

REBOX®

Oxyfuel boosting of a pusher furnace



Customer

Edelstahlwerke Buderus AG

Equipment

4 gas-cooled oxyfuel burners plus control system

Fuel

Natural gas

Installation date

2000

Background

Buderus Edelstahl based in Wetzlar, Germany, produces yearly 500,000 tonnes of billet, bars, flats, strip and coils in a range of carbon, alloy and stainless steels. Within the rolling mill section they have a pusher furnace which is used for pre-heating alloy and stainless steel ingots of between 2 to 4.6 tonnes up to 1240°C prior to rolling. The furnace is 23 m long and 7 m wide and has a maximum installed airfuel power of 38 MW that comes from 40 roof and 14 side recuperative burners. At higher production rates it was difficult to maintain a furnace temperature of 1240°C, particularly in one of the mid-section heating zones. Thus in order to maintain a high production rate and the target temperature of 1240°C, the decision was taken to install 4 REBOX® oxyfuel boost burners in the furnace. The burners have a total maximum power of 6 MW and were placed in the mid-section heating zone of the furnace after extensive trials had proved that additional oxyfuel power could solve the problem.

Customer objectives

- Maintain the production capacity of the furnace by being able to maintain temperature in the heating zones at higher production rates
- Improve temperature uniformity within the product
- Improve temperature control within the heating zones

REBOX® – leading-edge technology

Linde has pioneered the development of the use of oxyfuel combustion for heating furnace applications. With over 85 installations worldwide, they were a natural choice for Buderus to work with on this project.

Using REBOX® oxyfuel burners in the combustion process substantially increases the thermal efficiency of a furnace. The main reasons for this are that the radiant heat transfer properties of the furnace gases produced by oxyfuel combustion are significantly better than those of airfuel.

Also, due to the absence of nitrogen in the combustion mixture, the volume of exhaust gases is reduced substantially, thus the total heat losses via the exhaust gases are also as a result substantially reduced. As a result of the improved thermal efficiency, both the heating rate and productivity are increased and less fuel is required to heat the product to a given temperature, i.e. specific fuel consumption is reduced. This makes a valuable contribution to reducing the overall environmental impact of the company's operations on the local environment.

Equipment installation

- 4 x 1.5 MW gas-cooled oxyfuel burners designed by Linde
- Separate flow trains for both oxygen and natural gas to the main burners and pilot burners
- A complete control system that offers a choice of 3 pre-set power levels

Results

- Productivity was increased by 11 % whilst maintaining the desired set-point temperature of 1240°C
- Overall energy consumption per tonne was reduced by 8.7 %
- The NO_x emissions are well within the TA-Luft environmental limits for such furnaces

Customer benefits

- Improved production capacity
- More flexible production capability
- Lower operating costs per tonne as a result of lower specific fuel consumption and increased productivity
- Higher maximum temperature capability
- Improved temperature control within the furnace mid-section heating zones



Subject to change

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