

# Fibre grades

Thermal Ceramics' three grades of high temperature insulation fibres are:

- Low Biopersistent Fibres:**
  - Superwool® Plus - Classification temperature 1200°C (2192°F)
  - Superwool HT - Classification temperature 1300°C (2372°F)
  - Superwool XTRA - Classification temperature 1450°C (2600°F)
- Refractory Ceramic Fibres:**
  - Kaowool® - Classification temperature 1260°C (2300°F)
  - Cerablanket® - Classification temperature 1315°C (2400°F)
  - Cerachem® - Classification temperature 1426°C (2600°F)
  - Cerachrome® - Classification temperature 1426°C (2600°F)
- Polycrystalline Wool Fibres:**
  - Denka® Alcen®\* - Classification temperature 1600°C (2912°F)

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Superwool fibre is a high-temperature insulating wool composed of man-made vitreous silicate fibres. Each fibre grade features its own unique attributes and benefits to meet the demands of your application. Our low biopersistent, alkaline earth silicate and potassium aluminosilicate, marketed as Superwool insulating fibres have been engineered to offer advantages in high temperature insulation applications.

Traditional Refractory Ceramic Fibre (RCF) is a highly versatile material. It can be spun or blown into the product forms as seen in the table.

Our polycrystalline fibres (PCW) are made from high alumina (>95% alumina) or mullite fibres (85% alumina) using the Sol-Gel process. These fibre solutions are ideally suited for many challenging atmospheres and feature a temperature rating up to 1600°C (2912°F) with very low linear shrinkage and excellent resistance to alkali and chemical attack.



### Superwool® XTRA™

delivers the strength that industrial applications need, both in terms of its resistance to high temperatures and pollutants, but also its improved EHS credentials



Increasing application capability

Lifetime vs fibre choice



Product form	Temperature range, °C (°F)
Bulks	1000°C – 1427°C (1832°F – 2600°F)
Blankets	1000°C – 1600°C (1832°F – 2912°F)
Modules and Logs	1000°C – 1600°C (1832°F – 2912°F)
Papers	1000°C – 1649°C (1832°F – 3000°F)
Felts	1000°C – 1427°C (1832°F – 2600°F)
Boards and Shapes	1000°C – 1649°C (1832°F – 3000°F)
Mastics (wet fibres)	982°C – 1593°C (1800°F – 2900°F)
Textiles	482°C – 1371°C (900°F – 2500°F)



# Bulk fibres

**Thermal Ceramics bulk fibres serves as the foundation for our entire line of fibre products.**

Bulk consists of a loose mass of randomly orientated normally long, fibres collected after fiberisation and not further altered and can be:

- Needled into a blanket
- Converted into paper boards and shapes
- Woven into yarn to produce rope and cloth
- Blended into liquid binders for coatings and cements

Bulk fibres can be engineered by changing length, fibre diameter, shot content and lubricity. They offer unique solutions to many industrial applications such as expansion joint construction and base seals as well as automotive applications in filtration and acoustical insulation. High temperature insulation wool is a material for use in high temperature applications such as the insulating lining of metallurgical ovens and furnaces, petrochemical heaters, and ceramic kilns etc.

**In use high temperature insulation fibre will:**

- Contribute to protecting people and property from excessive heat
- Reduce greenhouse gas emissions
- Reduce energy usage
- Improve efficiency of furnaces and process equipment

**Grades available:**

**Lubricated bulk**

**Extra Long - Long lubricated fibre**

- For packing expansion joints and voids
- For infill in the roofs and walls of certain types of kilns
- For seals around penetrations in furnaces, such as burner tubes, site holes etc, areas in refractory constructions

**Un-lubricated bulk**

**Extra Long - Long - Medium - Short fibre**

- Un-lubricated fibre is used in vacuum forming processes, mastics, mouldables sprays and coatings
- Selection of different fibre lengths controls the properties of the final product



## Bulk fibres

### Physical characteristics

- Classification temperature up to 1600°C (2912°F)
- Excellent insulating performance
- Low heat storage
- Fibre diameter and length control variables

### Applications

- Thermal and acoustical insulation
- Primary material in mastics and vacuum formed boards and shapes
- Expansion joints

### Brands

- Kaowool®
- Cerafibre®
- Cerachem®
- Cerachrome®
- Superwool® Plus
- Superwool® HT
- Denka®

## Blankets

### Physical characteristics

- Classification temperature up to 1600°C (2912°F)
- Excellent insulating performance
- Excellent thermal shock resistance
- Low heat storage capacity

### Applications

- Furnace, boiler and kiln insulation linings
- Thermal barriers
- Fire Protection
- Field stress relieving
- Steam and gas turbine insulation

### Brands

- Kaowool®
- Cerafibre®
- Cerachem®
- Cerachrome®
- Superwool® Plus
- Superwool® HT
- Superwool® XTRA
- FireMaster®
- Denka®\*

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# Blankets

**Thermal Ceramics blankets are available in a wide range of chemistries, densities and dimensions.**

Blankets are air laid into a continuous mat and mechanically needled for added strength and surface integrity. A needling process results in a forced matrix of bulk fibres to produce a coherent blanket without the use of chemical binders.

High temperature insulation wool is a material for use in high temperature applications such as the insulating lining of metallurgical ovens and furnaces, petrochemical heaters, and ceramic kilns etc.



### In use high temperature insulation fibre will:

- Contribute to protecting people and property from excessive heat
- Reduce greenhouse gas emissions
- Reduce energy usage
- Improve efficiency of furnaces and process equipment

### Common characteristics are:

- Low thermal conductivity
- Excellent thermal shock resistance
- Low heat storage capacity
- Inorganic - smoke free

## Modules and Logs

Thermal Ceramics exclusive Pyro-Bloc® products have set the standard for quality and versatility in furnace and boiler lining systems. Modules are manufactured from Pyro-Log™, a monolithic ceramic fibre that is fabricated into modules that offer superior performance and durability.

Pyro-Bloc Modules and Pyro-Log are available in low biopersistent Superwool® Plus, Superwool HT and our newest technology, Superwool XTRA. Refractory Ceramic Fibre grades are also available.

### Modules

A unique solution to high temperature insulation needs in industrial heaters, boilers and furnaces as well as many other applications.

### Logs

An uncompressed monolithic mass of fibre. Pyro-Log fibre is the basic building block for all Pyro-Bloc applications.

At moderate temperatures this lubricant burns out and the fibre becomes rigid enough to stand on. This feature, unique to Pyro-Log fibre, assists during installation and provides the durability and toughness necessary for long life.

### Folded or Stacked Blanket Modules

Our Pyro-Fold and Pyro-Stack™ blanket module systems are available using our market leading blankets.



## Modules and Logs

### Pyro-Bloc modules

#### Physical characteristics

- Classification temperature up to 1427°C (2600°F)
- Exceptional insulating performance
- Excellent thermal shock resistance
- Low heat storage capacity
- Monolithic ceramic fibre composition

#### Applications

- Furnace, boiler and kiln insulation linings
- Burner blocks
- Furnace and boiler doors
- Harsh and corrosive environments
- High air velocity environments

#### Brands

- Pyro-Bloc
- Pyro-Log

## Papers

### Physical characteristics

- Classification temperature up to 1650°C (3000°F)
- Excellent tensile strength
- Low thermal conductivity
- Thickness availability of 0.8 up to 38 mm (1/32 up to 1in)

### Applications

- High temperature gaskets and seals
- Refractory back-up insulation
- Filtration
- Separating media

### Brands

- Kaowool®
- K-Shield™
- Superwool® Plus
- Superwool® HT
- Superwool® XTRA

## Papers

**Thermal Ceramics manufactures a wide range of high temperature rated paper products. We meet requirements ranging from economical mineral wool grades to high purity alumina and alumina-silica grades for demanding applications.**

Paper products are specially processed to offer excellent performance in high temperature applications and offer an alternative to traditional solutions due to its unique properties of high refractoriness and excellent non-wetting characteristics to applications requiring direct contact with molten aluminum and stability and resistance to chemical attack.

Insulating paper conforms easily to complex shapes and can be die-cut and used in a wide range of applications as thermal insulation and are especially suited to use in gaskets and as a parting medium.

Many of our paper products also meet strict automotive, aerospace, and industry specifications.

### In use high temperature insulation fibre will:

- Contribute to protecting people and property from excessive heat
- Reduce greenhouse gas emissions
- Reduce energy usage
- Improve efficiency of furnaces and process equipment





# Felts

Thermal Ceramics insulating felt products, obtained by hot pressing are particularly suitable for die-cutting operations. Semi-rigid, it is neither brittle nor dusty. Felt optimizes the manufacture of complex, die-cut shapes to close tolerances.



## Superwool felt products

Superwool felt is made from Superwool fibres, bonded with an organic binder which begins to burn out at 180°C (356°F). This special binder makes Superwool felt particularly suitable for die-cutting operations. Made from chemically stable fibres, lightweight and very insulating, Superwool felt is a multi-purpose product.

## Cerafelt and Cerachrome felt

Cerafelt and Cerachrome felt are made in a unique manufacturing process which allows a wide thickness and density range. Both products are recommended for high temperature industrial applications such as expansion joints in kilns, furnaces, and boiler walls. When used as a gasket, Cerafelt exhibits excellent resistance to penetration from molten metal both ferrous and non-ferrous. This unique property coupled with its ease of fabrication makes it ideal for ingot stool seals and stopper rod gaskets.

## K-Shield felt

The K-Shield felt range of products are manufactured on the same line as the high temperature paper products. This manufacturing process allows excellent, uniform material density and thickness control. In addition, the lightweight, flexible nature of this product allows it to be packaged in roll form. K-Shield felts are made from very clean, high purity ceramic fibres.

## Felts

### Physical characteristics

- Classification temperature up to 1427°C (2600°F)
- Flexible, lightweight
- Low thermal conductivity
- Thickness availability of 3 to 25 mm (1/32 to 1/2 in)

### Applications

- High temperature gaskets and seals
- Expansion joints
- Molten metal resistant insulation

### Brands

- Cerafelt®
- Cerachrome®
- K-Shield™
- Superwool® Plus
- Superwool® HT
- Superwool® Felt

## Board and Shapes

### Physical characteristics

- Dimensional stability up to 1650°C (3000°F)
- Excellent thermal shock resistance
- Low heat storage
- Low thermal conductivity
- Range of mechanical strengths

### Applications

- Furnace and kiln hot face linings
- Combustion chambers for boilers and heaters
- Appliance and heat processing insulation
- Hot tops, riser sleeves
- Burner blocks

### Brands

- Kaowool®
- Inorganic I-series
- Superwool®
- Superwool® HT

## Board and Shapes

Thermal Ceramics' has designed a wide range of products using the vacuum forming technology. This versatile process, flexible in batch size, allows the production of products in different geometries according to customer drawings as well as boards with bespoke specifications and dimensions.



Our board and shape vacuum formed products cover an entire temperature and mechanical strength range. They feature excellent insulating performance, superior high temperature strength and can be custom designed for a broad range of uses.

Manufactured from our bulk fibres these products are available in grades:

- Low Biopersistent Fibres (LBP) - Superwool
- Refractory Ceramic Fibres (RCF) - Kaowool
- Polycrystalline Wool Fibres (PCW) - Denka®

Organic and inorganic compositions are available and offer:

- Low thermal conductivity and low heat storage
- Excellent thermal shock resistance
- Dimensional stability up to 1600°C (2912°F)
- No off-gassing during initial heat up of inorganic products

### Boards

- Wide range of standard thicknesses and sizes
- Can be machined for tighter tolerance
- Post-treatment applications of Alfibond® and Minimox™ for many RCF grades

### Shapes

- Custom designed for optimized high temperature performance, utilising decades of application experience
- Can be one-time use product or integral part of design
- Offer superior insulating performance, excellent molten metal resistance, and high strength
- Expertise in embedding hardware into shapes for integrated mounting, support or process specific benefits

# Mastics, Coatings, Cements

Thermal Ceramics has a full product offering of fibre base insulation materials available in pumpables, moldables, coatings and cements.

Manufactured specifically to aid in efficient furnace, kiln and boiler operation, these products eliminate hot spots, provide superior maintenance solutions, and make insulation installation quick and easy.

A complete line of mortars are also available in wet and dry grades.

These mortars combine ease of use and high temperature performance.

## In use high temperature insulation fibre will:

- Contribute to protecting people and property from excessive heat
- Reduce greenhouse gas emissions
- Reduce energy usage
- Improve efficiency of furnaces and process equipment

For use in high temperature industrial applications where patching and filling of voids is required, available as pumpables (with pumps), moldables, air-setting cements and coatings.

## Mastics, Coatings, Cements

### Mastic - Pumpables

- Classification temperature use up to 1540°C (2800°F)
- Non-wetting to molten aluminium

### Applications

- Furnace, boiler and kiln hot spot repair
- Back-up insulation

### Brands

- Kaowool®
- Superwool®
- Therm-O-Hot Patch™

### Moldables

- Classification temperature use up to 1430°C (2600°F)

### Applications

- Trough linings and hot face linings
- Back-up insulation
- Patching mix for fibre products or linings

### Brands

- Kaowool®
- Superwool®

### Coatings

- Classification temperature use up to 1650°C (3000°F)
- Good abrasion resistance

### Applications

- Grout refractory joints and gaps
- Seals furnace lining cracks
- Furnace maintenance and emergency repairs

### Brands

- Sealcoat HT
- Unikote®
- Therm-O-Flake™

### Cements

- Classification temperature use up to 1316°C (2400°F)
- Develops strong bond upon drying
- Increases surface hardness and resistance to erosion

### Applications

- Surface treatment for vacuum formed boards and shapes to increase surface hardness
- Adhesive to apply various materials to fibre and insulation for joining fibre or heating elements

### Brands

- Kaowool® Rigidiser
- Cera-Kote®
- Super Stic-Tite™
- Kao-Seal®
- Therm-O-Stix™





## Textiles

### Physical characteristics

- Classification temperature up to 1370°C (2500°F)
- Exceptional tensile strength
- Cloth, rope, chord, thread, sleeving, tubing and tape available
- Excellent thermal shock and corrosive attack resistance

### Applications

- Expansion joints
- Gaskets and seals
- Stress relieving blankets
- Fire and heat barriers

### Brands

- Kao-Tex™
- Superwool®

## Textiles

**Thermal Ceramics high temperature textile products are used in applications such as the insulating lining of metallurgical ovens and furnaces, petrochemical heaters, and ceramic kilns etc.**

Cloths, threads, ropes and yarns converted into various forms for specialised applications.

### In use high temperature insulation fibre will:

- Contribute to protecting people and property from excessive heat
- Reduce greenhouse gas emissions
- Reduce energy usage
- Improve efficiency of furnaces and process equipment

Low thermal conductivity, high tensile strength and excellent abrasion resistance are among the outstanding characteristics of textile products.

- Offered with specialised coatings
- Provide excellent thermal protection
- Heat resistant
- Chemically resistant to most elements

Fabrication with other Thermal Ceramics products enables custom engineered thermal solutions to be developed to customer specifications.

