# Engineered Plastic Cooling Towers vs. Galvanized or Stainless Steel

PROCESS ENGINEER?
While galvanized, metal-clad cooling towers require frequent maintenance and replacement, the stainless steel lining offers superior durability. But engineered plastic towers not only match the durability of stainless, they also exceed the uptime, ease of care, and lifespan of any metal.

When Bob Gant, a sales engineer for Delta Cooling Towers, Rockaway, NJ, called on a sophisticated fabricator of alloy-coated sheet steel, he was curious about their interest in a cooling tower with an engineered plastic shell. After all, for many years, galvanized steel had been the de facto standard material for lining cooling towers. “Of course, I was well aware of the advantages of our engineered plastic towers,” Gant explains, “but when I got a request for a bid from a company that makes coated sheet steel, I was impressed.”

Gant was addressing the fact that “traditional” galvanized metal cooling towers are still fairly popular, even though somewhat notorious for being maintenance intensive and requiring frequent replacement due to pH problems, corrosion, leakage, high maintenance costs, and sporadic disruptions. “Those disruptions are invariably expensive,” Gant explains. “An unplanned shutdown in process industries can be disastrous, in some instances costing thousands of dollars an hour.”

Gant says those problems are avoidable with the advent of cooling towers with engineered plastic shells that are virtually impervious to the environmental factors, harsh water treatment, and cleaning chemicals that eat metal clad towers alive. “I think the clincher for the sheet metal alloy coatings firm was the 15-year warranty on the unitary molded plastic shells,” he says. “You commonly find that galvanized metal-clad shells have a one-year warranty, although that may be understandable due to environmental conditions.”

Cooling towers with shells of engineered plastic also reduce operating costs, which include electric power usage, water-treatment chemicals, labor and materials for maintenance, and unscheduled process downtime for repairs.

Maintenance and repairs usually means process interruptions, the costliest of all problems related to cooling towers. Given their short lifespan, metal-lined models inevitably invite such breaches in operations, while corrosion-, rust-, and leak-proof plastic cooling towers are more likely to provide continuous and reliable operation with few if any disruptions.

For instance, the “white rust” scale that forms on galvanized towers operating at pH higher than 8.0 can quickly lead to failure and replacement. Conversely, the use of engineered plastic allows the use of better scale inhibitors that operate at higher

pH.

Because the zinc plating of galvanized towers is thin (normally a scant 2.5 oz per square foot), a pH lower than 4 will destroy this protective lining in a matter of months. At that point, it becomes necessary to replace the zinc galvanizing with expensive coatings and repair any cavities and other damage that may have occurred.

Not requiring inordinate concern over pH levels or mineral deposits, engineered plastic cooling towers can operate at higher cycles of concentration, leading to operational savings. Higher cycles of concentration are achieved by lowering the amount of blow-down or bleed-off of recirculating water.

Gant adds that the imperviousness of engineered plastic cooling tower shells to pH, harsh environmental factors, and cleaning agents is important, but only part of the story. He says that stainless steel shells, while considerably more expensive, also offer corrosion resistance, lower maintenance, and improved durability over their galvanized metal counterparts. Still, he knows of no cooling towers with stainless steel shells that offer warranties anywhere close to 15 years. “Also, those models with stainless steel shells weigh considerably more than the engineered plastic ones,” he says, and that introduces some added structural support requirements.”

The inherent design advantages of the latest plastic cooling towers also include easier installation (especially on rooftops) because a lightweight plastic shell often weighs 40 percent less than a steel tower, even though 5-10 times thicker.

Engineered plastic cooling towers are available in modular designs where units are combined in a cluster, making installation easier, faster, and less expensive. For applications that require mounting flexibility, Delta offers an induced-draft, counter-flow design that incorporates I-beam “pockets” in the tower basin for reinforcement so that a plastic tower can be easily mounted on standard I-beams or imperfect concrete pads.

Utility savings can also be realized. While the cost of electric power to drive cooling tower fans may seem incidental to process costs, they can add up. In the case of the engineered plastic towers manufactured by Delta, direct-drive motors are employed to power the cooling fans. With no pulleys, bearings, and belts, such direct-drive motors prove more efficient and, hence, provide substantial savings in energy costs while also delivering more horsepower. Also, stress from frequent turning on and shutting off cooling towers is no factor.

For further energy conservation, when modular towers are incorporated into a cluster, individual direct-drive fan motors can be shut off when supported processes are not operating.

Additionally, polyethylene plastic water towers save costs by reducing or eliminating the possibility of process material contamination. In particular, treatment chemicals can cause the leaching of zinc from galvanized metal, which in some cases could result in the zinc migrating into the process — a potential

environmental discharge problem.
More information is available by contacting Delta Cooling Towers at 800-289-3358 or sales@deltacooling.com or by visiting www.deltacooling.com.Idelta_report?Idelta2?Idelta3?UOTE:?‘Polyethylene plastic water towers save costs by reducing or eliminating the possibility of process material contamination’??

#### Case in Point: HVAC Manufacturing

The first plastic cooling towers became available in limited sizes 30 years ago. The success of those early models and advanced molding techniques gave rise to second-, third-, and now fourth-generation engineered plastic cooling towers that are much larger in capacity. Units available include compact sizes — as small as10-ton (15 GPM) force draft models — up to high-capacity 2,000-ton (12,000 GPM) induced draft towers. “I’m amazed that our plastic towers are still working well after 27 years,” says Courtney Perkins, engineering laboratory manager with Bard Manufacturing in Bryan, OH, a manufacturer of air conditioners, heat pumps, and furnaces. “Our first plastic cooling tower must have been one of the early ones, but it keeps running with relatively little general maintenance every couple of years.”

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