

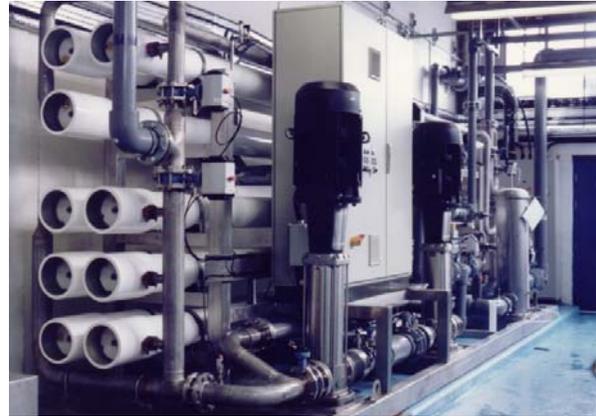
CASE HISTORY

H J Heinz, Wigan Factory

End User H J Heinz
Process Reverse Osmosis
Application Process Water, Supply



Raw water break tank, sand filters and wastewater buffer tank



RO Skid, including duty/ standby high Pressure pumps and control panel

Introduction

For some time Heinz had sought to reduce the variability of its water supply and ensure consistency throughout the seasons. To address the situation Thames Water Utilities were approached to provide a suitable and cost effective treatment facility, which would be owned and maintained by Heinz. Following the submission of acceptable process design proposals, Thames Water commissioned ACWA to design and install a water purification plant, using Reverse Osmosis (RO) technology.

Description	Influent Characteristics Average	Product	Concentrate
Flow m ³ /day	2x 62.5m ³ /h	2 x 50m ³ /h	2 x 12.5m ³ /h
Suspended Solids mg/l	1 - 3	Nil	<1
Conductivity (average) 2500 µS/cm	<100 µS/cm	<10 µS/cm	400 µS/cm
pH	8	6	8.5
Temperature °C	2-20	unchanged	unchanged

Description

Filtration System

A fully automatic pre-filtration system (using three multi-media packed pressure vessels) was installed at the front end of the process to make sure that the upstream cartridge filter was not fouled by suspended solids (such as iron and manganese). This has 'significantly' reduced the costs of production by extending the cartridge filters' life. Raw water is used for backwashing purposes and a wastewater tank takes any high flows which could create potential surges to drain. Treated water is then pumped through a 5.0 micron (nominal) cartridge filtration system from the multi-media vessels.

Chemical Dosing

Although the feedwater is not likely to be prone to scaling (it is low in hardness and alkalinity) the water source means that the organic loading is higher than usual. Dosing the membranes with anti-foulant protects them. In addition sodium bisulphite is dosed to remove any remaining free chlorine and protect the RO membranes against oxidation.

Reverse Osmosis

Each of the 2 RO plants are two stage process containing 9 RO vessels staged 6:3. Each tube contains 7 KMS low pressure membranes in series. Each system is designed to accept 62.5m³/h filtered feedwater at up to 16 bar. This is provided by 2 x 37kW inverter driven high pressure pumps. The speed of these pumps is PLC controlled to maintain a fixed flow (at variable pressure depending on prevailing conditions). On each skid a concentrate control valve is positioned by the PLC in order to maintain a fixed flow of 12.5m³/h ensuring the plant operates at 80% permeate recover at all times.

Increased Automation and Reliability

To reduce operator intervention and increase automated operation at the plant, the flow rate of the two inverter driven high pressure pumps is automatically adjusted by the PLC as the cartridge filters and / or RO membranes become increasingly fouled. This eliminates the need for throttling valves. The pumps are designed to cope with a variety of worst case scenarios.

Membrane and Monitoring System

The RO system consists of two membrane arrays, each of which has nine pressure tubes. When both streams are on line, the RO plant is designed to produce 100m³/hour permeate <10mg/l TDS. Operating pressure is controlled by the reject stream control valve which is modulated under PLC control to ensure the correct reject flow rate. A conductivity meter within the permeate line continuously monitors plant performance.

Clean in Place

A manually initiated, automatic clean in place (CIP) system, which comprises a 3000l polythene tank has also been installed on site which is used approximately every three months.

Control System

There is a dedicated control panel for each stream of the treatment system. The system automatically alarms if measurements fall outside pre-set limits and shows a detailed display of the fault.

The plant also has a supervisory control panel which looks after all equipment not dedicated to a particular stream and is used to monitor and activate the raw water break tank, waste break tank, automatic media filters and backwash pumps, dosing tank levels and product tank level controls.