

 <b>JÄGER</b> Umwelt-Technik	<b>Technical Information</b>	Diffuser Engineering Guide
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<h2>Membrane Fouling Issues</h2>		

### ***Fouling and Clogging Problems***

Even with proper design and/or proper installation and operation, some flexible membranes will experience maintenance issues that require special attention. These maintenance issues are substantially reduced from some of the conditions that might exist with rigid media, however, questions regarding fouling, clogging, or other potential issues can be resolved on an individual discussion basis:

1. Inside Fouling – Membrane diffuser systems seldom foul from inside unless there has been a major rupture of the piping system to allow gross amounts of biological solids inside the system. For the membrane diffusers, if this gross solids attack from the inside of the piping occurs it may be necessary to physically clean the diffuser unit by membrane removal, cleaning, and then reinstallation. Complete replacement of a flexible membrane would also be an option in lieu of cleaning, based on the economics of the particular site.
2. Clogging of slits – Good air filtration is required with all fine bubble diffusers including JetFlex<sup>®</sup> units. The blower system should be equipped with inlet filters having a performance efficiency of > 90% – Class G4 according to DIN EN 779 – to prevent clogging of the diffuser media. Inlet filters of the blower system should be changed before the inlet filter headloss reaches 50 hPa. This headloss is normally measured with a manometer. Improper maintenance of the air filtering system may overload the blower system due to a high inlet loss or may result in reduced filtration efficiency which could lead to diffuser clogging. In addition all drop lines and laterals should be free from debris, rust, and other residues. See installation manuals for details of air/water purging.
3. Biological fouling – For flexible membrane-type media (EPDM, VMQ, PUR), the biological fouling factor is limited and has less long-term effect. Because the openings are designed to be variable orifice to release the air supply, modest amounts of fouling has little impact on oxygen transfer or mixing capability. In cases of excess biological growth, it may be necessary to review the operating procedures of the facility to minimize this condition. Generally, some change in the biological process or operation of that process can resolve most of the biological fouling conditions. If biological fouling persists, high-pressure hosing or similar maintenance to remove the bio film may be employed.
4. Calcium carbonate fouling – For membrane diffusers, calcium carbonate fouling seldom occurs. For cleaning membrane diffusers a light muriatic acid rinse can be quite successful in the operating pressure characteristics generated by this calcium carbonate formation. Injection of dilute muriatic acid or formic acid into the piping system of membrane diffusers has also been successfully employed on a full-scale basis. It is anticipated these cleanings would be on a one to three year requirement even in very difficult operating circumstances.

### ***Proper Maintenance Extends System Performance***

Fine pore flexible membrane aeration devices offer maximum benefits for oxygen transfer and mixing. Proper operation and maintenance of the membrane can provide years of long term performance with minimum energy cost and minimum maintenance cost. For all fine pore diffusers, it is necessary to follow **preventive maintenance** procedures to sustain peak or optimum performance, prolong equipment life, and avoid emergency situations or a system failure. Proper maintenance procedures will also minimize the frequency of system interruptions.

1. EPDM diffuser sheaths should be protected from petroleum products, such as mineral oils and aromatic hydrocarbons. Contact with such substances will degrade the membrane.
2. Some evidence of increased headloss through the diffuser unit may be experienced over a long period of operation. This pressure build-up is often the result of biological and/or inorganic materials building up on the media surface. The propensity for this condition is job specific and is a function of the type of waste and the specific operating characteristics of the system. To restore media performance and decrease the operating headloss, system performance (pressure, treatment, etc.) should be monitored and routine maintenance performed. To restore the flexing capabilities of all slits application of overload maintenance airflow has proven to reduce headloss during normal operation; especially after diffusers have been operated at low airflow rates for prolonged periods of time. (low = lower half of standard airflow rates; see individual data sheets)



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3. Jaeger Umwelt-Technik GmbH recommends membrane diffuser units be accessed on a regular basis (annually) to visually inspect the units. Typically, the aeration system is designed to allow the diffuser units to be accessed by dropping the water level in the basin being serviced, or individual units or groups of units accessed without interfering with ongoing operations. The air to the basin being serviced should be turned off to prevent the possibility of excessive airflows to the units or damage to the blower unit.

Properly operated and maintained membranes for aeration and mixing systems as provided by Jaeger Umwelt-Technik GmbH will provide years of high efficiency treatment with minimum operator attention.

*For additional information contact us at +49-5121-913 8900 or refer to [www.jaeger-envirotech.com](http://www.jaeger-envirotech.com)*