

## Veolia Water Solutions and Technologies

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ORION® Performance (Single Pass RO)								
Model		500	1000	2000	4000	6000	8000	10000
Product (nominal)	l/h	500	1000	2000	4000	6000	8000	10000
Feed (nominal)	l/h	625	1250	2500	5000	7500	10000	12500
Concentrate (nominal)	l/h	125	250	500	1000	1500	2000	2500
Recovery (range)	%	75 - 90						
ORION® Performance (Twin Pass RO)								
Model		500	1000	2000	4000	6000	8000	10000
Product (nominal)	l/h	500	1000	2000	4000	6000	8000	10000
Feed (nominal)	l/h	715	1430	2860	5720	8580	11440	14300
Concentrate (nominal)	l/h	215	430	860	1720	2580	3440	4300
Recovery (range)	%	65 - 75						

\*nominal flowrates based on 80% conversion (single pass), 70% conversion (twin pass), 15°C, 500mg/l TDS, 20mg/l CO<sub>2</sub>, SDI<3 and maximum outlet pressure of 1 bar.

Feed Water Requirements	
General	Potable water free from organics, colloids and suspended matter, SDI<3
Free Chlorine	<0.25ppm
Temperature	10 – 30°C
Pressure	4 – 6 bar

Services	
Electrical	380/440V; 3 Phase; 50/60Hz
Compressed Air	Oil free, instrument grade 6 – 9 bar

Typical Treated Water Quality		
	STANDARD ORION®	ORION® WITH UF OPTION
	Meets current USP & Ph Eur requirements for Purified Water	Meets current Ph Eur requirements for Highly Purified Water
Conductivity	<0.2 µS/cm	<0.2 µS/cm
TOC	<250 ppb	<250 ppb
Bacteria	<10 cfu/ml	<10 cfu/100ml
Endotoxins	N/A	<0.125 EU/ml

ORION® Material Specifications		
	Cold Sanitised Pre-treatment	Hot Water Sanitised Pre-treatment
<b>Pre-treatment System</b>		
Pipework	PVC or Stainless Steel	316L Stainless Steel
Softeners	High Density Polyethylene & GRP Composite	316Ti Stainless Steel
Filter Vessels	Polypropylene or 316L Stainless Steel	316L Stainless Steel
<b>Purified Water System</b>		
Tank	316L Stainless Steel	
Reverse Osmosis	316L Stainless Steel	
CEDI	FDA approved materials	
Pipework	316L Stainless Steel	
<b>General</b>		
Frame	304 Stainless Steel	
Control Panel	Mild Steel Painted or 304 Stainless Steel	



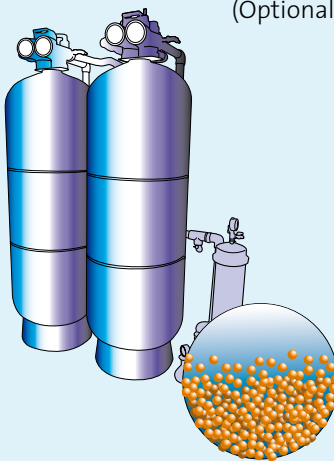
# ORION<sup>®</sup>

# Modular Pure Water Solutions

# The Complete Water Purification Package



(Optional)



**1. Pre-treatment**

Choice of pre-treatment is available to match the chemistry of your feedwater. ORION® chooses from either water softening, granular activated carbon, microfiltration or chemical injection to pre-condition the process feedwater.



**2. Multi-purpose tank**

The stainless steel multi-purpose tank approach eliminates a complicated pipework system and avoids the risk of hydraulic shocks and cross contamination. The multi-purpose tank also operates as an integrated CIP station for occasional system cleaning.

## Quality for a Lifetime

The ORION® includes many features to ease the operation and required maintenance of the system. The features that make up our integrated risk management approach are supported and enhanced by a comprehensive range of service maintenance products. Standardised Performance Qualification Maintenance Contracts (PQMC) are tailored to your system and ensure continuing accreditation. Scheduling service on a preplanned basis coupled with time-based replacement of specific parts and consumables significantly reduces the risk of downtime. This approach enables us to guarantee the quality and value of your system for a lifetime.

## ALL IN PACK®

We understand your need for a new pure water installation and the investment this involves. This is why we bring you the **ALL IN PACK®** solution, which provides you with a complete commercial and technical solution, including: **equipment supply, installation, system maintenance and a leasing package** to meet all costs. This innovative package gives you peace of mind for your current and future needs without a large initial capital investment.

Developed **with** the Pharmaceutical Industry **for** the Pharmaceutical Industry

### Research customer needs

Designed in consultation with Pharmaceutical engineers and end users.

### Develop user requirement specification

The URS describes clearly and accurately what the industry requires from the system.

### Functional design specification

The FDS describes the functions the system will perform and the facilities required to meet the specification.

# that fits all your needs



## Standard Options

### Pre-Treatment

- No Pre-treatment
- Base Exchange Softeners
- Granular Activated Carbon Media Bed (within softeners)
- Pre-filtration
- Hot Water Sanitisable Softeners
- Hot Water Sanitisable Activated Carbon Media Bed (within softeners)
- Plastic or Sanitary Stainless Steel Pipework

### Process

- Single Pass Reverse Osmosis, Recovery up to 90%
- Twin Pass Reverse Osmosis
- Membrane Degasser
- Continuous Electrodeionisation
- Post-Treatment UV
- Ultra Filtration (For Ph Eur Highly Purified Water)
- Post Micro-Filtration
- Storage Tank and Ring Main Control\*\*
- Continuous or Stop/Start Operation
- ASME BPE or Dairy Pipework
- Automatic or Manual CIP

### Monitoring

- TOC
- Chlorine
- Hardness
- pH
- Final Water Monitoring and Control
- Chart Recorder\*\*

### Communications Link

- Ethernet
- Profibus
- Modem Access
- Volt-Free Contacts

### Testing

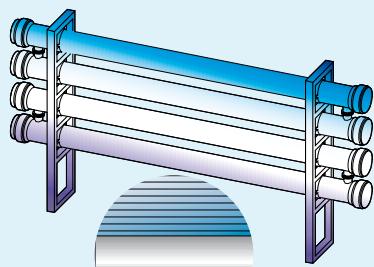
- Fully-Functional FAT\*
- Witnessed Fully-Functional FAT\*\*
- Witnessed Control Panel and Fully-Functional FAT\*\*

### NDT Requirement

- Boroscope with photographs
- 10% of all Stainless Steel Pipework\*
- 100% of all Stainless Steel Pipework\*\*

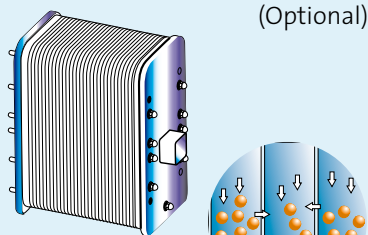
\*Included in standard specification

\*\* Optional



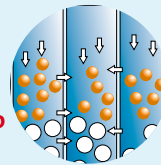
### 3. Reverse Osmosis

The Reverse Osmosis unit uses the latest hot water sanitisable advanced membrane technology to remove up to 97% of dissolved inorganics and over 99% of total dissolved organics, colloids and particles. Reverse Osmosis also provides excellent removal of microbial species. ORION® is available either in single or twin pass Reverse Osmosis.



### 4. Continuous Electro Deionisation CEDI

The CEDI continuously provides high purity water whilst withstanding hundreds of hot water sanitisation cycles (85°C). By applying voltage across chambers of cation and anion resins, regeneration is continuous and chemical free. The patented design of resin filled concentrate cells eliminates the need for an additional concentrate recycle pump, reduces power consumption and avoids the disadvantages of brine infusion.



## 10 Reasons why the ORION® is the WORLD'S leading water treatment solution!

- Guaranteed microbial compliance through regular hot water sanitisation at 85°C
- Designed, manufactured and validated to GAMP
- Fully compliant with latest ISPE, USP and Ph Eur specifications
- Automated PLC control minimises operator involvement
- Unique CEDI design efficiently and reliably ensures product quality
- Fast-track project delivery through truly standardised product
- Reduced validation hours through standard validation package
- Water purification package with more than 80 standard options
- Comprehensive and standardised validation pack (FAT, IQ, OQ)
- Already tested and proved by blue chip companies

### Design qualification

The DQ provides documented evidence that the key aspects of the design adhere to the URS.

### Hardware and software design specifications

The HDS and SDS describe the hardware and software components and their arrangements including the PLC.

### Installation and operation qualifications

The IQ and OQ provide documented evidence that the system is installed and operates as intended.

### ORION® system

The result is a pre-validated system that is fully compliant with Pharmaceutical standards.