BS ISO 20466:2024

BSI Standards Publication

Guidance for performance grading of recovered reverse osmosis (RO) membranes for water reuse

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National foreword

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Foreword

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This document was prepared by Technical Committee ISO/TC 282, *Water reuse*, Subcommittee SC 3, *Risk and performance evaluation of water reuse systems*.

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Introduction

Reverse osmosis (RO) membranes are used in various applications such as seawater desalination, ultrapure water production, wastewater treatment, advanced treatment of secondary treated wastewater for reuse, etc. However, the performance of RO membranes gradually declines due to aging and membrane fouling caused by long-term use. At present, used RO membranes are disposed of as consumable materials after several years of use.[1]

However, used RO membranes, if recovered by an appropriate process such as chemical cleaning, can be reused for various water reclamation and reuse applications, with lower costs than those involved in new membrane production.[2][3] For example, in Japan, disposed RO membranes from Fukuoka seawater desalination plant have been reused for boiler feed water production in the waste water processing centre (sewage plant).

If a used membrane is graded based on its performance, then an appropriate membrane can be selected for each purpose for water reuse. For example, a Grade C1 membrane (lower salt rejection rate and higher flow rate) is suitable for reuse in treating sewage for irrigation usage, while a Grade A1 membrane (higher salt rejection and higher flow rate) is preferable for processing treated sewage for boiler feed water usage.

By reducing membrane disposal, the use of recovered RO membranes can contribute to sustainable development goals (SDGs). Membrane life extension will promote the reduction of old membrane disposal (GOAL12), and less production of new membranes will reduce the carbon footprint (GOAL13). Furthermore, reusing and repurposing RO membranes will also result in an inexpensive and safe water supply to more people (GOAL6).

In order to promote the use of recovered RO membranes, users need information on the membranes, including their performance. This will enable new users to apply the membranes to their intended purpose.

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