



# CSX-RO

## High-efficiency membrane feed pump for reverse osmosis processes

*Long-term reliability with  
minimized operating expenses*

The Flowserve CSX-RO pump represents the next generation of multistage, segmental ring, diffuser-style membrane feed pumps.

Developed with finite element analysis and engineered to meet operator preferences, the CSX-RO pump is simple and reliable. Advanced CFD hydraulic design ensures top of class efficiency. Optimized component design minimizes wetted fasteners to prolong operating life. The result is a highly reliable, cost-effective feed pump for the heart of any RO system.

### Features and benefits

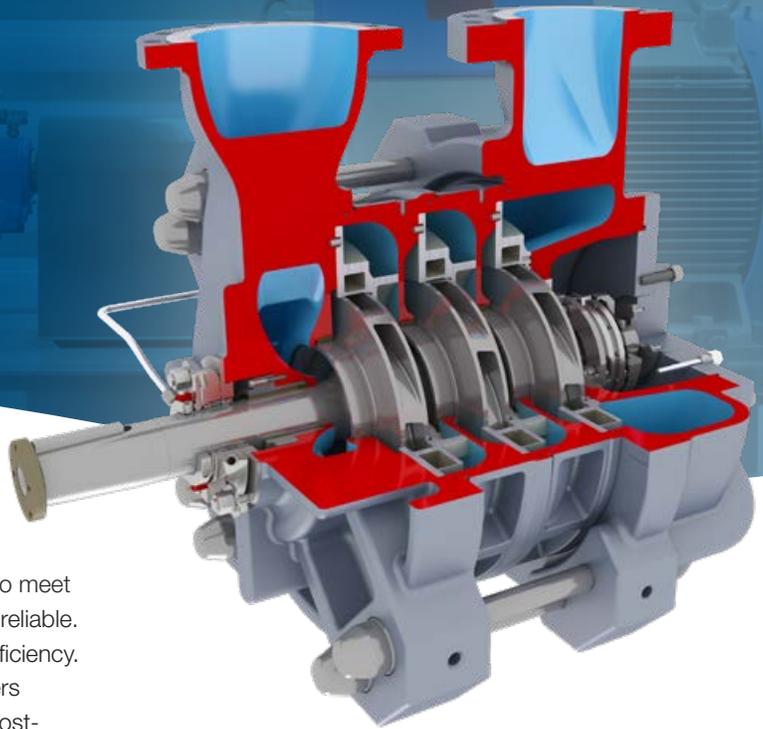
**Precision cast impellers** deliver high-efficiency performance and dimensional repeatability. The impellers are ring-less and individually dynamically balanced to achieve an assembled rotor balance grade of G2.5.

**Easily replaceable wear rings** are made with engineered thermoplastic and permit easy refurbishment of clearances to maintain high-efficiency operation and low lifecycle costs.

**Precision cast diffuser and channel rings** provide a continuous fluid passageway around the impellers without loss of efficiency. This design helps to balance radial loads so pump life is extended.

**Axial thrust balance** is achieved by applying a hydrodynamic axial bearing design which significantly reduces leakage/flushing rate and supports optimized pump efficiency.

**Independently configurable nozzle heads** are able to be rotated in 90-degree steps to suit a variety of piping layouts.

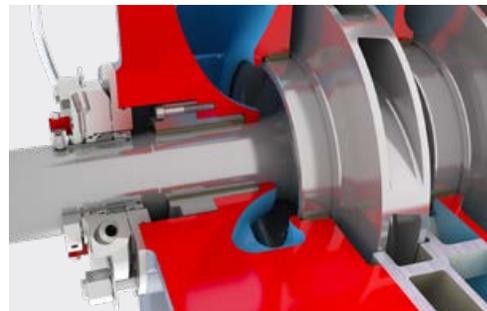


*The CSX-RO pump is based on the widely used Flowserve CSX pump, which is designed for high-efficiency operation and long-term reliability.*

**Stiff rotor design** minimizes deflection, thereby increasing bearing and mechanical seal life.

**Standardized mechanical seal chamber** provides an optimal environment to prolong seal life without costly and complex auxiliary flush systems.

**Maintenance** is typically done on-site. The pump's side/side flange configuration reduces work on its surrounding piping, and bearings plus mechanical seals are easily accessible.



*Single mechanical seal and precision cast diffuser and channel rings*

## Typical applications

- Seawater and brackish water reverse osmosis desalination
- High-pressure membrane feed
- High-pressure filtered water applications
- Any other high-pressure applications with filtered liquids and ambient temperature

## Operating parameters

- Sizes from 100 to 250 mm (4 to 10 in)
- Flows to 1500 m<sup>3</sup>/h (6600 gpm)
- Heads to 720 m (2370 ft)
- Pressures to 90 bar (1305 psi)
- Temperatures to 45°C (113°F)
- Frequency 50 or 60 Hz; compatible with VFD applications

## Corrosion-resistant construction

Pitting, crevice corrosion and stress corrosion cracking are major challenges in processing seawater and brackish water. To maximize service life, wetted components of the CSX-RO pump are available in a broad range of materials able to resist these aggressive forms of corrosion. These include super duplex stainless steels and proprietary Alloy 885 with PREN >40.

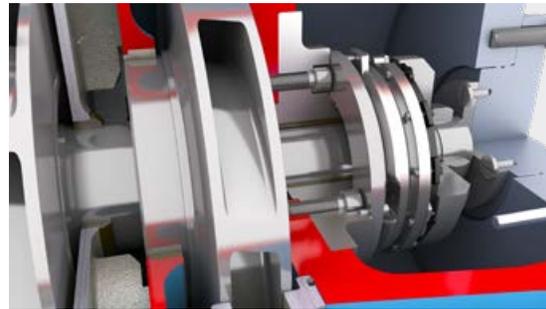
## Bearing configuration

Two bearing designs are available to meet customer and application requirements.

- Fully product lubricated – Hydrodynamic axial thrust and radial sleeve bearing. This makes the pump also more compact and removes oil or grease as a lubricant. Eliminates high-pressure mechanical seals and reduces pump footprint.
- Oil lubricated – Split sleeve radial and ball thrust bearings

The CSX-RO pump is available with several bearing options to ensure long-lasting and reliable performance.

- Bearing cooling – air or water cooling system
- Bearing lubrication – ring oil and force feed system
- Bearing monitoring instrumentation



*Hydrodynamic axial thrust and radial sleeve bearing*

### Headquarters

Flowserve Corporation  
5215 North O'Connor Blvd.  
Suite 2300  
Irving, Texas 75039-5421 USA  
Telephone: +1 937 890 5839

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