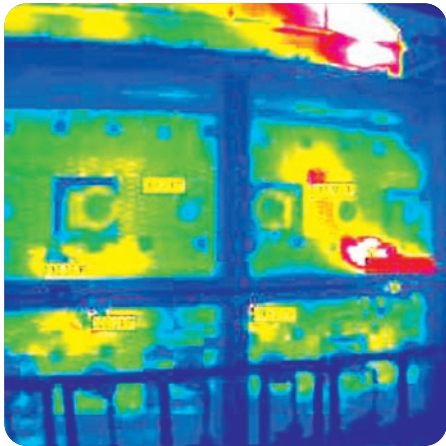


**FACT SHEET**  
**SAVE ENERGY**



**Superwool® Plus™**  
Insulating fibre

Save energy...

...seeing is believing

**Superwool® Plus™ fibre is the most energy efficient fibrous insulation material; it can reduce energy losses without occupying more space or using increased mass.**

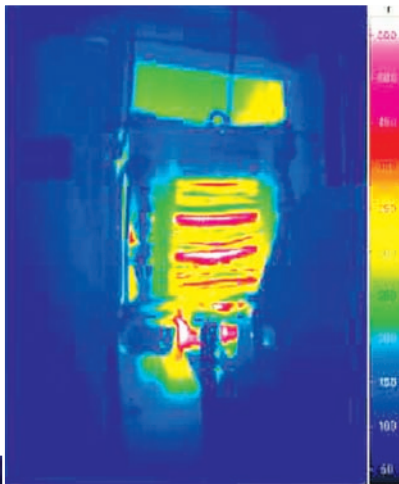
- Reduces thermal conductivity and energy loss and thereby reduces the outside furnace temperature
- Provides significant energy savings compared to other tested AES and RCF fibres
- Minimises the weight and thickness of the insulation layer saving up to 25% in material
- Reduces carbon emissions
- Provides more...for less...

## Thermal imaging...infrared camera...energy efficiency

Maintenance of your furnace lining and insulation system can result in significant energy savings. In many cases, the extra cost of more efficient lining materials can often be recouped within a year or two.

Manufacturing costs, especially in energy-intensive processes requiring furnaces and kilns, have been negatively impacted by rising fuel costs.

The key to the energy efficiency of your furnaces and kilns is how well the refractory insulation lining is working. Refractory insulation provides many heat-saving benefits and it needs to be maintained and repaired during service. Before replacing materials, it is better to first conduct a thorough evaluation of the furnace lining condition.



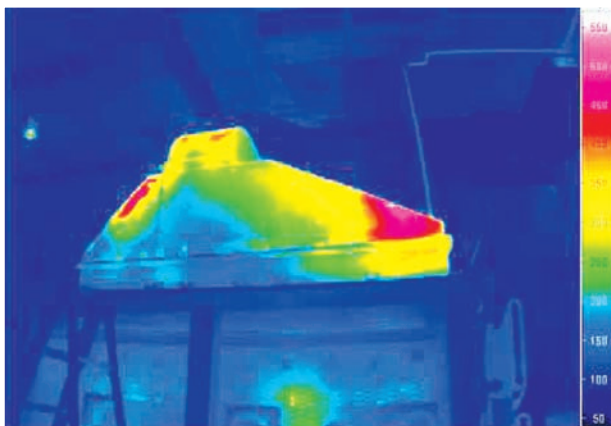
The analysis of the existing furnace is critical to determining which steps to take in lining maintenance. In addition to observing the general integrity of the furnace lining, using engineering services like heat-flow calculations, infrared cameras and energy analysis enables insulation inefficiencies and inadequacies that are essential in establishing maintenance priorities to be discovered.

Infrared cameras can survey the furnace lining while the unit is operating to determine the location and severity of furnace hot spots. The infrared camera captures the thermographic data needed to assess the thermal efficiency of the existing insulation lining.



Each Morgan Thermal Ceramics sales division is equipped with its own thermal imaging camera and is able to conduct a furnace survey and assist in recommending a more energy efficient solution if available.

Energy costs continue to rise and furnace maintenance in heat-intensive industries is crucial to keeping fuel expenses under control. Routine engineering audits of the furnace lining help determine the condition of the existing equipment.



Maintaining the lining in your furnace and making the recommended and necessary changes enables you and your business to reduce energy waste and improve operating efficiencies and process consistency.

*Examples of conducted furnace surveys*

## Can Superwool® Plus™ blanket help with energy and material weight savings?

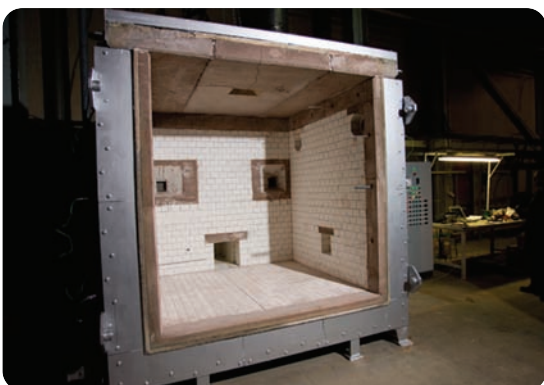
The ability to perform tests “in-house” brings expertise and product development at a much faster rate than could be achieved by only using external laboratories.

Morgan Thermal Ceramics’ research and development facility houses a purpose designed gas-fired kiln which has the ability to test all forms of furnace wall and roof construction and to measure resulting cold face temperatures.

By having a test furnace facility on-site, we are able to work closely with our customers to ensure their requirements and solutions are met.

### Our furnace:

- is a 1.5 MW gas powered kiln, with 6 burners
- is 2m high x 2m deep, with a volume of 8m<sup>3</sup>
- has 2 control thermocouples and 8 monitoring thermocouples ensure uniform heat distribution in all zones
- has a maximum temperature 1300°C (2372°F) with rapid heating to allow simulation of hydrocarbon fires as well as cellulose fires
- can be set up to test bulk head (wall) or deck head (roof) panels or to test samples totally enclosed inside the furnace
- can test a complete new furnace lining using a combination of refractory products: such as blanket, modules and boards
- internal and external temperatures can be measured with up to 40 thermocouples or using an infra red camera



At Morgan Thermal Ceramics we have conducted a benchmark test in our R&D centre using Superwool® Plus™ fibre with a competitor AES blanket and Cerablanket RCF.

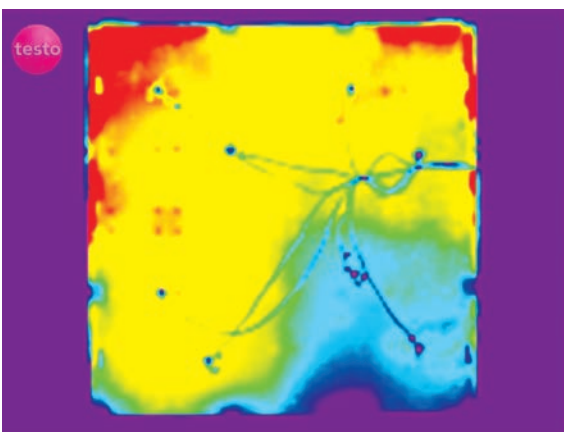
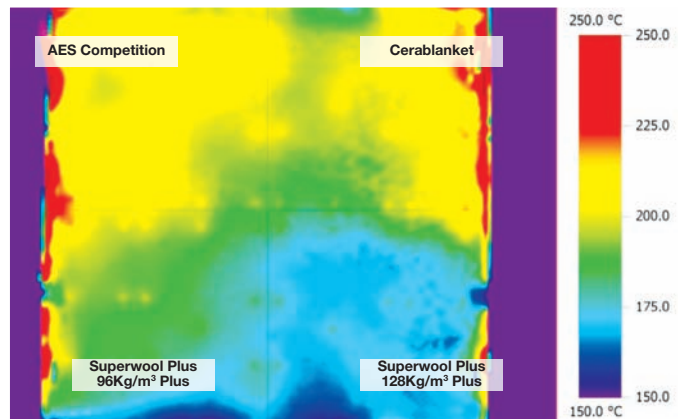
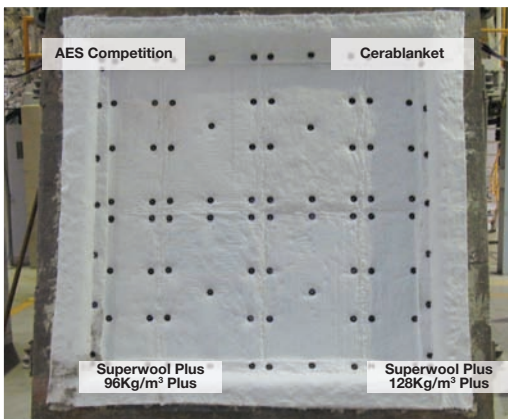
**On the same panel, 1m<sup>2</sup> blanket was installed with 4 different insulation layers:**

2x25mm (2x1inch)	128kg/m <sup>3</sup> (8lbs/ft <sup>3</sup> )	competitor AES blanket
2x25mm (2x1inch)	128kg/m <sup>3</sup> (8lbs/ft <sup>3</sup> )	Cerablanket RCF
2x25mm (2x1inch)	96kg/m <sup>3</sup> (6lbs/ft <sup>3</sup> )	Superwool® Plus™ blanket
2x25mm (2x1inch)	128kg/m <sup>3</sup> (8lbs/ft <sup>3</sup> )	Superwool® Plus™ blanket

**We clearly observed that:**

- **Superwool® Plus™ 128 blanket** provides a significantly lower cold face temperature than a competitor AES 128Kg/m<sup>3</sup> (8lbs/ft<sup>3</sup>) blanket and Cerablanket RCF 128Kg/m<sup>3</sup> (8lbs/ft<sup>3</sup>)
- **Superwool® Plus™ 96 blanket** provides a lower cold face temperature compared to a competitor AES blanket 128Kg/m<sup>3</sup> (8lbs/ft<sup>3</sup>) and Cerablanket RCF 128Kg/m<sup>3</sup> (8lbs/ft<sup>3</sup>)

**The results outline the thermal insulation superiority of Superwool® Plus™ fibre with energy savings up to 25%**

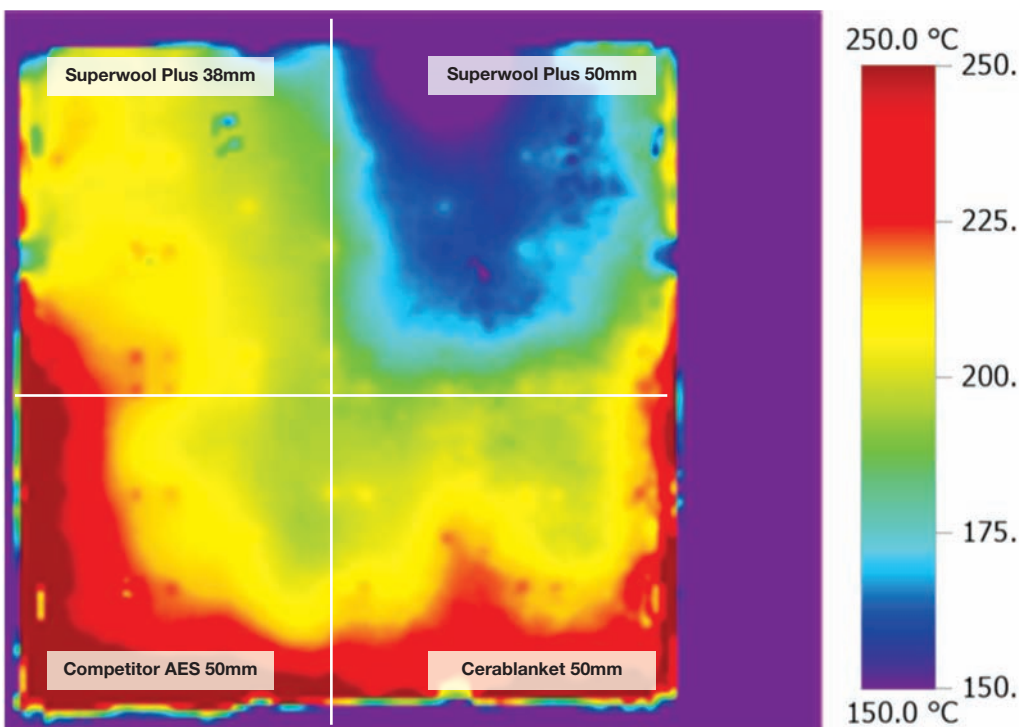


The panel was heated up to a temperature of 1000°C (1832°F) for 2 hours until steady state was achieved. Thermocouples were placed on the cold face (casing) of the 4 zones to follow the temperature evolution in real time.

A second test was performed with another set of insulation materials. The layout aimed to show that a thinner insulation of Superwool® Plus™ blanket will perform comparably to competitor AES or RCF blankets:

- 2 layers of 25mm 128Kg/m<sup>3</sup> (2 layers of 1 inch 8lbs/ft<sup>3</sup>) Superwool® Plus™ blanket
- 1 layer of 38mm 128Kg/m<sup>3</sup> (1 layer of 1.5 inches 8lbs/ft<sup>3</sup>) Superwool® Plus™ blanket
- 2 layers of 25mm 128Kg/m<sup>3</sup> (2 layers of 1 inch 8lbs/ft<sup>3</sup>) Cerablanket RCF
- 2 layers of 25 mm 128Kg/m<sup>3</sup> (2 layers of 1 inch 8lbs/ft<sup>3</sup>) a competitor AES blanket

These materials were heated up to a hot face temperature of 1000°C (1832°F) for 2 hours until steady state was achieved. Thermocouples were placed on the cold face (casing) of the 4 zones to follow in real time the temperature evolution.



	Superwool® Plus™ 50mm (2 inches)	Superwool® Plus™ 38mm (1.5 inches)	Cerablanket 50mm (2 inches)	AES competition 50mm (2 inches)
Average cold face temperature (°C)	164 (327°F)	202 (395°F)	213 (415°F)	208 (406°F)

Our thermal image shows that at the same thickness of material, 50mm (2 inches), Superwool® Plus™ blanket out-performs all other materials. If you were to use a thinner insulation lining, just 38mm (1.5inches) of our Superwool® Plus™ blanket performs better than 50mm (2 inches) of Cerablanket RCF and a competitor AES blanket.



# Superwool<sup>®</sup> Plus<sup>™</sup>

## Insulating fibre

### Features

### Benefits

An engineered solution (unique)

Takes insulation beyond normal performance

Patented technology

Proven chemical formulation

Exonerated from Carcinogen classification under  
Nota Q of European Directive 67/548

Restrictions on use do not apply. No special  
requirements for dust control, supply to the  
general public or waste disposal

Lower thermal conductivity

Improves insulation by 20%

Up to 30% more fibres

Efficient prevention of heat transfer and  
greater strength

Less shot

Cleaner workplace

High Fibre Index

Up to 20% reduction in thermal  
conductivity giving energy saving

Stronger with good handleability (no tearing)

Ease of installation saving time and waste

Improved handling

Operator satisfaction

Soft & smooth feel

Less mechanical skin irritation

**Consistent use of pure raw materials**

**Higher classification temperature,  
low shrinkage and consistent quality**

Lower density grade for the same result

Material weight savings up to 25%

Thinner lining for the same result

Create more working space within unit

Resistant to vibration

Allows long lifetime under vibration  
conditions where other products fail

An environmental solution

Potential savings on waste disposal

Worldwide production

Availability



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SUPERWOOL® is a patented technology for high temperature insulation wools which have been developed to have a low bio persistence (information upon request). This product may be covered by one or more of the following patents, or their foreign equivalents:

SUPERWOOL® PLUS™ products are covered by patent numbers:  
US5714421, US5994247, US6180546, US7259118, and EP0621858.

SUPERWOOL® 607HT™ products are covered by patent numbers:  
US5955389, US6180546, US7259118, US7470641, US7651965, US7875566, EP0710628, EP1544177, and EP1725503

A list of foreign patent numbers is available upon request to The Morgan Crucible Company plc.

For all enquiries please contact: [marketing.tc@morganplc.com](mailto:marketing.tc@morganplc.com)

[www.morganthermalceramics.com](http://www.morganthermalceramics.com)

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