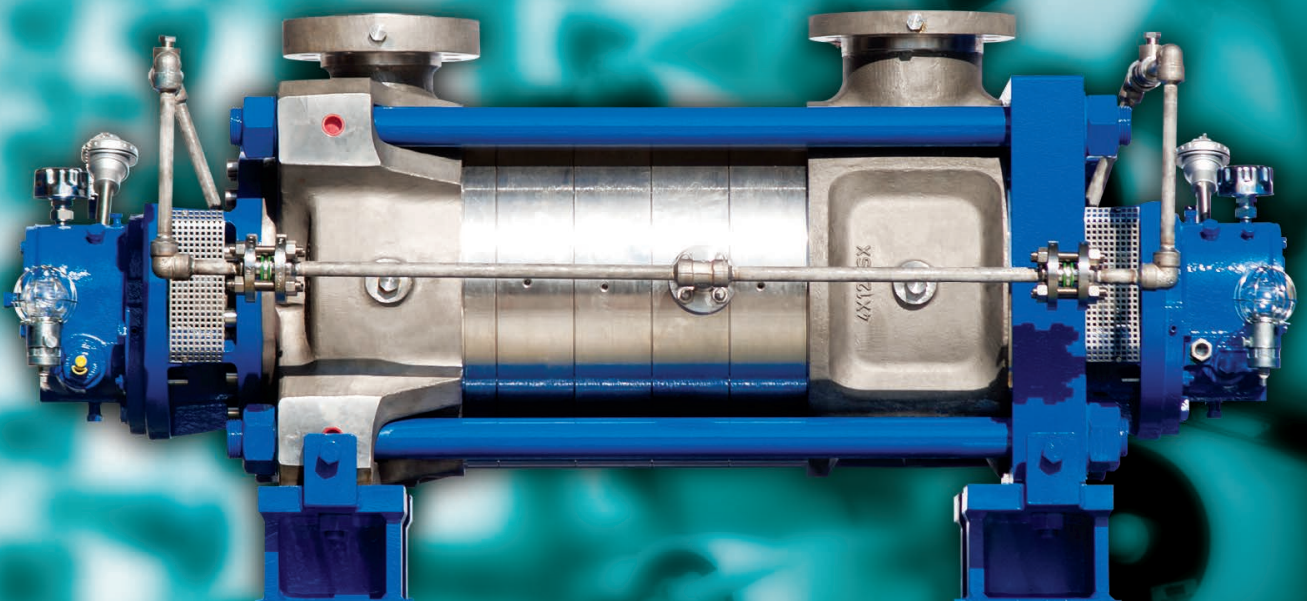




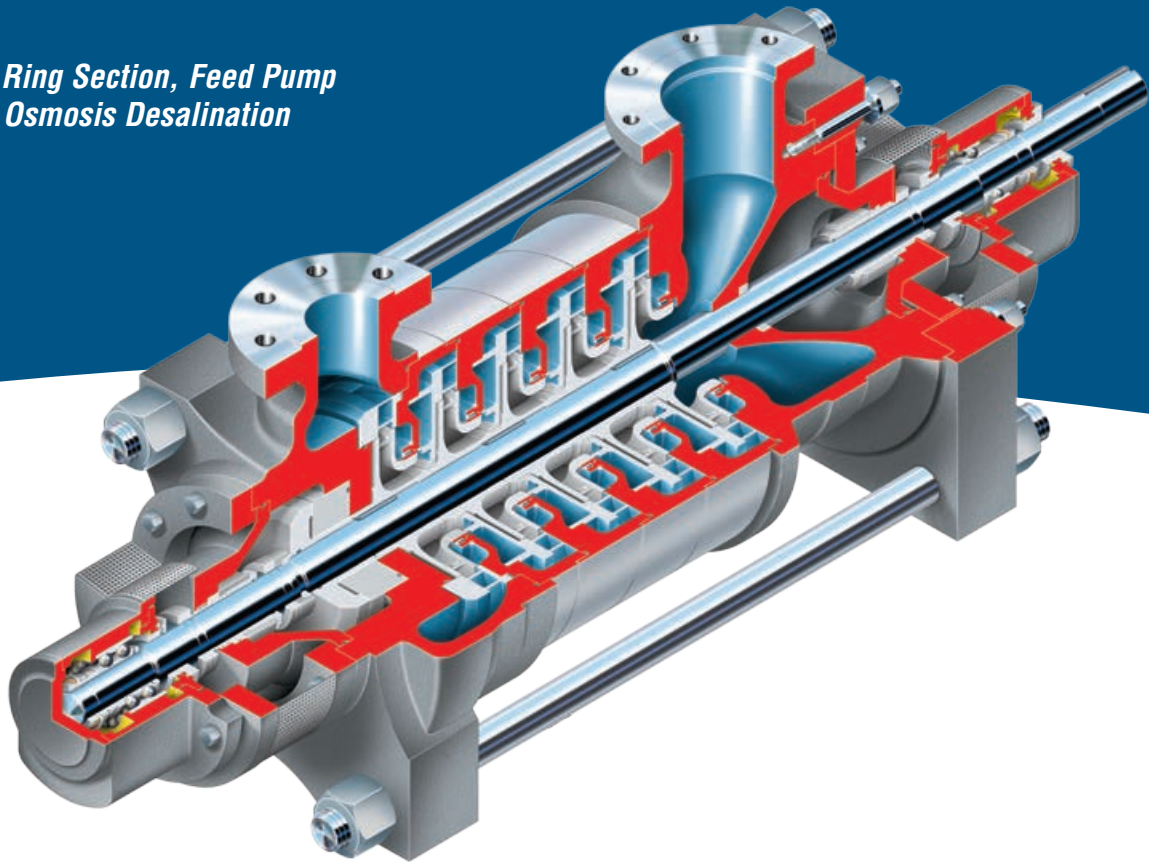
***CSX***  
***Multistage, Ring Section, Feed Pump***  
***for Reverse Osmosis Desalination***



***Experience In Motion***

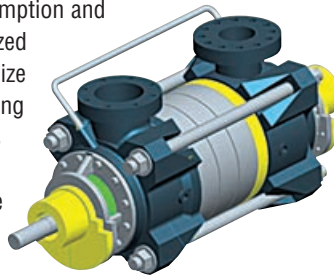
## CSX

### Multistage, Ring Section, Feed Pump for Reverse Osmosis Desalination



The Flowserve CSX represents the next generation of multistage, segmental ring, diffuser-style, membrane feed pumps. Designed for high-efficiency operation and long-term reliability in reverse osmosis (RO) desalination systems, the CSX responds to the industry's need for low life cycle cost equipment.

Developed with finite element analysis and engineered to meet operator preferences, the CSX is both simple and reliable. It features advanced hydraulics and high-efficiency impellers so energy consumption and costs are kept low. Optimized component designs minimize wetted fasteners and prolong operating life. The result is a highly reliable and cost-effective feed pump for the heart of any RO system.



#### Operating Parameters

- Flows to 600 m<sup>3</sup>/h (2650 gpm)
- Heads to 900 m (2950 ft)
- Pressures to 100 bar (1450 psi)

#### Features and Benefits

**Precision Cast Impellers** deliver high-efficiency performance and dimensional repeatability. Impellers are individually dynamically balanced to achieve an assembled rotor balance grade of G2.5.

**Renewable Case Wear Rings** permit easy refurbishment of clearances to maintain high-efficiency operation and low life cycle costs.

**Precision Cast Diffuser and Channel Rings** provide a smooth and continuous fluid passage without loss of efficiency. This design helps to balance radial loads so pump life is extended.

**Self-Compensating Balancing Device** eliminates residual axial thrust, thereby eliminating the need for complex thrust bearing arrangements.

**Symmetrical Suction and Discharge Heads** enable the pump nozzles to be rotated and positioned to suit a variety of piping layouts.

**Generously Proportioned Shaft** minimizes deflection, thereby increasing bearing and mechanical seal life.

**Mechanical Seal Chamber** provides an optimal environment to prolong seal life without costly and complex auxiliary flush systems.

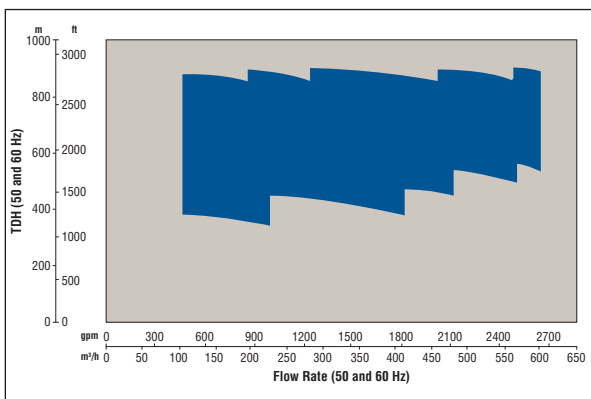




### Corrosion-Resistant Construction

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

### Operating Range



### Complementary Pumps

Flowserve offers pumps to meet every service within an RO desalination plant – from intake to distribution.

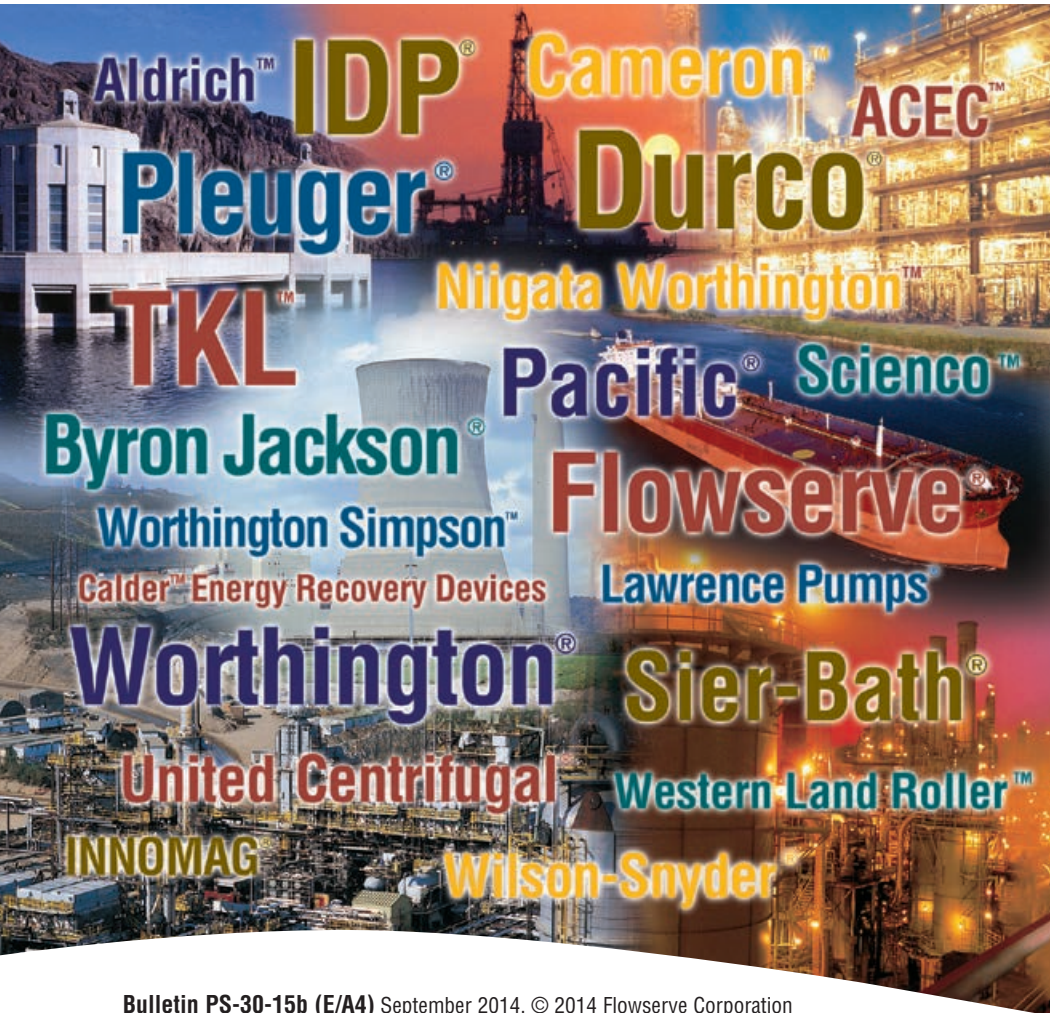
- VTP: High-efficiency vertical turbine pump for seawater intake
- CPX and Mark 3: ISO and ASME chemical process pumps for filter backwash, membrane flush and chemical dosing
- LNN: Axially split, double-suction pump for low-pressure boosting, product transfer and distribution



### A Leader in Desalination Technology

Responsible for numerous significant advancements in water-handling technology, Flowserve has supplied reliable, corrosion-resistant and energy-efficient equipment and systems to the desalination industry for more than half a century. Flowserve offers SWRO plant owners and operators the following benefits:

- Worldwide sales and services network with offices in more than 55 countries
- Single point of contact and responsibility for all major equipment including pumps, energy recovery devices (such as the Calder™ ERT and DWEER™), valves and mechanical seals
- Engineering and technical resources for application support as well as life cycle cost reduction services
- Unparalleled expertise in the design and operation of high-efficiency fluid motion and control systems
- Fixed fee maintenance contracts that guarantee performance and availability of the equipment



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