Development and stand tests of reciprocating-switcher energy recovery device for SWRO desalination system

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\textbf{ABSTRACT}

In this paper, a novel piston exchanger—reciprocating-switcher energy recovery device (RS-ERD) was introduced and developed. The RS-ERD adopts the unique open/close plate design, which not only ensures a perfect sealing effect and high efficiency of the device, but also favors avoiding the destruction of micro-particles in the liquid occasionally. For proving the operating performances of the RS-ERD, an emulating RO-ERD desalination platform was established and the testing conditions were regulated as ERD capacity of 30 m\textsuperscript{3}/h and operating pressure of 6.5 MPa. The experimental results indicate that the operating stability of the RS-ERD is good. The leakage ratio of the device is lower than 1.7\% and the energy recovery efficiency is above 98\%, which can satisfy the industrial requirements of the SWRO plant.

\textit{Keywords:} Seawater reverse osmosis (SWRO); Desalination; Energy recovery device (ERD); Operating performance

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