

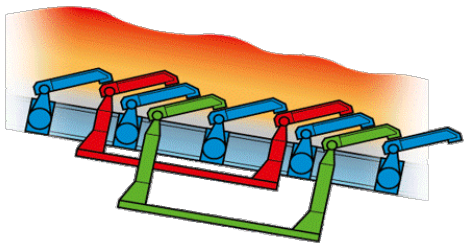
Technology Portrait:

Doosan Lentjes Grate Combustion (Reciprocating Grate)

The grate firing system is the heart of every thermal treatment plant for waste-based fuels. It has been proven for decades and has been continuously further developed at Doosan Lentjes to achieve high efficiency, high availability and a long service life, which are crucial for economical plant operation.

The wide range of fuels and the ever-changing properties during operation in terms of piece size, calorific value, water, ash and pollutant content require maximum flexibility in operation and an extremely robust design.

Today's high demands on energy utilisation, ash quality and emissions as well as availability are met by the Doosan-Lentjes grate-based furnaces thanks to the unique counter-reciprocating design, which ensures excellent stoking and air supply through the reciprocating movement of the movable, inclined rows of grate bars.



The supply of combustion air is adjusted depending on the fuel and takes place in five zones per grate lane, which are regulated independently of each other. Since the air is only blown through the head of the grate bars into the combustion bed the grate bar is optimally cooled on the one hand, on the other hand the air supply is independent of the movement of the grate bars.

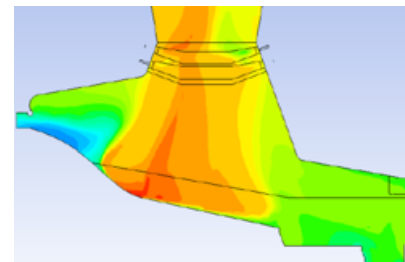
The Doosan-Lentjes grate consists of several segments whose drive speed is individually controlled. In conjunction with the inclined position of the front grate segments, the fuel is transported by the movement of the grate bars from the feed to the horizontal burnout segment and on to the ash discharge. A lintel between the main combustion zone and the burnout module supports the safe burnout of the grate ash. The speeds of the hydraulic drives of the grate and feeding system (feeder) are adapted to the fuel characteristics so that an optimum bed height and position of the fire on the grate is set.

The Doosan Lentjes grate combustion systems have a modular design and consist of one or two lanes. The grate, which consists of prefabricated and easy-to-assemble grate segments, is subjected to a functional test before delivery.

Water-cooled grate plates are used for consistently high calorific values, which minimises the temperature and wear of the

grate bars. The energy extracted in the process is recovered for steam generation, e.g. by preheating the combustion air.

An optimised combustion system also includes the customised design of the combustion chamber and the combustion air system. Doosan Lentjes simulates the entire combustion process using CFD and optimises the air distribution and preheating under the grate as well as in the secondary air zone and, if necessary, in the flue gas recirculation. The results are incorporated into the design of the combustion air system, the combustion chamber geometry and the lining of the particularly stressed and corrosion-prone areas.



As a result, high efficiency and complete burnout of gases and ash can be achieved. At the same time, the flue gas velocities and temperatures are kept at a comparable level, resulting in low-wear operation and ensuring compliance with the statutory minimum retention time of two seconds at 850°C.

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Features of the Doosan Lentjes grate combustion system:

- ▶ Throughput capacity of up to 55 tonnes per hour per line
- ▶ Low primary emissions in the flue gas (CO, TOC, NO_x) and fly ash discharge
- ▶ Very good grate ash and fly ash burnout
- ▶ High steam output and therefore electricity and heat generation
- ▶ Low-wear system operation and high system availability
- ▶ Assured compliance with legal requirements for temperature and retention time

