

37. AiRO, air/water cleaning to control membrane fouling

Title and name of product or technology
AiRO, air/water cleaning to control membrane fouling
Abstract
Spiral wound membranes are often fouling and need to be cleaned. Using air instead of chemicals in a vertical positioned membrane fouling can be controlled.
Description including main features/advantages
Spiral wound membrane processes, i.e. reverse osmosis (RO) and nanofiltration (NF), are increasingly used in water treatment for the production of water for drinking water, process water for industrial uses and for waste water re-use. One of the largest problems using membrane processes, however, is membrane fouling. This results in loss of performance (capacity/ quality) and increasing the total cost of ownership. The innovative AiRO process uses air/water cleaning in vertically positioned membrane elements to control membrane fouling. Thus less chemical cleaning has to be used to protect the environment and call also be done during production. Often only the first membrane in a system is fouled. By making a separate skid with only one membrane in a vessel upfront a membrane system fouling on the other membranes can be minimised.
Innovative aspects
Spiral wound membranes are not cleaned with air at the moment. Only known for tubular or capillary membranes (mostly MF and UF). 1) Less membranes have to be cleaned. Only the first membrane instead of whole stack. 2) less (to no) additional chemical cleaning/ sanitation chemicals have to be used 3) environment friendly 4) can be done automatically without attendance. 5) total cost of ownership will decrease
Current and potential industrial users/domains of application
All membrane systems can be equipped with upfront systems using AiRO. All over the world.
Current state of development
First idea came from Vitens and was developed further by KIWA. Pilot tests were done by KIWA (now KWR) and showed promising. At the moment a technical scale pilot unit is made by Logisticon Water Treatment and will be tested. If successful high capacity units for a total capacity of 1600 m ³ /h will be built. Furthermore: PhD research will be done by KWR & University of Twente The main research questions are: (i) the mechanical/physical understanding of air/water cleaning of membrane elements, (ii) the effectiveness of the air/water cleaning process in relation to different feed components, (iii) the long term behaviour of air/water cleaning.

Contact details	
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