

Alternative Water Storage

Choosing an eco-friendly storage tank system

By Mark Eklund

It is generally easy to think of water as “green.” Water comes from nature. The capture of water, the processes which go into treating water, the storage of water, the product itself—they all give the impression of being green, which is great because increased demand is pushing companies and municipalities to give greater emphasis to sustainability and the environment. The effort to be environmentally conscious is gaining momentum across the spectrum and appears to dominate the future.

ARTICLE SUMMARY

Challenge: Many traditional water storage tanks utilize materials, designs and coatings that are not as environmentally friendly as those of alternative storage tank options.

Solution: Panel-design steel water storage tanks offer “green” benefits, including reduced CO₂ emissions and the elimination of spray-on coating applications.

Conclusion: As has been the case in Grain Valley, Mo., municipalities across the country are discovering steel tanks to be quick-install, sustainable water storage solutions.

But while water itself may be green, what about the equipment used in the storage and treatment of water? Believe it or not, some water storage systems may be greener than others, beginning with water storage tanks.

Steel for Sustainability

According to the American Iron and Steel Institute, it takes a little more than 10 million BTUs of energy to produce one ton of steel. In typical construction for a 500,000-gal steel tank (59 ft diameter by 24 ft tall), a bolted design uses approximately 43 tons of steel, while a field-welded tank uses about 58 tons of steel. Choosing a bolted design saves 150 million BTUs of energy, or the amount of energy consumed by 1.5 American households in one year.

The production of steel produces somewhere around 1.7 tons of CO₂ for every ton of steel. The same steel

tank already mentioned, built using a bolted design, saves roughly 25 tons of CO₂ emissions based on its 25% lighter construction. To see it another way, each gallon of gasoline burned releases 24 lb of CO₂. This savings to the environment is the equivalent of burning 2,000 fewer gal of gasoline.

When comparing the construction materials of tanks, consider that steel is 93% recyclable. Decades down the road, removal and recycling of a bolted steel tank will be more economical and require less energy than its concrete or field-welded counterpart. Concrete may be crushed and recycled and used in the production of new concrete.

Coating Application

Aside from a storage tank’s materials of construction, the tank’s coating—and more specifically, how the coating is applied—has a huge impact on how green a tank is. The release of volatile organic compounds (VOCs) into the atmosphere is a primary source of pollution. The process by which a coating is applied has a significant impact when it comes to VOCs.

Tanks that are factory-welded or that have a bolted panel design receive their coating at the factory. In the bolted design, each panel is individually coated and cured before shipment to the field for construction. Factory-applied powder coatings are 100% solids, which are fused to steel in an oven. This type of coating does not contain VOCs. Bolted panel tanks also receive a urethane topcoat, which contains 0.7 lb of VOCs for each 100 sq ft of surface painting. Blasting material used in the coating process is captured and recycled. Bolted tanks also give off no-weld emissions due to their construction with hardware and gaskets.

Factory-applied coatings are the most environmentally friendly because the coating application is controlled and all particulates are captured and measured in closely controlled conditions. Often a factory-applied coating is durable enough to last more than 20 years, translating to less recoating costs and fewer emissions into the environment.

Steel tanks of welded design must receive their coating on site as part of the construction process. A typical field-applied coating for a welded tank consists of epoxy solids that are suspended in solvents. The tank



A bolted design tank uses less steel than factory-welded tanks, and thus saves 25 more tons of carbon dioxide during construction.

walls must be prepared and sandblasted after welding is completed, and all blast materials must be captured. Overspray from the coating application must be captured. At usual application rates to a field-welded tank, approximately 3.8 lb of VOCs are released into the atmosphere for each 100 sq ft of surface painted.

Capturing all particulates during field application of a coating can be a difficult task when the job site is exposed to natural environmental conditions such as weather, dust, humidity, temperature and wind. In addition, weld emissions or toxic fumes are released during the process of welding a tank together. It also must be considered that field-welded tanks normally require recoating after eight to 12 years.

Whether your water storage needs are for fire protection, public works, industrial or utilities, if sustainability is an important part of your tank choice, consider the alternatives and you will know which type of tank to choose to make your system greenest of all.

Case Study: Grain Valley, Mo.

To meet the growing demand of a population that had doubled in size, the city of Grain Valley, Mo., erected a 774,000-gal bolted-steel water storage tank from Columbian TecTank. Timing of the installation was critical because the region was in the midst of a drought, which, coupled with population growth, put

tremendous strain on the city's water supply.

The installation of the water tank, measuring 74 ft in diameter by 24 ft high, was completed in just two weeks, including the installation of an aluminum dome cover. The panel design of the tank allowed for the quick installation, and the completed tank was put immediately into service, providing needed water to the citizens of Grain Valley.

Although the installation of the tank was quick, the high quality of the tank and its factory-applied coating have had lasting effects. The tank has proven to have excellent corrosion resistance and has not needed recoating. The tank is constructed of expandable and recyclable steel panels, which benefit the municipality in the long run. Because the city chose a panel-design water tank, the coating was applied at the factory before shipping, eliminating the need for sprayed-on coating in the field and the environmental considerations that go with it.

Overall, the city of Grain Valley has been extremely satisfied with the tank it chose. www

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This bolted-steel water storage tank has a factory-applied coating, high corrosion resistance and is constructed of expandable and recyclable steel panels.

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