

PROTECTIVE
COATINGS
AND LININGS
ADVANTAGES

- Corrosion resistant
- Durable
- Impermeable
- Pure
- Flexible
- Fast curing

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Steel Facts

Number 8

Coatings and linings for water storage tanks

Yes, it's true: **all** water storage tanks require maintenance, and steel water storage tanks **do** require protective coatings and linings as part of their maintenance procedure. As a result, however, they offer benefits that tanks constructed of other materials simply can't provide:

- Exterior surface features, such as logos unique to your community .
- Exterior surfaces with long-term color and gloss retention.
- Interior surfaces with NSF 61 acceptability.
- Interior surfaces that are easy to clean and disinfect.
- Extended service life and reduced life cycle costs.

Corrosion resistance

There is no salt in drinking water and, therefore, no need for water tank linings to resist salt water immersion. But they do, nevertheless.

The same NSF 61 epoxy linings used to protect drinking water tank interiors are also used to protect salt water steel pilings, for example, from corrosion, in winter, summer, and any weather in-between.



Inside Coating System 4: Zero VOC Epoxy (ICS No. 4)

Durability

Exterior coating systems offer substantial UV protection, protection from the effects of condensation, impact and abrasion resistance (hail and wind-borne sand, for example). ISO Standards and NACE International documents support the lifetime value of protective coating systems. These resources can also be used to calculate the Total Cost of Ownership (TCO) of a water storage tank.

Impermeability

It's noteworthy that concrete tanks made in accordance with AWWA D110 and D115 are permitted to leak.

Concrete is porous and, in northern climates, concrete tank surfaces can crack and spall as a result of freeze/thaw cycling. This can expose steel compression wire and steel diaphragms to corrosion.

In contrast, steel tank surfaces are simply unaffected by cold or hot weather. Unpainted steel may corrode, which is why the Steel Tank Institute recognizes the need for coatings, but steel tanks do not crack, chip, spall, or otherwise deteriorate because of temperature fluctuations.

Steel Facts: Coatings and linings for water storage

Purity

All steel water tank interior surfaces are lined with NSF 61 certified coatings that prevent corrosion and protect the purity of water. The interior surfaces of concrete water tanks, on the other hand, while required to be NSF 61 certified in 45 states¹, are often not.

Because these concrete surfaces are uncoated/unlined, they have a rough surface where silt and bacteria can be deposited. Performing Heterotrophic Plate Counts (HPC) is much more important with water stored in concrete versus (painted) steel storage tanks.

According to *Research Study & Results: Biofilm Development on Concrete Surfaces*³, “The porosity and unevenness of uncoated concrete surfaces enhances bacterial attachment and biofilm growth. Biological fouling and some anti-fouling techniques can lead to water quality compliance problems, nitrification risks, and disinfectant residual loss and formation of disinfection by-products.

“Painting interior concrete surfaces in potable water storage tanks greatly reduces biofilm growth and provides better water quality.”³

Pure taste

An added benefit of tank coatings and linings is that systems for tank interiors are available with low-to-zero VOC’s, thus eliminating any concerns over taste and odor problems cause by solvents. Two examples of these coating systems can be found in the AWWA D102 Standard, *Coating Steel Water Storage Tanks*, as Inside Coating System (ICS No. 3) and Inside Coating System (ICS No. 4)².

Flexibility:

FRP and concrete tanks may crack and leak, while steel tanks can be protected with linings that meet AWWA Inside Coating System (ICS) No. 4. These NSF 61-certified elastomeric linings provide high protective film thickness and



Inside Coating System 3 : Zero VOC Polyurethane (ICS No. 3)

elasticity throughout their service life—which is measured in decades.

Such coatings can easily provide 300+% elasticity. Why is that important? NSF 61 certified elastomeric linings are resistant to erosion caused by interior ice layers that form in tanks in northern climates. Concrete tanks, by contrast, may experience erosion of interior surfaces as ice grinds up and down the interior sides of these tanks and “knocks off” the substrate.

Fast Cure

Coating systems, especially ICS No. 3 and ICS No. 4 listed above, contain rapid-reacting components that allow for fast drying, fast curing, and fast placing-in-service. Disinfection of these painted interior surfaces can often be done within a range of four to twenty-four hours.

The appeal of steel

Inside Coating Systems 3 and 4 (ICS No. and No. 4) are considered to have a service life approaching thirty years. These long-lasting lining systems have been

proven to reduce life cycle costs for municipalities and privately-owned water systems.

When used in combination with today’s superior exterior tank coatings, welded steel water tanks are recognized as one of any water system’s most valuable assets.

Is it any wonder that the majority of water tanks in use today—some over 100 years old—are made of steel?

Resources

1. Survey of ASDWA Members: *Use of NSF Standards and ETV Reports*, Association of State Drinking Water Administrators, May 2008
2. AWWA D102-4 Standard, *Coating Steel Water Storage Tanks*. American Water Works Association (AWWA), Denver, CO
3. *Research Study and Results: Biofilm Development on Concrete Surfaces*. Water Systems Engineering, Inc.