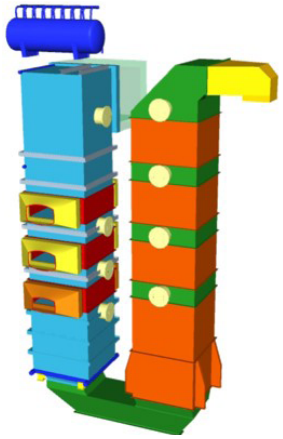
Technology portrait:
Doosan Lentjes Steam Generator with integrated Air Preheater

Even if the focus of thermal sewage sludge treatment is on processing sewage sludge for the recovery of phosphorus as a valuable material, the effective utilisation of the energy contained in the fuel is becoming increasingly important and therefore requires careful planning of the steam generator.

Our knowledge gained from several decades of boiler construction and operating experience in thermal sewage sludge treatment has led to the development of selected boiler concepts with and without integrated air preheaters, which are characterised by high efficiency and flexibility with regard to the individual project-specific framework conditions as well as compact design.



The task

From a thermodynamic point of view, the task of the steam generator downstream of the bubbling bed combustor - regardless of the selected concept - is to transfer the heat from the combustion to water, which is heated (economiser), evaporated (evaporator) and then superheated (superheater) and to the combustion air for preheating, if required.

The heat transfer cools the flue gas from the combustion temperature to a flue gas temperature that is suitable for separating the ash used for phosphorus treatment and the flue gas cleaning system downstream of the steam generator. The heat from the incineration is thus utilised, for example, for sewage sludge drying and/or in a water-steam-cycle.

Depending on the sewage sludge properties, it may be necessary to integrate an air preheater to raise the combustion air temperature for a safe autothermal combustion process. This results in a stable combustion process due to the higher variability in the air temperature.

Optimised design

The requirements that need to be taken into account in the thermal design of a modern steam generator are diverse and have a significant impact on the design. Overall, these can be summarised as follows:

- Compliance with legal regulations and ordinances - if possible, without the use of support fuel,
- Creating a reliable concept, such as lowering the flue gas temperature before it enters the superheater heating surfaces, avoiding temperature and flue gas velocity peaks or imbalances, taking ash quality into account when arranging the economiser heating surfaces and high variability in the temperature of the combustion air as well as compact design,
- Minimisation of investment and operating costs, i.e. use of materials that are as simple and inexpensive as possible, long service life for the convection heating surfaces, simple production and installation as well as ease of maintenance

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The advantages of our Doosan Lentjes steam generator with integrated air preheater at a glance:

- ▶ Maximum flexibility with regard to individual customer requirements
- ▶ Consideration of the respective project and site-specific conditions
- ▶ Ensuring autothermal combustion while taking into account the rheological fuel properties
- ▶ Reliable and cost-effective components with a compact design
- ▶ Long-term and reliable fulfilment of tasks with high efficiency and the lowest possible maintenance requirements