Technology Portrait:
Doosan Lentjes Combustion Control

The task
The combustion control is used to operate the grate and boiler fully automatically considering changing fuel quality using intelligent control loops, so that:

- Legal minimum requirements for the operation of the combustion are met under all conditions,
- Steam output and electricity as well as heat generation are kept at a constantly high level and are only subject to minimal fluctuations,
- Combustion-related primary emissions in the flue gas (CO, TOC, NO_x) are minimised,
- The fly ash carry over from the combustion chamber is minimised,
- Grate and fly ash are optimally burnt out,
- Plant components are operated with low wear,
- A high level of plant availability is achieved

Usually, a wide range of sensors are used for this purpose, such as temperature, pressure and volume flow measurements as well as flue gas composition analysers, which provide signals about the operating status of the system.

Optimised design
Doosan Lentjes also uses advanced temperature detection in the combustion chamber and boiler to record valuable data for an intelligent combustion control; camera signals are also analysed.

The combustion control automatically derives suitable corrective measures by means of setpoint adjustment and thus ensures compliance with the performance data specified by the operating personnel. Additional data is calculated from measured values, e.g. the calorific value of the fuel, which also contributes into the control system.

The combustion control ensures stable and low-emission operation of the system by regulating the fuel and air supply, the feed water supply and, if necessary, the flue gas recirculation. Optimum firing position and good output are achieved by harmonised control of the fuel feeder and individual grate speed for each grate segment. For primary and secondary air, both the temperatures and the distribution to the various air zones are adjusted depending on the fuel and load.

Technically, the combustion control is realised either in a separate process control unit (black box) or directly in the central control system of the plant. Doosan Lentjes supplies all the necessary function descriptions, control loops and logics; depending on the agreed scope of delivery, the entire hardware and software is also supplied. The detailed settings (setpoints, control characteristics, etc.) are based on the extensive experience gained from many years of reference plant operation.

The processes are visualised on monitors in the control room so that the operating personnel are constantly informed about the status of the system and can intervene in a targeted way if necessary. Doosan Lentjes engineers can also monitor the proper operation via remote data transmission and provide support to the operating personnel if required.

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Features of the Doosan Lentjes combustion control system:

- Ensured compliance with the legal requirements for the operation of the combustion
- High and constant steam output and thus electricity and heat generation
- Low primary emissions in the flue gas (CO, TOC, NO_x) and fly ash
- Optimum grate and fly ash burnout
- Low-wear system operation and high system availability
- Extended temperature detection in the combustion chamber and boiler