



Southern Africa Case Study:



www.bokomofeeds.co.za

With an annual fuel bill rocketing ever skywards, Jacques Willmot, Factory Engineer at Bokomo Feeds in Malmesbury was under pressure to contain his boiler running costs. He was already using a fuel additive to improve combustion and keep the boilers clean, but he is always looking at new technologies.

The site uses two John Thompson steam boilers, both in excess of 16,000 lb/hr steam production to satisfy the plants steam demand on a run and stand-by basis. Both boilers were installed with modern fully modulating Riello Burners.

In addition to fuel savings Jacques had two concerns; intermittent lockouts on the boiler caused by vibration on the burner mounted control panel and corrosion to the silos on site positioned behind the boiler stacks caused by the sulphur in the boiler exhaust gases.



Bokomo Feeds Plant in Malmesbury.

In October 2001 the **Autoflame Combustion Management System** features and benefits were presented to Jacques Willmot. Each facility within the system addressed his various concerns over the shortcomings of the existing mechanical modulating controls.

Autoflame Modulating Burner provides:

- Independent servomotors directly coupled to the fuel valve and air damper to an accuracy of 0.1°.
- Microprocessor used to store paired fuel and air positions.
- Stainless steel damper blades with sealed bearings for airtight shut-off and smooth repeatable operation.
- Rose joints for precise positioning.
- Positive drive 'v slot' valve for oil regulation.
- Simple hydraulic nozzle pin shut-off control.
- Separate wall mounted control panel with pre-wired clip-on industrial connector.
- Full lockout and error log of the last 16 events stored with time and date stamp, and reset time.
- Full flame supervision using patented self-adaptive UV amplification.

Riello P450 Burner converted to Autoflame Specification.



One Monday morning after 6 months in operation, Jacques Willmot received a call from the account's office to enquire why they had used 3000 litres more than normal over the weekend. A quick investigation revealed that the stand-by boiler with mechanical controls had been on-line revealing a stark comparison in efficiency between the two systems.

Based on the benefits and savings shown at Bokomo Feeds in Malmesbury two of the other largest steam consumers in the Pioneer Group have converted their boilers to Autoflame control – Ceres Fruit Juices in October 2002 and Craft Box in July 2003.



The **Autoflame Combustion Management System** provides many additional features made possible by the simple programmability of the modern microprocessor:

- **Optimum ignition position** – traditional burners have a common start and low fire position. However once a boiler has reached thermal equilibrium it is possible to maintain a smaller flame and therefore increase the burners turndown ratio. Very important when controlling a steam boiler to the requirements varying process demands. Each time the boiler switches off and back on again, cold air is blown through the boiler that one is ultimately trying to heat up. This continual cycling not only produces thermal stresses on the boiler shell but wastes unnecessary fuel.
- **Fuel flow-metering software.** Using the microprocessor and through a simple commissioning process the **Autoflame** controller is able to calculate an instantaneous and totalised fuel flow for each position of the oil control valve. This software facility has proven to be as accurate as most meters available on the market today.
- **Second setpoint facility.** During evening and weekends, when production is at its lowest demand, the **Autoflame** unit provides a simple mains input to actuate a second reduced setpoint. This keeps the boiler warm and produces sufficient heat to maintain the plant without consuming vast quantities of fuel to maintain an unnecessary 10 bar pressure.

In May 2002 the **Autoflame Combustion Management System** was installed on the John Thompson P160 Multipack. The existing mechanical Riello P450 burner was removed from site during the annual boiler maintenance period. The burner was completely stripped down, and;

- The aluminium casting was shot-blasted and re-sprayed,
- The windbox was stripped, welded, sprayed and installed with bearings, stainless steel shafts, damper blades, rose joints and an **Autoflame** actuator
- The fan wheel was removed, cleaned and re-balanced
- The fan motor was re-conditioned with a full 6 month warranty
- The pump was cleaned and pressure checked.
- The heaterpack was replaced as the chores were deemed to be blocked beyond repair.
- The sliding bars were acid dipped and nickel-plated.
- The cast iron head was shot-blasted and repainted.
- The diffuser was renewed.



Boiler No.1



New Control Panel

All the remaining mechanical and electrical parts were removed and replaced with the new **Autoflame Combustion Management System** which included – UV flame sensor, v slot oil valve and actuator, hydraulic single nozzle carrier, ½” safety solenoids, 1/8” control solenoids, nickel plated pipework, 3 pressure gauges for pump pressure, nozzle pressure and return pressure.

A new wall mounted control panel was installed containing the **Autoflame** Mk6 Evolution module with all necessary relays and interlocks to control the safe start-up and operation of the boiler

The existing boilers followed a 10 minute cycle of on, high fire, low fire, off. Once the new installation was commissioned and before the engineer left site he watched the burner modulate up and down tracking the load for a full 2 hours without turning off.

**For Further Information,
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