

Pioneering for You

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Wilo-Sevio ELASTOX®-T

Tube diffuser

New
productname





Wilo-Sevio ELASTOX®-T

Application

- For fine-bubble compressed air aeration within the biological treatment stage
- Depending on application and basin geometry: Use as surface, wide-band or line aeration and for aeration with separate circulation
- Preservation aeration of sewage, e.g. in buffer tanks
- Oxygen entry in activated sludge tanks for specific nitrification
- Oxygen entry for sludge stabilisation
- Aeration of rivers and lakes
- Aeration of fish ponds
- Regulation of pH value by stripping CO₂

Function

The Wilo-Sevio ELASTOX®-T tube diffuser and air supply are attached in pairs via corresponding air outlet holes in a central manifold. At rest, the diaphragm rests on the round support or carrier tube. During aeration the diaphragm rises slightly from the supporting body over its circumference and length so that the air in the emerging intermediate space or annular gap can be distributed.

The optimised perforation of the diaphragm ensures fine-bubble and uniform coalescence-free aeration of the fluid.

Special features/product advantages

- Extremely low-buoyancy behaviour due to floodable support tube
- Simple and quick installation and dismantling on the aeration grids
- Low specific piping requirement due to individual diffuser lengths and paired installation.
- Modification and retrofitting possible for a wide range of basin geometries

Intermittent operation

Intermittent operation allows modern process engineering to be utilised (e.g. nitrification/denitrification) even for existing systems.

The structural design largely prevents backflow of fluid or activated sludge into the diffuser or pipe system when pressure is relieved.

Description/function

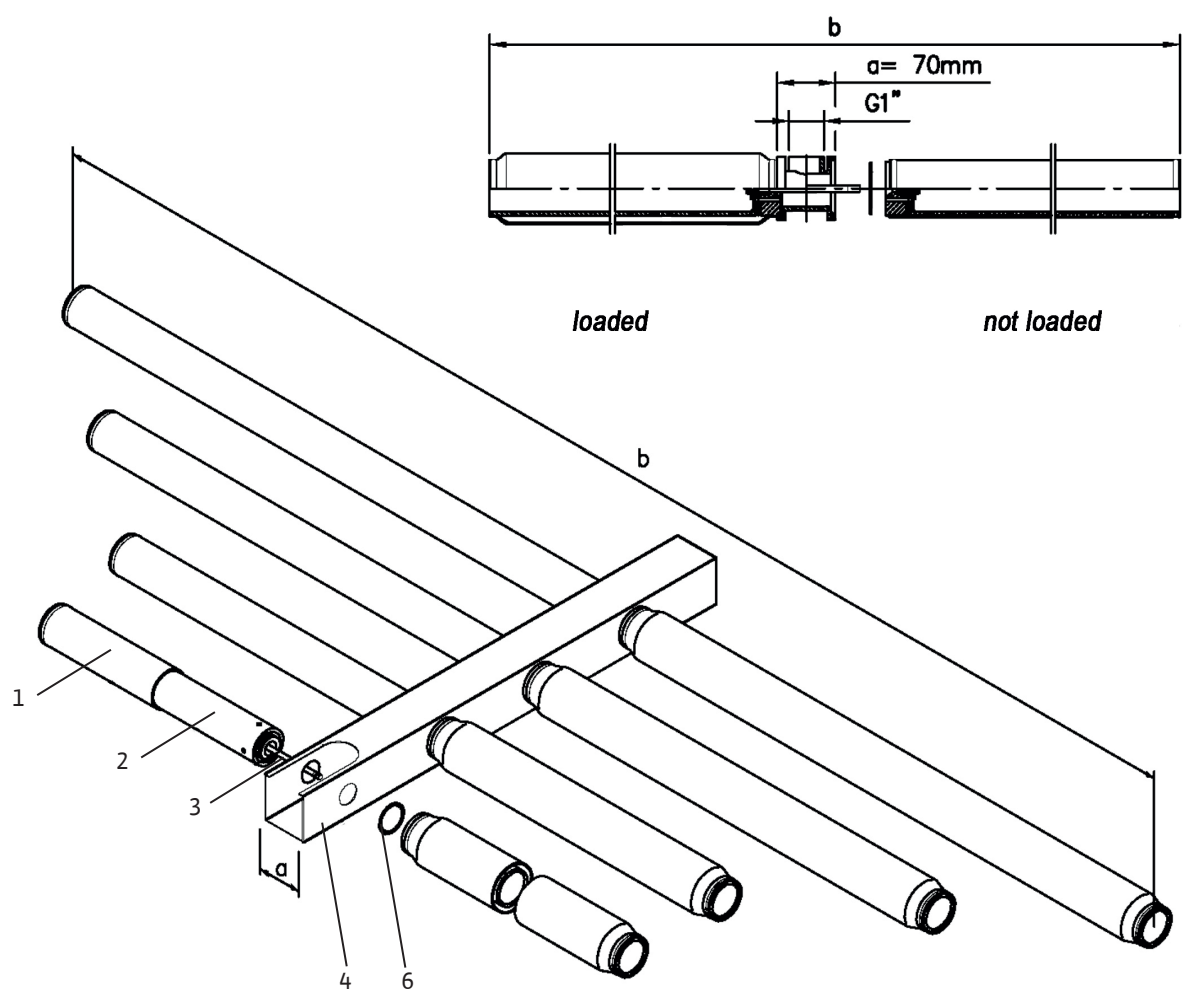
The low-buoyancy behaviour of the Wilo-Sevio ELASTOX®-T tube diffuser enables a design of removable aeration systems which can be dismantled without the need to empty the tank.

Tube diffusers with aeration lengths of 750 or 1000 mm are usually used in newly built aeration basins. As part of the process of retrofitting existing wastewater treatment plants, old basin structures largely with unfavourable geometries (e.g. channels) are often modified and converted into aeration basins.

Characteristics					
Dimensions		400	500	750	1000
Support tube diameter	mm	65	65	65	65
Aeration length	mm	400	500	750	1000
Overall length, b	mm	a + 890	a + 1170	a + 1660	a + 2160
Tie-rod length	mm	a + 42	a + 42	a + 42	a + 42
Minimum spacing	mm	~ 300	~ 300	~ 300	~ 300
Weight per unit	kg	~ 0.64	~ 0.81	~ 1.06	~ 1.33

Dimension drawing

Tube diffuser Wilo-Sevio ELASTOX®-T



Subject to change without prior notice.

Materials

All materials were chosen in such a way as to ensure excellent resistance to the predictable chemical and biochemical effects during the biological sewage treatment.

Both the supporting body and the frame construction are made from eco-friendly polypropylene.

The diaphragm material is particularly significant in terms of its resistance to ageing and the overall efficiency it brings to the aeration systems. The diaphragm is produced under optimum vulcanisation conditions as a high-quality extruded product.

The diaphragm materials have been specially developed on the strength of many years of experience. They have been optimised in numerous test runs and guarantee a long service life.

EPDM EPDM diaphragm
Silicone Plasticizer-free diaphragm made from silicone with very good thermal and chemical resistance and anti-adhesive surface characteristics

Characteristics of materials			
No.	Designation		
1	Diaphragm	EPDM SIL	Silicone
2	Support tube	PP	Polypropylene
3	Tie-rod	A4	Stainless steel 1.4404
4	Aeration grid (optional)	VA	Stainless steel
5	T-connector adapter (optional)	PP	Polypropylene
6	O-ring Ø 45 mm	NBR	
	Fastening clip	A4	Stainless steel 1.4571

Consulting guide

Perforation and airflow rate

The perforation of the diaphragm opens when air is supplied and the compressed air flows in the form of small bubbles from the diffuser into the surrounding medium. After the air is disconnected and the pressure is relieved within the distribution system, the water pressure coupled with the resilience of the diaphragm ensure that the perforation and the air outlet openings on the carrier structure close.

In order to achieve optimised aeration and separation of the emerging air bubbles from the diaphragm surface, the spacing between the pores and their size are defined such that air-bubble coalescence is avoided or minimised as early as during the formation process.

Characteristics					
Perforation/buoyancy		400	500	750	1000
Component length	mm	445	585	830	1080
Aeration length	mm	400	500	750	1000
Perforation area	cm ²	~ 760	~ 950	~ 1425	~ 1900
Weight	kg	~ 2 x 0.64	~ 2 x 0.81	~ 2 x 1.06	~ 2 x 1.33
Buoyancy per pair	N	~ 15	~ 15	~ 20	~ 25

Airflow rate		
Minimum	Nm ³ /h · m	~ (0) 1.5
Nominal operation	Nm ³ /h · m	~ 8.0
Maximum	Nm ³ /h · m	~ 10.0
Flushing/regeneration	Nm ³ /h · m	~ 15.0

Installation

Fixation/installation

The diffusers are mounted in pairs on rectangular or square feed pipes (aeration grids), which should be provided with the corresponding connection holes $\varnothing 41$ mm. In addition to standard fixation to square/rectangular pipes, it is possible to install the aeration elements via a T-connector with 1" connection to, for example, round pipes. The T-connector is produced in polypropylene as an injection-moulded part.

On one side the Wilo-Sevio ELASTOX®-T tube diffuser has a face with a spigot and integrated groove for sealing in pairs against the face of the central feed pipe using a suitable O-ring $\varnothing 45$ mm. Tie-rods M8 and the corresponding sealing plates are used for fixation and screwed connections via the stainless steel threaded bushes that are built into the diffuser.

The structural design of the diffusers is devised such that replaceability with ceramic aeration pipes or other tube diffusers $\varnothing 40/70$ is assured. Special adapters are available for particular types of installation.

Mounting the diffusers on the aeration grids is a very straightforward and time-saving process. This can be carried out by one person without the use of specialised tools.

Consulting guide

Oxygen entry capacity

The oxygen utilisation of Wilo-Sevio ELASTOX®-T tube diffusers has been optimised over numerous pilot-based trials and verified in practice through substantiating measurements. The result is a diffuser which features outstanding fine-bubble aeration properties.

The specific standard oxygen transfer rate $g\ O_2/(m_N^3\ m)$ and the standard oxygen transfer rate SOTR $kg\ O_2/h$, apart from the general aeration concept,

- surface aeration
- aeration with separate circulation, e.g. oblique flow aeration
- partial surface aeration, line aeration (spiral flow)

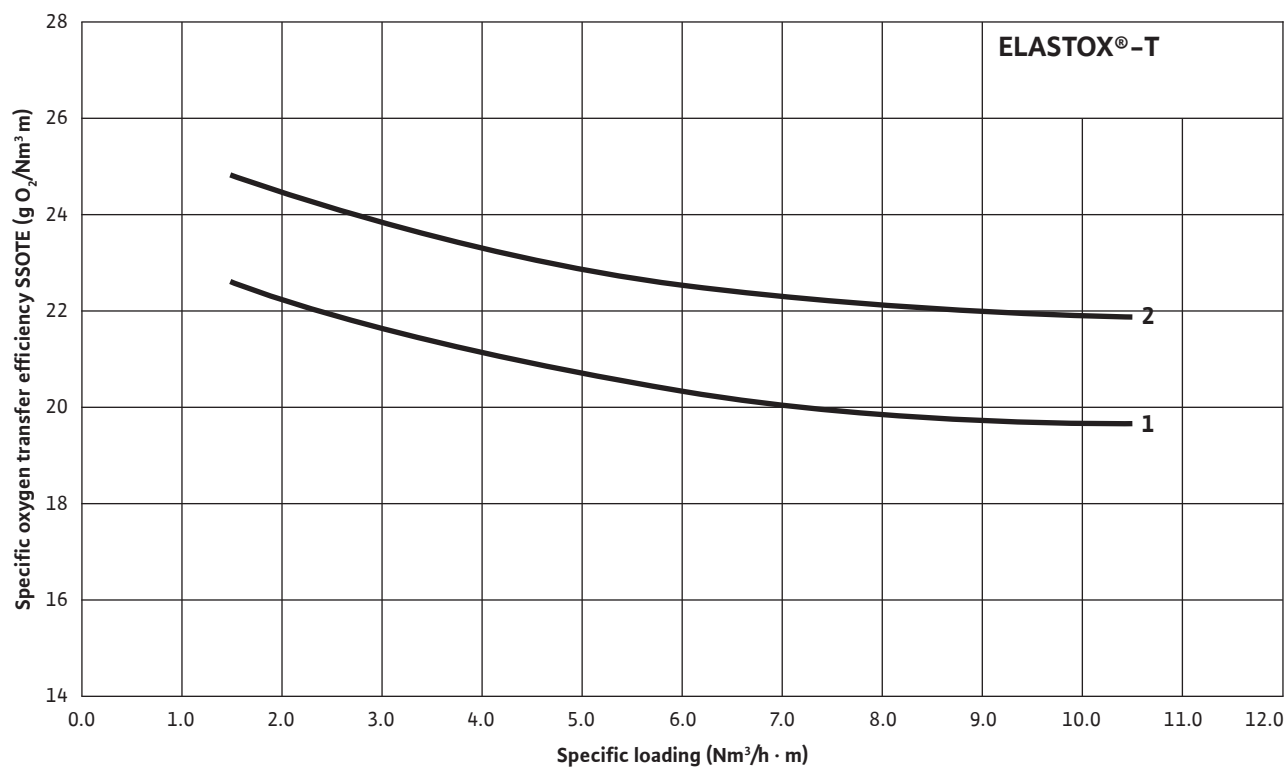
among other things, very strongly also depend on the activation density in the aeration basin under consideration.

The illustration of the oxygen utilisation is based on area aeration in pure water under standard conditions at a blow-in depth of 3.75 m.

To determine the magnitude of influence of the activation density, the number of tube diffusers was varied:

- 1 = 0.85 m diffuser length per m^2
- 2 = 2.40 m diffuser length per m^2

Wilo-Sevio ELASTOX®-T tube diffuser duty chart



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Pressure loss

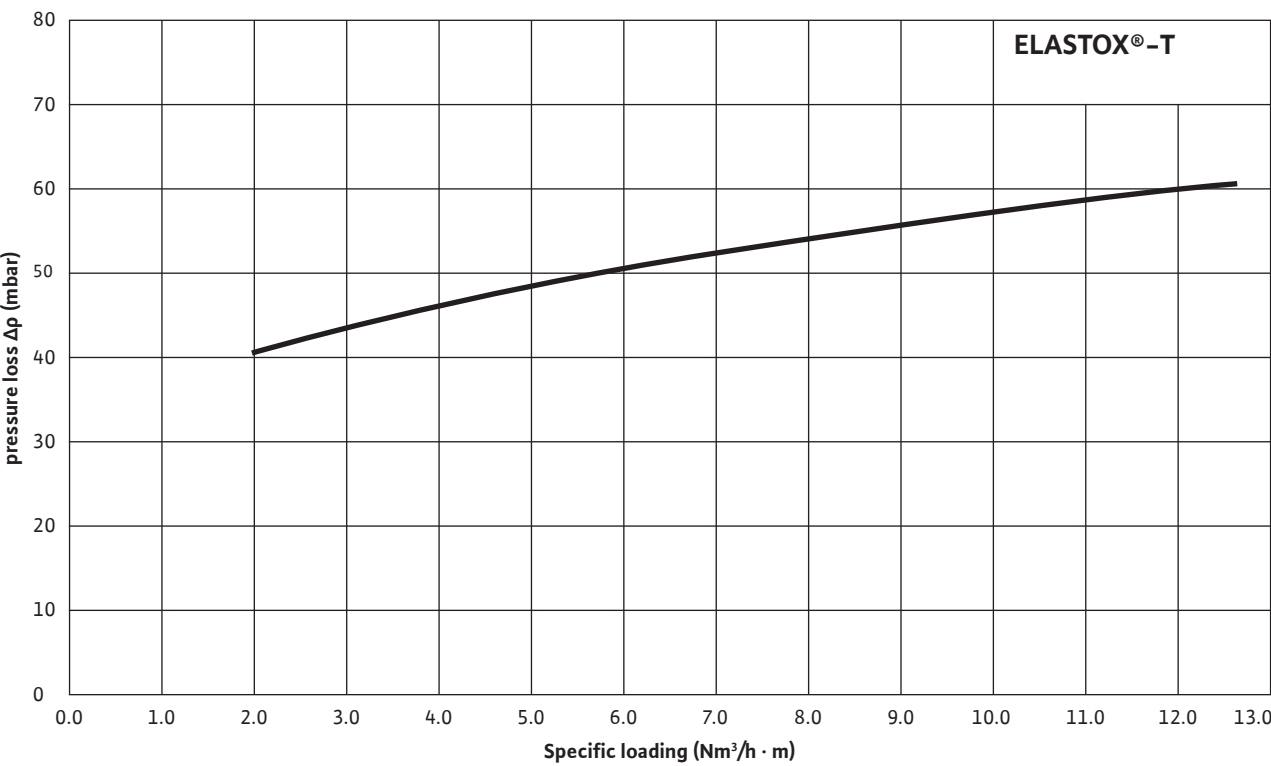
Wilo-Sevio ELASTOX®-R tube diffusers are distinguished by their elasticity, featuring very low base pressure losses and a shallow arched pressure loss curve, compared to rigid aeration bodies. This leads to improved economy and overall efficiency of the system.

Nominal loading

A nominal loading between 6 – 8 Nm³/h · m per diffuser is estimated for aeration system configuration. Loading up to 12 Nm³/h · m per diffuser is permitted in temporary test operation.

The specifications in this table relate to all diaphragm qualities made from EPDM. The base pressure loss of silicon diaphragms in their new condition is marginally higher, although it has a notably lower increase over its operating period.

Wilo-Sevio ELASTOX®-R tube diffuser duty chart



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