Case Study

New Ultralite Insulating Firebricks

Proven 16% Energy Saving in Kiln Roof Insulation

Background

Ultralite Insulating Firebricks (UIFBs) are manufactured by Mantec Technical Ceramics using advanced microporous refractory technology and unique patent pending engineering expertise. The standard UIFB-26 brick meets the requirements of ASTM C155 for group 26 applications requiring a temperature rating of 1400°C/2552°F. UIFB-26 comes in two standard sizes – 230mm x 114mm x 64mm (9" x 4 ½" x 2 ½") and 230mm x 114mm x 76mm (9" x 4 ½" x 3").

Introduction

This case study covers a pilot project carried out by Mantec, which was to study the effect on energy usage when changing the insulation material within a kiln roof from a typical IFB-28 brick to the recently developed Ultralite UIFB-26 brick.

The front-loading electric intermittent kiln is sited at Mantec's Stoke-on-Trent headquarters facility in the UK and was fired and monitored over a period of a few months following the roof brick conversion.

The kiln is used to fire technical ceramics, has a useful capacity of 1m^3 (35ft^3) and achieves a top temperature of 1400°C (2552°F). In this case study we highlight the changes that occurred in energy consumption when only the roof material was subject to substitution – no other parts of the kiln were modified.

Performance

The performance and energy consumption of the kiln was monitored over several months, both with the original construction (IFB-28) and with the modified construction (UIFB-26).

In order to produce completely comparable results for this study, each firing was carried out to the same temperature profile and used the same kiln loading of the same technical ceramic product.

Initially, Mantec used its SIMUTHERM Heat Flow Simulation Software to model the thermal performance of the two kiln roof constructions. When comparing the heat loss results from this software model, **a saving of 27% in energy through the roof** was calculated for Mantec's UIFB-26 brick compared to the original IFB-28. *(See overleaf for supporting technical data).*

However, in overall terms, when the average total power consumption of the kiln was recorded, this fell from 2083 kWh to 1749 kWh per firing - **a real saving of 16%** - as a result of Mantec merely replacing the roof bricks with its lower classification UIFB-26. This is an extremely favourable result for Mantec considering that only a partially refurbished kiln was studied. Greater overall energy savings can therefore be expected once the full conversion of the kiln has been completed using Ultralite UIFB-26 bricks.

Continued overleaf

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New Ultralite Insulating Firebricks
by Mantec Technical Ceramics

Ultralite™ Advanced Solutions

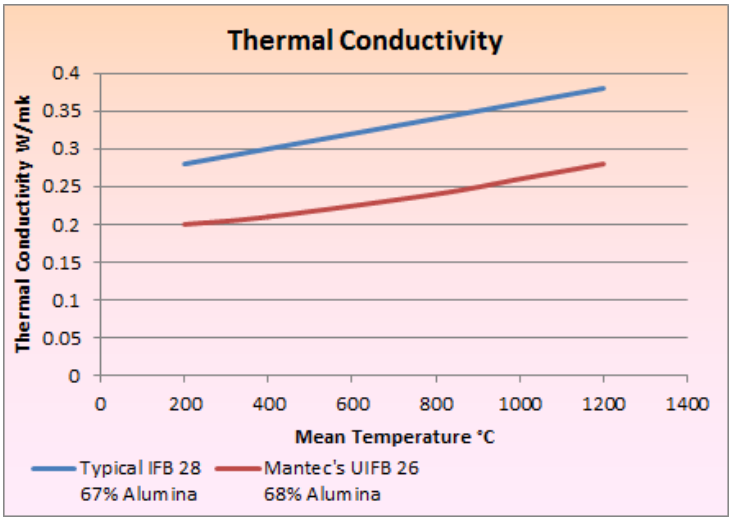
Ultralite Technology

The unique, patent pending Ultralite technology has been developed by Mantec's in-house ceramic experts and is manufactured in its factory in Stoke-on-Trent. It is designed to be a modern substitute for more traditional materials across a number of quite distinct applications.

The superior thermal performance of Ultralite means it is becoming invaluable across a wide range of industries including global heavy clay, sanitaryware, tableware, refractories, iron and steel and glass production industries – reducing energy consumption and saving manufacturers significant costs associated with the overall kiln and furnace operations.

How do Mantec's Ultralite Insulating Firebricks Compare?

The graphs below indicate how well the enhanced properties of Mantec's Ultralite UIFB-26 insulating firebricks compare against a typical industry standard IFB-28 product, with both products having a similar alumina content.



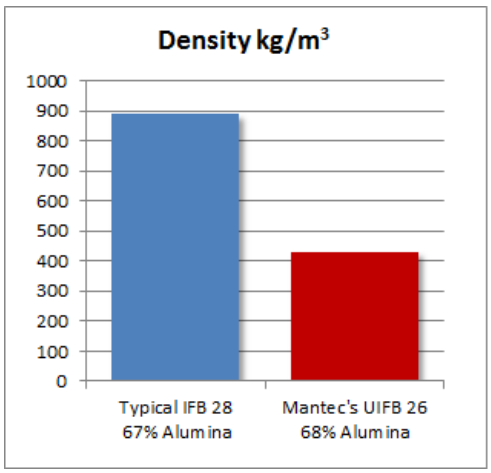
The density, heat stored and heat loss data has been calculated based on a 240mm thickness at a hot face temperature of 1400°C (2552°F) using SIMUTHERM Heat Flow Simulation Software.

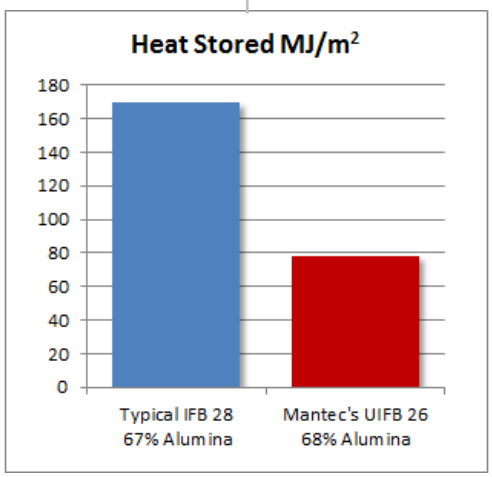
The proven **lower thermal conductivity, lower density, lower heat storage and lower heat loss** properties of Ultralite Insulating Firebricks, as shown in the four charts, therefore allow customers to benefit from additional reduction in energy usage and thus improved manufacturing efficiencies.

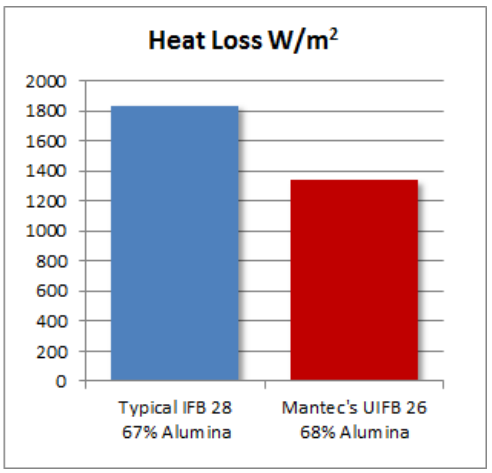
The Benefits of Ultralite Insulating Firebricks (UIFB)

- Probably the lightest insulating firebrick on the market today within its classification
- Patent pending technology
- Half the weight and half the density of other industry standard Group 26 insulating firebricks
- Lower thermal conductivity
- Lower heat storage
- Higher strength
- Superior all-round thermal performance
- Thinner wall constructions are possible for the same energy efficiency of other products
- Special shapes available to customer order
- Ease of handling due to their lightness

For more information, please contact Adrian Wake at Mantec Technical Ceramics Ltd at awake@mantectc.com or by telephone +44 (0)1782 377560.







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