



# Catalyst-Based Scale Prevention for Cooling Towers

## Technology Overview

Catalyst-based scale prevention alters the chemistry of hard water to prevent calcite buildup. Scaling is particularly challenging in open cooling towers because as water evaporates, due to exposure to the atmosphere, mineral content suspended in the remaining water becomes increasingly concentrated. When the water's mineral content reaches a point where it can no longer hold the minerals in suspension, scaling results. Consequently, tower water must be flushed periodically, a process known as "blowdown," to minimize mineral build-up. Catalyst-based scale prevention mitigates mineral build-up by transforming calcium carbonate into a soft non-bonding crystal. The technology consists of a single length of pipe with a fixed helical metallic insert. As water flows over the metallic alloy, calcium and carbon form flushable crystals of the inert mineral aragonite rather than calcite.

## Why is GSA Interested?

After a successful evaluation of catalyst-based scale prevention in an electric domestic water heater at the Frank E. Moss Federal Courthouse in Salt Lake City, Utah, GSA will test the technology's efficacy in chilled-water-plant cooling towers. Chilled water plants consume approximately 23% of a building's total water demand, and in some cases, where scale and corrosion control is poor, substantially more. This technology promises to save cooling tower water, eliminate all chemicals used for scale and corrosion control, and reduce ongoing maintenance costs for mechanical cleaning and descaling.

## How Will Success Be Measured?

The test bed will be designed to evaluate the manufacturer's claim that this technology will reduce blowdown by more than 36%, water consumption by more than 13% and the use of biocide chemicals by 25%, all while eliminating scale and corrosion inhibitor chemicals and delivering payback in under three years. Additional criteria to be evaluated include ease of installation (< 2 days) and reduced maintenance costs for mechanical cleaning and descaling. Measurement and verification (M&V) will also evaluate the ease of use for facility operators.

## Deployment Potential

Catalyst-based scale prevention is applicable to any GSA cooling tower with hard water and calcification issues. Cooling towers and hard water are both prevalent within GSA's portfolio— approximately 80% of GSA floor space is conditioned by central plants with cooling towers and 85% of the United States has hard water according to the US Geological Survey.

*GSA'S Proving Ground (GPG) program, in association with the National Renewable Energy Laboratory, is evaluating the real-world performance of Catalyst-Based Scale Prevention for Cooling Towers at a GSA test-bed location. Technology will be provided by NaturalSof.*