

Veolia Water Technologies designs and installs a new Renal Water System for Royal Derby Hospital, UK

Health Care | Case Study

The Client

The new Royal Derby Hospital was built under a £335m PFI scheme and was officially opened in April 2010. It is one of two teaching hospitals under the Derby Hospitals NHS Foundation Trust, and is one of the largest in the UK with 1139 beds and 35 operating theatres.

Construction was carried out in two phases; Phase 1 had to be completed so that several departments housed in older buildings could move in and allow those buildings to be demolished to clear the site for construction of Phase 2.



Key Figures

- New bespoke engineered system
- 106 points of use
- Reduce carbon footprint

The Client's Needs

Level four of the new building houses the renal wards, where 106 points of use have been installed, providing 55 dialysis stations, eight of which are in the isolation ward and five in the adjacent High Dependency Unit.

Phase 1 was completed in 2007 and at the same time the ring main distribution system was designed to be easily extended to meet the requirements of the Phase 2 expansion, which supplied a further 20 beds in the Intensive Therapy Unit on the floor below. These points of use require a total of up to 1750 litres per hour of purified water in accordance with the Renal Association Guidelines.

The Solution

Veolia Water Technologies's engineers worked closely with the hospital's renal technicians to engineer a custom water purification and distribution system, which will also reduce the carbon footprint.



Mains water is softened using duty/standby water softeners which is then pumped through carbon filters to ensure that the water is free from chlorine, which could damage the downstream equipment, and chloramines which could harm the patient.

Two 100% duty units are installed, operating in parallel to avoid stagnation which can lead to microbiological growth. The pre-treated water then feeds two NephroRO reverse osmosis units, each consisting of two pump and membrane sets operating as duty/standby on a daily basis with the standby unit automatically flushed to drain at regular intervals.

The permeate from the reverse osmosis units feeds two separate stainless steel, heat sanitisable NephroSAFE ultrafiltration units.

The Benefits

Each ultrafiltration unit feeds separate ring mains, each supplying approximately half the dialysis stations, with excess permeate being recycled. Using two separate ring mains ensures that half the dialysis stations are always available even when one ring main is under maintenance. The ring mains have a total of 1700 metres of orbitally welded hygienic 316L stainless steel pipe work, and are fully lagged to reduce heat losses during the automatic heat sanitisation cycles.



The Carbon Footprint is further reduced with the use of a central concentrate supply system to deliver the concentrate to the media panels via ring main distribution system. The bulk storage and delivery system significantly reduces the environmental impact of supplying the concentrate in conventional six litre containers by reducing packaging waste. It also saves ward storage space, avoids manual handling and helps to save money.

Results

Since start-up, Veolia Water Technologies's renal water system at Royal Derby Hospital has consistently delivered purified water which exceeds the water quality goals set at the design stage. The heat sanitisation system has controlled bacterial and endotoxin levels within Renal Association Guidelines and has eliminated the use of aggressive, hazardous and environmentally damaging chemicals, which contributes to sustainability.

Variable speed drive pumps have been employed wherever possible, regulating pump speed and output to match demand thus reducing energy consumption when demand is low, and together with the online acid concentrate system this has helped to meet the hospital's sustainability targets.

- Consistent supply of purified water to meet RAG guidelines
- Eliminated the manual handling and storage of chemicals
- Reduced energy consumption to meet sustainability targets



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