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OEM standardises using ABB drive to improve boiler range efficiency

ABB machinery drive chosen by boiler maker after embedded control loop helps stabilise boiler control and improve system efficiency.

An improvement in the pumping accuracy of water feed within industrial boilers has led to Byworth Boilers standardising using an ABB variable speed drive (VSD) to enhance the efficiency of its products.

A boiler needs to provide a constant flow of feed water to its heat exchanger. At the same time, steam is often tapped to meet the demand for process steam in some applications. This causes the temperature, pressure and flow rates of water and steam to constantly change. Yet in some applications, particularly in food production, a stable water level is critical for boiler efficiency and vital for the process.

Working alongside the ABB authorised value provider, Halcyon Drives, Byworth's control system engineer, Jason Atkinson, identified the proportional integral derivative (PID) loop control as a way of stabilising the water and steam flow when built within the VSD.

PID control is a mathematical algorithm that measures a range of parameters such as water and steam temperature, flow and pressure. It then calculates the optimum speed at which the pump's motor should operate for the best boiler water flow rate to maximise the efficiency of the complete boiler system. As the demand for steam varies in the process over time, the PID controller alters the supply rate of the water entering the boiler. This ensures the boiler uses the correct amount of energy to heat the water to meet the actual steam demand of the process. By maintaining a more stable water level, the boiler is no longer filled with a mass of 'colder' water and attains a much more consistent steam supply.

The VSD and the PID controller work together by maintaining pressure behind a feed water valve based on feedback from a pressure transmitter. It also takes feedback from the boiler water level measuring instrument, typically a guided wave radar.

Byworth Boilers manufacture steam, hot water and waste heat boilers, with capacities ranging from 250 to 18,000 kg/hr. Each boiler is fitted with an ABB machinery drive, ranging from 1.1 kW to 20 kW, dependent on the boiler flow rate.

"The ABB drive with PID loop control gives much more control over the water pump, for example allowing us to turn down speed and change valve position to account for differing water feed demand," explains Atkinson. "We have now standardised on the ABB machinery drive, giving true closed loop control on all our boiler products supplied to our customers. Having better control makes the customer's plant safer by ensuring that it stays within safe operating temperatures and pressures."

As one of Europe's leading manufacturers of industrial boilers, Byworth Boilers, based in Keighley, West Yorkshire, makes up to 100 boilers per year for use in breweries, distilleries, healthcare and petrochemicals.

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products. As title partner in ABB Formula E, the fully electric international FIA motorsport class, ABB is pushing the boundaries of e-mobility to contribute to a sustainable future. ABB operates in more than 100 countries with about 147,000 employees. www.abb.com



Caption: An ABB drive is helping Byworth Boilers bring greater control to its boilers and more efficiency to its customers.

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