

Seawater Desalination for Methanex

Methanex has a large methanol production facility in Punta Arenas, Chile. In this region of the world, fresh water is not available, and the facility requires seawater desalination to provide drinking water and process water. When the facility underwent renovation and expansion of their facilities, Aqua-Chem ICD provided a total of five (5) new Once through Multi-stage Flash plants.

The Problem

Existing Multistage Flash (MSF) desalination plants at the Punta Arenas facility were aging quickly. The materials of construction proved to be inadequate for the service. Aqua-Chem ICD provided materials of construction in the new plants that would ensure long plant life in excess of 20 years. The new Multi-Stage Flash (MSF) units were furnished with titanium tubes, titanium tubesheets, and shells of high alloy Stainless Steel to make the plant corrosion resistant to the harsh seawater environment.

The Solution

In a three year period, Aqua-Chem ICD provided five of the high alloy construction MSF plants to Kvaerner Process. The plants ranged in net distillate capacity from 1370 M³/day to 2740 M³/day each. The total installed capacity of the Aqua-Chem ICD plants is over 8000 M³/day.

The Once Through MSF process is a low seawater concentration (<1.12) process so scaling can be controlled by using a commercially available antiscalant. The distillate produced is very pure at less than 5 ppm of Total Dissolved Solids (TDS). The Top Brine Temperature (105°C) is high enough to kill any bacteria in the seawater, making the distillate pure for drinking without any additional chemical treatment.

The MSF process also operates on low pressure steam (2 barg) which makes ideal for waste heat applications.



PROJECT PROFILE SERIES # 7

The Multi-Stage Flash Process

The Multistage Flash evaporator process produces distilled water from seawater by heating it until it is ready to flash. The distillation process operates from a positive pressure in the first stage to a high vacuum in the last stage, with stage-to-stage pressure differential being the key to the repeated flashing. Vapor from the flashing process then passes through entrainment separators where it condenses to form pure distillate on the condenser tubes. At Methanex, 3.7 kilograms of of distillate are produced for every kilogram of steam input to the brine heater.

Multistage Flash Evaporation (Once-Through)

