</b>	<b>10</b>
<b>4. INSTALLATION</b>	<b>11</b>
4.1. Preparation for installation	11
4.2. Installation procedure	12
<b>5. START-UP</b>	<b>13</b>
5.1. Preparation for start-up	13
5.2. Start-up procedure	14
<b>6. OPERATION</b>	<b>14</b>
<b>7. SHUTDOWN</b>	<b>14</b>
7.1. Shutdown procedure	14
<b>8. PARTS LIST</b>	<b>15</b>
9.1. Maintenance procedure	15
9.2. Cleaning and replacing the disc and spring	16
9.3. Tightening torques	16
<b>10. TROUBLESHOOTING</b>	<b>17</b>
<b>11. DISPOSAL</b>	<b>17</b>
<b>12. RETURNING PRODUCTS</b>	<b>18</b>

# 1. SAFETY INFORMATION

## 1.1. Explanation of symbols



### DANGER

Hazardous situations which, if not avoided by applying the correct preventive measures, will result in fatal or serious injury and/or considerable property damage.



### WARNING

Hazardous situations which, if not avoided by applying the correct preventive measures, could result in fatal or serious injury and/or considerable property damage.



### CAUTION

Hazardous situations which, if not avoided by applying the correct preventive measures, could result in moderately severe or minor injury.



### NOTICE

Situations which, if not avoided, can result in property damage or product malfunction.



### NOTE

Indicates additional informations, tips, and recommendations.

## 1.2. Intended use

Refer to the markings on the device, such as nameplate and laser markings, Information Sheet (IS) and these Installation and Maintenance Instructions (IMI) to check that the product was designed for the intended use and meets the specifications used for sizing and selection. This includes checking application, material suitability, process medium, pressure and temperature as well as their respective limiting values.

VALSTEAM ADCA does not assume any responsibility for damage resulting from inappropriate use of the product, damage caused by external stresses or any other external factors. Correct installation of the product is the full responsibility of the contractor.

Inappropriate use of the product is any use other than the one described in this chapter. Inappropriate use also includes:

- Use of spare parts that are not genuine;
- Performance of maintenance work not described in these instructions;
- Use outside the limits defined by the accessories connected to the product;
- Unauthorized modifications to the product.

If the product is to be used for an application or with a fluid other than the one it was designed for, contact VALSTEAM ADCA.

### 1.3. Qualification of personnel

Handling, installation, operation and maintenance work must be carried out by fully trained and qualified personnel, capable of judging the work which they are assigned to perform and recognizing potentially hazardous situations. They should be trained to properly use this product according to these Installation and Maintenance Instructions.

Where a formal “Permits to Work” system is implemented in the plant it must be complied with.

### 1.4. Personal protective equipment

Personal protective equipment should always be worn during work in order to protect against hazards posed by e.g. the process medium, dangerous temperatures, noise, falling or projected objects and working at height. These equipment includes a helmet, safety glasses, safety harness, protective clothes, safety shoes, hearing protection, etc.

#### NOTE

Always assess whether you or others in your vicinity require any protective equipment. When in doubt check with the plant's health & safety responsible personnel for details on required protective equipment.

### 1.5. The system

The complete system should be assessed as well as every action (e.g. closing of shut-off valves, disconnection of the power supply) to ensure this will not bring additional risk to personnel or property.

Dangerous actions that can result in a hazardous situation include isolation of protective devices such as safety valves, vents, vacuum relief valves, disconnection of electric safety devices, sensors, and alarms.

## 1.6. ATEX

If the product is in the scope of the ATEX 2014/34/EU directive and as such bears the Ex marking, consult its specific Additional Instructions for use in Potentially Explosive Areas (IMI Ex). In such cases, handling, installation, operation, and maintenance work must only be performed by personnel qualified and authorized to work in potentially explosive areas.

## 1.7. General safety notes



### DANGER

#### RISK OF BURSTING OR IMPLOSION IN PRESSURE EQUIPMENT

Valves, ancillaries, and pipelines are pressure equipment. Working outside their operating limits, improper opening, malfunction, or system operation failure may result in component bursting or implosion.

- Observe the maximum and minimum operating limits of the product and check if they are within those of the system in which it is being installed. If not, ensure a safety device is included in the system to prevent operation outside those limits. Check the product Information Sheet (IS).
- In case the malfunction of any equipment installed on the system or a system operation failure may result in a dangerous overpressure, overtemperature, or vacuum condition, ensure a safety device is included in the system to prevent such situation.
- Before starting any work on the product, depressurize it and cool or heat it to ambient temperature. This also applies to the line in which it is fitted.
- Drain the process medium from the product and all the relevant plant sections.



### WARNING

#### RISK OF BURNS

Depending on the operating conditions, products and pipelines may get very hot or cold and cause burn injuries.

- Do not touch the product while it is hot or cold, allowing it firstly to cool down or heat up.
- Wear protective clothing and safety gloves during working operation.
- Thermally insulate tubes and products as a preventive measure



## WARNING

### **RISK OF INJURY CAUSED BY FLUID ATTACK ON PRODUCT MATERIALS**

The product must only be used with mediums that do not attack the materials of the product (body, gaskets, seals). Otherwise, leaks may occur, and hot and/or hazardous fluid can escape.

- Do not use the product with mediums other than the ones it was designed for. Check section 1.2 - Intended Use.
- Prevent medium contamination.

### **RISK OF INJURY CAUSED BY UNDER TIGHTENED PRODUCT OR ITS COMPONENTS**

Excessively low tightening torques may cause medium to escape and/or components to be projected at high speed, which may result in a hazardous situation depending on the medium, chemical properties and/or its operating conditions.

- Do not loosen any screws while the equipment is pressurized.
- Observe the specified tightening torques on these Installation and Maintenance Instructions. If the relevant torque value is not mentioned, contact VALSTEAM ADCA.

### **RISK OF HEARING LOSS**

Depending on the operating conditions, the product may generate loud noises.

- Wear hearing protection when in the vicinity of the product.

### **RISK OF INJURY AS A RESULT OF ILLEGIBLE INFORMATION**

Important information written in the product nameplate, markings, and warning signs may wear over time or become illegible due to e.g. dirt accumulation, resulting in hazardous situations and personal injury or property damage.

- Keep nameplates, markings, and warning signs in a legible state, replacing them when illegible, missing, or damaged.



## CAUTION

### **RISK OF INJURY DUE TO RESIDUAL PROCESS MEDIUM**

Direct contact with a dangerous process medium may lead to personal injury, e.g. smoke inhalation and chemical burns.

- Drain the process medium from the product and all the relevant plant sections.
- Wear protective clothing, safety gloves, mask, and eye protection.



## CAUTION

### RISK OF INJURY DUE TO IMPROPER HANDLING

Manual handling (e.g. lifting, carrying, pushing, pulling) of large and/or heavy products may result in personal injury.

- Assess the risk associated with the handling task.
- Use adequate handling methods and appropriate auxiliary handling equipment.



## NOTICE

### RISK OF PRODUCT DAMAGE DUE TO EXCESSIVELY HIGH TIGHTENING TORQUES

High tightening torques may lead to premature wearing of product components.

- Observe the specified tightening torques on these Installation and Maintenance Instructions. If the relevant torque value is not mentioned contact VALSTEAM ADCA.

## 2. PRODUCT INFORMATION

The ADCA RT25 all stainless steel disk check valves feature a compact design and are specially designed for use with saturated steam, water and other gases, preventing the backflow of fluids and allow the correct operation of other equipments.

The RT25 check valves can be installed in any position and flow direction. Without spring, installation is restricted to the vertical position with upward flow (from bottom to top).

These valves can be supplied with soft sealing in various materials ensuring compatibility with the application and product media.

### 2.1. Principle of operation

A spring (6) pushes the disc (5) to keep the RT25 closed against upstream pressure. When the force exerted by the upstream pressure exceeds the force of the spring, the RT25 will open and allow flow of the process medium. If reverse flow occurs, the spring force and the downstream pressure force exerted on the backside of the disc and close the valve. In case of valves installed in vertical installations the weight of the disc will apply opening or closing force depending on its orientation. This is more significant in bigger valve sizes.

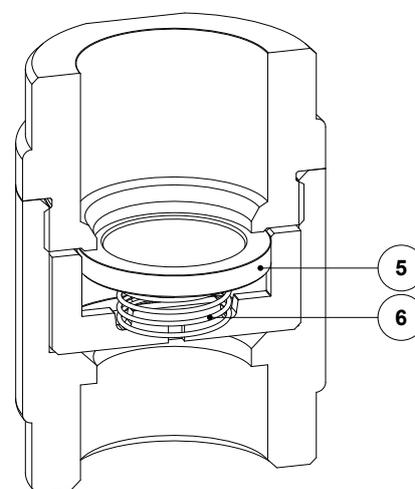


Fig. 1

## 2.2. Certification

This product has been specifically designed for use with liquids and gases which are in Group 2 of the European PED – 2014/68/EU Pressure Equipment Directive and it complies with its requirements.

CE MARKING – GROUP 2 (PED – European Directive)	
PN 25	CATEGORY
1/4" to 1 1/2"	SEP
2"	1 (CE marked)

### NOTE

If the product falls within the category SEP it must not be CE marked, unless other directives are applicable.

This product is not in the scope of the ATEX 2014/34/EU directive as it does not have its potential ignition source. Personnel responsible for the plant installation must assess the risks caused by static electricity and take the necessary precautionary measures to prevent static charge. These measures include e.g. connection of the product to the equipotential bonding system.

## 2.3. Product identification

The following items are indicated on the product nameplate or directly on its body:

- Manufacturer
- Product model (e.g. RT25)
- Nominal size (e.g. 1/4")
- Maximum operating pressure (e.g. PMO: 21 bar)
- Maximum operating temperature (e.g. TMO: 220 °C)
- Serial number and year of manufacturing (e.g. Reg.:17483/19)
- CE Marking (when applicable – see section 2.2 – Certification)
- EX Marking (when applicable e.g. EX h IIB T6...T3 Gb – see section 2.2 – Certification)

## 2.4. Technical data

For technical data including dimensions, materials, limiting conditions and versions refer to the product's respective Information Sheet (IS).

### 3. TRANSPORT, STORAGE AND PACKAGING

#### WARNING

##### **RISK DUE TO FALLING LOADS**

Loads may tip or fall over resulting in damage to property, serious injury, or death.

- Use suitable equipment when moving or lifting suspended loads.
- Make sure no one is standing below the suspended load.

#### CAUTION

##### **RISK OF INJURY DUE TO IMPROPER HANDLING**

Manual handling (e.g. lifting, carrying, pushing, pulling) of large and/or heavy products may result in personal injury such as back injury.

- Assess the risk associated with the handling task.
- Use adequate handling methods and appropriate auxiliary handling equipment.

#### NOTICE

##### **RISK OF PRODUCT DAMAGE DUE TO IMPROPER STORAGE**

- Do not remove any packaging or protective covers until immediately before installation at the site.
- Store the product in a solid base in a dry, cool, and dust-free environment.
- Until its installation, protect it from the weather, dirt, corrosive atmospheres and other harmful influences.

##### **RISK OF PRODUCT DAMAGE DUE TO LONG TERM STORAGE**

Some product components may deteriorate with time (e.g. valve packings, seals).

- Do not store the product for more than 12 months.
- If, for any reason, the product must be stored for longer periods, contact VALSTEAM ADCA.

Products are individually wrapped in plastic film, thermo shrinkable plastic, and/or stored in a cardboard box as they leave VALSTEAM ADCA. Avoid removing packaging and any protective cover until immediately before installing the product at the site.

#### NOTE

If the transport packaging has any shipping damage, contact VALSTEAM ADCA or its representative.

Before storing and transporting the product, protect it from impacts and mechanical damage, paying special care to sealing surfaces and other fragile parts.



#### NOTE

If the corrosion protection (paint and other surface coatings) of the product is damaged during transport or other handling procedures repair it immediately.

## 4. INSTALLATION

Before performing any installation work, refer to section 1 – Safety information.



#### WARNING

##### **RISK OF INJURY DUE TO INSUFFICIENT SUPPORT DURING INSTALLATION**

Insufficient support of the product during installation may cause it to fall and cause personal injury.

- Ensure the product is safely held in place during installation.
- Wear protective safety shoes.



#### NOTICE

##### **RISK OF PRODUCT DAMAGE DUE TO STRESS**

The product is not intended to withstand external stresses that may be induced by the system to which it is being connected.

- Make sure that the connected pipe does not subject the body to any stress (forces or torques) during installation and operation.
- Do not use the product as an elevation point.

### 4.1. Preparation for installation

Before installation, make sure the following conditions are met:

- The installation area has easy access and the product is to be installed in a position where operation and maintenance work can be performed safely.
- The product will be installed with proper support and free of any stresses that can be induced by the system due to e.g. pipe expansions. The necessary precautions are recommended during system design.
- The pipeline where the product will be installed is designed in such a way that it takes into account the weight of the product. The pipeline may require support on

both sides next to the product, particularly if its size and weight are considerable and especially if vibrations are to be expected in the system.

- The product is not damaged.
- Make sure all the necessary materials and tools are readily available during installation work.
- Referring to this Installation and Maintenance Instructions (IMI), Information Sheet (IS), and nameplate, check that the product is suitable for the intended installation: temperature, medium, pressure, etc. – see section 1.2 – Intended use.
- Check that there are no foreign bodies inside the pipelines and ancillaries, flushing may be necessary. These should be thoroughly cleaned.
- Check any mounted pressure gauges and make sure they function properly.
- Do not use excessive force when connecting threaded pipes to the product. Over-tightening may cause breakage leading to fluid discharge, which may cause burns or other injury.
- These valves are only suitable for use under conditions in which no freeze-up will occur.
- Avoid installing check valves too close to ON-OFF or extremely quick-opening valves, as sudden changes in flow can create shock or water hammer conditions that may shorten check valve life. Rapid pulsations or strong shocks on internal components can lead to spring damage or premature wear of the disc and seating surfaces. To improve performance, install the check valve farther away from any quick-opening valves to increase the available piping volume. Additional distance and volume help the system pressure stabilize gradually, reducing surges and potential shock loads on the check valves.
- Disc check valves are not suitable for use where heavily oscillatory flow exists, such as near compressors, diaphragm pumps, etc.



#### NOTE

Assembly Drawings (AD) with assembly details and parts lists are available on request.

## 4.2. Installation procedure

1. Remove plastic film and other packaging, as well as the protective covers that are placed on flanges or connection ends. Make sure the check valve is free from foreign matter.
2. Determine the correct installation position and direction of the fluid flow (indicated by an arrow). If supplied with spring, the check valve can be installed in any position; without spring, installation is restricted to the vertical position with upward flow (from bottom to top).

3. Take care with jointing materials and sealing compounds to ensure that none may be permitted to block or enter the check valve.

## 5. START-UP

Before performing the start-up procedure, refer to section 1 – Safety Information.

The start-up procedure must be followed every time the product is put back into service.

### 5.1. Preparation for start-up

Before starting up, make sure the following conditions are met:

- All works on the system have been completed.
- All the necessary safety devices have been installed.
- When required, warning notices are used to alert others that the system is starting up.
- The product is correctly installed – see section 4 – Installation.
- Referring to these Installation and Maintenance Instructions (IMI), Information Sheet (IS), and nameplate, check that the product is suitable for the intended installation: temperature, medium, pressure, etc. – see section 1.2 – Intended use.
- A safety check was performed by qualified personnel. Checking for leaks, structural damage and integrity of system components.



#### NOTICE

##### **RISK OF PRODUCT DAMAGE DUE TO CONTAMINATION**

The plant operator is responsible for cleaning the pipelines in the plant as well as keeping the product well maintained. At start-up, the presence of small particles in the medium (dirt, scale, weld splatters, etc.) may damage the product or cause malfunction.

- Flush pipelines before start-up.
- Clean protection varnishes from pipes and flanges, leftover paint, graphite, grease, etc.
- Use a pipeline strainer or a filter.

## 5.2. Start-up procedure

1. Open shut-off valves slowly, until normal operating conditions are achieved. This will prevent sudden surges of pressure that can damage the check valve.
2. Check for any leaks.
3. Check the check valve to ensure it is operating correctly.



### NOTE

24 hours after system start-up, it is recommended to check the pipe connection for leaks and retighten when necessary. Clean strainers/filters to avoid blocking.

## 6. OPERATION

**Before operating the product, refer to section 1 – Safety information**

Immediately after completing the start-up procedure, the product is ready for operation.

## 7. SHUTDOWN

**Before performing the shutdown procedure, refer to section 1 – Safety information.**

### 7.1. Shutdown procedure

1. Switch off the system and secure it so it cannot be turned on by unauthorized personnel.
2. Fully close the upstream shut-off valve, to stop the process medium from flowing through the check valve.
3. Allow medium to cool down and completely drain it from the pipeline and check valve.
4. Make sure the pipeline and check valve are not under pressure and are at a safe temperature.
5. Fully close the downstream shut-off valve.
6. If the check valve is to be removed from the pipeline – see section 3 - Transport, storage and packaging.

## 8. PARTS LIST

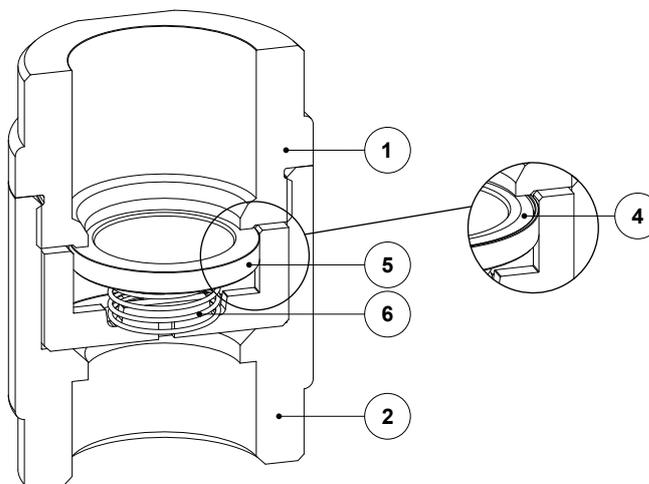


Fig. 2

POS. No.	DESIGNATION	SPARE PARTS
1	Body	
2	Cover	
4	Soft seal	X
5	Valve disc	X
6	Spring	X

## 9. MAINTENANCE

**Before performing a maintenance procedure, refer to section 1 – Safety information.**

The product requires maintenance to ensure that it operates correctly and safely throughout its lifetime. Maintenance work should be performed in a planned manner at periodic intervals. These intervals must be defined by the operator according to the service conditions.

### 9.1. Maintenance procedure

1. Make sure all the necessary materials and tools are readily available during maintenance work.
2. Perform the shutdown procedure – see section 7 – Shutdown.
3. Perform the maintenance procedure – see the following sections.
4. Put the check valve back into operation – see section 5 – Start-up.

## 9.2. Cleaning and replacing the disc and spring

1. Place the cover (2) in a suitable vise, ensuring the check valve is held securely.
2. Unscrew the body (1) from the cover (2).
3. Remove the disc (5) and spring (6).
4. Carefully clean the disc (5) checking for any signs of wear or damage.
5. Clean and inspect the seat, ensuring the sealing surface is clean, smooth and free from damage.
6. During internal cleaning, the threaded connections must also be cleaned.
7. Replace the spring (6) and disc (5) if necessary.
8. Apply a suitable thread sealing compound such as Loctite® 542 (sizes 1/4" to 3/4") and Loctite® 572 (sizes 1" to 2") to the threaded connections.
9. Screw the cover (2) onto the body (1) and tighten with the recommended torque – see section 9.3 – Tightening torques.

## 9.3. Tightening torques

POS. No.	DESIGNATION	TORQUE (Nm)
		All sizes
1, 2	Body and cover	70

## 10. TROUBLESHOOTING

Before applying any corrective measure, refer to section 1 – Safety information.

If the malfunction cannot be solved with the help of the following table, contact VALSTEAM ADCA or its representative.

MALFUNCTION	POSSIBLE CAUSE	CORRECTIVE MEASURE
Check valve is leaking.	Foreign matter is stuck between seat and disc.	<ul style="list-style-type: none"> <li>Open and clean the check valve.</li> </ul>
	The sealing surfaces are damaged / worn.	<ul style="list-style-type: none"> <li>Replace the disc.</li> <li>If the sealing surface on the valve body is damaged, replace the valve.</li> </ul>
The valve does not open at the specified differential pressure.	Sticking disc and valve seat due to rust, pipe sealing agent, etc.	<ul style="list-style-type: none"> <li>Open and clean the check valve.</li> </ul>
Loud noise.	The equipment is operating in the unstable range of it's flow capacity with the valve disc oscillating.	<ul style="list-style-type: none"> <li>Raise the flow rate by increasing the pump capacity.</li> <li>In the case of upward flow remove the fitted spring.</li> <li>Install a valve of smaller nominal size.</li> </ul>
Leakage to the outside of the check valve.	Incorrect tightening torque.	<ul style="list-style-type: none"> <li>Ensure an adequate sealing compound is being used.</li> <li>Tighten with the proper torque.</li> </ul>
	The check valve is subject to stress from the piping (weight, torsion, etc.)	<ul style="list-style-type: none"> <li>Correct the piping.</li> </ul>
Flow is poor.	The valve disc is catching due to wear, dirt, rust, etc.	<ul style="list-style-type: none"> <li>Clean parts.</li> </ul>
	Incorrect operating pressure.	<ul style="list-style-type: none"> <li>Adjust by increasing.</li> </ul>

## 11. DISPOSAL

Once the product has reached the end of its working life, it should be sent for disposal in accordance with the prevailing national and local regulations.

Before disposal make sure that the product is clean and free from fluid residues.

During its disposal, pay special attention to rubbers, resins and polymer components (PVC, PTFE, PP, PVDF, FKM, NBR, etc.).

Do not dispose of components and hazardous substances together with household waste.

## 12. RETURNING PRODUCTS

Information regarding hazards and precautionary measures to be considered due to contaminating fluids and residues or mechanical damage that may represent a health, safety or environmental risk must be provided in writing when returning products to VALSTEAM ADCA.



### WARNING

#### **RISK DUE TO THE PRESENCE OF HAZARDOUS RESIDUES ON RETURNED PRODUCTS**

Contaminated fluids and residues may represent an environmental risk, or risk to VALSTEAM ADCA personnel.

- Information regarding any hazards or precautionary measures to be considered must be provided in writing when returning products to VALSTEAM ADCA.
- Health and Safety information sheets relating to any substances identified as hazardous or potentially hazardous must be provided outside the packaging.
- Use Hazmat labels on the packaging.

### IMPORTANT NOTE

Total or partial disregard of these Installation and Maintenance Instructions involves loss of any right to warranty.

The extent and warranty period are specified in the “General sales conditions”.