ELECTRONIC CONTROL FOR BETTER COMBUSTION

Terry West, business manager at ETC, believes effective combustion control can reduce emissions by 10 per cent and save thousands of dollars a year

Lets start with some facts. Typically, combustion of 1 m3 of Natural gas in an industrial boiler produces 2.03Kg of CO2, and 1 KWh of electricity generated in a gas fired power station produces 0.420Kg of CO2.

It is not unusual for an industrial burner/boiler to use in excess of 150,000 dollars of fuel pa and to directly emit 15,700 Tonnes of CO2 pa. If the electricity used to power the burner fan is taken into account then the total CO2 emissions caused by a single burner of this size are in the region of 15,750 Tonnes pa

It makes good sense to conserve fuel and by improving efficiency we can reduce CO2 emissions and process/heating costs. A wise choice of combustion control could save several thousand dollars a year and reduce emissions by up to 10 per cent.

Qualifying for the UK government's enhanced capital allowances and meeting the latest safety standards these combustion controls are often customised for each burner manufacturer to ensure that the unique design features of each burner are fully realised. Integration of burner and boiler control into a small electronic controller removes the need for vast cabinets, lowering capital cost and improving space utilisation.

On an electronic control, the low fire point can be set lower than the ignition point which means that the turn-down ratio can be increased and burner on/off cycles and their associated cold air purges reduced. Savings of 5 per cent have been reported on a burner that prior to conversion had an on/off frequency of approximately once every 10 minutes.

If a plant does not run continuously then a second modulation control setpoint can be used to switch the boiler to a lower steam pressure or hot water temperature during periods of reduced activity. One manufacturer employing this approach is LandRover in Solihull. The company uses hot water for paint drying but the process is held on stand-by at night. Using a second boiler setpoint provides LandRover energy savings of approximately 10 per cent pa.

When oxygen trim is employed oxygen levels can be trimmed to their optimum level. This process automatically and continuously compensates for the variables that affect efficient combustion.

AN ADAPTIVE TRIM SYSTEM WILL CONTRIBUTE ENERGY SAVINGS OF APPROXIMATELY 3 PER CENT.

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Some air dampers leak and even when fully closed the air flow can be significant. Combustion efficiency can be improved at low fire if the fan speed is reduced. By adding fan speed control burner turn-down can be increased further without compromising low fire efficiency, and additional fuel savings can be achieved. Also, when an inverter is used to slow the speed of an ac electric motor, electrical energy savings result. For example, when a fan motor is slowed to to half speed an 80 per cent electrical energy saving is achieved and emissions at the power generation plant reduced.

Electronic control facilitates direct driving of the fuel valves and air dampers resulting in no wear/backlash and on frequently modulating burners additional energy savings of up to 1 per cent are common.

Finally, boiler sequencing control enables the plant operator to achieve better utilisation through matching of boiler output to demand

More efficient combustion in industrial burners conserves fuel, lowers emissions, reduces plant operating cost and prolongs the life of the boiler plant.

Benefits for the burner manufacturer

- Full integration
- Outstanding control flexibility
- Increased performance
- Improved reliability
- Lower cost
- Small size
- Simplified wiring

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