Pulverized Fuels and Biogas

Burner output	1x 40 MW
Fuel	pulverized lignite
Additional fuel	natural gas / biogas
Control range pulv. lignite	1:3

Drying Processes with Pulverized Fuels

Sugar Plant Jülich (Germany)

Reliable firing at minimal operating costs

In times of uncertain heat markets fuels that have not been utilized up to now and are able to replace conventional standard fuels become interesting – given maximum availability and unbeatable low operating costs. The example of the Jülich sugar plant shows that pulverized coal can also be used reliably in critical processes and the investment costs are amortized within an extremely short time.

The plant installed in Jülich serves the function of drying sugar beet chips that are generated only a few weeks a year in the so-called sugar beet campaign. In addition to the actual drying with SAACKE SSB-D dust burners, harmful waste gases are subjected to thermal after-treatment, thus ensuring reliable compliance with all limit values according to the TA Luft (Technical Instructions on Air Quality Control) even under unfavorable conditions.
The heart of the chip drying system consists of two separate high-temperature drying units, one of which provides 80 % of the drying capacity. The capacity of this plant corresponds to 40 t of water evaporation per hour. The second high-temperature drying unit covers peak loads and is run according to need. The two driers have to adhere to a tight temperature window and dry the beet chips at a temperature of 750 °C. This precise temperature control not only protects the dried material, but also enables parallel disposal of harmful waste gases.
Carbonatation gases containing ammonia, whose emission values were lowered in the current TA Luft, are generated during further sugar production. In the past these waste gases were in most cases condensed or washed (acid washing – absorption) and caused substantial costs with this process.

Integrated thermal exhaust air purification

- Significant cost reduction
- Precise temperature control
- SNCR eliminates waste gas containing ammonia
- TA Luft limits are complied with reliability (NO_x < 200 mg/m³)

The Selective Non-Catalytic Reaction (SNCR) process implemented at the same time as the new plant takes place while the drier is running. Dosed exactly, the waste gas containing ammonia flows into the hot gas generator of the drier and reacts continuously with the nitrogen oxides in the burner waste gas, forming nitrogen dioxi-

SAACKE GmbH | Unternehmenszentrale Bremen: Südweststraße 13 | 28237 Bremen | Deutschland | Tel.: +49 421 6495 0 | Fax: +49 421 6495 5224
Kontakte weltweit: www.saacke.com | E-Mail: info@saacke.com
0-0750-0021-02

de and water. This reaction takes place stably within a temperature window of 900 – 1100 °C and lowers the emission values for NO_x and ammonia substantially below the stringent limits.

SAACKE hot gas generator during installation

Furthermore, the previous disposal costs for the reaction products are eliminated completely.
The precise quantity control of the waste gases containing ammonia flowing into the hot gas generator enables additional regulation of the drier temperature so that the maximum temperature of 750 °C can be maintained.

SSB-D: rugged and versatile

The firing plant for both driers is composed of an adapted SAACKE SSBG-D swirl burner. This burner with an output of 40 MW burns pulverized lignite and is based on the proven combustion technology for industrial and power station applications.
In principle, the rugged design is suitable for all fuels and it generates a broad, short flame that can be adapted to any furnace geometry. Because of the greatly swirling main air, the flame is exceptionally stable and offers a large control range.
Compared to the previously used heavy fuel oil firing plant, the burnout of the installed burner is extraordinarily high at over 99.5 % and significantly prolongs the maintenance intervals of the system.
The SSBG-D adapted for Jülich offers an additional important advantage: it can be alternatively operated with biogas from an existing biogas plant. This not only provides for environmental relief, but also additionally reduces the already low operating costs.

SSBG-D with gas ring (yellow)

The plant in Jülich was designed within only 7 months, installed on site and set into operation. Production was launched again smoothly without test operation.

Summary

The changeover of firing to pulverized lignite has a number of advantages in operation in addition to security of supply, low price and easy storage in an inerted silo. This solution is characterized by long maintenance intervals and a high degree of availability. Simultaneous after-treatment of waste gas containing ammonia is a classic win-win situation. It provides relief for the budget and the environment alike.

Functional features

- High degree of availability and rugged technology
- Minimal fuel costs
- Large control range
- Alternative fuel: biogas
- Exceptionally short project period of only 7 months
- In addition: thermal utilization of waste gas containing ammonia

Technical data

Application	Dryer with SAACKE hot gas generator
Burner model	SSB-D
Burner output (max.)	Pulverized lignite: 40 MW Natural gas: 10 MW Biogas: 3 MW
Pulverized lignite	
Emissions value	NO_x: < 200 mg/m³
Lower heating value (LHV)	23 MJ/kg
Control range	1:3, realized with automatic dosing resistant to pressure surge
Natural gas	
Emissions value	NO_x: < 100 mg/m³
Lower heating value (LHV)	36 MJ/m³
Amortization period	< 3 years

For further information, please visit: **www.saacke.com**

SAACKE GmbH | Head Office in Bremen: Südweststrasse 13 | 28237 Bremen | Germany | Tel.: +49 421 6495 0 | Fax: +49 421 6495 5224
International contact details: www.saacke.com | e-mail: info@saacke.com