



Using pulverized coal as energy, safely adhering to emission limits

*SAACKE CONOX UCC system for energy
production in China*

CONOX UCC

Energy and heat suppliers

Since 2017, in urban areas of China, a NO_x limit of 100 or 150 mg/Nm^3 applies at 9% O_2 for coal combustion at new energy production facilities with an output of $< 65 \text{ t/h}$. The specifications for SO_2 (50 mg/m^3) and dust (10 mg/m^3) were tightened as well. These regulations are therefore still well below the strict standards of the EU. In the Middle Kingdom, coal continues to play a significant role in generating energy. However, numerous existing facilities are equipped with inefficient grate-fired furnaces – limited output, slow modulation, poor efficiency and high NO_x values are the consequence.

Low NO_x -Emissions, maximum efficiency

SAACKE developed the burner system CONOX UCC (Ultra Clean Combustion) especially for use in Chinese coal power and heating plants. High flame stability, a sophisticated flue gas recirculation, staged combustion and an optimal dust-oxygen ratio enable the energy from the pulverized coal to be safely under the required NO_x emission limits and at a very good burn-out of $>99\%$. At SAACKE, “Made in Germany” combustion engineering is combined with the know-how of engineers in Shanghai, Qingdao and the entire SAACKE service network in China. Training sessions for boiler operators at the company's own headquarters in Qingdao can also be offered on request.

All benefits at a glance

- Reliably below the emission limits* (with secondary measures)
- Reliable, economic use of pulverized lignite or coal dust
- Principally compact and stable flame for compact furnaces
- Large control range at maximum burn-out
- Reliable and approved dust dosing system
- Standardized, but flexible burner management system in line with requirements
- Various capacities available
- Price advantage over natural gas and fuel oil as well as independence from market fluctuations of raw materials prices
- Reference facility in Qingdao is available for customer visits

* Compliance with regulations depends on the necessary coal qualities and the furnace geometry, which SAACKE communicates to the boiler manufacturer. Estimates and guaranteed values on the coal quality can only be provided after a successful measurement run in the SAACKE test facility.

The SAACKE solution in detail

High combustion temperatures generate more/higher NO_x -Emissions. To reduce downstream secondary measures to a minimum, the SAACKE technique avoids peaks in flame temperatures and generates a homogeneous distribution of heat in the flame. Thanks to intelligent staged air supply, swirled combustion air and a special dust lance in the burner, the coal dusts are fired evenly. Natural gas or propane is required only as ignition fuel. The scope of supply of the coordinated overall CONOX UCC system, in addition to the burner, also includes a fail-safe SAACKE se@vis control, SNCR with urea injection and an explosion proof dust dosing system. With its modular construction, the system is also available as a combination-type burner with either natural gas or fuel oil as a secondary fuel.

Conclusion

Using pulverized coal for low-emission and economical heat generation, the SAACKE CONOX UCC system makes a contribution which has no competition. With more than 30 years of dust firing experience within Europe, we are now turning our sights to the most recently installed test facility in Qingdao which is also available for customer visits. Also developed at the Chinese site: The SAACKE LONOX UCC system which represents our competency in the area of low NO_x combustion with natural gas.

Technical data: CONOX UCC

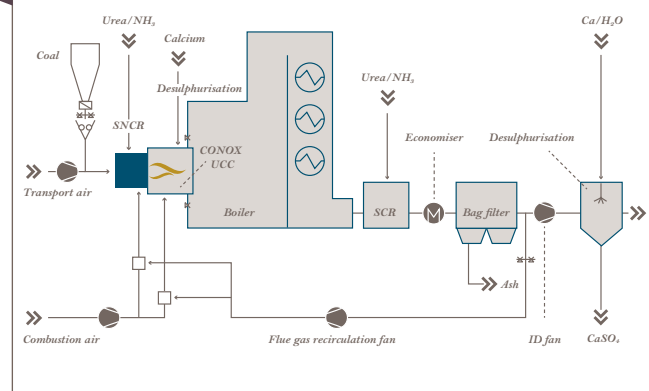
Applications	Steam and hot water boiler
Burner capacity (max.)	4 - 64 MW*
Fuel	Pulverized lignite or coal, natural gas and oil
NO_x emission values	100 - 250 mg/m^3 at full load depending on fuel-nitrogen content (with SNCR 100 or 150 mg/m^3)**
Heat value	15 - 30 MJ/kg
Control range	1:3 (1:4 possible)

Dust requirement for coal combustion***

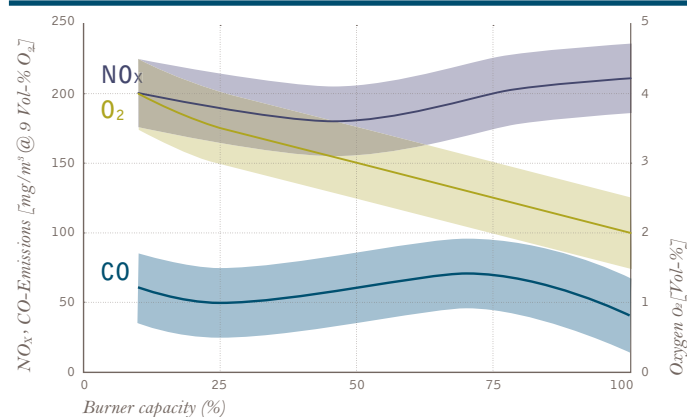
Grain size	100% < 200 μm , 90% < 100 μm
Sulfur and nitrogen content	< 1%
Ash content	< 15 %
Ash softening temperature	> 1,150 °C
Volatile constituents	> 30%
Moisture content	< 10%

* Burner sizes 160, 320 and 640 vary in terms of capacity, weight and size. ** Depending on coal quality and system concept, NO_x emissions of 100 - 250 mg/m^3 at 9% O_2 are possible. *** Dust in this context is defined as a solid material with a maximum grain size of up to 0.2 mm. The above-mentioned coal qualities should be available for the CONOX combustion and thus the adherence to the regulations. Estimates and guarantee values can only be given after successful test run in the testing facility. In this connection it is important that the subsequent boiler maker adheres to the specifications of the furnace geometry given by SAACKE.

Example diagram of an executed CONOX UCC



Emissions diagram



CONOX UCC

