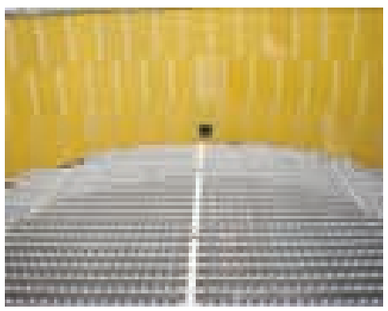
Achieving a Better Tank Lies in the Details

Choosing a storage tank is not as easy as it would seem. A variety of storage vessels are on the market and figuring out which is best for the job can be a challenge. Buyers are looking for a storage tank that will accommodate the quantity and type of liquid to be stored, offer the proper features, be produced and installed in the least amount of time and come to the table with the best price point.

By Mark Eklund

Quality coating ensures the life span of storage vessels



Safety considerations, proper testing and application types are all factors to consider in choosing a storage tank.

It can be easy to look at the selling price and overlook one of the most important cost considerations of a tank—its long-term maintenance requirements and projected total life span.

Top Priority: The Coating

The top priority should be the tank's coating. The coating is absolutely essential when it comes to protecting the tank against corrosion, protecting the material to be stored from contaminants and ensuring a long, low-maintenance life span.

Corrosion is the principal enemy of the storage tank. It shortens the life of the tank and increases the possibility of contamination. Stored liquids can be aggressive toward tanks. Whether storing potable water, wastewater, chemicals or other liquids, each will react differently to the tank, and each has its own specific storage requirements. Quality coatings provide resistance to corrosion, high impact and abrasion, as well as chemicals such as strong acids and bases. In short, high-quality coatings provide durability and longevity.

Types of Coatings

A variety of coatings are available for concrete as well as welded and bolted steel tanks. Some examples of coatings include epoxy, coal tar epoxy, glass-fused-to-steel, high-heat coatings, cold-weather coatings and coatings designed to withstand corrosive environments.

Epoxy coatings are a solid choice and are commonly applied electrostatically as a powder or liquid. They are flexible, not brittle, and provide durable coverage because they bend without cracking. On the exterior of a tank, epoxy coatings may be combined with polyurethane topcoats to provide protection against the environment. Polyurethane with UV inhibitors helps prevent chalking and fading, and it provides better value and less maintenance requirements in the form of recoating.

The tank's coating should be specifically designed for the liquid to be stored, with a proven track record over time. For example, consider that storage of wastewater and wastewater sludges will require a coating that is designed to withstand the aggressive effects of ever-present materials such as fatty acids and hydrogen sulfide. Not all coatings are designed for such materials.

Safety Considerations

Make sure the tank coating is well tested and suitable for the specific application. It is unsafe to use an old storage tank for a product for which the tank was not designed and tested.

If you are considering recycling a used tank for storing a new product (e.g., using a dry-material storage tank for liquids), have the tank evaluated for safety. Incorrect use of a tank could result in severe corrosion, premature failure of the coating, harm to the product or serious injury to personnel. Keep in mind that any tank used for drinking water storage must be NSF-certified.

The Difference Lies in Application

Bolted steel tanks are constructed of individual panels, which allow them to receive coatings at the factory before shipment to the field for erection. Factory-welded tanks also receive their coatings at the factory. Field-welded and concrete receive their coatings in the field after construction is completed.

Factory application and cure of coatings under environmentally controlled circumstances yields a highly consistent and durable coat. When application and cure of coatings is done under stringent control at the factory, a consistent coating is achieved.

Field-welded and concrete tanks receive their coatings on site. These tanks often undergo a chemical process to protect the coating while the tank is being erected (i.e., heat from welding may damage the coating). When reviewing this type of tank, make sure adequate quality-control measures are listed in the specification and consider third-party inspections.

Once a tank has been erected in the field, there are often areas of the tank that are difficult to fully prepare for field coating. Even "missing the smallest spots" leaves exposed areas open to corrosion. The thickness of coatings applied in the field cannot be controlled as closely as under ideal factory conditions, which may result in uneven application. Finally, weather and the environment will affect the quality and timeliness of the curing process in the field.

Factory-applied coatings are "greener" than field-applied coatings. Prior to receiving their coating, tank surfaces must be blasted with material to create a uniform anchor profile to ensure better coating adhesion. In the field, blasting often includes the use of sand, which is carcinogenous, and a sandblast gun, which may result in overshot and a less uniform blast. In the factory, surfaces may be blasted with materials that are easily captured for proper disposal. In addition, powder epoxy coatings applied in the factory contain no volatile organic compounds.

Field-applied air-cured systems, however, do have them, and they must be captured.

Testing the Coating

The integrity of a tank's coating may be compromised by pinholes, inclusions, thin spots and bubbles—also known as holidays. Testing for holidays before putting the tank into use is essential.

The first common test is the wet sponge test. In practice, the wet sponge is moved over the coating and a holiday is detected by the wet sponge contacting bare steel and completing the electrical circuit, which then activates an audible or visual indicator. The wet sponge test is commonly used because it is low-cost, easy to perform in the field and causes no damage to the tank surface. Over time, however, it has proven to be unreliable. It may show falsely that a coating is consistent across the surface without measuring the thickness of the coating applied. A thinly applied coating will break down over time in spots and may cause tank failure.

A second, more reliable coating test is high-voltage defect testing. In practice, an operator checks all surfaces of the coating with a high-voltage wand, which uses the material dielectric strength to determine the minimal coating thickness. If the electrical current reaches bare metal or detects a thinly applied coating, an electrically conductive path will form and a visual spark will appear.

High-voltage defect testing proves the uniformity of the coating over all surfaces, including tough-to-reach areas. It reveals any spots where coatings have been applied thinly, allowing the manufacturer to touch up the coating and ensure its durability. Such high-voltage defect testing is not common among all tank manufacturers, and its use is a way to measure the quality of a tank manufacturer and its product.

Cost Review: Compare Total Life Cycles

When reviewing bids from manufacturers, consider the details. If you are promised a low-cost tank with a corrosion-resistant coating, review the total life-cycle cost for the tank, not just initial cost. A better-quality coating may have a higher upfront cost but offer lower life maintenance and recoating requirements. Corrosion shortens the life of a tank, so a high-quality coating will help ensure that you are not soon in the market again for another storage tank. WWD

Mark Eklund, P.E., is product manager, wastewater market sales, for Columbian TecTank. Eklund can be reached at 913.621.3700 or by e-mail at meklund@columbiantectank.com.

For more information, write in 1106 on this issue's Reader Service Card.

WEBresources ➤➤➤

Related search terms from www.waterinfolink.com: tanks, coatings, curing process

For more information related to this article, visit www.wwdmag.com/lm.cfm/wd011006