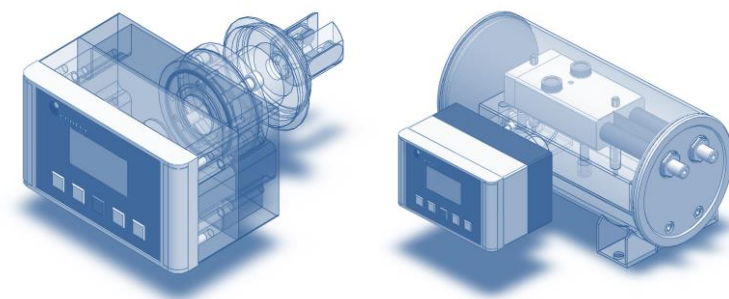


## The Centec Group

Centec is a privately owned group of companies. A core business for us is customized systems for the production and distribution of high purity water and water for injection (WFI) for pharmaceutical and biotechnological plants in accordance with GMP and FDA guidelines. We are an experienced partner for pure steam generation, CIP- and SIP-processes as well as for services related to product preparation. Centec technology includes a range of high precision process sensors for accurately measuring critical product properties such as the concentration of acidic and caustic solutions and O<sub>2</sub> content. The largest pharmaceutical groups in the world are among our key customers.



**Accuracy. Reliability. Centec.**

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**REVOTEC**

**Reverse Osmosis**

**Centec Pharma Systems**



Automated  
process skids  
and high precision  
sensors from a  
single source.  
**Centec.**

# REVOTEC

## The Principle

The Centec reverse osmosis (RO) system REVOTEC is used for water purification. RO is the reversal of natural osmosis. If a semipermeable microporous membrane is placed between pure water and water with dissolved ions (salts) osmosis will come into play. The pores of the membrane only allow the passage of H<sub>2</sub>O, but not of salts, viruses, bacteria and larger molecules. Osmotic pressure due to a concentration difference causes the pure water to pass through the membrane to dilute the solution on the impure side. This will continue until osmotic equilibrium is reached. In the REVOTEC unit this process is reversed. In order to separate pure water from water containing dissolved salts and solids, pressure is applied to the contaminated water. When the applied pressure overcomes the natural osmotic pressure, pure water will pass through the membrane into the pure water side. The purified water (permeate), is practically free of all impurities. Cross-flow technology minimises fouling by quickly removing the impure water (concentrate). However, depending on the feedwater quality, pre-treatment may be required to prevent scaling and chemical attack by oxidizing agents like chlorine.

## Technical Data

Capacity	1 - 150 m <sup>3</sup> /h
Residual Conductivity	< 1,1 µS/cm (20°C) possible
Pressure of Operation	0 - 30 bar
Temperature of Operation	2 - 35 °C
Temperature of CIP	max. 85 °C
Material	1.4404/1.4435/... AISI 316L/... electropolishing possible
Surface Finish	Ra < 0,4 possible
Ferrite Content	< 1 % possible
PLC	SIMATIC S7
Options	pre-filtration softening & electro deionization disinfection

The Centec production is certified according to ISO 9001.



- **Application Specific and Energy Efficient**  
all stainless steel sanitary execution  
double stage REVOTEC for highly purified water (HPW)
- **Modular Design with Standard PLC**  
skid mounted for easy installation and start-up
- **In Compliance with USP, ASME, GMP, FDA, ISPE**
- **Completely Qualified (DQ, IQ, OQ)**
- **Low Operating and Maintenance Costs**

## Experience. Expertise. Centec.

Particle Pre-Filtration · Disinfection · Water Softening & Demineralization · Ultrafiltration · Reverse Osmosis  
Electro Deionization · WFI Distillation · Membrane Deaeration · Column Deaeration · Vacuum Deaeration  
Multi Component Mixing · Additive Dosing · Flash Pasteurization · Cleaning-in-Place · Pure Steam Generation

