



## Condensate ion exchange package

SOCAR Turkey Aegean Refinery (STAR) is an oil refinery located in Aliaga, Izmir Province, Turkey. Operated by STAR Rafineri, the facility has a processing capacity of ten million tonnes of crude oil a year, equivalent to 214,000 barrels a day.

The STAR Aegean refinery is a high-complexity high-conversion oil refinery that processes natural gas and refinery fuel gas. The facility includes three marine shipping terminals and a stand-alone wastewater treatment plant for managing refinery by-products.

Aquatech was contracted to supply a condensate polishing and ion exchange package for installation at the STAR refinery for processing and purifying condensate from the plants operating facilities.

## Corrosive sulphuric acid

During the ion exchange process, the condensate, containing the harmful minerals that need removing, is collected in 8m deep concrete tanks. A neutralising solution is then added to the condensate and an ion exchange process takes place between the condensate and the neutralising solution producing clean water that is free of the harmful ions and which can therefore be disposed of safely.

However, the by-product of the ion exchange process is highly concentrated sulphuric acid, which then needs to be removed from the ion exchange tanks for on-going processing.

Aquatech approached Amarith to supply API 610 VS4 high-flow sump pumps, rated at 500m<sup>3</sup>/h, with Plan 53B seal support systems, to pump out this highly corrosive sulphuric acid from the ion exchange tanks at the STAR refinery.

Amarinth was selected for its wealth of experience and knowledge in designing pumps for such demanding applications within the industry.

## Modular design

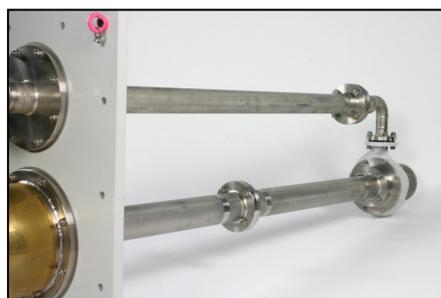
In designing the pumps, Amarith leveraged its unique modular design for API 610 VS4 pumps that has been configured to handle over 100,000 variants, quickly delivering a design for almost any pump length or application.

The bespoke design of 8m long API 610 VS4 pumps for Aquatech used a range of standardised modules, consisting of assemblies and sub-assemblies, which had already been checked against mating parts for clashes using computer-aided design tools, ensuring that any variant assembled from the modules would fit together perfectly.

Amarinth worked closely with Aquatech and STAR Rafineri to agree on the material for the pumps that could withstand the corrosive fluid, settling on Alloy 20. Furthermore, to ensure even higher reliability and to protect the pump column bearings from corrosion, an external flush design was incorporated. Finally, Plan 53B seal support systems were supplied to ensure total containment of the sulphuric acid and its associated fumes.

## Challenge of pump testing

Final testing of the pumps could not be undertaken at full length as they were longer than the depth of the test tank. However, Amarith was able to develop a bespoke test using a slightly shorter length of the pump that successfully proved the pumps capabilities for the target site conditions.



## Aquatech

Established in 1981, Aquatech is a global leader in water purification technology for industrial and infrastructure markets with a focus on desalination, water recycling and reuse, and zero liquid discharge.

Headquartered in Canonsburg, Pennsylvania, Aquatech has offices throughout North America, with subsidiaries in Europe, the Middle East, India and China. Aquatech has successfully executed more than 1,000 water management projects in over 60 countries around the globe.

*"The combined requirements of high specification, an extremely corrosive process and unusually deep sump dimensions made sourcing a pump supplier a real challenge. Thankfully, Amarith stepped up and utilised their experience of similar applications within the waste water treatment industry to provide a comprehensive and compliant offer that matched our requirements exactly."*

**Srinivas Pyati**  
Senior Manager Procurement  
Aquatech