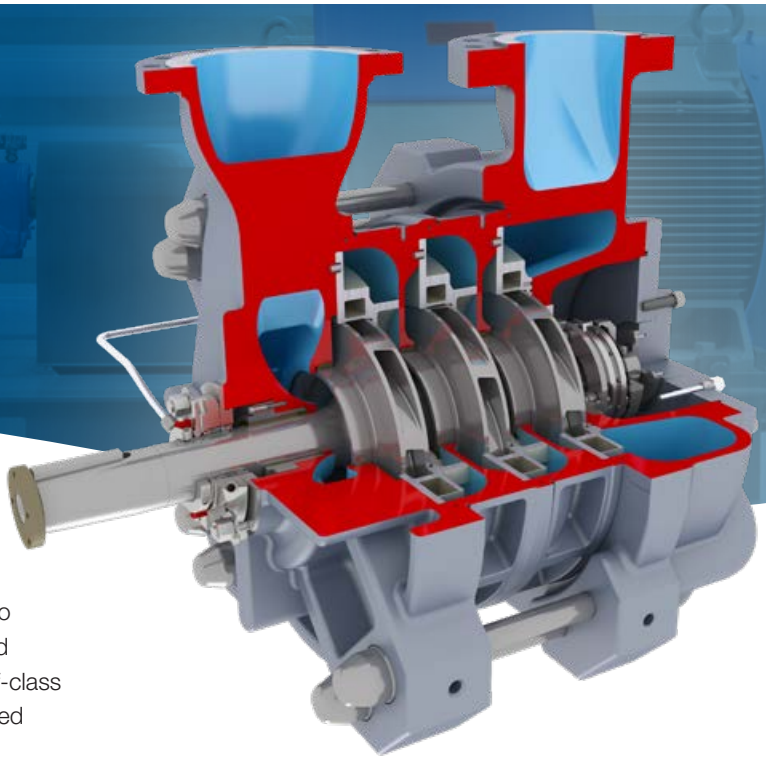
# CSX
# High-efficiency membrane feed pump for reverse osmosis processes

*Long-term reliability with minimized operating expenses*



The Flowserve CSX 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 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 reverse osmosis (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.

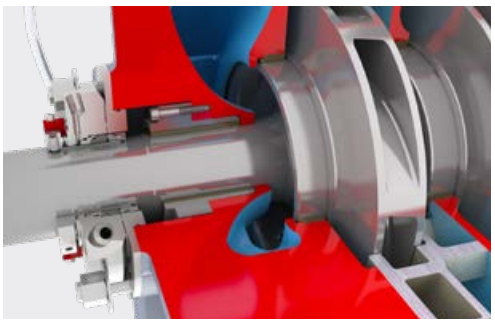
**Axial thrust balance** is achieved by applying a hydrodynamic axial bearing design which significantly reduces leakage/flushing rate and supports optimized pump efficiency.

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

**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 1,500 $m^3$/h (6,600 gpm)
- Heads to 720 m (2,370 ft)
- Pressures to 90 bar (1,305 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 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.

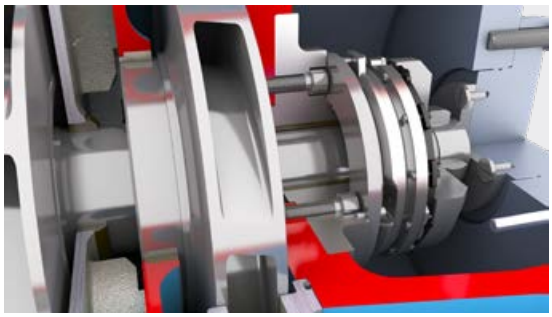
## Bearing configuration

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. Eleminates high-pressure mechanical seals and reduces pump footprint.
- Oil lubricated – Split sleeve radial and ball thrust bearings

The CSX 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*

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