DREAM: CFD Simulations of Kilns

Project:
Design for Resource and Energy efficiency in cerAMic kilns

The DREAM project (Design for Resource and Energy efficiency in cerAMic kilns) aims to design, develop and demonstrate a radically improved architecture for ceramic industrial kilns, characterised by optimised energy consumption, reduced emissions, and lower operating costs compared to currently available technological solutions.

DREAM website

Horizon 2020 - Research&Innovation Programme under Grant Agreement n° 723641

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Sector:

Cement

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Non-ferrous metails

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Steel

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Water

Summary:

Computational Fluid Dynamics (CFD) simulations have been demonstrated as efficient tools for the investigation of different design solutions for the kiln's components. The analysis helped to improve

the energy efficiency and thus the fuel consumption and the corresponding carbon dioxide emissions of an industrial ceramic kiln. The generated model is able to predict accurately the temperature distribution along the different modules of the kiln and the operation of the many natural gas burners employed to provide the required thermal power. In addition, a number of control strategies for the system working conditions can be simulated and compared in order to define the best trade off in terms of fuel consumption and product quality.

Features
• Customized simulations based on the real kiln designs;
• Optimize the working conditions
• Highlight the critical settings and zone for energy saving

Applications outside the project
• Optimization of the settings of kiln/furnaces
• Analysis of fluid flow
• Understand the impact of new equipment/settings on the existing set up;

Theme:
Industrial furnace design - SPIRE04-2016
Keywords:
Kiln, furnace, energy efficiency, simulations, fluid flows
Type:
Case study
Rights:

Paid Public Access

Resources

Link:
Effects of a CHP turbine unit exhaust gases recovery on the energy efficiency of a ceramic kiln
CFD analysis of a full-scale ceramic kiln module under actual operating conditions
Numerical analysis of the exhaust gases recovery from a turbine CHP unit to improve the energy effic
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