



Blast furnace gas (BFG) combustion without supporting fuel

Burner output	2x 11 MW (each boiler)
Heating value BFG	2.8 – 3.6 MJ/m ³
Pressure BFG	40 – 60 mbar

Lean Gas Burner

ArcelorMittal Bremen GmbH, Steel Plant (Germany)

Thermal utilization of lean gas instead of burning it off

Burning off lean gases with a low heating value was a typical picture of steel plants in the past. They generate large volumes of gases with a low heating value, like blast furnace gas, as a by-product of steel smelting.

Thermal utilization of lean gas with an extremely low heating value is now possible with burner technology from SAACKE – without any supporting fuel.

Thanks to use of this new technology, ArcelorMittal Bremen GmbH (formerly Stahlwerke Bremen) saves around 6.8 million standard cubic metres of natural gas every year. As a consequence, the company's energy costs dropped by about 2.3 million euros in the first year of operation. Beside that, CO₂ emissions were reduced by approx. 8 400 tons annually. In this way Arcelor Mittal was able to make a major contribution to environmental protection using the SAACKE firing plant. Thus, it is hardly surprising that a second ArcelorMittal boiler plant with SAACKE SSB-LCG lean gas burners was installed immediately.



ArcelorMittal Bremen GmbH – SAACKE realized the lean gas firing system

Facts

- Outstanding low emission values
- Without supporting fuel at LHV \geq 2.7 MJ/m³
- Extremely low pressure requirements for lean gas of 40 mbar at firing chamber backpressure of 25 mbar
- High degree of availability
- Large control range
- Exceptionally short flame
- Natural gas used as optional fuel
- Fuel-air ratio control with heating value and CO₂ correction

The SAACKE solution in detail

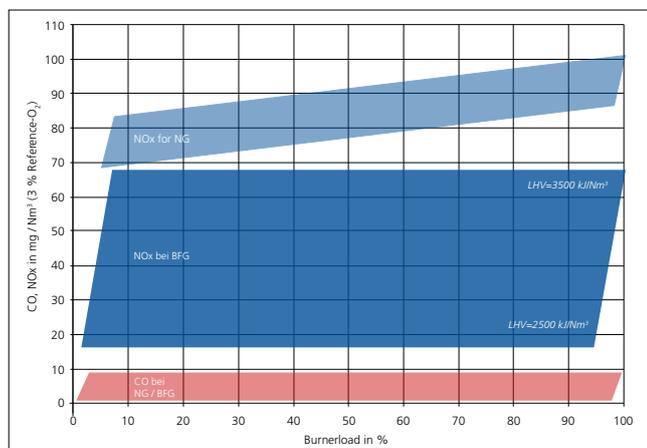
The lean gas firing system consists of a SAACKE SSB swirl burner with a special burner muffle into which gas with a low heating value is fed. The burner thus achieves nearly emission-free combustion without any supporting fuels.

A fuel with a high heating value (here: natural gas) is required only to start up the plant. As soon as the burner and its muffle have reached the operating temperature, the starting fuel is no longer necessary. After only a short time the flame burns solely with lean gas.



This is how clean a SAACKE lean gas burner burns; „energy that can be used without any problem“

The combustion air of the SAACKE SSB-LCG consists of two partial flows that enter the combustion chamber with a pronounced swirling effect. This swirling and the hot lining of the muffle ensure that the lean gas ignites reliably and burns absolutely stably at all power stages.



CO-, NO_x-Emissions for (Blast Furnace Gas BFG and Natural Gas NG)

Because of the thorough mixing of the combustion air and fuel, the temperature profile is extremely homogeneous and relatively low. As a result, the NO_x emissions are very low and even reliably meet future requirements.

Combustion air, core air and fuel are provided in the optimal volume at every power stage by means of fuel-air ratio control.

Summary

At ArcelorMittal Bremen GmbH low-emission combustion of lean gases is a decisive advantage for the balance sheet – both in economic and ecological terms.

This not only means the emission of nitrogen oxides and carbon monoxide has declined considerably. By virtue of blast furnace gas purification, the dust and sulphur dioxide emissions are also significantly below the permissible limits.

Because the lean gas replaces a substantial amount of natural gas, its combustion saves enormous costs so that a new facility pays off within an extremely short period of time.

This plant now supplies heat at a fraction of the cost incurred with conventional fuels and makes the operator independent of all fluctuations on the heat market.

Technical Data

Application 2x shell boiler; 30 t/h each

Burner model SSB-LCG

Burner output 2x 11 MW (each boiler)

Fuel

Emission values NO_x: 20 – 70 mg/m³
CO: 5 – 30 mg/m³

Lower heating value (LHV) 2.8 – 3.6 MJ/m³

Natural gas

Emission values NO_x: 70 – 100 mg/m³
CO: < 5 mg/m³

Lower heating value (LHV) 36 MJ/m³

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