



## Railcar Unloading - Sodium Chlorate

### Objective

Unload rail cars filled with sodium chlorate using tempered water to dissolve the  $\text{NaClO}_3$  and create the proper solution strength.

### End User

A major pulp and paper company uses an elemental chlorine-free process for bleaching in their pulp mills. Traditional ECF: replaces elemental chlorine with chlorine dioxide in the bleaching process.

### Design Conditions

Flow Rate:	Up to 1200 GPM [273 m <sup>3</sup> /hr]
Inlet Temperature:	30°F [-1°C]
Outlet Temperature:	190°F [88°C]
Steam Pressure:	60 psig [4 barg]

### Process Challenges

10-20% of product can remain undissolved in railcars and then returned to the chemical manufacturer if the water is not at proper temperature. This company wanted to improve their railcar unloading process by eliminating loss of product due to inconsistent temperature control. They also had to maintain safety restrictions derived from the highly corrosive and hazardous material.

### Solution

The solution was to use a K414AS series Hydroheater® with a 316 body, 2205 duplex head (high nickel alloy) and a titanium stem plug. It now dissolves the  $\text{NaClO}_3$  with precise and consistent 190°F hot water. The Hydroheater replaced competitive direct steam injection heaters that cost significantly more to maintain due to the entire unit being unnecessarily cast in titanium.

### Results

A railcar carries \$50,000-\$60,000 of  $\text{NaClO}_3$ . This pulp mill goes through 1 railcar/day and they have been saving an estimated 10% of \$50,000 (\$5,000) a day, or \$30,000 a week. With the cost of the K414AS, they averaged a two week Return on Investment (ROI).