

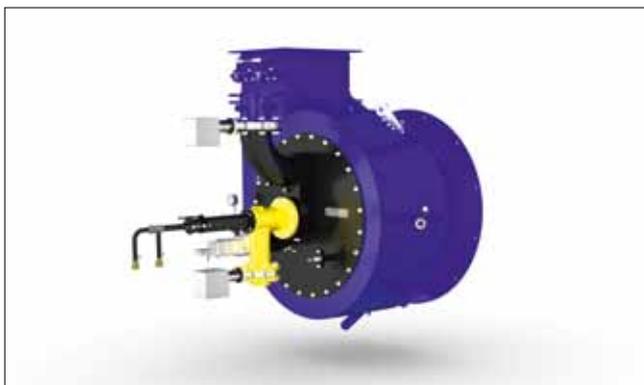
# Lean Gas

## Thermal utilization of lean gas instead of burning it off

Gases with heating values between 2 – 20 MJ/m<sup>3</sup>, so-called lean gases, are generated in large quantities as a by-product at steel plants, for example.

These lean gases, such as formalin gas in the chemical industry, cannot be combusted with conventional gas burners. Thus, they are burned off in most cases, although they still contain useful energy – energy that is given away.

A lean gas firing system on the basis of a SSB swirl burner offers you the opportunity of burning lean gases in a controlled manner, on nearly any heat generator.



SAACKE SSB burner

Thanks to the use of this new technology, ArcelorMittal Bremen GmbH (formerly Stahlwerke Bremen), for example, 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, CO<sub>2</sub> emissions were reduced by approx. 8400 tons annually. In this way ArcelorMittal was able to make a major contribution to environmental protection using the SAACKE firing system.

## The advantages of utilization for lean gas at a glance

- Minimal fuel costs because expensive natural gas is only necessary for start-up
- No support fuel necessary
- Outstanding low emission values
- Suitable for lean gases with heating values from 2 MJ/m<sup>3</sup>
- Can be installed on nearly any heat generator
- Furnace heat loads similar to those of fuel oil
- Gas pressure at burner inlet  $\geq$  15 mbar – booster fan not necessary as a rule
- High degree of availability
- Large control range
- Minimal emissions

### The SAACKE solution in detail

The lean gas firing system consists of a SAACKE 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 is required to start up the system. 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.

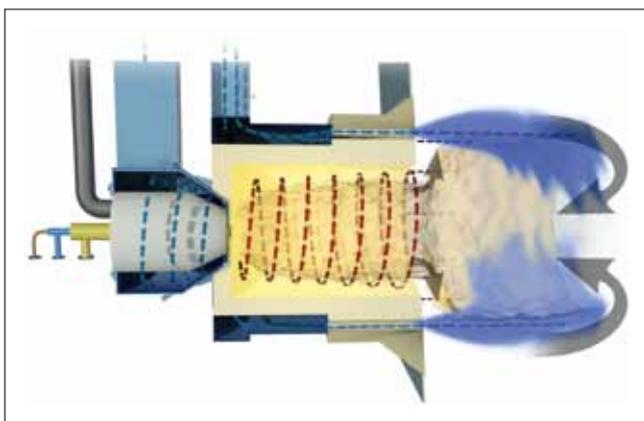
The geometry of the lean gas muffle is unique and enables combustion of gases for which a supporting fuel was always required in the past.

The combustion air of the 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.

Because of the thorough mixing of the combustion air and fuel, the temperature profile is extremely homogeneous and relatively cold. As a result, the NO<sub>x</sub> emissions are very low and even reliably meet future requirements.

### Sensible utilization instead of disposal

The lean gas firing system on the basis of a SAACKE SSB burner guarantees complete and stable combustion of the lean gas even at an extremely low gas pressure at the burner inlet. This means extremely low harmful emissions – and no need of supporting fuels. Either liquid or gaseous fuels can be used as starting and pilot fuel.



Flows in SSB-LCG burner

### Summary

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 is very low, but by virtue of blast furnace gas purification the dust and sulphur dioxide emissions are also significantly below the permissible limits.

### Technical data

<b>Applications</b>	Shell boiler, water tube boiler, thermal oil heater, hot gas generator
<b>Burner model</b>	SSB-LCG
<b>Burner output</b>	2 – 100 MW
<b>Fuels</b>	Blast furnace gas, coke oven gas, waste gas
<b>Emission values</b>	NO <sub>x</sub> : 10 – 100 mg/m <sup>3</sup> ; CO: 0 – 30 mg/m <sup>3</sup>
<b>Lower heating value (LHV)</b>	2 – 20 MJ/m <sup>3</sup>
<b>Characteristics</b>	
<b>Fuels</b>	Blast furnace gas, coke oven gas, waste gases
<b>Gas pressure at burner inlet</b>	≥ 15 mbar

For further information, please visit: [www.saacke.com](http://www.saacke.com)