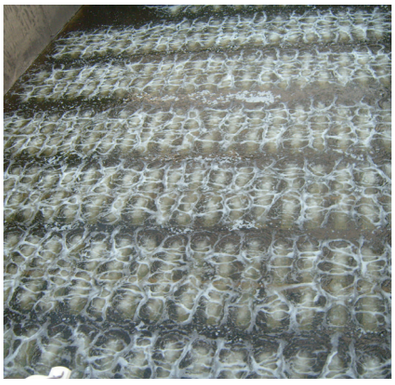
Pioneering for You

Range leaflet – edition 03/2018

Wilo-Sevio ELASTOX®-P
Panel diffuser

New productname



Wilo-Sevio ELASTOX®-P

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 CO_2

Function

The Wilo-Sevio ELASTOX®-P panel diffuser and air supply are attached in pairs via corresponding air outlet holes in a central manifold. At rest, the diaphragm rests firmly on the slightly curved supporting structure. Only when the internal air pressure is greater than the static pressure of the surrounding water, the diaphragm rises slightly from the supporting body so that the air in the emerging intermediate space can be distributed.

The structural design of the underside of the supporting body prevents gas volumes accumulating below the diffuser and reduces buoyancy by using an effective aeration system.

Special features/product advantages

→ Low-buoyancy behaviour
→ Very good specific oxygen transfer rate with low pressure loss owing to optimised diaphragm perforation and the resulting aeration behaviour
→ Low specific piping requirement
→ High quality and service life of the diaphragms owing to the production of moulded products

The optimised perforation of the diaphragm in conjunction with the upwardly directed aeration surface ensure fine-bubble and uniform coalescence-free aeration of the fluid.

Intermittent operation

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

The structural design prevents backflow of fluid or activated sludge into the diffuser or pipe system when pressure is relieved.
→ The resilience allows the diaphragm perforation to close automatically while simultaneously lying flat on the supporting or carrier structure.

Description/function

The low-buoyancy behaviour of the ELASTOX®-P panel diffuser enables a design of removable aeration systems which can be dismantled without the need to empty the basin.

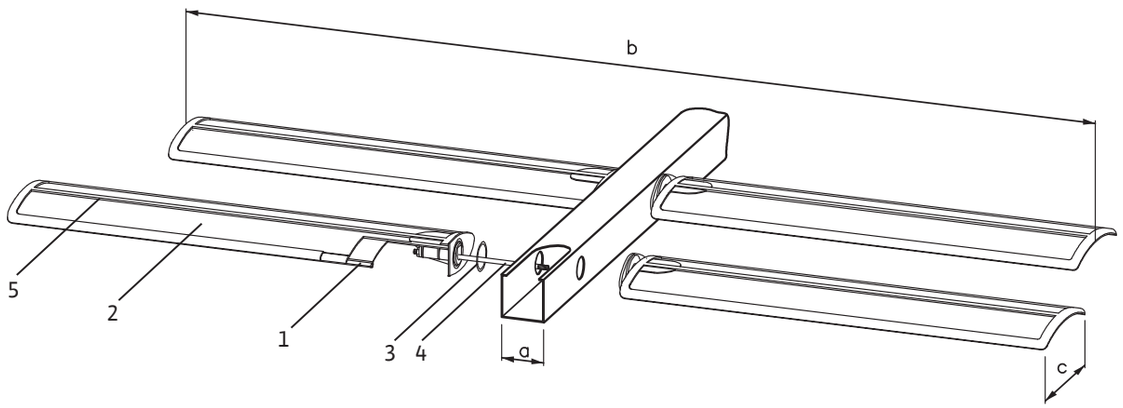
The Wilo-Sevio ELASTOX®-P panel diffuser has an exclusively upwards-facing aeration surface. The slightly convex-shaped diaphragm is fastened by a frame construction to the supporting body and stabilised by a central bar, which at the same time divides the aeration space into two chambers. The gas space between the diaphragm and supporting body is consequently minimised and the degree of buoyancy is also reduced.

On one side the supporting body of the ELASTOX®-P panel diffuser has a face with an integrated groove for sealing in pairs against the face of the central feed pipe using a suitable O-ring Ø 45 mm. Tie-rods M8 and the corresponding sealing plates are used for fixation and screwed connection.

Characteristics		
Dimensions		
Overall length, b	mm	a + 1655
Overall width, c	mm	210
Height	mm	~ 75
Tie-rod length	mm	a + 176
Minimum spacing	mm	~ 500
Weight per unit	kg	~ 3.80

Dimension drawing

Panel diffuser Wilo-Sevio ELASTOX®-P



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 moulded 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 can be expected to deliver a long service life.

EPDM	EPDM diaphragm
EPDM-mb	EPDM diaphragm in microbe-resistant version; reduced affinity to biological deposit formation due to a specially cross-linked additive
Silicone	Plasticizer-free diaphragm made from silicone with very good chemical resistance and anti-adhesive surface characteristics

Characteristics of materials

No.	Designation		
1	Supporting body	PP	Polypropylene GF
2	Diaphragm	EPDM EPDM-mb SIL	 Microbe-resistant Silicone
3	O-ring Ø 45 mm	NBR	
4	Tie-rod	A4	Stainless steel 1.4404
5	Diaphragm attachment	PP	Polypropylene GF
	Fixing screws	A4	Stainless steel

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 sewage. 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 precisely so that air-bubble coalescence is avoided or minimised as early as during the formation process.

Buoyancy forces

The pipe supports and fixations must be designed and dimensioned in consideration of the buoyancy forces listed in the table. Particular consideration should be given to the buoyancy forces for removable systems.

Characteristics		
Perforation/buoyancy		
Component length	mm	830
Aeration length	mm	750
Perforation area	cm^2	~ 1200
Weight	kg	~ 2 x 1.90
Buoyancy per pair	N	~ 30
Airflow rate		
Minimum	$Nm^3/h \cdot m$	~ (0) 4.0
Nominal operation	$Nm^3/h \cdot m$	~ 12.0
Maximum	$Nm^3/h \cdot m$	~ 15.0
Flushing/regeneration	$Nm^3/h \cdot m$	~ 18.0

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 Ø 41 mm. The edge length of the pipe must be at least 80 mm.

On one side the Wilo-Sevio ELASTOX®-P panel 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 Ø 45 mm. Tie-rods M8 and the corresponding sealing plates are used for fixation and screwed connection.

The structural design of the diffusers is devised such that replaceability with ceramic aeration pipes or other diffusers Ø 40/70 is assured.

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®-P panel 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 standard specific oxygen transfer efficiency SSOTE 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)

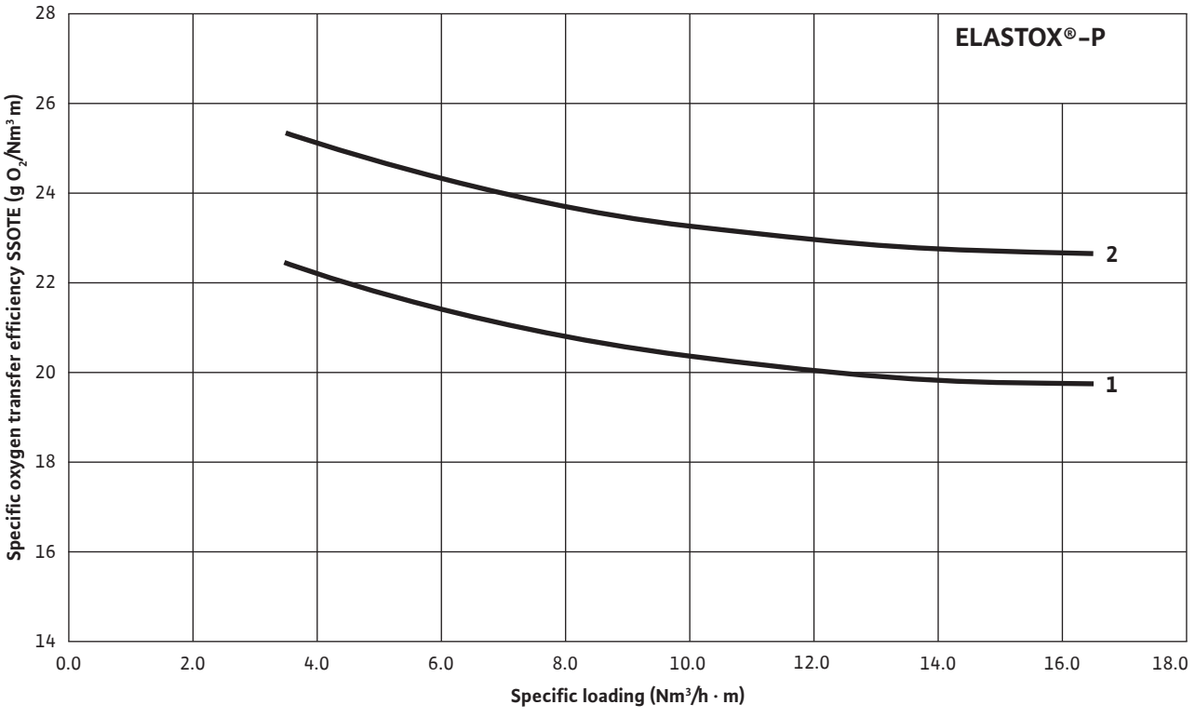
among other things, very strongly also depend on the activation density in the aeration basin under consideration.

The illustration of the oxygen utilisation is based on surface aeration in pure water.

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

1 = 0.85 m diffuser length per m^2
2 = 2.20 m diffuser length per m^2

Wilo-Sevio ELASTOX®-P panel diffuser duty chart



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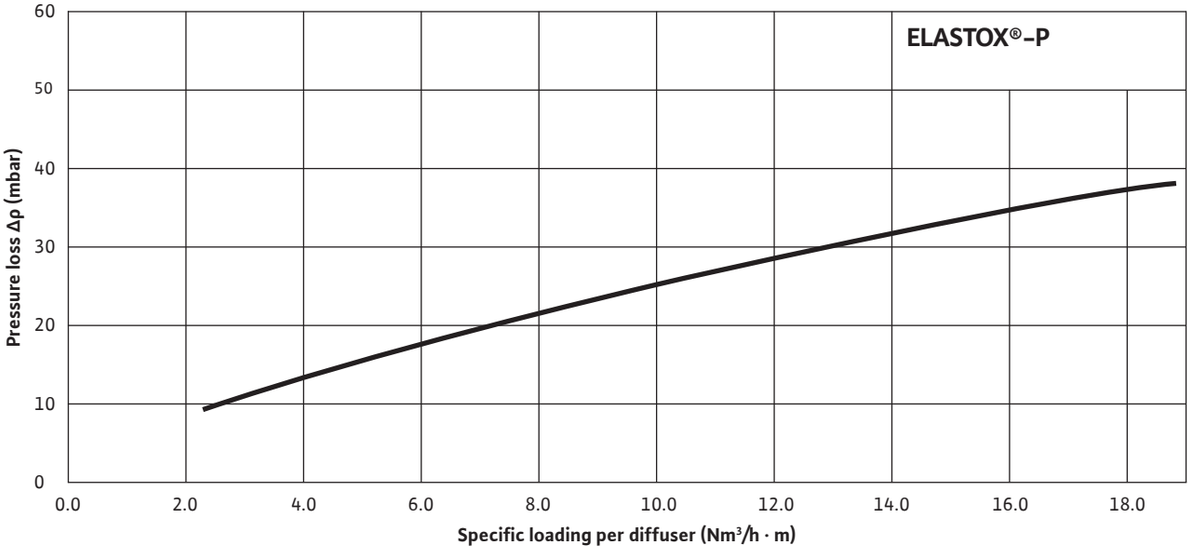
Pressure loss
Wilo-Sevio ELASTOX®-P panel diffusers are distinguished by their elasticity, featuring very low base pressure losses and a shallow arched pressure loss curve, compared to rigid aeration bodies. This leads to improved economy and overall efficiency of the system.

Nominal loading
A nominal loading of 12 $Nm^3/h \cdot m$ per diffuser is estimated for aeration system configuration. Loading up to 18 $Nm^3/h \cdot m$ 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®-P panel diffuser duty chart



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