



Combustion systems

Problem:

Energy efficiency and environmental compliance of reheating and treatment furnace in steelmaking plant

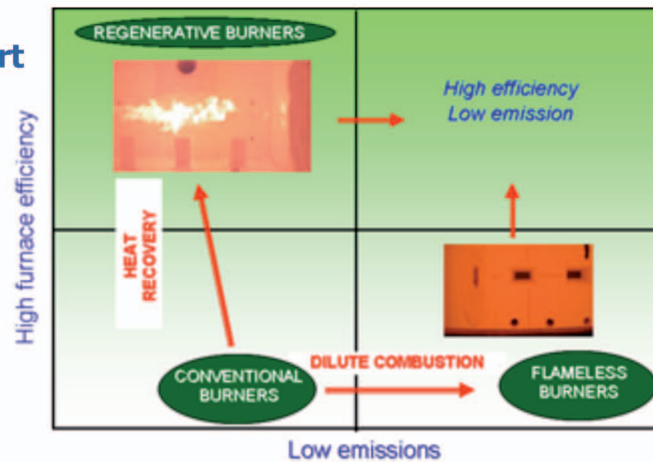


Solutions:

New combustion technologies and heat recovery systems for:

- very low NOx emissions (one/two digits) > flameless
- improvement of energy efficiency by heat recovery at highest temperature > regenerative/oxy burners
- maximizing the use of the process gases of the steel industry (BF, COG, BOF) > multifuel burners
- recovery of low-temperature heat > e.g. Organic Rankine Cycle

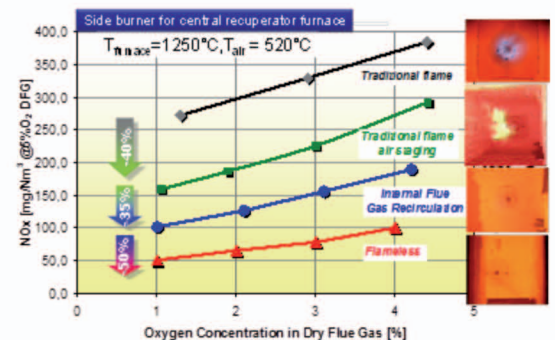
State of Art



Benefits:

New combustion systems contribute to:

- reduction of NOx emissions
- energy efficiency increase
- reduction of total emissions of CO2
- produce higher value from steelmaking process gases
- operating cost reduction through a better global optimization

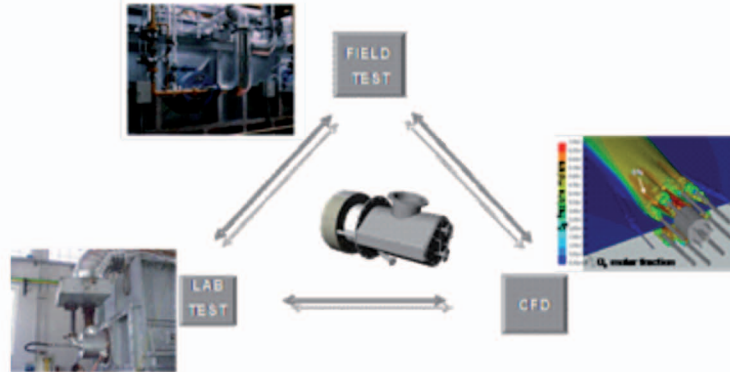


Burner emissions measured @ CSM



Combustion systems

Synergic approach among mathematical modeling, tests at pilot scale and furnace monitoring on the field.



Combustion Station at CSM Dalmine



Modular furnace

- 2 x 2 x (3 ÷ 7.5) m
- Up to 2.5 MW
- NG and syngas
- In-flame measurements with suction pyrometers



Roof burners furnace

- 1.5 x 1.5 x 1.5 m
- Up to 1 MW
- Natural Gas



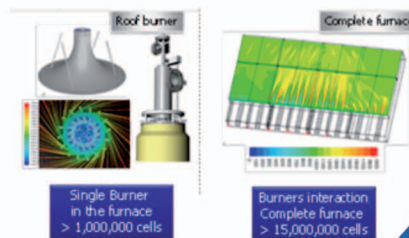
Descaler simulator

- Heating in a furnace burners (up to 150kW / 1300C)
- Heating on inert furnace (up to 16kW / 1300° C)
- Influence on product surface (billets, pipes, etc.)
- Descaling Up to 400br / 130l/min
- Up to n° 3 nozzles
- Descaling speed up to 5m/s
- Flat and bended surface (200x300mm)
- Inertization cooling after descaling

- Stand-alone Air Preheater: T up to 600 C
- Roof, Side & Hearth Thermocouples
- Continuous Pollutants Monitoring: O₂, CO & NO_x
- Completely Computer Controlled System
- Continuous Video Monitoring

Models and tools

- In house mass and energy balance
- Thermo-fluid dynamic (CFD) tools
- On-line control systems



CFD simulation

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