

SCHOENFELDER, CARL J.*, DENTON, ROBERT J., Hydrite Chemical Company, 300 N. Patrick Blvd, Brookfield, WI 53045. **Improving Sugar End Vessel CIP Results with Specialty Chemical Additives.**

Conventional clean in place (CIP) regiments for high temperature syrup vessels in the beet sugar industry implement some variation of a caustic and/or acid addition protocol. While this protocol remains effective on its own, time constraints that impact plant efficiency and the presence of heavy, difficult deposits present challenges to the conventional approach. Using vapor pressure drop, temperature profiles, inline coupons, and other predictive markers, an accurate prognosis of the internal condition can typically be established without opening the equipment. With fouling severity of the vessel or heat exchanger understood, the CIP solution and protocol can be tailored to yield maximum effectiveness. Chemistries with multiple chelating agents have shown to provide further effectiveness, particularly with calcium carbonate and calcium oxalate. When aggressively targeting the scale, the CIP process is monitored to ensure a sufficient residual level of chelating agent is present, while remaining sensitive to the potential of stripping metal from the equipment being cleaned. In regularly monitoring the specialty chemical cleaning process, the CIP solution is adjusted to optimize deposit removal while still protecting the equipment being cleaned. Three trials at separate beet sugar cooperatives have been conducted in 2015-2016. The augmentation of these chelating chemistries, in conjunctions with improved application guidelines and testing methodologies, have yielded significant increase in the amount of material removed as well as the rate of removal of scale material. This has consequently negated or minimizing the need for high pressure water cleaning, as well as ensuring the equipment is returned to baseline service with minimal downtime.