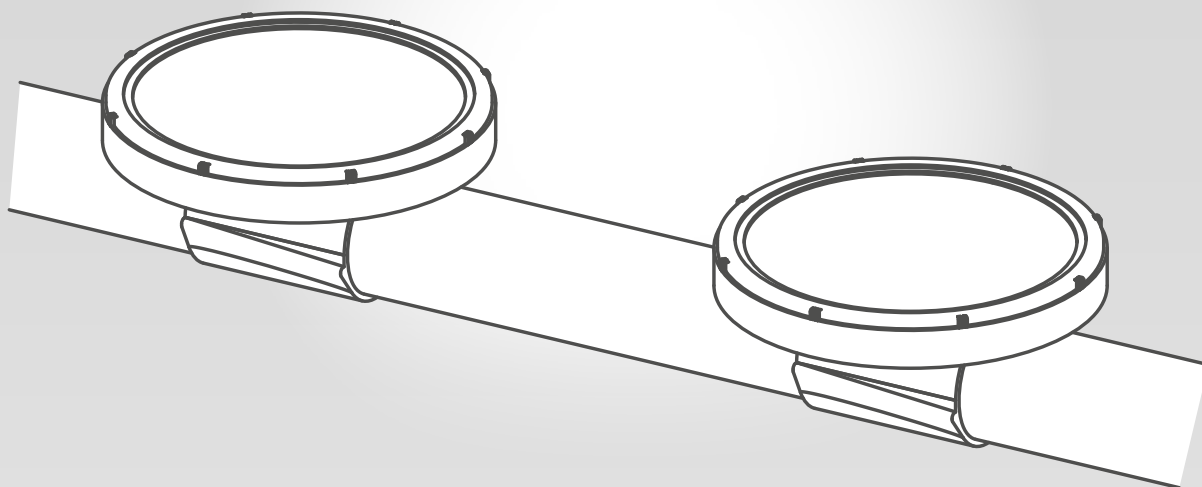


## Wilo-Sevio AIR



- de** Einbau- und Betriebsanleitung
- US** Installation and operating instructions
- hu** Beépítési és üzemeltetési utasítás

Fig. 1

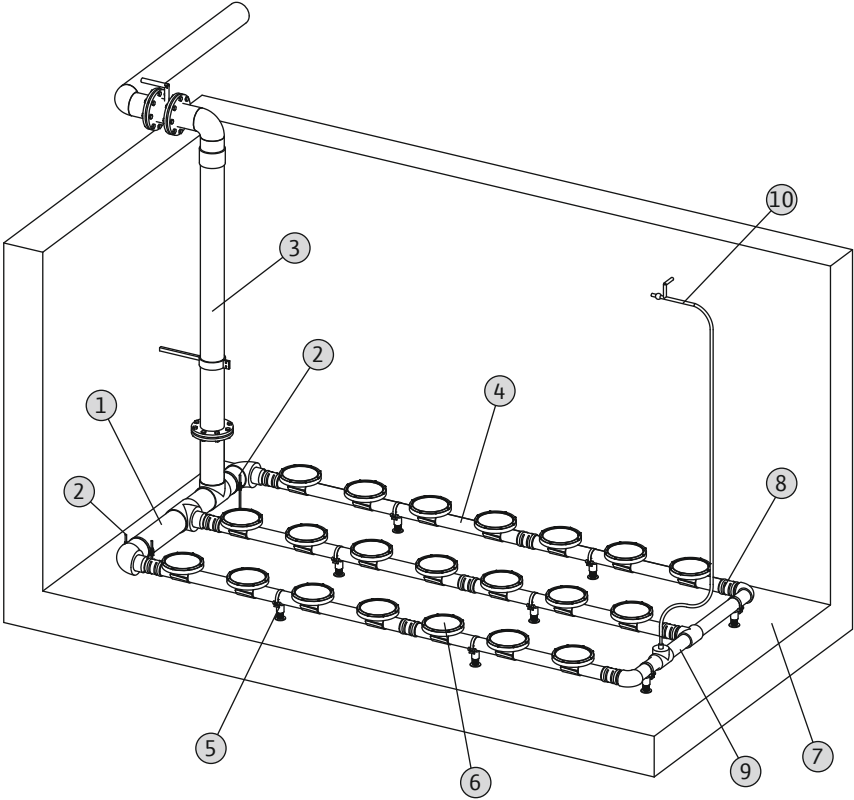


Fig. 2

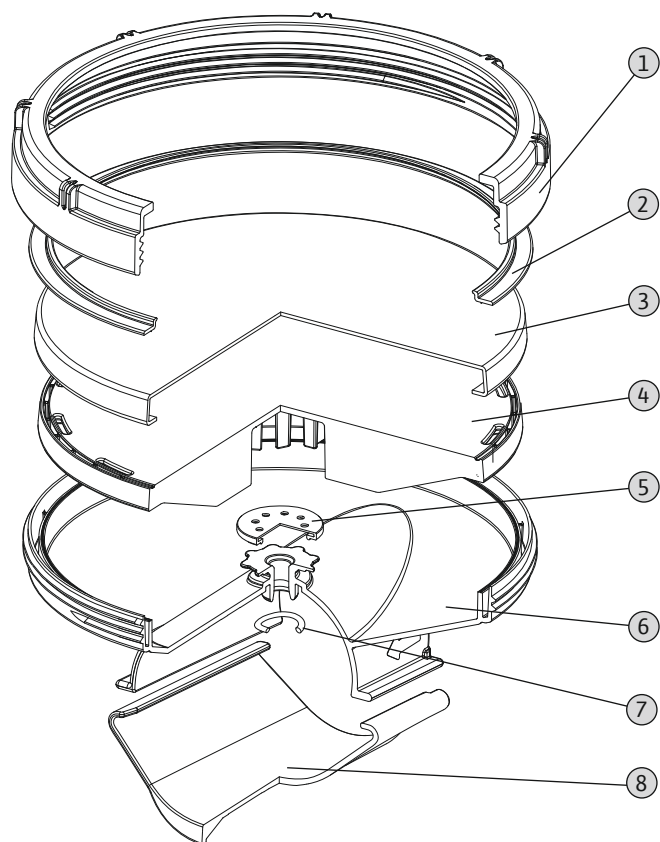


Fig. 3

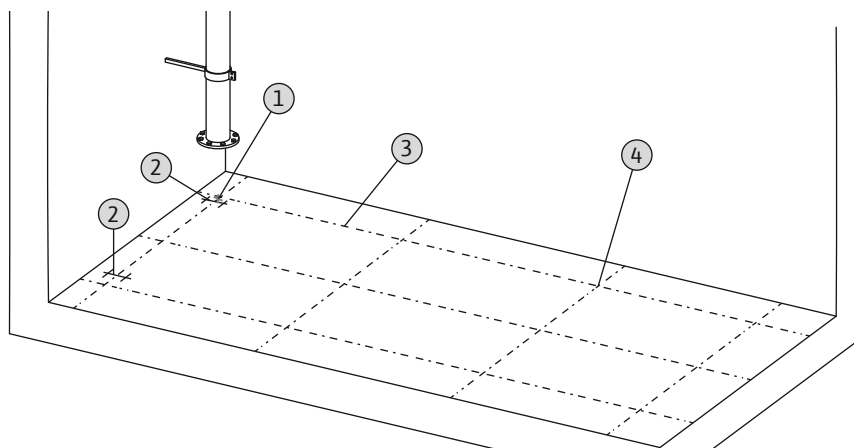


Fig. 4

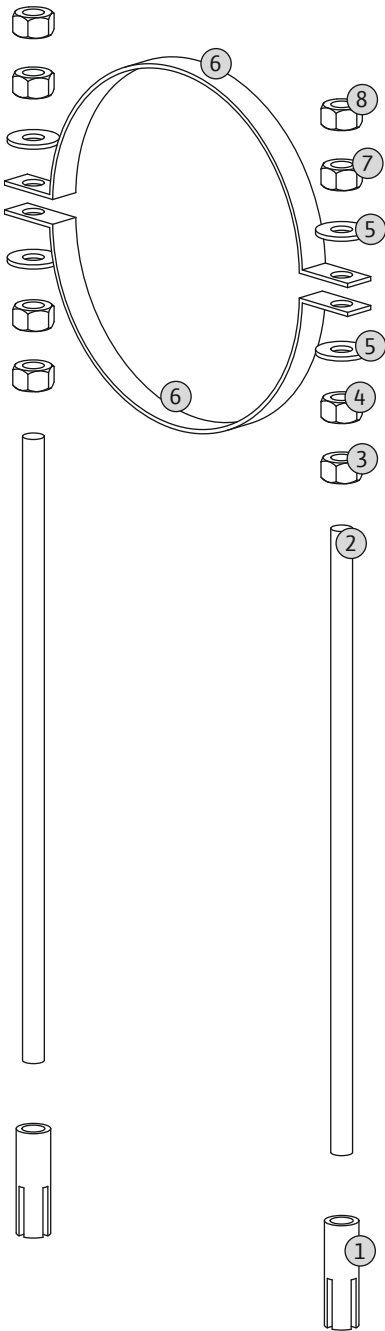


Fig. 5

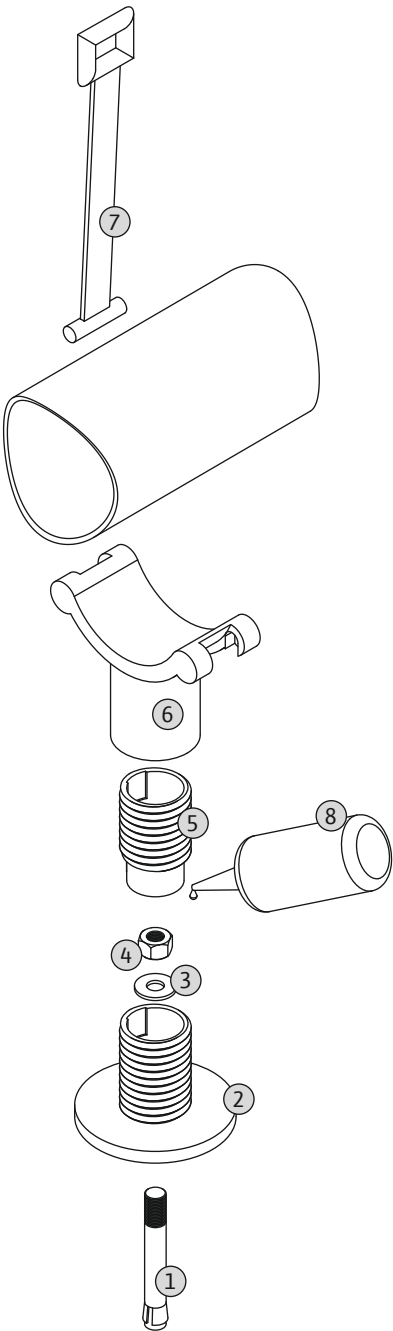


Fig. 6

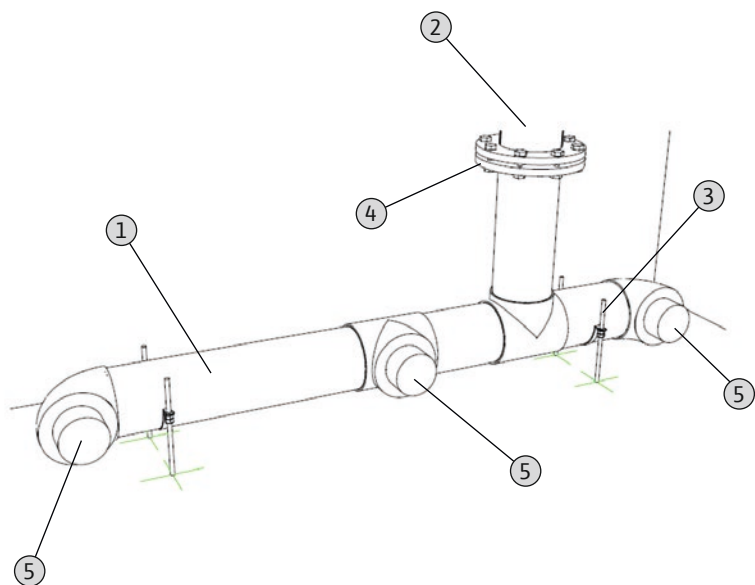


Fig. 7

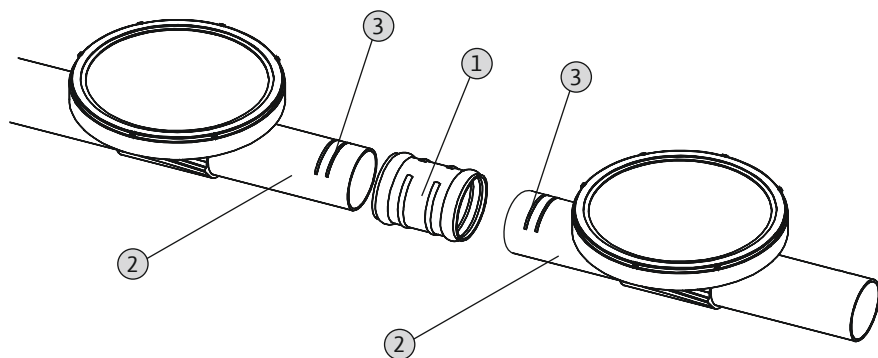


Fig. 8

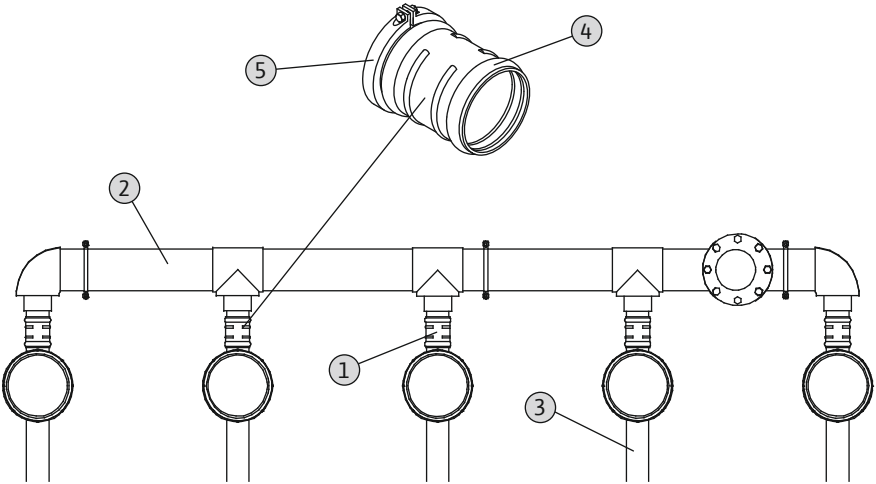


Fig. 9

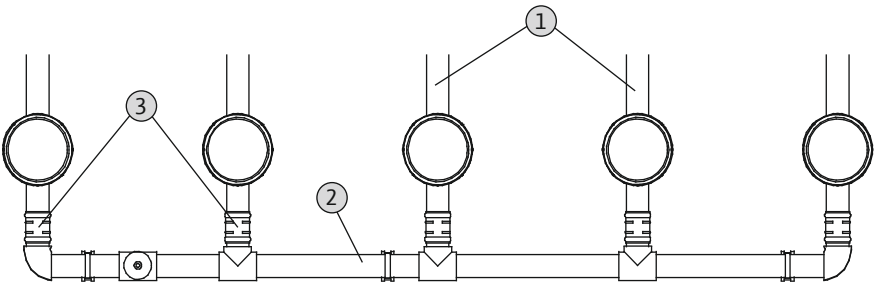


Fig. 10

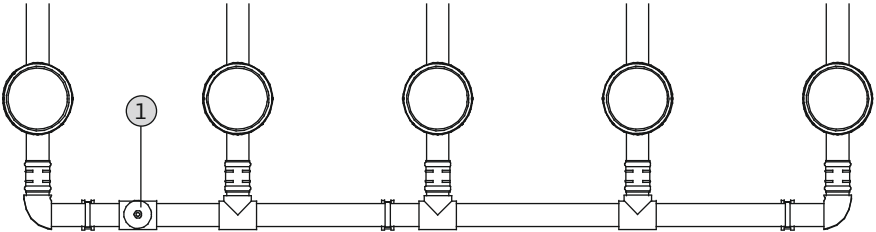


Fig. 11

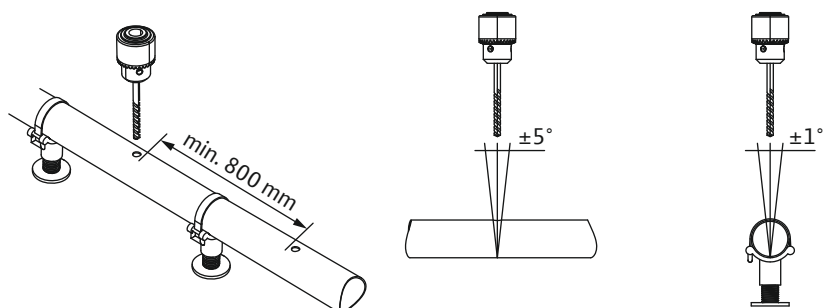


Fig. 12.1

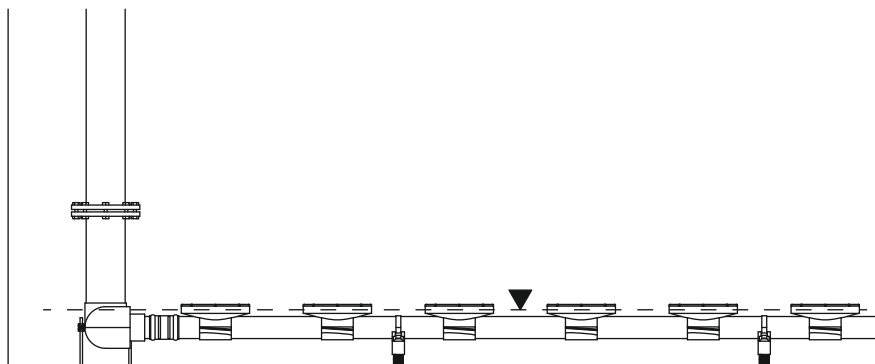


Fig. 12.2

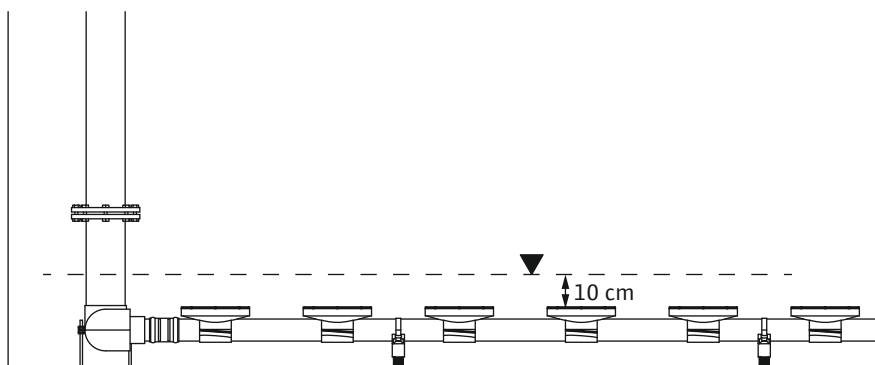
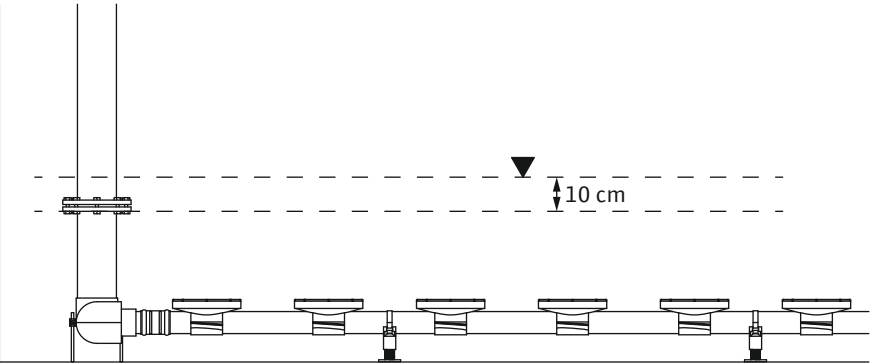


Fig. 12.3





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## **1. Introduction**

### **1.1. About this document**

The language of the original operating manual is German. All other language versions are translations of the original German manual.

The operating manual contains a copy of the EC Declaration of Conformity.

Any unauthorized or unapproved changes made to the design specified in it will nullify this declaration.

### **1.2. Structure of the manual**

The manual is divided into individual sections. Each section has a heading which clearly describes its content.

The table of contents also serves as a brief reference, since all the important sections have their own headers.

All the important operating and safety instructions are highlighted. For detailed information on the structure of these texts, see "Safety" in section 2.

### **1.3. Personnel qualifications**

All personnel who work on or with the product must be qualified for such work; electrical work, for example, may only be carried out by a qualified electrician. All personnel must be of legal age.

Operating and maintenance personnel must also observe national accident prevention regulations.

It must be ensured that the personnel have read and understood the instructions in this operating and maintenance handbook; if necessary, this manual must be ordered from the manufacturer in the required language.

This product is not intended to be used by persons (including children) with limited physical, sensory or mental capacities or without the relevant experience or knowledge, unless they are supervised by a person responsible for their safety and receive instructions from this person on how to use the product.

Children must be supervised in order to ensure that they do not play with the product.

### **1.4. Abbreviations**

- p.t.o. = please turn over
- re. = regarding
- approx. = approximately
- i.e. = that means
- incl. = including
- min. = minimum
- max. = maximum
- etc. = and so on
- s.a. = see also
- e.g. = for example

**1.5. Illustrations**

Dummies and original drawings of the products are used in the illustrations. This is the only sensible solution given our wide range of products and the differing sizes offered by the modular system. More exact drawings and specifications can be found on the dimension sheet, the planning information and the installation plan.

**1.6. Copyright**

This operation and maintenance manual has been copyrighted by the manufacturer. The operation and maintenance handbook is intended for use by assembly, operating and maintenance personnel. It contains technical specifications and diagrams which may not be reproduced or distributed, either completely or in part, or used for any other purpose without the express consent of the manufacturer.

**1.7. Rights of alteration**

The manufacturer reserves the right to make technical alterations to systems or components. This operating and maintenance manual refers to the product indicated on the title page.

**1.8. Warranty**

This section contains the general information on the warranty. Contractual agreements have the highest priority and are not superseded by the information in this section. The manufacturer is obliged to correct any defects found in the products it sells, provided that the following requirements have been fulfilled:

**1.8.1. General requirements**

- The defects are caused by the materials used or the way the product was manufactured or designed.
- The defects were reported in writing to the manufacturer within the agreed warranty period.
- The product was used only as prescribed.
- All safety and control devices were connected and inspected by qualified personnel.

**1.8.2. Warranty period**

If no other provisions have been made, the warranty period covers the first 12 months after initial start-up or up to 18 months after the delivery date. Other agreements must be made in writing in the order confirmation. These remain valid at least until the agreed warranty period of the product has expired.

**1.8.3. Spare parts, add-ons and modifications**

Only genuine spare parts from the manufacturer may be used for repairs, replacements, add-ons and modifications. These are the only parts that guarantee a long service life and maximum safety. These parts have been specially designed for our products. Unau-

thorized add-ons and modifications or the use of non-original spare parts can seriously damage the product and injure personnel.

#### **1.8.4. Maintenance**

The prescribed maintenance and inspection work should be carried out regularly. This work may only be carried out by qualified, trained and authorized personnel. Maintenance not listed in this operation and maintenance manual, and any type of repair work may only be performed by the manufacturer and authorized service centers.

#### **1.8.5. Damage to the product**

Damage and malfunctions that endanger safety must be eliminated immediately by trained personnel. The product may only be operated if it is in proper working order. During the agreed warranty period, the product may only be repaired by the manufacturer or an authorized service center. The manufacturer reserves the right to ask the operator to return the damaged product to the factory for inspection.

#### **1.8.6. Exclusion from liability**

No liability will be assumed for product damage if any of the following items apply:

- The manufacturer deems that information provided by the operator or customer is insufficient or incorrect
- Failure to observe the safety instructions, the regulations and requirements of German law or the applicable local laws, or of this operating and maintenance manual
- Improper use
- Incorrect storage and transport
- Improper assembly or dismantling
- Insufficient maintenance
- Improper repairs
- Inadequate construction site or construction work
- Chemical, electrochemical and electrical influences
- Wear

This means the manufacturer's liability excludes all liability for personal, material or financial injury.

## **2. Safety**

This section lists all the generally applicable safety instructions and technical information.

All instructions and information must be observed and followed during the various phases of the product's life cycle (installation, operation, maintenance, transport, etc.)! The operator is responsible for ensuring that personnel follow these instructions and guidelines.

## 2.1. Instructions and safety information

This manual uses instructions and safety information to prevent injury and damage to property. To clearly identify them for personnel, the instructions and safety information are distinguished as follows:

### 2.1.1. Instructions

Instructions are displayed in bold type. Instructions contain text that refers to the previous text or particular sections, or highlights short instructions.

Example:

**Note that products stored with drinking water must be protected from frost.**

### 2.1.2. Safety information

Safety information is slightly indented and displayed in bold type. It always commences with a signal word.

Information that only refers to material damage is printed in gray, without safety symbols.

Information that refers to personal injury is printed in black and is always accompanied by a safety symbol. Danger, prohibition or instruction symbols are used as safety symbols.

Example:



**DANGER symbol: General hazard**



**DANGER symbol, for example, electrical current**



**PROHIBITION symbol, for example, Keep out!**



**INSTRUCTION symbol, for example, wear protective equipment**

The safety symbols used conform to the generally valid directives and regulations, such as DIN and ANSI.

Each safety instruction begins with one of the following signal words:

- **Danger**

Serious or fatal injuries can occur!

- **Warning**

Serious injuries can occur!

- **Caution**

Injuries can occur!

- **Caution** (instruction without symbol)

Substantial material damage can occur. Irreparable damage is possible!

Safety instructions begin with a signal word and description of the hazard, followed by its cause and potential consequences, and end with advice on prevention.

Example:

**Beware of rotating parts!**

**The moving impeller can crush and sever limbs. Switch off the device and let the impeller come to a halt.**

## 2.2. General safety information

- When installing or removing the product, never work alone in rooms and shafts. A second person must always be present.
- Sufficient ventilation must be provided in enclosed rooms.
- When welding or working with electrical devices, make sure there is no risk of explosion.
- During work in environments hazardous to health (liquid containing fecal matter, activated sludge with bacteria, etc.), special caution is required:
  - Open wounds must be immediately cleaned and treated.
  - Eating and drinking are strictly prohibited.
  - Proper protective equipment must be worn!
  - Upon leaving the system, disinfect persons and tools.
- The product must always be switched off before any work is performed on it (assembly, dismantling, maintenance, installation). The product must be secured against being switched back on.
- The person operating the product must notify his or her supervisor immediately should any defects or irregularities occur.
- Tools and other objects should be kept in a place reserved for them so that they can be found quickly.
- Only use lashing equipment which is legally defined as such and officially approved.
- The lashing equipment must be kept safely and must be suitable for the conditions of use (weather, hooking device, load, etc).
- Mobile equipment for lifting loads should be used in such a way that it always remains stable during operation.
- When using mobile equipment for lifting non-guided loads, take action to prevent tipping, sliding, etc.
- Measures should be taken to ensure that no person is ever directly beneath a suspended load. Furthermore, it is also prohibited to move suspended loads over workplaces where people are present.

- If mobile equipment is used for lifting loads, a second person should be present to coordinate the procedure if required (for example, if the operator's field of vision is blocked).
- The load to be lifted must be transported in such a manner that nobody can be injured in the event of a power outage. Additionally, when working outdoors, such procedures must be stopped immediately if weather conditions worsen.

**These instructions must be strictly observed. Non-observance can result in injury or substantial material damage.**

### 2.3. CE marking

If the product is obliged to carry a CE marking,

- the marking is attached to the product and
- a copy of the EC declaration of conformity is enclosed or is part of this operating manual.

### 2.4. Ground connection

Products with metallic and/or conductive surfaces must be grounded. If there is a possibility that people can come into contact with the product and the pumped liquid, the connection must be additionally equipped with a residual current circuit breaker.

### 2.5. Safety rules during operation

When operating the product, always follow the locally applicable laws and regulations for accident prevention and securing the worksite. To help to ensure safe working practice, the responsibilities of employees should be clearly set out by the owner. All personnel are responsible for ensuring that regulations are observed.

### 2.6. Liquids

Each liquid differs in terms of its composition, corrosiveness, abrasiveness and dry matter content, as well as in many other aspects. Generally, our products can be used for many applications. Please note that if requirements change (density, viscosity or general composition), this can also affect many operational parameters of the product.

When using or replacing the product in a different liquid, observe the following points:

- When used in drinking water applications, all the parts that come into contact with the fluid must be approved for use with drinking water.

**Before being used in drinking water, the corresponding products must be checked to ensure that they have been approved for such use.**

- Products that have been operated in dirty waste water must be cleaned thoroughly before being used for other liquids.
- Products that have been operated in sewage water and/or fluids that are hazardous to health must be decontaminated before being used with other liquids.

**It must be clarified whether the product can be used with another liquid.**

- If the product is to be used with highly flammable, explosive and/or aggressive fluids, the manufacturer must be consulted.

### 2.7. Sound pressure

The product itself is generally operated under water and only with air. This means that the sound pressure cannot be measured.

However, the air is supplied using a compressor. Depending on its power and environmental conditions, this compressor can have elevated sound pressure.

For this reason we recommend that the operator carry out an the additional measurement in the workplace when the product is operating.



#### **CAUTION: Wear ear protectors!**

**In terms of the applicable laws and regulations, ear protection must be worn if the sound pressure is greater than 85 dB (A). The owner is responsible for ensuring compliance with these regulations.**

## 3. Transport and storage

### 3.1. Delivery

On delivery, immediately check that the product is complete and undamaged. If any parts are damaged or missing, the transport company or the manufacturer must be notified on the day of delivery. Claims made after this date cannot be recognized. Damage to parts must be noted on the delivery or freight documentation.

### 3.2. Transport

Before transport, the product must be packaged in such a way that it is protected from moisture, frost and other damage. It is important to keep the original packaging.

### 3.3. Storage

- The components must be stored in the original packaging.
- The store room must be dry and frost-proof. We recommend storage in a room with a temperature between 10 °C and 25 °C. The temperature may not exceed +50 °C.
- The product must be protected from direct sunlight, heat, dust and frost. Furthermore, the product may not be stored in rooms where welding takes place. Heat and cold, as well as the gas and radiation given off during welding, can damage the plastic parts.
- New disc aerators may not be stored for more than three months. If they are stored for more than three months, there is a risk that the membranes will become porous and leaky.



4. Product description

4.1. Proper use

The Wilo-Sevio AIR disc aerator and aerator systems are used for fine-bubble air inclusion in liquids such as water, waste water or sludges, for the purpose of supplying oxygen to the liquids.

The temperature of the liquid must be between +5 °C and 30 °C. If the products are to be used in liquid with higher temperatures, the manufacturer must be consulted. The surrounding liquid must also be free of objects with sharp edges. We recommend that the liquid be pre-cleaned with a filter.

The supplied air must be free of oil, dust and solvents. Dust filters must correspond to filter class EU4 according to DIN 24185 (degree of separation >90%).

All filters and insulating materials in use may not be made of fiberglass, mineral fibers or other materials consisting of fine fibers. Rotary slide valves with graphite fins must be equipped with an air filter on the pressure side.

**These materials can lead to clogging of or damage to the membranes.**

4.2. Construction

A Wilo-Sevio AIR aerator system consists of one or more aerator groups. An aerator group forms the base unit and consists of several components:

Fig. 1.: Aerator system component overview

1	Air distributor with connecting flange for the intake line (down pipe)	6	Disc aerators
2	Base support for air distributor	7	Basin bottom
3	Intake line (down pipe); must be installed by the customer.	8	Pipe coupling for connecting the individual components
4	Aerator pipe with pre-assembled disc aerators	9	Drainage connection
5	Base support for aerator pipe	10	Drainage line; must be installed by the customer.

4.2.1. Piping

The pipes are pre-fabricated in components that can be easily used:

- PVC air distributors in the diameters of 90 mm, 160 mm and 200 mm with central or lateral DN 80 to DN 200 flange connection for the intake line. Larger diameters are available in stainless steel with DN 125 to DN 350 flange connections.
- PVC aerator pipes with 90 mm external diameter or made from stainless steel with 88.9 mm external diameter with pre-assembled disc aerator

- Drainage connection as the terminating connection of all aerator pipes with a connection for the drainage line. This can be used to drain off the condensate that can form during aeration.
- Pipe coupling with rubber ring seal as a plug connection for connecting the individual PVC components. The pipe coupling for securing the aerator pipes on the air distributor must also be equipped with a stainless steel clamping ring.

**4.2.2. Base support**

All pipes on the basin bottom are secured by the base supports. They also make it possible to level the aerator group.

There are two different base supports:

- For securing the stainless steel air distributor
- For securing the aerator pipes and the PVC drainage connection

**4.2.3. Disc aerators**

The disc aerators introduce the supplied air into the liquid. The air is distributed across the entire membrane surface and released through the perforated membrane. The disc aerator consists of several components.

**Fig. 2.: Disc aerator component overview**

1	Threaded ring	5	Non-return valve
2	Separation ring	6	Aerator housing
3	Membrane	7	O ring
4	Membrane support	8	Slide closure

- Fiberglass-reinforced plastic threaded ring for securing the membrane to the membrane support. The threaded ring and aerator housing are matched to each other in such a way that the threaded ring can be easily loosened even after years of use, allowing the membrane to be replaced.
- The polyacetal separation ring prevents the membrane from sticking to the threaded ring. This ensures that the membrane can be easily replaced.
- The EPDM membrane with perforations across its entire surface for optimal air inclusion.
- Fiberglass-reinforced plastic membrane support, which holds the membrane in place.
- The EPDM non-return valve protects the aerator system from penetration of the liquid if the membrane is defective.
- Fiberglass-reinforced plastic aerator housing with integrated anti-rotation lock
- NBR O ring for sealing the disc aerator against the aerator pipe
- Fiberglass-reinforced sliding closure for easy installation and removal of the disc aerator

### 4.3. Function

A blower or compressor is used to pump air through the intake line into the air distributor. The air is evenly distributed into the aerator pipes through the air distributor and fed to the disc aerators. The disc aerators distribute the air across the entire membrane surface and introduce this air into the liquid.

### 4.4. Technical data

- Disc aerators
    - External diameter: 280 mm
    - Membrane diameter: 237 mm
    - Membrane surface: 0.044 m<sup>2</sup>
    - Oxygen utilization: 6.5 ... 8.5%/m
    - Size of the air bubbles: 1–3 mm
    - Pressure loss: 22 ... 43 mbar
    - Connection size: 88.9 ... 90 mm
    - Max. air temperature in the system / disc aerator: 100 °C
  - Pressurization range
    - Air volume range: 1–8 Nm<sup>3</sup>/h\*
    - Min. pressurization: 1.5 Nm<sup>3</sup>/h\*
    - Standard pressurization: 4.0 Nm<sup>3</sup>/h\*
    - Max. pressurization: 6.0 Nm<sup>3</sup>/h\*
- Pressurization of 7.5 Nm<sup>3</sup>/h\* is possible for a brief period (no more than 15 minutes).
- \*The values for the pressurization apply to standardized conditions: 0 °C and 1013 hPa.

### 4.5. Scope of delivery

The scope of delivery differs according to whether a complete aerator system or only disc aerators (with the pipes provided by the customer) were ordered.

#### 4.5.1. "Aerator system" scope of delivery

- Air distributor with flange connection for intake line
- Aerator pipes with pre-assembled disc aerator
- Drainage connection
- Pipe connections
- Base support
- Fastening material
- Drilling plan for the base supports
- Overview and position diagram of the individual components
- Special key for easy installation/removal of the threaded ring on the disc aerator
- Rubber mallet

#### 4.5.2. "Disc aerator" scope of delivery

- Disc aerators
- Drilling plan for the connection holes on the pipes for the disc aerators

#### 4.5.3. Material to be provided by the customer

- Intake line for the air supply
- Blower or compressor
- Drainage line with shut-off valve
- All pipes if only disc aerators were ordered

## 5. Installation

In order to prevent damage to the product or serious injury during installation, the following points must be observed:

- Installation work – assembly and installation of the machine – may only be carried out by qualified persons. The safety instructions must be followed at all times.
- The machine must be inspected for transport damage before carrying out any installation work.

### 5.1. General requirements

For planning and operation of technical waste water systems, pay attention to the pertinent local regulations and directives for wastewater technology (such as those of the German Association for Water, Wastewater and Waste).

The following information must be observed when installing the product:

- This work must be carried out by qualified personnel.
- Check that the available planning documentation (installation plans, layout of the operating area, drilling plan) is complete and correct.
- Observe all regulations, rules and legal requirements for working with and underneath heavy suspended loads.
- Wear appropriate protective equipment.
- During all work, a second person must always be present. If there is a risk of poisonous or asphyxiating gases forming, the necessary precautions must be taken.
- Please also observe the applicable national accident prevention regulations and trade association safety provisions.



#### **DANGER of falling!**

**Work may be necessary directly at the edge of the shaft and/or basin during installation. Carelessness or wearing inappropriate clothing could result in a fall. There is a risk of fatal injury! Take all necessary safety precautions to prevent this.**

**BEWARE of poisonous substances!**

During work in environments hazardous to health, such as waste water or sewage treatment plants, there is an increased hazard from bacteria and viruses. In order to counteract this elevated risk, please keep the following points in mind:

- **Open wounds must be immediately cleaned and treated.**
- **Eating and drinking are strictly prohibited.**
- **Proper protective equipment must be worn.**
- **Upon leaving the system, disinfect persons and tools.**

**5.2. Types of installation**

- Aerator group securely fixed to the basin bottom

**5.3. The operating area**

- The operating area must be clean, with coarse solid particles removed, dry, frost-free and, if necessary, decontaminated.
- During all work, a second person must be present for safety reasons.
- If there is a risk of poisonous or asphyxiating gases forming, the necessary precautions must be taken.
- Safe, truck-accessible access must be available to the operating area.
- A storage location of sufficient size and with a solid subsurface must be available so that the complete load can be unloaded and stored in accordance with the specifications in the "Transport and storage" section.
- Provisioning of the electricity, water and compressed air supply for the installation.
- It must be ensured that hoisting gear can be fitted without any trouble, since this is required for assembly and removal of the product. It must be possible to reach the product safely in its operating and storage locations using the hoisting gear.
- For transport of the product, load-carrying equipment must be secured to the pipes with approved fastening devices. Here it is necessary to ensure that the load does not shift during transport.
- The structural components and foundations must be of sufficient stability in order to allow the product to be anchored securely and functionally. The operator or the supplier is responsible for the provision of the foundations and their suitability in terms of dimensions, stability and strength.

**5.3.1. Material to be provided by the customer**

- Intake line for the air supply  
The aerator group is connected through the air distributor to the intake line. The position of the intake line may not change after the order is placed, since this can otherwise lead to problems during installation.  
The intake line also needs to be self-supporting. The weight of the intake line may not be transferred to the air distributor.  
We also recommend installation of a compensating joint between the intake pipe and

the rest of the pipelines, as well as installation of a manometer in the intake line. These measures allow tension and transmissions of vibration to be reduced and the current air inclusion to be checked.

- Blower or compressor  
The blower or compressor must have sufficient output for introducing the required air volume into the aerator group(s).
- Drainage line with shut-off valve  
In order to channel off any liquid that has penetrated into the aeration system or condensate that has formed during operation.
- All pipes if only disc aerators were ordered  
If only disc aerators were ordered, the complete pipe system must be installed in advance.

#### **5.4. Work steps**

Installation takes place in the following steps:

1. Checking the operating area
2. Unpacking and checking the components
3. Installing the base supports
4. Aligning the contact surface for the pipes
5. Installing the air distributor
6. Installing the aerator pipes
7. Installing the drainage connection
8. Securing the pipes
9. Installing the drainage line
10. Installing the disc aerators

When a complete aerator system is being installed, the disc aerators are already pre-assembled. In this case, item 10 is omitted during installation. If the pipe system is being provided by the customer and only disc aerators were ordered, items 3 to 9 are omitted during installation.

##### **5.4.1. Checking the operating area**

Before you begin with installation, check the operating area to ensure that it is prepared for installation:

- The design of the system as well as the installation and drilling plan match the current conditions.
- The operating area is clean and the components to be provided by the customer are appropriately prepared/installed.
- PVC becomes brittle when subjected to cold temperatures. For this reason, the ambient temperature must be over +10 °C during installation.

**Installation with an ambient temperature below +5 °C is strictly prohibited.**

### 5.4.2. Unpacking and checking the components

The pipes are packed in wooden crates, and the installation parts are packed in cardboard boxes. Carefully open the packaging so that you do not injure yourself or damage the components.

The individual components must be unpacked in a clean, dry and frost-free place near the installation location.

The following components must be included in the scope of delivery:

- “Aerator system” scope of delivery
  - Air distributor with flange connection for intake line
  - Aerator pipes with pre-assembled disc aerator
  - Drainage connection
  - Pipe connections
  - Base support
  - Fastening material
  - Drilling plan for the base supports
  - Overview and position diagram of the individual components
  - Special key for easy installation/removal of the threaded ring on the disc aerator
  - Rubber mallet
- “Disc aerator” scope of delivery
  - Disc aerators
  - Drilling plan for the air escape holes on the pipes for the disc aerators

Check all components for damage. Do not install defective parts. In this case, contact the manufacturer.

### 5.4.3. Installing the base supports

The base supports on the bottom of the basin are used to secure and align the aerator group. The drilling plan contains information regarding the position as well as the design (support for air distributor or aerator pipe) of the individual base supports, along with information on the borehole (depth, diameter).

The center of the intake pipe is used as a reference point. The air distributor must be placed here precisely in order to ensure a problem-free connection to the supply line.

#### Applying borehole markings to the bottom of the basin

Fig. 3.: Applying markings

1	Center of the intake pipe	3	Marking lines for the aerator pipes
2	Boreholes for the air distributor base support	4	Boreholes for the base support for the aerator pipes

1. Mark the center of the intake pipe on the bottom of the basin.
2. Mark the boreholes for the air distributor base supports on the bottom of the basin.

3. Using a colored line, mark the center of the individual disc aerators on the bottom of the basin and measure the boreholes for the base supports of the aerator pipes.  
**The boreholes of the base supports must be precisely on the marking line and match the supplied drilling plan, since there can otherwise be twisting during installation.**
4. Before you begin drilling the holes, check the distances of the aerator group to the basin wall. The distances must match the design, since the calculated air inclusion can otherwise not be ensured.

**Installation of the stainless steel base supports with drop-in anchors and threaded rods (for the air distributor)**

**Fig. 4.: Stainless steel base support component overview**

1	Drop-in anchor	5	Flat washer
2	Threaded rod	6	Pipe clamp: 1x support for the air distributor 1x securing of the air distributor
3	Locknut for securing the height adjustment	7	Hexagon nut for securing the pipe clamps
4	Hexagon nut for height adjustment	8	Locknut for securing the attachment

- The drop-in anchor may only be used in reinforced or unreinforced normal concrete with a strength class between C20/25 and C50/60 (according to EN 206:2000-12).
  - The drop-in anchor is only suitable for crack-free concrete.
  - Before the drop-in anchors are used, the strength of the structure must be ascertained in order to ensure that the reaction forces can be absorbed.

1. Drill the individual holes for the corresponding base supports. Use a drill with a borehole depth marking.

2. Thoroughly clean the boreholes, such as by vacuuming them out.

3. Place the drop-in anchor into the borehole and carefully drive it into the hole using a rubber mallet. The anchor and foundation must be flush with each other.

4. Rotate the threaded rods completely into the anchor.

5. Twist on two hexagon nuts per anchor rod, place one flat washer on each, and attach a pipe clamp with the bend pointing downwards.

**Installation of the PVC base support with anchor bolt (for the aerator pipes)**

**Fig. 5.: Stainless steel base support component overview**

1	Anchor bolt	5	Extension
2	Foot	6	Upper part with pipe support



3	Flat washer	7	Elastic band for securing pipe
4	Hexagon nut for attachment	8	PVC adhesive

- The anchor bolt may only be used in reinforced or unreinforced normal concrete with a strength class between C20/25 and C50/60 (according to EN 206:2000–12).
- The anchor bolt is only suitable for crack-free concrete.
- Before the anchor bolts are used, the strength of the structure must be ascertained in order to ensure that the reaction forces can be absorbed.

1. Drill the individual holes for the corresponding base supports. Use a drill with a borehole depth marking.
2. Thoroughly clean the boreholes, such as by vacuuming them out.
3. Place the anchor bolt into the borehole and carefully use a rubber mallet to drive it into the hole until it reaches the insertion depth marking. The threaded rod for securing the components must protrude out of the foundation.
4. Place the foot of the base support onto the threaded rod and secure it with the washer and hexagon nut.

**Important: When tightening the hexagon nuts, make sure that the foot doesn't break.**

5. Turn the upper part of the base support with the pipe support onto the foot.

#### 5.4.4. Aligning the contact surface for the pipes

In order to ensure proper aeration, the individual aerator groups must be aligned so that they are precisely horizontal and all aerator groups are the same height. The recommended distance between bottom of the basin and the pipe support is 70 mm. Within an aerator group, a deviation of no more than  $\pm 10$  mm is permitted. The height of each support can be adjusted between 70 mm and 100 mm. The precise height can be measured and adjusted using a leveling device (laser).

**When carrying out leveling work, also keep in mind the height of the air distributor. The air distributor must be connected to the intake line so that it is free of strain.**

#### **Height adjustment of the stainless steel base support with drop-in anchor and threaded rod**

The height is adjusted using the two hexagon nuts. The top hexagon nut is used to set the desired height, and the bottom nut is used to secure the adjustment (locknut).

#### **Height adjustment of the PVC base support with anchor bolt**

The height is adjusted by turning the pipe support. If this height adjustment is not sufficient, an extension can be installed.

1. Rotate the extension onto the foot and secure the connection using PVC adhesive.
2. Rotate the upper part of the support onto the extension and set the desired height.

5.4.5. Installing the air distributor

Fig. 6.: Installing the air distributor

1	Air distributor	4	Air distributor / intake line flange connection
2	Intake line	5	Connection flange of the aerator pipes
3	Base support		

1. Place the air distributor into the pipe clamp of the base support so that the flange connection is pointing straight upwards.
2. Slide the air distributor to the left or right until the flange connection is positioned directly under the connection flange of the intake line.

**Important: The air distributor must be easily slid under the supply pipe. The two flanges may not twist, and the distance between them may not be larger than 1 mm. The height of the base support may need to be adjusted.**

3. Screw the two flanges onto each other and tighten the screws securely.
4. The connections for the aerator pipes must be precisely horizontal so that the connected aerator pipes run horizontally.

5.4.6. Installing the aerator pipes

The aerator pipes are installed using pipe couplings. A differentiation must be made here between the installations “aerator pipe / aerator pipe” and “aerator pipe / air distributor.” For connecting two aerator pipes, the pipe couplings are used purely as plug connections. When connecting the aerator pipes to the air distributor, the pipe coupling is additionally secured on the side of the air distributor using a pipe clamp.

Aerator pipe / aerator pipe installation

Fig. 7.: Connecting the aerator pipes

1	Pipe coupling	3	Slide-in marking
2	Aerator pipe with disc aerator		

1. Clean the outside of the pipe ends of the aerator pipe as well as the inside of the pipe coupling.
2. Check the round sealing rings in the pipe coupling for damage. Defective seals must be replaced.
3. Wet the outside of the pipe ends of the aerator pipe as well as the inside of the pipe coupling with a liquid soap solution (**do not use grease or oil**).
4. Fit the pipe coupling onto an aerator pipe. Slide the pipe coupling up to the first marking on the aerator pipe.

5. Slide the other aerator pipe into the pipe coupling also up to the first marking.
6. Continue until the corresponding aerator pipes have all been joined in accordance with the overview diagram.
7. In each case place a line of aerator pipes onto the base supports.

**Aerator pipe / air distributor installation**

**Fig. 8.: Installing the aerator pipes with the air distributor**

1	Pipe coupling with pipe clamp	4	Pipe coupling: aerator pipe connection side
2	Air distributor	5	Pipe coupling: connection side with pipe clamp for securing to the air distributor
3	Aerator pipe with disc aerator		

1. Clean the outside of the pipe end of the aerator pipe, the outside of the connection flange of the air distributor and the inside of the pipe coupling.
2. Check the round sealing rings in the pipe coupling for damage. Defective seals must be replaced.
1. Wet the outside of the pipe end of the aerator pipe, the outside of the connection flange of the air distributor and the inside of the pipe coupling with a liquid soap solution **(do not use grease or oil)**.
2. Fit the pipe coupling onto the aerator pipe. Slide the pipe coupling up to the first marking on the aerator pipe. Ensure that the pipe clamp is not needed on this side.
3. Slide the pipe coupling with pipe clamp onto the connection flange of the air distributor and secure the pipe coupling with the pipe clamp.
4. Also attach the other aerator lines to the air distributor in this manner.

**5.4.7. Installing the drainage connection**

**Fig. 9.: Installing the drainage connection**

1	Aerator pipes with disc aerators	3	Pipe connections
2	Drainage connection		

The drainage connection forms the end piece of an aerator group. Accordingly, all aerator lines must also be connected to it. The connection for the drainage line is also here. The drainage connection is installed on an aerator pipe in the same way as the "aerator pipe / aerator pipe" installation.

**5.4.8. Securing the pipes**

After the entire pipe system has been assembled, the aerator group can be affixed to the base supports.

1. Check whether the aerator group is complete and resting horizontally on the base supports. It may be necessary to adjust the height of some base supports.
2. Use the elastic bands to secure the aerator pipes to the base support. The elastic bands are hooked into the support using the eyelets.

**Important: If the ambient temperature is below 15 °C, it is recommended that the elastic bands be placed in warm water before installation. This allows the elastic to be more easily stretched and simplifies installation.**

3. Use the second pipe clamp to secure the air distributor. Fit this onto the anchor rod, put on a flat washer, and screw on two hexagon nuts per anchor rod. The pipe clamp is secured using the bottom hexagon nut; the attachment is secured using the top hexagon nut (locknut).

**5.4.9. Installation of the drainage line (supplied by the customer)**

**Fig. 10.: Connecting the drainage line**

1	Connection for the drainage line
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Once the aerator group has been completely installed, the drainage line needs to be connected. The drainage connection is located at the end of the pipe system, or, in case of aerator systems that are not connected, the drainage connection is located on the air distributor.

The drainage line must be attached outside of the basin and equipped with a valve.

**5.4.10. Installing the disc aerators with customer-supplied aerator systems**

If the aerator system has already been provided by the customer, only the disc aerators can be installed. To do this, it is only necessary to drill the connection holes into the existing pipe system. The corresponding drilling diagram can be found in the included drilling plan.

**Fig. 11.: Installing the disc aerators**

1. Clean the pipes.
2. Mark the boreholes according to the included drilling plan. The minimum distance between two connection holes may not be smaller than 800 mm.
3. Drill the connection holes:
  - Size: 20 mm; +5/-0 mm
  - Horizontal tolerance:  $\pm 5^\circ$
  - Vertical tolerance:  $\pm 1^\circ$
4. Fit the disc aerator onto the pipe. Ensure that the connection of the disc aerator is completely inserted into the connection hole.

5. Place the slide closure laterally into the guide and slide it up in the direction of the arrow.

## 6. Start-up

The “Start-up” section contains all the important instructions for the operating personnel for starting up and operating the product safely.

The following conditions must be adhered to and monitored:

- The compressor/blower has sufficient output for the required air supply.
- The pressure in the intake line corresponds to the specification and remains constant.
- The pipes are absolutely tight.
- The drainage line is connected.

**If the machine has not been operated for an extended period, also check these conditions and rectify any identified faults.**

Always keep this manual either by the product or in a place specially reserved for it, where it is accessible to all operating personnel.

In order to prevent damage or serious injury when starting up the product, the following points must always be observed:

- The product may only be started up by qualified, trained persons. The safety advice must be followed at all times.
- All persons working on or with the product must have received, read and understood this operating and maintenance manual.
- The product is suitable for use under the specified operating conditions.
- The work area of the product is not a recreational area and is to be kept free of people! No persons are allowed in the work area during start-up or operation.
- During all work, a second person must be present. Adequate ventilation must be ensured if there is danger of poisonous gases forming.

### 6.1. Initial start-up

The following points must be checked before the initial start-up:

- Inspecting the installation as described in the “Installation” section.
- Basic cleaning of the operating area.
- Function test / clear water test

#### 6.1.1. Inspecting the installation as described in the “Installation” section

Before a function test of the aerator system is conducted, the complete installation needs to be checked to ensure that it is correct (tightness, horizontal installation, base support securely anchored to the floor, etc.). Any defects must be rectified before a function test is conducted.

6.1.2. Basic cleaning of the operating area

The operating area can be heavily soiled during installation. This soiling can negatively influence the air inclusion or damage the disc aerator. For this reason you should clean the entire operating area with clear water and remove soiling. Course soiling and foreign bodies must be removed by hand.

**The stream of water must not directly impact the membrane, since this can lead to damage.**

6.1.3. Function test / clear water test

A function test is used to ensure that all components are tight and that the aerator groups are working flawlessly. A function test is conducted with clear water. During the function test, people must be in the basin to inspect the aerator groups. Inspection from the corners or from outside of the operating area is not permitted.

Fig. 12.: Function test in three steps

12.1	Tightness test of the pipes and of the disc aerator
12.2	Function test of the membranes
12.3	Tightness test of the intake line

1. Before the water is introduced into the operating area for the function test, air must be introduced into the aerator system. This prevents water from penetrating into the aerator system if there are any leaks.
2. Once the air supply is ensured, the operating area is slowly flooded with clear water.
3. In the first step, the water level must extend up to the halfway point of the threaded ring on the disc aerator. If air bubbles emerge, the corresponding location must be disassembled and the fault rectified. This can be caused by the following:
  - Incorrect installation of the pipe coupling
  - Defective sealing ring in the pipe coupling
  - Defective sealing ring on the connection of the disc aerator
  - Material fault
4. In the second step, the water level is increased to approx. 10 cm above the membranes. With this water level, you can see whether all disc aerators are functioning flawlessly. For this test, air pressurization of 1.5 Nm<sup>3</sup>/h to 6 Nm<sup>3</sup>/h must be present. If the pressurization is too low, the disc aerators do not operate flawlessly. If there are defective disc aerators in the system, they need to be replaced. Before a replacement can be made, the water must be completely pumped out so that no water penetrates into the pipes. If several disc aerators within a line are operating erratically, it is likely that water has penetrated into the pipes. Open the drainage line to press out the water that has penetrated into the pipes.

5. In the third step, the water level must be increased to approx. 10 cm above the flange connection of the air distributor / intake pipe. Check the air distributor as well as the intake connection for tightness. Leaky spots must be fixed.
6. To complete the test, check the drainage line. To do this, open the valve on the drainage line. If the aerator system is tight, only air or an air/water mixture may escape.
7. After the test is complete, a retest must be conducted after 24 hours. The system can only be placed into operation if this test also results in no faults.

**After the second function test is completed successfully, the operating area must be flooded.**

**If it is not yet possible to place the system into operation, provision must be made to ensure a water level >1 m. In this way the disc aerators are protected from falling objects and the membranes are protected from UV light.**

Before the system is placed into operation at a later point in time, an additional function test must be conducted. The relevant maintenance measures in accordance with the "Maintenance" section must be taken into account starting at this point.

#### **6.2. Before switching on**

- Check the operating area to ensure that it is completely flooded.
- If the start-up procedure was not yet conducted in full, an additional function test must be conducted.

#### **6.3. Starting up the aeration**

After the function test has been successfully conducted, the system can be placed into operation. For this the aeration is switched on using a separate, customer-provided control station. It is standard that a differentiation is only made between the operational states of On and Off.

Additional operational states such as intermittent operation or time-based control must be arranged on an individual basis.

#### **6.4. After switching on**

During operation, check the formation of air bubbles on the surface of the liquid on a regular basis. If individual aerators or entire aerator groups fail, you can recognize this from the appearance of the bubbles.

We also recommend checking the air inclusion into the aeration system using a manometer in the intake line. The pressure in the intake line changes due to deposits (the pressure increases) or defects (the pressure falls).

Note that when there is a pressure increase of 20 mbar, the maintenance measure "Cleaning the membrane surface" must be carried out. The highest permitted pressure increase in the system is 50 mbar. Higher deviations can damage the disc aerators.

## 7. Shutdown/disposal

- All work must be carried out with the greatest care.
- Proper protective equipment must be worn.
- When carrying out work in basins or containers, the local protection measures must be observed in all cases.
- During all work, a second person must be present.
- Only hoisting gear that is in a technically perfect condition and load-carrying equipment that has been officially approved may be used for lowering and raising the product.

### 7.1. Temporary shutdown

With this type of shutdown, the product remains completely installed and is ready to operate at all times.

While the system is shut down, a minimum water level of >1 m must be maintained in the operating area. Also ensure that the temperature of the liquid and in the operating area does not fall below +3 °C.

During down times, it is also necessary to ensure that a 10-minute function run is conducted on a weekly basis.

### 7.2. Shutdown for maintenance work or storage

Switch off the system and secure it against being switched on again without permission. The operating area must be completely drained and cleaned. Work on removing the product and storage can then commence.

During basin drainage, we recommend that the aerator system be allowed to continue to run. This prevents deposits on the bottom of the basin and foul odors.



#### **BEWARE of poisonous substances!**

**During work in environments hazardous to health, such as waste water or sewage treatment plants, there is an increased hazard from bacteria and viruses. In order to counteract this elevated risk, please keep the following points in mind:**

- **Open wounds must be immediately cleaned and treated.**
- **Eating and drinking are strictly prohibited.**
- **Proper protective equipment must be worn!**
- **Upon leaving the system, disinfect persons and tools.**

#### 7.2.1. Removal

Removal takes place in the reverse order to installation:

1. Remove the drainage line
2. Remove the base support attachment
3. Remove the drainage connection
4. Remove the aeration pipes
5. Remove the air distributor



### 7.2.2. Return delivery / storage

#### **Return delivery**

For shipping, the parts must be packed and sealed in sufficiently large, non-tearing plastic sacks to prevent leakages. Shipping must be performed by carriers who have been briefed accordingly.

**Please also refer to the “Transport and storage” section.**

#### **Storage**

- Thoroughly clean all components, decontaminating them if necessary.
- Store them in a clean, dry place protected from frost.
- Place them on a firm foundation and secure them against falling.
- Protect components from direct sunshine to prevent the plastic parts from becoming brittle.

**Please also refer to the “Transport and storage” section.**

### 7.3. Starting up again

Clean the product of dust and soiling before starting up again. During operation and storage, the membrane is subject to natural wear and thus must be checked for cracks and elasticity before it is installed. The product can then be installed in accordance with the Installation section. After it is installed, a function test in accordance with the “Start-up” section must be conducted.

### 7.4. Disposal

#### 7.4.1. Protective clothing

Protective clothing worn for installation and dismantling as well as cleaning and maintenance work is to be disposed of in accordance with German Waste Code TA 524 02 and EC Directive 91/689/EEC.

#### 7.4.2. Product

Proper disposal of this product avoids damage to the environment and risks to personal health.

- Make use of the services or the advice of public or private waste disposal companies for the disposal of the product or parts of it.
- More information about proper disposal can be obtained from the urban administration, the waste disposal authorities or from the supplier from whom the product was purchased.

## 8. Maintenance

Maintenance or repair work must be carried out by an authorized service center, Wilo customer service or a qualified specialist.

**Maintenance or repair work and/or constructional changes that are not listed in this operating and maintenance manual may only be carried out by the manufacturer or by authorized service centers.**

Note the following:

- This manual must be available to the maintenance personnel and its instructions must be followed.
- All maintenance, inspection and cleaning work on the product and system may only be carried out by trained specialists exercising extreme care. Proper protective clothing is to be worn.
- When carrying out work in basins or containers, the local protection measures must be observed in all cases. A second person must be present for safety reasons.
- Only hoisting gear that is in a technically perfect condition and load-carrying equipment that has been officially approved may be used for lowering and raising the product. The maximum load-carrying capacity must never be exceeded.

**Make sure that all fastening devices, ropes and safety devices of the hoisting gear are in a technically perfect condition. Work may only commence if the hoisting gear has been checked and found to be in perfect working order. If it is not inspected, fatal injuries may result.**

- Electrical work on the system must be carried out by an electrician.
- When working with flammable solvents and cleaning agents, fires, naked lights and smoking are prohibited.
- Products that operate in fluids that are hazardous to your health must be decontaminated. It must be ensured that no dangerous gases can form or are present.



### **BEWARE of poisonous substances!**

**During work in environments hazardous to health, such as waste water or sewage treatment plants, there is an increased hazard from bacteria and viruses. In order to counteract this elevated risk, please keep the following points in mind:**

- **Open wounds must be immediately cleaned and treated.**
  - **Eating and drinking are strictly prohibited.**
  - **Proper protective equipment must be worn!**
  - **Upon leaving the system, disinfect persons and tools.**
  - **If injuries involving hazardous liquids or gases occur, first-aid measures must be performed in accordance with the notices in the workplace and a doctor should be called immediately.**
- Ensure that all necessary tools and materials are available. Tidiness and cleanliness guarantee safe and trouble-free operation of the product. After working on the unit, all

cleaning materials and tools should be removed from it. All materials and tools should be stored in an appropriate place.

- Appropriate protective clothing must be worn for cleaning and maintenance jobs. This is to be disposed of in accordance with waste code TA 524 02 and EC Directive 91/689/EEC.
- Only use genuine parts made by the manufacturer.

### **8.1. Maintenance intervals**

To ensure reliable operation, various maintenance tasks must be carried out regularly. The maintenance intervals should be decided according to the demands placed on the product. If strong vibrations occur during operation, the product or installation must be checked, regardless of the maintenance intervals.

#### **8.1.1. Intervals for normal operating conditions**

##### **Weekly during a brief period of shutdown**

- Function run
- Drainage of the aerator system

##### **Weekly during regular operation**

- Cleaning the membrane surface

##### **Annually during regular operation**

- Leak check of the aerator group(s)
- Maintenance measures of the compressors/blower
- Changing the filter

#### **8.1.2. Intervals for difficult operating conditions**

For difficult operating conditions, the maintenance intervals stated should be shortened accordingly. In this case, please contact Wilo customer service. If the products are to be used in difficult conditions, we also recommend that you take out a maintenance contract.

The following are considered difficult operating conditions:

- Large quantities of fibrous materials or sand in the fluid
- Heavily corrosive liquids
- Very aggressive liquids
- For industrial applications

#### **8.1.3. Measures recommended to ensure smooth operation**

We recommend installation of a manometer in the intake line for the aerator group. The current pressure allows small defects to be immediately detected and rectified as necessary.

Deposits on the aerator membranes reduce the air inclusion into the liquid and increase the pressure in the aerator system. This reduces the efficiency of the system. This becomes visible due to a changed appearance of the bubbles on the surface of the liquid. In this case, the maintenance measure "Cleaning the membrane surface" must be carried out.

If the aerator system is not tight or if a membrane cracks, the pressure drops in the aerator system. This leads to uncontrolled air inclusion and causes the efficiency of the aeration to drop. This also becomes visible on the surface of the liquid, where large air bubbles will be escaping. In this case, the plant needs to be taken out of operation and a function test with clear water must be conducted in order to find the leak.

Regular checks can therefore prevent greater damage from occurring later and reduce the risk of a total failure. For monitoring on a regular basis, we recommend remote monitoring of the air inclusion. Please contact Wilo customer service about this.

## **8.2. Maintenance tasks**

### **8.2.1. Function run**

To prevent damage to the membrane, a function run lasting 10 minutes must be conducted. Here it must be ensured that a minimum water level  $>1$  m exists in the operating area. The air inclusion must be between  $1.5 \text{ Nm}^3/\text{h}$  and  $6 \text{ Nm}^3/\text{h}$ .

### **8.2.2. Drainage of the aerator system**

During the function run, open the valve of the drainage line. Supplying air into the aeration system causes any water/condensate that is present to be channeled through the drainage line.

### **8.2.3. Cleaning the membrane surface**

During operation, the membrane surface can be clogged by deposits. This leads to reduced air inclusions into the fluid and decreases the efficiency of the aeration system. To counteract this, the membrane must be blown off in brief intervals under peak load in accordance with the maintenance intervals.

1. Increase the pressure in the system to the max. permitted value of  $7.5 \text{ Nm}^3/\text{h}$  for five minutes.
2. Switch off the aeration for two minutes.
3. Repeat these steps 3 to 4 times.

**The max. permitted value for pressurization of  $7.5 \text{ Nm}^3/\text{h}$  may not be exceeded.**

Since this maintenance measure makes a major contribution to the functional safety and efficiency of the system, we recommend that the maintenance interval be carried out automatically. This can be accomplished using a control station. Contact the manufacturer of the control station in this regard.

#### **8.2.4. Leak check of the aerator group(s)**

Leaks become visible on the surface of the liquid through a change in the appearance of the bubbles. Check the operating area from all sides for unusual bubble formation.

For this maintenance measure, we recommend carrying out a function test with clear water and an inspection of the operating area.

#### **8.2.5. Maintenance measures of the compressors/blower**

Carry out maintenance work according to the manufacturer's specifications for the devices.

#### **8.2.6. Changing the filter**

If filters are used in the air intake, they need to be cleaned or replaced on a regular basis. You can find more information in the respective filter documentation.

### **8.3. Repairs**

When carrying out repairs, you must:

- Switch off the system and make sure it cannot be switched on accidentally.
- Drain the operating area, thoroughly clean all components, and decontaminate them if necessary.
- Never use brute force during any of this work.

#### **8.3.1. What repairs may be carried out?**

- Membrane replacement, including the non-return valve
- Disc aerator replacement

#### **8.3.2. Membrane replacement, including the non-return valve**

1. Use the special key to loosen and unscrew the threaded ring on the disc aerator.
2. Remove the separation ring and membrane support.
3. Remove the non-return valve.
4. Pull off the membrane from the membrane support.
5. Attach a new membrane to the membrane support.
6. Attach a new non-return valve.
7. Fit the membrane support and separation ring.
8. Screw the threaded ring back on and tighten it securely using the special key.

**Before the system is started up again, a function test must be conducted.**

#### **8.3.3. Disc aerator replacement**

1. Use a rubber mallet to push down the slide closure on the underside of the disc aerator against the direction of the arrow.
2. Remove the disc aerator.
3. Fit the new disc aerator onto the connection hole in the aerator pipe.

**Important The connection of the disc aerator must be completely on the connection hole and the O ring must seal the connection!**

4. Slide the slide closure up in the direction of the arrow using a rubber mallet.  
**Before the system is started up again, a function test must be conducted.**

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