EMERSON

REVERSE OSMOSIS DESALINATION APPLICATIONS
USING TRIPLE OFFSET VALVES

Advancements in membrane manufacturing and applications engineering have made reverse osmosis (RO) the leading process in seawater desalination.

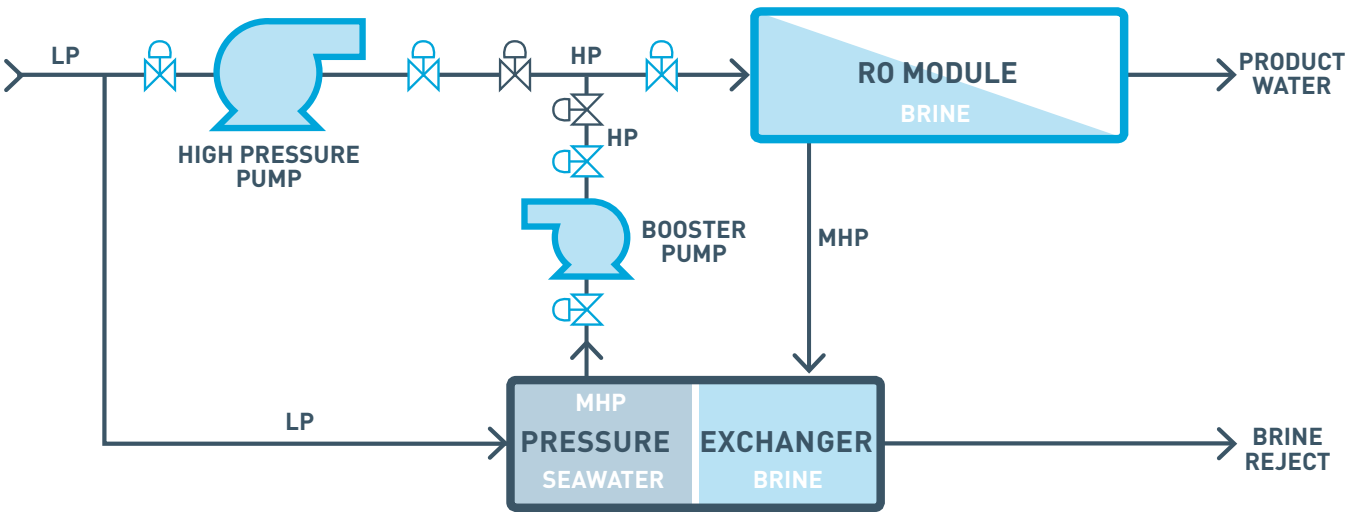
RO plants however are extremely dependent on the effectiveness of the water's pre-treatment, which means they may require larger amounts of energy compared to more traditional methods.

With end users constantly re-assessing their valve performance and looking for new ways to improve overall plant efficiency, Vanessa Triple Offset Valves (TOVs) have proven instrumental in overcoming the issues arising from traditional valve use and in helping customers achieve their productivity targets.

The key advantages in adopting Vanessa Series 30,000:

- Isolation and tight zero leakage shut-off during single RO block maintenance
- High-pressure pump isolation and pressure control during start-ups
- Smooth pressure control to preserve membranes during restarts

REVERSE OSMOSIS



KEY TO DIAGRAM

LP LOW PRESSURE **HP** HIGH PRESSURE **MHP** MEDIUM HIGH PRESSURE ISOLATION VALVE CONTROL VALVE

Seawater and brine water make for a truly corrosive operating environment. The challenges of a naturally high salt and chlorine content are compounded by the fouling and scales commonly found in seawater, while valves and other moving parts have to withstand extreme pressures ranging from 15 to 80 bar / 220 to 1160 psi

Valve routine maintenance, refurbishments or repairs can cause the temporary production shutdown of an entire membrane stack. So it is essential to secure a tight valve shut off to safeguard equipment and membrane integrity.

Vanessa Series 30,000 valves can easily replace PTFE seated duplex butterfly valves, thanks to their unique metal seated and non-rubbing triple offset design. This enables operators to overcome the on-site issues and wearability associated with using PTFE seats or sleeves typical of traditional valves (usually butterflies and plugs). Moreover, because the Vanessa Series 30,000 delivers a predictable torque demand throughout its entire valve life, it generates other key benefits such as high reliability and ease of operation.

VANESSA SERIES 30,000 TRIPLE OFFSET VALVES
PRODUCT INFORMATION

THE VANESSA TRIPLE OFFSET VALVE ADVANTAGE

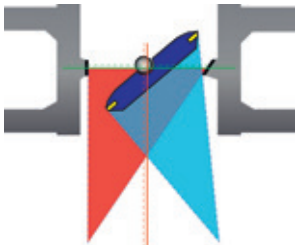
With their unique sealing elements, delivering true zero leakage across a range of pressure conditions, Vanessa Triple Offset Valves are ready suited to the demands of seawater reverse osmosis. The standard Vanessa seal ring on every valve is not only manufactured from Duplex stainless steel for maximum durability, but has the ability to slightly compress. This ensures a uniform contact pressure distribution around the seating surface, whilst also guaranteeing full tightness.

Based on a "cone-to-cone" sealing principle, our triple offset design completely eliminates any rubbing action of the sealing elements during the 90 degrees of rotation. This overcomes the problems of a resilient deformation of the soft components (butterfly valves) or a compression of the sleeve (plug valves).

In addition, a 100% metal-to-metal body seat enables Vanessa triple offset valves to operate at virtually all temperatures, pressure levels and fluid types - while carbon steel lapped flanges can be used on piping according to ASME B16.5.

*Zero Leakage means no visible leakage when tested at high pressure with water and low pressure with air according to existing international standards.

TRIPLE OFFSET VALVE DESIGN



BUTTERFLY VALVE DESIGN

PLUG VALVE DESIGN

* Points where rubbing occurs

TYPICAL SPECIFICATIONS

- Valve sizes range from DN 80 to 600 (NPS 3 to 24)
- Pressures range from ISO PN20 to PN100 (ASME class 150-600)

1.

2.

3.

4.

BODY TYPES

1. DOUBLE FLANGED BODY
The strongest pipe connection

2. LUG BODY
A lighter body using flanged connections

3. WAFER BODY
The lightest body using flanged connections

4. BUTTWELD BODY
A light body directly welded to the pipe (pipe flanges are therefore eliminated).

This body can also be machined to accommodate grooved type joints.