

WHY CHOOSE WELDED STEEL?

- **Economical:** Low initial cost, unlimited life cycle with maintenance
- **Design flexibility:** Any diameter/height, easy to add accessories or attachments
- **Zero leakage:** Required by AWWA D100 standard
- **Durable:** Easy to repair or modify, easy to re-level if differential settlement
- **Field construction versatility:** Year-round construction in most temperatures, shorter construction schedule reduces residential impact
- **Esthetically pleasing:** Multiple roof styles, decorative architectural treatments, virtually unlimited paint schemes
- **Use QR code for more Steel Facts:**



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Special requirements for concrete and bolted tanks



Steel Facts



NUMBER 4

Choose Steel for Lifetime Value

The water industry has a continual need to assess the total cost of ownership when planning water storage. Such assessment is essential for project selection and long-range planning. It also supports compliance with financial regulations (e.g. GASB Rule 34).

However, the complexity of factors required in lifetime value analysis can be daunting.

Easy analysis: TCO tool

STI/SPFA's Total Cost of Ownership (TCO) online tool is designed to provide reliable results to assess the lifetime cost/value of your water storage tank.

The TCO tool calculates present value of all costs associated with construction and maintenance of the storage tank. The values are based on user input for initial costs and costs for maintenance and renovation activities.



This steel tank in Raymond, Mississippi, has been in continuous use since 1905.

The calculated costs are determined for a 100 year period and an alternate analysis period selected by the user.

Coatings maintenance and renovation intervals are based on industry data and published research and testing results for coatings commonly used today. The data is derived from the ongoing research study presented by NACE International and industry professionals with recent project data.

TCO reports include graphical and tabulated data for the total cost of ownership for each tank type selected, based on the user inputs. Reports include both future cost and net present value cost of each projected maintenance, renovation and replacement activity throughout the selected analysis period.

The TCO tool is available to all users at www.steeltank.com.

Water Tank MYTHS

- **Myth:** "ALL tanks have to be leak-free."
Reality: AWWA standards have an allowable leakage rate for concrete tanks, and don't require leak testing of a bolted steel tank's floor.
- **Myth:** "Welded steel tanks can't be made to be partially buried."
Reality: Welded steel tanks have been successfully designed and installed in partially-buried configurations for at least 25 years.
- **Myth:** "Some tank types are maintenance-free."
Reality: All tanks require maintenance to achieve their design life.
- **Myth:** "Steel tanks must be blasted down to bare metal every 8-10 years."
Reality: Industry research and testing data actually show complete renovation intervals of 20-30 years.

Special requirements for concrete and bolted tanks

Special requirements for concrete tanks in California

California regulations require tanks to be of impervious construction to prevent the movement of water into or out of the tank. AWWA standards for concrete tanks (AWWA D110 and D115) have an allowable leakage rate for the tank as constructed. Therefore, you must specify tank construction in excess of AWWA standards to achieve a tank in compliance with the regulations.

California regulations require that all potable water contact materials (materials of construction such as concrete or coatings, linings, gaskets, sealants, etc.) must be certified in accordance with ANSI/NSF Standard 61.

The concrete mix must be certified or the tank interior surfaces must be lined to meet NSF certification. NSF certification requirements apply to all contact surfaces, including vapor zone above the top capacity level.

Although the California Code of Regulations requires the water system operator to only use materials and products that are certified for compliance with NSF Standard 61, the AWWA standards for concrete tanks (D110 and D115) do not require the use of NSF 61 certified products.

Therefore, for construction of new tanks, **the tank owner must specify that compliance with NSF Standard 61 is required in order to ensure that the tank will comply with California code requirements.**

Special requirements for bolted steel tanks

The cost of replacing original, glass-lined factory coatings on bolted steel tanks is very high. It is assumed that if a glass-lined bolted tank is selected, the maintenance to restore a near-original coating system may require disassembly and recoating plates at the factory.

If coating maintenance, repair or renovation is performed without using the same 'special' coating that was originally shop applied, a total cost analysis must include additional coating maintenance and shortened renovation intervals.

Some bolted tank manufacturers include a sacrificial anode cathodic protection (CP) system in conjunction with their factory applied coatings. CP would not be necessary if the coating was holiday free, so coating maintenance on these types of tanks is obviously required. Future costs of CP system annual inspections and anode replacement are not included in STI/SPFA's TCO analysis.

If cathodic protection system maintenance is not planned, a cost analysis must include increased future costs to account for CP system maintenance and the additional coating maintenance and renovation that will be required for this type of coating.

The bolted seams in bolted steel tanks are required to be made watertight with gasket materials to provide a leak-proof seal. Although many of the joints may require sealant to be made leak-proof, application or re-application of sealant at regular intervals will not eliminate the need to maintain the



Many states require water storage tanks to be impervious. However, AWWA standards for concrete tanks have an allowable leakage rate as constructed. That means tank construction specifications must contain special instructions to be in compliance with those state regulations.

coating system. It would only keep the tank from leaking.

When performing a total cost analysis, be sure to include future costs of replacement sealants in addition to the coating maintenance and renovation noted above.

Field holiday testing of the factory-applied coatings for bolted steel tank is not a requirement of the AWWA standard unless specified. If this step is not performed, when performing a cost analysis, be sure to increase the future costs to account for the additional maintenance and renovation that will be required where holidays and pinholes exist in the original coating system after erection.

SPECIFY STEEL FOR YOUR TANKS AND PIPELINES

- ▶ **HIGH LIFE-CYCLE VALUE**—long-term material strength.
- ▶ **STRONG**—able to handle stresses from all load conditions, including wind and seismic activity.
- ▶ **IMPERMEABLE**—to vapors and fluids of all types.
- ▶ **FLEXIBLE**—adaptable to tank designs of virtually unlimited shape and capacity.
- ▶ **SUSTAINABLE**—more steel is recycled in America each year than paper, aluminum, glass and plastic combined.