



Aeration Components

JetFlex TD™ Tube Diffuser | JetFlex HD™ Disc Diffuser



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Welcome at Jäger Umwelt-Technik.



Jessica Gaumert (sales & administration), Frank Bruss (Key-Account-Manager) and Thomas Dargel (Key-Account-Manager) inspecting 1st shipment of a new specific OEM product

About us

We are pleased to welcome you at Jäger Umwelt-Technik GmbH & Co. KG. The following pages will provide you an overview of our products and services.

The parent company of Jäger Umwelt-Technik GmbH & Co. KG, Gummi-Jäger, was founded in 1942. Specialized in rubber and plastic Gummi-Jäger provided application engineering, material development and value added product solutions for more than 60 years.

The commitment to continual improvement and best in class product development and customer service of the companies of the Jaeger Group helps us to meet our customers current and future demands.

Today more than 850 professionals are working in the highly specialized companies of Jaeger Group.

Since 2007 all environmental protection related services and products of the Jaeger Group are focused in Jäger Umwelt-Technik GmbH & Co. KG.

- Our core competence is providing aeration solutions for biological wastewater treatment.
- Our success is based on continuous product innovation, friendly, competent service and zero-defect philosophy.
- Our customers are design engineers, OEM accounts, contractors and design-build companies all over the world.

30 years of innovation

Innovative and customer driven

30 years ago Arnold Jäger, 2nd generation owner of Gummi-Jäger, was approached by the leading German OEM water treatment company to develop its first rubber membrane diffuser. At that time diffused air aeration using ceramic membranes technology was standard in German waste water treatment plants. But increasing energy and labor costs forced German municipalities to look beyond this technology. Enthusiastic about the idea to save energy and decrease operational cost he developed together with his teenage sons EPDM rubber membranes.

His deep knowledge about rubber chemistry and processing, lean manufacturing and quality control enabled Arnold Jäger to offer unique solutions for the German waste water treatment industry.

Membranes are not just rubber parts

Using his experience based on Automotive and Machine Tool industry he engineered custom designed disc and tube type diffusers for almost every German and US OEM waste water company.

Since 1975 Gummi-Jäger sold more than 10 Million membranes and diffuser assemblies.

As pioneer in the industry Arnold Jäger innovated the diffused air wastewater treatment and created more than 30 diffuser related patents.

As chairman of the advisory Board of the Jaeger Group Arnold Jäger is still pursuing the continuous improvement of the Jäger diffusers.

Standardized products based on experience

Our standard diffused air products of the JetFlex TD™- and HD™-range are available off-the-shelf for instant delivery. We also dedicate all our knowledge and experience to our OEM customers to develop customer specific designs.

Customized products based on innovation

Being an engineering driven company we support our clients with innovative technical solutions to create economic benefits. We enable our customers to comply with almost every effluent specification and project-specific life-cycle-cost requirements.

State of the art engineering tools (CAD, CAM, FEA), in house medium scale testing and evaluation facilities and the close cooperation with research organizations as the Leibnitz University of Hannover or the German Institute for Rubber Technology (DIK) insure further innovation.

Dedicated to rubber and plastics



Arnold Jäger (Chairman of the advisory board) and his sons Claudius (left) and Andreas (right), both General Managers of the Jaeger Group

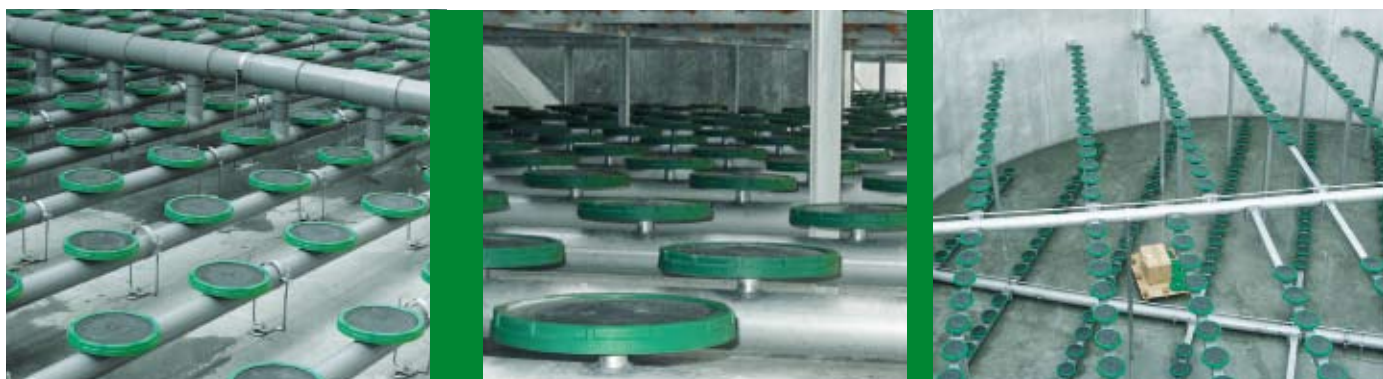
Disc diffusers
Tube diffusers
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Disc diffusers

JetFlex HD™ disc diffuser

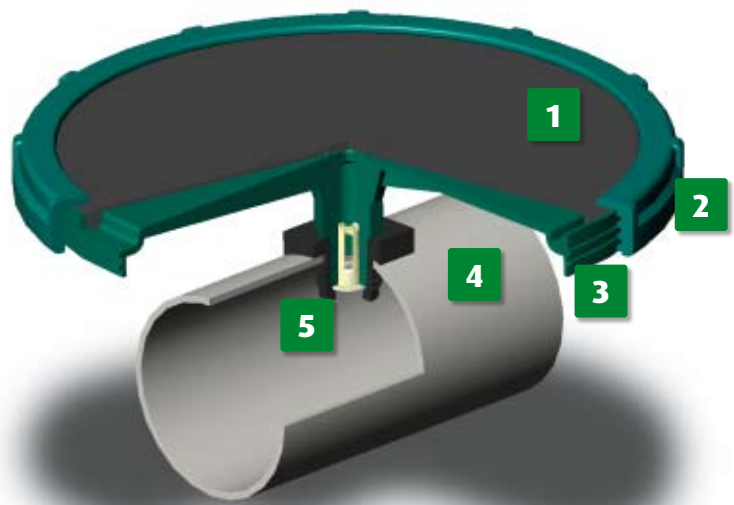
The Jaeger HD™ disc diffuser series combines cost effective design, low installation costs, reliability and performance in intermittent and continuous aeration processes.

- Precision die cut openings for high oxygen transfer efficiency and performance: The operating pressure (DWP) can be adjusted to customer or system specification by using different slit patterns varying the number and length of the slits and the spacing between the slits
- Active diameter between 184 mm and 295 mm
- Different standard and special membrane materials specially engineered for a wide spectrum of applications:
 - **EPDM:** municipal wastewater
 - **Low plasticizer EPDM:** animal processing, food processing, beverage production
 - **Silicone:** pulp and paper industry, petrochemical and refining processes
- Glass fiber reinforced polypropylene body plate and ring for maximum chemical, temperature and UV resistance
- Different orifice sizes to adapt various air flows
- Check valve integrated into body plate, optional ball valve available
- Easy mounting on 3-inch and 4-inch IPS pipe as well as 90-mm and 110-mm diameter metric pipe of any thermoplastic material (PVC, CPVC, PP, ABS etc).
 - EPDM rubber grommet
 - Glue-on PVC saddle (for PVC only)
- Low maintenance requirements
- Standard units in stock for immediate shipment.





- 1. Membrane
- 2. Retaining Ring
- 3. Base Plate
- 4. Rubber Grommet
- 5. Ball Valve (opt.)



JetFlex™ Disc Type	Diameter total/effective	Perforated area	Orifice	Standard Air Flow	Available materials		
	[mm]				[m ²]	[mm]	[m ³ /h]
HD 200	233/184	0.025	6	1,5 - 4,0	x	x	x
HD 270	268/218	0.037	6	1,5 - 7,0	x	x	x
HD 340	346/295	0.067	10	2,0 - 10,0	x	x	

Torque controlled
assembly and 100%
dry functional test



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Spare membranes



Supplying cost effective replacements

The JetFlex™ HD disc diffuser replacement membrane series is among the most advanced fine bubble aeration membrane technology available to the waste water treatment industry. It combines highest oxygen transfer efficiency and low energy usage.

The replacement membranes are compatible with most original equipment manufacture's fine bubble aeration membrane systems.

Authorized sales and engineering partners

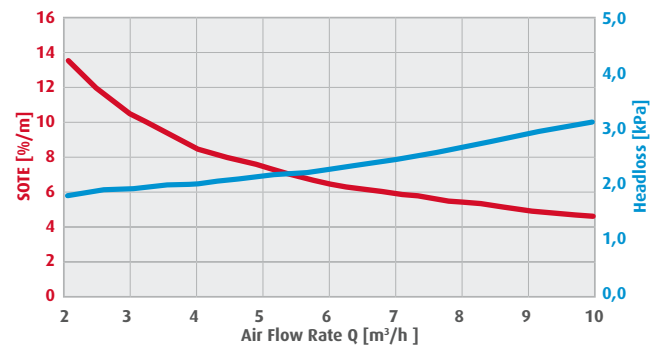
JetFlex™ HD disc diffuser replacement membranes are exclusively sold by authorized sales and engineering partners of Jäger Umwelt-Technik GmbH & Co. KG.

Our professional partners provide system design and consulting services to upgrade, expand or completely (re)-design waste water treatment processes.

These aeration experts will assist proper product selection regarding compatibility of the Gummi-Jäger JetFlex™ HD disc diffuser replacement membrane series with the originally

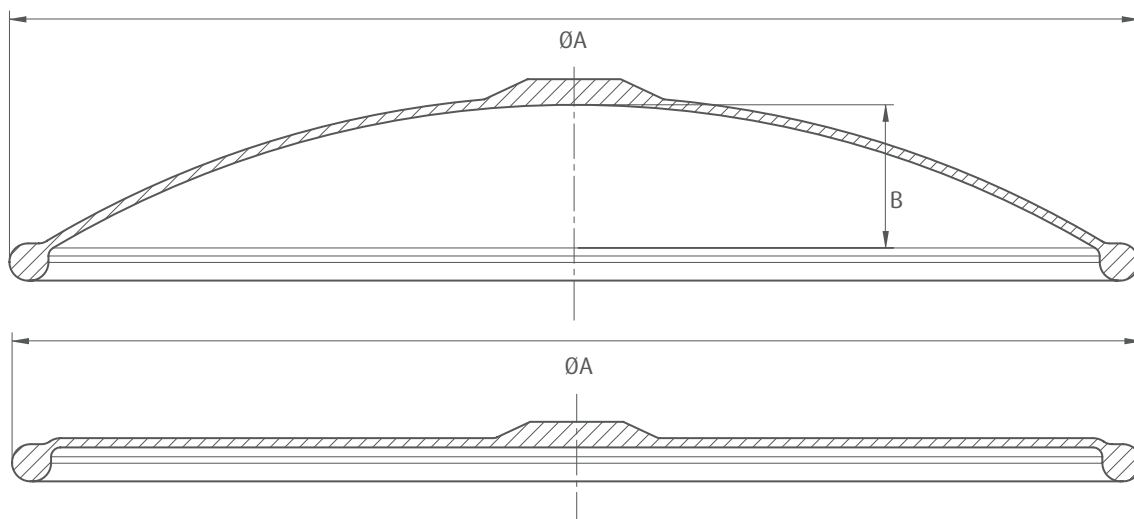
installed fine bubble aeration system. They also provide installation, operation and preventive maintenance manuals.

Standard oxygen transfer-efficiency and headloss disc diffuser: HD340 - F053 - F31

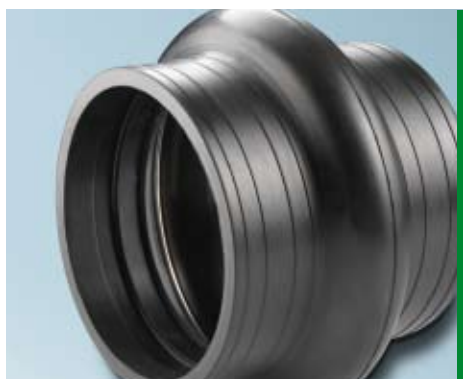


Submergence depth	1,2 m
Water temperature	20,9 °C
Tank volume	5,09 m³
Reservoir area	1,13 m²
$C_{ss,T}$	8,94 mg/l





JetFlex™ Disc Type	Disc Class	Overall Disc (ØA)	Material	Dome Hight (B)	Perforated area	„System“
		[mm]		[mm]		
HD200	7"	204	Silicone/EPDM	flat	0,025	7" Sanitaire®
HD200	7"	204	EPDM	flat	0,025	7" Nopon®
HD270	9"	241	Silicone/EPDM	flat	0,037	9" Sanitaire®
HD269	9"	242	EPDM	21	0,038	9" Aercor®
HD340	12"	316	EPDM	flat	0,067	12" Nopon®
HD***	Custom sizes/dimensions on special request, minimum > 500 units per order					



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Tube diffusers

Tube and disc comparison

In order to determine the optimum aeration equipment, following questions should be considered:

- Type of wastewater being treated including any special characteristics
- Type of treatment process being operated or considered
- Electrical energy cost per kWh
- Type and capacity of existing aeration components
- Number and capacity of existing or proposed blowers
- Number and configuration of existing or proposed reactors
- Ability to access reactors including ability to dewater and take off-line

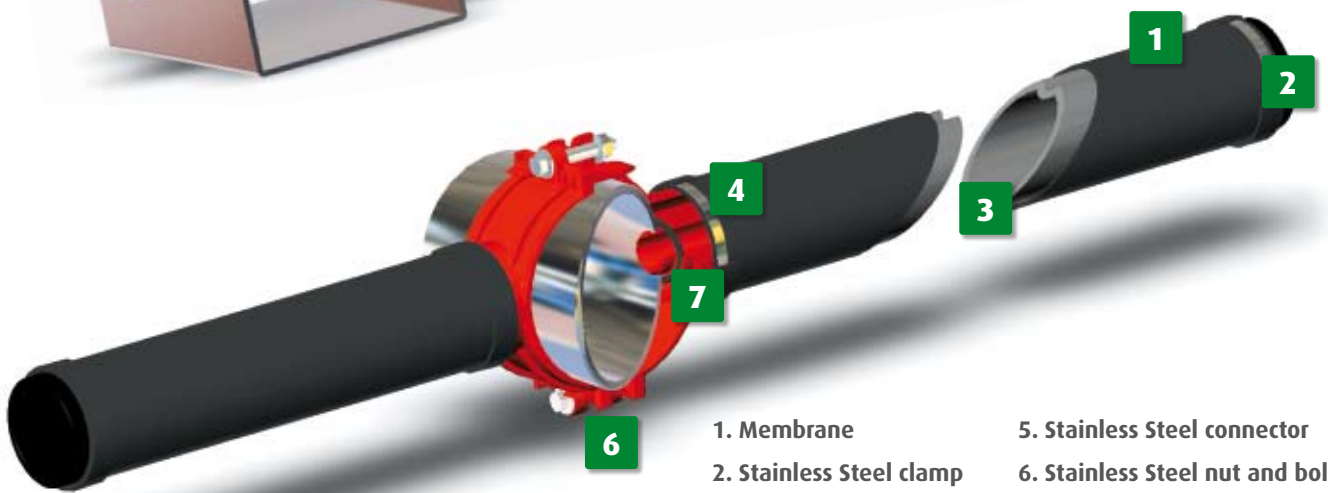
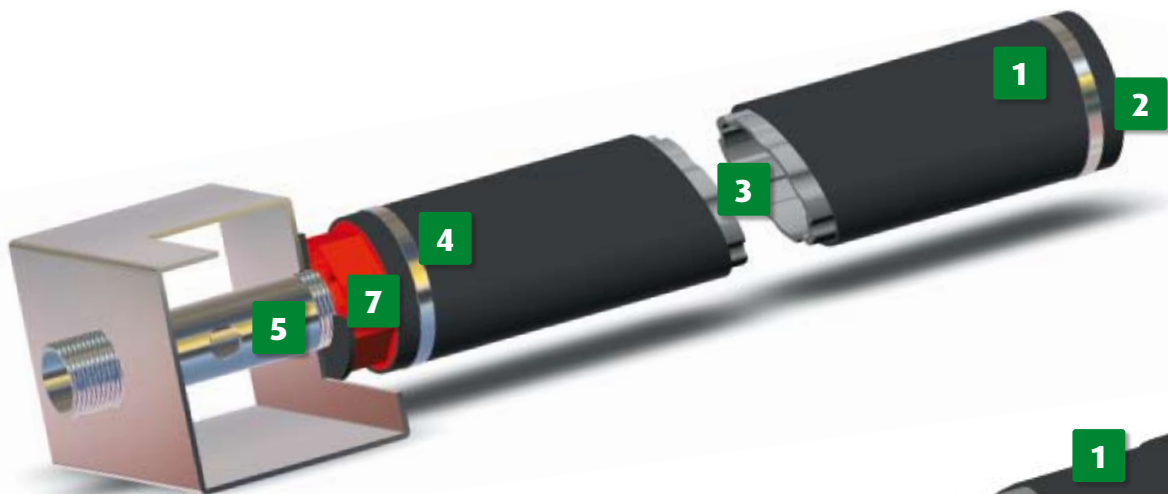
Since for every treatment plant several restrictions for the overall configuration apply there is no general guide-line for choosing the optimum diffuser. The experienced designer will consider certain outlines as "one disc diffuser can treat the wastewater of 30 people" and "2 discs are equal to one meter of tube diffuser" or "air speed in the laterals should not exceed 10 m/s" etc.

JetFlex TD™ tube diffuser

The Jaeger TD™ tube diffuser series combines cost effective design, low installation costs, reliability and performance in intermittent and continuous aeration processes.

- Precision die cut openings for high oxygen transfer efficiency and performance: The operating pressure (DWP) can be adjusted to the system specification by using different slit patterns varying number and length of slits and the spacing between the slits
- Low headloss due to grooved PP-support tube
- Active length from 200 – 1200 mm with standard length of 500 mm, 750 mm, and 1000 mm
- Mounting onto round and square tube laterals.
- Different membrane materials (can be equipped with an anti-fouling surface based on nano technology):
 - **EPDM:** municipal wastewater
 - **Low plasticizer EPDM:** animal processing, food processing, beverage production
 - **Silicone:** paper and petrochemical industry
 - **Polyurethane:** petrochemical industry





- 1. Membrane
- 2. Stainless Steel clamp
- 3. Grooved support tube
- 4. Stainless Steel clamp
- 5. Stainless Steel connector
- 6. Stainless Steel nut and bolt
- 7. Seal



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Spare membranes



Compatible and efficient

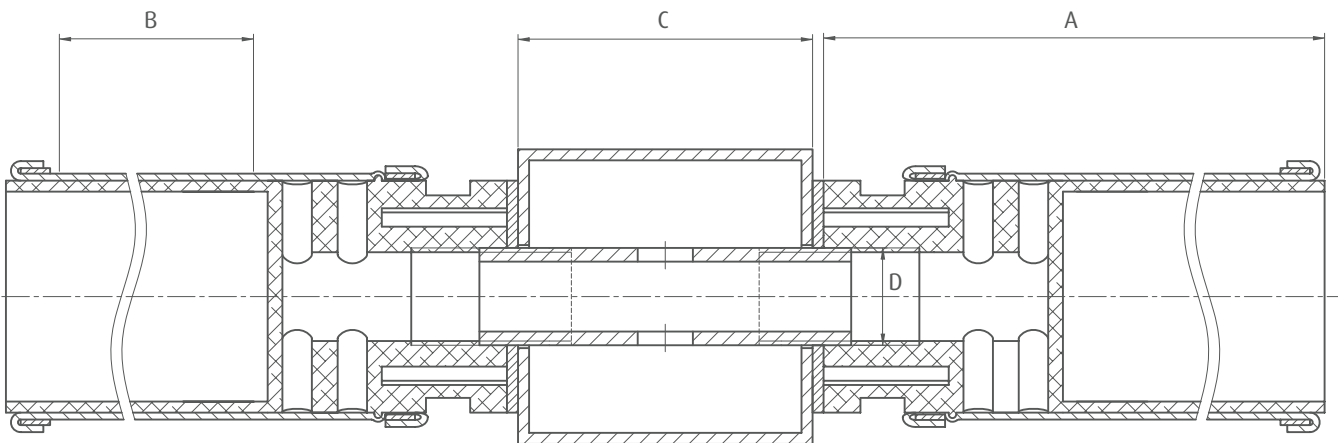
The JetFlex TD™ tube diffuser replacement membrane series is among the most advanced fine bubble aeration membrane technology available to the waste water treatment industry.

The replacement membrane series is compatible with most original equipment manufacture's fine bubble aeration membrane systems.

Replacement Sleeves

Sleeve		Wall		Suitable for Lateral with		"System"
ID Sleeve	Tolerance ID	Thickness	Tolerance	OD Tube	OD Tube	
[mm]	[mm]	[mm]	[mm]	[mm]	[inch]	
26	1,0	2,00	0,15	25	1	Miscellaneous
30	2,0	2,00	0,20	N/A	N/A	INVENT
41	1,0	1,90	0,15	40	1 ½	Miscellaneous
55	1,0	1,90	0,15	54	2 ⅛	Miscellaneous
60	2,0	2,00	0,20	WYSS®	WYSS®	Parkson®
62	1,0	1,90	0,15	60,3	2 ¾	Sanitaire®; EDI®
65	1,0	1,90	0,15	63	2 ½	Envicon®; EDI®
66	1,0	1,90	0,15	65	2 ½	Envicon®; EDI®
71	1,0	1,95	0,15	70	N/A	Passavant®
75	1,0	2,00	0,15	73	2 ⅞	Miscellaneous
77	1,0	2,00	0,25	75	N/A	Miscellaneous
91	1,0	2,00	0,25	88,9/90	3 ½	EDI®





Diffuser Length (A)	Perforation Length (B)	Perforation area	Square Tube (C)		Thread (D)	
[mm]	[mm]	[m ²]	[mm]			
1060	1000	0,16	80	100	3/4"	1"
810	750	0,12	80	100	3/4"	1"
560	500	0,08	80	100	3/4"	1"

Custom sizes/dimensions on special request, minimum > 500 units per order



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Operation & Maintenance



Cutting operational costs

The main operational objective is to achieve acceptable effluent quality while maximizing the aeration performance at minimal costs. It is essential that diffusers be kept clean through cost-effective preventive maintenance procedures:

■ Cleaning the air intake filters:

Filtration equipment maintenance entails cleaning and changing filter media to eliminate air-side (blower filtration system) particulate fouling of diffuser slits.

■ Calibrations of all meters:

Calibration and/or zeroing of meters is necessary as part of preventive maintenance because accurate airflow and DO measurements are a critical part of monitoring aeration systems.

■ Cleaning:

The operator should check the diffusers continuously during operation. Especially the increase of pressure has to be checked. Any increase of pressure may be the result of fouling and clogging.

■ To prevent the membranes from fouling it is strongly recommended to clean the membranes periodical.

The most common techniques are:

- Running the diffusers with the maximum overload airflow (air bumping) for a short period of time
- Inject formic acid into the airflow
- Flush the whole system with acid or alkaline solution
- Dewater the tank and blow off the fouling with an high-pressure water jet

Increase diffuser lifetime

Proper preventive maintenance and cleaning can increase the diffuser lifetime up to 50 %.

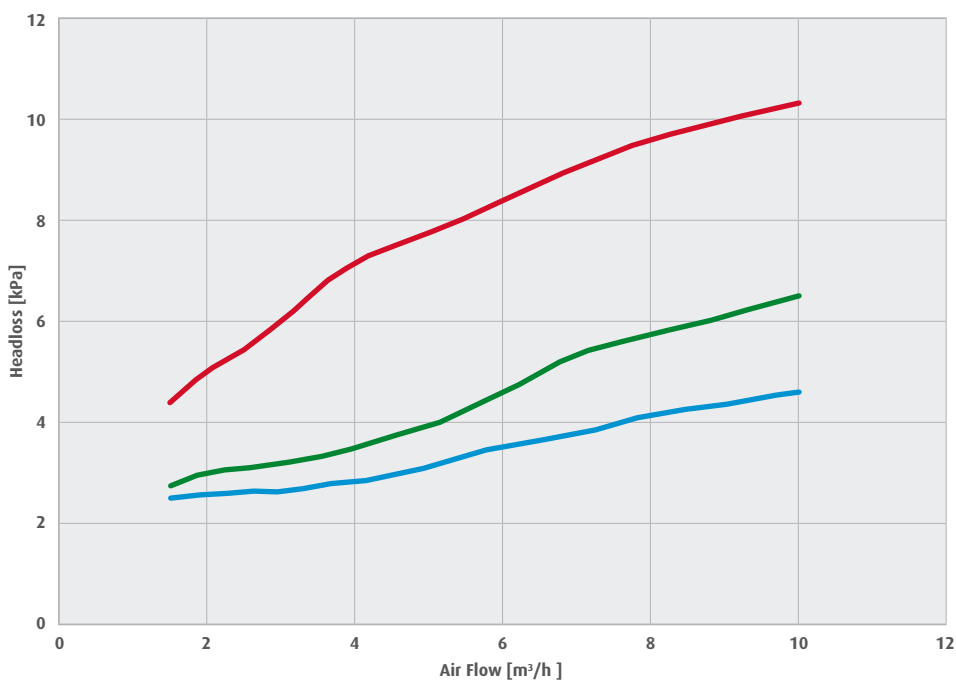
Before choosing one of these techniques it is necessary to check the material resistance of the diffuser membrane and to verify the type of fouling. Every wastewater is special and may create its own type of fouling. Jäger Umwelt-Technik GmbH & Co. KG is collaborating with specialized engineering companies and biochemical laboratories to determine the most effective cleaning procedure.





Energy saving by cleaning

Often routine maintenance or cleaning can reduce the membrane pressure, providing additional economic life. If no improvement in pressure is obtained after cleaning or maintenance, the economics of replacement should be reviewed.

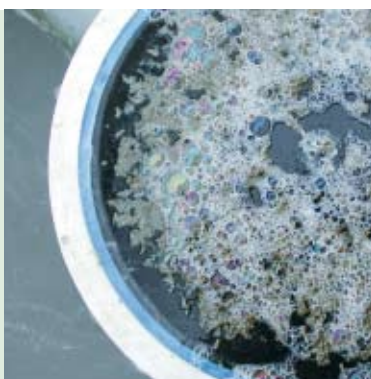


Headloss of diffusers before and after cleaning with air pressure washer

- Before cleaning
- After cleaning
- Virgin reference diffuser



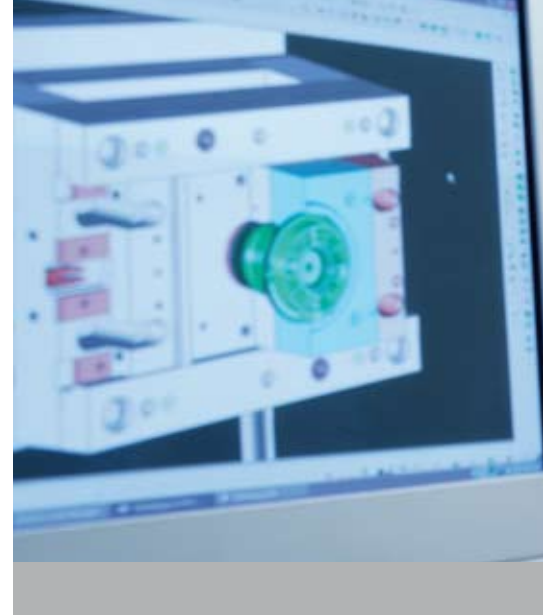
Clogged membrane before cleaning (courtesy of Dr.-Ing. Frey)



Flushing the membrane with acid solution (courtesy of Dr.-Ing. Frey)

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Customer support



Proven solutions

Gummi-Jäger and its successor, Jäger Umwelt-Technik GmbH & Co. KG, has proven records to provide cost effective, long life aeration solutions for even the most challenging applications. In close cooperation with leading waste water OEM customers we developed a broad variety of

- Membrane shapes and sizes
- Diffuser platforms
- Clamping mechanisms
- Waste water resistant materials.

Professional partners

Today we market our products in cooperation with more than 140 individual marketing and engineering partners. Our authorized partners can roughly be classified in

- Small and medium national engineering companies
- International aeration supply companies/
OEM manufacturers
- Global turnkey contractors

We supply proven system components with the necessary performance data measured in our test facilities or measured in large scale plants in cooperation with our partners.

We generally do not design the plant layout or participate in local tenders nor do we supply diffusers to the waste water treatment plants directly.

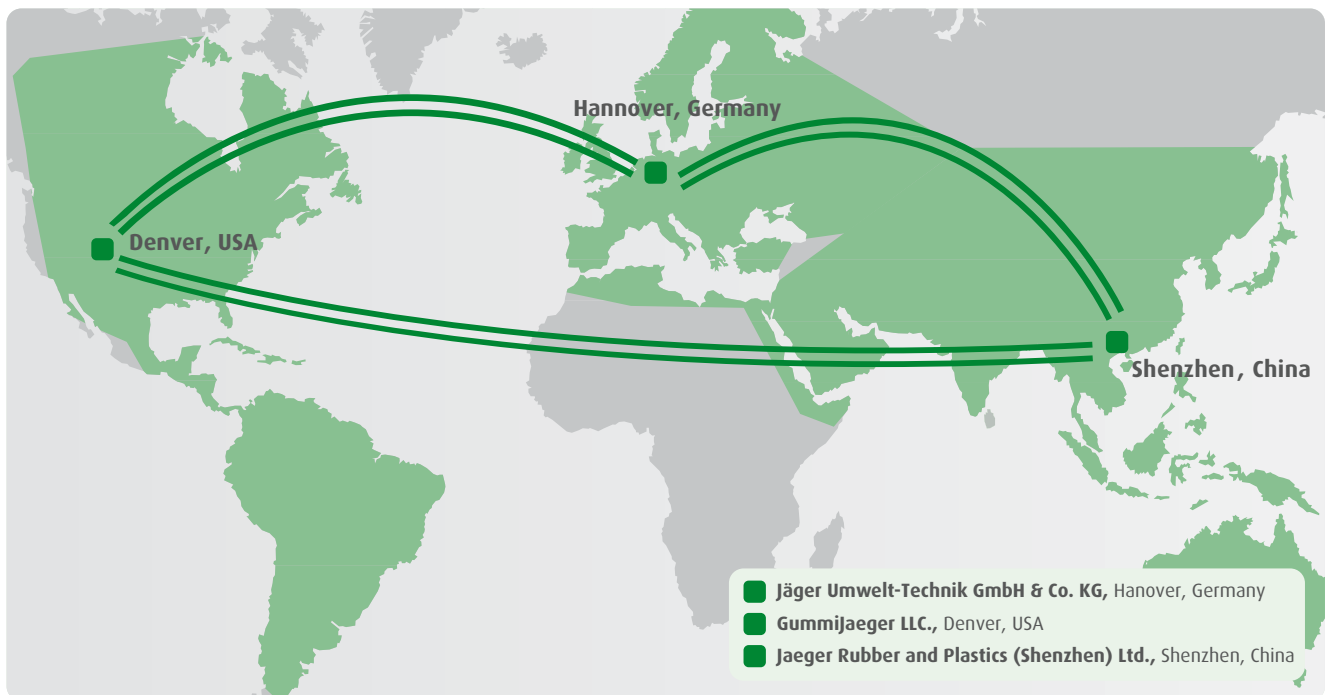
But we provide all necessary design data for our partners to engineer the aeration system including installation, operation and maintenance manuals.

Manufacturing excellence

Our products are manufactured on 3 continents meeting local content requirements, price level expectations and transport costs restrictions.

Since all manufacturing plants of the Jaeger Group are certified according ISO 9001 or TS 16949 and ISO 14000 our customers receive the same quality level worldwide.





In our global production network we control the entire manufacturing process chain. All manufacturing and test data are recorded for traceability:

- Compound mixing
- Rubber molding and extrusion
- Plastic injection molding
- Membrane perforation
- Final assembly
- Headloss testing



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Research & Development

Application requirements

For superior performance diffusers and membranes have to be engineered according to the intended application with special focus on:

- Polymer formulation for specific performance requirements
- Physical properties of the base membrane material.
- Mechanical requirements of the membrane which is perforated to allow air to escape
- Shape and geometry of the plastic support structure to insure an even air distribution over the entire membrane area and length
- Nitrile and Urethane for superior service in oily wastewater applications
- Silicone based compounds for excellent performance in high temperature applications and municipal treatment plant with high load of various industrial waste
- Fluoro- and other specialty polymers for specific industrial or unusual wastewater applications or specific industrial manufacturing processes

Polymer materials

Our polymer engineers in the Jaeger Group formulate and fabricate compounds in-house on 2 mixing lines. Based on more than 25 years of experience we recommend:

- EPDM for most residential wastewater applications

Evaluation and test

Jäger Umwelt-Technik GmbH & Co. KG offers a membrane evaluation program for difficult or unusual waste waters. For these unusual influents apparatus for on-site testing is available. Field-testing allows the selection of the membrane material to be optimised as well as provides an opportunity to demonstrate the performance capabilities of different products by one-to-one comparison. When evaluating applications with unusual conditions, the field test program is invaluable in determining the appropriate membrane material. In general it takes 3 to 6 months to retrieve reliable perfor-



Continuous testing of physical properties of membrane materials

Carbon black, sulphur and ozone protection chemicals used in high performance rubber compounds





mance and lifetime data of the diffusers. Within this period membrane samples are analyzed for change of their mechanical and chemical properties. Whenever more detailed analysis is required our in-house rubber laboratory is complemented by the independent German Rubber Research Institute (DIK) in Hannover.

Customized design

Due to our rubber and plastic manufacturing expertise Jäger Umwelt-Technik GmbH & Co. KG is the preferred partner of many OEM waste water companies for their proprietary diffuser design. We provide the complete design of membrane and plastic body, connectors to header pipes according to customer specifications regarding

- Application
- SOTE
- Airflow and headloss
- Physical and chemical resistance
- Shape and size

We are able to test prototypes and single units in our laboratory for mechanical strength and headloss performance in clean water. Especially for intermittent operation requirements we can provide a test bed to simulate operational stress for membranes and plastic bodies in water depths up to 10 meters. On special request we can also supply manuals for

- Installation
- Operation
- Maintenance

To determine SOTE and medium scale performance tests Jäger Umwelt-Technik cooperates with the Leibnitz University of Hannover, Institute of Water Quality and Waste Management (ISAH), located directly on the main WWTP of the city of Hannover.

As an independent government body ISAH can provide test certificates for different diffuser configurations in its 100 m³ test tank. But this does not exempt our customers from performance and lifetime evaluation by thorough field testing in different waste water applications and operation modes.



Performance test laboratory of ISAH, Leibnitz University of Hannover

Testing the physical strength of imperforated membranes



Testing the basic suitability of EPDM and silicone membranes in a tar factory

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