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Climate protection and energy efficiency in the production of pharmaceutical grade water

Water is one of the most frequently used raw materials in the pharmaceutical industry. It serves for the production of pharmaceutical ingredients, intermediates and final products. Furthermore, water is required for the purification and preparation of reagents. Due to the importance of clean water as a product component or in production use, the quality requirements are particularly high. Pharmacopeias describe the official standards, which assure quality control of pharmaceutical products – including water -during their life cycle. Accordingly, the production of water for pharmaceutical use is mainly based on multi-stage distillation (MSD) and membrane processes, especially reverse osmosis (RO). These processes are characterized by a relatively high energy demand. In 2015, the total global emissions of the pharma sector was about 52 megatonnes of CO2, this was significantly higher than the CO2 emissions generated by the automotive sector in the same year. Thus, efforts must be made at all stages of production of pharmaceuticals to reduce the emission of climate-active gases. Membrane distillation (MD) could be an energy-efficient alternative process to the classical water preparation methods, as it offers advantages in terms of energy demand and energy supply. The paper will stress the preparation of pharmaceutical-grade water from tap water in a one-step process using a pilot scale MD plant. The performance of two different module designs and the selection of optimum process parameters will be discussed.

Keywords: PW, WFI, IX, RO, distillation, energy demand

Biography:

Prof. Dr.-Ing. Frank Rögener, Since 2014 Frank Rögener has been working as Professor of Fluid Process Engineering at Cologne University of Applied Sciences (TH Köln). His focus is on thermal process technology, including membrane and water/wastewater technology. He studied chemical engineering at TU Clausthal, Germany. In 2000 he received his doctorate from the University of Saarland on the application of membrane processes. For more than 20 years, Dr. Rögener has been involved in the development of energy- and resource-efficient processes, especially in the food industry, chemical industry and metal finishing industry.

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