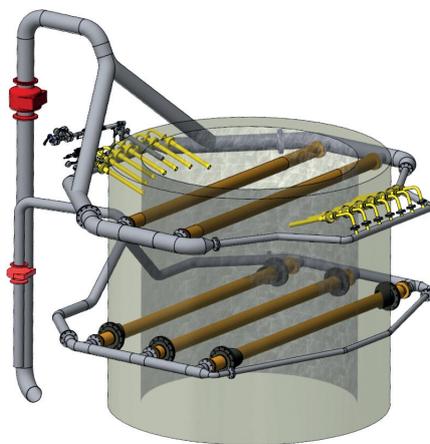


## Construction and commissioning of a GDS kiln for American Crystal Sugar Company, North Dakota/USA

For both environmental and economic reasons, natural gas is becoming the most important fuel in the beet sugar industry. In addition, the need for higher production capacities, especially in the USA, is leading to consideration of new or modernized lime kilns. The largest US beet sugar cooperative, American Crystal Sugar Company, commissioned German lime kiln specialist Eberhardt Schwab GmbH to build a new natural gas-fired kiln.

The kiln built for American Crystal Sugar Company at its Drayton (North Dakota) facility was successfully commissioned in February 2021. The kiln is equipped with the GDS combustion tube system patented by Eberhardt Schwab GmbH. This system can be used for new plants as well as for retrofits. The Drayton plant was built for a nominal throughput of 216 t/d CaO, but the design is already geared for higher capacity and therefore the kiln can easily be expanded to 270 t/d CaO. This through-



Type lime kiln (Source: Eberhardt Schwab GmbH)

put is achieved with a shell diameter of 4.3 m at a working shaft lining height of 12.7 m. By way of comparison, a coke-fired kiln having the same throughput requires a diameter of at least 6.5 m with a shaft height of 27 m.

Four pilot burners ensure reliable ignition of the main burner system. These preheat some of the limestone inside the kiln to the ignition temperature of

the natural gas, thus enabling safe and reliable start-up of the burner system.

Despite outside temperatures of as low as  $-30\text{ }^{\circ}\text{C}$ , startup went smoothly. An important safety feature is the fast-response detection of the  $\text{CH}_4$  content in the exhaust gas. In addition, the  $\text{CO}_2$  content of the exhaust gas is a reliable indicator of the correct temperatures inside the furnace, which thus allows the pilot burners to be switched off.

After a short time, the kiln was able to supply the factory reliably. The improved quality of milk of lime as well as kiln gas had a direct influence on the juice purification immediately after the changeover.

In the future, due to the advanced control system only the desired throughput has to be selected. Air and fuel quantities are automatically adjusted to the lime throughput. With minimal effort, the plant can also be adjusted to changes in raw material quality, thus a consistently good product quality is ensured.