

QUALITY ENABLES.

Case study about boiler feedwater production
in a power plant in Lippendorf, Germany

QUALITY WORKS.

LANXESS
Energizing Chemistry

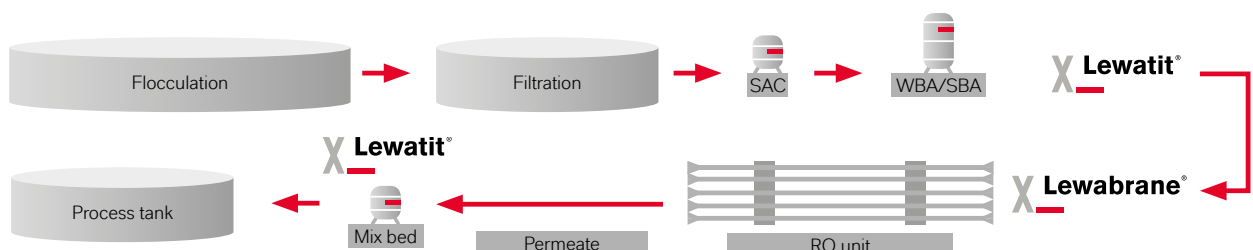
A Process to Achieve the Highest Standards of Boiler Feedwater – an Efficient Combination of IX and RO Processes

Application and system design

Lewabrane® RO B400FR is used to produce boiler feedwater for the coal-fired power plant in Lippendorf. The gross output of the power plant is above 1,800 MW. The water treatment plant is fed by surface water from a lake. The water is pretreated via a gravel filter before being passed into the ion exchange (IX) column with a demineralization process with Lewatit® MonoPlus S108, Lewatit® MonoPlus MP64, and Lewatit® MonoPlus MP500. The reverse osmosis (RO) process consists of three trains, one of these trains is equipped with Lewabrane® RO B400FR, to remove organic substances prior to the final treatment with an IX mixed-bed (Lewatit® S100H and M800). Each train treats approx. 40 m³/h with a recovery rate of around 86%, and each train is composed of three stages in a 5:2:1 array with eight elements per pressure vessel.

At a glance

Industry	Power plant
Application	Process water
Location	Germany
RO product	Lewabrane® RO B400FR
Number of elements	64 pieces
IX product	Lewatit® MonoPlus S108 Lewatit® MonoPlus MP64 Lewatit® MonoPlus MP500 Lewatit® S100H and Lewatit® M800 (mix bed)
Production capacity	3x 960 m ³ /day
Water type	Lake water
Installation	August 2015



Membrane performance

The main target of this process is the reduction of neutral-charged organic substances in the feedwater. These molecules are difficult to reject with RO membranes, where the rejection is based on electrostatic repulsion. However, due to its highly cross-linked surface, **Lewabrane**[®] exhibits a constantly high rejection of organic molecules. In this case a rejection of 99.2% was measured while the TOC (total organic carbon) concentration of 300–700 ppb in the feed can be reduced to a level of approx. 20 ppb in the RO permeate. With this performance, it is ensured that the standards of the VGB/EU and of the USA/Electric Power Research Institute of < 100 ppb is achieved.

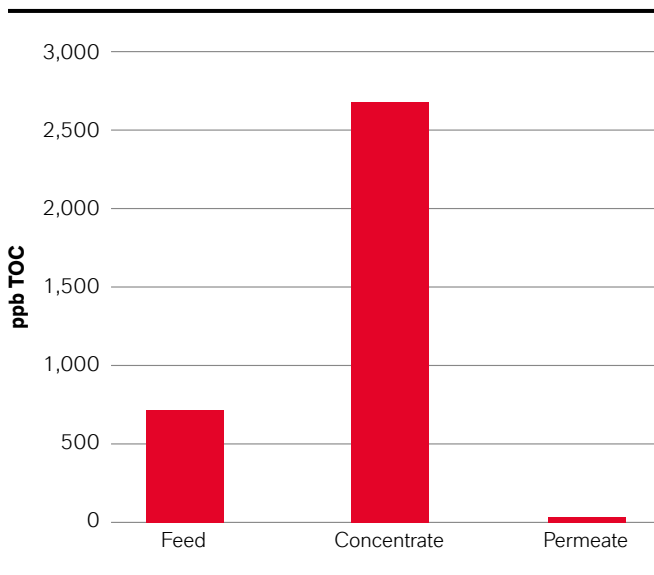


Figure 1: TOC concentration

About the power plant

The reverse osmosis plant at Lippendorf was developed and designed by VWT Deutschland GmbH, a subsidiary of the globally active Veolia Water Solutions & Technologies. VWT is one of the leading suppliers in the field of water treatment. The core competencies lie in the planning, engineering, and realization of complex plants for drinking water and process water treatment, as well as wastewater treatment.

Conclusion

Lewabrane[®] RO B400FR confirms the high rejection of organic molecules. Although it is challenging to remove neutral or hydrophobic organic molecules by ion exchange or reverse osmosis, the combination of **Lewabrane**[®] RO membranes and **Lewatit**[®] MonoPlus resins for demineralization lead not only to a permeate quality of 0.06 µS/cm but also to a stable and reliable process. **Lewabrane**[®] products achieve a rejection rate above expectations, which underlines the high rejection of critical substances by highly cross-linked **Lewabrane**[®] products.

Contact

LANXESS Deutschland GmbH
Liquid Purification Technologies
Kennedyplatz 1, 50569 Cologne
Germany
Phone: +49-221-888-50
E-mail: lewabrane@lanxess.com

We are happy to support your business. Please contact us for additional information: visit www.lpt.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 Regulatory Affairs and Product Safety Department of LANXESS Deutschland GmbH or – for business in the USA – the LANXESS Corporation Product Safety and Regulatory Affairs Department in Pittsburgh, PA, USA.

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 – for business in the USA – the LANXESS Corporation Regulatory Affairs and Product Safety Department in Pittsburgh, PA, USA or for business outside US the Regulatory Affairs and Product Safety Department 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 10/2017