Storage Tank Coatings: The Most Important Selection Guidelines

By Peter Vodak

If you're considering the purchase of a new storage tank, the type of coating found on the inside will be one of the most important factors you consider. Whether you plan to store liquid or dry bulk chemicals, or other liquid or dry bulk products, each material has its own specific requirements.
Coatings are essential. They provide corrosion and abrasion resistance, protecting the inside of your tank from the materials that pass through, and they extend the life of your tank. Quality coatings for liquid tanks provide chemical resistance against strong products such as acids and bases. Finally, the protection offered by coatings often means less maintenance during the life of the tank.
Construction materials used for tanks and silos are basically defined &#151 carbon steel, stainless steel, aluminum, and for exceptionally large volumes, concrete. What most differentiates brands and manufacturers &#151 and the quality and total life cycle of the tank you buy &#151 is the coating. Some examples of coatings include epoxy such as Trico Bond EP, glass fused-to-steel such as Vitrium, high heat coatings, cold weather coatings, and coatings designed to withstand high levels of acidity.
Epoxy coatings are most commonly applied electrostatically either as powder or liquid. Once applied and cured, epoxy coatings will bend without breaking or tearing. On the exterior, epoxy coatings may be combined with urethane topcoats to provide protection against environmental elements.

Corrosion and Chemicals

In the storage of dry bulk chemicals, coatings are most important for providing abrasion resistance. However, when it comes to liquid storage, the most important factors are corrosion and chemical resistance. In general, stored liquids are more aggressive toward tanks than dry products. Many common industrial use chemicals are stored in small volumes. However, end-use liquid products, such as soybean and vegetable oils, petroleum industry products and by-products, as well as raw materials such as crude oil and brine water, may require large volumes of storage. When considering a tank, make sure the coating is specifically designed for your product. The tank you choose should offer a coating with proven corrosion resistance over long periods of time. For liquid chemical storage, choose a coating that has been ASTM tested and proven to withstand the aggressive affects of products such as strong acids and bases.

The Safety Factor

Coatings do play a role in safety. Some coatings are designed for storing a wide variety of products while others are designed for specific products. When it comes to safety, the most important consideration is ensuring that the tank coating is suitable for the application. If your tank is for liquid storage, be sure the coating

applied is for liquid, and likewise for harsh chemicals. Some coatings may react poorly with products not designed for them.
It is unsafe to use an old storage tank for a product for which it was not designed and tested. If you are considering recycling a used tank for storing a new product, such as using a dry material storage tank for liquids or a water storage tank for liquid chemicals, be sure to first have the tank evaluated for safety, flow, corrosion resistance, chemical resistance, etc. Incorrect use of a tank can result in severe corrosion, premature failure of the coating, harm to the product, or serious injury to personnel.

Application is Key

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The key difference in coatings lies in the application process. The highest quality coatings are applied at the factory under environmentally controlled circumstances to ensure the most consistent application. Taken one step further, the best coatings are also thermally cured at the factory. Some manufacturers apply the coatings at the factory but then allow them to air-dry and cure with ambient heat, which exposes the cure to environmental factors such as dust and humidity. Other manufacturers outsource the coating process. The optimal coating solution is one that is both applied and thermally cured in controlled factory conditions before the tank is shipped and erected in the field. High-quality bolted and factory-welded tanks offer this feature.
Field-welded and concrete tanks often receive their coatings onsite once the tank has been erected. These tanks may need to undergo a chemical process to protect the coating while the tank is being erected (i.e., heat from welding may damage the coating). If you are reviewing this type of tank, make sure there are adequate quality control measures listed in the specification. Also, consider third-party inspections. Be aware that once a tank has been erected in the field, there are often areas of the tank that are extremely difficult to sand-blast and/or fully prepare for field coating. Even “missing the smallest spots” leaves exposed areas open to corrosion. In addition, the thickness of coatings applied in the field cannot be controlled as closely as those applied under ideal factory conditions. Finally, weather and the environment &#151 dust, humidity, temperature, and wind &#151 will affect the curing process in the field.

Cost Review

If a tank manufacturer promises a low cost for a tank and coating system, make sure the competitive products you are comparing are equal over the total life cycle of the tank. A higher quality coating may have a higher upfront cost but lower life maintenance and recoating requirements. A high-quality coating often means lower maintenance for the long term because it’s expensive to recoat a tank.

Experience Matters

It may seem like common knowledge to mention experience as a factor for choosing a tank and coating, but it is a key consideration. Consider the experience of the tank manufacturer &#151 how long the company has been fabricating tanks, whether it uses state-of-the-art coatings, whether its coatings are factory-applied and thermally cured, what its quality control measures are, what its volume sold is, and what countries and markets it's involved in. Also, consider tank manufacturers with third-party accreditation such as the ISO 9001 Quality Certification.

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