

GUARANTEEING THE WATER QUALITY AT SOITEC'S NEW WAFER FABRICATION PLANT IN PASIR RIS, SINGAPORE

CASE STUDY | Microelectronics



| Introduction

Ultrapure water is crucial to the semiconductor manufacturing process because even trace impurities in the water can have detrimental effects on the fabrication of silicon wafers.

In semiconductor manufacturing, where precision and purity are critical, our experts support Soitec's water management at their new Singapore facility, ensuring reliable, sustainable water solutions that protect product quality and operational efficiency.

| The client's needs

M+W Zander - the engineering and construction group overseeing the project on behalf of Soitec - awarded Veolia experts a contract to design and build the ultrapure water treatment (UPW) plant along with the wastewater treatment plant (WWTP) for the Soitec wafer fabrication in Pasir Ris, Singapore. Veolia later began managing the complete operations on both plants with a two year total water management contract.

| The solution

The UPW plant is designed to produce 70 cubic meters per hour (m³/hr) of Grade A water, and 58 m³/hr of Grade B water. The WWTP is designed to neutralise 154 m³/hr of acid waste and to treat 35 m³/hr of slurry and fluoride waste. The WWTP effluents meet local reject quality standards and are rejected in the sewerage. The UPW plant uses the continuous deionisation technology (CDI-VNX) for producing high purity water without the costs associated with the chemicals regeneration and waste neutralisation. It is used to polish reverse osmosis (RO) product water and remove CO₂, Boron, Silica and total organic carbon (TOC) from the stream. The CDI systems use ion exchange resins and electricity to produce continuous and consistent high-quality water with no regeneration downtime. By offering an innovative solution, our team has been able to answer the most specific design requirements: small footprint and ongoing capacity to upgrade the UPW plant when future expansion is needed.



Singapore

| The client

Singapore

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Created in 1992, Soitec, a leading French semiconductor company specializing in Silicon On Insulator wafers and engineered substrates, partners with key global semiconductor players including AMD, Freescale Semiconductor, and Mitsubishi Electric to drive technological innovation.

In 2006, Soitec advanced its manufacturing capabilities by establishing a state-of-the-art 300mm silicon on insulator (SOI) fabrication facility, Fab 3, in Singapore. This investment of approximately \$400 million enabled the creation of a highly efficient, clean room environment designed to support cutting-edge semiconductor production with a focus on operational excellence and sustainability.

| Process description

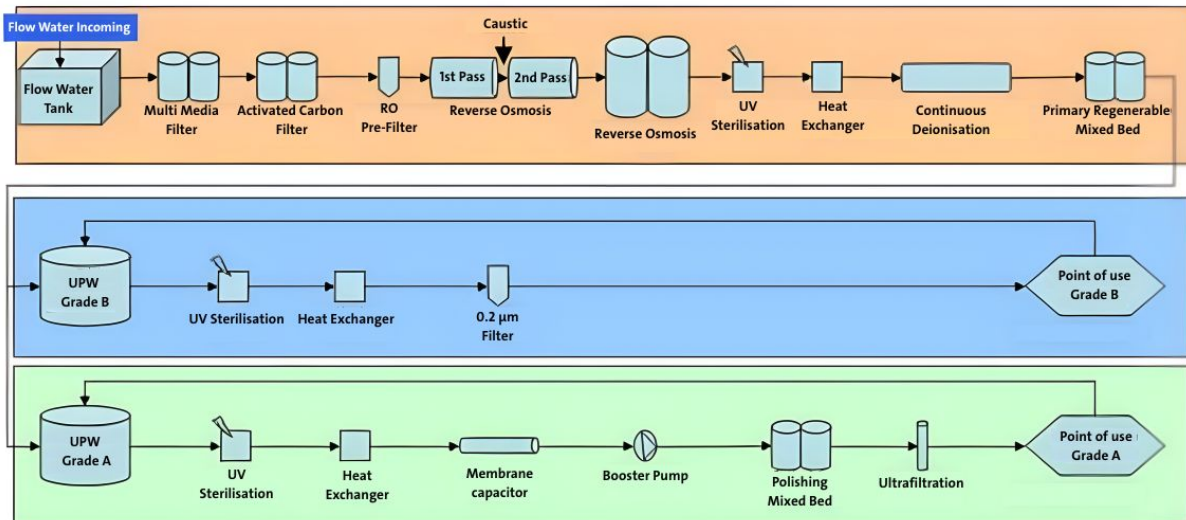


Figure 2: Process Scheme of the Ultra Pure Water production plant

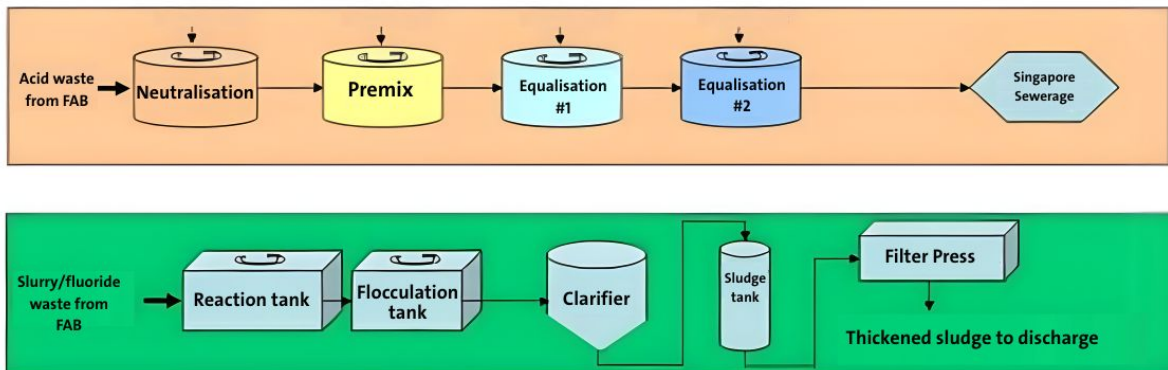


Figure 2: Process Scheme of the Waste Water Treatment Plant

| Results

Our experts provide an economically viable and sustainable solution that combines two high-quality water grades, ensuring consistent production of highly purified water with stringent specifications for total organic carbon (TOC), resistivity, boron content, silica concentrations, and dissolved oxygen. The treatment is environmentally responsible, employing chemical-free continuous deionization technologies. Soitec benefits from comprehensive water management across the entire plant, supported by the expertise of our industrial services team to ensure a seamless and optimized water treatment process.