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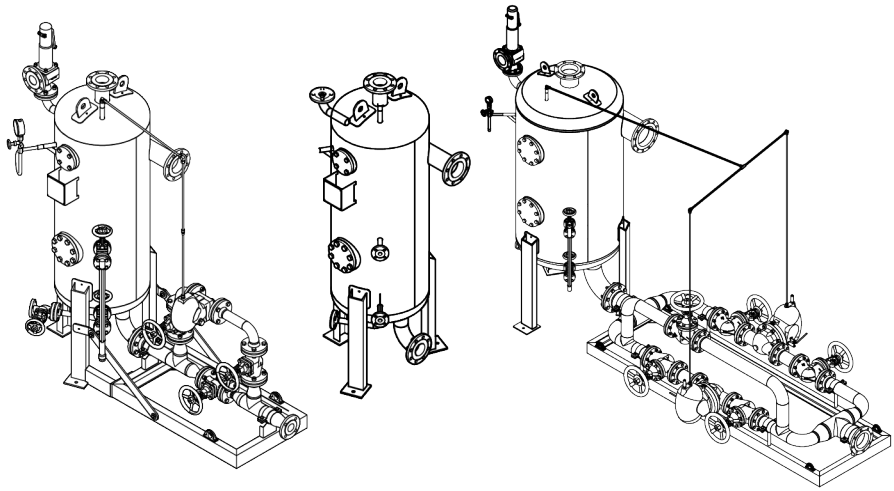


Flash vessel system VD

Flash vessel VD

EN
English

Original Installation Instructions

818974-01

Contents

Foreword

This Installation & Operating Manual will help you ensure the correct, safe and cost-effective use of the flash vessel system VD and the flash vessel VD.

The flash vessel system VD is also referred to below simply as “System”.

Where the flash vessel VD is described as a single component, it is also referred to simply as a “Tank”.

Where flash vessel systems and flash vessels are described, the product is also referred to simply as “Equipment”.

This installation & operating manual is intended for anyone commissioning, using, operating, servicing, cleaning or disposing of this equipment and, in particular, for professional after-sales service technicians, qualified personnel and authorised and trained staff.

All of these persons must read and understand the content of this installation & operating manual.

Following the instructions given in this installation & operating manual helps avoiding danger and increases the reliability and service life of the equipment. Please note that in addition to the instructions given in this installation & operating manual you must also observe all locally applicable rules and regulations concerning the prevention of accidents as well as approved safety guidelines for good professional practice.

Availability of documents; other applicable documents

Further notes, instructions and information on the assemblies can be found in the documents published by the respective manufacturers. These documents form part of this Installation & Operating Manual.

Store these documents together with this Installation & Operating Manual. Make sure that the Installation & Operating Manual and the other applicable documents are available to the operator.

Hand over these documents if you sell or pass on the equipment in any way.

Please also read and follow the instructions, particularly the safety notes, in the operating instructions for the steam trap.

Formatting features in the document

Certain text elements of this installation & operating manual feature a specific typographic design. You can easily distinguish the following text elements:

Standard text

Cross-reference

- Listing
  - Sub-items in listings

➢ Steps for action.

Here you will find additional useful information and tips serving to assist you in using the equipment to its fullest potential.

Safety

Use for the intended purpose

The flash vessel system VD (system) is installed in the condensate network of steam systems.

The system is used to flash water in the flash vessel VD. After reducing the pressure from high-pressure steam applications, it separates condensate and flash steam and makes them available for the low-pressure steam system.

The flash vessel VD (tank) is the central component of the system. It can also be installed individually in a flash vessel system assembled by the operator.

The equipment must only be used within the allowable pressure and temperature limits and only if the chemical and corrosive influences on the equipment are taken into account.

Correct use includes compliance with the instructions given in this installation & operating manual, in particular obedience to all safety instructions.

Any other use of the equipment is considered to be improper.

Note that the equipment is also used incorrectly if the materials of the equipment are not suitable for the fluid.

Basic safety notes

Explosion hazard

The equipment does not have explosion protection. Only use the equipment outside potentially explosive atmospheres. Make sure that the equipment remains outside potentially explosive atmospheres.

Risk of severe injuries

- The equipment may become hot during operation. Do not operate the equipment unless thermal insulation or protection against accidental contact prevents you from touching hot surfaces.
- The equipment is under pressure and can get hot during operation. Only perform work on the equipment if the following conditions are satisfied:
  - The pipes must not be under pressure.
  - All fluid must be thoroughly removed from pipes and the equipment.
  - Before carrying out any work, the higher-level system must be switched off and secured so it cannot be switched on by unauthorised persons.
  - Pipes and the equipment must have cooled to around 20 °C (lukewarm).
- The equipment may only be used with fluids that are not aggressive in contact with material and gaskets. Otherwise, leaks may occur and hot or toxic fluid may escape.
- The equipment is calculated without taking additional loads into account. Wind and snow loads are not taken into account. Connect the equipment without load or torque.
- The equipment is calculated without taking pressure changes into account. Do not operate the equipment under changing loads.
- The equipment and its components may only be installed or removed by specialist personnel. Specialist personnel must have knowledge and experience in the following areas:
  - Producing pipe connections.
  - Selecting suitable lifting gear for the product and using it safely.
  - Working with hot or pressurised fluids.
- If the admissible pressure and temperature ratings are exceeded, the equipment may be destroyed and hot or pressurised fluid may escape. Make sure that the equipment is always used within the admissible pressure and temperature ratings.
  You can find information on the pressure and temperature ratings on the name plate.
- If unsuitable lifting gear is used or the gear is used improperly the equipment or parts of it could fall down.
  - Make sure that only qualified personnel lifts the equipment or parts of it.
  - Make sure that nobody is standing or working below the hoisted equipment.
  - Make sure that the lifting gear is of sufficient strength for the load to be hoisted and that the load is properly secured and attached to it. For more information on the nature and weight of the components and safe lifting points please contact the manufacturer.
  - Make sure that all locally applicable regulations on safety and the prevention of accidents are strictly adhered to.

Risk of minor injuries

- There is a risk of cuts from sharp-edged parts of the equipment. Always wear protective gloves when working on the equipment.
- If the system or its parts and components are insufficiently supported, they may fall down and cause bruising. Secure the system and its components to prevent them falling down. Wear sturdy safety boots.

Information on property damage or malfunctions

- Installing the equipment against the specified direction of flow or in the wrong location will result in malfunctions. This could cause damage to the equipment or the higher-level system. Install the equipment in the pipe in the direction of flow stated in this Installation & Operating Manual.
- If the material is unsuitable for the fluid, increased wear may occur and fluid may escape. Make sure that the material is suitable for the fluid used in your installation.

Qualification of personnel

A qualified person must be acquainted with and experienced in the following:

- the pertinent on-site rules and regulations for preventing fire and explosions as well as industrial safety regulations
- working on pressure equipment
- making pipe connections
- working with dangerous (hot or pressurized) fluids
- lifting and transporting loads
- observing all notes and instructions in this installation & operating manual and the applicable documents
- safely working with tanks for dangerous (hot or pressurized) fluids

Personal protective equipment

The operator must ensure that anyone working on the equipment must wear the required protective clothing and safety gear stipulated for the site of installation. The protective clothing must be suitable for the used media and must protect the wearer against safety and health hazards associated with a particular job to be carried out at the site of installation. Protective clothing & equipment must provide protection from potential hazards, in particular from injuries to:

- Head
- Eyes
- Body
- Hand
- Feet
- Hearing

Note that this list is not exhaustive. The operator must establish personal protective equipment guidelines and specify any additional protective gear that is required if the worker is exposed to a specific risk at the site of installation.

Typographic features of warning notes

DANGER

Notes with the heading DANGER warn against imminent dangerous situations that can lead to death or serious injuries.

WARNING

Notes with the heading WARNING warn against possibly dangerous situations that could lead to death or serious injuries.

CAUTION

Notes with the heading CAUTION warn against dangerous situations that could lead to minor or moderate injuries.

Formatting features for warnings of property damage

Attention!

This information warns of a situation leading to property damage.

Description

Scope of supply and equipment specification

Scope of supply

The equipment can be delivered in various forms:

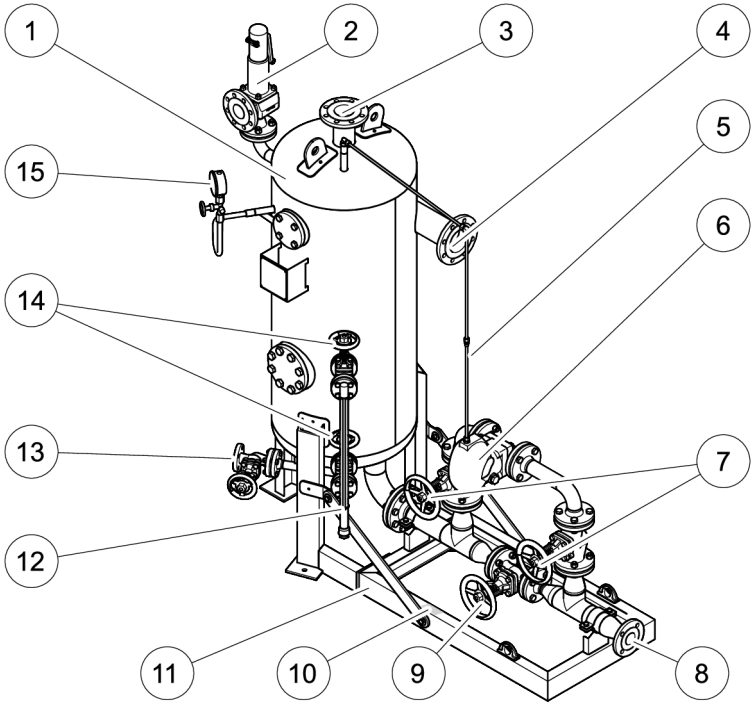
- Tanks without additional components for installation in a system provided by the operator
- Tanks with attachments for transport separate from the system
- Complete system for connection to a higher-level system

The system consists of the following main assemblies:

- Tank VD
- One steam trap for 50 L, 100 L, 400 L
- Two steam traps for 850 L, 1400 L
- Stop valves
- Visual level indicator
- Safety valve
- Pressure gauge with pressure gauge valve
- Base frame
- Pipes

Equipment specification

System VD 50 L to VD 400 L

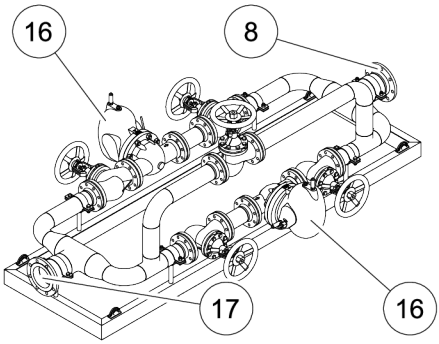


No.	Designation
1	Tank
2	Safety valve N11
3	Flash steam outlet N2
4	Condensate inlet N1
5	Air-balance pipe
6	Steam trap UNA
7	Stop valves (steam trap)
8	Condensate outlet N10

No.	Designation
9	Stop valve (bypass)
10	Rating plate (system)
11	Base frame
12	Visual level indicator
13	Stop valve (drain N5)
14	Stop valves (visual level indicator)
15	Pressure gauge

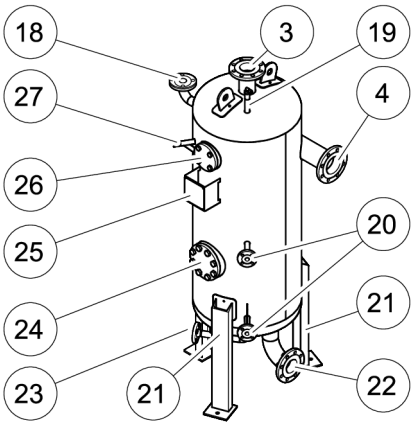
System VD 850 L to VD 1400 L

For systems VD 850 L to VD 1400 L two steam traps UNA (16) are installed. The pipes upstream and downstream of the two steam traps are parallel.



No.	Designation
8	Condensate outlet N10
16	Steam trap UNA
17	Condensate outlet (N3 of the tank)

Tank



No.	Designation
3	Flash steam outlet N2
4	Condensate inlet N1
18	Connection N4 for safety valve
19	Connection N9 for air-balance pipe
20	Connections N6 for visual level indicator
21	Feet
22	Condensate outlet N3
23	Drain N5
24	Inspection hole N8
25	Rating plate (tank)
26	Inspection hole N12
27	Connection N7 for pressure gauge

Name plate/identification

A rating plate is attached to both the system and the tank.

- The rating plate for the system is attached to the base frame.
- The rating plate for the tank is attached to the side between the inspection hole and the hand hole.

System rating plate

The following items are indicated on the name plate:

- Manufacturer
- Type designation
- Serial number
- Year of construction
- Approx. weight
- Safety valve trigger pressure
- Service pressure
- Condensate flowrate
- Orifice
- Steam trap type
- Number of steam traps

Rating plate on tank

The following items are indicated on the name plate:

- Manufacturer
- Type designation
- Serial number
- Year of construction
- Mark (if required), e. g. CE, UKCA, EAC
- Max. service pressure
- Min. service temperature
- Type of vessel
- Max. service temperature
- Test pressure
- Body of regulations
- Test date
- Volume
- Empty/test weight

End connections

- Flanges

The system has the following connections:

Connection	Designation
N1	Condensate inlet
N2	Flash steam outlet
N5	Drain (stop valve outlet)
N8	Inspection hole
N9	Air-balance pipe
N10	Condensate outlet
N11	Safety valve outlet
N12	Inspection hole (from 400 L)

The tank has the following connections:

Connection	Designation
N1	Condensate inlet
N2	Flash steam outlet
N3	Condensate outlet
N4	Safety valve
N5	Drain
N6	Visual level indicator
N7	Pressure gauge
N8	Inspection hole
N9	Air-balance pipe
N12	Inspection hole (from 400 L)

Versions

The equipment is available in different versions.

The system sizes differ in terms of the capacity of the tank. The following tank sizes are available:

- 50 L
- 100 L
- 400 L
- 850 L
- 1400 L

The type designation corresponds to the tank size in litres. Depending on the size, the number or position of the inspection holes may vary.

The equipment is available in the following pressure ratings:

- 0.5 bar
- 1.0 bar
- 2.5 bar
- 8.0 bar
- 10.0 bar
- 12.0 bar

The safety valve type and the connection (N11) size depend on the design pressure.

Depending on the size and operating data of the systems, the following types of steam traps are installed:

- UNA 43
- UNA 45
- UNA 45A

The steam trap and the outlet orifice (AO) used are selected depending on the flowrate and operating pressure.

Depending on the type, the following AO are available:

- 50 L: AO4, AO8, AO13
- 100 L: AO2, AO4, AO13
- 400 L: AO2, AO4, AO4 max, AO8
- 850 L: AO2, AO4, AO8
- 1400 L: AO2, AO4, AO8

The equipment can be supplied in non-alloyed or stainless steel.

Accessories

The following components are required for safe operation of the tank:

- Safety valve
- Steam trap
- Pressure gauge, display range corresponding to the tank design pressure
- Pressure gauge valve
- Siphon, U-shape
- Visual level indicator
- Stop valves (steam trap/bypass)
- Stop valves for visual level indicator
- Stop valve (drain)

These components are available as accessories from the manufacturer.

These components are already installed on the system.

Application of European Directives

Fluids

The equipment is designed for the following fluids (in accordance with the EU Pressure Equipment Directive or UK Pressure Equipment (Safety) Regulations):

- Fluids of group 2

Due consideration must be given to chemical and corrosive influences.

Use in potentially explosive atmospheres

The equipment does not have explosion protection.

➢ Only use the equipment outside potentially explosive atmospheres.

➢ Make sure that the equipment remains outside potentially explosive atmospheres.

Task and function

Purpose

The flash vessel system is installed in steam systems, e.g. an existing condensate network.

After reducing the pressure from high-pressure steam applications, the system is used to separate condensate and flash steam and makes the flash steam obtained in this process available for the low-pressure steam system.

The flash steam released during pressure relief is made available for the low-pressure steam system. This makes the overall system more efficient. Excess condensate is discharged.

The systems are mainly used for boiler blowdown and condensate.

The system must be designed for the flash pressure. It must be protected against excess pressure by a safety valve. A sufficient water level in the tank must prevent the flash steam from escaping.

Function

Highly pressurised water with a high saturation temperature flows tangentially into the tank from the high-pressure steam application through connection N1. The flash steam collects at the top of the tank. From there, it is conveyed through connection N2 into a low-pressure steam system. The condensate is conveyed through connection N3 to the steam trap.

The condensate is discharged from the system through the steam trap via connection N10 into a condensate network at a lower pressure level. The steam trap can be separated by stop valves if necessary. The condensate is then conveyed directly to connection N10 via a bypass.

The level in the tank is indicated by the visual level indicator. The pressure in the tank is indicated by a pressure gauge. The tank is protected against inadmissible excessive pressure by the safety valve. The excess pressure is discharged via connection N11.

The air-balance pipe ensures unobstructed flow to the steam trap.

The following pressure ratios are required for the equipment to work correctly: $p_{HP} > p_{LP} > p_{SD}$

p_{HP}: pressure of high-pressure application
p_{LP}: pressure of low-pressure steam line
p_{SD}: Pressure of collection tank

Storing and transporting the equipment

Storage and transport differ depending on the condition on delivery:

- Tanks without additional components for installation in a system provided by the operator
- Tanks with attachments for transport separate from the system
- Complete system for connection to a higher-level system

Storing the equipment

➢ Please observe the following items when storing the equipment:

- Do not store the equipment for more than 12 months.
- Use the supplied sealing plugs or other suitable seal caps in order to seal off all openings of the equipment.
- Protect the sealing surfaces and contact areas against mechanical damage.
- Protect the equipment and all components against hard shocks and impacts.
- Store the equipment only in closed rooms that meet the following environmental conditions:
  - Air humidity below 50 %, not condensing
  - Indoor air: clean, salt-free and non-corrosive
  - Temperature 5–40 °C.

➢ Make sure that all these requirements are always met when storing the equipment.

➢ Please contact the manufacturer if you cannot comply with the recommended storage conditions.

Transporting the equipment

DANGER

Risk of bruises if the equipment or component parts fall down.

- ➢ Use suitable lifting gear when moving or lifting the equipment and/or component parts.
- ➢ Make sure that the equipment cannot topple over.
- ➢ Make sure that nobody is standing below the lifted equipment.

- ➢ Meet the requirements for storage also when transporting the equipment.
- ➢ Before transporting the equipment, fit the sealing plugs or covers on the connections.

If you do not have the covers that were supplied, seal off the connections using comparable covers.

- ➢ For short distances (only a few metres) you can transport the equipment unpacked.
- ➢ When transporting the equipment over larger distances use the original packaging.
- ➢ If you do not have the original packaging use a box that protects the equipment adequately against corrosion and physical damage.

For a short period of time the equipment may be transported even if the temperature is below 0 °C, provided that the equipment is completely empty and dry.

You can lift the equipment with straps in order to transport it. The attachment points on the connections are also specified in the customer/transport drawing.

- ➢ Fasten the straps to the attachment points.
- ➢ Lift the equipment at the straps using suitable lifting gear.
- ➢ Transport the equipment to your desired position.

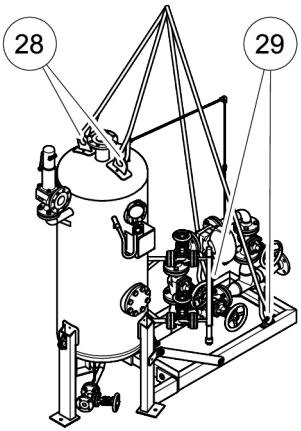
A transport drawing is supplied for transporting the complete system.

The attachment points on the base frame and on the tank are shown in the transport drawing.

Transporting the system

The system is transported fully installed up to a size of VD 850 L.

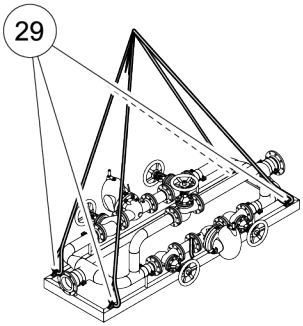
- ➢ When transporting, read and follow the information in the applicable transport drawing.
- ➢ Attach suitable lifting gear to the attachment points (28) on the tank and the attachment points (29) on the base frame.
- ➢ Lift the system.
- ➢ Transport the lifted system to the desired location.
- ➢ Lower the system and connect it properly.



The tank of size VD 1400 L is transported separately from the system. Transport the remaining components of the system as follows:

- ➢ Attach suitable lifting gear to the four attachment points (29).
- ➢ Lift the system.
- ➢ Transport the lifted system to the desired location.

➢ Lower and install the system.



Transporting the tank

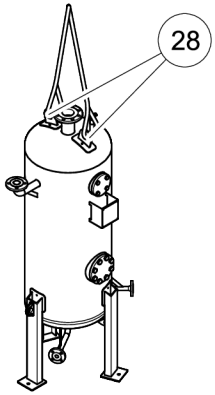
The tank VD 1400 L is transported separately from the system. In this case, the tank is not transported differently than transporting tanks sold individually.

➢ Attach suitable lifting gear to the two attachment points (28).

➢ Lift the tank.

➢ Transport the lifted tank to the desired location.

➢ Lower and install the tank.



Installation and connection

Preparing installation

DANGER

Risk of bruises if the equipment or component parts fall down.

- ➢ Use suitable lifting gear when moving or lifting the equipment and/or component parts.
- ➢ Make sure that the equipment cannot topple over.
- ➢ Make sure that nobody is standing below the lifted equipment.

➢ Take the equipment out of the transport packaging.

➢ Check the equipment for transport damage.

➢ Contact the manufacturer if you detect any kind of shipping damage.

DANGER

Personnel working on pipes are exposed to safety risks and may suffer severe injuries, poisoning or even loss of life.

- ➢ Make sure that no hot or hazardous fluid is in the equipment or the pipes.
- ➢ Make sure that the pipes upstream and downstream of the equipment are depressurised.
- ➢ Make sure that the installation is switched off and protected against unauthorised or unintended activation.
- ➢ Make sure that the equipment and the pipes have cooled down to room temperatures.
- ➢ Wear protective clothing that is suitable for the fluid and, if necessary, wear protective gear.

For more information on suitable protective clothing and safety gear refer to the safety data sheet of the fluid in question.

➢ Drain pipes until they are empty.

➢ Switch the installation off and protect it against unauthorised or unintended re-activation.

Mounting the equipment

Installation and connection differ depending on the condition on delivery:

- Tanks without additional components for installation in a system provided by the operator
- Tanks with attachments for transport separate from the system
- Complete system for connection to a higher-level system

Installing the system

- ➢ If necessary, level the system using shims.
- ➢ Make sure that the weight is evenly distributed across the system base frame.
- ➢ Bolt the system to a steel structure using M12 or M16 bolts, or to the foundation or concrete using M16 bolt anchors or compound anchors.
- ➢ Tighten the bolt connections to the torque specified in the following table.

Bolt	Torque
M12	63 Nm
M16	153 Nm

The specified torques apply only to bolting in steel structures. They apply to bolt grade 8.8 with lubricated threads.

Torques for bolting in concrete depend on the manufacturer of the bolt anchors.

Installing the tank

If you want to install the tank in a flash vessel system provided by the operator, the following requirements must be met:

- An air-balance pipe (5) must be installed between the flash vessel VD and the venting of the installed steam trap (6). Use progressive ring fittings and the corresponding 10 mm pipes made of stainless steel for the air-balance pipe.
- The steam trap must be installed at least at the level of the lower connection N6 (14).
- The pipes must be connected properly to all connections on the tank.
- The tank must be protected against excess pressure by a safety valve. Steam escaping from the safety valve (18) must be discharged via a pipe to a safe discharge area.

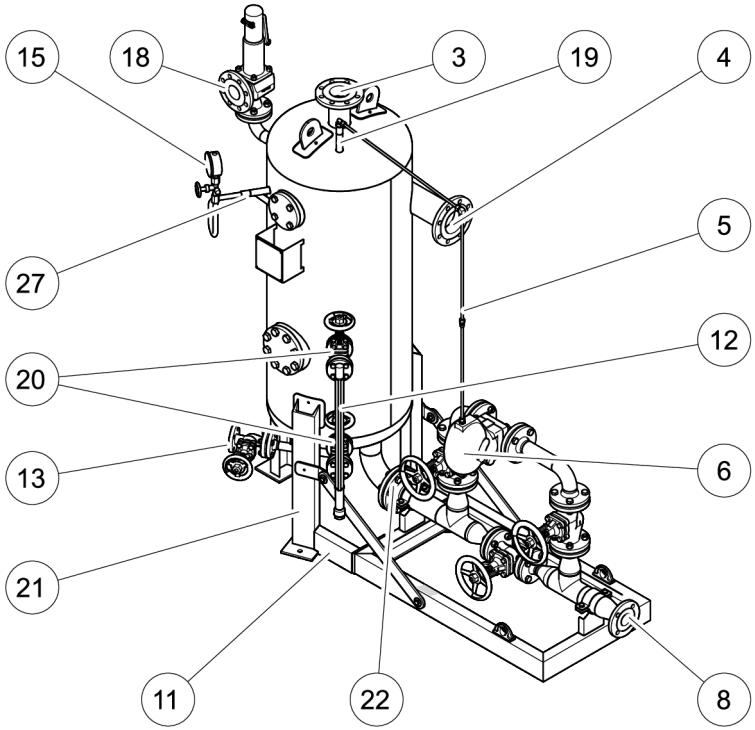
- ➢ Make sure that the system base frame is securely bolted to the ground.
- ➢ Lift the tank into the system frame using suitable lifting gear (see details from page 13).
- ➢ If necessary, level the system using shims.
- ➢ Make sure that the weight is evenly distributed across the system base frame.
- ➢ Align the tank with the connections and fastenings in the system.
- ➢ Make sure that the tank is upright.
- ➢ Make sure that the weight is evenly distributed across the tank feet.
- ➢ Make sure that the holes in the couplings (21) are aligned with the holes in the base frame (11) without any tension.
- ➢ Make sure that the following flange connections are aligned without tension:

- Condensate outlet of tank N3 (22)
- Connections of the air-balance pipe (5) to the tank (19) and to the steam trap (6)

- ➢ Ensure that the following flange connections are aligned without tension to the pipes of the higher-level system:

- Condensate inlet N1 (4)
- Flash steam outlet N2 (3)
- Condensate outlet of the system N10 (8)
- Drain N5 (13)
- Connection N11 for safety valve and connection for steam outlet (18)

- ➢ Make sure that the pressure gauge (15) is securely bolted to connection N7 (27).
- ➢ Make sure that the visual level indicator (12) is securely bolted to the two connections N6 (20).



➢ Tighten the bolt connections to the torque specified in the following table.

Bolt	**Torque**
M12	30 Nm
M16	90 Nm
M20	190 Nm
M24	300 Nm

The specified torques apply to lubricated threads and flat graphite seals with sheet metal inserts. They apply to bolt grade 5.6 galvanised and A2-70 for stainless steel.

➢ Make sure that the equipment is safely mounted and that all connections are made correctly.

Connecting the equipment

DANGER

Incorrectly connected equipment can cause fatal accidents or severe injuries.

➢ Make sure that only qualified skilled personnel connect the equipment to pipes.

Specialist personnel must be highly qualified and fully experienced in making pipe connections for the respective type of end connection.

When supplied by the factory, the connections may be sealed off with sealing plugs.

➢ Remove sealing plugs before mounting the equipment.

➢ Keep the sealing plugs and the packing for further use.

Attention!

The equipment can be damaged if connections are too weak.

➢ Make sure that the connected equipment is not subjected to any forces or torques.

The plant owner is responsible for ensuring that the equipment and sealing material are suitable for the fluid used.

➢ Make sure that the materials of all equipment components are suitable for the fluid used.

➢ Inspect all seals before installation to ensure they are in perfect condition.

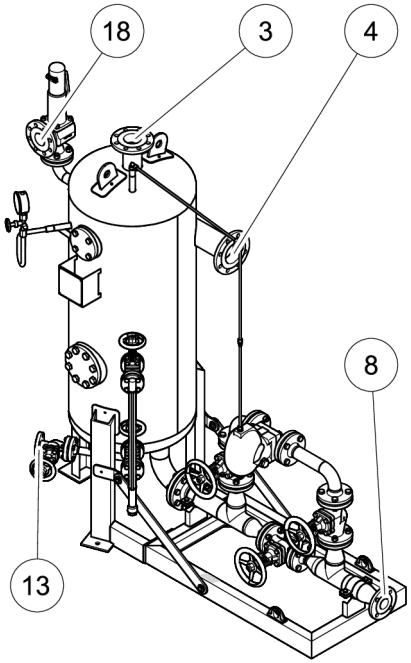
➢ Make sure that the pipe system of the plant is clean.

➢ Make sure that the equipment is free from foreign matter.

➢ Connect the equipment to the pipes.

➢ Connect the following system connections to the pipes of the higher-level system:

- Condensate inlet N1 (4)
- Flash steam outlet N2 (3)
- Condensate outlet of the system N10 (8)
- Drain N5 (13)
- Connection N11 for safety valve and connection for steam outlet (18)



➢ Tighten the bolt connections to the torque specified in the following table.

Bolt	Torque
M12	30 Nm
M16	90 Nm
M20	190 Nm
M24	300 Nm

The specified torques apply to lubricated threads and flat graphite seals with sheet metal inserts. They apply to bolt grade 5.6 galvanised and A2-70 for stainless steel.

➢ Power up the system.

➢ At operating temperature, check that flanged connections are tight.

If any flanged connections are leaking, proceed as follows:

➢ Power down the system.

➢ Wait until the tank and pipes have cooled to a lukewarm temperature.

➢ Re-righten threaded joints.

➢ Power the system up again.

➢ Again check that flanged connections are tight at operating temperature.

CAUTION

During operation, the surface of the system and its components becomes hot. There is a risk of burns!

➢ Insulate the surfaces of the system using suitable material.

➢ Attach warning notices to any surfaces that are not insulated.

The insulation material is not included in delivery.

Starting up the system

➢ When bringing the system into service, read and follow all information in this Installation & Operating Manual and in the applicable documentation.

➢ Make sure that all connections and joints are properly established and tight.

➢ Make sure that the transport lock on the safety valve has been removed.

➢ Check that the safety valve is in perfect condition.

➢ Make sure that the transport lock on the safety valve has been removed.

To do this, proceed as described in the applicable operating instructions for the safety valve.

➢ Drain the blowdown line from the safety valve (2) to the higher-level system.

Flushing the system

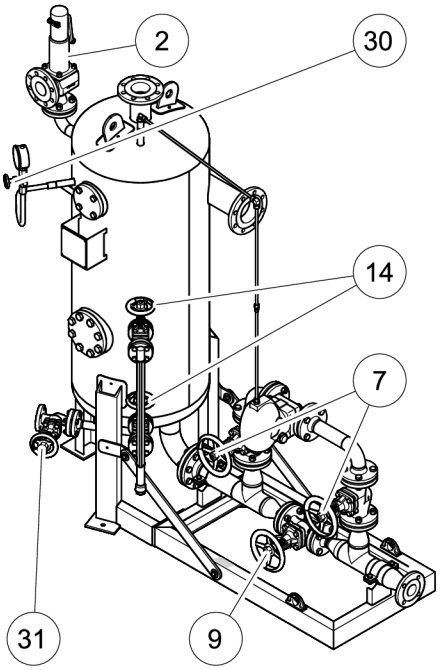
➢ Flush the system before bringing it into service.

➢ Make sure that all connections and joints are properly established and tight.

➢ Slowly adjust the stop valves according to the sequence in the following table.

No.	Stop valve	Activity
7	Steam trap	Close
9	Bypass	Close
14	Visual level indicator	Close
30	Pressure gauge valve	Open
31	Drain	Open

➢ Briefly rinse the container.



Bringing into service

➢ Slowly adjust the stop valves according to the sequence in the following table.

No.	Stop valve	Activity
7	Steam trap	Open
9	Bypass (when starting up the steam system)	Open
14	Visual level indicator	Open
30	Pressure gauge valve	Open
31	Drain	Close

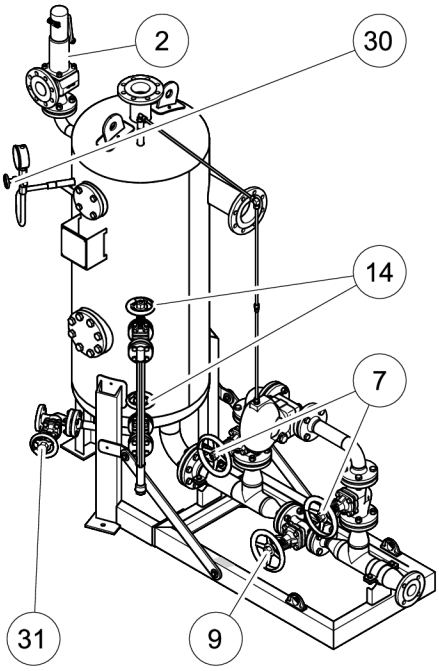
➢ Power up the steam system.

➢ Check the connections of the system when it is warm.

➢ Tighten the bolts on leaking connections to the torque specified on page 14.

➢ Check that the visual level indicator is functioning properly as described in the operating instructions for the visual level indicator.

➢ After checking, close the stop valves to the bypass (9).



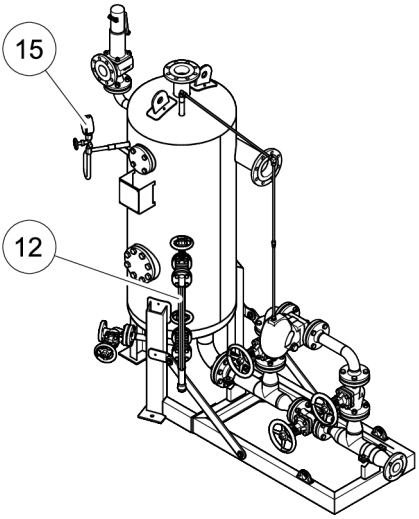
Operation

Do not work on the equipment while it is operating.

➢ Check the pressure gauge reading (15).

➢ Check the operating states and operating data when the safety valve is activated.

➢ Make sure that the water level in the tank is within the display range of the visual level indicator (12).



In order to display operating conditions and ensure high efficiency and system availability, the manufacturer recommends annual or continuous testing with GESTRA testing equipment (e.g. TRAPtest VKP, ecoBolt MSB or Vaposkop VK).

➢ Contact your local GESTRA sales partner.

➢ Maintenance intervals are specified by the plant designer or the system operator.

After operation

DANGER

Personnel working on pipes are exposed to safety risks and may suffer severe injuries, poisoning or even loss of life.

- Make sure that no hot or hazardous fluid is in the equipment or the pipes.
- Make sure that the pipes upstream and downstream of the equipment are depressurised.
- Make sure that the installation is switched off and protected against unauthorised or unintended activation.
- Make sure that the equipment and the pipes have cooled down to room temperatures.
- Wear protective clothing that is suitable for the fluid and, if necessary, wear protective gear.

For more information on suitable protective clothing and safety gear refer to the safety data sheet of the fluid in question.

Attention!

Frost damage can occur when the system is not in operation.

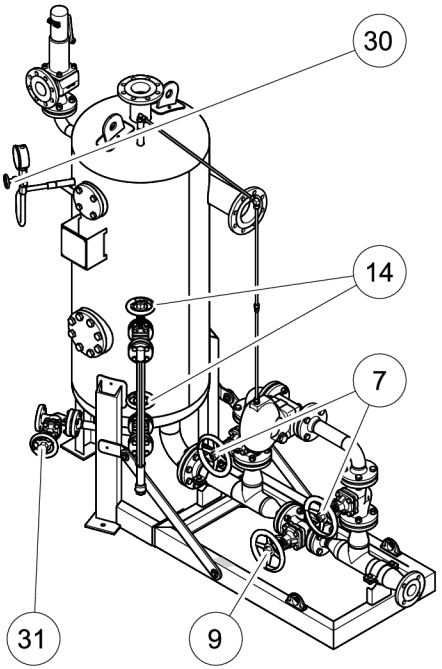
- Drain the equipment if there is a risk of frost.

- At the installation site, make sure that the equipment can be safely drained.
- When taking the system out of service, read and follow all information in this Installation & Operating Manual and in the applicable documentation.
- Close the condensate supply.
- Close the flash steam outlet.
- Slowly adjust the stop valves according to the sequence in the following table.

No.	Stop valve	Activity
7	Steam trap	Close
9	Bypass	Close
14	Visual level indicator	Remains open
30	Pressure gauge valve	Remains open
31	Drain	Open

If the tank needs to be emptied, proceed as follows:

- Make sure that the equipment can be safely drained.
- Make sure that all components of the system have cooled down to lukewarm.
- Empty the tank.



Removing external dirt deposits

- To remove dirt deposits rinse the equipment with fresh water and wipe it with a clean, lint-free cloth.
- To remove any persistent residues use a cleaning agent that is suitable for the material and carefully wipe the equipment with a clean, lint-free cloth.

Maintaining the equipment

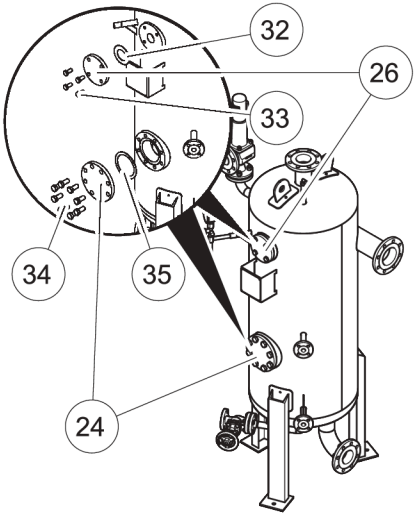
The system and the tank are pressure equipment and are subject to special testing regulations.

The intervals for checking the equipment for internal corrosion and deposits must be determined by the owner based on the local conditions. These intervals must be agreed with the local inspection bodies.

The manufacturer recommends the following maintenance work:

- Perform all specified tests at the appropriate intervals.
- Perform the functional test of the safety valve in accordance with the applicable operating instructions.
- Flush the equipment.
- Perform an annual visual inspection of the tank for fouling through the inspection hole.
- Take the equipment out of service as described from page 19.
- Make sure that all components have cooled down to lukewarm.
- Remove the bolts (33).
- Remove the cover from the inspection hole (26).
- Remove the gasket (32) from the inspection hole.
- Remove the bolts (34).
- Remove the cover from the inspection hole (24).
- Remove the gasket (35) from the inspection hole.
- Remove deposits from the bottom of the tank through the inspection hole.
- Replace gaskets on opened inspection holes.
- Dispose of the old gasket from the inspection hole and used cleaning materials properly.
- Insert a new gasket (32, 35) of the same type into the inspection hole.

	Gasket type	**Material**	**Standard**
Inspection hole DN 120	Flat seal Aø149 × Iø120, t=2	Graphite/stainless steel sheet metal	—
Inspection hole DN 150	Flat seal, DN 150, PN16	Graphite/stainless steel sheet metal	DIN 1514-1
Inspection hole DN 50	Flat seal, DN 50, PN16	Graphite/stainless steel sheet metal	DIN 1514-1



- Place the covers on the inspection holes.
- Tighten the bolts to the torque specified in the following table.

Bolt	Torque
M12	30 Nm
M16	90 Nm
M20	190 Nm
M24	300 Nm

The specified torques apply to lubricated threads and flat graphite seals with sheet metal inserts. They apply to bolt grade 5.6 galvanised and A2-70 for stainless steel.

- Maintain the steam trap in accordance with the applicable operating instructions.
- Maintain the visual level indicator, safety valve and pressure gauge in accordance with the applicable Installation & Operating Manual.

Servicing the equipment and installing spare parts

Various components of the system can be replaced in the event of damage.

- Replace damaged equipment with new equipment.

Information on the components can be found in the specifications provided by the manufacturers in question and in the applicable documentation.

- Replace damaged components with new ones of the same type.

Spare parts for the steam trap are available as set out in the Installation & Operating Manual of the steam trap.

- Replace components only with genuine spare parts from the manufacturer.

Troubleshooting

Problem	Cause	Remedy
Fluid escapes (equipment is leaking).	The connections are not tight.	Provide the connections with leakproof seals.
The equipment is losing steam.	The steam trap fitted is damaged or worn.	Follow the instructions in the Installation & Operating Manual for the steam trap fitted.
The flow rate is too low.	The steam trap fitted contains dirt, deposits or foreign bodies.	Follow the instructions in the Installation & Operating Manual for the steam trap fitted.
The flow rate is too low. The equipment is cold or only lukewarm. Consumers have insufficient heat capacity.	The supply, drain or equipment is soiled.	Clean the pipe. Remove deposits and blockages from the equipment.
The flow rate is too low. The equipment is cold or only lukewarm. Consumers have insufficient heat capacity.	The system contains fouling, deposits or foreign bodies.	Flush the system. Replace affected components if necessary.
No level indication.	The float of the visual level indicator is faulty.	Replace the float.
The fill level in the tank is too high.	Introduction of supercooled condensate.	Check the thermodynamic data of the system. Check whether flash steam is produced with the given data.
The fill level in the tank is too high, water hammer occurs.	The capacity of the steam trap is too low. The condensate flowrate is too high.	Check the performance data of the steam trap.
Safety valve trips.	Condensate with too much flash steam. Service pressure is incorrectly selected. Flash steam outlet is closed. Stop valves of the steam trap are closed.	Check the thermodynamic data of the system. Check the stop valves.

Problem	Cause	Remedy
Leak in the safety valve.	Safety valve is dirty or corroded. Lack of maintenance of the safety valve.	Maintain the safety valve; see the applicable Installation & Operating Manual. Replace the safety valve if necessary.
The admissible pressure is exceeded.	One or more stop valves are closed. The safety valve does not respond.	**Take the system out of service immediately!** Open the stop valves. Maintain the safety valve; see the applicable Installation & Operating Manual. Replace the safety valve if necessary. Make sure the pipe is properly connected to the safety valve outlet. Make sure the safety valve is set to the correct trigger pressure; see the customer's drawing.

- Maintain the steam trap in accordance with the applicable operating instructions.
- Maintain the visual level indicator, safety valve and pressure gauge in accordance with the applicable Installation & Operating Manual.
- If faults occur that are not listed above or cannot be corrected, please contact our Technical Service or authorized agency in your country.

Putting the equipment out of operation

Removing the equipment

DANGER

Personnel working on pipes are exposed to safety risks and may suffer severe injuries, poisoning or even loss of life.

- ➢ Make sure that no hot or hazardous fluid is in the equipment or the pipes.
- ➢ Make sure that the pipes upstream and downstream of the equipment are depressurised.
- ➢ Make sure that the installation is switched off and protected against unauthorised or unintended activation.
- ➢ Make sure that the equipment and the pipes have cooled down to room temperatures.
- ➢ Wear protective clothing that is suitable for the fluid and, if necessary, wear protective gear.

For more information on suitable protective clothing and safety gear refer to the safety data sheet of the fluid in question.

DANGER

Risk of bruises if the equipment or component parts fall down.

- ➢ Use suitable lifting gear when moving or lifting the equipment and/or component parts.
- ➢ Make sure that the equipment cannot topple over.
- ➢ Make sure that nobody is standing below the lifted equipment.

➢ Fully drain the equipment using the drain.

➢ Disconnect the equipment from the pipe of the higher-level system.

Tank VD 1400 L must moved separately from the system.

➢ If necessary, disconnect the tank from the system.

➢ Remove the tank from the system in the reverse order to installation.

➢ Transport the tank to a suitable location; see details from page 13.

➢ Loosen the fastenings securing the system to the ground.

➢ Transport the system to a suitable location; see details from page 12.

➢ Place the system or its components on a suitable surface.

➢ Store the equipment as described on page 11.

Re-using equipment after storage

Observe the following instructions if you want to remove the equipment and use it again somewhere else:

◗ Make sure that the equipment is free of any fluid residues.

◗ Make sure that all connections are in good condition and leak-free.

➢ Use the equipment only for its intended purpose and the service conditions for which it was specified.

Returning the equipment

You can return the valve to your contractual partner.

➢ Make sure that all harmful substances are removed from the valve.

➢ Insert the stoppers in the connections.

➢ Observe the instructions in section "Transporting the equipment" from page 12.

➢ Pack the valve in its original packaging or in a suitable transport packaging.

The transport packaging must protect the valve from damage in the same way as the original packaging.

➢ Add the completed and signed decontamination declaration to the valve. The decontamination declaration must be attached to the packaging so that it is accessible from outside.

➢ Register the return delivery with your contractual partner before returning the valve.

Disposing of the equipment

CAUTION

Environmental damage may be caused by poisonous fluid residues.

- ➢ Before disposing of the equipment make sure that it is clean and free of fluid residues.
- ➢ For the disposal of all materials observe the pertinent legal regulations concerning waste disposal.

The equipment is made from the following materials:

Component	**Unalloyed steel**	**Stainless steel**
Tank	1.0425, 1.0345, 1.0460	1.4571
Pipes, flange	1.0345, 1.0460	1.4571
Units	5.3103, 1.0460	1.4408
Base frame	1.0038	1.4301

The materials used for the other components are listed in the component documentation.

Technical data

Capacity table

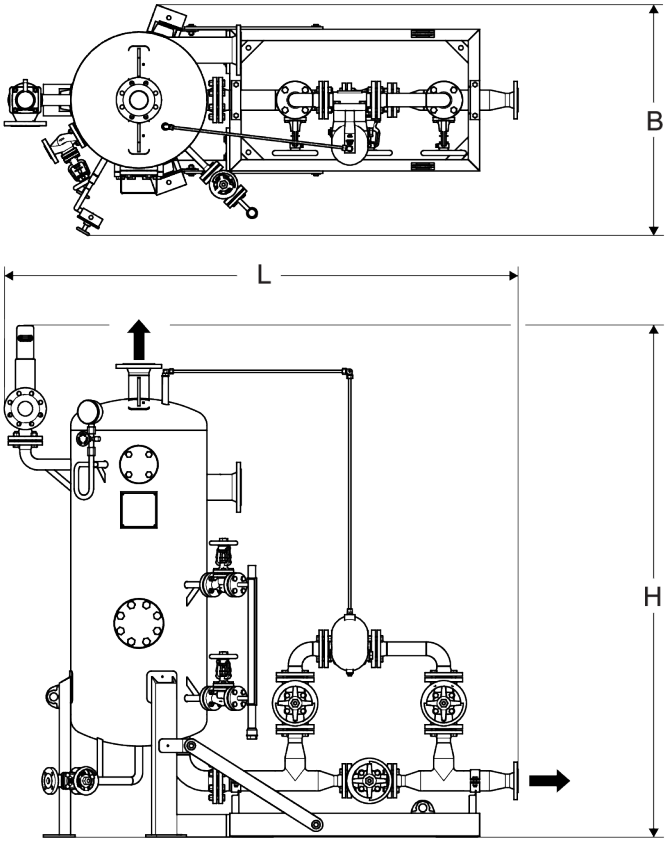
Type		**50 L**	**100 L**	**400 L**	**850 L**	**1400 L**
Contents	l	50	100	400	850	1400
Max. capacity (condensate inlet)	t/h	1.2	2.5	8.0	18.0	32.0
Flash steam flowrate at 10 % flash steam	kg/h	120	250	800	1800	3200

Ambient conditions

Admissible ambient temperature	0 — 55 °C
Relative humidity	5 — 85 % (no moisture condensation)
Atmosphere	Not suitable for use above 2000 m or in potentially explosive or corrosive atmospheres

Dimensions

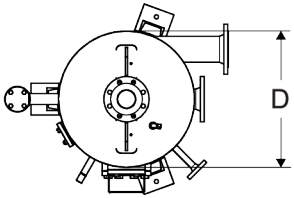
System VD 50 L to VD 400 L

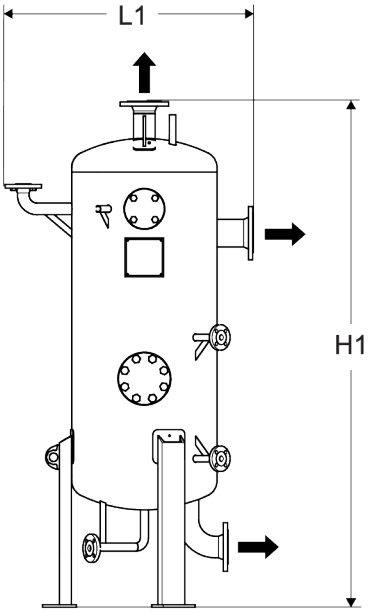


Type		**50 L**	**100 L**	**400 L**	**850 L**	**1400 L**
L	mm	1875.0	2078.5	2262.0	3692.0	4710.0
B	mm	763.0	837.0	1016.0	1320.0	1817.0
H	mm	1325.0	1365.0	2254.0	2693.0	2983.0
Condensate outlet N10	DN	25	40	50	100	150
Safety valve outlet N11	DN	40	40/65	40/65/80	65/80/100	80/100/150

Additional dimensions can be found in the customer's drawing.

Tank





Type		**50 L**	**100 L**	**400 L**	**850 L**	**1400 L**
Contents	l	50	100	400	850	1400
D	mm	324	400	600	800	1000
H1	mm	1242	1297	2086	2485	2661
L1	mm	711	808	1025	1233	1493
Condensate inlet N1	DN	40	65	100	125	200
Flash steam outlet N2	DN	40	50	80	100	150
Condensate outlet N3	DN	40	50	80	100	150
Safety valve inlet N4	DN	20	25/40	25/40/50	40/50/65	50/65/100
Drain N5	DN	20	20	25	25	25
Water level N6	DN	20	20	20	20	20
Pressure gauge N7	DN	G½	G½	G½	G½	G½
Inspection hole N8	DN	120	120	120	150	150
Air-balance pipe N9	DN	G½	G½	G½	G½	G½
Inspection hole N12	mm	—	—	50	50	150

Additional dimensions can be found in the customer's drawing.

Weights and pressure and temperature ratings

Weights and pressure and temperature ratings 50 L

Admiss. pressure	bar	**0.5**	**1.0**	**2.5**	**8.0**	**10.0**	**12.0**
Admiss. temperature	°C	—	-10—111	—	—	—	-10—250
Tank weight							
Steel	kg	—	91	—	—	—	97
Stainless steel	kg	—	85	—	—	—	85
System weight							
Steel	kg	—	240	—	—	—	240
Stainless steel	kg	—	230	—	—	—	230

Weights and pressure and temperature ratings 100 L

Admiss. pressure	bar	**0.5**	**1.0**	**2.5**	**8.0**	**10.0**	**12.0**
Admiss. temperature	°C	-10—111	—	—	—	-10—250	—
Tank weight							
Steel	kg	160	—	—	—	115	—
Stainless steel	kg	98	—	—	—	98	—
System weight							
Steel	kg	270	—	—	—	280	—
Stainless steel	kg	265	—	—	—	265	—

Weights and pressure and temperature ratings 400 L

Admiss. pressure	bar	**0.5**	**1.0**	**2.5**	**8.0**	**10.0**	**12.0**
Admiss. temperature	°C	-10—111	—	-10—200	-10—250	—	—
Tank weight							
Steel	kg	228	—	228	240	—	—
Stainless steel	kg	195	—	195	230	—	—
System weight							
Steel	kg	415	—	415	425	—	—
Stainless steel	kg	385	—	385	420	—	—

Weights and pressure and temperature ratings 850 L

Admiss. pressure	bar	**0.5**	**1.0**	**2.5**	**8.0**	**10.0**	**12.0**
Admiss. temperature	°C	-10—111	—	-10—200	-10—250	—	—
Tank weight							
Steel	kg	351	—	351	380	—	—
Stainless steel	kg	305	—	305	353	—	—
System weight							
Steel	kg	692	—	692	752	—	—
Stainless steel	kg	650	—	650	695	—	—

Weights and pressure and temperature ratings 1400 L

Admiss. pressure	bar	**0.5**	**1.0**	**2.5**	**8.0**	**10.0**	**12.0**
Admiss. temperature	°C	-10—111	—	-10—200	-10—250	—	—
Tank weight							
Steel	kg	496	—	496	643	—	—
Stainless steel	kg	445	—	445	615	—	—
System weight							
Steel	kg	1225	—	1225	1375	—	—
Stainless steel	kg	1180	—	1180	1350	—	—

Declaration of Conformity – Standards and Directives

You can find details on the conformity of the equipment and the relevant standards and directives, where applicable, in the Declaration of Conformity and associated certificates or approvals.

The valid Declaration of Conformity is available to download at www.gestra.com . You can request the associated certificates and approvals by writing to the following address:

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28215 Bremen
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Fax +49 421 3503-393
e-mail info@de.gestra.com
Web www.gestra.com

Modifications to the equipment not approved by us will invalidate the Declaration of Conformity and certificates/approvals.

You can find our authorized agents around the world at: **www.gestra.com**

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