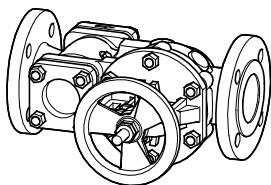


Steam Traps

GK 11

GK 21

with stage nozzle
for large quantities of condensate



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Foreword

This installation & operating manual will help you use the following types of equipment safely and efficiently for their intended purpose.

- ▶ GK 11, DN65–DN150
- ▶ GK 21, DN50

These steam traps will be called equipment in this document.

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

Keep this installation & operating manual together with the plant documentation for future reference. Make sure that this installation & operating manual is available to the operator.

The installation & operating manual is part of the equipment. Please hand over this installation & operating manual when selling the equipment or passing it on.

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 thermodynamic steam traps mentioned below are installed in pipes:

- ▶ GK 11, DN65–DN150
- ▶ GK 21, DN50

These steam traps are used to remove large volumes of continuously forming condensate from steam, and for venting pipes.

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

Risk of severe injuries

- ▶ 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 be isolated from pressure.
 - ▶ All medium 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 back on by unauthorised persons.
 - ▶ Pipes and the equipment must have cooled to around 20 °C (lukewarm).
- ▶ The equipment may only be used with media that are not aggressive in contact with material and seals. Otherwise, there may be leaks and hot or toxic medium may escape.
- ▶ The equipment and its components may only be installed or removed by specialist personnel. Specialist personnel must have knowledge and experience of the following areas:
 - ▶ Producing connections on pipes.
 - ▶ Selecting suitable lifting gear for the product, and using it safely.
 - ▶ Working with hazardous (contaminated, hot or pressurised) media.
- ▶ Risk of burns during setting work. Settings can only be performed when the equipment is at operating temperature. Wear suitable protective clothing for the operating temperature of the medium. Do not touch any parts of the system.

Risk of minor injuries

- ▶ Sharp edges on internals present the danger of cuts to hands. Always wear industrial gloves when servicing the equipment.
- ▶ If the support of the equipment during installation is insufficient the equipment might fall down, thereby causing bruises or injuries. Make sure the equipment is safely held in place during installation and cannot fall down. Wear protective safety footwear.

Information on property damage or malfunctions

- ▶ Malfunctions will occur if the equipment is installed in a wrong position or with the flow arrow pointing in the opposite direction of the fluid flow. This may result in damage to the equipment or the installation. Make sure that the flow arrow on the equipment body matches the indicated direction of the fluid flow in the pipe.
- ▶ 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 pressurised) fluids
- ▶ lifting and transporting loads
- ▶ observing all notes and instructions in this installation & operating manual and the applicable documents

Protective gear

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

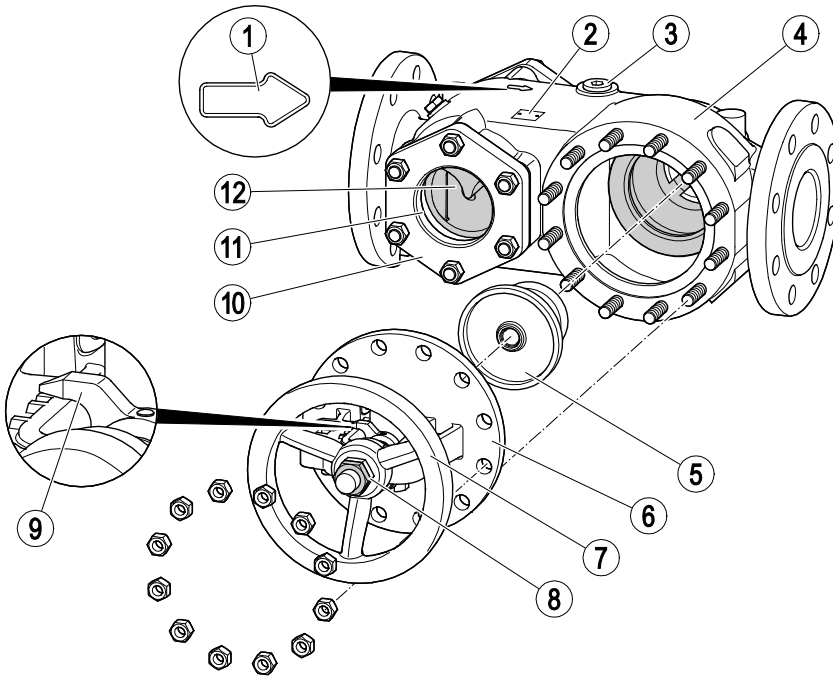
Scope of supply and equipment specification

Scope of supply

Our equipment is delivered packed and ready for assembly.

Component parts

The diagram below shows a GK 11 DN80 steam trap. The other steam traps have the same basic construction.



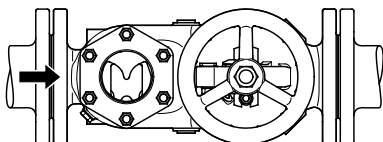
No.	Designation
1	Direction of flow arrow
2	Rating plate
3	Sealing plug (both sides)
4	Body
5	Stage plunger
6	Lid
7	Screw spindle with handwheel

No.	Designation
8	Counter nut for fixing threaded spindle in place
9	Scale with pointer and "Operation" sign
10	Sight glass lid
11	Sight glass
12	VAPOSOSCOPE insert

Installation positions

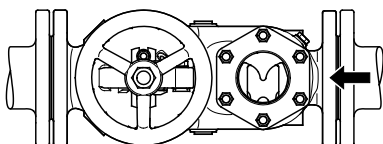
The following installation positions are possible:

Horizontal installation with direction of flow from left to right (standard in GK 21)



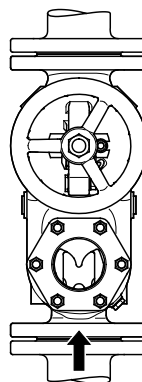
A

Horizontal installation with direction of flow from right to left (standard in GK 11)



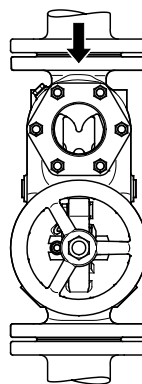
B

Vertical installation with direction of flow from bottom to top



C

Vertical installation with direction of flow from top to bottom



D

You can change the installation position of the equipment. The steam trap must always be installed in the pipe with the screw spindle horizontal.

To change the installation position, you must realign the VAPOSCOPE insert.

- To do this, proceed as described in the section "*Positioning the equipment*" on page 11.

End connections

The equipment is available with the following end connections:

- ▶ Flanges

Name plate

The following items are indicated on the name plate:

- ▶ Manufacturer
- ▶ Type designation
- ▶ Nominal size
- ▶ Pressure rating
- ▶ Design temperature
- ▶ Design pressure
- ▶ Max. service temperature
- ▶ Max. admissible differential pressure
- ▶ CE marking
- ▶ Date of manufacturing

The following items are indicated on the equipment body:

- ▶ Material
- ▶ Batch code
- ▶ Direction of flow

Application of European Directives

Pressure Equipment Directive

The equipment conforms to this directive (see "Manufacturer's Declaration" section) and can be used for the following media:

- ▶ Fluids of group 2

ATEX Directive

The equipment has classification: CE Ex II 2G/D c X.

For use in potentially explosive atmospheres in zones (surrounding atmosphere to Directive 1999/92/EC) 1, 2, 21 and 22, please read and observe the following information:

The sign "X" in the Ex label signifies that operation at an excessive surface temperature caused by the medium must be avoided. The equipment itself does not generate additional surface temperatures.

Once installed, static electricity may arise between the equipment and the connected system. During use in potentially explosive atmospheres, the discharge or prevention of possible electrostatic charging is the responsibility of the manufacturer or owner of the system. If there is a possibility that medium might escape, e.g. via actuating devices or leaks in screwed couplings, the manufacturer or owner of the system must take this into consideration when dividing the area into zones.

Task and function

The equipment is used for automatically draining off large volumes of condensate where pressure and the condensate flowrate fluctuate greatly.

The equipment vents automatically during start-up and operation.

The equipment may also be used as a peak limiter.

You can infinitely adjust the aperture of the stage nozzle using the handwheel.

The flow of medium is displayed in the integrated VAPOSCOPE.

Storing and transporting the equipment

Attention!

Equipment can be damaged if stored or transported improperly.

- Close all openings with the sealing plugs or covers supplied with the equipment or use similar sealing covers.
- Protect the equipment against moisture and corrosive atmospheres.
- Please contact the manufacturer if the specified transport and/or storage requirements cannot be met.

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



CAUTION

Do not drop the equipment. If it falls down it may cause bruises and injuries.

- To transport and mount the equipment safely use suitable lifting gear.
- Connect the noose strap of the lifting gear to the body.
- Provide sufficient support for the equipment during transport and installation.
- Wear protective safety footwear.

Lightweight equipment may be transported and mounted without using any lifting gear.

To lift equipment the weight of which exceeds approx. 25 kg, you need the help of a second person or suitable lifting gear.

Your physical strength and on-site regulations and conditions determine what weight can be lifted and if support is required.

- Meet the requirements for storage also when transporting the equipment.
- Prior to transport seal off connections with sealing plugs.



If you do not have the sealing plugs supplied with the equipment use appropriate seal caps to seal off the connections.

- 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.

Mounting and connecting the equipment

Preparing installation

- 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.

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.



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.

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.
- Make sure that the flow arrow on the equipment body matches the direction of flow in the pipe.

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

Attention!

Equipment will be damaged if the end connections are undersized.

- Make sure that the connections are strong and rigid enough to support the weight of the equipment and to withstand the forces that occur during operation.

To allow easy access for routine servicing and exchanging components observe the indicated withdrawal distances and allow for clearances to adjacent installation parts.

For more information see section "*Dimensions and weights,*" on page 33.

- Make sure that the pipe system of the plant is clean.
- Make sure that the equipment is free from foreign matter.

Attention!

An incorrect installation position can prevent the equipment from functioning correctly.

- If an installation position described here is not possible in your system, please contact the manufacturer.

You can change the installation position of the equipment. The steam trap must always be installed in the pipe with the screw spindle horizontal.

To change the installation position, you must realign the VAPOSCOPE insert.

- To do this, proceed as described in the section "*Positioning the equipment*" on page 11.
- Mount the equipment in the desired installation position.
- Make sure that the equipment is safely mounted and that all connections are made correctly.

Orientation of the equipment

Attention!

The VAPOSCOPE may show incorrect displays if in the wrong installation position.

- Only install the VAPOSCOPE in one of the installation positions described here.

The deflector tip of the VAPOSCOPE insert must always point downwards.



To position the VAPOSCOPE insert, you need only remove a sight glass. You need to replace the sight glass seals only if the equipment had already been in operation. If you are positioning the insert before bringing the equipment into service for the first time, you can reinstall the seals.

You require the following tools to position the VAPOSCOPE insert:

- ▶ Combination wrench to DIN 3113, type B (size 11, 17, 18, 19 or 24, depending on equipment type)
- ▶ Torque wrench to DIN ISO 6789

Temperature-resistant lubricant is required for lubricating the system. The lubricant must have the same properties as OKS 217.

- ▶ Allen key to DIN ISO 2936 (size 6 or 10, depending on equipment type)
- ▶ Screwdriver



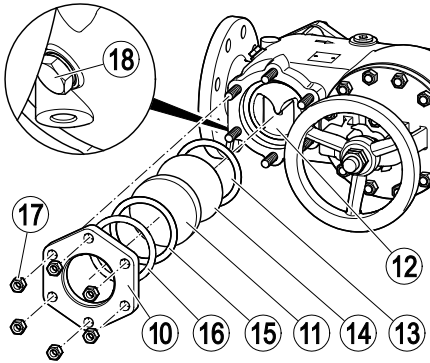
The types of equipment differ in the number of hexagon-head bolts and whether they are equipped with a spherical washer.

- ▶ In GK 11 steam traps, the lid of the sight glass is fastened with six hexagon-head bolts.
- ▶ In GK 21 steam traps, the lid of the sight glass is fastened with four hexagon-head bolts.

- ▶ A spherical washer is only fitted between the sight glass lid and the sight glass in GK 21 steam traps.

Otherwise, the same procedure is used for the different types of equipment.

- Slacken the hex nuts (17) in the sight glass lid.
- Remove the sight glass lid (10).
- In GK 21 steam traps, remove the spherical washer (16) from the sight glass.
- Remove the sight glass seal (15).
- Remove the sight glass (11).
- Remove the mica disc (14).
- Remove the sight glass seal (13).
- Slacken the shoulder screw (18) on the body.
- Turn the VAPOSCOPE insert (12) to the desired position.



- Coat the thread and contact surfaces with temperature-resistant lubricant.

The lubricant must have the same properties as OKS 217.

- Insert one sight glass seal.
- Insert the mica disc.
- Insert the sight glass.
- Insert the second sight glass seal.
- In type GK 21, insert the spherical washer in the upper sight glass.
- Insert the sight glass lid.

The necessary torque for tightening the hex nuts varies depending on type.

- Please refer to the following table for the correct torque.

GK 21 DN50	GK 11 DN65, DN80	GK 11 DN100	GK 11 DN150
25 Nm	30 Nm	90 Nm	90 Nm

- Tighten the hex nuts to the specified torque.

The necessary torque for tightening the shoulder screw varies depending on type.

- Please refer to the following table for the correct torque.

GK 21 DN50	GK 11 DN65, DN80	GK 11 DN100	GK 11 DN150
4.5 Nm	20 Nm	20 Nm	20 Nm

- Tighten the shoulder screw to the specified torque.

Operation

Do not work on the equipment while it is operating.

- If necessary, change the equipment settings.

Adapting settings



CAUTION

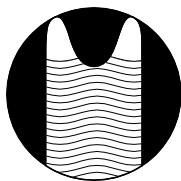
Severe injuries from burns are possible when changing the equipment settings.

- Do not touch any parts of the system.
- Wear suitable protective clothing for the operating temperature of the medium, and use suitable personal protective equipment if necessary.
- Make sure that no unauthorised persons are in the vicinity of the equipment.

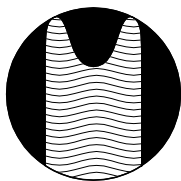
You will find information on suitable protective clothing and personal protective equipment in the safety data sheet of the medium used.

The system must be at operating temperature for setting the equipment.

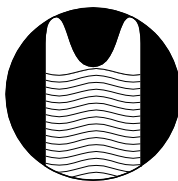
Set the equipment such that the display in the sight glass conforms to the diagram on the left below.



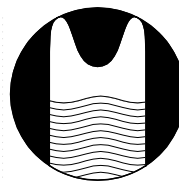
A



B



C



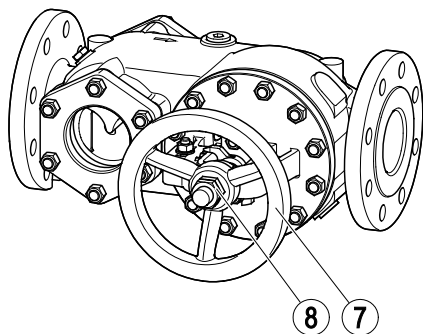
D

Normal condensate level	Banking-up of condensate	Penetration of live steam if medium throughput is excessive	Penetration of live steam due to leaks or other major disruptions
Setting correct	Change setting: Increase flow	Change setting: Reduce flow	Change setting: Reduce flow

i You can find information on what to do in the event of problems in section "Troubleshooting" on page 27.

You require the following tools for working on the equipment:

- ▶ Combination wrench to DIN 3113, type B (size 24, 30, or 36, depending on equipment type)
- Slacken the two counter nuts (8) on the handwheel (7).
- Screw the counter nuts upwards to the end of the screw spindle.



- To increase the flow, turn the handwheel anticlockwise.

The pointer on the scale moves towards the "O" (OPEN) mark.

- To reduce the flow, turn the handwheel clockwise.

The pointer on the scale moves towards the "C" (CLOSED) mark.

- Set the equipment such that a normal condensate level is visible in the sight glass.
- Hand-tighten the counter nuts.

The equipment can now only be opened as far as this position. It can still be fully closed, however.

You can affix the supplied "Operation" sign to mark this setting.

- Affix the "Operation" sign so that it is opposite the pointer on the spindle.

- After draining, turn the handwheel as far as it will go.

The stage plunger is now once more in normal operating position.

i If you make a mark on the scale in the operating position, it will show you the correct setting.

An "Operation" sign is supplied with the equipment.

After operation



DANGER

If fluid escapes personnel may suffer severe injuries, poisoning or even loss of life.

- After working on the equipment make sure that all connections and valves are tight.
- Make sure that the gaskets of the body are leakproof.



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 may occur when the installation is shut down.

- Drain the equipment if ambient temperatures below 0 °C (frost) are to be expected.

You require the following tools to drain the equipment:

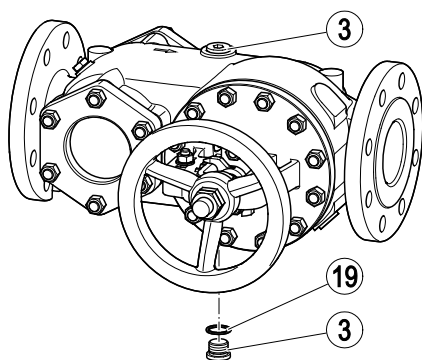
- ▶ Combination wrench to DIN 3113, type B (size 16, 17, 18, or 19, depending on equipment type)
- ▶ Torque wrench to DIN ISO 6789

Temperature-resistant lubricant is required for lubricating the system. The lubricant must have the same properties as OKS 217.



A sealing plug (3) is mounted on the top and on the bottom of the body. For drainage, open the bottom sealing plug.

- Make sure that medium exiting the system is caught.
- Open the sealing plug (3) at the bottom of the body.
- Wait until the equipment has drained fully.
- Clean the sealing surfaces of the sealing plug and body.
- Insert a new gasket (19) into the hole in the body.



- Coat the thread and contact surfaces with temperature-resistant lubricant.

The lubricant must have the same properties as OKS 217.

The necessary torque for tightening the sealing plug varies depending on type.

- Please refer to the following table for the correct torque.

GK 21 DN50	GK 11 DN65, DN80	GK 11 DN100	GK 11 DN150
100 Nm	190 Nm	190 Nm	190 Nm

- Tighten the sealing plug to the specified torque.

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 equipment does not require any particular maintenance.



You should perform regular function tests to ensure the equipment functions correctly. The intervals between tests depend on the type of use and operating conditions.

For critical applications you should monitor the equipment continuously.

- Remove any parts that are dirty and cannot be cleaned properly.

Cleaning the equipment

Check the equipment at regular intervals for contamination. The intervals depend on the amount of dirt in the system. The operator must determine the maintenance intervals.



Malfunctions may occur if the equipment is used with different types of condensate: The following condensates in particular cause problems:

- very oily condensates
- condensates that resinify or become gummy
- condensates that recrystallize
- condensates that contain solid matter.

In these cases check the equipment at regular intervals for contamination and, if necessary, remove dirt deposits.

To reduce contamination we recommend installing a sedimentation vessel or a dirt pocket arrangement upstream of the equipment.

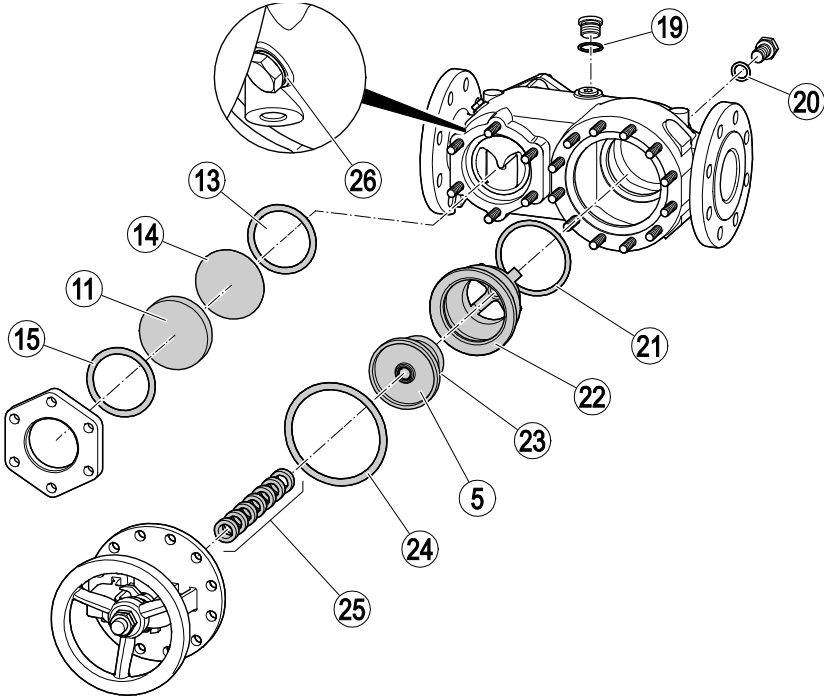
In normal cases, the components inside the equipment do not need cleaning.

To clean the equipment completely, you must remove the lid and take out the stage plunger.

- 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.

Servicing the equipment and installing spare parts

You may exchange the following component parts in case of wear or damage:



No.	Designation	GK 11			GK 21
		DN65, DN80	DN100	DN150	DN50
Sight glass set, comprising:		369605	369606	360606	369604
11	2 × sight glasses				
14	2 × mica discs				
13.15	4 × sight glass seals				
Stage plunger set, comprising:		369608	369609	369610	369607
5	1 × stage plunger				
20	1 × sealing ring for collar screw				
21	1 × nozzle insert seal				
22	1 x nozzle insert				
23	1 × threaded pin for stage plunger (3 × for DN150)				
24	1 x body gasket				
Seal set, comprising:		369719	369720	369721	369718
24	1 x body gasket				
21	1 × nozzle insert seal				
19	4 × sealing ring for sealing plug				
20	1 × sealing ring for collar screw				
23	1 x threaded pin				
25	Stuffing box ¹				
26	1 × sealing ring for shoulder screw				

- 1 5 × DN50
7 × DN65–DN80
6 × DN100–DN150

Replacing the sight glass



⚠ 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.

You require the following tools to replace the sight glass:

- ▶ Combination wrench to DIN 3113, type B (size 11, 17, 18, 19 or 24, depending on equipment type)
- ▶ Torque wrench to DIN ISO 6789

Temperature-resistant lubricant is required for lubricating the system. The lubricant must have the same properties as OKS 217.



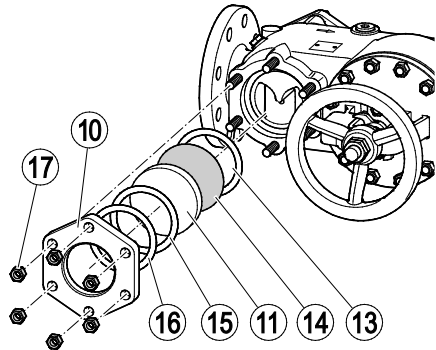
The types of equipment differ in the number of hexagon-head bolts and whether they are equipped with an additional spherical washer.

- ▶ In GK 11 steam traps, the lid of the sight glass is fastened with six hexagon-head bolts.
- ▶ In GK 21 steam traps, the lid of the sight glass is fastened with four hexagon-head bolts.

- ▶ A spherical washer is only fitted between the sight glass lid and the sight glass in GK 21 steam traps.

Otherwise, the same procedure is used for the different types of equipment.

- Slacken the hex nuts (17) in the sight glass lid.
- Remove the sight glass lid (10).
- In GK 21 steam traps, remove the spherical washer (16) from the sight glass.
- Remove the sight glass seal (15).
- Remove the sight glass (11).
- Remove the mica disc (14).
- Remove the sight glass seal (13).
- Remove the second sight glass and its seal in the same way.
- Dispose of the removed sight glasses, mica discs and seals in accordance with regulations at the location of use.





DANGER

Burns or intoxication from escaping medium may cause extremely severe or even fatal injuries.

- Only insert new sight glasses in perfect condition.
- Clean all VAPOSCOPE components before installation.
- Remove foreign objects.
- Tighten the hex nuts in the sight glass lid evenly to the specified torque.

-
- Check all removed parts for signs of damage.
 - Replace all worn or damaged parts.
 - Clean all dirty parts.
 - Coat the thread and contact surfaces with temperature-resistant lubricant.

The lubricant must have the same properties as OKS 217.

- Insert the new inner sight glass seal.
- Insert the new mica disc.
- Insert the new sight glass.
- Insert the new outer sight glass seal.
- In type GK 21, insert the spherical washer in the upper sight glass.
- Insert the sight glass lid in the body.

The necessary torque for tightening the hex nuts varies depending on type.

- Please refer to the following table for the correct torque.

GK 21 DN50	GK 11 DN65, DN80	GK 11 DN100	GK 11 DN150
25 Nm	30 Nm	90 Nm	90 Nm

- Tighten the hex nuts to the specified torque.
- Secure the second sight glass in the same way.

Removing the lid



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.

You require the following tools to remove and fit the lid:

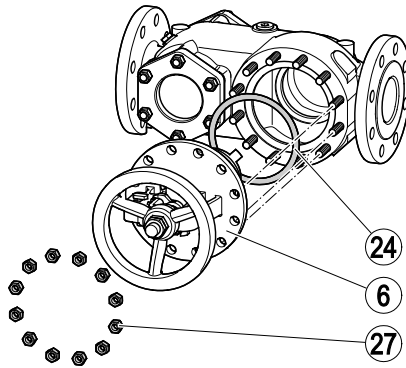
- Combination wrench to DIN 3113, type B (size 17, 18, 19, 24 or 30, depending on equipment type)
- Torque wrench to DIN ISO 6789

Temperature-resistant lubricant is required for lubricating the system. The lubricant must have the same properties as OKS 217.

Attention!

Equipment may not work properly or get damaged if parts are canted or tilted during removal work.

- Use suitable lifting gear to lift the components off the body.
- Make sure that the components are not canted or tilted.
- Make sure that the component parts are not damaged by physical shocks.



The required bearing capacity of the lifting gear depends on the equipment type. Contact the manufacturer for more information on the weights of the individual parts.

You can remove the lid together with the spindle and stage plunger.

The lid is secured to the body with hex nuts (27). The number of hex nuts varies depending on type:

- ▶ GK 11, DN65–80: 12
- ▶ GK 11, DN100: 16
- ▶ GK 11, DN150: 20
- ▶ GK 21, DN50: 8

- Slacken the hex nuts (27) on the lid (6).
- Remove the lid from the body.
- Remove the body gasket (24).

Replacing the stage plunger and nozzle insert

You require the following tools to replace the stage plunger and nozzle insert:

- ▶ Combination wrench to DIN 3113, type B (size 11, 17, 18, 19 or 24, depending on equipment type)
- ▶ Torque wrench to DIN ISO 6789

Temperature-resistant lubricant is required for lubricating the system. The lubricant must have the same properties as OKS 217.

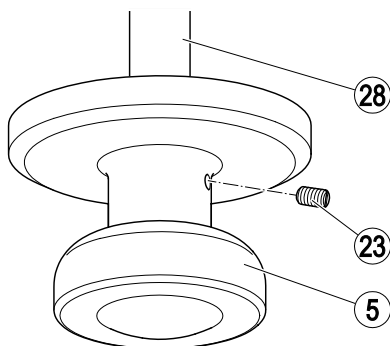
- ▶ Allen key to DIN ISO 2936 (size 6 or 10, depending on equipment type)
- ▶ Screwdriver

- ▶ Remove the lid, as described on page 21.



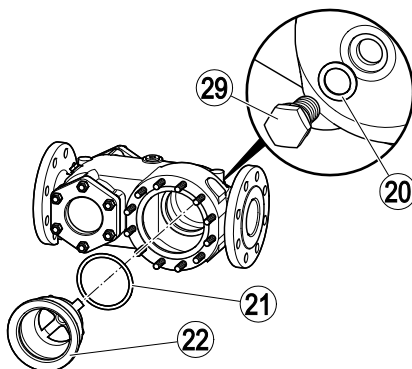
The stage plunger is fastened to the spindle by one or two threaded pins. GK 11, DN150 steam traps have two threaded pins. The other types have one threaded pin.

- ▶ Remove the threaded pins (23) from the stage plunger (5).
- ▶ Completely unscrew the stage plunger from the spindle (28).
- ▶ Position the new stage plunger on the spindle such that the two holes for the threaded pins are one above the other.
- ▶ By hand, screw the threaded pins into the holes.



- ▶ Remove the collar screw (29).
- ▶ Remove the sealing ring (20) of the collar screw.
- ▶ Lift the nozzle insert (22) out of the body.

- ▶ Lift the seal (21) for the nozzle insert out of the body.



- ▶ Check all removed parts for signs of damage.
- ▶ Replace all worn or damaged parts.
- ▶ Clean all dirty parts.
- ▶ The gaskets of the equipment must be replaced in any case.
- ▶ Insert the new sea for the nozzle insert into the body.
- ▶ Insert the new nozzle insert in the body.
- ▶ Insert the new sealing ring of the collar screw in the body.
- ▶ Screw the collar screw into the body.

The necessary torque for tightening the collar screw varies depending on type.

- Please refer to the following table for the correct torque.

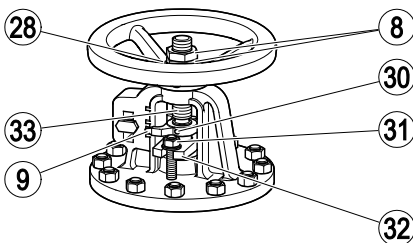
GK 21 DN50	GK 11 DN65, DN80	GK 11 DN100	GK 11 DN150
140 Nm	140 Nm	370 Nm	670 Nm

- Tighten the collar screw to the specified torque.
- Fit the lid, as described on page 25.

Replacing the stuffing box

- Remove the lid, as described on page 21.
- Remove the stage plunger from the spindle, as described on page 23.
- Remove the two counter nuts (8) from the handwheel.
- Remove the tapered groove pin (30) from the pointer (9).
- Slacken the two hex nuts (31) on the stuffing box gland (32).
- Screw the spindle (28) downwards out of the threaded sleeve (33).
- When the spindle is unscrewed from the threaded sleeve, pull the pointer (9) upwards and off the spindle.
- Pull the spindle downwards out of the lid.

You can now replace the stuffing box.

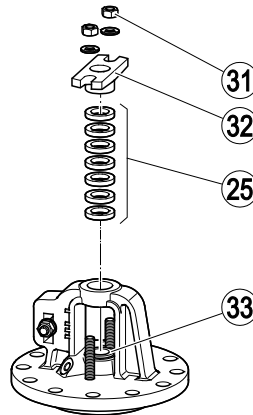


Proceed as follows to replace the stuffing box:

- Remove the two hex nuts (31) and the stuffing box gland (32).

You do not need to remove the stuffing box bush (33) in order to replace the stuffing box.

- Remove the packing rings (25) from the lid.
- Replace the packing rings with the same number of new ones.



- Check all removed parts for signs of damage.
- Replace all worn or damaged parts.
- Clean all dirty parts.
- The gaskets of the equipment must be replaced in any case.
- Position the stuffing box gland on the studs in the lid.
- By hand, screw the two hex nuts onto the studs.
- Push the spindle through the gland seal from below.
- Screw the spindle into the threaded sleeve.
- Align the pointer so that the holes for the tapered groove pin are situated one above the other.
- Knock in the tapered groove pin to secure the pointer.
- By hand, screw the two counter nuts onto the spindle and pointer.
- Coat the thread and contact surfaces with temperature-resistant lubricant.

The lubricant must have the same properties as OKS 217.

The necessary torque for tightening the hex nuts on the stuffing box gland varies depending on type.

- Please refer to the following table for the correct torque.

GK 21 DN50	GK 11 DN65, DN80	GK 11 DN100	GK 11 DN150
20 Nm	20 Nm	70 Nm	70 Nm

- Tighten the hex nuts to the specified torque.
- Fit the lid, as described on page 25.

Mounting the lid

- Check all removed parts for signs of damage.
- Replace all worn or damaged parts.
- Clean all dirty parts.

You require the following tools to remove and fit the lid:

- ◆ Combination wrench to DIN 3113, type B (size 17, 18, 19, 24 or 30, depending on equipment type)
- ◆ Torque wrench to DIN ISO 6789

Temperature-resistant lubricant is required for lubricating the system. The lubricant must have the same properties as OKS 217.

- Replace all worn or damaged parts.
- Clean all dirty parts.
- The gaskets of the equipment must be replaced in any case.
- Coat the thread and contact surfaces with temperature-resistant lubricant.

The lubricant must have the same properties as OKS 217.

Attention!

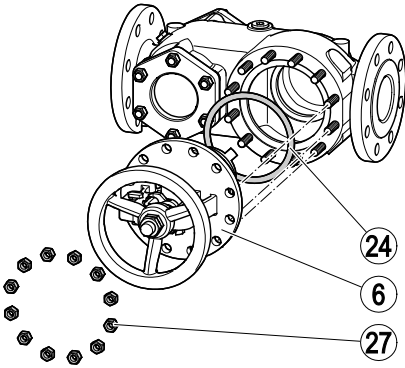
Equipment may not work properly or get damaged if parts are tilted or skewed when installed.

- Use suitable lifting gear to mount the component parts.
- Do not tilt or skew the component parts during installation.
- During installation make sure that the component parts are not damaged by physical shocks.

The required bearing capacity of the lifting gear depends on the equipment type. Contact the manufacturer for more information on the weights of the individual parts.

- Check all removed parts for signs of damage.

- Insert the new body gasket (24) in the body.
- Position the lid (6) on the body along with the spindle and stage plunger.
- Tighten the hex nuts (27) on the lid crosswise.



The necessary torque for tightening the nuts on the lid varies depending on type.

- Please refer to the following table for the correct torque.

GK 21 DN50	GK 11 DN65, DN80	GK 11 DN100	GK 11 DN150
55 Nm	60 Nm	120 Nm	250 Nm

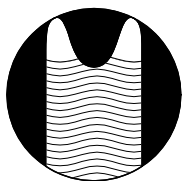
- Tighten the nuts to the specified torque.
- If necessary, adjust the stuffing box seal as described on page 30.
- Set the medium flow, as described on page 13.

Troubleshooting

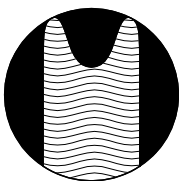
Problem	Cause	Remedy
Fluid escapes (equipment is leaking).	The body has been damaged by corrosion or erosion.	Replace the equipment with a new one. Use equipment made of material that is suitable for the application.
The discharge capacity is too low. Insufficient thermal output of the user.	The differential pressure is too small.	Increase the steam pressure. Lower the pressure in the condensate line. Use equipment with a larger discharge capacity. If necessary, use a pump steam trap or a condensate return unit.
Fluid escapes (equipment is leaking).	The equipment has been damaged by frost.	Replace the equipment with a new one. When shutting down the installation make sure that all lines and the equipment are completely drained.
The discharge capacity is too low. The equipment is cold or only warm to the touch.	The shut-off valves for fluid flow are closed.	Fully open the shut-off valves.
The handwheel can only be moved by exerting a lot of force.	It has reached its end position for this direction of rotation.	Turn the handwheel in the other direction.
	The stroke limiter is locked.	Slacken the counter nut of the stroke limiter and reset the stroke limiter.
The handwheel can only be moved by exerting a lot of force.	The spindle has insufficient lubrication.	Lubricate the spindle.
The equipment is cold or only warm to the touch.	The sealing plugs are still attached to the connections.	Remove the equipment. Remove the sealing plugs. Mount the equipment.
Fluid escapes (equipment is leaking).	The equipment or the body is damaged.	Replace the equipment with a new one.
Fluid escapes (equipment is leaking).	A gasket is damaged.	Replace the gasket with a new one. Clean gasket seating surfaces.
Fluid escapes (equipment is leaking).	The connections are not tight.	Provide the connections with leakproof seals.

Problem	Cause	Remedy
Fluid escapes (equipment is leaking).	The stuffing box packing has not been tightened enough.	Tighten the stuffing-box packing hand tight. Make sure that the stuffing box packing does not impair the movement of the internals.
Fluid escapes (equipment is leaking).	The stuffing-box packing is damaged.	Replace the stuffing-box packing.
The handwheel can only be moved by exerting a lot of force.	The stuffing box is fastened too tightly.	Slacken the stuffing box screw a little. Replace the stuffing box if damaged.
The equipment does not close fully.	Inner parts are damaged or worn.	Replace the inner parts or the equipment.
The flowrate is too low. The equipment is cold or only lukewarm. Insufficient heat output of consumers.	Contamination in the inflow, outflow or equipment.	Clean the pipe. Clean all inner parts. Replace inner parts or equipment if damaged.
The sightglass or water level gauge does not offer an unambiguous evaluation of the operating condition.	The sightglass or water level gauge is dirty, worn or scratched.	Replace the sightglass or water level gauge.

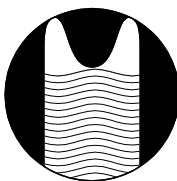
You can recognise and remedy faults due to incorrect settings as follows:



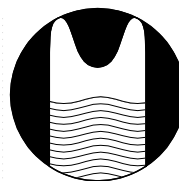
A



B



C



D

Normal condensate level	Banking-up of condensate	Penetration of live steam if medium throughput is excessive	Penetration of live steam due to leaks or other major disruptions
–	Condensate covers the entire sight glass. No flow is visible.	The condensate in the sight glass is being suppressed. There is a clearly visible flow.	The sight glass is nearly opaque.
Do not change the settings.	Open the equipment until a normal condensate level is displayed.	Close the equipment until a normal condensate level is displayed.	Close the equipment until a normal condensate level is displayed. Check that the part of the system and the equipment are not leaking and are in perfect condition. Fix leaks and damages.

Setting the equipment is described on page 13.

- If faults occur that are not listed above or cannot be corrected, please contact our Technical Service or authorized agency in your country.

Adjusting the gland seal

If the stuffing box is leaking, you must adjust it. To do so, proceed as follows.



DANGER

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

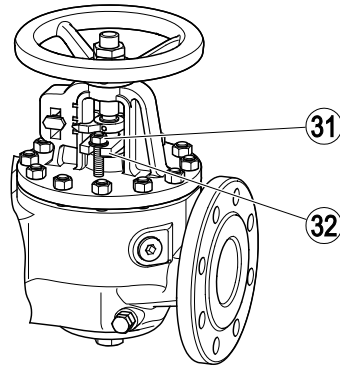
- Make sure that no hot or hazardous fluid is in the equipment or the pipes.
- Make sure that the pipes upstream and downstream of the equipment are depressurised.
- Make sure that the installation is switched off and protected against unauthorised or unintended activation.
- Make sure that the equipment 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.

The torque for tightening the hex nuts on the stuffing box varies depending on type.

The necessary torque for tightening the hex nuts depends on the condition of the stuffing box. Tighten the hex nuts sufficiently firmly to ensure the following conditions are satisfied:

- ▶ No medium may escape from the gland seal.
 - ▶ The gland seal must not hinder the movement of the stage plunger.
-
- If these conditions cannot be satisfied at the same time, you must replace the stuffing box.
 - Evenly tighten the two hex nuts (31) on the stuffing box gland (32).



- Allow medium to flow through the equipment.
- Move the stage plunger fully several times.
- Tighten the hex nuts again so that no medium escapes.
- Check that the stage plunger can move easily.
- If necessary, slacken the hex nuts evenly.

The stuffing box is correctly adjusted if no medium escapes and the stage plunger can move easily.

If you are unable to adjust the gland seal as described, you must replace the stuffing box.

- To do so, proceed as described on page24.

Putting the equipment out of operation

Removing harmful substances

- For the disposal of all residues observe the pertinent legal regulations concerning waste disposal.

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.



CAUTION

Do not drop the equipment. If it falls down it may cause bruises and injuries.

- To transport and mount the equipment safely use suitable lifting gear.
 - Connect the noose strap of the lifting gear to the body.
 - Provide sufficient support for the equipment during transport and installation.
 - Wear protective safety footwear.
-
- Detach the end connections of the equipment from the pipes.
 - Put the equipment onto a suitable base.
 - Store the equipment as described on page 9.

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.

Disposing of the equipment

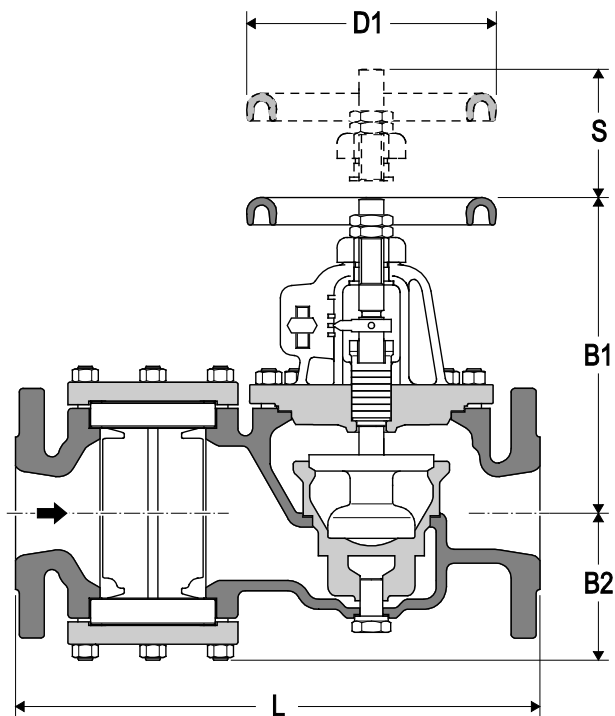
The equipment is made from the following materials:

Component	GK 21 DN50	GK 11 DN65, DN80	GK 11 DN100	GK 11 DN150
Body, lid	5.1301 (A126-B*)			
Bolts, nuts	1.7709 (A193 B7*/A194 size 4)			
Nozzle insert	1.0460 (A105)		1.0619 (A216-WCB*)	
Stage plunger	1.0460 (A105)		1.0619 (A216-WCB*)	
Spindle	1.4104 (AISI 430 F*)			
Handwheel	5.1300	5.3106 (A536 60-40-18*)		
Gasket	Graphite-CrNi			
Packing rings	Graphite			
Sight glass	Borosilicate glass			
Mica disc	Mica			

*) ASTM material is comparable to EN material. Note the differences in chemical and physical properties.

Technical data

Dimensions and weights



		GK 21	GK 11			
DN	[mm]	50	65	80	100	150
Length	L [mm]	320	420		620	900
Width	B1 [mm]	220	275		485	670
	B2 [mm]	100	120		200	285
Diameter of handwheel	D1 [mm]	140	200		315	
Height	H [mm]	165	195		326	495
Service dimension ¹	S [mm]	90	110		230	300
Weight	[kg]	25	50	52	145	310

1 From upper edge of spindle, equipment fully open

		GK 21	GK 11			
DN	[“]	2	2 ½	3	4	6
Length	L [in]	12.6	16.5		24.4	35.4
Width	B1 [in]	8.7	10.8		19.1	26.4
	B2 [in]	3.9	4.7		7.9	11.2
Diameter of handwheel	D1 [in]	5.5	7.9		12.4	
Height	H [in]	6.5	7.7		12.8	19.5
Service dimension ¹	S [in]	3.5	4.3		9.1	11.8
Weight	[lb]	55.1	110.2	114.6	319.7	683.4

1 From upper edge of spindle, equipment fully open

Pressure & temperature ratings

You can find the values for your equipment on the rating plate.

Manufacturer's declaration

For more information on the Conformity Assessment according to European rules refer to our Declaration of Conformity or our Declaration by Manufacturer.

To download the current Declaration of Conformity or Declaration by Manufacturer go to www.gestra.com/documents or contact:

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This declaration is no longer valid if modifications are made to the equipment without consultation with us.



Agencies all over the world: www.gestra.de

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