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FLEX™: A new era of isobaric energy recovery devices for seawater reverse osmosis

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A B S T R A C T

The invention and commercial adoption of isobaric energy recovery devices (ERDs) have profoundly transformed seawater reverse osmosis (SWRO) processes, reducing net energy requirements by over 50% and enabling the economic viability of large-scale SWRO. Building on this legacy, Isobaric Strategies, Inc. and Flowserve US, Inc. have partnered to develop the next generation of isobaric ERDs, the FLEX™ line. This paper introduces the FLEX™ 8600, a groundbreaking isobaric ERD that redefines industry standards with over 98% efficiency, a significantly smaller and lighter unit size, and greater output capacity. The FLEX™ 8600's innovative design, featuring only four main components made of durable, corrosion-resistant materials such as titanium and ceramic, ensures simple, reliable, and continuous operation. Its superior efficiency translates into substantial reductions in capital and operational costs for desalination plants, primarily through decreased energy consumption, fewer required ERD units, and simplified installation. Furthermore, the FLEX™ 8600 significantly enhances the sustainability of SWRO by minimising material use and CO₂ emissions. This commercially available and highly adaptable technology represents a critical advancement, offering a scalable, practical, and highly desirable solution for global desalination needs.

Keywords: Seawater reverse osmosis; Energy recovery device; Isobaric; FLEX™; Desalination; Energy efficiency; Sustainability; Flowserve

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