



CASE STUDY:

Field-Erected Tower Retrofit at Chemical Plant



Field-Erected Tower Retrofit

Location: Spain

Products Installed: OF21MA, CF150MAx, AccuSpray

Results: 8 °C Cold Water Temperature Improvement

Overview

Ube Industries, Ltd., is leading manufacturer of chemicals for the plastics industry. Headquartered in Japan, the company runs several plants and logistics facilities in Asia, Europe, and the U.S. Two decades ago, Ube acquired production facilities linked to the BP oil refinery in Castellón de la Plana, Spain. There, the company produces caprolactam (raw material for nylon manufacturing), several fine chemicals (1,6-Hexanediol, 1,5-Pentanediol, etc.), and fertilizers (ammonium sulfate).

Problem

After 10 years in operation, the two cooling towers were experiencing a steep drop in performance. This directly affected the efficiency of their chemical reactors, which are a crucial part of the overall plant process.

During inspection of the cooling towers, the problem was identified as heavily obstructed fill, primarily caused by scaling. In collaboration with a Japanese company, Kurita, which services numerous Ube plants, significant presence of calcium, zinc, and phosphorus was detected across the

surface of the cooling media. On average, the deposits on the surface of the fill were around 2 mm thick, but some fill packs were considered “solid rock”. Fill weight, with inorganic salt deposits and biofouling, was more than 10 times the original weight of the clean fills.

Additionally, the PVC sheets were becoming brittle, and due to the deposits, the flute geometry was distorted. The presence of ferric oxides also indicated corrosion of the distribution system.

Solution

Revamping of the cooling towers required the installation of a new distribution system, equipped with a stainless steel water collector and Brentwood’s AccuSpray Nozzles. The robust concrete structure of the towers also needed a heavy-duty protective coating, and new FRP sidewall panels were installed.

At the heart of the towers, OF21MA was installed to provide better cooling performance and increase the tower’s capacity over time. The fill packs were assembled on site using Brentwood’s patent-pending mechanical assembly technology, which limits Volatile Organic Compound emissions and reduces the risk of fire – important criteria that met Ube’s requirements for environmental and safety protection. To complement the fill, Brentwood’s highly efficient CF150MAx drift eliminators were installed to replace existing blade-type extrusions.

The Brentwood team provided technical support throughout the implementation, including chemical analysis of deposits within the existing cooling fills and recommendations for water treatment.

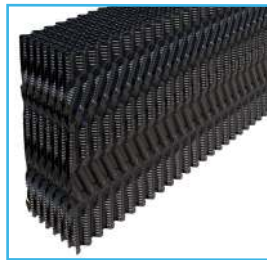
Results

The first cooling tower significantly increased its performance, even with harsh conditions and an actual water flow more than 30% above design conditions. Based on historic data, the retrofit resulted in more than an 8°C improvement in cold water temperature. This enabled significant energy savings and increased efficiency. The second tower was retrofitted several months later and yielded similar results.

Brentwood Inside: Products Installed for the Field-Erected Tower Retrofit

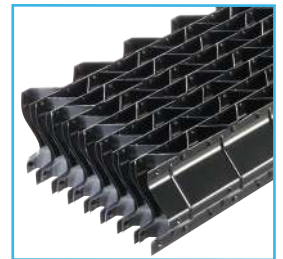
OF21MA

OF21MA is an offset-fluted fill that yields comparable performance to CF1900 but with lower potential for fouling at a lower cost. It is generally used in applications where water contains a moderate level of total suspended solids.



CF150MAx

Brentwood's CF150MAx features a high surface area and nesting design that maximize performance at minimum pressure drop. It offers a cost-effective solution, producing drift loss of 0.001%.



AccuSpray

The AccuSpray Nozzle creates a uniform spray pattern, providing superior water distribution at low operating pressures. It was selected for this project due to its non-clogging design and its ability to handle the high level of suspended solids in the water.



BRENTWOOD EUROPE S.R.O.

Na Cintlovce 535/7
268 01 Horovice
Czech Republic
+420-371-595-795

brentwoodeuropesro@brentwoodindustries.com

BRENTWOOD INDUSTRIES, INC.

500 Spring Ridge Drive
Reading, PA 19610, USA
+1-610-236-1100

coolingtower@brentwoodindustries.com