Energy saving and CO$_2$ reduction on continuous and intermittent kiln plants
Energy saving and CO2-reduction

General:

More than 50% of the electricity and over 85% of the fuel, usually natural gas, required for the production of technical ceramics, are consumed for drying and sintering/firing. Therefore an efficient use of energy and maximum energy savings are the main characteristics of modern thermoprocessing plants.

In a good approximation a reduction of 2 kg CO$_2$ can be achieved per 1 m$^3$ of natural gas saved during production.

Guidelines for an efficient use of energy

1. The higher the kiln room temperature and thus the waste gas temperature upstream the heat exchanger, the better is the potential for saving energy by means of air preheating.
2. The use of energy inside the kiln is to be preferred to external use. Piping losses reduce the saving potential. The efficiency strongly depends on the costs for fittings, burners and piping systems.
3. The air excess adjusted on the burner should be as low as possible for the respective thermal treatment process.
4. Heat losses on the external kiln wall are the main selection criteria for stationary kiln plants.
Energy saving on continuous kiln plants

Spray tower
Potential: ≈ 29 % (2)

Warm air generation
Potential: ≈10 % (2)

Casting benches
Potential: ≈ x % (2)

Glaze dryer
Potential: ≈ 6 % (2)

Dryer
Potential: ≈ 25 % (2)

Hot water
110 °C, 6 bar
Potential: ≈12 % (2)

Combustion air preheating up to 450 °C
Potential: 8-10% (1)

Pre-drying & sluice air
Potential: 3-6% (1)

Potential: 3-6% (1)

Potential: ≈ 29 % (2)

Potential: ≈ 6 % (2)

Potential: ≈ 25 % (2)

Potential: ≈10 % (2)

Potential: ≈12 % (2)

Potential: 8-10% (1)

Potential: 3-6% (1)

(1) in % of the fuel energy input
(2) Savings in % of the necessary process fuel energy
Energy saving on intermittent kiln plants

1260°C shuttle kiln

Reku burners preheated combustion air

1600°C shuttle kiln

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