

Cool Runnings: Dow Achieves Max Efficiency with Aquastore®

Every morning when you pour a cup of coffee or tear open a package of frozen waffles, the science of Dow Chemical is there to help make your breakfast convenient and fresh. Dow makes high performance materials that go into food packaging, personal care products, medications



and clothing—to name a few. Dow’s breadth of technologies touch just about every part of our lives and with Dow’s growth investments around the world to meet increasing demand, the Company continues to prove that it is the preferred innovation partner to accelerate solutions for the global good.

The alchemic wizards at Dow are hard at work at places like Dow’s manufacturing facility in Freeport, Texas—home of the world’s largest on-purpose propylene production facility. With the abundance of low-cost natural gas that is derived from shale gas, Dow can reduce manufacturing costs by processing the gas itself rather than purchasing the ethylene and propylene that go into creating useful products for our daily lives.

Efficiency and savings have made the U.S. Gulf Coast an attractive region for growth in the petrochemical industry. In fact, nearly half of Dow’s products sold in the U.S. and more than 20 percent of its products sold globally are made in the state of Texas.

Converting low-cost natural gas into ethylene and propylene is a hot topic and becoming more popular as a feedstock strategy for the industry. It’s also a HOT process. After all, we’re talking about cracking hydrocarbon molecules. Water—and lots of it—is needed to keep the machinery cool. Instead of sourcing its water from the local utility, Dow realizes big savings by operating its own ultra-filtration system on the Freeport premises, using water drawn from the nearby Brazos River.

A sophisticated operation like that also demands a foolproof storage solution. That’s why Dow handles its clarified water in gleaming, glass-lined Aquastore tanks from CST Industries — three of them, in fact. Each tank has a capacity of 1.3 million gallons and measures 117 feet in diameter by 19 feet in height.

Clarified river water (CRW) from the Aquastore tanks feeds the plant’s cooling towers, and a clean cooling tower is a more productive cooling tower, according to U.S. Gulf Coast Clarified River Water project manager Ed Krywiak.

“It’s like a car’s radiator,” says Krywiak. “If the water is full of impurities, they collect on the fins and core of the radiator and restrict heat transfer, generating extra heat. Clean water, however, leaves fewer deposits so the equipment runs more efficiently and requires less maintenance.”

Krywiak and his team considered a whole array of water storage solutions—from bolted steel to concrete—and got an up-close look at the benefits of each. The choice became clear after they watched the installation of an Aquastore tank in Victoria, Texas and toured CST’s plant in DeKalb, Illinois to witness Aquastore’s multi-step fabrication process:

1. A panel of high strength low carbon steel is blasted and alkaline cleaned.
2. The panel’s edges are beveled and its surface sprayed with a stainless steel alloy.
3. Next, the panel is sprayed with a specially formulated slurry that gives it durability, consistency and impermeability. Unlike powder coatings or paint, the slurry is inorganic so it blocks corrosion.
4. The panel is then fired at temperatures above 1,500° F to fuse the porcelain coating and the steel.
5. Tests are conducted to verify integrity and durability, including high voltage testing to detect discontinuities.

“Many of our prospective customers have toured the CST manufacturing facility and they’re amazed at what goes in to the fabrication of an Aquastore tank,” says John Haddox, sales manager at Texas Aquastore. “The process truly differentiates Aquastore from the rest.”

Aquastore’s glass-fused-to-steel system was developed to meet the demands of liquid storage for the long term. It’s resilient and requires minimal maintenance with the lowest lifecycle costs. Unlike other bolted steel tanks the Aquastore is virtually seamless, which reduces the likelihood of leaking from within or contamination from the outside.

“We did a thorough analysis of concrete and welded steel tanks and our consulting engineer, CH2M, suggested the glass-lined steel tank,” says Krywiak. “They introduced us to Texas Aquastore and we looked at some tanks that have been in service for nearly 30 years and were impressed by the excellent condition they were in.”

Krywiak says Dow chose Aquastore for its durability, low maintenance costs and safe installation.

“We liked how the tanks were built and CST’s commitment to safety,” says Krywiak. “For Dow, a significant benefit is being able to erect the tank entirely from the ground.”

Krywiak believes the Aquastore tank distinguishes itself from other technologies in the following ways:

- Long-term cost of ownership – The glass and steel fused panels require little, if any, maintenance
- Ease of construction – No scaffolding is required and it’s faster to erect than a steel tank

- Labor – Due to a shortage of welders in the Gulf Coast, a big plus is the Aquastore tank requires no on-site welding
- Safety – All construction is performed on the ground, as the dome is raised with scissor lifts to make room for panels underneath

Dow has big plans for Freeport. Construction of its ELITE™ Polymer production facility and a High Melt Index (HMI) AFFINITY™ Polymer production facility are just two of the components of Dow's investment of more than \$6 billion in the U.S. Gulf Coast. Aquastore is proud to be a part of Dow's future.

Benefits of CST's Aquastore® glass-fused-to-steel tanks:

- No painting for life of tank
- Will not corrode or rust
- Lowest total life cycle cost compared to concrete & welded
- Turnkey services from approval drawings to tank testing
- Faster construction
- No need for cranes or other large equipment for construction
- Expandable
- Interior & exterior easily cleaned
- Tank can be easily relocated
- Available in diameters from 11 feet (3.3 m) to 204 feet (62.2 m) and capacity from 20,000 gallons (75 cu m) to over 6 million gallons (22,700 cu m)
- Specific tank designs, options and accessories to meet customer needs
- Industry best warranty
- White interior coating
- Multiple color options
- Authorized network of local Aquastore Dealers for convenient service and support

OptiDome® geodesic aluminium domes are the preferred cover solution for any storage application. Aluminum dome structures are superior to other cover designs of alternate materials due to: corrosion resistance, low lifetime maintenance cost, clear-span capability, fast and low cost construction and design flexibility.

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