10th North American Waste to Energy Conference
ASME 2002
NAWTEC10-1017

Saving Energy with Brick, Refractory, Insulation and Lagging

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Abstract

For the refuse-to-energy industry, *"Saving Energy with Brick, Refractory, Insulation and Lagging (BRIL)"* is as simply as understanding it's refuse boiler. A refuse-fired boiler has many components to make it do what it is supposed to do. BRIL is a key component of the boiler just as important as the tubes that carry the water &/or steam, the soot blowers that keep the unit free of fly ash or dust, the burners that burn the fuel efficiently, the economizers that recover heat and pre-heat the water, and many more such systems found on, in and around the boiler. They all help keep the boiler operating thermally and energy efficient. Proper BRIL material selection and installation can have an energy savings of 5-7% per year in fuel consumption. That is why experts say, "brick, refractory, insulation, and lagging (BRIL) installed to save energy, saves money at a rate that is essential for efficient plant operation."

Background

The boiler is at the epicenter of the entire refuse-to-energy industry. Not only is the boiler important for burning refuse, mass or refuse-derived, it also acts as an energy source supplying steam and electricity. It would than seem appropriate that the plants would want that valuable resource to be as energy efficient as possible. To obtain peak energy efficiency, the refuse-fired boiler must have the proper brick, refractory, insulation and lagging, the true energy saver.

To help us understand, and appreciate the BRIL that exists on the refuse-fired boilers of today it is helpful to see how the designs of the boilers and the bril changed over time. For this paper, we shall follow the development of the Kraft Recovery boiler, which was the first type of boiler to use solid waste (of a sort) as its main source of fuel. The Kraft recovery process was developed in Danzing, Germany in 1853. In 1907, the Kraft recovery process was introduced in North America. By 1929, G.H. Tomlinson and Babcock & Wilcox Canada had designed and supplied the first Tomlinson boiler. This black liquor recovery boiler had refractory furnace walls. Later, around 1934, a completely water-cooled design was developed.

The BRIL design on the recovery boilers changed as the tube construction changed. As the mill's smelt requirements increased so too did the recovery boiler. As the boiler increased in size, pressure, and temperature more was expected of the refractory and insulation being used on the recovery boiler.