News Release

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LANXESS Adds New Closed Circuit Reverse Osmosis (CCRO) Module to Its Innovative LewaPlus Design Software

- **Rapid & accurate CCRO system designs**
- **Modern dimensioning tool for RO system designers**
- **Allows for more MLD/ZLD RO designs**

Cologne – Specialty chemicals company LANXESS has announced a significant addition to its LewaPlus software suite of reverse osmosis (RO) and ion exchange (IX) system dimensioning capabilities. The new module provides system modeling with Desalitech's Closed Circuit Reverse Osmosis (CCRO) technology and enables the dimensioning of RO systems using the latest available water treatment technology, helping system designers bring their water treatment footprint closer to zero liquid discharge (ZLD) or minimum liquid discharge (MLD) goals.

Reverse osmosis is used for the desalination and purification of water and has been growing rapidly in industrial, municipal and waste water reuse applications. The technology is widely used, especially in areas of water stress such as the American West. The traditional reverse osmosis process is sometimes limited to recovery levels of 75 to 85%, wherein 15 to 25% of the feedwater is not purified and becomes waste. In contrast, the CCRO process now available for modeling in LewaPlus offers recovery rates of up to 98%. This high recovery is achieved by incorporation of a recirculation pump that returns the brine to the membrane feed and provides a high crossflow velocity through the membrane array.

The system operates in two alternating modes: Closed Circuit (CC) mode at 100% recovery and Plug Flow (PF), or flushing mode, at 10 to 50% recovery. During CC operation, permeate is produced at a rate equal to the flow rate from the high-pressure pump. When a desired recovery percentage is reached, the operating mode is

switched to PF mode in which concentrated brine is purged from the system and displaced by feed water from the high-pressure pump in a single plug-flow sweep.

The new software module was developed cooperatively by LANXESS Sybron Chemicals and Desalitech, Inc. (Newton, MA, USA). Until now, the modeling of the CCRO process was based on experience values without energetic optimization, which generally limited CCRO projections for recovery rates and system capabilities.

Rapid and Accurate RO system Designs

“The new CCRO module inside LewaPlus allows for rapid and accurate reverse osmosis system designs utilizing the existing performance algorithms and computational techniques that support the good performance of the Lewabrane elements in the reverse osmosis process,” says Firuza Mir, President of LANXESS Sybron Chemicals. This new module replaces the prior calculation protocol using multiple Excel spreadsheets to approximate system performance. It incorporates the existing graphical user interface, user-friendly layout and linear process logic that is the hallmark of the LewaPlus design software. In addition, the new module includes tabs for power consumption, post-treatment and cost analysis. These additional analyses are available “within a second,” Mir emphasizes.

The new CCRO software module follows the same stringent reverse osmosis membrane design guidelines as traditional reverse osmosis modules. The process uses conventional reverse osmosis elements, such as the industry-standard 8-inch diameter x 40 inch long spiral-wound, polyamide-type thin film composite elements as offered in LANXESS’s proven Lewabrane portfolio. Desalitech assembles these standardized parts to create a unique system configuration which autonomously adapts to feed water changes, unlike the linear, constant filtering process of traditional reverse osmosis.

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Desalitech's CCRO process reaches much higher recoveries by recycling water through a single-stage membrane array until no further recovery is possible, at which time it discharges the concentrated waste. Constant variations in flow and salinity inhibit fouling and scaling, extending membrane lifespans. Furthermore, the process automatically adapts to variations in feed water conditions in order to maintain set recovery goals.

Nadav Efraty, Chief Executive Officer at Desalitech, explains, "Desalitech is helping many Fortune 500 companies and some of the most sophisticated water users on the planet substantially reduce their water consumption and operating costs. We are very excited about working with LANXESS to provide an easy to use and intuitive design software that will enable many organizations to take control of their own water future and do it with a membrane company that is as committed to technical excellence and leadership as themselves."

Detailed information on LPT's products and services, as well as a free download of the LewaPlus design software, can be found at http://lpt.lanxess.com/en/home/.

LANXESS is a leading specialty chemicals company with sales of EUR 7.7 billion in 2016 and about 19,200 employees in 25 countries. The company is currently represented at 75 production sites worldwide. The core business of LANXESS is the development, manufacturing and marketing of chemical intermediates, additives, specialty chemicals and plastics. Through ARLANXEO, the joint venture with Saudi Aramco, LANXESS is also a leading supplier of synthetic rubber. LANXESS is listed in the leading sustainability indices Dow Jones Sustainability Index (DJSI World) and FTSE4Good.

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Picture

LANXESS makes the membrane elements for reverse osmosis – which comply with the highest German and international production and quality standards – at the company's site in Bitterfeld, Germany. The elements of the Lewabrane range comprise a polyamide composite membrane, wound in several layers to form a spiral wound element. Photo: LANXESS AG

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