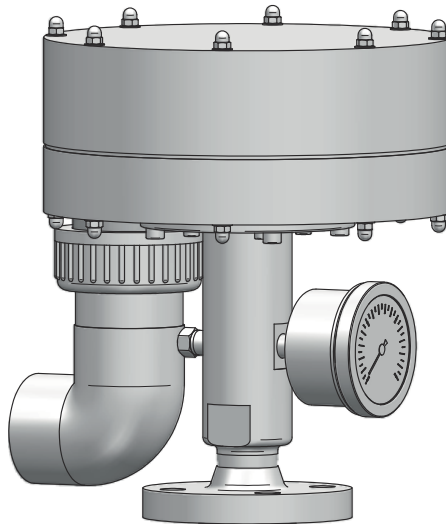


Vacuum Regulator for Chlorine Gas

C 2700-V

Operating Instructions



Read the Operating Instructions!

The user is responsible for installation and operation related mistakes!

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1 Notes for the Reader

This operating manual contains information and behaviour rules for the safe and designated operation of the device.

Observe the following principles:

- read the entire operating manual prior to commissioning the device.
- ensure that everyone who works with or on the device has read the operating manual and follows the instructions.
- keep the operating manual throughout the service life of the device.
- pass the operating manual on to any subsequent owner of the device.

1.1 General non-discrimination

In these operating instructions, only the male gender is used where grammar allows gender allocation. The purpose of this is to make the text easy to read. Men and women are always referred to equally. We would like to ask female readers for understanding of this text simplification.




1.2 Explanation of the signal words

Different signal words in combination with warning signs are used in this operating manual. Signal words illustrate the gravity of possible injuries if the risk is ignored:

Signal word	Meaning
DANGER	Refers to imminent danger. Ignoring this sign may lead to death or the most serious injuries.
WARNING	Refers to a potentially hazardous situation. Failure to follow this instruction may lead to death or severe injuries.
CAUTION	Refers to a potentially hazardous situation. Failure to follow this instruction may lead to minor injury or damage to property.
NOTICE	Refers to a danger which, if ignored, may lead to risk to the machine and its function.

1.3 Explanation of the warning signs

Warning signs represent the type and source of a danger:

Warning sign	Type of danger
	Danger to life from chlorine poisoning
	General danger zone
	Danger of damage to machine or functional influences

1.4 Identification of warnings

Warnings are intended to help you recognise risks and avoid negative consequences.

This is how warnings are identified:

Warning sign	SIGNAL WORD
Description of danger. Consequences if ignored. ⇒ The arrow signals a safety precaution to be taken to eliminate the danger.	

1.5 Instruction for action identification

This is how pre-conditions for action are identified:

- ✓ Pre-condition for action which must be met before taking action.

This is how instructions for action are identified:

➔ Separate step with no follow-up action.

1. First step in a series of steps.
2. Second step in a series of steps.
 - ▶ Result of the above action.


- ✓ **Action completed, aim achieved.**


2 Safety


2.1 General warnings


The following warnings are intended to help you to eliminate the dangers that can arise while handling the device. Risk prevention measures always apply regardless of any specific action.


Safety instructions warning against risks arising from specific activities or situations can be found in the respective sub-chapters.

	DANGER
<p>Danger to life from chlorine poisoning!</p> <p>Chlorine is poisonous. In severe cases, breathing in chlorine may lead to death. It irritates the eyes, the respiratory system and the skin.</p> <ul style="list-style-type: none"> ⇒ Use sufficient personal protective equipment. ⇒ When carrying out any work on the system, use a respirator mask with a Type B gas filter that complies with EN 14387. ⇒ Always comply with the accident prevention regulations that apply at the place of use. ⇒ Get rid of leaks without delay. You must get rid of even very minor leaks without delay. Together with the humidity, chlorine forms hydrochloric acid and corrosion rapidly results in increased leakage. ⇒ Only use chlorine-resistant seals. ⇒ Only use seals once. Reusing them leads to leaks. 	

	DANGER
<p>Danger to life from chlorine poisoning!</p> <p>If chlorine gas escapes, a filter mask is ineffective, since it is not a self-contained breathing apparatus.</p> <ul style="list-style-type: none"> ⇒ If chlorine gas escapes, wear type 2 self-contained breathing apparatus that complies with EN 137. 	

	DANGER
<p>Danger to life from chlorine poisoning!</p> <p>Chlorinators without gas warning devices represent an increased safety risk since escaping chlorine gas can either not be detected at all or not in good time.</p> <ul style="list-style-type: none"> ⇒ Install a gas warning device. 	

	WARNING
<p>Increased risk of accidents due to insufficient qualification of personnel!</p> <p>Chlorinators and their accessories must only be installed, operated and maintained by personnel with sufficient qualifications. Insufficient qualification will increase the risk of accidents.</p> <ul style="list-style-type: none"> ⇒ Ensure that all action is taken only by personnel with sufficient and corresponding qualifications. ⇒ Prevent access to the system for unauthorised persons. 	

	NOTICE
<p>Damage to the system due to the formation of hydrochloric acid</p> <p>Chlorine gas is highly hygroscopic. This means that humidity enters the system at any open connection on devices or pipes, which results in the formation of hydrochloric acid and contamination. Damage to the devices is then inevitable.</p> <ul style="list-style-type: none"> ⇒ Keep all the connections (in the vacuum system too) closed at all times. 	


2.2 Information about chlorine

Chlorine is a hazardous substance. The chemical element chlorine is a greenish-yellow, toxic gas with a pungent odour, which can be detected in the air at concentrations below 1 ppm (= 1 ml/m³).

Chlorine is 2.5 times heavier than air and accumulates at ground level.

Chlorine is extremely toxic for water organisms. The reason for the toxicity of chlorine is its extraordinary reactivity. It reacts with animal and vegetable tissue and thus destroys it.

Air with a chlorine gas content of 0.5 – 1% leads to a quick death in mammals and humans as it attacks the respiratory tract and the pulmonary alveolus (formation of hydrogen chloride or hydrochloric acid).

	NOTICE
<p>Faults due to insufficient chlorine quality</p> <p>Impurities in the chlorine gas result in build-ups in devices and valves and can chemically attack the components. This can cause malfunctions.</p> <ul style="list-style-type: none"> ⇒ Only use technically pure chlorine which satisfies the following requirements: <ul style="list-style-type: none"> - Chlorine mass content of at least 99.5% - Max. chlorine water content of 20 mg/kg <p>Chlorine as per EN 937 satisfies these requirements.</p>	

2.3 Hazards due to non-compliance with the safety instructions

Failure to follow the safety instructions may endanger not only persons, but also the environment and the device.

The specific consequences can be:

- failure of major device and corresponding system functions,
- failure of required maintenance and repair methods,
- danger to persons,
- danger to the environment caused by substances leaking from the system.

2.4 Working in a safety-conscious manner

Besides the safety instructions specified in this operating manual, further safety rules apply and must be followed:

- accident prevention regulations
- safety and operating provisions,
- safety regulations on handling hazardous substances,
- environmental protection provisions,
- applicable standards and legislation.

2.5 Personal protective equipment

Depending on the type of work being performed, appropriate protective equipment must be worn. Read the Accident Prevention Regulations and the Safety Data Sheets on the dosing media to find out what protective equipment is required.

As a minimum, the following protective equipment is recommended:



Mask



Protective clothing



Gloves



Safety footwear

Corresponding protective equipment must be used during these tasks:

- commissioning,
- all work on gas-bearing sections of the system
- changing the chlorine gas containers,
- shutdown,
- maintenance work,
- disposal.

- knowledge of this operating manual, particularly of safety instructions and sections relevant for the activity,
- knowledge of fundamental regulations regarding health and safety and accident prevention.

All persons must generally have the following minimum qualification:

- training as specialists to carry out work on the device unsupervised,
- sufficient training that they can work on the device under the supervision and guidance of a trained specialist.

This operating manual distinguishes between these user groups:

2.6.1 Specialist staff

Specialist staff are able, thanks to their professional training, knowledge and experience as well as knowledge of the respective provisions, to do the job allocated to them and recognise and/or eliminate any possible dangers by themselves.

2.6.2 Trained persons

Trained persons have been trained by the operator on the tasks they are supposed to perform and on the dangers stemming from improper behaviour.

Trained persons have attended all trainings offered by the operator.

2.6.3 Personnel tasks

In the table below you can check what qualifications are the pre-condition for the respective tasks. Only people with appropriate qualifications are allowed to perform these tasks.

Qualification	Activities
Specialist staff	<ul style="list-style-type: none"> ■ Assembly ■ Commissioning ■ Taking out of operation ■ Maintenance ■ Repairs ■ Disposal ■ Fault rectification
Trained persons	<ul style="list-style-type: none"> ■ Storage ■ Transportation ■ Operation

2.6 Personnel qualification

Any personnel who work with the device must have appropriate special knowledge and skills.

Anybody who works with the device must meet the conditions below:

- attendance at all the training courses offered by the owner,
- personal suitability for the respective activity,
- sufficient qualification for the respective activity,
- training on the handling of the device.
- knowledge of safety equipment and the way this equipment functions,

3 Intended Use

3.1 Notes on product warranty

Any non-designated use of the device can compromise its function or intended protection. This leads to invalidation of any warranty claims!

Please note that liability passes to the user in the following cases:

- The device is operated in a manner which is not consistent with this operating manual, particularly the safety instructions, handling instructions and chapter Intended Use.
- Information on the usage and ambient conditions (see "Technical data" on page 10) is not observed.
- If people operate the device who are not adequately qualified to carry out their respective activities.
- No original spare parts or accessories of Lutz-Jesco GmbH are used.
- Unauthorised changes are made to the device.
- The user uses different dosing media than those indicated in the order.
- Maintenance and inspection intervals are either not adhered to at all or not as prescribed.
- The device is commissioned before it or the corresponding system has been correctly and completely installed.
- Safety equipment has been bridged, removed or made inoperative in any other way.

3.2 Intended purpose

The vacuum regulator is designated exclusively for chlorinators based on the vacuum procedure. The vacuum regulator is only supplied with gaseous chlorine. It reduces the existing underpressure from the chlorine gas supply to a lower pressure than the atmospheric air pressure.

Only technically pure chlorine with a mass chlorine content of at least 99.5% may be used.

3.3 Device revision

This operating manual applies to the following devices:

Device	Month / year of manufacture
Vacuum Regulator for Chlorine Gas C 2700-V	07/2007 onwards

The date of production is stated on the rating plate.

3.4 Prohibited dosing media

The device must not be used for the following media and substances:

- Any gases except chlorine gas,
- Liquid chlorine
- Chlorine of insufficient quality.

4 Product description

4.1 Scope of delivery

Carefully check the delivery prior to installation and refer to the delivery note to ensure the delivery is complete and to check for any transport damage. Contact the supplier and/or carrier regarding any questions concerning the delivery and/or transport damage. Do not operate defective devices.

The device is assembled ready-to-install. All the openings are closed by transportation locks.

The scope of delivery includes:

- Vacuum regulator with inlet valve and integrated safety valve.
- Pressure gauge (optional)
- Flange connection on chlorine gas input including screws and seal (optional)
- 5-m tube with mounting material as blow-off line
- Ammonia solution for leakage test
- Operating manual

4.2 Design and function

4.2.1 Design of a vacuum chlorinator

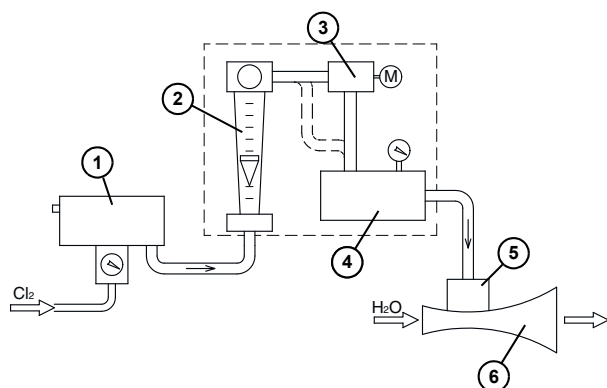


Fig. 4-1: Design of a vacuum chlorinator

The chlorine gas is under overpressure when it comes from the chlorine barrels. The vacuum regulator (1) only allows the chlorine to flow if there is a suctioning vacuum at the device's output. Therefore, if a line behind the vacuum regulator breaks, there is no need to fear a chlorine leak.

The dosing device comprises a flow meter (2) with manual control valve, and also often an electrically actuated control valve (3) and a pressure regulator (4).

The injector (6) creates the vacuum based on the Venturi effect and mixes the chlorine gas in the motive water flow. If the water does not move, chlorination is stopped immediately. Then the non-return valve (5) prevents water from penetrating into the dosing devices.

4.2.2 Structure of the device

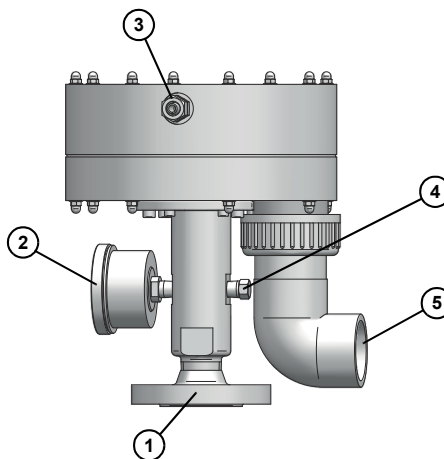


Fig. 4-2: Structure of the device

Item	Description
1	Input
2	Pressure gauge (optional)
3	Safety valve output
4	Plug
5	Output

4.2.3 Function description

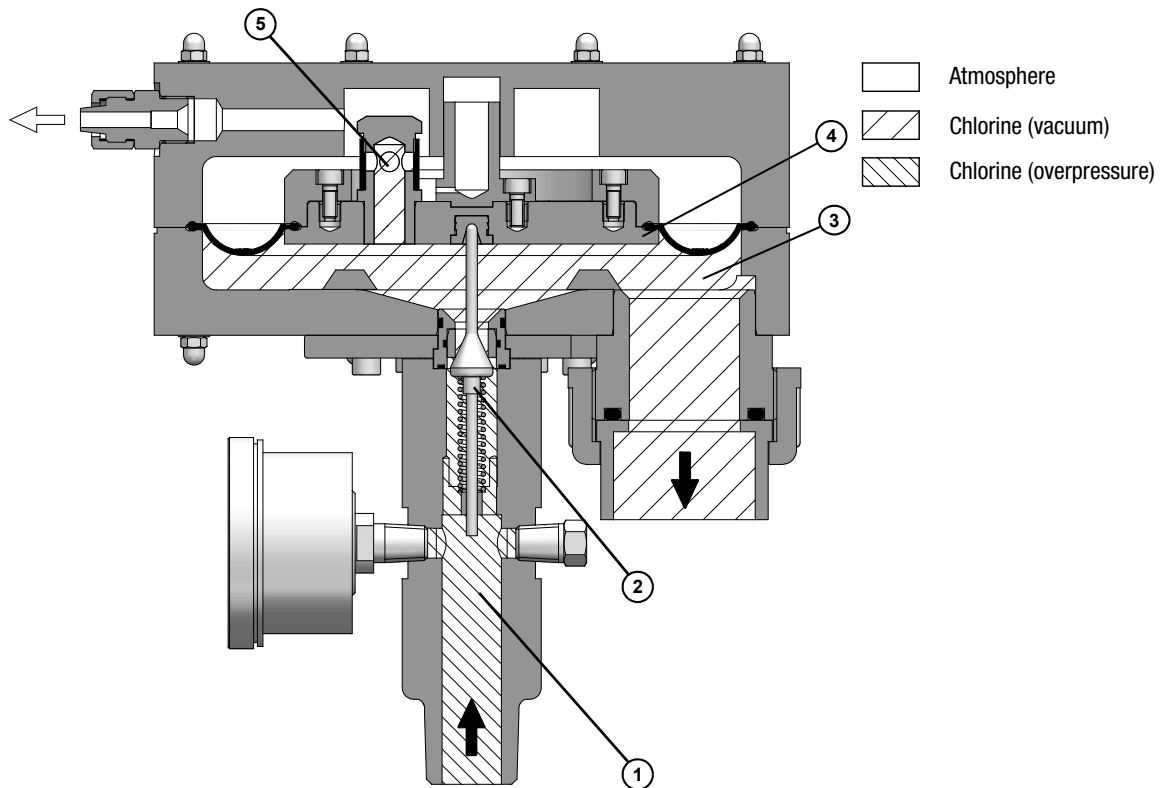


Fig. 4-3: Vacuum Regulator for Chlorine Gas C 2700-V - cross-sectional view

Pressurised chlorine gas flows from the chlorine barrel to the vacuum regulator. The vacuum regulator comprises the inlet valve (1) and the membrane chamber (3). In the inlet valve the chlorine gas is under overpressure, in the membrane chamber there is a vacuum.

The PVC output of the vacuum regulator is connected to the injector. A sufficient vacuum draws the diaphragm disc (4) upwards and pushes the valve cone (2) downward against the spring force. The inlet valve (1) opens and the amount of chlorine required flows into the membrane chamber (3). If the vacuum is not sufficient, the spring closes the system again. This results in a constant vacuum in the piping downstream of the vacuum regulator.

A constant vacuum ensures maximum system safety: In the event of a leak, ambient air is drawn into the tube without enabling a dangerous amount of chlorine gas to escape into the atmosphere.

If the valve cone (2) does not close properly due to heavy soiling, slight overpressure builds up in the membrane chamber (3). In the event of such faults, the safety valve (5) in the diaphragm disc opens and vents the system vents to a neutralisation system, e.g., a chlorine eliminator or an activated carbon cartridge.

4.3 Rating plate

The rating plate contains information on the safety and functional method of the product. The rating plate must be kept legible for the duration of the service life of the product.

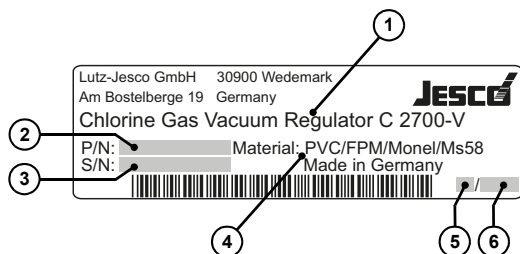


Fig. 4-4: Rating plate

Item	Meaning
1	Product designation
2	Part number
3	Serial number
4	Materials
5	Month of manufacture
6	Year of manufacture

4.4 Technical data

Description		Value
Throughput		up to 200 kg/hr
Inlet pressure		1.5 – 16 bar
Operating vacuum		-50 mbar
Response pressure of the safety valve		500 mbar
Pressure gauge (optional)		0 – 16 bar / Ø 63 mm
Materials	Inlet valve	Brass (chemically nickel-plated), Monel, Hastelloy
	Vacuum housing	PVC
	Seals	FPM, PTFE
Weight with flange and pressure gauge		approx. 8 kg
Ambient temperature		10 – 50°C (no direct sunlight)

5 Dimensions

All dimensions in mm

5.1 Vacuum regulator with threaded connection

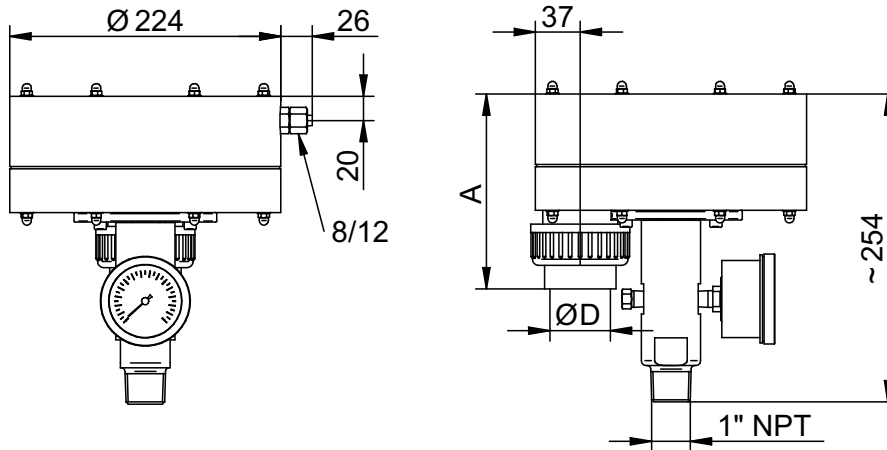
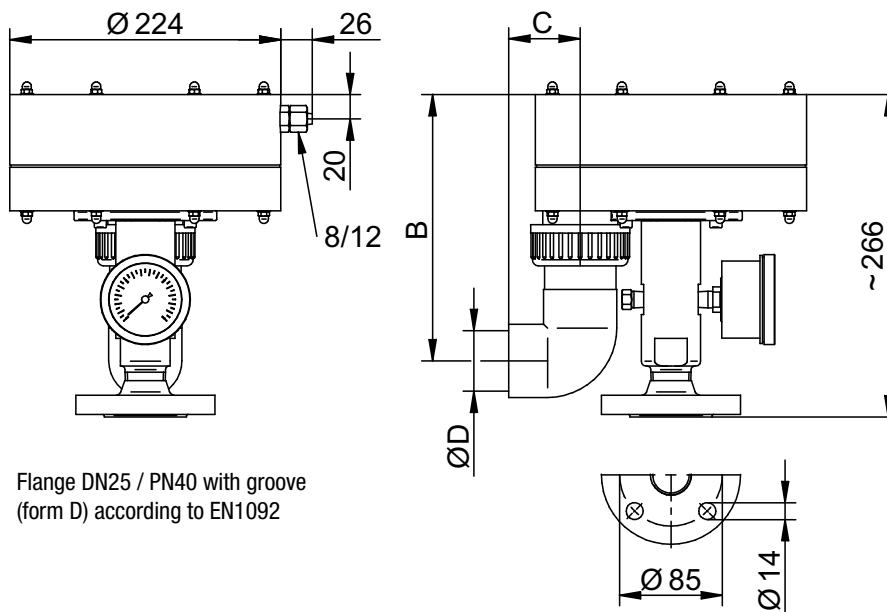


Fig. 5-1: Dimensioned drawing of vacuum regulator with threaded connection

5.2 Vacuum regulator with flange connection




Flange DN25 / PN40 with groove
(form D) according to EN1092

Fig. 5-2: Dimensioned drawing of vacuum regulator with flange connection

Size	Value
A	161
B	220
C	59
ØD	50

6 Installation




WARNING

Increased risk of accidents due to insufficient qualification of personnel!

Chlorinators and their accessories must only be installed, operated and maintained by personnel with sufficient qualifications. Insufficient qualification will increase the risk of accidents.

- ⇒ Ensure that all action is taken only by personnel with sufficient and corresponding qualifications.
- ⇒ Prevent access to the system for unauthorised persons.



NOTICE

Damage to the system due to incorrect installation

Failure to comply with the installation instructions (e.g., use of unsuitable tools, incorrect torques) can damage the system components.

- ⇒ Only apply the appropriate amount of force to plastic components! Plastic threads (especially PVC threads) can be tightened and loosened more easily by applying a thin layer of silicone or PTFE grease to them beforehand.
- ⇒ Observe the following torques:

6.1 Installation location

Based on the chlorine direction of flow, the vacuum regulator is the final device in the installation which is operated with overpressure. For this reason, the vacuum regulator must be installed in the chlorine supply room which is monitored by a gas warning device (see "Installation examples" on page 16).

All the subsequent devices and lines in the direction of flow operate at negative pressure compared to the atmosphere. These devices are normally installed in the dosing device room.

The device must not be exposed to direct sunlight.

6.2 Mounting position

The device input must point downwards.

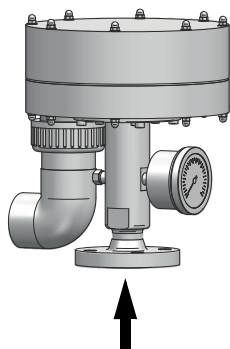



Fig. 6-1: Mounting position

6.3 Installing the device

6.3.1 Chlorine input (pressure line)



NOTICE

Damage to the system due to liquid chlorine

The vacuum regulator is only suitable for gaseous chlorine. Liquid chlorine destroys PVC components.

- ⇒ Install a chlorine evaporator upstream of the vacuum regulator if liquid chlorine is used. An additional pressure-reducing valve prevents condensation of the chlorine gas in the installation downstream of the chlorine evaporator.
- ⇒ In the case of systems without pressure-reducing valves, the highest temperature must be in the line directly before the vacuum regulator. This is achieved by heating up the line directly upstream of the inlet valve with a heating collar or by equipping the entire pipe line with a heating belt. This prevents the condensation of chlorine gas.
- ⇒ Install a moisture eliminator with a heating collar at the vacuum regulator input to evaporate residual quantities of liquid chlorine.

The vacuum regulator should be installed directly on the supply line. It can be carried by the line and thus does not have to be fixed separately. However, the line should be sufficiently secured.

The line from the chlorine barrel to the vacuum regulator must be laid so as to ascend continuously.

A shut-off valve should be fitted upstream of every vacuum regulator.

Seamless pipes with a nominal diameter of DN25 (1") made of non-alloy carbon steel are used as pressure lines. A larger pipe only has to be used for very long distances or if several vacuum regulators are connected to a joint supply line.

The following nominal diameters are recommended for the pressure line (pressure drop of a maximum of 0.5 bar, max. speed of 20 m/s, calculated at 1.5 bar with 4x90° angles):

Mass chlorine flow	Length of pressure line					
	10 m	20 m	30 m	50 m	100 m	150 m
80 kg/hr	DN25	DN25	DN25	DN25	DN25	DN25
120 kg/hr	DN25	DN25	DN25	DN25	DN25	DN32
200 kg/hr	DN25	DN25	DN25	DN32	DN32	DN32
400 kg/hr	DN32	DN32	DN32	DN40	DN40	DN50
600 kg/hr	DN40	DN40	DN40	DN40	DN50	DN50

Installing the connection with flange connection

Precondition for action:

- ✓ The inside of the supply line is clean and dry.
- ✓ The transport protection has been removed.
- ✓ The sealing surfaces are free of contamination and damage.
- ✓ The seals are clean, undamaged and dry.
- ✓ The screws, nuts and washers are clean and undamaged.



Any screws, nuts and washers that are removed during installation must be replaced with new ones if damaged. Used screws, nuts and washers may only be installed if they are in at least new condition.

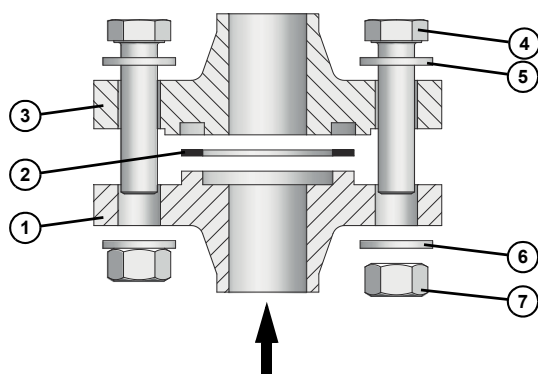


Fig. 6-2: Installing the flange connection

Perform the following working steps:

1. Lubricate the sliding surfaces and threads of the screw, nuts and discs using, for example, fitting or PTFE grease.
2. Place the flat gasket (2) onto the projecting tongue of the connection flange (1). Install the seal whilst dry.
3. Place the groove flange (3) of the vacuum regulator in position. Make sure that the flat gasket does not slip.
4. Attach the screws (4), discs (5, 6) and nuts (7) by hand.
5. Tighten the screws evenly in three stages crosswise: 20 Nm, 35 Nm, 50 Nm. After this, retighten all the screws to the full target tightening torque (50 Nm).
6. Setting the seal (adapting to the flange seal surface) can make it necessary to retighten the screws). Thus the screws should be retightened to a torque of 50 Nm after a few hours.

✓ **Installed chlorine input with flange connection.**

Installing the connection with threaded connection



DANGER

Danger to life from chlorine poisoning!

Use chlorine-resistant material for sealing pipe connections and fittings in pressurised pipes. Inadequate sealants will react with chlorine and cause leaks.

⇒ Use only sealants that resist contact with chlorine (e.g., anaerobic sealing compounds).

Precondition for action:

- ✓ The inside of the supply line is clean and dry.
- ✓ The transport protection has been removed.
- ✓ The threads are bare metal.

Perform the following working steps:

1. Clean the threads with a degreasing cleaning agent, e.g., alcohol.
2. Allow the threads to dry completely.
3. Apply the thread sealant compound around the male thread at the start of thread. Keep the first thread pitch clear. Press the thread sealant compound into the thread groove to ensure the thread flanks are well moistened.

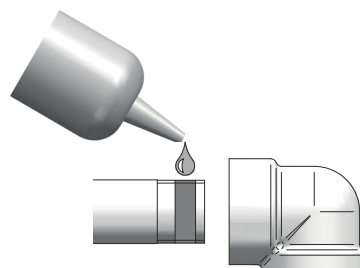


Fig. 6-3: Seal the threads.



NOTICE

Leak due to incorrect installation

To correctly align the connection, it may be necessary to turn the thread in an anticlockwise direction. When releasing the connection, bubbles form in the adhesive which can result in leaks.

⇒ Only turn the thread in a clockwise direction.

⇒ If, after tightening, the connection is not correctly aligned, repeat steps 1 – 5.

4. Guide the threaded pin into the internal thread and, in doing so, apply a little adhesive to the internal thread. Screw the components together by hand.
5. Tighten the connection using tools. When doing this, the tool must only be used on the metal inlet valve and not on the PVC component of the vacuum regulator. The thread size 1" NPT demands approx. 150 Nm
6. Remove any excess adhesive with a cloth.

7. Allow the adhesive to cure for at least 12 hours before carrying out the leak test.

✓ **Installed chlorine input with threaded connection**



If the pressure gauge on the inlet valve is pointing in the wrong direction after installation of the chlorine supply, the pressure gauge can be attached to the opposite side. For this, exchange the pressure gauge and threaded plug. They are installed with PTFE strips.

6.3.2 Chlorine output (vacuum line)

Pipes made of PVC-U must be used for the vacuum lines. The pipe with the nominal diameter of the vacuum connection should be chosen for short distances. A larger pipe should be used for longer distances. If several devices are connected to a line, the line must be calculated for the entire chlorine flow.

The following nominal diameters are recommended for the vacuum line (pressure drop of a maximum of 25 mbar, calculated at 0.9 bar with 4x90° angles):

Mass chlorine flow	Length of vacuum line					
	5 m	10 m	20 m	30 m	50 m	100 m
80 kg/hr	DN32	DN32	DN40	DN40	DN40	DN50
120 kg/hr	DN32	DN40	DN40	DN50	DN50	DN65
200 kg/hr	DN40	DN50	DN50	DN65	DN65	DN65

If necessary, a greater nominal diameter can be installed for longer distances and for shorter sections just in front of or after the devices a connection with the nominal diameter of the devices can be selected:

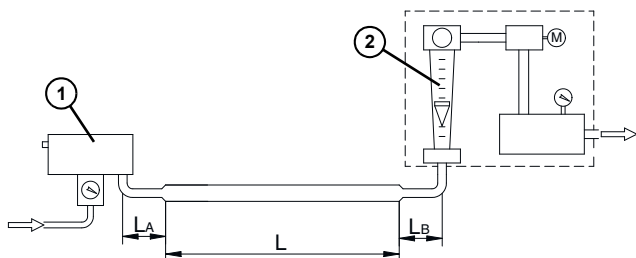


Fig. 6-4: Long vacuum line

Item	Description
1	Vacuum regulator
2	Dosing device
L _A	Line at the connection of the vacuum regulator approx. 0.5 m in the nominal diameter of the connection
L	Greater distance with a larger nominal diameter
L _B	Line at the connection of the dosing device approx. 0.5 m in the nominal diameter of the connection

Installing the vacuum line

Precondition for action:

- ✓ The chlorine input of the vacuum regulator is installed.
- ✓ The vacuum line is secured with a sufficient number of pipe clamps and meets with the output of the vacuum regulator without tension.
- ✓ All the components are clean and dry.
- ✓ The transport protection at the output of the vacuum regulator has been removed.

Perform the following working steps:

1. Cut the PVC pipe at a right angle. Make a bevel on the outside of the pipe (approx. 3 mm x 20°).
2. Clean the pipe and the sleeve with the cleaning agent recommended by the manufacturer of the adhesive.
3. Glue the pipe in the connection. When doing so, follow the instructions for the PVC adhesive.

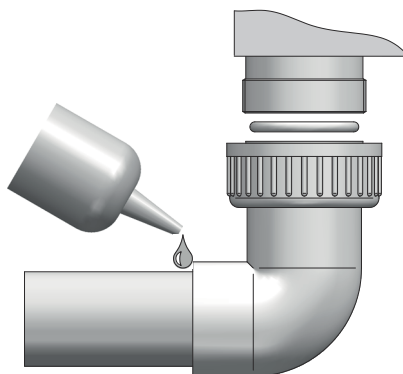


Fig. 6-5: Installing the chlorine output

4. Install the connection on the device. Make sure that the O-ring is fitted.
5. Tighten the union nut by hand.
6. Allow the adhesive to cure for at least 3 hours before carrying out the leak test.

✓ **Installed vacuum line.**

6.3.3 Safety valve

The blow-off line is a tube whose open end should be located in the vicinity of the gas sensor. The installation of an activated carbon cartridge is recommended at the open end of the tube which prevents an alarm being issued in the event of system-related short shock pressures.

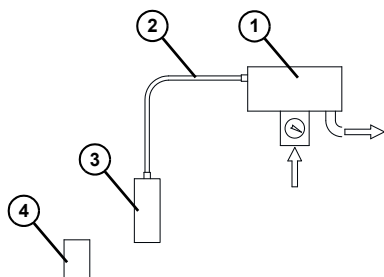


Fig. 6-6: Blow-off line

Item	Description
1	Vacuum regulator
2	Blow-off line
3	Activated carbon cartridge
4	Gas sensor



A transparent PVC tube is ideal as a blow-off line. It becomes milky in appearance when it comes into contact with chlorine for the first time and thus allows faults to be detected early on.

Installing the blow-off line

Precondition for action:

- ✓ The chlorine input of the vacuum regulator is installed.
- ✓ The chlorine output of the vacuum regulator is installed.
- ✓ The transport protection on the safety valve has been removed.

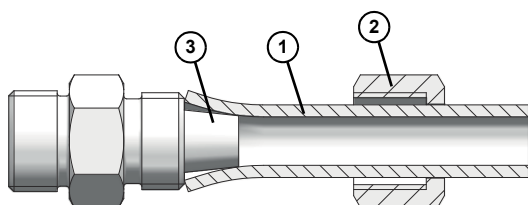


Fig. 6-7: Installing the tube connection

Perform the following working steps:

1. Cut the tube (1) at a right angle.
2. Push the union nut (2) onto the tube.
3. Push the end of the tube onto the cone of the tube connection (3).
4. Tighten the union nut by hand.

5. Secure the tube onto the wall.
6. If relevant, install the activated carbon cartridge at the open end of the tube.

✓ **Installed blow-off line.**

6.4 Completing the installation

After completing installation, you must check that all the connections are leak-proof (see "Inspecting the pressure system" on page 18 and "Inspecting the vacuum system" on page 19).



All the exposed bare metal surfaces must be painted as the atmosphere in chlorine gas rooms is highly corrosive. A two-part epoxy resin varnish yellow RAL1003 is suitable for example. The surfaces must not be painted until after successful completion of the leak test.

6.5 Installation examples

6.5.1 Installation without a chlorine evaporator

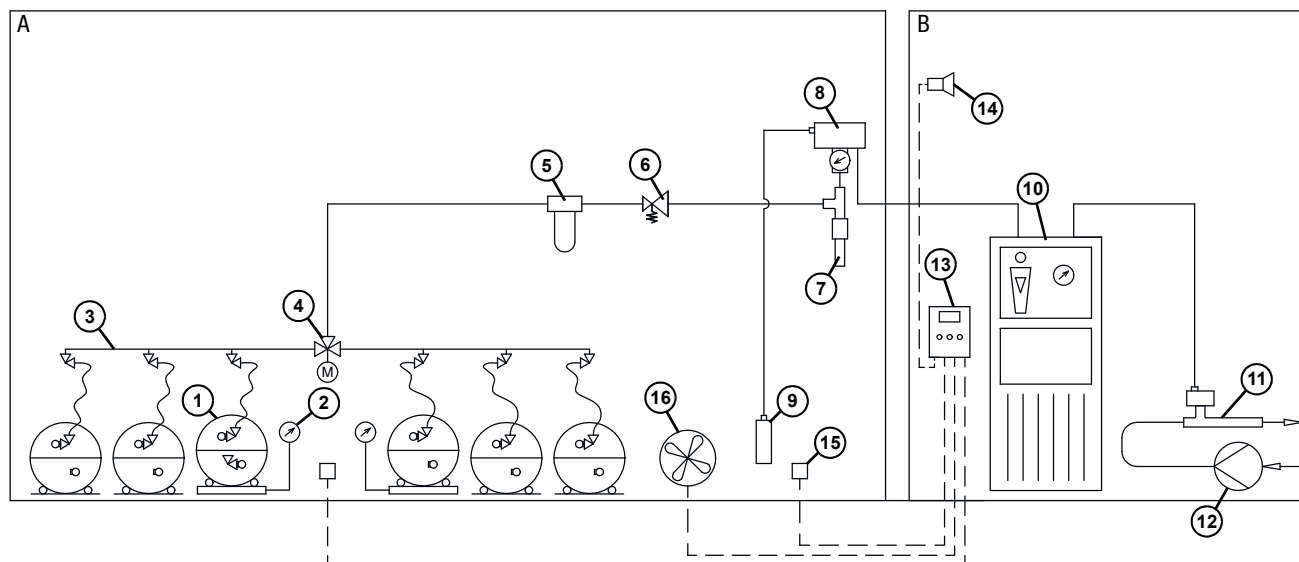


Fig. 6-8: Installation without a chlorine evaporator

Item	Description
A	Room for the chlorine supply
B	Dosing device room
1	Chlorine barrel
2	Chlorine barrel scale
3	Manifold
4	Changeover switch
5	Chlorine gas filter
6	Pressure reducing valve
7	Moisture eliminator with heating collar
8	Vacuum regulator
9	Activated carbon cartridge
10	Dosing device
11	Injector with non-return valve
12	Motive water pump
13	Gas warning device
14	Horn
15	Gas sensor
16	Entrance port of the chlorine eliminator

6.5.2 Installation with a chlorine evaporator

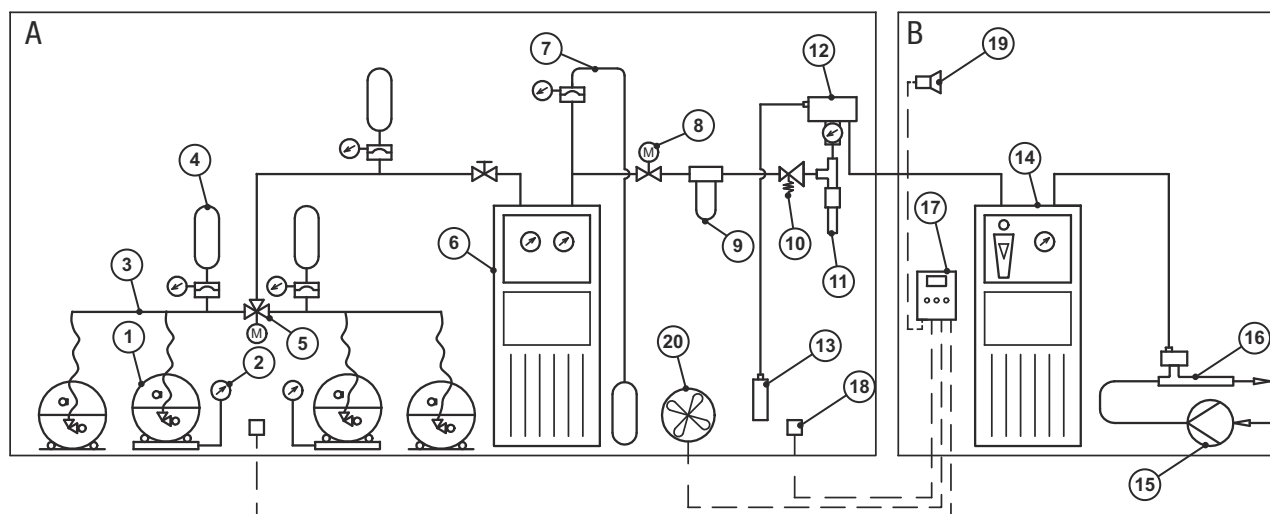



Fig. 6-9: Installation with a chlorine evaporator

Item	Description
A	Room for the chlorine supply
B	Dosing device room
1	Chlorine barrel
2	Chlorine barrel scale
3	Manifold
4	Rupture disk with expansion container
5	Changeover switch
6	Chlorine evaporator
7	Expansion system
8	Quick-action valve
9	Chlorine gas filter
10	Pressure reducing valve
11	Moisture eliminator with heating collar
12	Vacuum regulator
13	Activated carbon cartridge
14	Dosing device
15	Motive water pump
16	Injector with non-return valve
17	Gas warning device
18	Gas sensor
19	Horn
20	Entrance port of the chlorine eliminator


7 Commissioning

	DANGER
<p>Chlorine gas can escape due to systems that are leaky or not installed correctly!</p> <p>Chlorinators represent an increased risk to safety if they have not been installed properly, if adequate tightness tests have not been performed or if the devices are not in a good condition.</p> <ul style="list-style-type: none"> ⇒ Before commissioning the system, have an expert inspect that it is tight and in the proper condition. ⇒ The condition of the installation must be checked for adequate tightness on a regular basis. ⇒ Get rid of leaks without delay. You must get rid of even very minor leaks without delay. Together with the humidity, chlorine forms hydrochloric acid and corrosion rapidly results in increased leakage. 	

7.1 Inspecting the pressure system

Check the tightness of the pressure system from the chlorine container to the vacuum regulator in two stages:

7.1.1 Carrying out the leak test with nitrogen

	<p>You are strongly recommended to carry out this inspection before carrying out the leak test with chlorine since it demonstrates leaks in the pressure system without the risk of chlorine escaping.</p> <p>As an alternative, you can carry out the inspection using dry compressed air.</p>
--	---


Precondition for action:

- ✓ All the open connections of the pressure system were closed correctly.
- ✓ All the shut-off valves in the pipe system were opened.
- ✓ A nitrogen cylinder was connected.

Perform the following working steps:

1. Slowly raise the system pressure on the nitrogen cylinder's pressure reducing valve to 10 bar.
 2. Close the nitrogen cylinder's valve.
 3. Apply soap solution to all the potential leaks. Bubbles will appear at leak locations.
 4. Close the output on the nitrogen cylinder's pressure reducing valve and observe the pressure gauge in the installation. The pressure must not drop within one hour.
 5. If necessary, repair leaks and repeat the leak test.
- ✓ **Leak test with nitrogen carried out.**

7.1.2 Carrying out the leak test with chlorine

	DANGER
<p>Danger to life from chlorine poisoning!</p> <p>If you start the leak test with chlorine before the entire system has been installed and the injectors are ready for operation, the chlorine may not be extracted immediately in the case of a leak.</p> <ul style="list-style-type: none"> ⇒ Make sure that all the components in the system are installed correctly and the injectors are ready for operation before starting the leak test with chlorine. ⇒ Put on protective clothing before carrying out the leak test with chlorine. 	

Precondition for action:

- ✓ The leak test with nitrogen was carried out successfully.
- ✓ All the open connections of the pressure system were closed correctly.
- ✓ A chlorine container was connected.
- ✓ The injector is ready for operation.

Perform the following working steps:

1. Briefly open the chlorine container valve and close it again.
2. Carry out the ammonia test on the entire pressure system: Ammonia steam with chlorine forms a white vapour and makes even very small leaks visible. Hold an open bottle containing ammonia solution close to the pipe and make slight pumping motions with the plastic bottle.

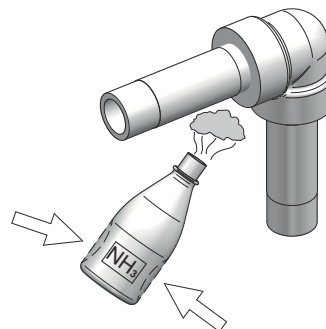



Fig. 7-1: Leak test with ammonia


	NOTICE
<p>Damage to the system by the ammonia solution</p> <p>If the ammonia solution comes into contact with the system, this leads to corrosion on the devices.</p> <ul style="list-style-type: none"> ⇒ Make sure that you do not spill any ammonia. 	

3. If you find leaks: Use the injector to suction off the chlorine immediately! Repair leaks and repeat the leak test.
4. If you do not find any leaks: Open the chlorine container valve and leave it open.

5. Carry out the leak test again.
6. Close the chlorine container valve and suction off the chlorine using the injector.

✓ **Leak test with chlorine carried out.**

7.2 Inspecting the vacuum system

	NOTICE
<p>Operational disturbances due to leaks in the vacuum system</p> <p>In normal operation, you cannot detect minor leaks in the vacuum system since no chlorine escapes. Humid air, however, enters the system. Together with the chlorine, the humidity can cause build-ups and operational disturbances.</p> <p>With the injector switched off, there may be a slight chlorine smell.</p> <p>⇒ Carry out a proper inspection of the vacuum system.</p> <p>⇒ Ensure that all action is taken only by personnel with sufficient and corresponding qualifications.</p>	

Tightness of the vacuum system is inspected together with the dosing device.

7.2.1 Carry out the leak test on the vacuum system

Precondition for action:

- ✓ The vacuum system is completely installed.
- ✓ All the open connections of the vacuum system were closed.
- ✓ The injector is ready for operation.

Perform the following working steps:

1. Connect the chlorine supply to, for example, the chlorine container valves or to a valve in the vacuum regulator supply line.
2. Open the valves on the dosing device to adjust the dosing quantity.
3. Switch on the injector and wait until the vacuum meter on the dosing device displays at least 0.5 bar underpressure.




Some dosing devices feature a valve which protects the injector from excessive vacuums. If, for example, this vacuum is set to an underpressure of 0.4 bar, an underpressure of 0.5 bar cannot be reached during the leak test.

4. Switch off the injector.
 - ▶ The vacuum must stay unchanged for at least five minutes.
5. If the vacuum collapses quickly, eliminate the leak (see 7.2.2 "Localising leakages in the vacuum system") and repeat the check on the vacuum system.

✓ **Vacuum system leak test carried out.**

7.2.2 Localising leakages in the vacuum system

Leaks in the vacuum system are localised with the help of compressed air or nitrogen at a slight positive pressure and a soap solution.

	NOTICE
<p>Damage to the plant due to excessive pressure</p> <p>When using positive pressure to localise leaks, components in the vacuum system, e.g. membranes or springs, may be mechanically overloaded.</p> <p>⇒ Use a maximum positive pressure of 0.5 bar.</p>	

Precondition for action:

- ✓ When checking the tightness of the vacuum system, a leak was detected.
 - ✓ The vacuum system is fully assembled.
 - ✓ All the open connections of the vacuum system were closed correctly.
 - ✓ The valves on the chlorine supply have been closed.
 - ✓ If the system was previously operated with chlorine, the residual chlorine has been extracted with the injector and the system operated for approx. 5 minutes using nitrogen or dry compressed air.
 - ✓ The injector was switched off.
1. Close the water valves upstream and downstream of the injector.
 2. Connect the supply of nitrogen or dry compressed air to the vacuum system.
 3. Slowly increase the system pressure to approx. 0.2 – 0.4 bar (at significantly higher positive pressures, the safety valve in the vacuum regulator will open).
 4. Apply soap solution to all the potential leaks.
 - ▶ Bubbles will appear at leak locations.
- ✓ **Leakage in the vacuum system localised**

7.3 Switching the system on

The vacuum regulator does not need to be operated separately. If there is a sufficient vacuum and supply of chlorine, the device opens and, if the vacuum is not sufficient, the device stops the flow of chlorine gas.

8 Operation



DANGER

Chlorine gas can escape due to systems that are leaky or not installed correctly!

Chlorinators represent an increased risk to safety if they have not been installed properly, if adequate tightness tests have not been performed or if the devices are not in a good condition.

- ⇒ Before commissioning the system, have an expert inspect that it is tight and in the proper condition.
- ⇒ The condition of the installation must be checked for adequate tightness on a regular basis.
- ⇒ Ensure that all action is taken only by personnel with sufficient and corresponding qualifications.

The vacuum regulator does not need to be operated separately. If there is a sufficient vacuum and supply of chlorine, the device opens. If the vacuum is interrupted, the device stops the flow of chlorine gas.



In the event of an unfavourable combination of supply pressure, pipe length and dosing amount, the vacuum regulator may vibrate.

The vibrations can be remedied by adjusting the supply pressure or by slightly restricting the stop valve ahead of the vacuum regulator.

8.1 Test intervals

You must check the components of the chlorinator for leaks on a daily basis and after maintenance or commissioning work.

9 Shutdown

9.1 Short-term shutdown

Perform the following working steps:

1. Close the chlorine container valves.
2. Use the injector to suction off the remaining chlorine.
3. Switch off the injector.

✓ **Chlorinator shut down for the short term.**

9.2 Long-term shutdown

Precondition for action:

- ✓ The chlorine gas container valves were closed.
- ✓ The remaining chlorine was suctioned off using the injector.
- ✓ The injector was switched off.

Perform the following working steps:

1. Run the chlorinator for approximately five minutes with nitrogen or dry compressed air.
2. Close all the connections to protect the lines and devices from humidity and dirt.

✓ **Chlorinator shut down for the long term.**




Before commissioning after longer breaks in operation, minor maintenance measures are recommended as a minimum (see "Maintenance intervals" on page 22).

9.3 Disposal of the old device

- Before the disposal of the old device, clean off the remaining chlorine by rinsing it with nitrogen or air.
- The device must be disposed of in accordance with applicable local laws and regulations. It should not be disposed of as domestic waste!

As the disposal regulations may differ from country to country, please consult your supplier if necessary.


10 Maintenance

	WARNING
<p>Increased risk of accidents due to insufficient qualification of personnel!</p> <p>Chlorinators and their accessories must only be installed, operated and maintained by personnel with sufficient qualifications. Insufficient qualification will increase the risk of accidents.</p> <p>⇒ Ensure that all action is taken only by personnel with sufficient and corresponding qualifications.</p>	

10.1 Maintenance intervals

In order to avoid malfunctions, chlorinators must be maintained regularly. The following maintenance intervals are recommended:


Interval	Maintenance
After 1 year	Minor maintenance measures: <ul style="list-style-type: none"> ■ Clean the device thoroughly ■ Replace seals subject to high stress levels at the inlet valve
After 3 years	Major maintenance measures: <ul style="list-style-type: none"> ■ Replace all elastomers ■ Replace the valve cone and spring on the inlet valve
After 5 years	<ul style="list-style-type: none"> ■ Replace the pressure gauge

	<p>In some cases, regional regulations may require shorter maintenance intervals.</p> <p>Maintenance intervals depend only on how frequently the equipment is used. Chemical wear, for example of rubber parts, begins with the initial medium contact and continues irrespective of the usage.</p>
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10.2 Accessories for maintenance

Description	Part number
Silicone grease, medium viscosity 35 g to rub into the seals	35537
Liquid sealant 50 ml to rub into the thread 1" NPT	97715
Ammonia solution 50 ml for the leak test	13514
Plastic tool to disassemble O-rings	W00133

10.3 Preparing the system for maintenance

	DANGER
<p>Danger to life from chlorine poisoning!</p> <p>Do not carry out maintenance or any other work on the chlorinators until the system has been decommissioned and there is no more chlorine gas in the pipes. Otherwise, chlorine gas may escape.</p> <p>⇒ Proceed as per the instructions below:</p>	

Perform the following working steps:

1. Close the chlorine container valves.
2. Use the injector to suction off the remaining chlorine.
3. Switch off the injector.
4. Run the chlorinator for approximately five minutes with nitrogen or dry compressed air.
5. Close all the connections to protect the lines and devices from humidity and dirt.

✓ **System prepared for maintenance.**

10.4 Maintaining the inlet valve

Precondition for action:

- ✓ The system has been prepared for maintenance (see page 22).
- ✓ A maintenance set is available.

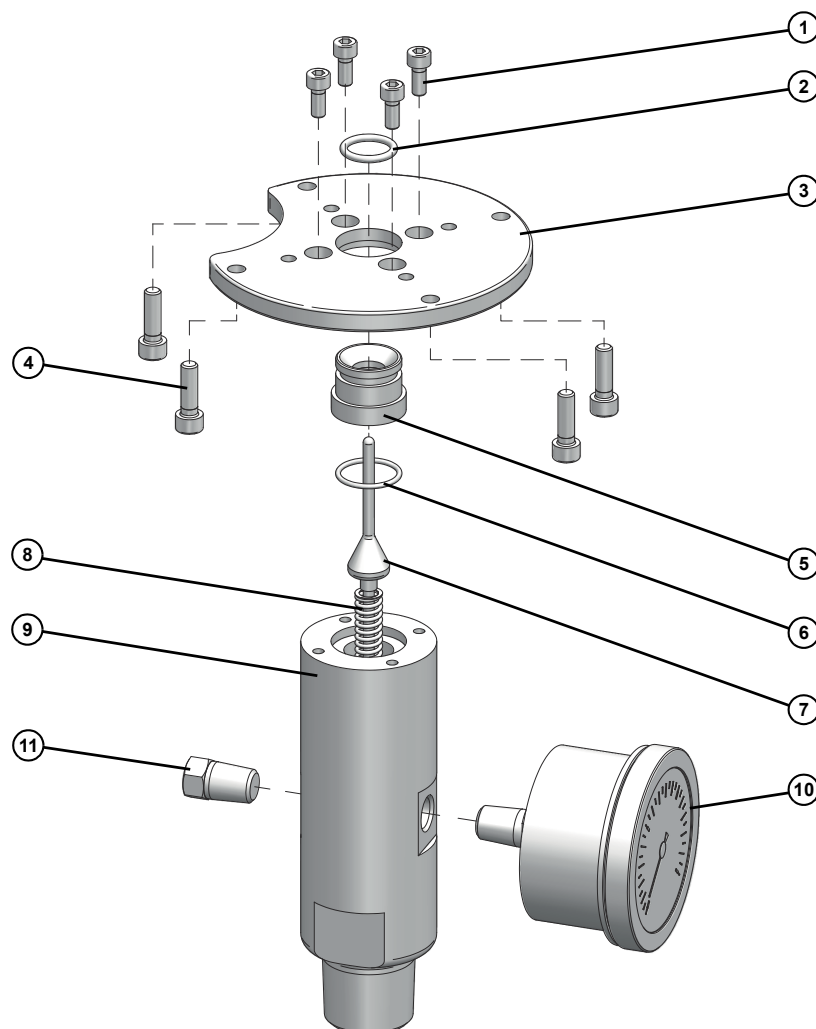


Fig. 10-1: Exploded view of the inlet valve

10.4.1 Disassembling the inlet valve

Perform the following working steps:

1. Remove the screws (4) which fix the flange (3) to the plastic part of the vacuum regulator.
2. Pull the inlet valve out of the plastic part by turning.
3. Undo the screws (1).
 - ▶ The spring (8) pushes the valve apart.
4. Remove the O-ring (2) on the valve seat (5) and take the valve seat out of the flange (3).



The valve seat (5) is an assembly which is not dismantled any further during maintenance.

5. If you wish to clean the valve with water, screw out the pressure gauge (10). Close the pressure gauge so that humidity cannot enter.

✓ **Inlet valve disassembled.**

10.4.2 Cleaning the inlet valve

1. Thoroughly clean all parts which are not replaced. Warm water and isopropyl alcohol are suitable for this. The pressure gauge must not be immersed in water!
2. The parts which are not included with the maintenance set should be subjected to a visual inspection and replaced if they are damaged. Note in particular the cone area of the cone valve (7).

✓ **Inlet valve cleaned.**

10.4.3 Installing the inlet valve

Precondition for action:

- ✓ The parts are completely dry following cleaning.
- ✓ The parts are in good condition.
- ✓ Wearing parts are available.

Perform the following working steps:

1. Push the valve seat (5) through the flange (3) and place the O-ring (2) in the groove of the valve seat.
2. Rub a little silicone grease onto the O-ring (6) and place in the groove on the valve seat (5).
3. Push the spring (8) onto the flat side of the valve cone (7).
4. Place the spring and valve cone in the housing (9). The guide rod must hit the central drill hole.
5. Place the flange and valve seat on the valve housing (9). Ensure that the O-ring (6) remains in the groove.
6. Align the flange (3) so that the pressure gauge is in the correct position following installation of the inlet valve on the plastic part.
7. Screw in the screws (1) with a little fitting grease.
8. Tighten the screws crosswise to a torque of approx. 3 Nm.
9. Install the pressure gauge (10) and plug (11) with approx. 3 layers of PTFE tape

✓ **Inlet valve installed.**



If it is not possible to immerse the inlet valve, the test can also be performed with soapy water, e.g., a thin coat of soapy water is applied with a brush.

3. Observe the valve for a few minutes. No bubbles must ascend.
4. If there is a leak at the valve output, take the valve out of the water, open it briefly by pressing hard on the valve rod and then repeat the test. If it is still then not tight, either the valve seat or valve cone must be replaced.
5. Allow the inlet valve to dry thoroughly before installing it.

✓ **Inlet valve tested.**



Do not install the inlet valve on the vacuum part until the former has been tested for leaks and after maintenance of the vacuum part.

10.4.4 Testing the inlet valve

Precondition for action:

- ✓ The valve is completely installed.

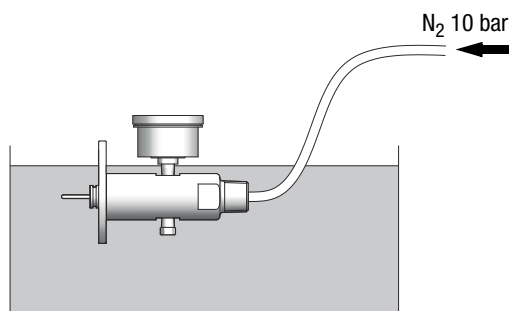


Fig. 10-2: Test the inlet valve

Perform the following working steps:

1. Connect the valve input to nitrogen or dry compressed air and set to pressure to approx. 10 bar.
2. Immerse the inlet valve in water. The pressure gauge must not be immersed in water!

10.5 Maintaining the vacuum part

Precondition for action:

- ✓ The chlorinator has been prepared for maintenance (see page 22).
- ✓ A maintenance set is available.
- ✓ The inlet valve is removed.

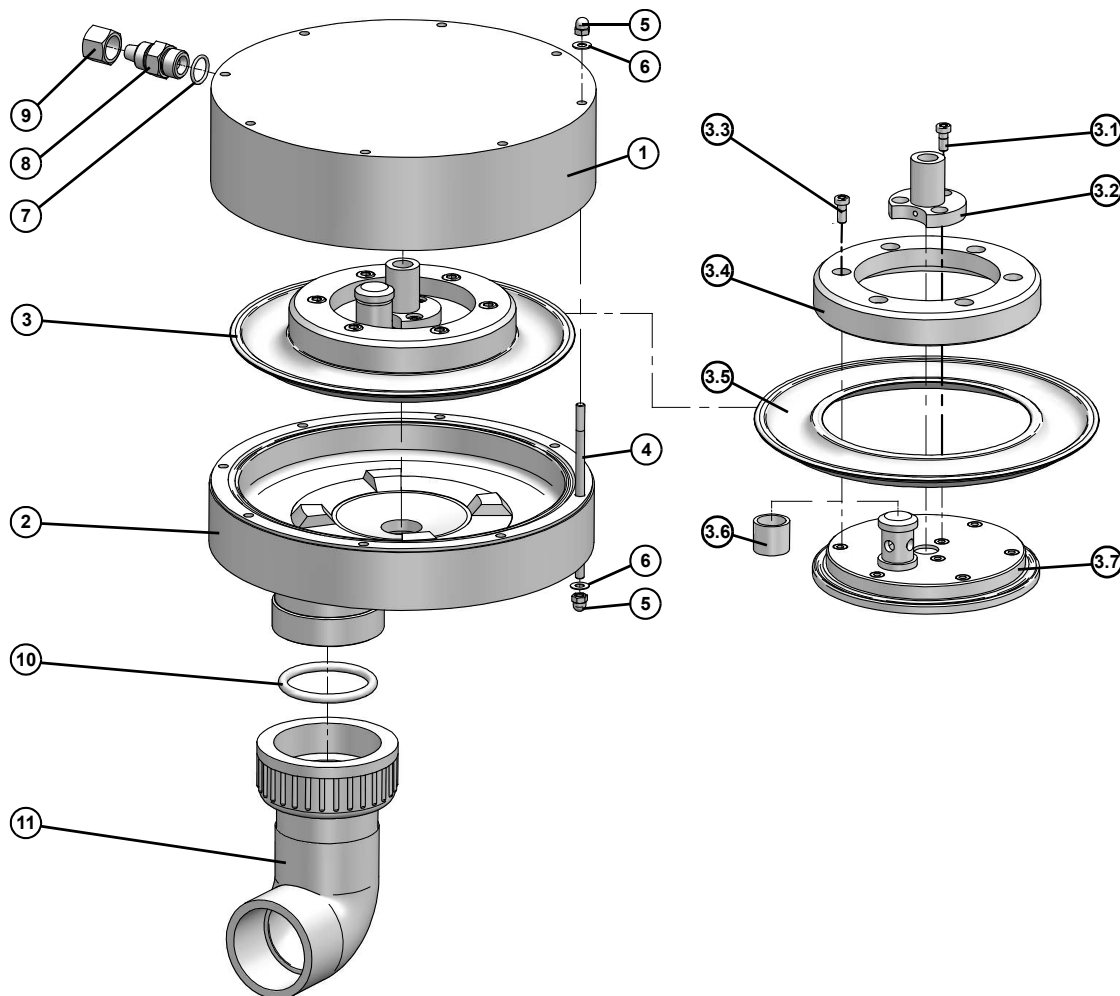


Fig. 10-3: Exploded view of the vacuum part

10.5.1 Disassembling the vacuum part

Perform the following working steps:

1. Release and remove the screws (4 – 6).
2. Remove the diaphragm (3) from the device.
3. Remove the O-rings (7, 10)
4. Remove all the screws on the diaphragm disc and remove the diaphragm (3.5).
5. Carefully lift up the rubber tube piece (3.6) using a blunt object. Ensure that the PVC part is not damaged.

✓ **Vacuum part disassembled.**

10.5.2 Cleaning the vacuum part

Perform the following working steps:

1. Thoroughly clean all parts which are not replaced. Warm water and isopropyl alcohol are suitable for this.
2. The parts which are not included with the maintenance set should be subjected to a visual inspection and replaced if they are damaged. Pay particular attention to the PVC surface below the rubber tube piece (3.6) and the contours for the diaphragm (3.5) on the diaphragm disc (3.7, 3.4) and on the housing (1, 2).

✓ **Vacuum part cleaned.**

10.5.3 Installing the vacuum part

Precondition for action:

- ✓ The parts are completely dry following cleaning.
- ✓ The parts are in good condition.
- ✓ Wearing parts are available.

Perform the following working steps:

1. Rub a little silicone grease onto the edges of the diaphragm (3.5).
2. Put the diaphragm (3.5) with the curvature facing downward onto the diaphragm disc (3.7) and then attach the clamping ring (3.4).
3. Firstly only put the screws (3.3) and some fitting grease loosely into place.
4. Check that the diaphragm (3.5) is in the correct position by pulling gently on it.
5. Tighten the screws (3.3) crosswise applying a torque of approx. 1 Nm.
6. Install the rubber tube piece (3.6) on the PVC tap on the membrane disc (3.7). Do not use sharp tools for this.
7. Install the guide sleeve (3.2). Screw in the screws (3.1) using a little fitting grease (tightening torque approx. 1 Nm).

✓ **Diaphragm disc installed.**

8. Place the diaphragm disc (3) with the metal insert facing downwards in the lower housing (2) and ensure the diaphragm (3.5) fits properly.
9. Attach the upper housing (1). Applying slight pressure turn the housing parts against each other to ensure that the diaphragm (3.5) is well seated.
10. Screw in the screws (4 – 6) with a little fitting grease. Tighten the screws crosswise to a torque of approx. 2 Nm.
11. Screw in the screw connection (8) with the O-ring (7) by hand.
12. Fit the O-ring (10) to the output and tighten the union nut (11) by hand.

✓ **Vacuum part installed.**

10.5.4 Testing the vacuum part

Testing for leaks

Precondition for action:

- ✓ The vacuum part is installed.
- ✓ The inlet valve has been successfully tested, thoroughly dried and installed on the vacuum regulator.
- ✓ The injector is ready for operation.

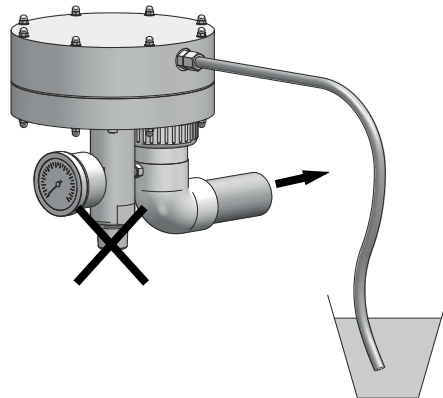


Fig. 10-4: Test for leaks

Perform the following working steps:

1. Close the input of the vacuum regulator
2. Connect the injector to the output of the vacuum regulator.
3. Switch on the injector.
4. After approx. ½ minute attach a tube to the safety valve connection.
5. Immerse the open end in water.
 - ▶ The water must not rise in the tube.

✓ **Leak test concluded**

Testing the functioning of the safety valve

Precondition for action:

- ✓ The leak test is concluded.
- ✓ Compressed air or nitrogen with a suitable pressure reducing valve is available.

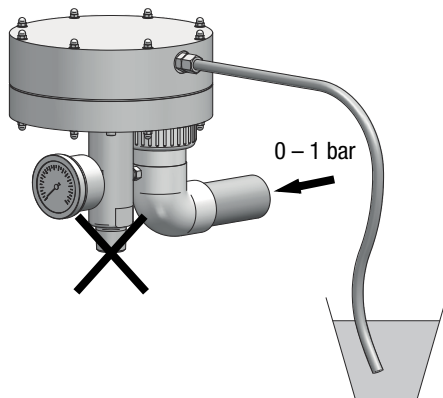


Fig. 10-5: Testing the safety valve

Perform the following working steps:

1. Close the input to the vacuum regulator.
2. Connect the compressed air or nitrogen to the output of the vacuum regulator.
3. Install a tube on the safety valve connection.
4. Immerse the open end into water.
5. Increase the pressure slowly, starting at 0 bar.
 - ▶ To start off with there is no permanent flow. Bubbles only form when the pressure is increased. As of approx. 0.5 bar, a permanent flow can be observed.
6. Slowly decrease the pressure again. The safety valve must be closed below 0.1 bar.

✓ **Testing of the safety valves concluded**

10.6 Conclusion of maintenance

Perform the following working steps:

1. Note the date and scope of maintenance.
2. Attach a sticker with the date of maintenance to the device.
3. Install the vacuum regulator in the system.
4. To recommission the system, proceed as described in the chapter "Commissioning" on page 18.

✓ **Maintenance concluded.**

11 Troubleshooting

Problem	Possible cause	Remedy
No or too little dosing	The chlorine container is empty	Connect a new chemical container
	The container valve or a valve in the chlorine supply is closed or not fully open.	Open the valves fully
	The connection line on the chlorine container is blocked or bent	Clean or replace the line
	The filter in the chlorine gas line is blocked (can be recognised by the low pressure on the input to the vacuum regulator)	Clean and exchange the filter Use chlorine gas of a better quality
	The supply pressure for the vacuum regulator is too low	Increase the outlet pressure of the pressure reducing valve
	Vacuum is too low due to ...	
	... a leak in the line	Tighten all screw connections in the vacuum line Check the O-rings
	... a leak in the dosing device	See the troubleshooting section in the dosing device's operating manual
	... reduced injector performance	See the troubleshooting section in the injector's operating manual
	... a leak in the vacuum regulator (can be recognised by the permanent drawing in of air at the vent line).	Maintain the vacuum part
Vent line draws air in continuously	Diaphragm is not installed correctly, torn	Maintain the vacuum part
	There is dirt in the safety valve, the rubber tube piece is faulty, PVC tap below the rubber tube piece is damaged.	Maintain the vacuum part
Smell of chlorine in the room	The safety valve opens as the inlet valve cannot close completely due to dirt	Maintain the inlet valve If necessary install a chlorine gas filter
	There is a leak on the overpressure line	Localise and repair the leak using the ammonia test
	The injector non-return valve is not tight and returning water creates overpressure in the vacuum line The safety valve responds	Carry out maintenance on the injector non-return valve
PVC parts have been badly attacked or liquid chlorine in the flow meter	Chlorine gas condenses to form liquid chlorine as the temperature at the inlet valve is lower than the temperature at the chlorine barrel	Install the pressure reducing valve Install tube heating directly in front of the inlet valve Install the moisture eliminator
	Condensed chlorine collects at the lowest point of the pipe system and enters the vacuum regulator	Install the vacuum regulator at the highest point Lay the supply line so that it ascends continuously
Ice or a lot of condensation at the inlet valve or on the pressure line	Chlorine withdrawal is too high	Connect additional chlorine barrels
	Drop in pressure at the not fully open valves causes extreme cooling due to expansion	Open the valves fully
Water in the device	The injector non-return valve is not tight	Carry out maintenance on the injector non-return valve If necessary install a second non-return valve
	The end of the vent line is not protected against the entrance of water	Lay the vent line accordingly Point the end of the line downwards
Vibrations in the system	The installation coincidentally hits the resonance frequency of the vacuum regulator	Change the setting of the pressure reducing valve or slightly restrict the stop valve ahead of the vacuum regulator.

Table 11-1: Troubleshooting

12 Spare parts

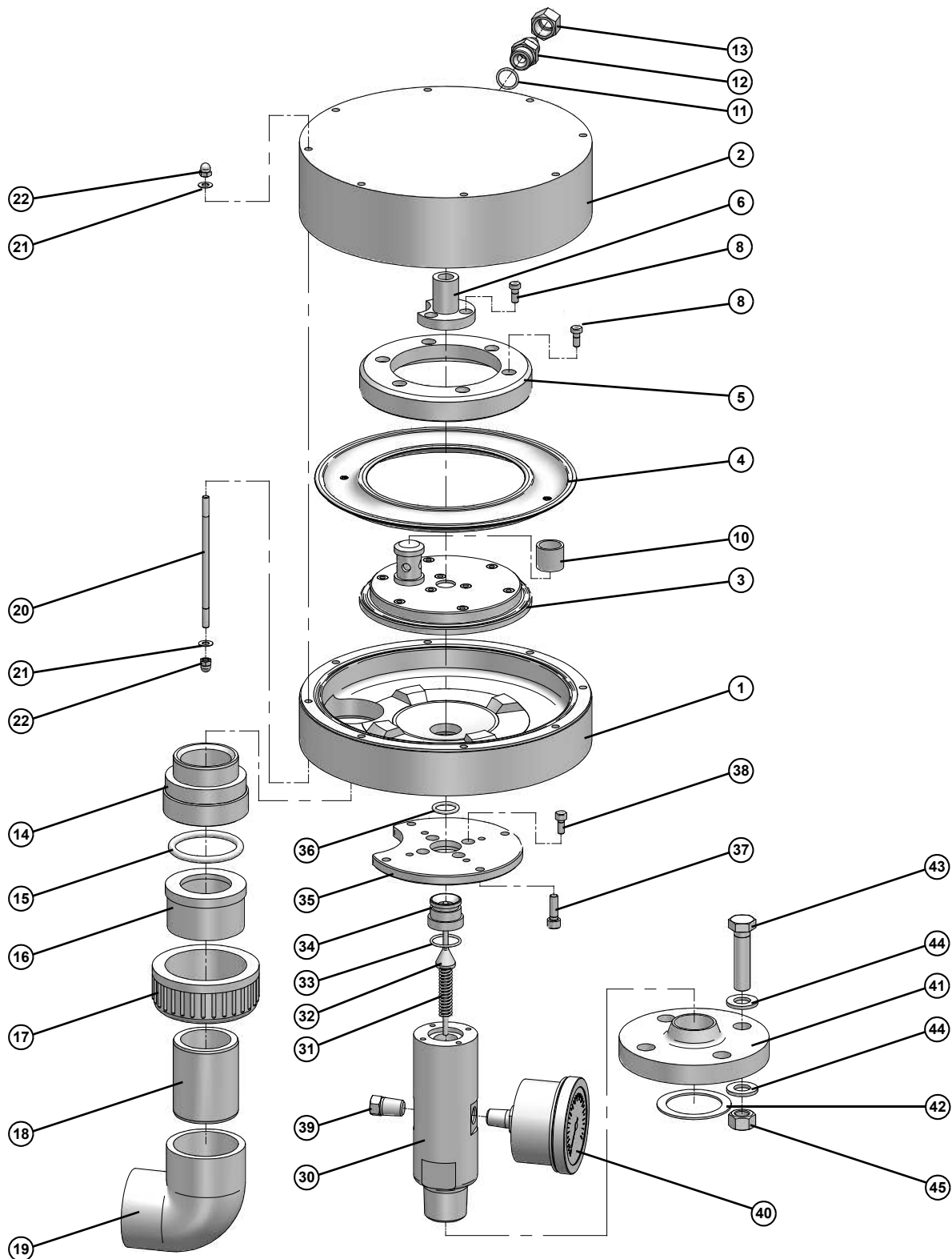


Fig. 12-1: Vacuum Regulator for Chlorine Gas C 2700-V – spare parts

12.1 Individual parts

Items which are contained in the maintenance sets (see Table 12-3 on page 31) are marked with A, B or C.

Item	No.	Description	Info	Part number
1	1	Lower part housing	PVC	39505
2	1	Upper part housing	PVC	39518
3	1	Diaphragm disc	PVC	13273
4 ^(B)	1	Ring diaphragm	FPM, Ø200/122	81308
5	1	Diaphragm clamping ring	PVC	13276
6	1	Guide sleeve	PVDF	13275
8 ^(B)	9	Cylinder head screw	M5x12	84250
10 ^(A, B)	1	Tube piece	FPM, Ø21/17x18	81242
11 ^(A)	1	O-ring	FPM, Ø14x1.78	80003
12	1	Tube connection	8/12 – G 3/8	35017
13	1	Union nut	8/12	10365
14	1	Reducer	Ø50a – G 2 ¼ a	39506
15 ^(A)	1	O-ring	FPM, Ø47x5.3	80079
16	1	Stick-on connector	Ø50i	13718
17	1	Union nut	G 2 ¼	13717
18	1	Pipe piece	Ø50x60	27391
19	1	Bracket	Ø50	82926
20	8	Stud	M5x108	35650
21 ^(C)	16	Washer	Ø5.3	84064
22 ^(C)	16	Cap nut	M5	83005
30	1	Housing for inlet valve	1" NPT	39787
31 ^(C)	1	Compression spring	Ø10x55	13687
32 ^(C)	1	Valve cone		13271
33 ^(A)	1	O-ring	FPM, Ø20.35x1.78	80001
34 ^(A)	1	Valve seat	PTFE, Monel	28278
35	1	Clamp flange		39784
36 ^(A)	1	O-ring	FPM, Ø15.5x2.62	80008
37 ^(A)	4	Cylinder head screw	M6x20	84252
38 ^(A)	4	Cylinder head screw	M5x12	83606
39	1 – 2	Plug	¼" NPT	38778
40	1	Pressure gauge	16 bar, Ø63, ¼" NPT	24087599
41	1	Threaded flange DN25 / PN40 with groove	1" NPT i	15928
42 ^(A)	1	Flat gasket	Ø57/43x1.5	81421
43	4	Hexagonal bolt	M12x50	83712
44	8	Washer	Ø13	84136
45	4	Hexagonal nut	M12	83128

Table 12-1: Spare parts – individual parts for C 2700-V

12.2 Complete assemblies

Item	Description	Part number
3 – 10	Diaphragm disc	27389
30 – 45	Inlet valve without pressure gauge, connection 1" NPT a	39788
	Inlet valve with pressure gauge, connection 1" NPT a	39507
	Inlet valve without pressure gauge, connection with flange DN25/PN40	39508
	Inlet valve with pressure gauge, connection with flange DN25/PN40	39509
42 – 45	Assembly set for flanges	38712

Table 12-2: Spare parts – complete assemblies for C 2700-V

12.3 Maintenance sets

Part	Content	Part number
Small maintenance set	All parts which are marked with (A) in the table 12-1: <ul style="list-style-type: none"> ■ All O-rings ■ Valve seat for inlet valve ■ Tube piece for safety valve ■ Flat gasket ■ Screws for inlet valve 	39511
Maintenance set for diaphragm disc	All parts which are marked with (B) in the table 12-1: <ul style="list-style-type: none"> ■ Ring diaphragm ■ Tube piece for safety valve ■ Screws for diaphragm disc 	39513
Large maintenance set	All parts which are marked with (A), (B) or (C) in the table 12-1: <ul style="list-style-type: none"> ■ Small maintenance set ■ Maintenance set for diaphragm disc ■ Compression spring ■ Valve cone 	39512

Table 12-3: Spare parts – maintenance sets for C 2700-V

13 Declaration of Incorporation



(DE) Einbauerklärung im Sinne der EG-Richtlinie 2006/42/EG über Maschinen (Anhang II B)

Hiermit erklären wir, dass die nachstehend beschriebene unvollständige Maschine alle grundlegenden Anforderungen der Maschinenrichtlinie 2006/42/EG erfüllt, soweit es im Rahmen des Lieferumfangs möglich ist. Ferner erklären wir, dass die speziellen technischen Unterlagen gemäß Anhang VII Teil B dieser Richtlinie erstellt wurden. Wir verpflichten uns, den Marktaufsichtsbehörden auf begründetes Verlangen die speziellen Unterlagen zu der unvollständigen Maschine über unsere Dokumentationsabteilung zu übermitteln. Die unvollständige Maschine darf erst dann in Betrieb genommen werden, wenn ggf. festgestellt wurde, dass die Maschine oder Anlage, in welche die unvollständige Maschine eingebaut werden soll, den Bestimmungen der Richtlinie 2006/42/EG über Maschinen entspricht und die EG-Konformitätserklärung gemäß Anhang II A ausgestellt ist.

(EN) Declaration of Incorporation according to EC directive 2006/42/EC on machinery (Annex II B)

Herewith we declare, that the partly completed machinery described below is complying with all essential requirements of the Machinery Directive 2006/42/EC, as far as the scope of delivery allows. Additional we declare that the relevant technical documentation is compiled in accordance with part B of Annex VII. We commit to transmit, in response to a reasoned request by the market surveillance authorities, relevant documents on the partly completed machinery by our documentation department. The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of Directive 2006/42/EC on Machinery, where appropriate, and until the EC Declaration of Conformity according to Annex II A is issued.

(FR) Notice de montage dans le cadre de la directive européenne 2006/42/CE relative aux machines (annexe II B)

Nous expliquons ici que la machine incomplète décrite ci-après répond à toutes les exigences fondamentales de la directive relative aux machines 2006/42/CE, pour autant que cela soit possible dans le cadre du volume de livraison. Plus loin nous expliquons que les documents techniques spéciaux sont établis conformément à l'annexe VII partie B de cette directive. Pour ce qui est de notre service de documentation, nous nous engageons à communiquer aux autorités de surveillance du marché les explications fondées des documents spéciaux pour la machine incomplète. La machine incomplète doit d'abord être mise en service, quand il est constaté que la machine ou l'installation dans laquelle la machine incomplète doit être montée répond aux dispositions de la directive 2006/42/CE relative aux machines, et que la notice de conformité européenne est présentée conformément à l'annexe II A.

(ES) Declaración de incorporación según la Directiva 2006/42/CE sobre máquinas (Anexo II B)

Por la presente declaramos que la siguiente cuasi máquina cumple con todas las disposiciones pertinentes de la Directiva 2006/42/CE de máquinas, siempre y cuando lo permita el volumen de suministro. También declaramos que la documentación técnica descrita en el anexo VII parte B se ha elaborado conforme a la presente Directiva. Nos comprometemos a enviar los documentos de la cuasi máquina a las autoridades de vigilancia del mercado a través de nuestro departamento de documentación en respuesta a una previa solicitud motivada. La cuasi máquina no puede ponerse en servicio sin antes verificar que la máquina o el sistema en el que se instale la cuasi máquina, cumpla con las disposiciones de la Directiva 2006/42/CE de máquinas y con la declaración CE de conformidad según el anexo II A.

(PT) Declaração de Construção de acordo com a Directiva-CE 2006/42/CE de máquinas (Anexo II B)

Esclarecemos por meio deste que a máquina incompleta descrita a seguir segue os requerimentos da directiva de máquinas 2006/42/CE, contanto que sua utilização seja mantida dentro do escopo original. Esclarecemos ainda que a documentação técnica especial segue o disposto no Anexo VII Parte B de tal directiva. Comprometemo-nos a cumprir com as exigências das autoridades de fiscalização que forem feitas a nosso departamento de documentação que estejam relacionadas a qualquer documentação da máquina incompleta. A máquina poderá ser colocada em operação, se necessário for, desde que seja verificado que o sistema ou a máquina na qual a máquina incompleta será instalada foi montada, em conformidade com a directiva 2006/42/CE de máquinas e com a declaração de conformidade 2006/42/CE.

Bezeichnung des Gerätes:	Chlorgas-Vakuumregler	Descripción de la mercancía:	Regulador de vacío
Description of the unit:	Chlorinator	Designação do aparelho:	Regulador de vácuo
Désignation du matériel:	Régulateur à dépression		
Type / Type:	C 2700-V		
Volumen / Volume:			

Die unvollständige Maschine entspricht allen Bestimmungen der Richtlinie(n):
The partly completed machine is in conformity with all requirements of the directive(s):

2006/42/EG	Maschinenrichtlinie	Machinery Directive
1997/23/EG	Druckgeräte richtlinie	Pressure Equipment Directive

Folgende harmonisierte Normen wurden angewandt:
The following harmonised standards were applied:

DIN 19606	Chlorgasdosieranlagen zur Wasseraufbereitung - Anlagenaufbau und Betrieb
DIN 19606	Chlorinators for water treatment - Equipment, installation and operation



i. V. Dipl. Ing. (FH) Gerd-Richard Sacht
Leiter Abteilung Gasdosierung
Head of Gas Dosing Department
Lutz-Jesco, Wedemark, 01.07.2013

Dokumentationsbevollmächtigter:
Authorized person for documentation:
Gerd-Richard Sacht
Adresse: siehe Adresse des Herstellers
Address: see manufacturer's address

Lutz-Jesco GmbH
Am Bostelberge 19
30900 Wedemark
Germany

14 Declaration of harmlessness

Copy the Declaration of harmlessness and complete it separately for each unit. Enclose one copy to the unit you are sending. Please send the Declaration of Conformity to us also in advance per fax or e-mail!

Declaration of no objection

Please fill out a separate form for each appliance!

We forward the following device for repairs:

Device and device type: Part-no.:

Order No.: Date of delivery:

Reason for repair:

.....

.....

Dosing medium

Description: Irritating: ☐ Yes ☐ No

Properties: Corrosive: ☐ Yes ☐ No

We hereby certify, that the product has been cleaned thoroughly inside and outside before returning, that it is free from hazardous material (i.e. chemical, biological, toxic, flammable, and radioactive material) and that the lubricant has been drained.

If the manufacturer finds it necessary to carry out further cleaning work, we accept the charge will be made to us.

We assure that the aforementioned information is correct and complete and that the unit is dispatched according to the legal requirements.

Company / address: Phone:

..... Fax:

..... Email:

Customer No.: Contact person:

Date, Signature:

Notes

15 Warranty application

In the event of a repair, copy the warranty application and complete it separately for each unit. Enclose one copy to the unit you are sending. Please send the warranty application to us also in advance per fax or e-mail!

Warranty Application

Please copy and send it back with the unit!

If the device breaks down within the period of warranty, please return it in a cleaned condition with the complete warranty application, filled out.

Sender

Company: Phone: Date:

Address:

Contact person:

Manufacturer order no.: Date of delivery:

Device type: Serial number:

Nominal capacity / nominal pressure:

Description of fault:

.....

.....

.....

.....

.....

.....

.....

Service conditions of the device

Point of use / system designation:

.....

.....

Accessories used (suction line etc.):

.....

.....

.....

.....

Commissioning (date):

Duty period (approx. operating hours):

Please describe the specific installation and enclose a simple drawing or picture of the chemical feed system, showing materials of construction, diameters, lengths and heights of suction and discharge lines.

Notes

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