



Is Your Tank in Hot Water?

Cold Wall Effect Causes and Solutions

Is the temperature differential between the liquids inside your tank and the lowest outside temperature 70 degrees Fahrenheit or more? If your operation utilizes hot water, the “cold wall effect” may be a very real problem for you. The damage caused by this can lead to premature failure of tank linings, resulting in unplanned downtime, repair or replacement costs, and safety and environmental issues.

The cold wall effect occurs when there is a major difference in temperature between the contents inside a tank and the outside temperature. The hot liquid inside the tank is drawn to the colder exterior temperatures by the same force that heats up the outside of a ceramic mug when it holds hot coffee. This causes the hot liquid to permeate the tank lining at a significantly faster rate than if the interior and exterior temperatures were similar. The greater the temperature differential, the faster the permeation rate.

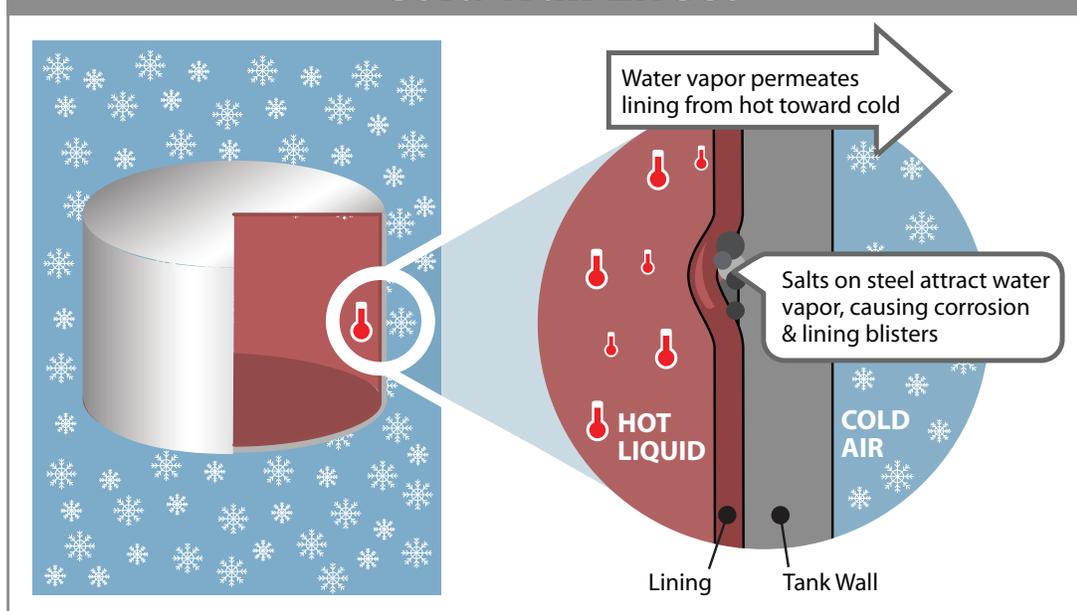
Advantages

- 25 years experience in lining application for chemical transportation
- Offer a wide array of both rubber and spray-on linings
- Technical expertise on recommendations of lining materials
- NACE Level III inspector on staff
- Wide range of protective materials
- Lining inspections and repair estimates within 24 hours

Industries



Cold Wall Effect



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When the hot liquid reaches any salt deposits on the steel, corrosion cells will form and grow. This eventually causes blisters in the lining that will rupture and expose the steel to chemicals and oxygen in the tank.

The following three techniques are often part of Goodwest Linings and Coatings' cold wall effect mitigation program:

1. The primary technique is the removal of soluble salt from the steel surface. Salts such as chlorides, sulfates, and nitrates form corrosion cells when the liquid permeates the lining and reaches the steel. If salts are not present on the steel, a corrosion cell will not form and the water molecule will simply permeate the lining at the molecular level while leaving the lining intact to continue protecting the steel from the oxygen and corrosive chemicals inside the tank. Salts are usually removed from the steel by water jetting at pressures from 10,000 psi to 35,000 psi and using a cleaning agent that dissolves salts.

2. Thick-film linings such as rubber or elastomeric polyurethane will reduce the temperature differential between the exterior and interior of the tank. Not only does a thick film lining serve as thermal insulation from the interior, it will also take the hot liquid much longer to permeate the lining before it reaches the steel. On their own, thick film linings can reduce the temperature differential by about 30° F. With the addition of ceramic brick courses laid over the lining, the temperature can be reduced at the lining interface by 50° F to 100° F.

3. Polyurethane foam insulation on the outside of the tank. As an example, let's say the outside temperature falls to a minimum of 40° F and the liquid inside the tank is kept at a minimum of 150 degrees; this is a 110 degree temperature differential. Polyurethane foam insulation would increase the exterior steel temperature, thereby reducing the temperature differential between the hot liquid inside and the exterior environment. Exterior insulation significantly reduces the rate at which the hot liquid will permeate the lining.

These solutions are crafted to provide long-lasting linings for carbon steel tanks in high temperature environments. Carbon steel-lined tanks cost much less than stainless steel tanks and are stronger and more repairable than fiberglass tanks. The combination of carbon steel tanks and well-engineered linings can provide the most cost effective solution.

About Goodwest Linings and Coatings

Goodwest has installed dependable protective lining and coating systems since 1961. Water, oil, power, transportation, and other key infrastructure providers rely on Goodwest to ensure critical equipment stays in service as long as possible. Goodwest specializes in applying materials resistant to the most aggressive chemical, abrasion, and high temperature environments. Our facility is located in Rancho Cucamonga, 30 miles east of Los Angeles. We perform field work throughout the western United States.

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