

# INSTALLATION AND OPERATING INSTRUCTIONS

**Disc diffuser**

**Wilo-Sevio ELASTOX®-D**



# INSTALLATION AND OPERATING INSTRUCTIONS

## Wilo-Sevio ELASTOX®-D



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WILO GVA GmbH Dieselstr. 6 D – 42489 Wülfrath Germany	T +49 2058 9210 - 0 F +49 2058 9210 - 20 info@gva-net.de www.gva-net.de	Deutsche Bank AG IBAN DE50330700900325933000 BIC DEUTDE33XXX	VAT ID no.: DE 815649284 Tax ID no.: 139/5809/0548	District court: Wuppertal HR B 14011 Managing Director: Dipl.-Ing. René Brunßen
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## **GENERAL INFORMATION**

These installation and operating instructions are a part of the ELASTOX® contents. Carefully following the notes stated here will prevent malfunctions in the aeration system and damage to the ELASTOX® diffusers due to incorrect application, incorrect installation and operating errors.

WILO GVA guarantees the fault-free quality and mechanical durability of its products when used as intended. Nevertheless, should a claim arise, the warranty is limited to the free repair of the ELASTOX® diffusers or the supply of a replacement of any parts or individual components of ELASTOX® diffusers for which a justified complaint has been submitted. Unless otherwise agreed in writing, WILO GVA is not responsible for the fitting and dismantling costs, including all associated costs.

We accept no liability for damage or malfunctions resulting from the failure to follow these installation and operating instructions. Damage and malfunctions resulting from sewage or air side fouling or scaling effects are also not covered by the warranty.

Additional claims are excluded, especially those arising from consequential damages.

If you have any queries regarding the installation and operating instructions, or any other technical questions, please contact our office:

**WILO GVA GmbH**  
Dieselstraße 6  
D – 42489 Wülfrath

T +49 2058 9210 - 0  
F +49 2058 9210 - 20  
info@gva-net.de



## **1. WILO-SEVIO ELASTOX®-D FINE-BUBBLE DISC DIFFUSER**

### **1.1. Intended use**

The disc diffuser is a high-quality product that, in every respect, fulfils the high demands placed on fine-bubble aeration systems in modern wastewater treatment technology. High efficiency and operational reliability plus flexibility in terms of their application and operating phase are the outstanding features of our aeration systems, which have proven their value since the mid-1980s.

A key component of the Wilo-Sevio ELASTOX® diffusers are the perforated membranes, which are made of a special rubber. This rubber is a particularly age-resistant EPDM compound generally supplied for utilisation in municipal sewage systems.

#### **1.1.1. Sewage composition**

The EPDM disc membrane demonstrates excellent durability against municipal sewage with a composition that meets the specifications issued by the German Association for Water, Wastewater and Waste (DWA) in the latest version of its DWA-M 115 leaflet. Complete evidence must be provided. However, a number of chemical compounds can affect the service life of the disc membrane. These include in particular all types of oils and greases, as well as the majority of the organic solvents, hydrocarbons and halogenated compounds. Fat content found in domestic sewage is not harmful, particularly given their separation in the course of mechanical pre-treatment.

Application in industrial wastewater treatment is possible after prior consultation with WILO GVA to clarify if, for example, there are any EPDM-damaging sewage contents or high levels of oil and greases, and whether the use of an alternative composite membrane might be advisable. If exact details of the sewage composition are not available, preliminary tests must be carried out under real application conditions.

Wilo-Sevio ELASTOX® diffusers are suitable for intermittent operation for the purpose of targeted nitrification/denitrification. However, they cannot be used in an anaerobic environment given their only limited durability against methane. It is therefore essential that anaerobic zones do not form in the vicinity of the aeration system, e.g. due to sludge deposits.

#### **1.1.2. Mechanical cleaning stage**

A mechanical pre-cleaning stage of rake, grease and grit chambers is required in accordance with the regulations for the use of fine-bubble aeration systems. If the mechanical cleaning stage is insufficient or absent, this will impair the efficiency and service life of compressed air aeration systems.

#### **1.1.3. UV radiation**

Over time, UV radiation affects the quality of the disc membrane and therefore its service life. As a result, Wilo-Sevio ELASTOX® diffusers must always be protected against UV radiation. UV exposure should be avoided during service interruptions and when draining tanks, such as by partially filling the tank with water.

#### **1.1.4. Temperature**

The temperature of the water or fluid should be between +5 °C and +35 °C. The air temperature at the inlet of the Wilo-Sevio ELASTOX® diffusers should not exceed +60 °C during continuous duty. If average temperatures are expected to be outside of this range because of external conditions, consult WILO GVA before application.

### 1.1.5. Compressed air quality requirements

When selecting the compressor to generate compressed air, ensure that the operating mode is absolutely oil-free.

Dust filters for ambient dust should be configured according to filter classes, with a separation efficiency greater than 90 % (ISO coarse 90 %). In addition, the specified requirements must also be taken into account in the application and configuration of additional components (e.g. heat exchanger, silencer, etc.).

**The air entering the piping system must be free of oil, dust and solvents.**

### 1.1.6. Piping system requirements

**Material selection** The compressed air distribution piping system should be dimensioned and configured in accordance with the aeration system's dimensioning and configuration requirements. The pipe material should be selected according to its suitability for the specific application. The chemical durability against sewage or air-side fluids should be checked in this regard. If, for example, cleaning chemicals are being considered for cleaning the aeration system, then the material selected for the piping system should also be suitable for the use of cleaning chemicals.

If an existing piping system is to be used as part of an expansion or upgrade of a sludge activation system, its resistance to corrosion must be examined. It must be ensured that no particles detach, or could detach in future, and then enter the diffuser through the air flow due to the corrosion of existing pipes and components (e.g. valves and fittings).

{2.1.3 Initial cleaning of the piping system}

#### Levelling

If at all possible, the final elevation of all ELASTOX® diffusers in a tank should not differ by more than 10 mm. Otherwise, the precondition for even distribution of compressed air is not satisfied.

If several tanks are supplied by a piping system, but there are no automatic control elements for the air supply to the individual tanks, then the aforementioned requirement is applicable for the entire system. We are unable to assume responsibility for any aftereffects that may arise during subsequent operation due to uneven distribution of compressed air.

**The piping system for the intake and supply of the ELASTOX® diffusers must be horizontally levelled at the tank bottom.**

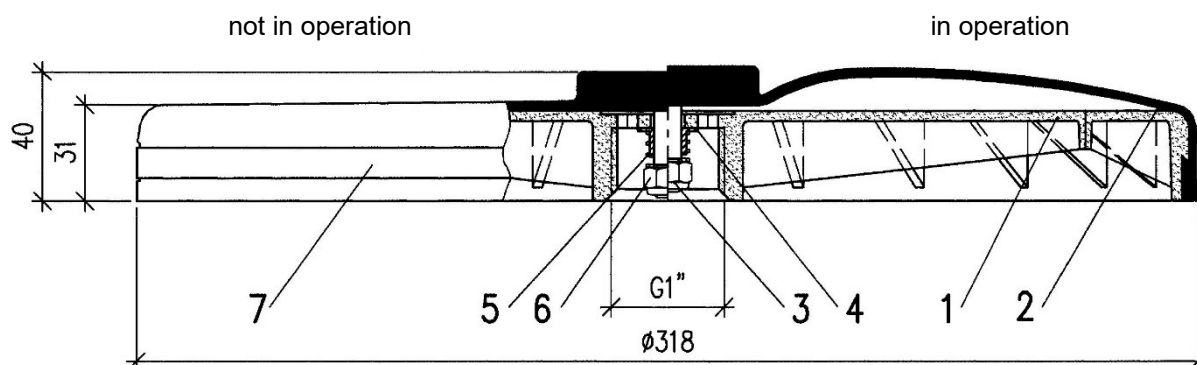
# INSTALLATION AND OPERATING INSTRUCTIONS

## Wilo-Sevio ELASTOX®-D



### 1.2. Technical data

#### 1.2.1. Dimensions, materials, weight, buoyancy forces



No.	Designation	Material
1	Support disc	Polypropylene
2	Disc membrane	EPDM / EPDM mr / silicone
3	Limiting shaft	Steel-stainless steel combination
4	Hull	Polypropylene
5	Spring	Stainless steel
6	Nut, self-locking	Stainless steel
7	Fixing clip	Stainless steel
	Threaded socket	G1"

Weight: 0.95 kg / piece – EPDM / EPDM mr  
0.90 kg / piece – silicone

Buoyancy forces: The aeration system (i.e. the system to distribute compressed air across the floor of the tank) and the fixation elements must be designed and configured with due regard to a buoyancy force of **30 N per disc diffuser**. Buoyancy forces should be afforded particular consideration in removable systems.

# INSTALLATION AND OPERATING INSTRUCTIONS

## Wilo-Sevio ELASTOX®-D



### 1.3. Fixation and sealing accessories

#### 1.3.1. General information regarding fixation of disc diffusers

The disc diffuser is connected via a G1" threaded socket on the support disc to a corresponding counterpart with a thread length of 20 mm on the pipe. The disc diffuser is sealed against the aeration pipe using an easy-to-install O-ring.

All suitable threaded connections can be supplied, including the required gaskets. The threaded nipple and saddle clamp must be applied perpendicularly on the aeration pipe. The required drilled holes and the right angularity of the threaded nipple and saddle clamp on the pipes must be within specified tolerances.

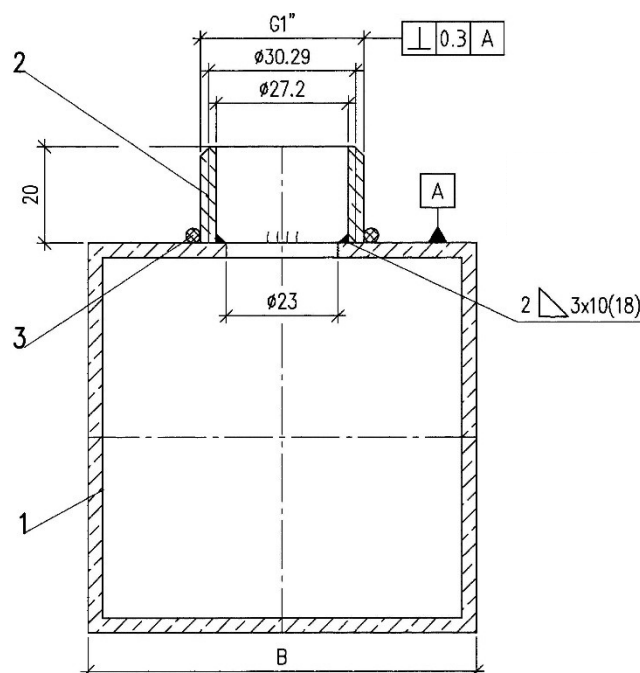
The disc diffusers can generally be installed on square and rectangular tubes made from stainless steel as well as on round pipes made from stainless steel or plastic.

#### 1.3.2. Fixation to a square or rectangular tube using threaded nipple

Tubes in accordance with EN 10305-5 – S2

#### Caution!

Sealing surface must be smooth and free of weld deposits.



No.	Description	Material	Dimensions
1	Square / rectangular tube	Stainless steel	B = 50mm, 60mm, 80mm, 100mm
2	Threaded nipple	Stainless steel	G1" x 20mm
3	O-ring	NBR	Ø32 x 2.5mm

# **INSTALLATION AND OPERATING INSTRUCTIONS** **Wilo-Sevio ELASTOX®-D**



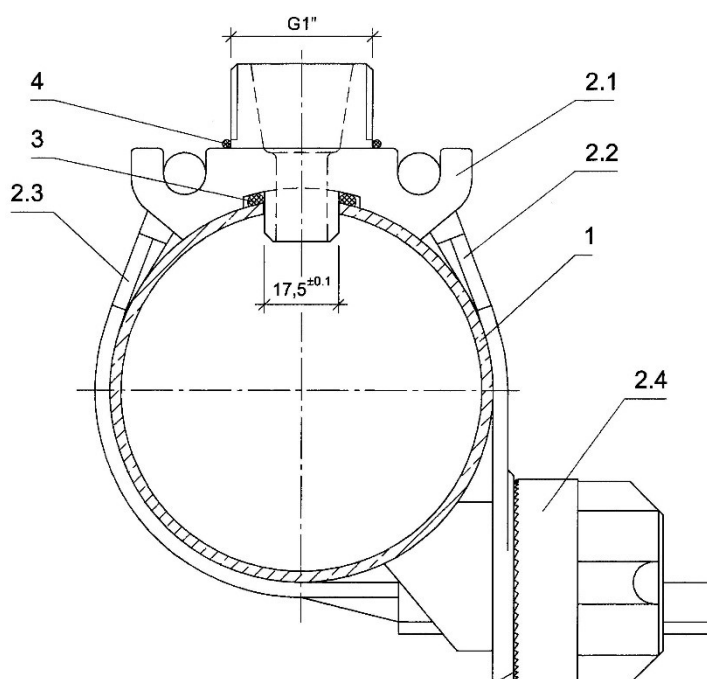
## **1.3.3. Fixation to round tube using saddle clamp**

The saddle clamp has been specially developed to simplify the installation of disc diffusers on round tubes of different nominal diameters and material. Piping systems in which saddle clamps are installed must be made exclusively of solid materials (no hose pipes or similar) with a minimum pressure rating of PN 3.2. The tolerances relating to straightness, parallelism and roundness of the tubes must be strictly observed.

The saddle clamp is available in three sizes:

Nominal diameter	Outer tube Ø [mm]	The outer diameter for each nominal diameter must be within the dimension ranges for outer diameters in accordance with this list.
DN 65	75.0-76.1	
DN 80	88.9-90.0	
DN 100	110.0-114.3	

Tubes in accordance with EN 10217-7 – TC1 / DIN 8062 / DIN 8074 / DIN 8077



No.	Description	Material	Dimensions
1	Round tube	Plastic / stainless steel	DN 65 / 80 / 100
2.1	Saddle piece	Polypropylene (GF)	
2.2	Clamping band S	Polypropylene (mineral)	
2.3	Clamping band L	Polypropylene (mineral)	
2.4	Clamping nut	Polypropylene (mineral)	
3	O-ring	NBR	Ø17 x 4 mm
4	O-ring	NBR	Ø32 x 2.5 mm



## 2. GENERAL INSTALLATION INSTRUCTIONS

### 2.1. Preparation for installation

#### 2.1.1. Weather conditions

Installation should not be performed at temperatures below +5 °C. If the installation is carried out under unfavourable weather conditions, such as heavy rain, snowfall or temperatures below +5 °C, the tanks may need to be covered with a tent and heating provided. In any case, the disc diffuser should be protected against mechanical load of any kind (e.g. snow and ice mass) at low temperatures.

#### 2.1.2. Cleaning the tank

Unless otherwise agreed, all construction and mechanical engineering work (such as welding, drilling, cutting and grinding work) on the tank must be completed before installation of the disc diffuser can commence. The tank must be grouted and ready to be filled with water. Before installing the disc diffusers, clean the tank and in particular remove any objects (e.g. sharp stones, glass shards, nails, etc.) that could cause physical damage to the membrane.

#### 2.1.3. Initial cleaning of the piping system

The compressed air generation must undergo a functional test and be ready for operation. When installing the disc diffusers, it is particularly important that the piping system is absolutely clean. The compressed air piping system must be blown clean of contaminants with the maximum volume of compressed air. If the piping system is not carefully cleaned, contaminants such as sand, earth, slag and other foreign bodies will become lodged between the membrane and the support element during installation.

This will prevent the disc diffusers from functioning properly, in particular with regard to their impermeability against the ingress of water and sludge; mechanical damage to the disc diffuser invalidates the warranty.

A high airflow rate in the piping system is necessary to ensure effective air flushing. It is therefore advisable to carry out the air flushing for piping systems which can be isolated either gradually or in small groups.

The duration of the flushing procedure depends on the airflow rate, the length of the piping system, the number of aeration pipes per aeration zone and, in particular, the degree of contamination. If the contamination is extreme, additional cleaning using a high-pressure cleaner may be required prior to installation of the ELASTOX® diffusers. In any case, careful removal of all contaminants must be ensured.

#### **Flushing the piping system with a high airflow rate**

# INSTALLATION AND OPERATING INSTRUCTIONS

## Wilo-Sevio ELASTOX®-D

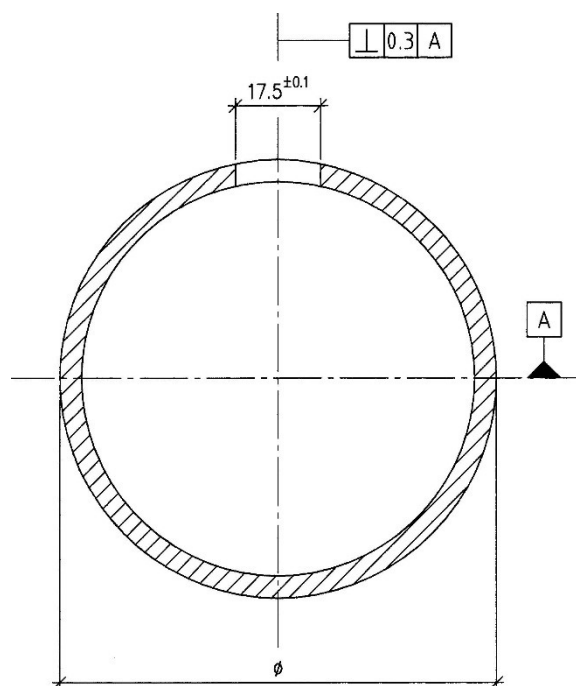


### 2.2. Installation of saddle clamp

#### 2.2.1. Preparation for saddle clamp installation

For the installation of saddle clamps, the aeration pipes must be free of contamination both internally and externally. Any auxiliary materials used when processing the pipes, e.g. drilling emulsions, etching chemicals and the like, must be removed.

In the interests of problem-free functioning of the disc diffusers, the drilled holes must be made in a row. The aeration pipes must be installed in the tank in such a way that the drilled holes are located perpendicular on the upper side of the pipe.



When installing saddle clamps on the construction site, take care to ensure minimal clearance of > 60 mm (between the bottom edge of the aeration pipe and the floor of the tank).

As a fundamental rule, when installing the saddle clamps on the aeration pipes, ensure that the saddle bracket (G1") of the saddle piece is vertical above the pipe. The intervals between saddle clamps on the aeration pipes should be determined according to the configuration of the aeration system. For visual reasons, it is advisable to install all saddle clamps on a aeration pipe in such a manner that the clamping nuts are all on the same side. If there is a horizontal water flow (e.g. from a sewage accelerator), the nuts should be installed facing away from the flow side to reduce the occurrence of braiding.

At the points where disc diffusers are to be installed, drilled holes with a diameter of  $17.5 \pm 0.1$  mm are made in the pipes. Care must be taken to remove burrs and drilling chips.

#### 2.2.2. Installation

The saddle clamp components with specific diameters, such as the saddle piece and clamping bands 1 and 2, must all be from the same diameter range. These components are marked with the respective nominal diameter. Assembling a saddle clamp with components with different nominal diameter markings is not permitted.

In principle, it is possible to install the saddle clamps in the factory or on the construction site.

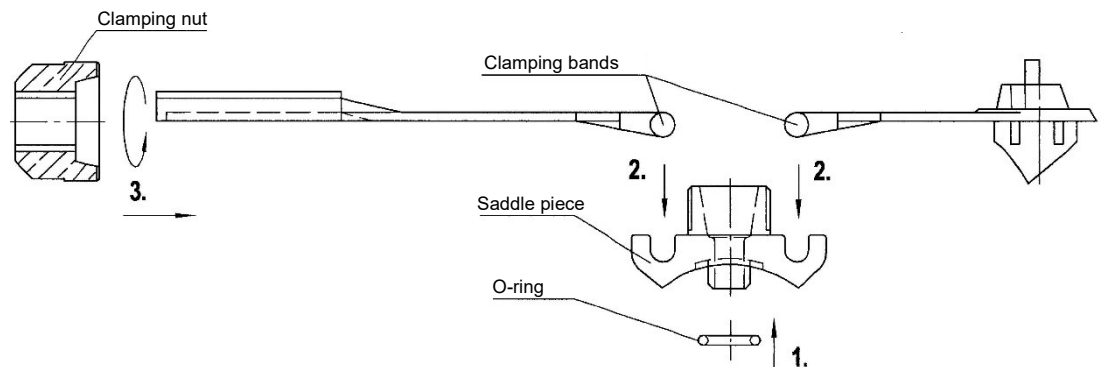
# INSTALLATION AND OPERATING INSTRUCTIONS

## Wilo-Sevio ELASTOX®-D

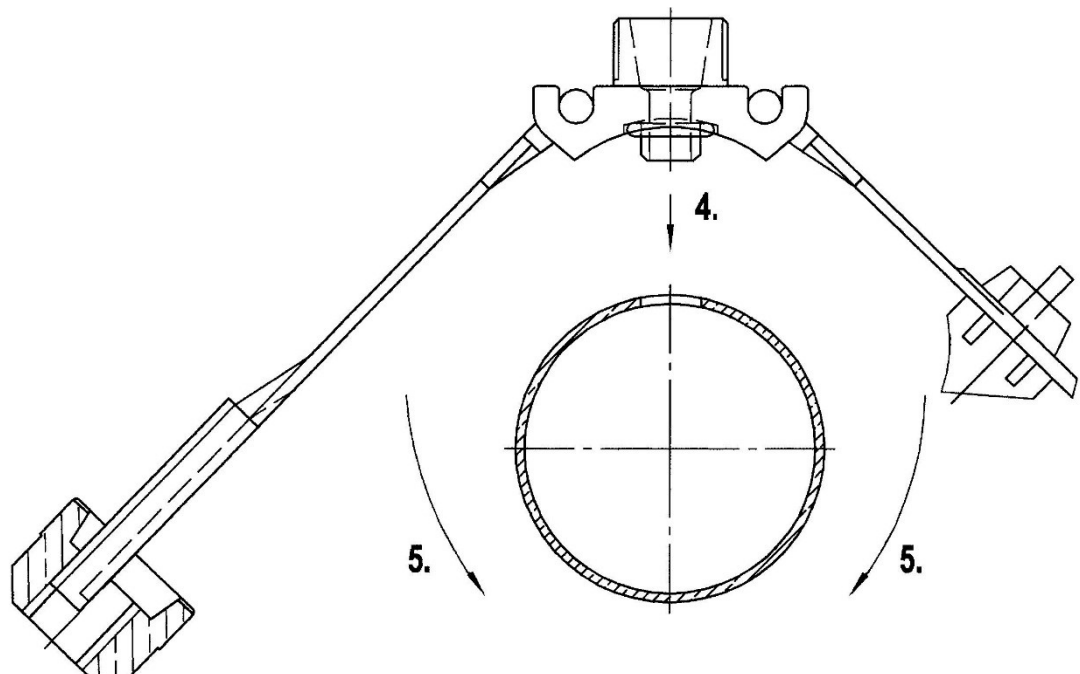


Proceed as follows for installation:

1. Slide the O-ring onto the saddle nipple of the saddle piece.
2. Clip the clamping bands into the counter bearings on the saddle piece.
3. Loosen the clamping nut by one to two rotations on the half-thread of the clamping band.



4. Insert the saddle clamp with saddle nipple into the drilled hole in the aeration pipe, attach clamping bands around the aeration pipe (but do not twist!).
5. Insert the end of the half-thread on the clamping band into the counter bearing on the clamping band.

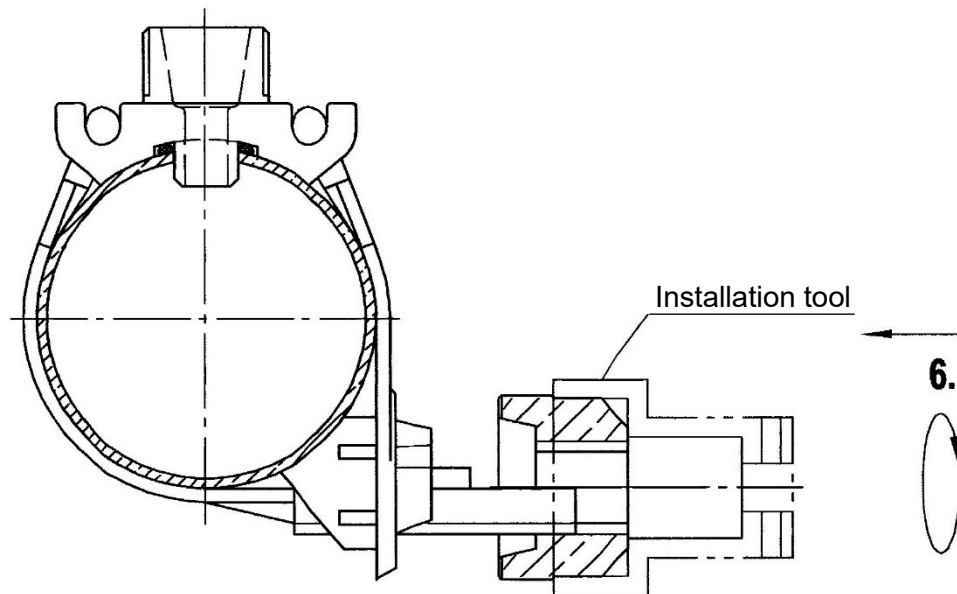


## INSTALLATION AND OPERATING INSTRUCTIONS

### Wilo-Sevio ELASTOX®-D



6. Tighten the clamping nut by hand to begin with, then tighten fully with torque of approx. 6 Nm. Torque of approx. 6 Nm is the normal level of force applied by a technician without extreme physical exertion (hand-tight).



To make sure that the nut is not over-tightened or under-tightened, we recommend using a torque wrench.

For larger quantities, it is advisable to use mechanical installation tools, such as low-speed battery-powered, electric or pneumatic screw drivers with a corresponding torque setting. (Observe corresponding safety instructions for such devices!)

When adjusting the torque, make sure that the settings are for “soft” screw joints. Check the settings of mechanical installation tools with the help of a suitable torque wrench.

If you wish, you can order adapters for square drive (3/8" or 1/2") from us. Other tools not specified here (e.g. pipe wrench) which do not preclude damage to the clamping nuts should not be used for installation.

To ensure that the temperature influences do not compromise the secure position of the saddle clamps, take note of the following:

- **In the event of a pipe surface temperature > 35 °C – due to direct sunlight, for example – the saddle clamps should only be pre-assembled by hand.**
- **The final tightening with the prescribed torque should only be applied when the surface temperature of the pipe has fallen below 35 °C.**
- **Installation should not be performed at temperatures below zero.**

# INSTALLATION AND OPERATING INSTRUCTIONS

## Wilo-Sevio ELASTOX®-D



### 2.2.3. Protective measures

In the case of factory installation of the saddle clamps, in order to protect the saddle pieces (G1") it is advisable to equip them with corresponding dust caps as the risk of damage to the threads cannot be excluded during transport of the aeration line and its installation on the construction site.

In the case of installation on the construction site, if it is not possible to install the disc diffusers immediately after installing the saddle clamps, we would again recommend fitting dust caps to protect against damage or the risk of penetration by contaminants.

### 2.3. Installation instructions Wilo-Sevio ELASTOX®-D

- **Installation should take place shortly before the system is commissioned in order to avoid harmful external effects during longer periods at a standstill.**
- **Each disc diffuser must be checked for damage before installation.**
- **The threaded connections on the diffuser pipes must be checked and cleaned with a cloth if necessary.**
- **Before screwing each disc diffuser into position, check its spring-mounted non-return valve with your finger.**
- **The disc diffusers are sealed with corresponding O-rings.**
- **Place the disc diffusers flat on the threaded connections and screw on until hand-tight.**
- **Torque of approx. 25 Nm is the normal level of force applied by a technician without extreme physical exertion (hand-tight) and ensures the disc diffusers are firmly in position. It is crucial to exclude the risk of leakages.**
- **Excessive force (e.g. torque > 40 Nm) and the use of tools which could cause damage to the disc diffusers and threaded connection are not permitted.**
- **Do not stand on the disc diffusers. The storage of materials on the disc diffuser is also prohibited. The disc diffusers and the membranes in particular must be protected against damage!**

### 2.4. Flushing the piping system

Before the final installation of all disc diffusers and commissioning of the aeration system, further thorough cleaning of the piping system is essential {2.1.3. Initial cleaning of the piping system}. To do so, the aeration pipes should only be partially fitted with disc diffusers. Depending on the location of the air supply, the position for the last disc diffuser in the respective airflow direction at the end of each aeration line should be kept free. If a larger number of disc diffusers (> 10) are installed per aeration line, the two connections furthest from the supply point should be left free.

### 2.5. Standstill periods between installation and test operation or commissioning

If it is not possible to conduct test operation or commission the system immediately after installing the disc diffusers, it is necessary to ensure sufficient water coverage of the disc diffusers to protect them against external environmental influences (e.g. UV radiation, frost, algae growth). If necessary, the disc diffusers should be cleaned again before test operation or commissioning.

WILO GVA GmbH Dieselstr. 6 D – 42489 Wülfrath Germany	T +49 2058 9210 - 0 F +49 2058 9210 - 20 info@gva-net.de www.gva-net.de	Deutsche Bank AG IBAN DE50330700900325933000 BIC DEUTDE33XXX	VAT ID no.: DE 815649284 Tax ID no.: 139/5809/0548	District court: Wuppertal HR B 14011 Managing Director: Dipl.-Ing. René Brunßen
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### **3. TEST OPERATION AND LEAKAGE TEST**

Test operation and a leakage test of the entire aeration system should be carried out immediately after installation of the disc diffusers with marginal submersion in water. This requirement applies in particular if the aeration system is intended for intermittent operation. If leakages are found, these should be corrected and rechecked. The impermeability should be confirmed by the client in the installation protocol. If impermeability tests are not carried out, or if they are performed inadequately or improperly, this voids the warranty. We are unable to accept responsibility for any aftereffects that can be attributed to this.

Test operation and the leakage test are to be carried out with a marginal water level of just a few centimetres (approx. 5 cm) above the disc diffusers. Higher water levels make it difficult to detect minor damage or leakages.

Use clean water for water filling. It is not suitable to drain the secondary clarifier for this purpose due to its tendency to foam. A tank inspection is also required as it is not always possible to identify damage or leakages from the rim of the tank.  
Ensure that suitable protective equipment is worn!

The air load of the aeration system should be as low as possible during the test procedure. This makes it easier to identify leakages. The gassing pattern must be checked with nominal air load.

▪ **Water level slightly (approx. 5 cm) above disc diffusers**

▪ **Use clean water which does not tend to foam**

▪ **Tank inspection required for testing**

▪ **Select low air load for leakage test**

▪ **Select nominal air load to test the gassing pattern**

#### **3.1. Tubes and aeration grids**

▪ **Check for leaks, especially at welds and joints (flanges, pipe seals, screwed connections, saddle clamps).**

### 3.2. Diffusers

- **Check the fixation of the disc diffusers for any leaks, ill-fitting gaskets or faulty threads. Leakages can be identified by air rising to the surface in the immediate vicinity of a disc diffuser in the form of large bubbles.**
- **Check the disc membrane for any damage, which can be identified by significantly larger air bubbles escaping.**
- **After checking a manageable section, the air for this section should be turned off for a second check.**

If any leakages were overlooked during the inspection, they will be visible when the air is turned off due to intensive post-gassing. Slight fine-bubble post-gassing at the disc membranes is normal and is not an indication of leakages.

If a conspicuously uneven distribution of compressed air is observed when the disc diffusers are exposed to nominal air pressure, the precise levelling of the disc diffusers must be checked and corrected. Slightly uneven air distribution may occur initially due to the different hydrophobic behaviour of disc membranes as a result of production factors; this will level out within approx. 2 weeks (continuous initial operation phase).

## 4. COMMISSIONING

Commissioning of the aeration system first requires proper installation, including flushing the piping system with air, test operation and the leakage test. The customer must confirm that these aspects were carried out properly in a commissioning protocol. A function test must be performed on the regulation and control of compressed air generation and distribution, including pressure monitoring.

New disc membranes may display different hydrophobic behaviour due to production factors, though this usually balances out completely during a two-week operation phase. The typical bubble pattern is only formed and the full oxygen entry rate achieved after the initial operation phase.

The disc diffusers must be pressurised during this period in accordance with the intended normal operating conditions. In the case of intermittent operation, a minimum daily operating time of 15 minutes must be ensured. After the initial operation phase, the switch-on frequency can be reduced to once per week.



## **5. OPERATION OF WILO-SEVIO ELASTOX®-D DISC DIFFUSERS**

### **5.1. Continuous duty**

In continuous duty, the ELASTOX® diffusers are to be operated in the range for air load specified below. Appropriate control and regulation systems of the compressed air supply must ensure that the ELASTOX® diffusers are operated within the specified range. It must be ensured that the maximum air load is not exceeded in order to avoid damage to the ELASTOX® diffusers due to overloading.

Wilo-Sevio diffuser type	Air load [Nm³/h per unit]		
	Nominal operation	Range	Air flushing operation
ELASTOX®-D / Type A	8	1 – 10	14
ELASTOX®-D / Type B	6	1,2 – 8	12
ELASTOX®-D / Type C	10	1,5 – 12	16

For further information on air load, oxygen utilisation and pressure losses, refer to the relevant technical information.

### **5.2. Intermittent operation**

The option to operate with intermittent air load is one of the outstanding features of the ELASTOX® diffusers.

If the intermittent operation phase is part of a targeted nitrification / denitrification process, no special precautions need to be taken in addition to the absolute impermeability of the aeration system. However, if the disc diffusers are exposed to air only very rarely (e.g. on a seasonal basis), some additional measures must be taken:

- In the vicinity of the ELASTOX® diffusers, use suitable circulation systems to prevent sediment deposits from forming.
- After a long period at standstill, it is fundamentally not possible to exclude the risk that water may have penetrated the aeration system. Therefore, when reactivating the aeration system, it is important not to increase the air load abruptly, and instead proceed gradually in order to avoid overloads.
- When used in normal operation, the disc diffusers should be flushed once per week with the maximum airflow rate. {6.3. Air flushing operation} It may also be prudent to arrange an automatic, regular flushing operation (e.g. 10 minutes per day) for continuous duty.

### **5.3. Nitrification / denitrification**

When using oblique flow aeration (aeration with separate circulation, e.g. in intermittent operation), take into account the mixer manufacturer's specifications with regard to the mixers' locations in relation to the disc diffusers in order to avoid damage to the mixer. For safety reasons, it must be ensured that no foreign influences (e.g. recirculation pumps, inlet pipes, mixers, etc.) create flows with currents > 1 m/s in the vicinity of the disc diffusers. Any damage caused to the disc diffuser due to unpredictable flow conditions is excluded from the warranty.



## 6. MAINTENANCE

### 6.1. General information

The efficiency and service life of the aeration system depends on the high elasticity, fine bubbling and low pressure loss of the high-quality disc membranes. Maintenance and care measures are required to ensure these features are ensured over the long term.

Problem-free operation of the aeration system can be monitored visually on the basis of the aeration pattern and the operating pressure. If irregularities are identified, the causes must be determined and, if necessary, remedied immediately to avoid any consequential damage.

- **An increase in pressure in the aeration system must always be investigated if, in the same operating situation, it exceeds 100 % of the original output value registered at the time of commissioning.**
- **In any case, the disc diffusers should be subjected to a visual inspection.**
- **Pressure losses greater than 120 mbar must be prevented in any case and in all operation phases, as permanent damage to the disc diffusers cannot otherwise be excluded.**

### 6.2. List of possible malfunctions

#### Occurrence of individual coarse air bubbles:

Causes	Braid formation around individual disc diffusers can occur especially in the case of insufficient pre-cleaning. The formation of braids is not harmful to the disc membranes in principle, but can lead to an increase in efficiency losses in the aeration system. Extremely high loads due to braid formation can result in mechanical damage (i.e. components breaking off).
Measures	Visually inspect the disc diffusers and clean or replace them as necessary.

#### Increased operating pressure:

Causes	Increased water level, braid formation, faulty pressure gauge, incorrectly throttled control elements, incorrectly set oxygen values, deposits in the tubes.
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#### Increased pressure loss and/or deterioration of the aeration pattern:

Causes	<p>The disc membranes are subject to a normal ageing process, which leads to the gradual hardening of the membrane and causes an increase in the pressure losses of the membrane and a deterioration of the aeration pattern.</p> <p>Substances in the sewage or on the air-side can damage the special rubber. Clogging on the rubber may be caused by process-related deposits (e.g. scaling or fouling processes).</p>
Measures	When used in municipal wastewater treatment plants, it is possible to achieve a service life of more than 10 years. The disc membranes' ageing process depends on the respective operating conditions. After an operation period of more than 5 years, it is generally advisable to have the disc membranes checked by WILO GVA.

The frequency of testing should be increased if it is known that the sewage contains critical substances with regard to the quality of the disc membrane or if the exact composition of the sewage treated is unknown (especially in the case of industrial sewage).

A check of the disc membranes by WILO GVA is recommended, as replacement of the disc diffusers is otherwise essential.

Preventing the formation of process-related deposits through process optimisation (e.g. pH regulation, optimisation of precipitant doses) as well as implementation of regular preventive air flushing are also reasonable measures.

- 6.3 Air flushing operation
- If required, clean the ELASTOX® diffusers

Without early intervention, the membrane slots may be clogged to such an extent that cleaning might not be successful, or the disc membrane may already be permanently damaged by overloading. Replacement of membranes is then unavoidable.

{6.5 Replacement of a disc diffuser or disc membrane}

### **6.3. Air flushing operation**

Wastewater treatment in the sludge activation stage comprises a number of biological, chemical and physico-chemical processes and substance conversions. Depending on the sewage composition, the system's load and process controls, it is possible that biological deposits (mucilage, fouling) and scaling effects (mineral deposits) may occur with varying degrees of severity.

Deposits on the disc membrane and in particular in the membrane slots should be avoided at all costs since, in the long term, such deposits will cause pressure losses to increase and reduce the service life of the ELASTOX® diffusers. The elastic disc membrane undergoes intermittent stretching and relaxation depending on the air load, a cycle which serves as a self-cleaning process and thereby "breaks off" mineral deposits. If this self-cleaning effect is not sufficient, an additional air flushing procedure should be carried out regularly.

Process-related deposits on the disc membrane can still be easily removed in the initial stage; it is therefore advisable to carry out the air flushing operation on a regular basis, starting immediately after commissioning. To counteract deposits on the disc membrane, we recommend deactivating the aeration process briefly at least once per week and then operating the disc diffuser for approx. 10 minutes at maximum air load.

Air flushing operation must always be carried out in the case of intermittent operation with longer standstill periods (e.g. seasonal operation) and in the case of continuous duty with low air load below 2 Nm<sup>3</sup>/h.

If heavy process-related deposits are expected (e.g. due to simultaneous precipitation, dairy wastewater or high water hardness), a suitable preventive air flushing operation is recommended. However, this preventive measure does not completely exclude the potential for process-related clogging.

#### **6.4. Cleaning**

Depending on the degree of biofouling, it may not be possible to prevent the formation of biological deposits through air flushing and the membranes' self-cleaning effect. In this case, carry out high-pressure cleaning after emptying the tank or remove the aeration fields at specific intervals. In case of sewage with a high proportion of industrial waste, cleaning should be carried out at least once or twice per year.

Disc diffusers can be cleaned by spraying them with a high-pressure cleaning device from the outside. In doing so, a spray nozzle must be used and a sufficient distance maintained from the disc diffuser (minimum distance approx. 50 cm); the use of fine nozzles is not permitted as the risk they will damage the membrane cannot be excluded. The water temperature should be between +5 and +50 °C. The safety instructions issued by the cleaning equipment's manufacturer must be observed.

If necessary, any contamination of the membrane slots can be eliminated by injecting a suitable cleaning fluid into the airflow. Prior consultation with our customer service department regarding suitable cleaning chemicals is essential.

#### **6.5. Replacement of a disc diffuser or disc membrane**

In comparison to a new disc diffuser, a used disc diffuser displays elevated pressure losses. Therefore, when replacing disc diffusers or disc membranes as necessary, if a aeration pipe can be isolated it is also advisable to replace all units on the line – even if only certain disc diffusers are defective. If at all possible, avoid mixing old and new disc diffusers in order to prevent uneven distribution of compressed air. Before reinstallation, the aeration lines must be cleaned and any sludge that has penetrated must be completely removed. After installing the disc diffusers, it is also necessary to conduct test operation including a leakage test {3. TEST OPERATION AND LEAKAGE TEST}.

#### **6.6. Differential pressure measuring device to monitor pressure losses**

To monitor the disc diffusers, the pressure loss at the disc diffuser itself is used as a parameter. The function of the disc diffusers is usually monitored on the basis of the pressure in the piping system. However, the pressure gauges normally used for this purpose are not usually able to measure pressure with sufficient accuracy. We therefore recommend installing differential pressure measuring systems with tenfold greater measurement accuracy. Our customer service is ready to assist with any further queries you may have; for further details, please also consult the corresponding technical information.

#### **6.7. Test lances for visual monitoring of the ELASTOX® diffusers**

In the event of irregularities (changes in the aeration pattern, changes in pressure conditions), the disc diffusers should be subjected to a visual inspection. In the case of aeration systems which can be removed from the tank during operation, this inspection can be conducted without any problems. In the case of aeration systems that are permanently installed on the floor of the tank, several tank units are usually available – allowing one of these to be emptied. Another option is to install a so-called "test lance" on a few disc diffusers; these test lances can then easily be removed from the tank without having to empty the tank.

If disc diffusers are replaced, the diffusers with test lances must also be replaced.

## **6.8. Maintenance tasks**

If the tanks are emptied or aeration lines lifted out of the tank using a lifting device in order to complete maintenance tasks, the corresponding safety regulations must be taken into account. It must also be ensured that deposits on the disc diffusers do not dry during maintenance.

## **7. DETERMINATION OF THE OXYGEN SUPPLY IN CLEAN WATER**

Oxygen entry tests conducted in clean water to verify the performance of aeration systems must be carried out in accordance with DWA leaflet M 209.

In any case, the test conditions must be agreed in advance with WILO GVA as any warranty claims in this regard shall otherwise be cancelled.

Oxygen entry tests must only be carried out after an initial operation phase of at least two weeks, as otherwise oxygen entry losses cannot be ruled out (4. COMMISSIONING).

For the clean water tests, water of drinking water quality must be used; biologically treated sewage or water containing algae is not suitable (for details, see DWA instructions).

If there is algae growth in the water due to unfavourable conditions during the initial operation phase, it is essential to clean the disc diffusers and tank and then re-fill the tank before conducting the tests.

## **8. PACKAGING, TRANSPORT AND STORAGE**

### **8.1. General information**

Negative influences, which can lead to changes in the physical properties of disc membranes and plastic articles, occur everywhere in the case of improper storage and handling. They usually lead to a shortening of the service life and are exhibited on the article as excessive hardening, softening, permanent deformation, cracking and other surface damage. The product must be stored in compliance with the current version of ISO regulations.

In general, the ELASTOX® diffusers must be protected against weather conditions such as frost, hail, direct sunlight and other mechanical damage.

### **8.2. Packaging and transport**

The disc diffusers and any spare parts must be transported and stored in their original packaging. Warranty is only issued for ELASTOX® disc diffusers in their original and undamaged packaging. Original packed pallets must not be stacked on top of each other!

Wilo-Sevio ELASTOX®-D disc diffusers are packaged in a maximum of 40 pieces per box. A maximum of five boxes may be stacked directly on top of each other without pallets (e.g. in shipping containers).

During transport, the pallets must not be stacked on top of each other, even for a short time. The cargo must also be protected against the weather and secured against slipping during transport.

### **8.3. Storage**

#### **8.3.1. Store room and temperature**

The disc diffusers must not be stored outdoors! The store room should be cool, dry, moderately ventilated, darkened and dust-free. The temperature in these rooms should be around +5 °C to +25 °C. Higher temperatures will change the products' physical properties, while plastic components and rubbers of all qualities will stiffen at low temperatures.

#### **8.3.2. Heating and humidity**

If it is necessary to heat the store room, the radiator must be shielded and the stored goods kept about 1 m away from it. The store room should have low humidity, of max. 65 %. Please make sure that you do not use humid rooms.

#### **8.3.3. Lighting and ozone formation**

Light and lighting are of particular importance. All rubber products must be protected against high levels of ultraviolet light, in particular from direct sunlight.

In addition to the ultraviolet radiation emitted by open fluorescent tubes, the associated ozone formation is also harmful. Electric motors and devices that generate sparks also have similar effects. Such devices must not be located in the store room. The same applies to solvents, oils, chemicals or acids which damage the quality of rubber and silicone through their vapours and fumes and which lead to hardening, softening or a significant change in volume.

# INSTALLATION AND OPERATING INSTRUCTIONS

## Wilo-Sevio ELASTOX®-D



## NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

# INSTALLATION AND OPERATING INSTRUCTIONS

## Wilo-Sevio ELASTOX®-D

