

# HUMIDITY SEPARATORS

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

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## 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 the problems that cannot be solved with the help of these instructions, please contact VALSTEAM ADCA or its representative.

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

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# 1. SAFETY INFORMATION

## 1.1. Explanation of symbols



### DANGER

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



### WARNING

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



### CAUTION

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



### NOTICE

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



### NOTE

Indicates additional information, 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 which 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, 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 valve, 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 up 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 product's as a preventive measure.



## WARNING

### **RISK OF INJURY CAUSED BY FLUID ATTACK ON PRODUCTS 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 or 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 screw 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 overtime or get 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 when illegible, missing or damaged.



## CAUTION

### RISK OF INJURY DUE TO RESIDUAL PROCESS MEDIUM

Direct contact with 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.

### 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 S16, S25, SH25 and S30 humidity separators remove moisture from steam, compressed air and other gas systems.

### 2.1. Principle of operation

Steam, compressed air or other gas passes through the separator and as a result of centrifugal forces (S16, S25 and SH25), expansion (S30), impacts and swirling effects, the particles with heavier specific gravity, such as water and oil droplets, moisture in suspension, dirt and scale are separated from the fluid.

The condensate collected at the bottom of the separator must be automatically drained by a suitable steam or air and gas trap.

### 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.



Consult the product respective Information Sheet (IS) for further details.

HYDROSTATIC TEST PRESSURE @ 20 °C		
RATING	S16/S, S25/S and S30/S	S16/SS and S25/SS
PN 16	23 bar	26 bar
PN 40	57 bar	70 bar
PN 63	91 bar	-

In case of a special product, its limiting condition such as PS (maximum allowable pressure) and TS (maximum allowable temperature) are written on its nameplate or directly on the body. If an hydrostatic test is to be performed on the system or product be aware of its limiting conditions.



#### NOTE

If the product falls within 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 own 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. S25/SS)
- Pressure rating (e.g. PN 40)
- Nominal size (e.g. DN 40, NPS 11/2")
- Volume (e.g. 5,7 L)
- Test pressure (in some cases)
- Flow direction (indicated by an arrow)
- 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 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 of time 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.

**i** **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 with sealing surfaces and other fragile parts.

If the humidity separator is fitted with lifting lugs, these should be used for transporting purposes. EN 13889 shackles with pin dimensions according to the hole size of the lifting lug should be used.

**i** **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 to.

- 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 device 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 pipework before and after the separator, must be properly sized in order to prevent that the recommended maximum flow speed, for the fluid in question, is exceeded.
- 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, temperature, 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.
- The product is designed to be applied in places protected from exposure to weather. Protective measures should be applied in case of applications on the outside or in adverse environments such as corrosion-promoting conditions (e.g. sea water or chemical vapours).
- The installation area should have the necessary firing system to prevent damage of the equipment due to over temperature/pressure caused by fire.



#### 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 protective covers which are placed on flanges or connection ends. Make sure the product is free from foreign matter.
2. Some larger humidity separators may feature structural reinforcement pads with telltale holes. To avoid accumulation of dirt or hidden corrosion inside these holes, these can be filled with a suitable grease compound. Do not close the holes with a cover or plug.
3. The humidity separator has an arrow or inlet/outlet designations, be sure that it is installed in the appropriate direction.
4. Humidity separators of larger sizes are fitted with supporting brackets. Ensure these are used to properly secure the equipment. The support must be able to withstand the full weight of the equipment and its content. Contact Valsteam ADCA for detailed information regarding bracket dimensions and hole positioning.
5. The humidity separator condensate outlet connection must be facing down and connected to the condensate line. Fit a suitable steam or air trap. In case of an air trap a balancing pipe should be fitted. Information on suitable steam traps or, in air or gas distribution systems, air and gas float traps, can be obtained from the manufacturer.
6. For those steam systems where air can be present, it can collect in the upper vent connection of the humidity separator (optional in some models) using a suitable air eliminator. In case it is not being used, ensure it is closed tightly with a proper plug.
7. Take care with jointing materials and sealing compounds to ensure that none may be permitted to block or enter the humidity separator. In case of flanged connections

use appropriate flange gaskets.

8. It is recommended to lag the surface of the humidity separator with suitable insulating material.

## 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, temperature, 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.

## 5.2. Start-up procedure

1. Open shut-off valves slowly, until normal operating conditions are achieved.
2. Check for any leaks.
3. Check the product to ensure it is operating correctly.

### NOTE

24 hours after system start-up, it is recommended to check 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 humidity separator.
3. Make sure the pipeline and the humidity separator are not under pressure and are at a safe temperature.
4. Allow medium to cool down and completely drain it from the pipeline and humidity separator.
5. Fully close the downstream shut-off valve.
6. If the product is to be removed from the pipeline – see section 3 - Transport, storage and packaging.

## 8. MAINTENANCE

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

Humidity separators do not require maintenance and have no spare parts. It is recommended to examine the unit at regular intervals. Cleaning/flushing may be necessary.

The estimated lifetime under satisfactory working conditions is 5 years. After this period, a wall thickness examination should be performed using appropriated inspection equipment. Different factors such as medium quality and properties, contact with corrosive fluids and external atmospheres with corrosion-promoting conditions (e.g. sea water, chemical vapours) will reduce this period.

## 9. 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.

## 10. 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 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

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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”.