

QUALITY ENABLES.

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

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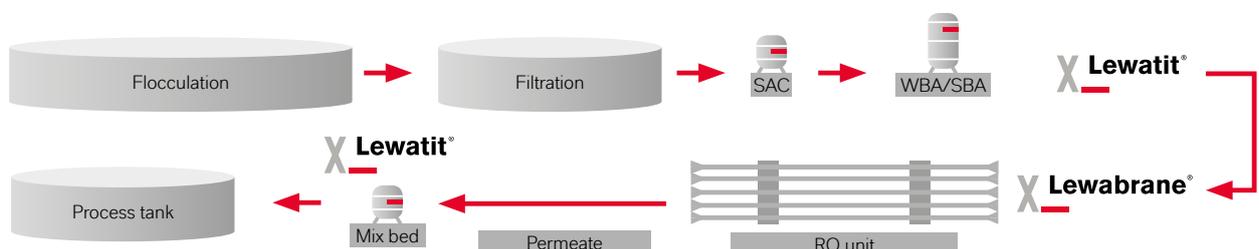
A process to achieve the highest standards of boiler feedwater – an efficient combination of IX and RO processes

Application and system design

Lewabrane® RO B400 FR 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 MP 64, and Lewatit® MonoPlus MP 500. The reverse osmosis (RO) process consists of three trains, one of these trains is equipped with Lewabrane® RO B400 FR, to remove organic substances prior to the final treatment with an IX mixed-bed (Lewatit® S100 H 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 B400 FR
Number of elements	64 pieces
IX product	Lewatit® MonoPlus S108 Lewatit® MonoPlus MP 64 Lewatit® MonoPlus MP 500 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.

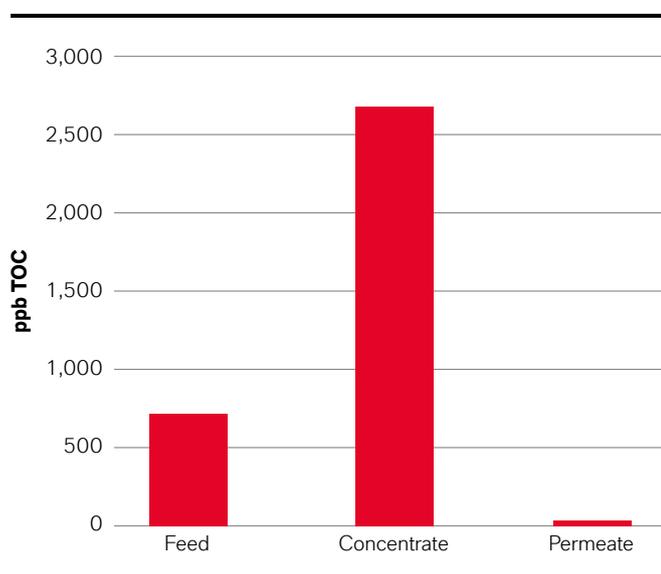


Figure 1: TOC concentration

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 B400 FR 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.

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