

RECP Best Practice Catalogue

Reducing boiler's stack temperature

Developed within the framework of MED TEST II



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



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Best Practice - Reducing boiler's stack temperature

SECTOR:	Food & Beverage
SUBSECTOR:	Bakery and farinaceous products
PRODUCTS	Sesame cakes
CATEGORY	Good Housekeeping
APPLICABILITY	Utilities

COMPANY NAME	---
COMPANY SIZE	Small

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Description of the problem

(Base scenario):

The energy efficiency measurements show that the boiler's stack temperature is relatively high and reflects the inefficient transfer of heat inside the boiler.

Measured Temperature is 420 °C

The reference stack temperature is 200 °C , so there is 220 °C above the reference temperature which goes as waste of heat and reduces the boiler efficiency.

Description of the solution

Reducing the boiler's stack temperature by properly cleaning the external and internal surfaces of the steam boiler to increase the rate of the desired heat transfer between the flue gas and the water. This measure increases the efficiency of the boiler.

Stack temperature (Before): 420 °C, stack temperature (After): 318 °C

Boiler efficiency (Before): 79.68%, boiler efficiency (After): 84.34%

After well-cleaning the boiler, if the stack temperature value would be still higher than the reference temperature, the fuel nozzles diameter need to be checked. Larger nozzle size means larger fuel flow rate, which indicates that the boiler capacity might be less than the actual energy input and some of its energy cannot be absorbed. In this case, the solution is in replacing the existing nozzle with well sized nozzle.

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Economic Benefits	Stack temp. drop : 220 °C Boiler efficiency rise: 10 %, New Efficiency :89.7% Energy saving: (New Eff. - Old Eff.)/New Eff. Energy saving : 11.17% Energy Saving: 11.17% * 1,285,714 kWh (annual cons.) Thermal energy Saving :143,602.7 kWh/year Diesel Fuel Saving : 14,360 Liter/year Annual Saving: € 8,336/year
Environmental Benefits	Energy Saving= 143,600 KWh/yr (11.17%) Reduced CO ₂ emissions= 22.6 tons/yr
Health and safety impact	---

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Capital investments & financial indicators	Investment= €0.0 (the needed cost is part of standard maintenance costs which can be applied by the maintenance staff). Payback period= immediately
Suppliers	Can be implemented by the company maintenance staff
Other aspects	Stack temperature measuring device should be installed in order to monitor the stack temperature values. Periodic cleaning is highly recommended and periodic check for the fuel nozzles diameter is recommended.
Implementation	Implemented