DARCO INDUSTRIES

"Your Global Solutions Experts"

Australian Owned and Operated

# High Temperature Insulation and Refractory Materials Overview

# DARCO INDUSTRIES

Darco Industries has accumulate a lot of experiences in refractory and insulation materials for steel plant, boiler, cement, ceramics, aluminum, petrochemical and metallurgy industries as well as other relevant thermal treatment industries. We have a professional team for R&D,QOC, Marketing and Post Services to our customers, distributors and partners all over the world.

We are committed to providing one-stop services from how-to-choose to final construction with varieties of refractory and insulation materials ranging from 500 ℃ to 2000 ℃.

Our products have been highly praised by our customers from USA, UK, Italy, Germany, Turkey, India, UAE, Brazil, etc. We are always striving to provide customers with comprehensive, one-stop and most suitable "energy saving" schemes to build a green-energy system.

# Our products

# Our products

## Why US?

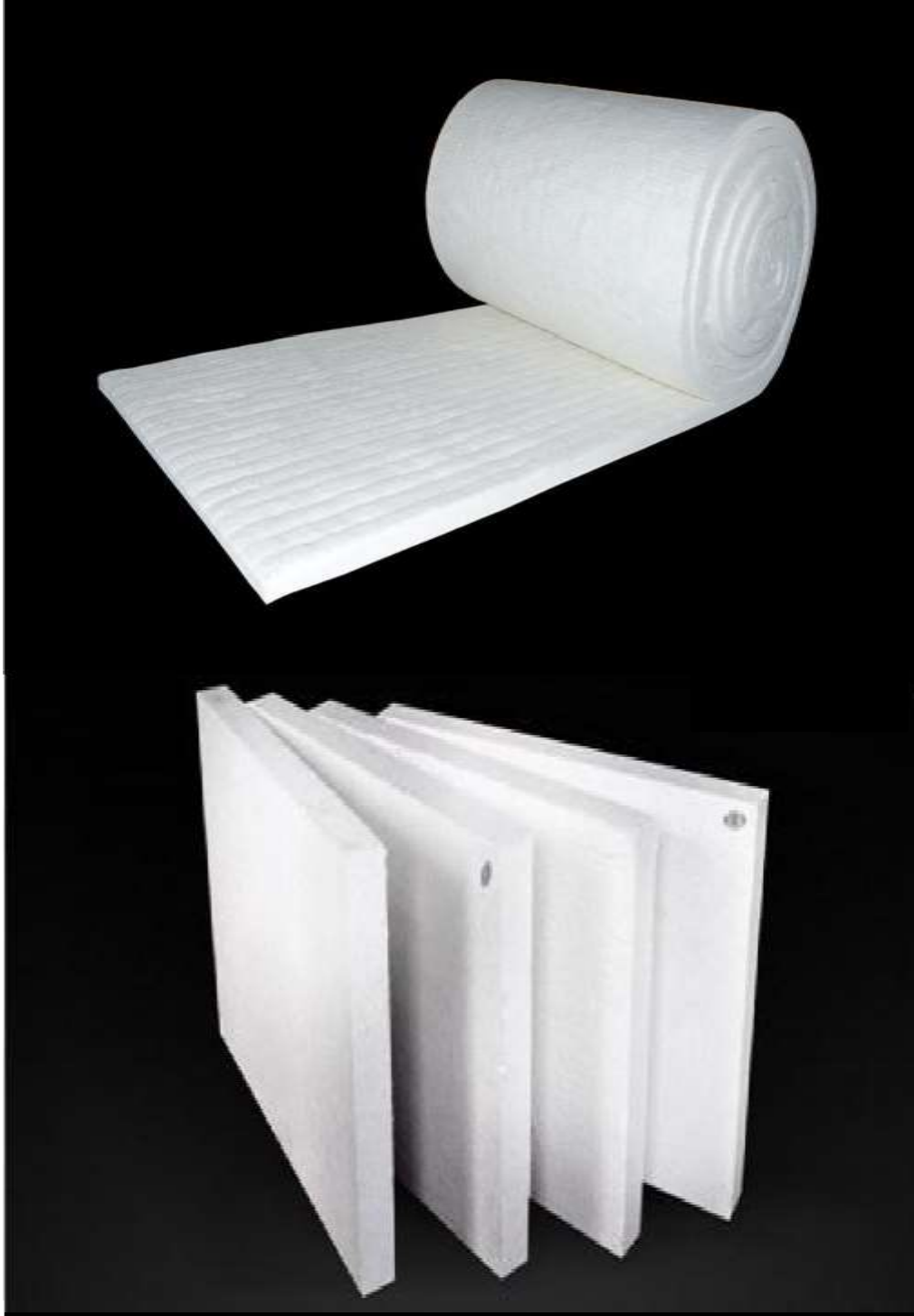
We know what you exactly need:
We have accumulated richful experience on supplying.
Fast Delivery Time:
We can supply most of them from our stock, and we are going to build a new big stock for rapid delivery.
Technical Support:
We can provide professional technical support.
Reasonable Price:
We are targeting on a long-term business cooperation with all the customers and partners, so competitive price will always offer as a support.

## Our Vision

We are striving to provide customers with comprehensive, most suitable "energy-saving" solutions.
We are striving to provide partners and customers with all around services and supports
We are striving to provide our colleagues with promising life.
We are starving to provide shareholders with substantial payback.


# Ceramic Fiber Products (RCF)

Ceramic fiber products also called as Refractory Ceramic Fiber (RCF) and Aluminium Silicate Fiber, with different physical configuration, it presents in different categories.



# Ceramic Fiber Bulks

Ceramic Fiber Bulks are manufactured to be used as feedstock in manufacturing processes or other applications made of high purity composite raw materials, melted in the resistance furnaces and processed by blowing or spinning technology.

## Features:

- ✓ Low thermal capacity
- ✓ Low thermal conductivity
- ✓ Excellent thermal stability
- ✓ Heat resistance
- ✓ Chemical resistance
- ✓ Excellent sound absorption

## Application:

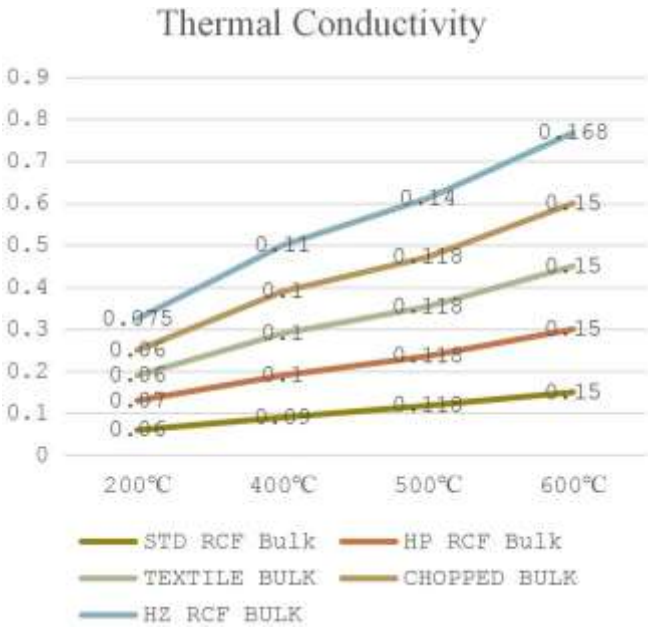
- ✓ Kiln Car filling
- ✓ Chimney filling
- ✓ Kiln roller filling
- ✓ High temperature filter medium
- ✓ Expansion joint filling
- ✓ Feedstock blanket, board, paper and textile.
- ✓ Feedstock for fiber spraying, castables and coatings

**Classification Temperature: 1050℃， 1260 ℃，1360℃，1400℃， 1430 ℃**

## Specifications and packaging

All kinds of fiber bulk are shipped in 20kg carton or 60-80kg package, and can also be packed in compression

| Items | STD RCF Bulk | HP RCF Bulk | TEXTILE BULK | CHOPPED BULK | HZ RCF BULK |
|---|---|---|---|---|---|
| Fiber Diameter（mm） | 3~5 | | | | |
| Shot content(Φ≥0.212mm)（%） | ≤15 | ≤15 | ≤12 | （Φ≥100mesh）≤10 | ≤12 |
| Chopped Length mm(inch) | 203(8) | 203(8) | 203(8) | 203(8) | 203(8) |
| Al2O3 | ≥44 | ≥45 | ≥45 | ≥45 | ≥34 |
| Al2O3+SiO2 | ≥96 | ≥99 | ≥99 | ≥99 | ≥84 |
| ZrO2 | | | | | ≥15 |
| Fe2O3 | < 0.5 | < 0.5 | ≤0.3 | | ≤0.3 |
| Na2O+K2O+Fe2O3 | < 0.9 | < 0.9 | < 0.9 | < 0.9 | < 0.9 |
| Classification Temperature（℃） | 1260 | 1260 | 1260 | 1260 | 1430 |
| Melting Temperature（℃） | 1425 | 1575 | 1575 | 1575 | 1750 |
| Thermal conductivity（W/m.k） | | | | | |
| 200℃ | 0.06 | 0.07 | 0.06 | 0.06 | 0.075 |
| 400℃ | 0.09 | 0.10 | 0.10 | 0.10 | 0.11 |
| 500℃ | 0.118 | 0.118 | 0.118 | 0.118 | 0.14 |
| 600℃ | 0.150 | 0.150 | 0.150 | 0.150 | 0.168 |
| Color | White/even | | | | |
| Packaging | Plastic bag inside, woven bag outside or with Vacuum bag | | | | |




# Ceramic Fiber Blanket

Ceramic Fiber Blanket is made from bulk fibers, produced by the most modern spinning needling and thermal forming processes.
Ceramic Fiber Blanket consist of a group of thermally efficient high temperature insulating materials that combine the advantages of both low heat storage and complete resistance to thermal shock.
Offering a broad range of thermal capabilities and physical characteristics, Ceramic Fiber family provides proven and effective solutions to a variety of heat processing applications.

**Classification Temperature：1050℃， 1260 ℃，1360℃，1400℃， 1430 ℃**

## Features:

- ✓ Heat resistance
- ✓ Low thermal conductivity
- ✓ Thermal shock resistance
- ✓ Excellent chemical stability
- ✓ Low shot content
- ✓ Low heat storage
- ✓ High tensile strength

## Application:

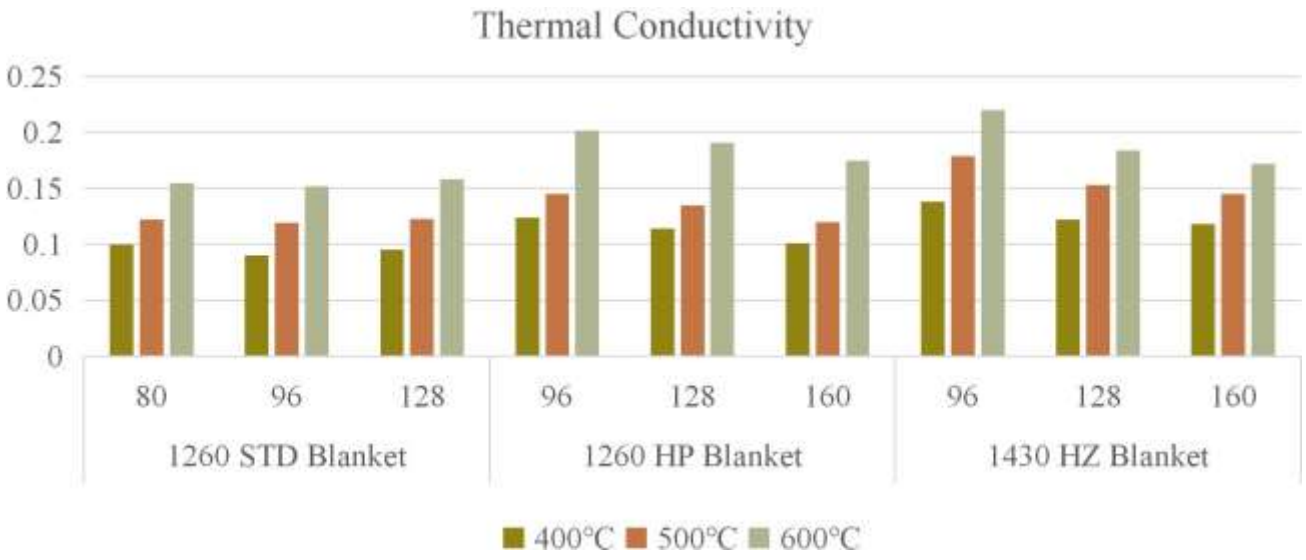
- ✓ Industrial furnace lining
- ✓ High temperature pipes heat preserve
- ✓ Heat resistant sealing gasket
- ✓ Glass tank furnace thermal insulation
- ✓ Power boiler and nuclear heat insulation
- ✓ Ceramics kilns thermal insulation
- ✓ High temperature filter materials

## Specifications and packaging

| Length(mm) | Width(mm) | Thickness(mm) |
|---|---|---|
| 3660 | 610(1220) | 50 |
| 4880 | 610(1220) | 38 |
| 7320 | 610 | 6 |
| 7320 | 610(1220) | 25 |
| 9760 | 610(1220) | 19 |
| 14640 | 610(1220) | 13 |

Other thickness, width and length can be customized.
Packing: Carton and woven bag packaging

| Item | 1260 STD Blanket | | | 1260 HP Blanket | | | 1430 HZ Blanket | | |
|---|---|---|---|---|---|---|---|---|---|
| Chemical Composition（%） | | | | | | | | | |
| Al2O3 | 44 | | | ≥45 | | | ≥34 | | |
| Al2O3+SiO2 | ≥96 | | | ≥98 | | | ≥85 | | |
| ZrO2 | - | | | - | | | ≥15 | | |
| Al2O3+SiO2+ZrO2 | - | | | - | | | ≥99 | | |
| Fe2O3+RTiO2 | 1.0 | | | ≤0.5 | | | ≤0.5 | | |
| K2O+Na2O | 1.0 | | | ≤0.2 | | | ≤0.2 | | |
| Density（Kg/M3） | 80 | 96 | 128 | 96 | 128 | 160 | 96 | 128 | 160 |
| Classification Temperature（℃） | 1260 | | | 1260 | | | 1430 | | |
| Shot Content(%) | ≤15 | | | ≤15 | | | ≤12 | | |
| Fiber Diameter（mm） | 3.5 | | | 3.5 | | | 3.5 | | |
| Permanent Heating Linear Change（%） | | | | 1100℃X24h≤-2.5 | | | 1350℃X24h≤-2.5 | | |
| Thermal Conductivity（W/m.k） | | | | | | | | | |
| 400℃ | 0.100 | 0.090 | 0.095 | 0.124 | 0.114 | 0.101 | 0.138 | 0.122 | 0.118 |
| 500℃ | 0.122 | 0.119 | 0.123 | 0.145 | 0.135 | 0.120 | 0.179 | 0.153 | 0.145 |
| 600℃ | 0.155 | 0.152 | 0.158 | 0.202 | 0.191 | 0.175 | 0.220 | 0.184 | 0.172 |
| Tensile Strength （Mpa） | 0.040 | 0.040 | 0.050 | 0.050 | 0.060 | 0.075 | 0.050 | 0.060 | 0.075 |
| Specifications（mm） | Length X Width：14400/7200/3600X1220/610;Thickness： 6~60mm | | | | | | | | |
| Packing | Plastic bag inside, carton box outside or with pallet or woven bags<br>Can be customized by specific requirement. | | | | | | | | |
| Quality Certificate | ISO9001-2008 ISO14001-2004 | | | | | | | | |



# Ceramic Fiber Low Density Board

Ceramic Fiber Low Density Board is a kind of lightweight and flexible refractory fiber insulation material made from Bulk Fibers, processed by vacuum forming. Ceramic Fiber Low Density Board is a multi-functional products combines excellent tensile and strength together, which is widely used in various furnaces and boilers wall lining and back lining.

## Specifications and packaging

The packaging of fiber Low Density Board is carton packaging, which is placed on the pallet and then wrapped in plastic wrap.

| RCF Low Density Board Specification | |
|---|---|
| Length(mm) | 900, 1200 |
| Width(mm) | 600, 900 |
| Thickness(mm) | 6-25 |

**Classification Temperature：1050℃，1260 ℃，1360℃，1400℃，1430 ℃**

## Features:

- ✓ Low thermal storage, low thermal conductivity
- ✓ Excellent chemical stability
- ✓ Excellent thermal stability and thermal shock

## Application:

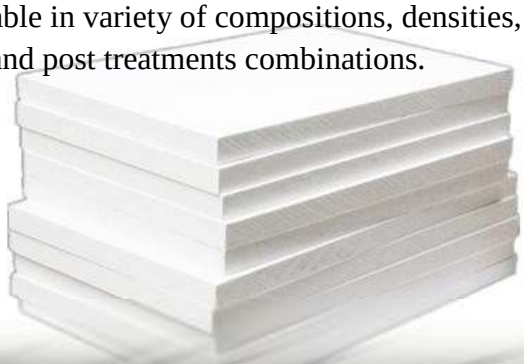
- ✓ Industrial furnace lining
- ✓ Heating equipment wall lining and back lining
- ✓ Ceramics kilns thermal insulation
- ✓ Molten metal thermal insulation, etc...

| Items | LNTX -1050F | LNTX -1260F | LNTX -1260HPF | LNTX -1360F | LNTX -1400F | LNTX -1430F |
|---|---|---|---|---|---|---|
| Permanent Heating Linear Change(%) | 950℃X24h ≤-4 | 1000℃X24h ≤-4 | 1100℃X24h ≤-4 | 1200℃X24h ≤-4 | 1250℃X24h ≤-4 | 1350℃X24h ≤-4 |
| Thermal Conductivity (Average 500℃) W/(m.k) | ≤0.153 | | | | | |
| Water Content（%） | ≤1 | | | | | |
| Organic Content （%） | ≥7 | | | | | |
| Density（Kg/M3） | 180~250 | | | | | |
| $Al_2O_3$ | ≥40 | ≥43 | 44-47 | 51-53 | 43-45 | |
| $Al_2O_3+SiO_2$ | ≥95 | ≥96 | ≥98 | ≥99 | ≥90 | |
| $Al_2O_3+SiO_2+ZrO_2$ | | | | | | ≥99 |
| $ZrO_2$ | | | | | 5~7 | 15~17 |
| $Fe_2O_3$ | < 0.5 | < 0.5 | ≤0.3 | | ≤0.3 | ≤0.2 |
| $Na_2O+K_2O+Fe_2O_3$ | < 0.9 | | | | | |
| Product specifications(mm) | Length: 900/1000/1200/2400 Width：500/600/1000 Thickness：10~25mm All sizes can be customized made | | | | | |
| Packaging | Carton Box outside or with pallet | | | | | |
| Quality Certificate | ISO9001-2008 ISO14001-2004 | | | | | |

# Ceramic Fiber Board

Ceramic Fiber Boards are high performance insulation products manufactured from ceramic fiber bulk and binders, with unique shot removing and vacuum forming process, they offer low thermal conductivity, high temperature stability, uniform density, and excellent resistance to thermal shock and chemical attack.

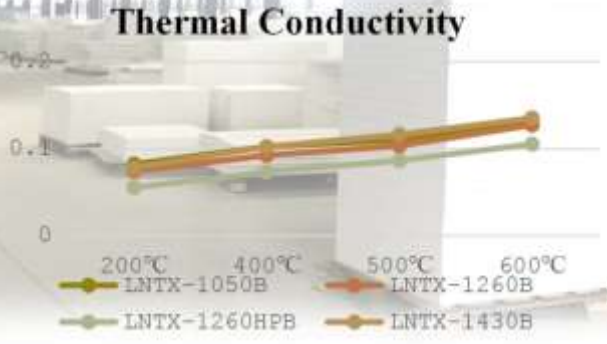
Ceramic Fiber Boards are widely used in various high temperature applications in furnaces, kilns etc. Additional hardness and strength can be reached with post treatments. Available in variety of compositions, densities, sizes and post treatments combinations.



**Classification Temperature：1050℃， 1260 ℃，1360℃，1400℃， 1430 ℃**

## Features:

- ✓ High temperature stability
- ✓ Low thermal conductivity
- ✓ Low heat storage
- ✓ Non-wetting to molten Aluminium
- ✓ Close tolerance with excellent surface finish
- ✓ Easy to cut, drill or saw




## Applications:

- ✓ Furnace linings
- ✓ Kiln furniture
- ✓ Hot gas duct linings
- ✓ Launder insulation
- ✓ General molten metal contact
- ✓ Glass tank side and wall insulation
- ✓ Combustion chamber insulation
- ✓ High temperature gasket and seals

| Description | LNTX-1050B | LNTX-1260B | LNTX-1260HPB | LNTX-1430B |
|---|---|---|---|---|
| Permanent Heating Linear Change（% | 950℃X24h≤-4 | 1000℃X24h≤-4 | 1100℃X24h≤-4 | 1350℃X24h≤-4 |
| Thermal Conductivity(Average 500℃) W/(m.k) | ≤0.165 | | | |
| Water Content（%） | ≤-1.5 | | | |
| Organic Content（%） | ≥-6 | | | |
| Density（Kg/M3） | 250~300 | 280~320 | 300~320 | 300~320 |
| Al2O3 | ≥40 | ≥43 | 44-47 | |
| Al2O3+SiO2 | ≥95 | ≥96 | ≥98 | |
| Al2O3+SiO2+ZrO2 | | | | ≥99 |
| ZrO2 | | | | ≥15 |
| Fe2O3 | < 0.5 | < 0.5 | ≤0.3 | ≤0.2 |
| Na2O+K2O+Fe2O3 | < 0.9 | | | |
| Thermal Conductivity(W/m.k) | | | | |
| 200℃ | 0.082 | 0.074 | 0.055 | 0.078 |
| 400℃ | 0.102 | 0.092 | 0.073 | 0.102 |
| 500℃ | 0.110 | 0.103 | 0.086 | 0.116 |
| 600℃ | 0.133 | 0.127 | 0.105 | 0.135 |
| Cold Crushing Strength (Mpa) | 0.2 | 0.2 | 0.15-0.2 | 0.12 |
| Product Specifications | Length: 900/1000/1200/2400mm; Width：500/600/1000/1200mm; Thickness：3~125mm All sizes can be customized made | | | |
| Packaging | Carton Box outside or with pallet | | | |
| Quality Certificate | ISO9001-2008 ISO14001-2004 | | | |

## Specifications and packaging

The packaging of fiber board is carton packaging, which is placed on the pallet and then wrapped in plastic wrap.

Other sizes and capacities can be produced according to customer requirements.

| board (mm) | | | | |
|---|---|---|---|---|
| 1200x1000 | 900x600 | 1000x600 | 1200x1000 | 900x600 |
| Thickness: 6-50mm | | | | Thickness: 10-25mm |

# Ceramic Fiber Paper

Ceramic Fiber Paper is manufactured from high-grade ceramic fiber formed into flexible sheet. It offers high temperature resistance, very low thermal conductivity, chemical corrosion resistance and thermal shock stability.

Ceramic Fiber Paper can be widely used in the applications where purity, cracking resistance and heat resistance are highly required. It provides excellent heat resistance and thermal insulation in a rather limited space.


**Classification Temperature：1050℃， 1260 ℃，1360℃，1400℃， 1430 ℃**

## Features:

- ✓ High temperature stability
- ✓ Low thermal conductivity
- ✓ Low heat storage
- ✓ Close tolerance with excellent surface finish
- ✓ Easy to cut, drill or saw

## Applications:

- ✓ High temperature gasket
- ✓ Ingot mould liner
- ✓ Refractory back up insulation
- ✓ Heat shield and silencer insulation
- ✓ Hot top lining
- ✓ Molten metal splash and spark protection

## Specifications and packaging

The standard volume and high-dimensional paper has 610mm, 1200mm width, thickness and length listed in the following table. Special thickness, width and length can also be customized and supplied.

| Thickness(mm) | Length(mm) |
|---|---|
| 0.5 | 60 |
| 1 | 60 |
| 2 | 30 |
| 3 | 20 |
| 4 | 15 |
| 5 | 12 |
| 6 | 10 |

| Description | STD Paper | HA Paper | HZ Paper |
|---|---|---|---|
| Chemical Composition（%） | | | |
| Al2O3 | 47 | ≥52 | ≥34 |
| SiO2 | ≥52 | ≥47 | ≥50 |
| ZrO2 | - | - | ≥15 |
| Fe2O3 | 5 | ≤0.5 | ≤0.5 |
| Na2O | | ≤0.2 | ≤0.2 |
| Tensile Strength（MPa） | ≥0.3 | ≥0.3 | ≥0.3 |
| Water Content（%） | ≤2 | | |
| Loss of Ignition（%） | ≤10 | | |
| Organic Content（%） | ≤9 | ≤8 | ≤8 |
| Density （Kg/M3） | 190~250 | | |
| Product Specifications | Length X Width : 40000/30000/20000/10000X1220/610/Thickness: 0.5~6mm | | |
| Packaging | Plastic bag inside, carton box outside or with specific requirement | | |
| Certificates | ISO9001-2008;ISO14001-2004 | | |
| | | | |

# Ceramic Fiber Module

Ceramic Fiber Modules are made from ceramic fiber blanket stacked with cut edges exposed, and anchor systems to enable quick, easy and efficient installation in most furnace linings. These prefabricated modules are designed to meet the thermal insulation requirements of high temperature furnaces. Generally, based on different requirements, there are three regular types available:

A. Stack Bonded (flat surface)
B. Convoluted Module
C. Module with Anchors

**Classification Temperature：1050℃， 1260 ℃，1360℃，1400℃， 1430 ℃**

## Features:

- ✓ Heating furnace and cracking furnace in Petrochemical industry
- ✓ Heating furnace, Annealing furnace and Roller hearth furnace in Metallurgical industry
- ✓ Soaking furnace, homogenizing furnace in Aluminum industry
- ✓ Tunnel kiln, intermittent kiln and Calcining kiln in Ceramics industry
- ✓ Waste gas recovery, Combustion Chamber

## Supply specifications and packaging:

Fiber modules are usually supplied with specifications of 305x305 blocks. Thickness 100x305mm. Made of 25mm thick fiber blanket. Other sizes and capacities can be produced according to customer requirements.

| Description | STD RCF MODULE | HP RCF MODULE | HZ RCF MODULE |
|---|---|---|---|
| Chemical composition（%） | | | |
| Al2O3 | ≥43 | 44-47 | |
| Al2O3+SiO2 | ≥96 | ≥98 | |
| Al2O3+SiO2+ZrO2 | - | - | ≥99 |
| ZrO2 | - | - | ≥15 |
| Fe2O3 | < 0.5 | ≤0.3 | ≤0.2 |
| Na2O+K2O | ≤0.5 | ≤0.2 | ≤0.2 |
| Classification Temperature(℃) | 1260 | 1260 | 1430 |
| Permanent Heating Linear Change(%) | 1000℃X24h≤-2.5 | 1100℃X24h≤-2.5 | 1350℃X24h≤-2.5 |
| Density（Kg/M3） | 160~240 | | |
| Thermal Conductivity(W/m.k) | | | |
| 400℃ | 0.090 | 0.100 | 0.118 |
| 500℃ | 0.119 | 0.120 | 0.149 |
| 600℃ | 0.152 | 0.175 | 0.172 |
| Product Specifications | 300X300X125mm;300X300X300mm<br>All sizes can be customized made by requirement | | |
| Packaging | Plastic bag inside, carton box outside | | |

# Ceramic Fiber Vacuum Formed Shapes

Vacuum Formed Shapes are produced from slurry of ceramic fiber. The shapes are made to exact customer specifications and the flexibility of the process allows for a wide range of profiles and sizes in assorted grades and densities.

## Applications:

- ✓ Industrial furnace lining
- ✓ Heating equipment wall lining and back lining
- ✓ Ceramics kilns thermal insulation
- ✓ Molten metal thermal insulation, etc..

## Specifications and packaging

The vacuum molded products can be packed in carton, and the specific size can be produced according to the requirements of the customer drawings.

**Classification Temperature：1050℃， 1260 ℃，1360℃，1400℃， 1430 ℃**

## Features:

- ✓ Lightweight
- ✓ High definition
- ✓ Resistant to hot gas erosion
- ✓ Resistant to chemical attack
- ✓ Asbestos free
- ✓ Resistant to thermal shock

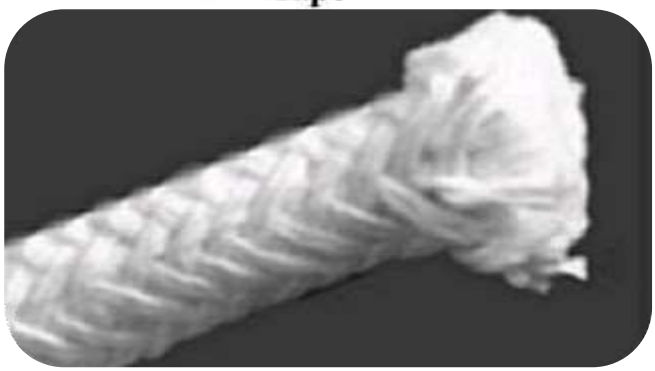
| Items | LNTX-1050VF | LNTX-1260VF | LNTX-1260HPVF | LNTX-1360VF | LNTX-1400VF | LNTX-1430VF |
|---|---|---|---|---|---|---|
| Permanent Heating Linear Change(%) | 950℃X24h≤-4 | 1000℃X24h≤-4 | 1100℃X24h≤-4 | 1200℃X24h≤-4 | 1250℃X24h≤-4 | 1350℃X24h≤-4 |
| Thermal Conductivity (Average 500℃)W/(m.k) | ≤0.153 | | | | | |
| Water Content（%） | ≤1 | | | | | |
| Organic Content（%） | ≥7 | | | | | |
| Density（Kg/M3） | 180~250 | | | | | |
| Al2O3 | ≥40 | ≥43 | 44-47 | 51-53 | 43-45 | |
| Al2O3+SiO2 | ≥95 | ≥96 | ≥98 | ≥99 | ≥90 | |
| Al2O3+SiO2+ZrO2 | | | | | | ≥99 |
| ZrO2 | | | | | 5~7 | 15~17 |
| Fe2O3 | < 0.5 | < 0.5 | ≤0.3 | | ≤0.3 | ≤0.2 |
| Na2O+K2O+Fe2O3 | <0.9 | | | | | |
| Product specifications(mm) | According to specific drawings provided | | | | | |
| Packaging | Carton Box outside or with pallet | | | | | |
| Quality Certificate | ISO9001-2008 ISO14001-2004 | | | | | |

Ceramic Fiber Textile Family

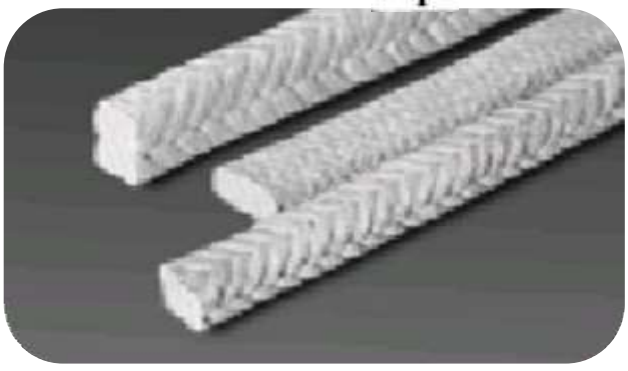
Ceramic Fiber Cloth

Ceramic Fiber Tape

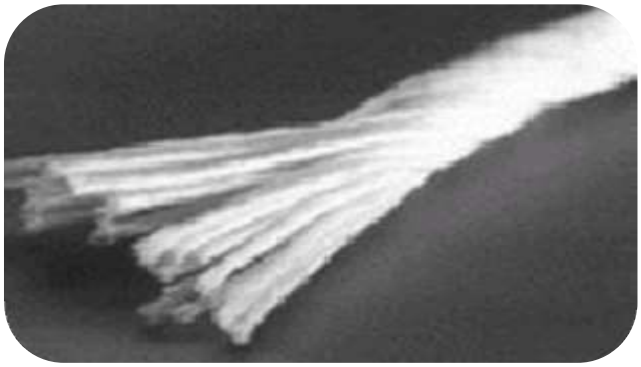
Ceramic Fiber Ladder Tape



C.F. Round Braided Rope



C.F. Square Braided Rope



C.F. Twisted Rope

Ceramic Fiber Yarn

# Ceramic Fiber Yarn

Ceramic Fiber Yarn is manufactured from high quality spun fiber 1260 ℃ , and has been mechanically twisted to give it tensile strength. The yarn is available with E-glass, stainless steel wire or high temperature alloy wire reinforced yarn from 525 Tex up to 2500 Tex in single, two or three plies of single yarn twisted together in order to form a heavier yarn or higher strength.

## Standard specifications:

| Tex (g/km) | Ply | Thickness |
|---|---|---|
| 525 | 2 | 2.0mm |
| 620 | 2 | 2.5mm |
| 1000 | 2 | 3.0mm |
| 2000 | 1 | 3.0mm |
| 2250 | 1 | 3.5mm |

## Applications:

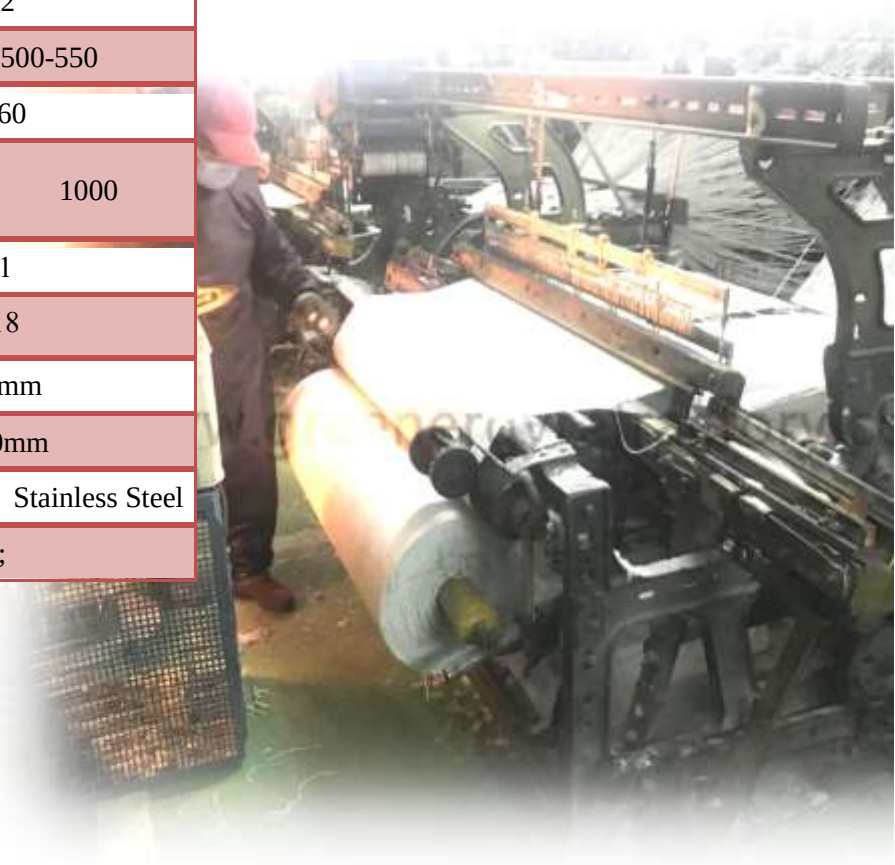
- ✓ High temperature gasket
- ✓ Production of textiles
- ✓ Sewing thread for high temperature textiles

# Ceramic Fiber Cloth

Ceramic Fiber Cloth is a cost-effective industrial cloth manufactured from ceramic fiber yarn, reinforced by a core of glass filament or stainless steel wire for high strength retention at elevated temperatures, ideal for most high temperature applications up to 1000°C.

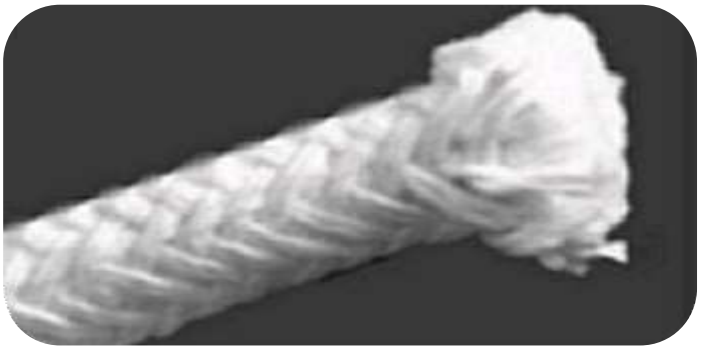
Ceramic Fiber Cloth contains Approximately 18% organic fiber which burns out at high temperatures, causing some smoking, but the cloth retains enough strength to be used as effective insulating cloth at high temperatures.

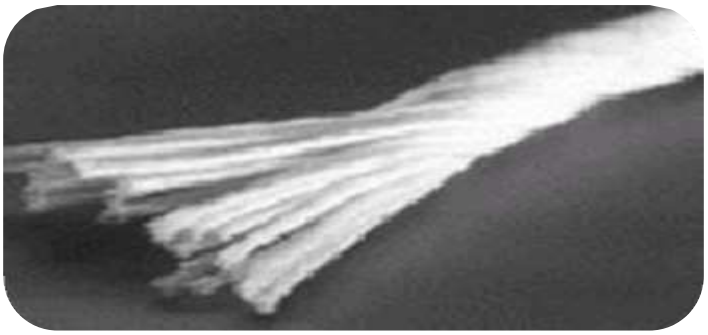
| Description | FG Cloth | SS Cloth |
|---|---|---|
| Al2O3（%） | 45-46 | |
| SiO2（%） | 52-53 | |
| Al2O3+SiO2(%) | 98 | |
| Fe2O3（%） | 0.85 | |
| Fiber length(mm) | 75 | |
| Fiber diameter(um) | 5.2 | |
| Density (Kg/M3) | 500-550 | 500-550 |
| Classification temperature (℃) | 1260 | |
| Maximum Service Temperature (℃) | 500-600 | 1000 |
| Water Content (%) | ≤1 | |
| Organic Content（%） | ≤18 | |
| Thickness(mm) | 1~6mm | |
| width(mm) | 1000mm | |
| Reinforced Material | Fiberglass | Stainless Steel |
| FG: Fiberglass; SS: Stainless steel; | | |



## Applications:

- ✓ Furnace Curtains
- ✓ High temperature insulation
- ✓ High temperature electronics insulation
- ✓ Combustion pipes protection
- ✓ Lining cloth for welding
- ✓ Fireproof rolling curtain
- ✓ Lining sleeves for industrial gas pipes





# Ceramic Fiber Rope

Ceramic Fiber Round Braided Rope is dense, resilient, high performance ceramic fiber material fabricated from ceramic fiber yarn braided around a core of ceramic fiber rope to form a packing in round section. It is widely used for a broad variety of high temperature gasket, packing and sealing application.

Ceramic Fiber Square Braided Rope (square packing) is dense, resilient, high performance ceramic fiber material plaited from E-glass, stainless steel wire or high temperature alloy wire inserted ceramic fiber yarn to form a packing in square section.

Ceramic Fiber Twisted Rope is fabricated from ceramic fiber yarn twisted left hand/right hand together to form a rope of specified diameters ranging from 3 mm to 50 mm, with glass filament, stainless steel wire or high temperature alloy wire inserted to provide high strength at elevated temperature.

## Applications:

- ✓ Wrapping insulation and refractory
- ✓ Sealing for different kinds of furnaces and doors
- ✓ High temperature gasket
- ✓ Lamp wick for burning equipment
- ✓ Replacement for Asbestos

| Description | FG R-Rope | SS R-Rope | FG S-Rope | SS S-Rope | FG T-Rope | SS T-Rope |
|---|---|---|---|---|---|---|
| Al2O3（%） | 45-46 | | | | | |
| SiO2（%） | 52-53 | | | | | |
| Al2O3+SiO2(%) | 98 | | | | | |
| Fe2O3（%） | 0.85 | | | | | |
| Density (Kg/M3) | 500-650 | | | | | |
| Classification temperature (℃) | 1260 | | | | | |
| Maximum Service Temperature (℃) | 500-600 | 1000 | 500-600 | 1000 | 500-600 | 1000 |
| Water Content (%) | ≤1 | | | | | |
| Organic Content（%） | ≤18 | | | | | |
| Specifications | According to specific requirement | | | | | |
| Reinforced Material | Fiberglass | | | Stainless Steel | | |
| FG: Fiberglass; SS: Stainless steel; R-Rope: Round Rope, S-rope: Square Rope, T-rope: Twisted Rope | | | | | | |

## Supply specifications and packaging:

| Product specification | | |
|---|---|---|
| Yarn（Tex） | fineness：420x2, 525x2, 625x2, 630x2, 830x2, 2000x1, 2000x2, 2250x2 | |
| Cloth（mm） | thickness：2、3、5、6 | width：1000 ~ 1500 |
| Tape（mm） | thickness：2、3、5、6 | width：15、25、50、75、100、120、150 |
| Rope（mm） | diameter：3、4、5、6、8、10、12、13、14、16、18、20、25、30、35、40、50 | |
| Aramid pan-gen（mm） | diameter/side length：6、8、10、12、14、16、18、20、25、30、35、40、50 | |
| Aluminum foil coated fiber cloth（mm） | thickness：0.3， 0.5， 2.0， 3.0 | width：1000 |
| Coated fabric（mm） | thickness： 0.2 ~ 2.0 | width：1000 ~ 1500 |

# Ceramic Fiber Tape

Ceramic Fiber Tape is a cost-effective insulating tape made from ceramic fiber yarn, reinforced by a core of glass filament or stainless steel wire for high strength retention at elevated temperatures, ideal for most high temperature applications up to 1000°C.

| Description | FG Tape | SS Tape |
|---|---|---|
| Al2O3（%） | 45-46 | |
| SiO2（%） | 52-53 | |
| Al2O3+SiO2(%) | 98 | |
| Fe2O3（%） | 0.85 | |
| Fiber length(mm) | 75 | |
| Fiber diameter(um) | 5.2 | |
| Density (Kg/M3) | 500-550 | 500-550 |
| Classification temperature (℃) | 1260 | |
| Maximum Service Temperature (℃) | 500-600 | 1000 |
| Water Content (%) | ≤1 | |
| Organic Content（%） | ≤18 | |
| Thickness (mm) | 1~6mm;can be customized made | |
| Reinforced Material | Fiberglass | Stainless Steel |

FG: Fiberglass; SS: Stainless steel;

# Bio Soluble Fiber (AES)

"Fraunhoffer, German laboratory certified"

Bio Soluble fiber, also called as Mg-Cal-Si Fiber and Alkaline Earth Soluble fiber, due to its special biodegradability, is becoming more and more popular in the market. Bio soluble fiber presently has three main products with continuous service temperature below 1100 ℃.

# Bio Soluble Fiber

Bio Soluble Fiber Bulk is lightweight insulating products made from high quality raw materials, which are eletro-melted, fiberized by spun process.
Bio Soluble Fiber Bulk offer high temperature resistance, superior insulating performance, and flexibility. This unique vitreous fiber has very high solubility in body fluids, so has no hazard classification.

## Availability

- ✓ Bulk spun fiber
- ✓ Chopped fiber
- ✓ Lubricant free

## Application

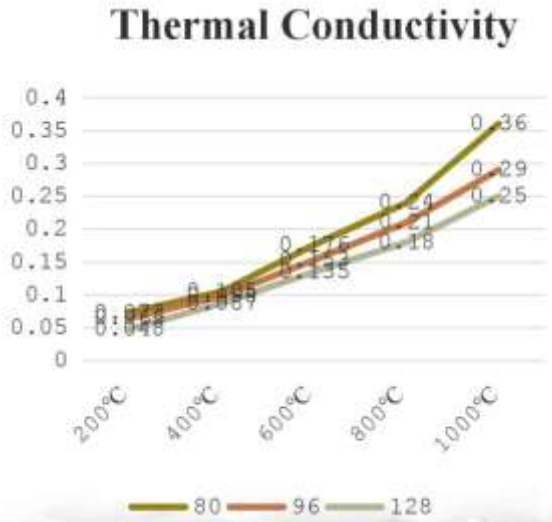
- ✓ Boiler insulation
- ✓ Chimney fill
- ✓ Fire seal
- ✓ Heater insulation
- ✓ Wood burning stove
- ✓ Domestic cooker insulation

| Description | Bio Soluble Fiber Bulk |
|---|---|
| Code | GBSF-1260M |
| Chemical Composition | |
| SiO2 | 55-65% |
| CaO | 23-35% |
| MgO | 5-10% |
| Others | ≤1% |
| Physical Properties | |
| Fiber Diameter(um) | 3-5 |
| Shot Content(%) | 12 |
| Linear Shrinkage after Heating (%) | 1000℃*24h ≤2.5 |

# Bio Soluble Blanket

Bio Soluble Fiber Blankets are a kind of strong, lightweight, flexible insulating products manufactured by using advanced spinning technology, display very low thermal conductivity, super thermal shock resistance, low heat storage and the excellent sound absorption. This unique vitreous fiber has very high solubility in body fluids, so has no hazard classification.

| Description | Bio Soluble Fiber Blanket | | |
|---|---|---|---|
| Code | GBSF-1260T | | |
| Chemical Composition（%） | | | |
| SiO2 | 55-65 | | |
| CaO | 23-35 | | |
| MgO | 5-10 | | |
| Al2O3 | ≤1.3 | | |
| Fe2O3 | ≤0.15 | | |
| Density | 80 | 96 | 128 |
| Color | Light Blue and White | | |
| Tensile Strength(Mpa) | 0.03 | 0.04 | 0.05 |
| Fiber Diameter(um) | 3.50 | | |
| Shot Content(%) | 12 | | |
| Linear Shrinkage After Heating | 1000℃X24h≤2.5% | | |
| Thermal Conductivity（W/m.k） | | | |
| 200℃ | 0.073 | 0.065 | 0.048 |
| 400℃ | 0.105 | 0.098 | 0.087 |
| 600℃ | 0.176 | 0.153 | 0.135 |
| 800℃ | 0.240 | 0.210 | 0.180 |
| 1000℃ | 0.360 | 0.290 | 0.250 |

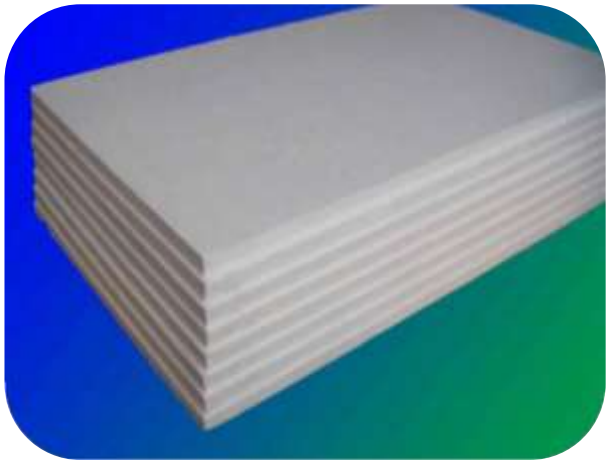



## Features

- ✓ Low thermal conductivity
- ✓ Low thermal capacity
- ✓ Excellent resistance to thermal shock
- ✓ Bio solubility

## Applications

- ✓ Boiler insulation
- ✓ Fire seal
- ✓ Heater insulation
- ✓ Domestic cooker insulation
- ✓ Building expansion joints
- ✓ Fire production column and beam wrap



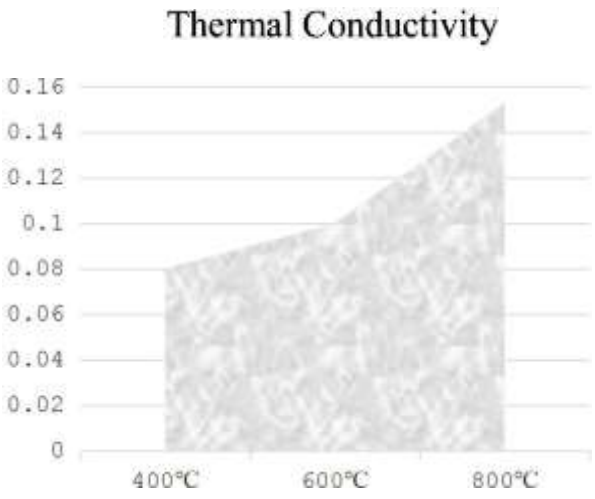
# Bio Soluble Board

Bio Soluble Fiber Board is manufactured from unique vitreous fiber which has very high solubility in body fluids hence has no hazard classification. With Darco's advanced vacuum forming technology, Bio Soluble Fiber Board provides excellent thermal insulation and high tensile strength.

| Description | Bio Soluble Fiber Board |
|---|---|
| Code | GBSF-1260B |
| Chemical Composition | |
| SiO2 | 55-65% |
| CaO | 23-35% |
| MgO | 5-10% |
| Solubility(mg/l) | ≥200 |
| Moisture Content（%） | ≤1 |
| Organic Content（%） | ≤6 |
| Density (Kg/M3) | 280—380 |
| Tensile Strength(Mpa) | ≥0.1 |
| Linear Shrinkage after Heating(%) | 1000℃*24h ≤2.5 |
| Thermal Conductivity（W/m.k） | |
| 400℃ | 0.080 |
| 600℃ | 0.100 |
| 800℃ | 0.153 |
| Specifications（mm） | 900X600/1000X500/1200X1000X25/50mm |
| Packaging | Plastic bag inside, carton box outside or with pallet |

## Applications

- ✓ Refractory lining for industrial furnaces
- ✓ Chimney lining
- ✓ Back-up insulation for bricks and monolithic refractories
- ✓ Transfer of molten aluminum and other non-ferrous metal
- ✓ Domestic cooker insulation
- ✓ Fire door infill
- ✓ Hot gas duct linings
- ✓ Launder insulation
- ✓ Fire protection systems
- ✓ Expansion joint material



# Alumina HT Fiber

Alumina High Temperature Fiber specializes in high temperature thermal insulation solutions whose classification temperature ranging from 1430 ℃ to 1800 ℃

# Alumina HT Fiber Bulk

Alumina High Temperature Fiber Bulk is referred to the refractory fiber with alumina content more than 72%, whose service temperature can reach 1600℃ (2912°F). With high alumina content and less shot, Alumina High Temperature Fiber Bulk products possess low thermal conductivity and low thermal linear shrinkage and superior thermal stability and corrosion proof, which have a longer service life in the harsh high temperature, even corrosion atmosphere.

| Description | LN-1600M |
|---|---|
| Color | White |
| Classification Temperature（℃） | 1600 |
| Molten Point （℃） | 1760 |
| Long time service temperature（℃） | 1500 |
| Chemical composition(%) | |
| Al2O3 | 73 |
| SiO2 | ≤27 |
| Al2O3 +SiO2+Cr2O3 | 100% |
| Shot Content(%) | ≤12 |
| Fiber Diameter(um) | 3.5 |
| Fiber Length(mm/inch) | 203/8; 178/7(chopped) |

## Applications

- ✓ Boiler insulation
- ✓ Chimney fill
- ✓ Filling materials for high temperature equipment
- ✓ Feedstock for high temperature refractory vacuum formed board

## Features

- ✓ Low thermal conductivity
- ✓ Low thermal linear shrinkage
- ✓ Superior thermal stability
- ✓ Corrosion proof

# Alumina HT Fiber Blanket

Alumina High Temperature Fiber Blanket is made from high purity alumina bulk fibers whose alumina content reach 72%. With high alumina content and less shot, alumina fiber blanket possesses low thermal conductivity and low thermal linear shrinkage and superior thermal stability and corrosion proof, which have a longer service life in the harsh high temperature, even corrosion atmosphere.

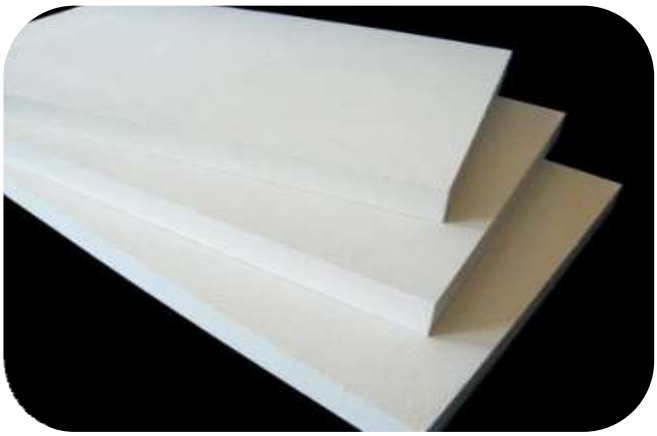
| Description | LN-1600T | |
|---|---|---|
| Color | White | |
| Classification Temperature（℃） | 1600 | |
| Molten Point （℃） | 1870 | |
| Long time service temperature（℃） | 1500 | |
| Fiber Diameter(um) | 3 | |
| Density(Kg/M3) | 96 | 128 |
| Tensile Strength(Mpa) | 0.35 | 0.50 |
| Reheating Linear Change | 1400℃X24h ≤1.0 | |
| Chemical composition(%) | | |
| Al2O3 | 72% | |
| SiO2 | ≤28 | |
| Al2O3 +SiO2 | 99.8 | |
| Others | ≤0.2 | |
| Thermal Conductivity（W/m.k） Average | 0.35 | |
| 800℃ | 0.190 | |
| 1000℃ | 0.260 | |
| 1200℃ | 0.350 | |
| Specifications | 7200/3600X1220/610 X（20-50）mm | |

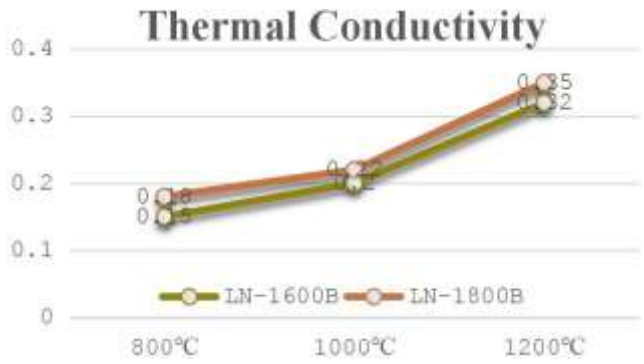
## Features

- ✓ Heat resistance
- ✓ Low thermal conductivity
- ✓ Thermal shock resistance
- ✓ Excellent chemical stability
- ✓ Low shot content
- ✓ Low heat storage
- ✓ High tensile strength

## Applications

- ✓ Industrial furnace lining
- ✓ High temperature pipes heat preserve
- ✓ Heat resistant sealing gasket
- ✓ Glass tank furnace thermal insulation
- ✓ Power boiler, steam turbine, nuclear heat insulation
- ✓ Ceramics kilns thermal insulation
- ✓ High temperature filter materials






# Alumina HT Fiber Board

High Temperature Alumina Fiber Board is made from supreme alumina bulk fibers, processed by special forming technology and treatment which has excellent high temperature resistance, excellent chemical stability, and low thermal conductivity. Meanwhile, different compositions, densities, specifications and post treatment processes are available. Post treatment process can meet additional requirements for hardness, strength, etc.. This depends on specific requirement.

## Features

- ✓ High temperature stability
- ✓ Low thermal conductivity
- ✓ Low heat storage
- ✓ Non-wetting to molten aluminum
- ✓ Close tolerance with excellent surface finish
- ✓ Easy to cut, drill or saw
- ✓ High tensile strength

## Applications

- ✓ Kiln furniture and lining
- ✓ Refractory backup insulation
- ✓ General molten metal contact
- ✓ Glass tank side and wall insulation
- ✓ Combustion chamber insulation
- ✓ High temperature gasket and seals

| Description | LN-1600B | LN-1800B |
|---|---|---|
| Color | White | White |
| Classification Temperature（℃） | 1600 | 1800 |
| Molten Point （℃） | 1870 | 1870 |
| Maximum service temperature（℃） | 1500 | 1650 |
| Density(Kg/M3) | 300-600 | 500-700 |
| Tensile Strength(Mpa) | 0.50 | 0.50 |
| Reheating Linear Change | 1500℃X24h ≤1.0 | 1600℃X24h ≤0.8 |
| Chemical composition | | |
| Al2O3 | 72% | 83 |
| SiO2+Al2O3 | 99 | 99 |
| Others | ≤1% | ≤1% |
| Thermal Conductivity（W/m·k） Average | | |
| 800℃ | 0.15 | 0.18 |
| 1000℃ | 0.20 | 0.22 |
| 1200℃ | 0.32 | 0.35 |
| Specifications | 1200/1000/900X1000/600/500X(6-100)mm | |


# Polycrystal Veneering Module

Veneering Modules are made from high purity polycrystal mullite fiber which can be directly bonded to other refractory material surfaces by high temperature adhesives to improve the thermal insulation performance of furnace lining.

Veneering Modules can be applied in 1600℃ high temperature atmosphere which can still maintain excellent thermal insulation and superior chemical stability.

## Features

- ✓ Low heat storage
- ✓ Low thermal conductivity
- ✓ Resistance to thermal shock
- ✓ Excellent sound-absorbing capacity
- ✓ Excellent chemical stability
- ✓ Ability to withstand gas flow

## Applications

- ✓ Heating furnace lining
- ✓ Heat treatment furnace lining
- ✓ Tunnel Kiln lining
- ✓ Shutter kiln lining

# Calcium Silicate Board & Shapes

Calcium Silicate board is also known as gypsum composite board, is a variety of materials, generally by natural gypsum powder, white cement, glue, glass fiber composite. It has the properties of fire prevention, damp proof, sound proof and heat insulation.

# 650
# Calcium Silicate Board

650 Calcium Silicate Board is a new type board which mainly comprises silica and calcium materials , and manufactured by pulping, molding, steam curing, drying and post processing. Performed board is anti-tread, fireproof, waterproof, damp-proof, radiation resistance, resistance to climate change. This product has excellent performance of light weight, high strength, fire insulation and good processing etc.

| Length（mm） | Width（mm） | Thickness（mm） |
|---|---|---|
| 400 | 250 | 25-120 |
| 500 | 500 | 25-120 |
| 600 | 300 | 25-120 |
| 900 | 600 | 25-120 |
| 1000 | 500 | 25-120 |
| 1050 | 850 | 25-120 |
| 1080 | 950 | 25-120 |
| 1220 | 1220 | 25-120 |

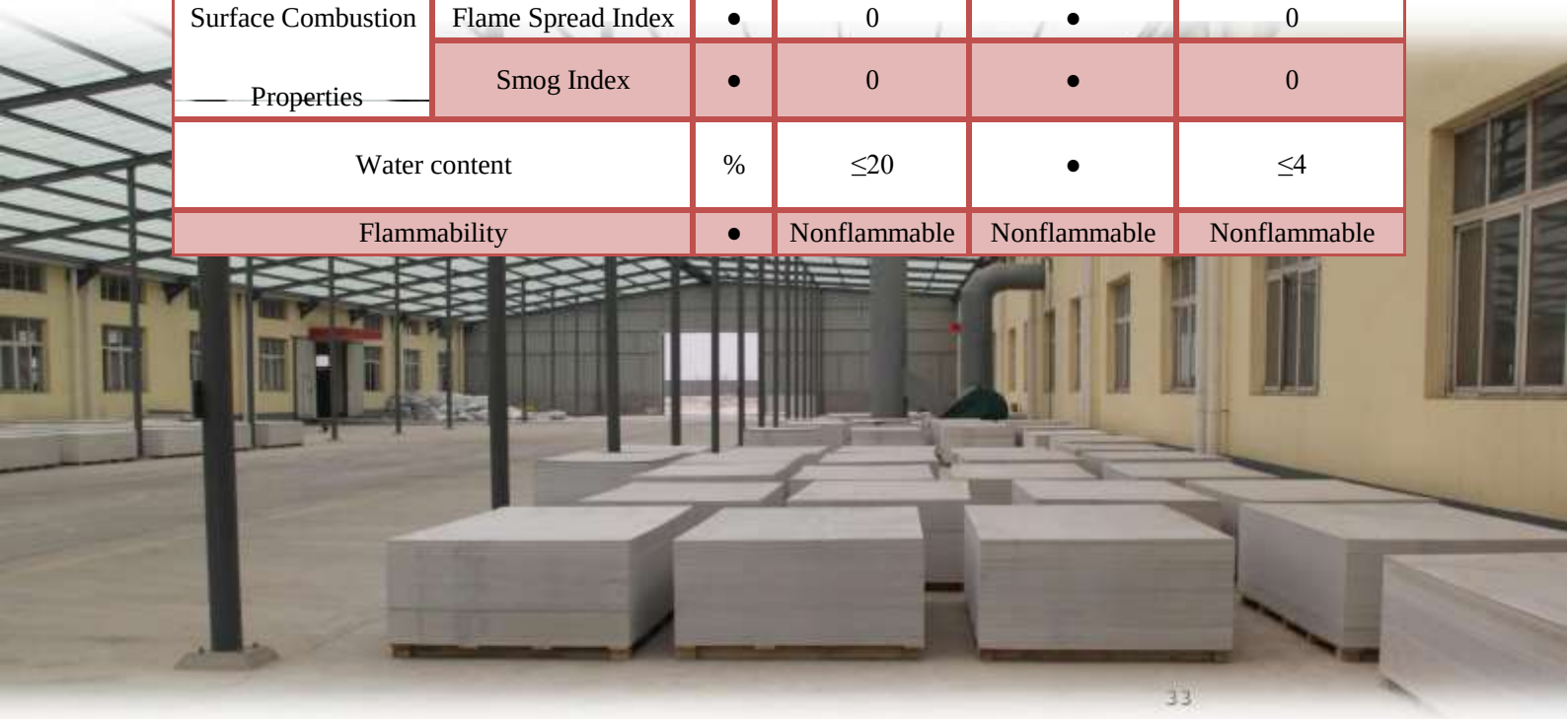
## Features

- ✓ Excellent waterproof performance
- ✓ No oil absorption, no water absorption, maintain the stability of the insulation performance.
- ✓ Non asbestos, no toxic and harmless to human body.
- ✓ High strength.
- ✓ Excellent corrosion resistance
- ✓ Excellent sound insulation

## Application

- ✓ Applied for industrial pipeline, heat supply pipe network system in the fields of electric power, petroleum chemistry, metallurgy ,building and shipping etc.
- ✓ Wall lining and back lining of industry furnace and heating device.

| Physical Properties | | UNIT | ASTM C533 | GB 10699 | GREETEC |
|---|---|---|---|---|---|
| Density | | Kg/m3 | ≤250 | ≤220 | ≤250 |
| Service Temperature | | ℃ | 650 | 650 | 650 |
| Thermal Conductivity | (50℃) | W/m.k | ≤0.060 | • | ≤0.052 |
| | (93℃) | | ≤0.065 | ≤0.065 | ≤0.0535 |
| | (100℃) | | • | ≤0.065 | • |
| | (149℃) | | ≤0.072 | • | ≤0.054 |
| | (200℃) | | ≤0.079 | ≤0.077 | ≤0.056 |
| | (260℃) | | ≤0.087 | • | ≤0.0757 |
| | (300℃) | | • | ≤0.088 | • |
| | (371℃) | | ≤0.102 | • | ≤0.0923 |
| | (400℃) | | • | ≤0.106 | • |
| | (500℃) | | • | ≤0.127 | ≤0.098 |
| | (538℃) | | ≤0.111 | • | ≤0.1002 |
| Linear shrinkage after heating | | % | ≤2.0 | ≤2.0 | ≤1.3 |
| Bending Strength | | Mpa | ≥0.344 | ≥0.30 | ≥0.36 |
| Tensile Strength | | Mpa | ≥0.689 | ≥0.45 | ≥0.85 |
| Heating Surface Properties | | CM | ≤0.635 （Non cracking） | • | ≤0.635 （Non cracking） |
| Surface Combustion Properties | Flame Spread Index | • | 0 | • | 0 |
| | Smog Index | • | 0 | • | 0 |
| Water content | | % | ≤20 | • | ≤4 |
| Flammability | | • | Nonflammable | Nonflammable | Nonflammable |



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# 1000
# Calcium Silicate Board

1050 STD Microporous Calcium Silicate Board is a kind of white, hard new thermal insulation material, it has the performances of light weight, low thermal conductivity, bending resistance, high tensile strength, high temperature resistance, corrosion resistance, nontoxic, nonflammable, can be sawed, easy to processing, not corrode pipeline and equipment etc. Has been widely used as thermal insulation, heat preservation, fireproofing and sound insulation, it is the new type of hard insulation materials which is welcomed by the departments of electric power, petroleum, Chemical industry and metallurgy.

## Application

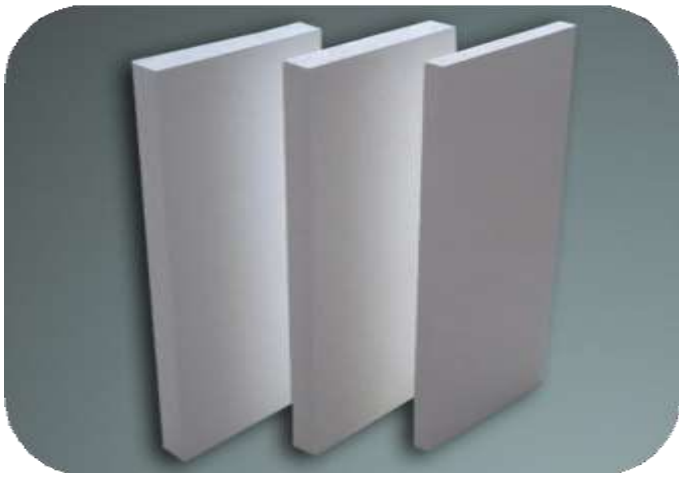
- ✓ Applied for industrial pipeline, heat supply pipe network system in the fields of electric power, petroleum Chemistry, metallurgy ,building and shipping etc.
- ✓ Wall lining and back lining of industry furnace and heating device.

| Length(mm) | Width(mm) | Thickness(mm) |
|---|---|---|
| 400 | 250 | 25-120 |
| 500 | 500 | 25-120 |
| 600 | 300 | 25-120 |
| 900 | 600 | 25-120 |
| 1000 | 500 | 25-120 |
| 1050 | 850 | 25-120 |
| 1080 | 950 | 25-120 |
| 1220 | 1220 | 25-120 |

## Features

- ✓ Excellent waterproof performance
- ✓ Excellent stability
- ✓ Easy to cut and processing
- ✓ High strength.
- ✓ Excellent corrosion resistance
- ✓ Excellent sound insulation

| Physical Properties | UNIT | GREETEC1000 STD | | | | ASTM C533 | JIS A9510 | GBT 10699 |
|---|---|---|---|---|---|---|---|---|
| | | GR-170 | GR-200 | GR-220 | GR-250 | | | |
| Bulk Density | Kg/m3 | 170 ( ±10 ) | 200( ±10 | 220 ( ±10 | 250 ( ±10 | ≤352 | ≤220 | ≤270 , ≤220 |
| Highest Temperature | ℃ | 1000 | | | | | | |
| Rupture Strength | Mpa | ≥0.25 | ≥0.35 | ≥0.50 | ≥0.55 | ≥0.344 | ≥0.30 | ≥0.30 |
| Thermal Conductivity | W/m.k | ≤0.048+0.00011t | | | | ≤0.078( 93℃ | ≤0.060 ( 70℃ | ≤0.060 ( 100℃ ) |
| Linear shrinkage after heating1000℃X16hrs | % | ≤2.0 | | | | | | |
| "t"is the average temperature of working surface and cold surface | | | | | | | | |



# 1100
# Calcium Silicate Board

1100 Microporous Calcium Silicate Board is based on GREETEC 1000 STD Microporous Calcium Silicate Board to Improve the temperature from 1000 ℃ to 1100 ℃, which can meet the service requirement of high temperature part of industrial furnace.

## Features

- ✓ Excellent waterproof performance.
- ✓ No oil absorption, no water absorption, maintain the stability of the insulation performance.
- ✓ Non asbestos, no toxic and harmless to human body.
- ✓ High strength.
- ✓ Excellent corrosion resistance.
- ✓ Excellent sound insulation.

| Length（mm | Width（mm） | Thickness（mm |
|---|---|---|
| 400 | 250 | 25-120 |
| 500 | 500 | 25-120 |
| 600 | 300 | 25-120 |
| 900 | 600 | 25-120 |
| 1000 | 500 | 25-120 |
| 1050 | 850 | 25-120 |
| 1080 | 950 | 25-120 |
| 1220 | 1220 | 25-120 |

| Physical Properties | UNIT | GREETEC |
|---|---|---|
| Density | Kg/m3 | 250±10% |
| Service Temperature | ℃ | 1100 |
| Linear shrinkage after heating（1050℃X3hrs） | % | ≤2 |
| Bending Strength | Mpa | ≥0.36 |
| Tensile Strength | Mpa | ≥0.90 |
| Heating Surface Properties | CM | ≤0.660（Non cracking） |
| Thermal Conductivity | W/m.k | ≤0.058+0.00011t |
| Water Content | % | ≤4 |
| Flammability | ● | Nonflammable |
| “t” is the average temperature of working surface and cold surface | | |

## Application

- ✓ Applied for industrial pipeline, heat supply pipe network system in the fields of electric power, petroleum Chemistry, metallurgy ,building and shipping etc.
- ✓ Wall lining and back lining of industry furnace and heating device.

# 1100 HD Calcium Silicate Board

HD High Strength Calcium Silicate Board is mainly for steel and glass industry, this board has excellent performance of large size, high strength, heat resistance and fireproofing. It can be widely used for heat insulation, heat preservation of industrial kilns, fireproofing of steel structures, fireproof flues and fireproof pipes, etc.

## Features

- ✓ Excellent waterproof performance
- ✓ No oil absorption, no water absorption, maintain the stability of the insulation performance.
- ✓ Non asbestos, no toxic and harmless to human body.
- ✓ High strength.

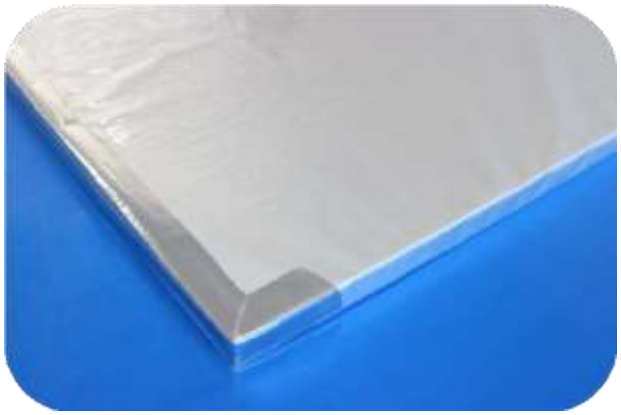
| Physical Parameters | UNIT | GREETEC |
|---|---|---|
| Density | Kg/m3 | 800-1000 |
| Service Temperature | ℃ | 1000 |
| Linear shrinkage after heating （1000℃X3hrs） | % | ≤2 |
| Rupture Strength | Mpa | ≥7 |
| Tensile Strength | Mpa | 13 |
| Thermal Conductivity | W/m.k | 0.13 |
| Flammability | ● | Nonflammable |
| Specification | （2300-2500）X1220X（25~50）mm<br>All size can be customized made | |

## Application

- ✓ Applied for industrial pipeline, heat supply pipe network system in the fields of electric power, petroleum Chemistry, metallurgy ,building and shipping etc.
- ✓ Wall lining and back lining of industry furnace and heating device.

# Microporous Board

Microporous Nano thermal insulation board is a kind of new type thermal insulating material, due to its excellent performance of thermal insulation, it can be applied in all fields of high temperature industrial furnaces, metallurgical industry, high temperature pipeline, nonferrous metals, household appliances and building fire protection. As a new type energy conservation and environmental protection Nano thermal insulation material, its thermal conductivity is even lower than air, under high temperature, its heat insulation performance is 3~4 times better than traditional thermal insulation materials. It is a premium thermal insulating material that can replace most of traditional thermal insulation materials.



# 950 TT Eco Classic Board

| Description | | 950 TT Eco Test Standards and Classic Board | |
|---|---|---|---|
| Color | | Grey | |
| Classification temperature (℃) | | 950 | |
| Melting point | | > 1200 | |
| Bulk density (Kg/M3) | | 250±10% | GB/T17911-2006 |
| Specific heat 800℃ (KJ/Kg K) | | 0.8 | YB /T4130-2005 |
| Tensile strength (Mpa) Compress10% | | 0.50 | GB/T 13480-1992 |
| Linear Shrinkage 850℃ (%) | | ≤2.0 | GB/T17911-2006 |
| Chemical Composition (%) | SiO2 | 80 | GB/T17911-2006 |
| | SiCk | 15 | |
| | Others | 5 | |
| Thermal Conductivity (W/m.k) | 50℃ | 0.018 | YB/T4130-2005 |
| | 200℃ | 0.020 | |
| | 400℃ | 0.023 | |
| | 600℃ | 0.026 | |
| | 800℃ | 0.030 | |
| Production Specification | | Length X Width: 1000X650 ; 650X500Thickness: 10~50mm All sizes can be customized by Requirements. | |

## Packaging

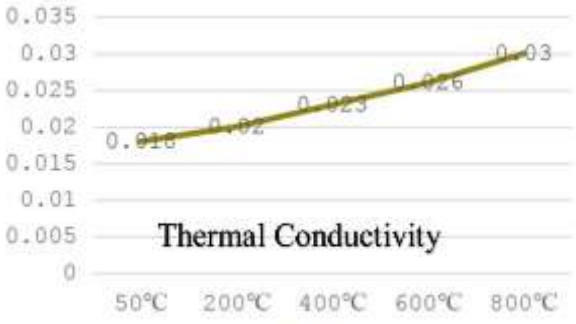
The production forms are in board form, the external protection materials can be PE heat shrink
age film, aluminum foil, fiberglass cloth and other forms of covering materials which can be customized as specific requirements.

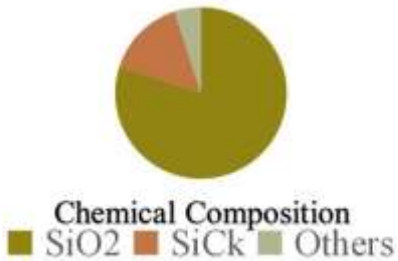
## Applications

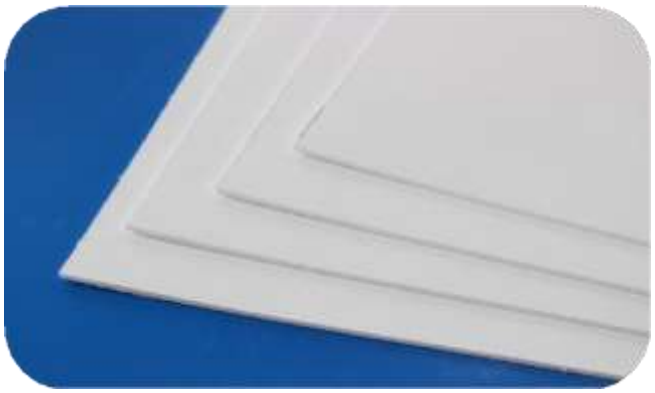
- ✓ High temperature furnace lining
- ✓ Nonferrous metals: smelting furnace, electrolytic cell, holding furnace
- ✓ Electron battery: electric appliance, fuel cell Communication and transportation: automobile, steamship, automobile
- ✓ Household appliance: electric stove, energy storage electric radiator
- ✓ Aeronautics and Astronautics: airplane, universe spacecraft

## Features

- ✓ Low thermal capacity, low thermal conductivity
- ✓ Good elasticity, long service life
- ✓ Excellent chemical stability
- ✓ Excellent thermal stability and thermal shock



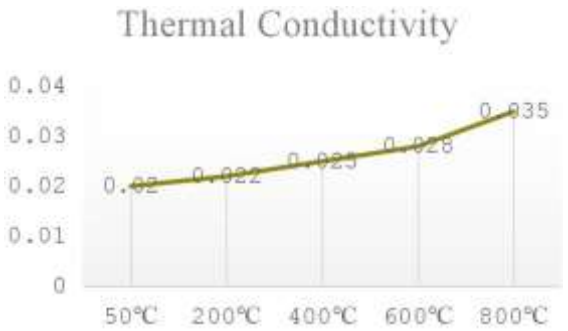



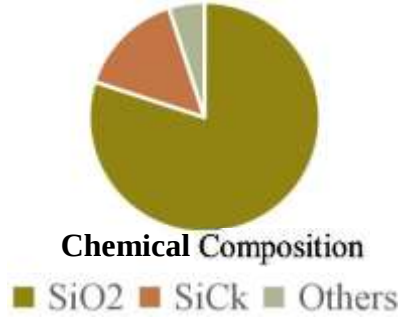


# 950 TT Flex Felt

950 TT Nano thermal insulation felt is a new product developed by the newest nanotechnology with specific inorganic fire-proof Nano powder, the thermal conductivity coefficient of the felt is lower than still air. In the high temperature condition, under high temperature, its heat insulation performance is 3~4 times better than traditional thermal insulation materials. Among current refractories and insulation materials, its heat insulating property is outstanding. On the high-temperature equipment restricted by space and weight, 950 Nano thermal insulation material is the optimal choice, has been applied to all kinds of complicated thermal equipment, and has helped to solve many worldwide problems of thermal insulation.

| Description | | GREENTEC 950 Nano Thermal Insulation Felt |
|---|---|---|
| Color | | Grey |
| Classification temperature (℃) | | 950 |
| Melting point | | > 1200 |
| Bulk density (Kg/M3) | | 350±10% |
| Specific heat 800℃ (KJ/Kg K) | | 0.8 |
| Tensile strength (Mpa) Compress10% | | 1 |
| Linear Shrinkage 850℃ (%) | | ≤2.0 |
| Chemical Composition (%) | SiO2 | 80 |
| | SiCk | 15 |
| | Others | 5 |
| Thermal Conductivity (W/m.k) | 50℃ | 0.020 |
| | 200℃ | 0.022 |
| | 400℃ | 0.025 |
| | 600℃ | 0.028 |
| | 800℃ | 0.035 |
| Production Specification | | Length X Width：1000X650；650X500Thickness：5~50mmAll sizes can be customized by requirements |



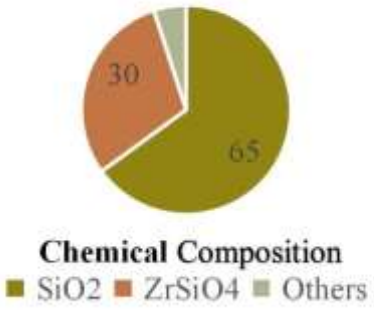

## Packaging

The production forms are in board form, the external protection materials can be PE heat shrinkage film, aluminum foil, fiberglass cloth and other forms of covering materials which can be customized as specific requirements

# TT 1050 Classic

TT 1050 Nano thermal insulation felt is a new product developed by the newest nanotechnology with specific inorganic fire-proof Nano powder, the thermal conductivity coefficient of the felt is lower than still air. In the high temperature condition, under high temperature, its heat insulation performance is 3~4 times better than traditional thermal insulation materials. Among current refractories and insulation materials, its heat insulating property is outstanding. On the high-temperature equipment restricted by space and weight, TT 1050 Nano thermal insulation material is the optimal choice, has been applied to all kinds of complicated thermal equipment, and has helped to solve many worldwide problems of thermal insulation.

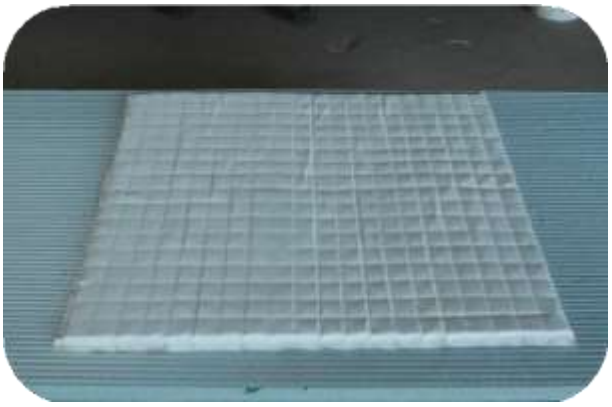
| Description | | TT 1050 Classic |
|---|---|---|
| Color | | White |
| Classification temperature (℃) | | 1050 |
| Melting point | | > 1200 |
| Bulk density (Kg/M3) | | 350±10% |
| Specific heat 800℃ (KJ/Kg K) | | 0.8 |
| Tensile strength (Mpa) Compress10% | | 1 |
| Linear Shrinkage 850℃ (%) | | ≤2.0 |
| Chemical Composition (%) | SiO2 | 65 |
| | ZrSiO4 | 30 |
| | Others | 5 |
| Thermal Conductivity (W/m.k) | 50℃ | 0.022 |
| | 200℃ | 0.024 |
| | 400℃ | 0.026 |
| | 600℃ | 0.030 |
| | 800℃ | 0.034 |
| Production Specification | | Length X Width: 1000X650;650X500 Thickness: 5~50mm All sizes can be customized by requirements |

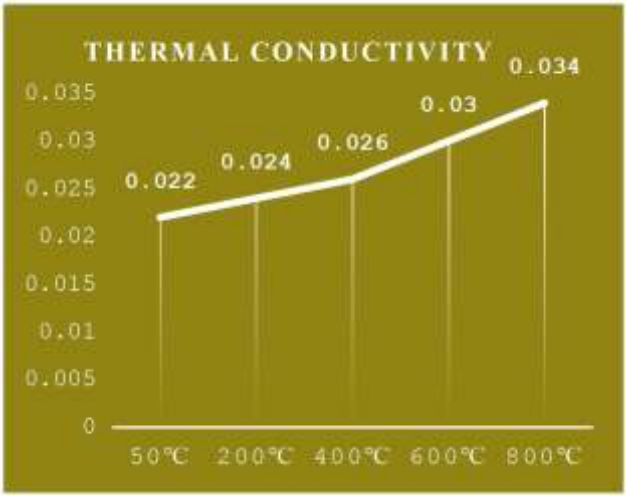

## Packaging

The production forms are in board form, the external protection materials can be PE heat shrinkage film, aluminum foil, fiberglass cloth and other forms of covering materials which can be customized as specific requirements.

# TT 1050 Flex Felt

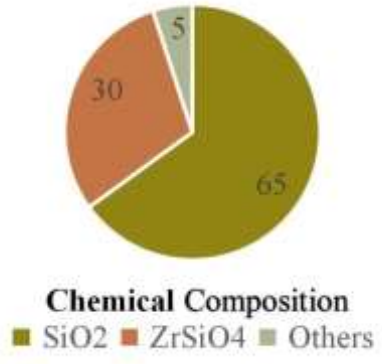


| Description | | TT 1050 Flex Felt |
|---|---|---|
| Color | | White/Grey |
| Classification temperature (℃) | | 1050 |
| Melting point | | > 1200 |
| Bulk density (Kg/M3) | | 350±10% |
| Specific heat 800℃ (KJ/Kg K) | | 0.8 |
| Tensile strength (Mpa) Compress10% | | 1 |
| Linear Shrinkage 850℃ (%) | | ≤2.0 |
| Chemical Composition (%) | SiO2 | 65 |
| | ZrSiO4 | 30 |
| | Others | 5 |
| Thermal Conductivity (W/m.k) | 50℃ | 0.022 |
| | 200℃ | 0.024 |
| | 400℃ | 0.026 |
| | 600℃ | 0.030 |
| | 800℃ | 0.034 |
| Production Specification | | Length X Width: 1000X650 ; 650X500.Thickness : 3,5,7,10mm All sizes can be customized by requirements |

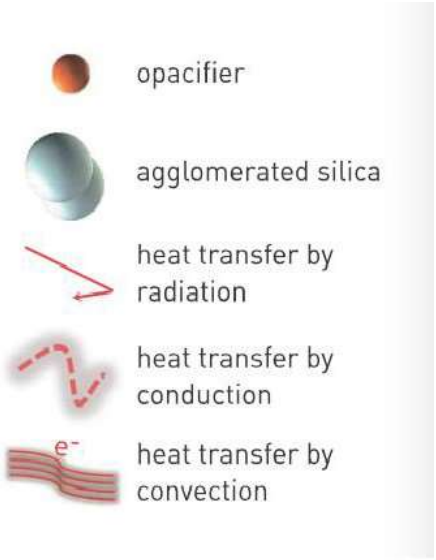



## Packaging

The production forms are in felt form, the external protection materials can be PE heat shrinkage film, aluminum foil, fiberglass cloth and other Forms of covering materials which can be customized as specific requirements.



# Theory of Microporous Board




There are three transmission routes of heat: conduction heat transfer, convection heat transfer and radiation heat transfer, the unique property of Nano thermal insulation materials comes from its unique Nano scale Microporous structure. The nonporous structure, which has been scientifically and rationally designed, has been optimized in the following three ways.

## Radiation heat transfer

The effect of radiation heat transfer is very huge, the Nano thermal insulation material is added with heat resisting anti-infrared ray fines, such anti-infrared additive causes infrared ray be farthest blocked and reflected back to heat resource occurred place, thus the radiation heat transfer effect of thermal insulation materials is very small.

In conclusion, the Nano scale microspore structure and additive of Nano thermal insulation materials developed by newest Nano technology lead to the three routes of heat transfer changed radically, the heat transfer effect in the role of Nano scale micropore goes into minimum value, so the Nano micropore thermal materials with excellent thermal insulation performance are made.

## Conduction heat transfer

The powder particles of Nano thermal insulation materials are very small, the primary particles are about 7nm, the contact area of solid particles are very small, so make the effective thermal resistance through the conduction heat transfer very large, which leads to very low effect of conduction heat transfer.

## Convection heat transfer:

The Nano particles of Nano thermal insulation materials are aggregate, the micropore diameter formed inside of materials is around 20nm, however the thermal motion free range of gas molecules retained in the materials is about 60nm at room temperature, so each gas molecule is locked inside the individual pore and cannot collide with other gas molecules, the convective heat transfer of gas molecules generated from this way is also limited at minimum value, so that the convective heat transfer inside the Nano thermal insulation materials is almost negligible.

# Special Shapes

| Thicknes s s (mm) | Hot surface temperature (℃) | | | | | | | | | | | 1000℃ Radiating W/m2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 850 | 900 | 950 | 1000 | |
| 3 | 85 | 117 | 146 | 175 | 210 | 239 | 269 | 288 | 308 | 319 | 339 | 9489 |
| 5 | 68 | 91 | 115 | 138 | 161 | 184 | 215 | 223 | 240 | 257 | 265 | 5849 |
| 7 | 58 | 77 | 95 | 116 | 136 | 155 | 176 | 190 | 197 | 212 | 227 | 4394 |
| 10 | 50 | 65 | 79 | 94 | 112 | 128 | 146 | 158 | 164 | 177 | 183 | 2999 |
| 15 | | | 64 | 75 | 87 | 103 | 117 | 122 | 132 | 137 | 147 | 2087 |
| 20 | | | | 65 | 74 | 85 | 96 | 104 | 113 | 117 | 126 | 1604 |
| 25 | | | | | 66 | 75 | 85 | 92 | 95 | 103 | 111 | 1305 |
| 30 | | | | | | 68 | 76 | 83 | 86 | 93 | 96 | 1025 |
| 35 | | | | | | | 70 | 76 | 78 | 85 | 87 | 887 |
| 40 | | | | | | | | 70 | 73 | 78 | 81 | 781 |
| 45 | | | | | | | | | 68 | 73 | 76 | 698 |
| 50 | | | | | | | | | | 69 | 71 | 632 |

Tip: Thermal calculation condition: even surface, environmental temperature 20℃, wind speed 0 cold surface radiation coefficient 0.9, hot surface temperature of thermal insulation materials℃ (density 300kg/m3)

# Aerogel

High Performance Insulation Blanket for Industrial Applications and Building & Construction Sector.

# GR06 Series

GR06 Series Aerogel Blanket is a high performance insulation blanket composed of silica aerogel, which is the lowest thermal conductor in the world, and of glass fiber needled mat, suitable for the applications between -50 ℃ to +650 ℃ in industry and in building & construction sector.

Being super low thermal conductive, hydrophobic yet vapor permeable, compression resistant and resilient, inorganic and inflammable profile, easy processing with reduced volume, and environmentally safe, DRT06 Series Aerogel Blanket is the state-of-art product which is the perfect choice for those in need of the best insulation performance with minimum thickness while achieving minimum energy consumption.

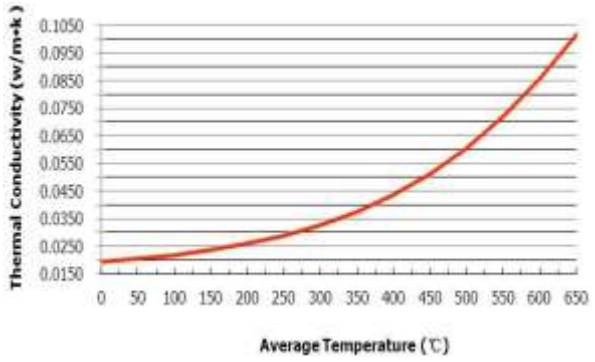
## Characteristics and Benefits

- ✓ Superior Insulation Performance
- ✓ 2~5 times better insulation performance than traditional materials, achieving same and even better insulation performance with minimum insulation thickness
- ✓ Hydrophobic but Vapor Permeable
- ✓ Water repellency and vapor permeability help to prevent Corrosion Under Insulation(CUI)
- ✓ Compression Resistant yet Resilient
- ✓ Compression resistance and bounce-back allow recovering thermal performance after being compressed
- ✓ Inorganic and Inflammable Profile
- ✓ Enables stable performance over long term while providing fire protection to objects
- ✓ Easy for Handling and Installation
- ✓ Can be cut on site easily with conventional cutting tools to fit any specific shape or geometry
- ✓ Less Volume for Storage and Transportation
- ✓ Less volume needed for insulation materials, sharply reducing volume and cost for storage and transportation
- ✓ Environmentally Safe
- ✓ No resperable fiber content, directly landfill disposable

## Applications

- ✓ Steam pipelines in petroleum exploitation, pre-insulated pipes
- ✓ Power plants, petrochemical plants, chemical plants
- ✓ Tanks and containers
- ✓ Ovens and furnaces
- ✓ Trains and vehicles
- ✓ Buildings and constructions

## Physical Properties




## Thermal Conductivity

| Package Form | Roll |
|---|---|
| Standard Thickness | 3mm, 6mm, 10mm |
| Max Width | 1500mm |
| Thermal Conductivity | 0.020w/m·k (at 25℃) |
| Max Use Temperature | 650℃ |
| Density | 200 ± 30 kg/m3 |
| Hydrophobic | Yes |

# GR10 Series

GR10 Series Aerogel Blanket is a high performance insulation blanket composed of silica aerogel, which is the lowest thermal conductive solid in the world, and of special high temperature fiber needled mat, suitable for the applications between 0 ℃ to +1000 ℃ in industry.

Being super low thermal conductive, hydrophobic(only suitable for hydrophobic version) yet vapor permeable, compression resistant, inorganic and inflammable profile, easy processing with reduced volume, and environmentally safe, GR10 Series Aerogel Blanket is the state-of-art product which is the perfect choice for those in need of the best insulation performance with minimum thickness while achieving minimum energy consumption.

## Applications

- ✓ Steam pipelines in petroleum exploitation, pre-insulated pipes
- ✓ Power plants, petrochemical plants, chemical plants
- ✓ Tanks and containers
- ✓ Ovens and furnaces
- ✓ Trains and vehicles

## Characteristics and Benefits

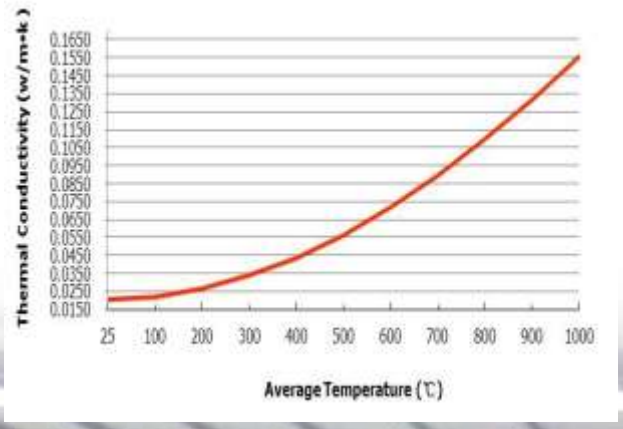
Being super low thermal conductive, hydrophobic(only suitable for hydrophobic version) yet vapor permeable, compression resistant, inorganic and inflammable profile, easy processing with reduced volume, and environmentally safe, GR10 Series Aerogel Blanket is the state-of-art product which is the perfect choice for those in need of the best insulation performance with minimum thickness while achieving minimum energy consumption.

- ✓ Superior Insulation Performance
- ✓ 2~5 times better insulation performance than traditional materials, achieving same and even better insulation performance with minimum insulation thickness
- ✓ Vapor Permeable
- ✓ Water repellency(only suitable for hydrophobic version) and vapor permeability help to prevent Corrosion Under Insulation(CUI)
- ✓ Compression Resistant yet Resilient
- ✓ Flexibility and bounce-back allow recovering thermal performance after being compressed
- ✓ Inorganic and Inflammable Profile
- ✓ Enables stable performance over long term while providing fire protection to objects

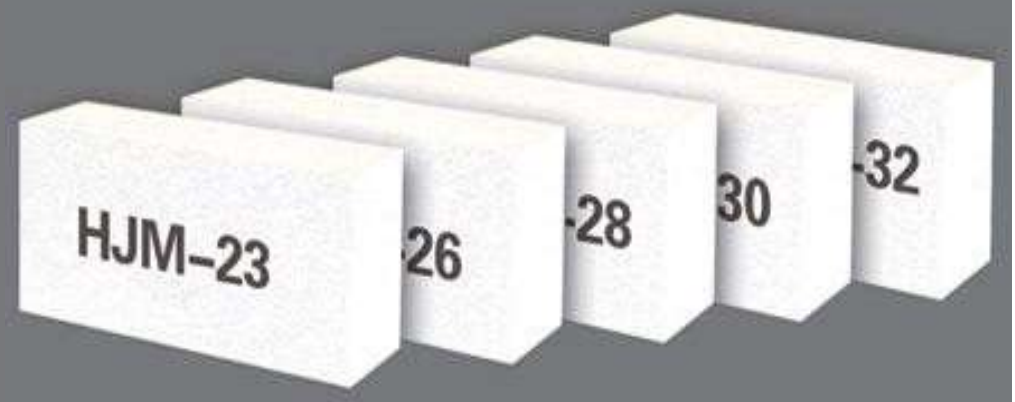
## Thermal Conductivity

| Package Form | Roll |
|---|---|
| Standard Thickness | 6mm |
| Max Width | 1200mm |
| Thermal Conductivity | 0.020w/m.k (at 25℃) |
| Max Use Temperature | 1000℃ |
| Density | 220 ± 20 kg/m3 |
| Hydrophobic | No or Yes |

## Physical Properties



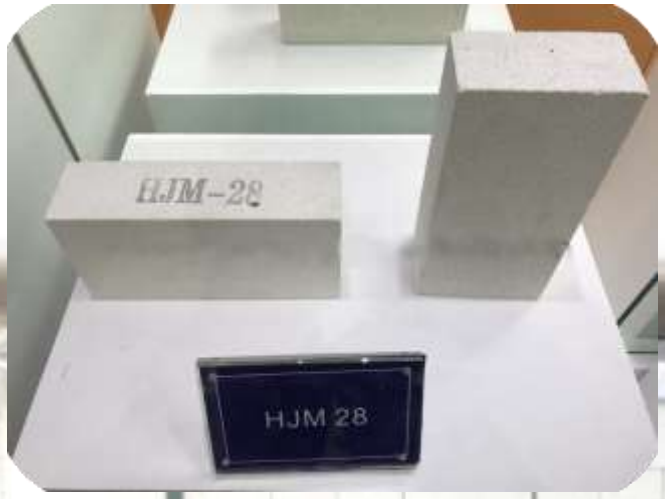

- ✓ Easy for Handling and Installation
- ✓ Can be cut on site easily with conventional cutting tools to fit any specific shape or geometry
- ✓ Less Volume for Storage and Transportation
- ✓ Less volume needed for insulation materials sharply reducing volume and cost for storage and transportation
- ✓ Environmentally Safe
- ✓ No resperable fiber content, directly landfill disposable




# Insulating Firebrick(IFB)

Light refractory bricks have been widely used in heat treatment equipment because of their characteristics such as small density, high porosity, small thermal conductivity, good thermal insulation and certain compressive strength.

# HJM Series


HJM insulating firebrick is manufactured from high grade refractory powder and materials in good purity. During the process of production, some organic and multiple filling materials are added according to the specific requirement proportion. By compressed in vacuum and sintered under high temperature, the brick has typical advantages including low thermal conductivity, good thermal shock resistance, low heat capacity and low iron content as well as outstanding mechanical flexibility which has extensive applications in variety of industrial markets.

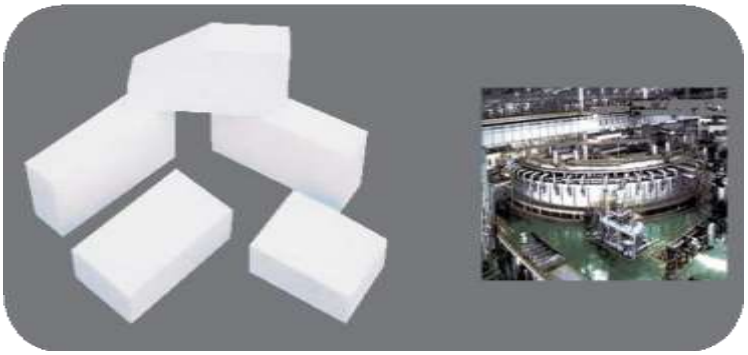
## Applications

- ✓ Cracking furnace
- ✓ Conversion furnace
- ✓ Heating equipment
- ✓ Refining equipment
- ✓ Hot Blast Stove
- ✓ Ceramics kiln

## Features

- ✓ Low thermal capacity,
- ✓ low thermal conductivity
- ✓ Excellent thermal stability
- ✓ High purity and low iron content
- ✓ Excellent thermal resistance
- ✓ Direct access to fire
- ✓ Accurate dimension and easy cutting

| Description | HJM-23 | | | HJM-26 | | HJM-28 | HJM-30 | HJM-32 |
|---|---|---|---|---|---|---|---|---|
| | 23C | 23 | 25 | 26 | 26A | | | |
| Chemical content(As Received Basis): | | | | | | | | |
| $Al_2O_3$ | 37 | 38 | 42 | 42 | 48 | 64 | 71 | 78 |
| $SiO_2$ | 47 | 59 | 54 | 54 | 48 | 33 | 26 | 20 |
| $Fe_2O_3$ | 0.5 | 1.1 | 1 | 0.9 | 0.9 | 0.75 | 0.6 | 0.4 |
| CaO+MgO | 13.8 | / | / | / | / | / | / | / |
| $Na_2O+K_2O$ | 1.5 | / | / | / | / | / | / | / |
| Physical properties | | | | | | | | |
| Density ($g/cm^3$) | 0.49 | 0.60 (37.5pcf) | 0.80 (49.9pcf) | 0.80 (49.9pcf) | 0.80 (49.9pcf) | 0.9 (56.2pcf) | 1.03 (64.3pcf) | 1.3 (81.2pcf) |
| Classification Temperature(°F) | 2300 | 2300 | 2500 | 2600 | 2600 | 2800 | 3000 | 3200 |
| Cold Rushing Strength (Mpa) | 1.5 | 1.0 (145psi) | 2.4 (348psi) | 2.4 (348psi) | 2.4 (348psi) | 2.5 (363psi) | 2.5 (363psi) | 4.0 (581psi) |
| Modulus of Rupture (Mpa) | 1.0 | 0.7 (102psi) | 1.5 (218psi) | 1.5 (218psi) | 1.5 (218psi) | 1.5 (218psi) | 1.8 (361psi) | 2.0 (290psi) |
| Permanent Linear Change(%) | 1230°C (2250°F) X24h -0.1 | 1230°C (2250°F) X24h -0.2 | 1350°C (2462°F) X24h -0.5 | 1400°C (2552°F) X24h -1 | 1400°C (2552°F) X24h -0.6 | 1510°C (2750°F) X24h -0.6 | 1630°C (2948°F) X24h -0.8 | 1730°C (3146°F) X24h 0.8 |
| Thermal Conductivity（W/m.k） | | | | | | | | |
| 400°C（752°F） | 0.14 | 0.18 (1.25**) | 0.27 (1.87**) | 0.28 (1.94**) | 0.27 (1.87**) | 0.31 (2.15**) | 0.42 (2.91**) | 0.50 (3.46**) |
| 600°C（1112°F） | 0.16 | 0.20 (1.39**) | 0.30 (2.08**) | 0.31 (2.15**) | 0.30 (2.08**) | 0.34 (2.36**) | 0.43 (2.98**) | 0.51 (3.53**) |
| 800°C（1472°F） | 0.18 | 0.23 (1.60**) | 0.33 (2.29**) | 0.35 (2.42**) | 0.33 (2.29**) | 0.37 (2.56**) | 0.44 (3.05**) | 0.53 (3.67**) |
| 1000°C（1832°F） | 0.21 | 0.26 (1.81**) | 0.37 (2.56**) | 0.39 (2.70**) | 0.36 2.49**) | 0.40 (2.77**) | 0.48 (3.33**) | 0.56 (3.88**) |



# Corundum Mullite Brick

Alumina bubble brick is made from alumina bubbles and alumina powders, together with other adhesives, burnt by 1750℃. It belongs to the super high temperature thermal insulation material which is widely used as the industrial furnace lining under 1800 ℃ . Since its high porosity, it cannot be applied to the part that contacts slag, or it will be damaged by the slag permeation. Also if used as the furnace lining, the temperature rising rate cannot be too sharp, or it will crack and reduce its service life.

## Features

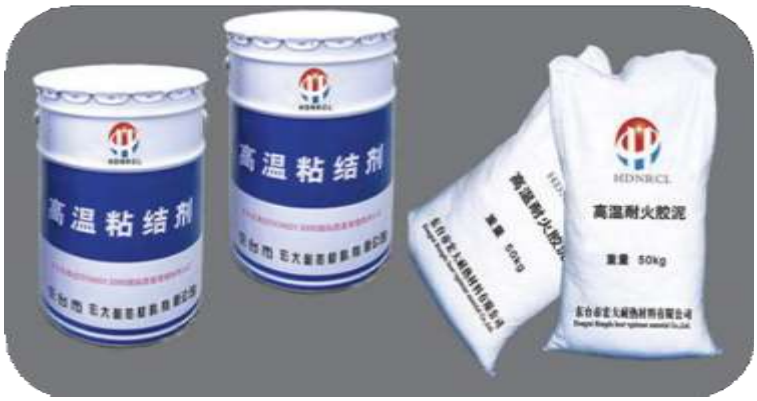
- ✓ Thermal stability
- ✓ Low thermal conductivity
- ✓ High porosity
- ✓ High refractoriness under load
- ✓ Low thermal linear change

## Applications

- ✓ Metallurgy induction furnace lining
- ✓ Petrochemical industrial
- ✓ gas furnace
- ✓ Thermal insulation lining
- ✓ Reaction Furnace lining

| Items | | Alumina Bubble Bricks | |
|---|---|---|---|
| Classification Temperature（℃） | | 1800 | 1700 |
| Density ( g/cm3） | | 1.2-1.6 | 1.2-1.6 |
| Permanent Linear Change (℃×hr.%) | | 1800×4≤0.3 | |
| Cold crushing Strength(Mpa) | | 15 | 16 |
| Modulus of Rupture （Mpa） | | 60-70 | 60-70 |
| Thermal Conductivity 350℃±20℃（w/m.k | | 0.6-0.9 | 0.6-1.0 |
| Refractoriness under load（℃） | | 1750 | 1650 |
| Thermal shock resistance ℃ times | | 1100 Times ＞20 | 15 |
| | Al2O3≥ | 98.5 | 85 |
| Chemical composites( %) | Fe2O3≤ | 0.1 | 0.1 |
| | SiO2 | 0.2 | 15 |

# Refractory Mortars Binder




HJM refractory mortars are specially developed for HJM insulating firebricks are usually supplied in dry state, which can be directly used by mixing certain amount of water.

HJM refractory binders are in wet state which can be directly used to the application. In natural dry state, both can generate great strength and formulate the binding joint and help the bricks to form the monolithic masonry. Usually, they are used together with bricks.

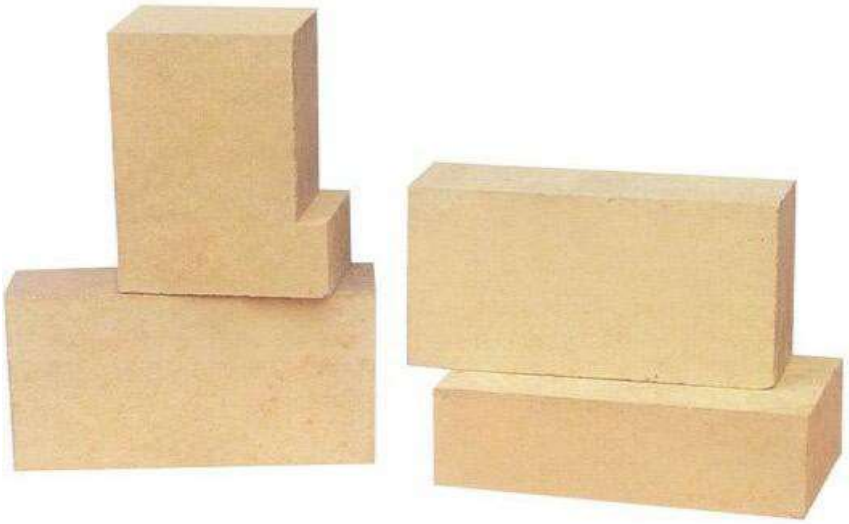
## Applications

Apply to masonry insulating bricks and special quality bricks to prevent the invasion for brickwork by air and hot air, and the corrosion for connection joint by puddle and chemical air.

| Item | | HJM2600 | HJM2800 | HJM3300 |
|---|---|---|---|---|
| Classification Temperature(℃ ) | | 1430 | 1650 | 1760 |
| Room condition (23℃/ relative humidity 50%) | | | | |
| Density (Delivery condition) | | 1750 kg/m3 | 1850 kg/m3 | 2000 kg/m3 |
| Breaking Tenacity 110℃ | | 10-12 | 18-20 | 22-26 |
| Chemical Composite (%) | Al2o3≥ | 35 | 45 | 56 |
| | Fe2O3≤ | 61 | 52 | 40 |
| KGS Needed for 1000 PCS Bricks | | 200 | 200 | 200 |

## Fireclay Bricks
## High Alumina Bricks

Light refractory bricks have been widely used in heat treatment equipment because of their characteristics such as small density, high porosity, small thermal conductivity, good thermal insulation and certain compressive strength.



# Fire Clay Brick

Fire clay bricks are typically used as linings for kilns, furnaces and boilers they possess mechanical strength and can be subjected to extreme thermal cycling and thermal shock. Fire clay bricks also have a high thermal mass which ensures they retain heat and provide excellent energy efficiency.

Fire clay bricks are made by firing a clay based composition until partly vitrified and for specialist applications can also be produced with a glazed finish. Normally fire clay bricks contain 40-50% alumina depending on the maximum operating temperatures.

| Main | Properties | | |
|---|---|---|---|
| Grade | SK30 | SK32 | SK34 |
| Al2O3 | 35 | 36 | 40 |
| Fe2O3 | 2.5 | 2.5 | 2.0 |
| Refractoriness ℃ | 1650 | 1670 | 1730 |
| Refractoriness under load 0.2Mpa（℃） | 1250 | 1300 | 1350 |
| Apparent Porosity(%) | 22-26 | 22-26 | 22-24 |
| Bulk Density(g/cm3) | 2.0 | 2.1 | 2.15 |
| Cold Crushing Strength(Mpa) | 20 | 22 | 25 |
| Thermal Expansion at 1000℃ | 0.8 | 0.6 | 0.6 |

C

# High Alumina Bricks

High alumina bricks are produced with selected bauxite chamotte as main raw material, fired at 1450-1470 ℃ by advanced process with strict quality control.

High alumina bricks have great features like high temperature performance, great corrosion and wear resistance, high bulk density, low iron content, etc.

High Alumina bricks are extensively used in mining, metallurgy, cement, chemical and refinery and refractory industries.

| Main | Properties | | |
|---|---|---|---|
| Grade | SK36 | SK38 | SK40 |
| Al2O3 | 55 | 75 | 80 |
| Fe2O3 | 2.0 | 2.0 | 2.0 |
| Refractoriness ℃ | 1770 | 1790 | 1790 |
| Refractoriness under load 0.2Mpa（℃） | 1470 | 1520 | 1530 |
| Apparent Porosity(%) | 22 | 23 | 21 |
| Reheating Liner Change(%) | -0.4~0.1 | -0.4~0.1 | -0.4~0.1 |
| Cold Crushing Strength(Mpa) | 44 | 54 | 65 |

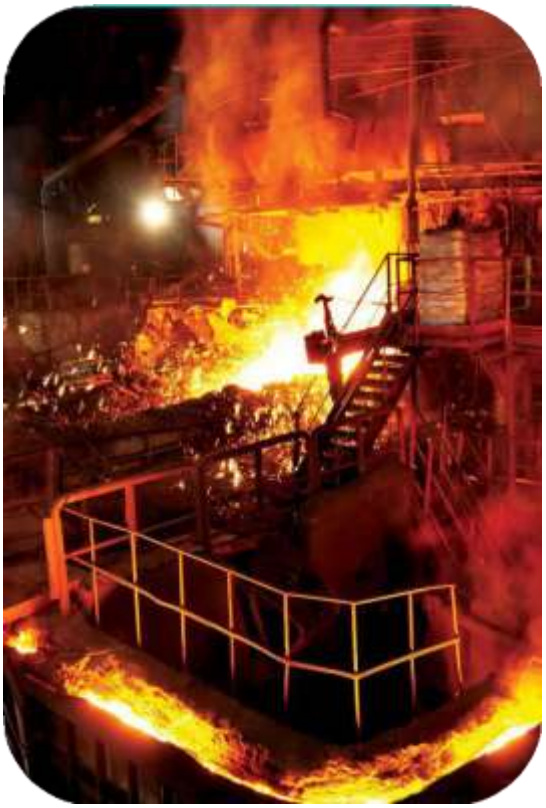
## Mgo & Mgc Bricks

Products whose main mineral components are magnesia. Compared with other refractory bricks, magnesia bricks have higher refractoriness, up to more than 2000, higher load-softening temperature, greater mechanical strength at high temperature, and good resistance to chemical erosion of basic slag containing iron oxide and calcium oxide.

# Magnesium Brick

Magnesium brick is made from periclasite with alkaline refractory products as raw material, it has good refractoriness performance, good refractory under load and high temperature machinery strength and corrosion resistance. It can be applied in metallurgy (EAF, Converter, Mixer furnace), non − ferrous (Smelting furnace) industries and high temperature tunnel kiln, sintered magnesite kiln, cement rotary kiln, glass kilns, new type lime kiln, soaking furnace, heating furnace, etc.

| Items | MgO Brick Series | | | | |
|---|---|---|---|---|---|
| | MZ-90 | MZ-92 | MZ-95 | MZ-96 | MZ-97 |
| Mgo % | ≥90 | ≥92 | ≥95 | ≥96 | ≥97 |
| SiO2% | ≤5.5 | ≤4.5 | ≤2.0 | ≤1.80 | ≤1.0 |
| CaO % | ≤3.0 | ≤2.0 | ≤2.0 | ≤1.80 | ≤1.0 |
| Apparent Porosity(%) | ≤19 | ≤18 | ≤18 | ≤17 | ≤16 |
| Bulk Density（g/cm3） | ≥2.90 | ≥2.92 | ≥2.95 | ≥3.00 | ≥3.05 |
| Cold Crushing Strength (Mpa) | ≥55 | ≥60 | ≥60 | ≥65 | ≥70 |
| High temperature reheating strength (1650 ℃X2hrs)Mpa | 0~0.5 | 0~0.4 | 0~0.3 | 0~0.3 | 0~0.2 |
| Refractoriness under load (0.2 Mpa) ℃ | ≥1550 | ≥1580 | ≥1640 | ≥1660 | ≥1680 |



# Magnesia Carbon Brick

Magnesia Carbon Brick is a basic refractory material made from graphite and periclasite. It has good performances of high temperature resistance, good slag resistance, good thermal shock stability, high strength under high temperature, etc. It is mainly used in Converter, EAF, Refining Ladle, Common Ladle etc.

| Items | MgC Series | | | | |
|---|---|---|---|---|---|
| | MT-10A | MT-14A | MT-14B | MT-18A | MT-18B |
| MgO % | ≥80 | ≥76 | ≥74 | ≥72 | ≥70 |
| C % | ≥10 | ≥14 | ≥14 | ≥18 | ≥18 |
| CaO % | | | | | |
| Apparent Porosity(%) | ≤4 | ≤4 | ≤5 | ≤3 | ≤4 |
| Bulk Density（g/cm3） | ≥2.90 | ≥3.00 | ≥2.95 | ≥3.00 | ≥3.00 |
| Cold Crushing Strength (Mpa) | ≥40 | ≥40 | ≥35 | ≥40 | ≥35 |
| High temperature bending strength (1400 ℃X30min) Mpa | ≥6 | ≥10 | ≥8 | ≥9 | ≥7 |

# Graphite Electrodes

It is mainly made with petroleum coke and needle coke as raw materials and coal and bitumen as the binding agent through Calcining, batching, mixing, pressing, roasting, graphitization and machining. It is the conductor that releases electric energy in electric arc furnace to heat and melt furnace materials.

# Graphite Electrodes

| Items | | Unit | Nominal Diameter | | | | |
|---|---|---|---|---|---|---|---|
| | | | Smelting Standard YB/4089-2000 | | Inner Quality Standard | | |
| | | | 200-400 | 450-500 | 200-300 | 350-500 | 550-600 |
| Electrical Resistivity | Electrode | μΩ•m | ≤7 | ≤7.5 | ≤5.0 | ≤6.5 | ≤7.0 |
| | Joint | | ≤6.5 | ≤6.5 | ≤5.5 | ≤6.0 | ≤6.0 |
| Rupture Strength | Electrode | Mpa | ≥10.5 | ≥9.5 | ≥11.0 | ≥10.0 | ≥15.0 |
| | Joint | | ≥14.0 | ≥14.0 | ≥15.0 | ≥15.0 | ≥15.0 |
| Elasticity Modulus | Electrode | Gpa | ≤12.0 | ≤12.0 | ≤12.0 | ≤12.0 | ≤12.0 |
| | Joint | | ≤16.5 | ≤15.0 | ≤14.0 | ≤14.0 | ≤14.0 |
| Bulk density | Electrode | g/cm3 | ≥1.60 | ≥1.60 | ≥1.64 | ≥1.65 | ≥1.64 |
| | Joint | | ≥1.70 | ≥1.70 | ≥1.75 | ≥1.75 | ≥1.74 |
| Ash content | Electrode | | ≤2.4 | ≤2.4 | ≤2.0 | ≤2.2 | ≤12.2 |
| | Joint | | ≤2.2 | ≤2.2 | ≤2.0 | ≤2.0 | ≤2.0 |
| Thermal expansivity | Electrode | 10-6/°C | ≤0.3 | ≤0.3 | ≤0.2 | ≤0.3 | ≤0.3 |
| | Joint | | | | | | |

| Nominal Diameter | | Sectional Area | YB/Y4089-2000 | | Inner Quality Standard | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Permissible Current Load | Ampere Density | Electric melting furnace | | Finery | |
| | | | | | Permissible Current Load | Ampere Density | Permissible Current Load | Ampere Density |
| In | mm | cm² | A | Acm2 | A | Acm2 | A | Acm2 |
| 8 | 200 | 314 | 5500-9000 | 16-25 | 5000-9000 | 22-30 | 8500-10000 | 27-37 |
| 9 | 225 | 397 | 5500-10000 | 16-25 | 8000-11000 | 20-27 | 10000-1400 | 25-34 |
| 10 | 250 | 495 | 6000-13000 | 16-25 | 10000-13000 | 20-27 | 12500-15000 | 25-34 |
| 12 | 300 | 715 | 13000-17400 | 17-24 | 13500-15000 | 18-25 | 17000-22500 | 23-31 |
| 14 | 350 | 973 | 17400-24000 | 17-24 | 17500-24000 | 16-25 | 22000-31000 | 23-31 |
| 15 | 400 | 1275 | 21000-31000 | 15-24 | 21000-31000 | 17-24 | 25000-30000 | 21-34 |
| 16 | 450 | 1622 | 25000-40000 | 15-24 | 26000-33000 | 16-24 | 32500-49000 | 20-30 |
| 20 | 500 | 2002 | 30000-46000 | 15-24 | 33000-45000 | 16-24 | 40000-50000 | 20-30 |
| 22 | 550 | 2427 | - | - | 36000-55000 | 15-23 | 45000-55000 | 19-29 |
| 24 | 600 | 2892 | - | - | 44000-61000 | 15-23 | 55000-64000 | 19-29 |

## Monolithics and Castables

Granular and powdered materials made of refractory materials and combined with a certain amount of binder and water. With high fluidity, the amorphous refractory which can be hardened without heating can be constructed by pouring.

# Conventional Dense Castables

Conventional Dense castables is mixed by high quality bauxite, flint clay as aggregate, Silica Powder, α-alumina powder as micro powder, refractory cement as binder.
Formulas are changed according to different applications.
GRCD series products are specially designed to use for steel industry, boiler furnaces, incinerators and other industrial furnaces.

| Item | | GRGC60 | GRGC75 | GRGC80 | GRGC85 |
|---|---|---|---|---|---|
| Service Temp℃ | | 1550 | 1600 | 1650 | 1700 |
| Bulk Density (g/cm3) | | 2.2 | 2.4 | 2.5 | 2.7 |
| CCS (Mpa) | 110℃ | 30 | 40 | 50 | 70 |
| | 1100℃ | 25 | 35 | 40 | 60 |
| | 1500℃ | 40 | 55 | 60 | 85 |
| MOR (Mpa) | 110℃ | 8 | 9 | 11 | 12 |
| | 1100℃ | 7 | 8 | 10 | 11 |
| | 1500℃ | 9 | 10 | 12 | 14 |
| Max Grain Size (mm) | | 5 | 5 | 5 | 5 |
| Chemical Analysis(%) Al2O3 Fe2O3 | | 60 2.6 | 75z 2.5 | 80 2.0 | 8.5 1.8 |
| Rebound Rate(%) | | 8-10 | 8-10 | 8-10 | 8-10 |

## Features

- ✓ Good abrasion resistance
- ✓ Good thermal shock resistance
- ✓ Good high-temperature resistance
- ✓ Anti-corrode

## Applications

- ✓ Boiler (CFB, Chain Boiler,etc)
- ✓ Steel Industrial
- ✓ Pizza Oven

# High Alumina Castables

High Alumina castables are mixed by high quality bauxite, mullite, andalusite or Corundum as aggregate, Silica Powder, α-alumina powder as micro powder, refractory cement as binder, also some additive to make better performance. Formulas are changed according to different applications.

Comparing to conventional dense castables, high alumina castables can be used in the area that have higher temperature and also have higher cold crushing strength.

## Features

- ✓ Excellent abrasion resistance
- ✓ Excellent high-temperature resistance
- ✓ Excellent Crushing Strength
- ✓ Anti-corrode

## Applications

- ✓ Steel Industrial (Ladle, Tundish, Induction Furnace, etc.)
- ✓ Incinerators
- ✓ Aluminium
- ✓ Cement Industrial

| Item | GRHA75 | GRHA80 | GRHA85 | GRHA95 |
|---|---|---|---|---|
| Service Temp℃ | 1600 | 1650 | 1700 | 1750 |
| Bulk Density (g/cm3) (Dried at 110℃) | 2.5 | 2.6 | 2.7 | 3.0 |
| CCS 110℃ | 65 | 70 | 90 | 95 |
| (Mpa) 1100℃ | 55 | 60 | 80 | 85 |
| 1500℃ | 80 | 85 | 100 | 110 |
| MOR 110℃ | 10 | 11 | 12 | 13 |
| (Mpa) 1100℃ | 9 | 9 | 10 | 12 |
| 1500℃ | 11 | 12 | 13 | 15 |
| Max Grain Size (mm) | 6 | 6 | 6 | 6 |
| Chemical Analysis(%) | | | | |
| Al2O3 | 75 | 80 | 85 | 95 |
| Fe2O3 | 2.5 | 2.0 | 1.8 | 1.2 |
| Application Guidelines | | | | |
| Mixer | P | P | P | P |
| Placement | V | V | V | V |
| Water/Mixer Temp℃ | 20±5 | 20±5 | 20±5 | 20±5 |
| Mixing Time(Min): Dry/Wet | 2/5 | 2/5 | 2/5 | 2/5 |
| Water % (Typical) | 7-9 | 7-9 | 6-8 | 6-7 |

# Low Cement Castables

Low cement castables is based on the use of low calcium aluminate cement content, and they are used in many applications that require high refractoriness, corrosion resistance and abrasion resistance. They possess a uniform structure with low porosity; have high temperature strength throughout the low and intermediate temperature range.
The content of CaO of low cement castables is usually less than 3%,so it insures the castables have a good strength in mid-temperature.

## Features

- ✓ Low Content of CaO
- ✓ Excellent Mid-Temp Crushing Strength
- ✓ Excellent High Temp Resistance
- ✓ Excellent Wear Resistance

## Application

- ✓ Cement Industrial
- ✓ Rotary Kiln
- ✓ Steel Industrial
- ✓ Furnace
- ✓ CFB Boiler
- ✓ Foundry Industrial

| Item | | GRLC 75 | GRLC 80 | GRLC 85 | GRLC 95 |
|---|---|---|---|---|---|
| Service Temp℃ | | 1650 | 1700 | 1750 | 1780 |
| Bulk Density (g/cm3) (Dried at 110℃) | | 2.55 | 2.6 | 2.7 | 3.0 |
| CCS (Mpa) | 110℃ | 65 | 70 | 80 | 90 |
| | 1100℃ | 75 | 80 | 90 | 95 |
| | 1500℃ | 80 | 85 | 100 | 110 |
| MOR (Mpa) | 110℃ | 9 | 10 | 11 | 13 |
| | 1100℃ | 10 | 11 | 12 | 14 |
| | 1500℃ | 11 | 12 | 13 | 15 |
| Max Grain Size (mm) | | 6 | 6 | 6 | 6 |
| Chemical Analysis(%) | | | | | |
| Al2O3 | | 75 | 80 | 85 | 95 |
| Cao | | 2-3 | 2-3 | 2-3 | 2-3 |
| Fe2O3 | | 2.4 | 2.0 | 1.8 | 1.5 |
| Application Guidelines | | | | | |
| Mixer | | P | P | P | P |
| Placement | | V | V | V | V |
| Water/Mixer Temp℃ | | 20±5 | 20±5 | 20±5 | 20±5 |
| Mixing Time(Min): Dry/Wet | | 2/5 | 2/5 | 2/5 | 2/5 |
| Water % (Typical) | | 7-9 | 7-9 | 6-8 | 6-7 |

Perlite

Vermiculite

Light weight mullite

Bubble Alumina

# Insulating Castables

The material basis of insulation castables can be Perlite, Vermiculite, Light weight clay, Light weight mullite or Bubble alumina according to the different working temperatures. We can supply insulating castables with working temperature from 800 ℃ to 1700 ℃ while the density from 0.8-1.5g/cm3.

| Item | GRIN08 | GRIN12 | GRIN14 | GRIN15 |
|---|---|---|---|---|
| Service Temp℃ | 800 | 1100 | 1400 | 1700 |
| Bulk Density (g/cm3) (Dried at 110℃) | 0.8 | 1.2 | 1.4 | 1.5 |
| CCS 110℃ | 10 | 15 | 25 | 35 |
| (Mpa) 1100℃ | / | 10 | 20 | 30 |
| MOR 110℃ | 3 | 4 | 5 | 6 |
| (Mpa) 1100℃ | / | 3 | 4 | 5 |
| Max Grain Size (mm) | 6 | 6 | 6 | 6 |
| Chemical Analysis(%) | | | | |
| Al2O3 | 25 | 30 | 45 | 83 |
| Fe2O3 | 3.5 | 2.8 | 1.5 | 1.0 |
| Application Guidelines | | | | |
| Mixer | P | P | P | P |
| Placement | V | V | V | V |
| Water/Mixer Temp℃ | 20±5 | 20±5 | 20±5 | 20±5 |
| Mixing Time(Min): Dry/Wet | 1/3 | 1/3 | 1/3 | 1/3 |

## Applications

- ✓ Furnace/Back-up lings
- ✓ Other insulating linings

## Features

- ✓ Low density
- ✓ Low heat thermal conductivity

# Plastic Castables

Plastic Castables are Phos-bonded, bauxite, mullite or corundum-based refractory. They are unsurpassed resistance to acid and neutral as well as basic slags allow it survive the corrosive environments. The plastic castables does not require forms during installation where anchors are present except for flat arch constructions. Usually the binder of plastic castables are liquid Aluminium dihydrogen phosphate, the plasticity can be adjusted when you are doing the installation. We can also supply the plastic castables with powder binder, and plastic castables ready for use (packed in cartons).

| Item | | GRPC65 | GRPC75 | GRPC80 | GRPC95 |
|---|---|---|---|---|---|
| Service Temp℃ | | 1550 | 1600 | 1650 | 1700 |
| Bulk Density (g/cm3) | | 2.4 | 2.5 | 2.6 | 2.8 |
| CCS (Mpa) | 110℃ | 30 | 35 | 40 | 50 |
| | 1100℃ | 45 | 45 | 50 | 65 |
| | 1500℃ | 50 | 50 | 60 | 70 |
| MOR (Mpa) | 110℃ | 8 | 9 | 10 | 12 |
| | 1100℃ | 9 | 10 | 11 | 13 |
| | 1500℃ | 10 | 11 | 12 | 14 |
| Max Grain Size (mm) | | 5 | 5 | 5 | 5 |
| Chemical Analysis(%) Al2O3 Fe2O3 | | 65 2.0 | 75 2.0 | 80 1.8 | 90 1.5 |
| Maxing liquid | | Shall be supplied with the castables powder | | | |

## Features:

- ✓ Excellent Plasticity
- ✓ Excellent high Temperature Resistance
- ✓ Excellent Wear Resistance
- ✓ Excellent Corrosion Resistance

## Applications

- ✓ Boiler
- ✓ Steel Industrial
- ✓ Cement Industry
- ✓ Furnace Repairing

# Gunning Castables

Gunning castables utilize specially selected raw materials including specific aggregate sizing, clays, cement and additives to ensure ease of placement by gunning methods. it can highly reduce installation time, cost and provide performance as good as refractory bricks and casting type castables.
The gunning castables is a tendency in the future, it can highly save the construction time because you do not need to wait for the cooling of the operating area.

## Applications

- ✓ Steel industrial ( Blast Furnace, Tundish, etc.)
- ✓ Boilers
- ✓ Cement industry
- ✓ Other high temp area need to be rush repaired

| Item | | GRGC60 | GRGC75 | GRGC80 | GRGC85 |
|---|---|---|---|---|---|
| Service Temp°C | | 1550 | 1600 | 1650 | 1700 |
| Bulk Density (g/cm3) | | 2.2 | 2.4 | 2.5 | 2.7 |
| CCS (Mpa) | 110°C | 30 | 40 | 50 | 70 |
| | 1100°C | 25 | 35 | 40 | 60 |
| | 1500°C | 40 | 55 | 60 | 85 |
| MOR (Mpa) | 110°C | 8 | 9 | 11 | 12 |
| | 1100°C | 7 | 8 | 10 | 11 |
| | 1500°C | 9 | 10 | 12 | 14 |
| Max Grain Size (mm) | | 5 | 5 | 5 | 5 |
| Chemical Analysis(%) Al2O3 Fe2O3 | | 60 2.6 | 75z 2.5 | 80 2.0 | 8.5 1.8 |
| Rebound Rate(%) | | 8-10 | 8-10 | 8-10 | 8-10 |

## Features

- ✓ Easy installation
- ✓ Low rebound rate
- ✓ High temp resistance
- ✓ Excellent corrosion resistance

## Specifications

Plastic bucket (Iron bucket)

## package

20kg/bucket

# Applications

Roller kiln

Tunnel kiln

Transfer ladle

Resistance furnace

Kiln car

Aluminum Smelting furnace

Steel ladle

Rotary kiln

# Applications


Cement Industry


Power Plant


Ceramics Industry

Glass Industry

Petrochemical Industry

Metallurgy Industry

DARCO INDUSTRIES

"Your Global Solutions Experts"


**Darco Industries**

1 / 245 Barrington Street
Bibra Lake,
WA, 6163
Australia
+61 8 9418 8826
sales@darco.com.au

https://www.darco.com.au/