

WCS Group



Case Study

WCS Engineering supports leading manufacturer to reduce costs, improve water quality and save energy.

A successful RO EDI installation

Introduction

Customer is a world leader in sustainable technology for decarbonisation of engine technology and the reduction of harmful emissions and improving of sustainability; using advanced metals chemistry to tackle these problems, with the aim of driving down emissions, and transforming energy systems.

Site is manufacturing hydrogen fuel cell and the membrane catalysts in them, for various applications including heavy duty and high usage road applications and non-road applications such as stationary power supplies, with the fuel cells providing numerous advantages over batteries.

The production process requires high quality pure and ultra- pure water for various

applications including the specialist inks used to manufacture the membranes.

The Challenge

The site has an ongoing requirement for ultra-pure water coupled with a smaller demand for RO quality water. Ultra-pure water quality requirement was $> 10 \text{ M}\Omega$, with the RO water quality requirement being $10 - 20 \mu\text{S}$.

Previously the water requirement had been met by using an RO plant and then passing some of the permeate through a separate EDI stack to produce the required demin water.

The site had stored treated water capacity of approximately 10 m^3 inside the factory. Site

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have a distribution system around the factory, which the new system would connect into with new distribution pump sets.

The Solution

WCS Groups Engineering team, designed a replacement system to cover the whole treatment and distribution system.

Based on the water usage on site the following was installed:

- New raw water break tank, sized at 0.5 m³, divided to enable easy cleaning
- Single Electronic Deionisation (EDI) plant with associated pre-treatment
- One new 4 m³ Demin water storage tank
- 1 new 1 m³ RO water tank
- 1 new demin water circulation loop, with new circulation pump set
- 1 new RO water circulation loop pump set
- Blend system to convert demin water to RO water Polishing vessels on demin water circulation loop to ensure water quality to service
- Uv units on loops to ensure water quality.

Value Added

The amount of water to drain was reduced significantly by the use of newer equipment.

Reducing the volume of stored treated water has improved the bacteriological control on the whole system.

The installation of new booster pumps has drastically reduced the energy usage by the circulation pumps.



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Water Savings

- Old pure water production units produced 0.8 m³ of water to drain per m³ of pure water produced.
- New units give 0.4 m³ of water to drain per m³ of pure water produced.
- Based on the same water production of 10 m³ per day, this gives a daily water saving of 4 m³
- Assuming the plant operating for 340 days per year, this gives a yearly water saving of 1360 m³.
- Using an estimated water cost of £5.00 per m³ in and out, this gives a yearly saving of **£6800**.

Energy Savings

- Energy savings; based on average unit cost of £0.34
- Circulation pumps were 4kW fixed speed pumps, one on each line
- Old pumps used total of 8 kW per hour @ £0.34 / kW hr = £2.72 hour
- New pumps use 4 pumps with 500W per pump average for the same circulation. = 2 kW per hour = £0.72 per hour
- Savings = £2.00 per hour.
- 24 hour running over 340 days = **£16320 saving per year**

