

QUALITY FLOWS.

QUALITY WORKS.

LANXESS
Energizing Chemistry

Innovative Lewabrane® – RO Elements for Brackish Water Treatment

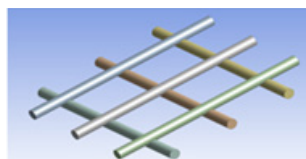
Key features

Lewabrane® ASD types like RO B400 LE ASD, RO B400 ULP ASD, and RO B400 FR ASD are reverse osmosis (RO) elements assembled with a tailor-made feed spacer based on an alternating strand design (ASD).

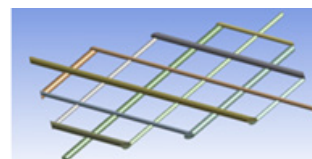
The feed spacer is a crucial component of spiral wound elements, as it influences both the height of the feed channel and the flow. Compared to the standard spacer, the new feed spacer has different thread filament heights. Thick and thin filaments alternate. Thus, the feed-channel height can be defined, and at the same time, sufficiently strong turbulences can be generated with thinner filaments in order to reduce the concentration polarization on the membrane surface. Simulations show that this leads to fewer areas with stagnated flow. Laboratory experiments and pilot tests have shown that this results in less biofouling in the feed channels.

Performance and design of feed spacers

The feed spacers incorporated in the membrane elements are multifunctional. They create space between the membrane surfaces for fast-flowing water, support the membrane in the process, and cause turbulent water flow. The optimal design of the feed spacers, therefore, is of critical importance to the properties of the elements and their performance in the application. Filaments or strands of different thickness are used for the new feed spacers in contrast to standard-type feed spacers with equal strands. The product family is named after this alternating strand design (ASD). The design is shown in the following picture.



Standard feed spacer



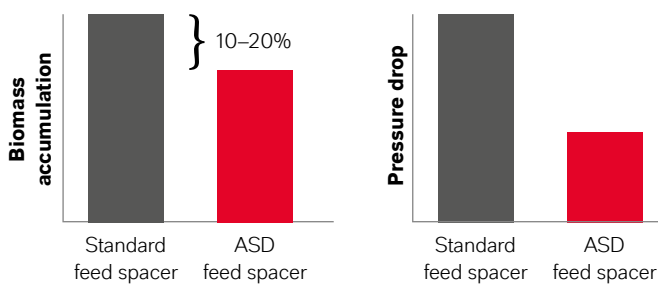
Alternating strand design (ASD)

Advantages during operation

ASD-type products are made with a 34 mil ASD-type feed spacer, which offers a low pressure drop. The impact on, for instance, the specific energy (kWh/m³) required for water production can be easily calculated by using **LewaPlus®** design software.

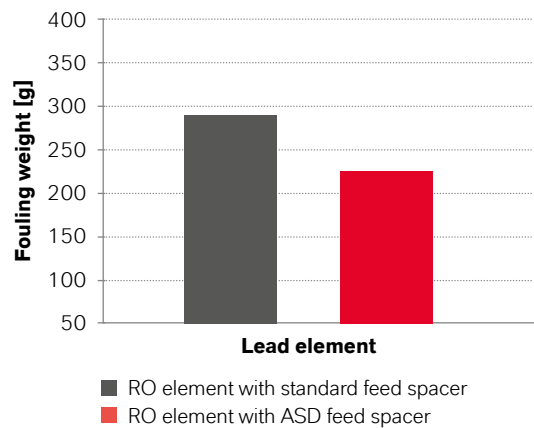
The open structure of the ASD feed spacer in general reduces clogging of the feed channel and ultimately allows good cleanability. The key feature of the new spacer is the lower tendency of biomass accumulation due to fewer areas of stagnated flow. This was confirmed by a flow cell experiment with biomass accumulation.

Pressure difference during biomass accumulation



Confirmation tests with wastewater

The tests of the ASD spacer were performed in a wastewater treatment plant. The pilot unit consisted of two separate lines in order to allow the comparison of different process conditions. Following the biological stage, the wastewater was pretreated by precipitation or flocculation followed by ultrafiltration (UF). The first line consisted of RO elements with a standard spacer, while in the second, elements with the ASD spacer were installed. After around 200 days in operation the elements were removed and the fouling of the lead elements measured. The ASD elements showed less fouling. Most of this fouling was of an organic nature.



We are happy to support your business. Please contact us for additional information: visit www.lpt.lanxess.com



LANXESS Deutschland GmbH
 Liquid Purification Technologies
 Kennedyplatz 1
 50569 Cologne
 Germany
 Phone: +49 221 88850
 E-mail: lewabrane@lanxess.com

Health and Safety Information:

Appropriate literature has been assembled which provides information concerning the health and safety precautions that must be observed when handling the LANXESS products mentioned in this publication. For materials mentioned which are not LANXESS products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be followed. Before working with any of these products, you must read and become familiar with the available information on their hazards, proper use and handling. This cannot be overemphasized. Information is available in several forms, e.g., material safety data sheets, product information and product labels. Consult your LANXESS representative in Germany or contact the Health, Safety, Environment and Quality Department (HSEQ) of LANXESS Germany or - for business in the USA - the LANXESS Product Safety and Regulatory Affairs Department in Pittsburgh, PA.

Regulatory Compliance Information:

Some of the end uses of the products described in this publication must comply with applicable regulations, such as the FDA, BfR, NSF, USDA, and CPSC. If you have any questions on the regulatory status of these products, contact your LANXESS Corporation representative, the LANXESS Regulatory Affairs Manager in Pittsburgh, PA or the Health, Safety, Environment and Quality Department (HSEQ) of LANXESS Deutschland GmbH in Germany. The manner in which you use and the purpose to which you put and utilize our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations are beyond our control. Therefore, it is imperative that you test our products, technical assistance and information to determine to your own satisfaction whether they are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety, and environmental standpoint. Such testing has not necessarily been done by us. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale. All information and technical assistance is given without warranty or guarantee and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance, and information. Any statement or recommendation not contained herein is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with patents covering any material or its use. No license is implied or in fact granted under the claims of any patent.

All trademarks are trademarks of the LANXESS Group, unless otherwise specified. Status 03/2019