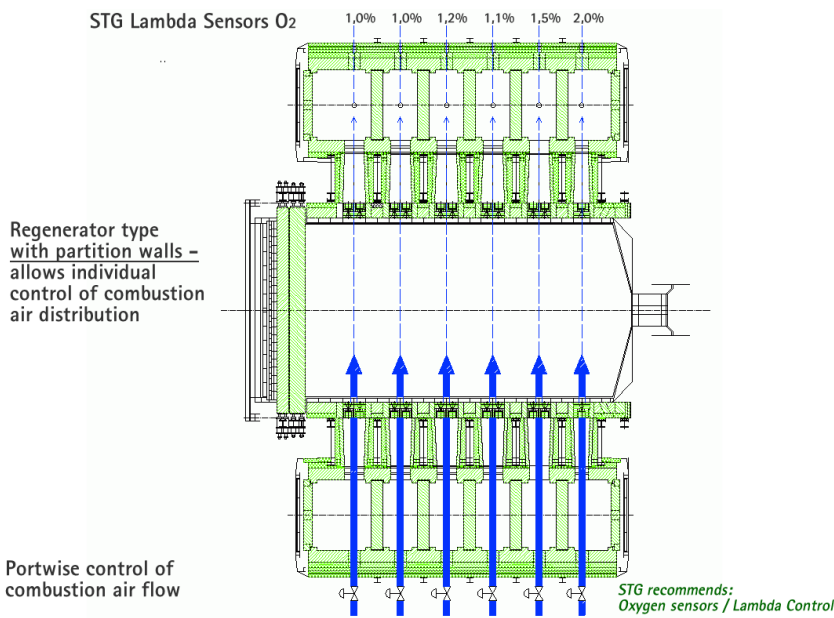


STG Air Curtain System to ensure an optimized distribution of combustion air for block type regenerators without partition walls

Taking over control of combustion air and making available STG Lambda Control



In order to establish an optimum combustion process with results as constantly as possible – either for tasks of saving energy or for reducing NO_x and CO₂ emissions – an optimized combustion air ratio in any way is essential.

By installation of “STG Lambda Control”, (based on STG Oxygen sensors) crossfired furnaces with separate chambers in the regenerators have available a proven technology for providing such constant combustion results.

But now STG offers it’s Lambda Control solution even to customers that operate furnaces with regenerators without partition walls – by providing an additional tool that helps with fulfilling these demands.

In contrast to a port design *with* partition walls (fig.1) , with such furnace designs the total ingress of combustion air is distributed relatively to the cross sections of the single burner ports. Therefore the technologically necessary distribution of combustion air is not given and so only one of the ports can be operated close to stoichiometrically at a time. (fig.2)

Fig.1 Optimum furnace / regenerator design with separating port walls in the regenerators, giving portwise control of combustion air flow

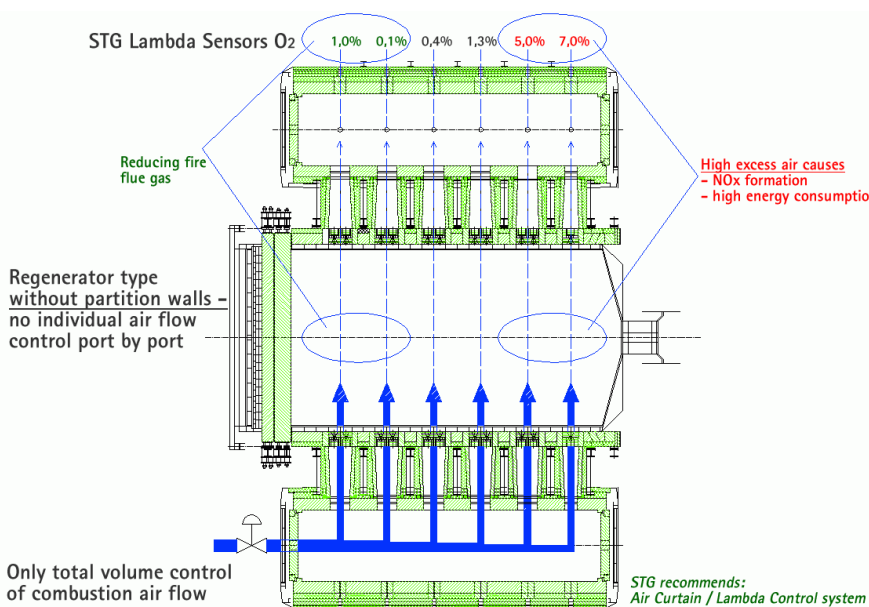


Fig.2 Ineffective furnace / regenerator design without separating port walls in the regenerators, giving only total volume control of combustion air flow

So for this type of furnaces STG has developed its technology “Air Curtain System”.

Basics of STG Air Curtain System

Compressed air lances with active water cooling, that we refer to as "air baffles", have to be installed into the typical excessive-air-ports (e.g. ports 5 and 6). Employing nozzles that are individually aligned with the ports geometry, a barrier of compressed air is created, that faces the combustion air flow. (fig. 4)



Fig.3 Compressed air baffle, installed in the port bottom

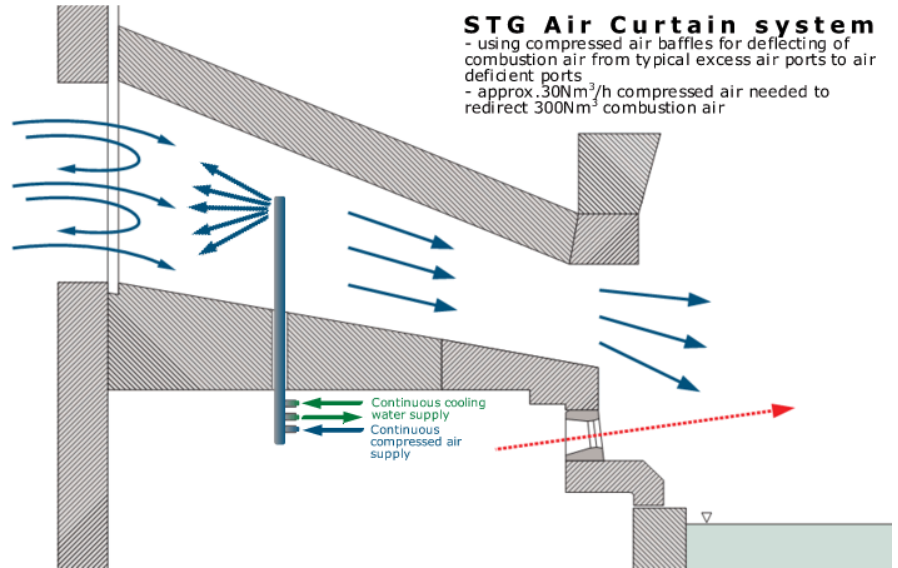


Fig.4 Working principle of compressed air baffle: deflecting of excess combustion air to air deficient ports



Fig.5 Installation in the port bottom

This Technology allows us to regulate the amount of incoming air at every single burner port individually and dynamically through adjustable blocking by the air baffles. Excessive air is deflected and forced through the regenerator head towards the neighboring air deficient ports. As soon as an harmonized O_2 profile is established we are free to reduce total air to significantly optimize the O_2 profile. This allows us to operate the majority of the ports near-stoichiometrically.

See figures 6 and 7 to compare O_2 profile before and after installation of the Air Curtain System (together with STG Oxygen measurement).

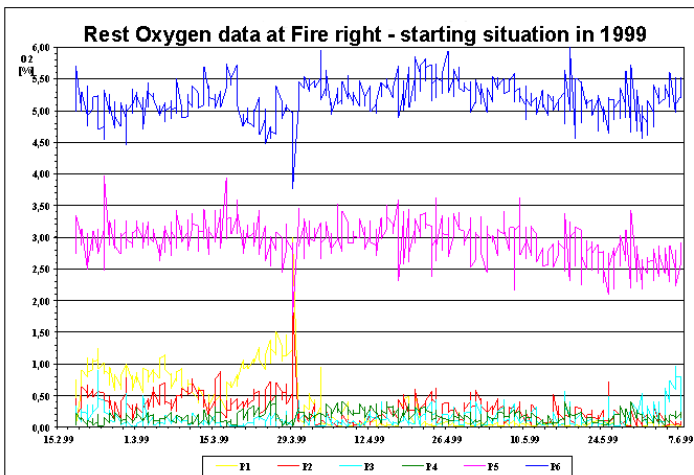


Fig.6 Starting situation: port 6 btw. 5...6% and port 5 btw. 2,5...4% O_2

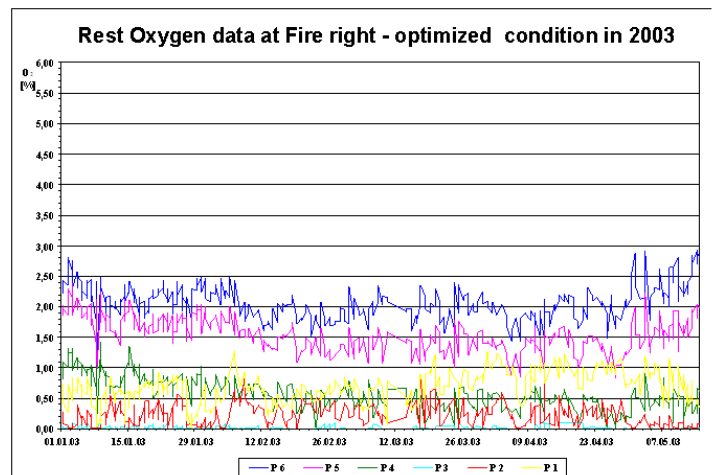


Fig.7 After Lambda Control and Air Curtain installation: harmonized O_2 profile with port 6 btw. 1,8...2,5% and port 5 btw. 1,2...2% O_2

So what does customer need to install STG Air Curtain?:

- Precondition: STG Oxygen sensors at all ports of the furnace, left and right
- Compressed Air baffles to control the combustion air distribution (each 1 baffle per port and firing side) – typical is a 3...5 ports air blocking system
- Preparative therefore vertical drillings have to be made in port bottom, diameter 50...60mm
- Supply of compressed air with 4...5 Bar (e.g. 30Nm³/h of compressed air are needed to deflect an amount of approx. 300Nm³/h preheated air)
- Non-active side requires continuous small flow of compressed air, as purge air (5...10Nm³/h)
- Supply of continuous water cooling, closed loop, best available quality (as for electric booster holders, Top Roll machines, Stirrer cooling...) with 2.5 Bar, approx. 10...25l/min (0.6...1.5Nm³/h) per baffle to install
- Control skid for working air required (standard scope of STG)
- Control skid for water cooling required (standard scope of STG)
- For automatic control / STG Lambda Control: PLC and Touch Panel, alternatively signal processing directly in DCS (standard scope of STG)

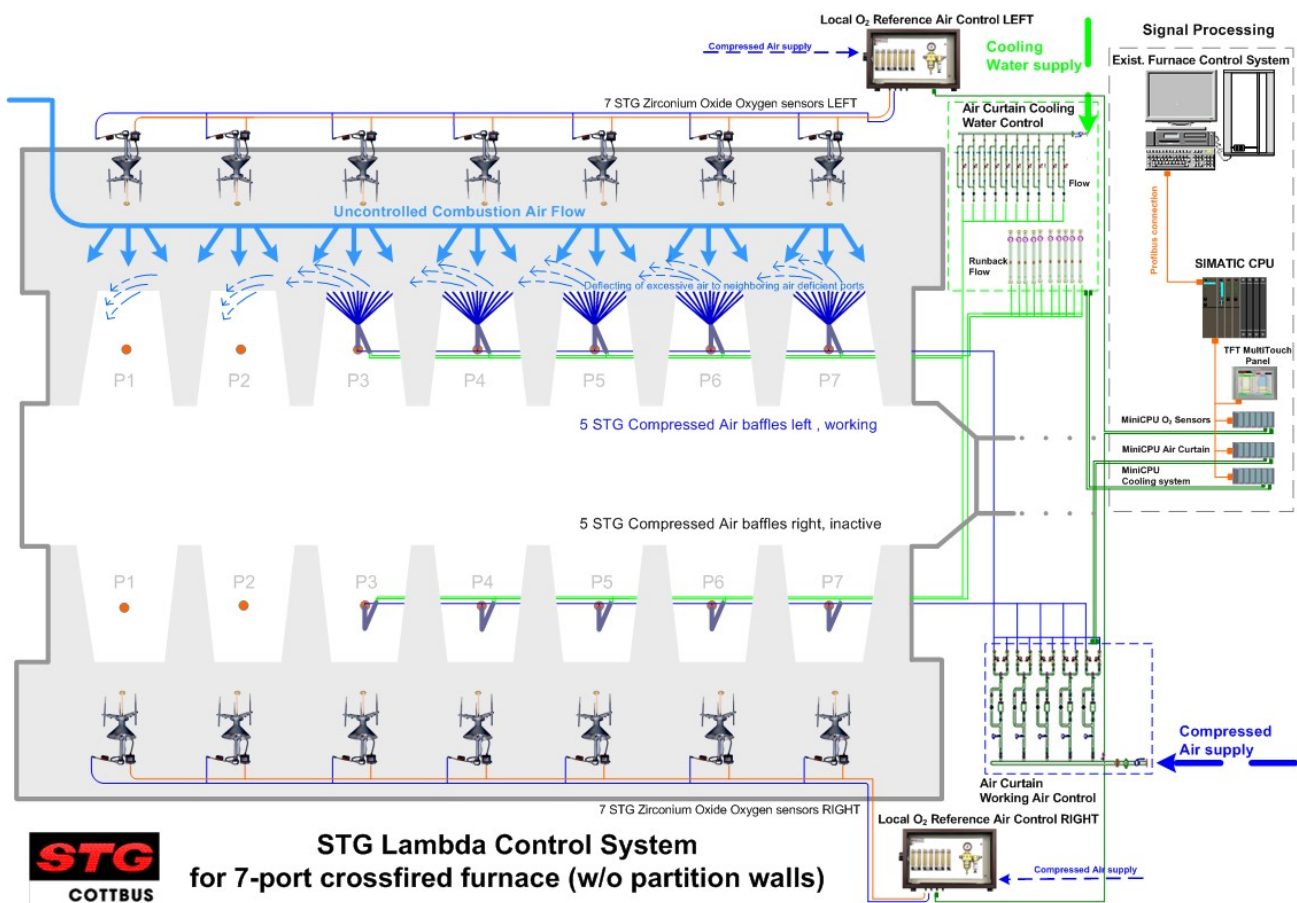


Fig.8 Complete STG Lambda Control System with Oxygen sensors, Air Curtain system and automatic control with SIMATIC CPU

STG Air Curtain, STG Oxygen sensors, STG PCS7 Furnace Control systems and STG Lambda Control as essential elements of STG complex DeNOx technology are well coordinated and harmonized with each other. Therefore it is recommended to use Air Curtain in a combination with PCS7 and Oxygen sensors by STG, but minimum is a purchase of a full STG Oxygen measurement at the same time.

Your Contact:

Dipl.-Ing. Andreas Birle, Head of STG Burner department

mail to: andreas.birle@stg-cottbus.de

Phone: +49 355 590 20 18