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Battery safety - Electric Vehicles

Discover our modular, battery pack, and cell solutions. Our range of EcoFiber fibers, polycrystalline fibers, and microporous insulation products are designed to prevent or delay thermal runaway in electric vehicles and energy storage applications.

Our Intumescent Paper, used in cell-to-cell, module-to-module, and battery pack protection systems, offers thermal runaway protection. Its insulative, heat-absorbing, and expansive properties alleviate concerns about space and weight.

We've developed a product portfolio for managing thermal propagation in battery and energy storage applications. Lightweight CCEWOOL EcoFiber fibers, polycrystalline fibers, Intumescent Paper, and microporous insulation products deliver exceptional thermal management, helping design systems that delay or prevent thermal runaway.

CCEWOOL® Low Biopersistent Fiber Blanket 2192

Temperature Grade 1200° C (2192° F) CCEWOOL® Low Biopersistent Fiber Blanket 2192 is made from alkaline earth silicate and is a calcium-magnesium insulating fiber. It is referred to as a soluble fiber because it has some solubility in bodily fluids. The introduction of MgO and CaO in soluble fibers enhances their flexibility, elasticity, and provides excellent thermal and mechanical performance. CCEWOOL® Low Biopersistent

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Fiber Blanket 2192 exhibits outstanding chemical stability and is unaffected by most chemicals except for hydrofluoric acid, phosphoric acid, and concentrated alkalis. If it becomes wet or saturated with water or steam, its thermal and physical properties are not compromised. It's certified by Fraunhofer laboratory.

Characteristic:

Low thermal conductivity;

Low thermal storage;

High tensile strength;

Thermal shock resistance;

Lightweight;

Excellent corrosion resistance.

Application:

Reusable insulation for steam and gas turbines;

High-temperature kiln and furnace insulation;

Furnace door linings and seals;

Furnace repairs;

Boiler and incinerator linings;

Seals and gaskets;

Automotive heat shields;

Appliance insulation;

Fire protection;

Duct, stack and flue linings;

Molten metal splash protection.

TDS

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Classification Temperature (℃)(℉)	1200℃(2192℉)	
Chemical Composition (%)		
SiO2	65-68	
CaO	27-33	
MgO	2-7	
CaO+MgO	-	
Color	Light Bluish	
Shot Content (%)	≤12	
Density (kg/m³)(4lb/ft³)	96(6lb/ft³)	128(8lb/ft³)
Tensile Strength (kPa)	55	75
Permanent Linear Shrinkage (%)	1200℃ x 24h ≤2.8	
Thermal Conductivity (W/m·K)		
200℃	0.05	0.04
400℃	0.09	0.08
600℃	0.19	0.15
800℃	0.3	0.2
1000℃	0.48	0.28
1200℃	0.69	0.49

Thickness	**Density kg/m3**			**Length**	**Width**
mm	96	128	160	mm	mm
13	√	√	○	14640	610, 1220
19	√	√	○	9760	

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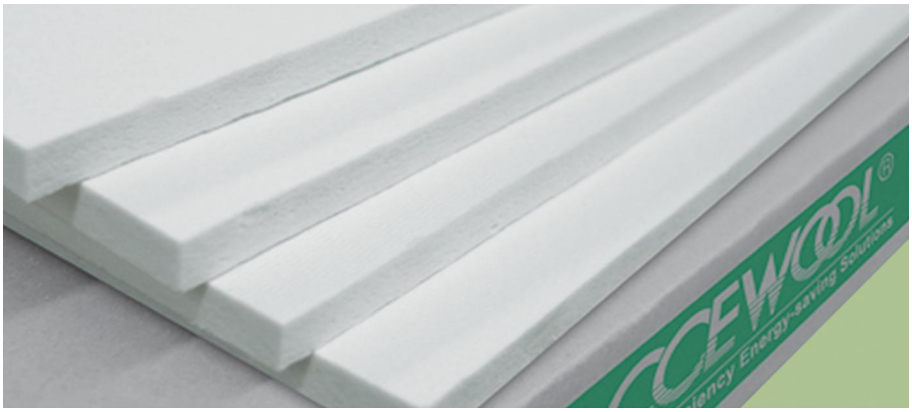
25	√	√	√	7320	
38	√	√	√	4880	
50	√	√	-	3660	

Note: (√) is standard size, Custom size are available

CCEWOOL® Low Biopersistent Fiber Board 2192



Temperature grade 1200℃ (2192℉)

CCEWOOL® Low Biopersistent Fiber Board 2192 is a soluble fiber board made from a mixture of organic and inorganic binders, with a very low Fe2O3 content. Our CCEWOOL® Low Biopersistent Fiber boards can come into direct contact with fire and can be cut into various sizes according to customer requirements. It has an extremely low thermal conductivity, low heat storage capacity, and excellent resistance to thermal shock, making it suitable for applications with large temperature variations.

Characteristics:

Low thermal conductivity;

Low thermal storage;

High tensile strength;

Thermal shock resistance;

Lightweight;

Excellent corrosion resistance.

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Application:

Hot face lining for furnace and oven;

Flue & chimney linings in furnaces & kilns;

Insulating backup for these products:

- Fire brick

- Insulating brick

- Refractory castable;

Insulation for electric appliance and heat treatment.

TDS

CCEWOOL® Low Biopersistent Fiber Board 2192	
Classification Temperature (℃)	1200℃(2192℉)
Color	Light Bluish
Density (kg/m³)	300
Modules of Rupture (MPa)	≥0.25
Compressive Strength (MPa, 10% relative deformation)	0.15
Loss of Ignition (%)	≤7
Permanent Linear Shrinkage (%)	1100℃ x 24h ≤2.0
Thermal Conductivity (W/m·K)	
200℃	0.05
400℃	0.08
600℃	0.10
800℃	0.12
1000℃	0.14

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CCEWOOL® Low Biopersistent Fiber Paper

Temperature Grade: 1200℃ (2192℉)

CCEWOOL® Low Biopersistent Fiber Paper is made from alkaline-earth silicate fibers primarily composed of SiO2, MgO, and CaO, blended with specific organic binders. This soluble fiber product is an innovative solution for high-temperature applications. With its unique calcium-magnesium chemical composition, it meets the requirements of applications up to 1200℃ (2192℉) while also demonstrating significant solubility and environmental-friendly characteristics. We offer soluble fiber paper in thicknesses ranging from 0.5 to 12mm. The product's safe operating temperature reaches up to 1200℃.

Characteristics:

Low bio-persistence fibre;

Excellent thermal insulating performance;

Thin, flexible high-temperature insulation;

Immune to thermal shock;

Low heat storage;

Easily die-cut to form complex shapes for high-temperature gasketing;

Excellent tensile strength;

Low thermal conductivity;

Non-wetting to molten aluminium.

Application:

High temperature gasket and sealing in various application;

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Fire proof;

Fireproof doors;

Expansion joints ;

Fireplace converter gasket;

Gasket between Aluminum and zinc washer

- High temperature gaskets
- Metal lining;

Melting and holding furnaces refractory backing;

TDS

CCEWOOL® Low Biopersistent Fiber Paper	
Classification temperature	1200 ℃(2192℉)
Density, Kg/m3	190-210
Operation temperature	1000℃ (1832℉)
Melting point	>1300℃ (2372℉)
Tensile strength(Kpa)	>250
Loss on ignition (wt%)	9
Permanent Linear shrinkage, % ENV(1094-1)	
After 24 hours ®1000℃	1.5
Thermal conductivity (%)	
400℃	0.1
600℃	0.16
800℃	0.22
Chemical composition (%)	
SiO2	65-68

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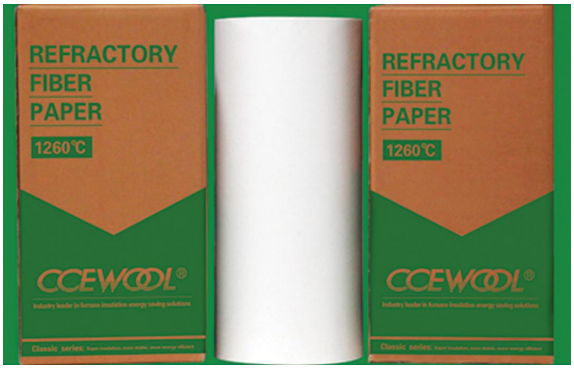
CaO+MgO	27-33
others	<=3%
Specification (MM)	60000*610*1;30000*610*2
	20000*610*3;15000*610*4
	12000*610*5;10000*610*6
	Min Width: 5cm
Package	Inner Plastic Bag+Outer Carton

CCEWOOL® Ceramic Fiber Retardant Paper



Temperature degree: 1260℃(2300℉), 1400℃ (2550℉), 1430℃(2600℉)

CCEWOOL® ceramic fiber retardant paper is a new research of our company. Up to now, it is the only product which doesn't get burnt when contact fire in ceramic fiber paper field. By adding certain proportion fire retardants into ceramic fiber paper's composition, the paper can be directly contact with fire and won't get burnt.

Characteristics :

retardant
Low thermal capacity
Low thermal conductivity
Excellent electrical insulation properties
Excellent machining performance
High strength, tear resistance
High flexibility
Low shot content

Applications:

Industrial insulation, sealing, anti-corrosion material
Insulation material for instruments and heating element
Insulation material for automobile and aerospace industry
Expansion joints filling material
Isolation for construction material, metallurgy and glass industries,

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Molten metal sealing gasket
Fireproof material

TDS

CCEWOOL® Ceramic fiber retardant paper			
Item	1260STD	1400HA	1430HZ
Operation Temperature	1050℃	1200℃	1350℃
Density (kg/m3)	180-200		
Tensile Strength (PSI)	58	94	136
Linear Shrinkage (%)			
@1000C,24hrs	2	-	-
@1100C,24hrs	-	2	-
@1200C,24hrs	-	-	2
Lose on ignition (%)	9	9	9
Chemical Composition (%)			
Al2O3	46	52-55	39-40
Al2O3+SiO2	97	99	-
ZrO2	-	-	15-17
Fe2O3	1	0.2	0.2
Na2O+K2O	0.5	0.2	0.2
Specification (MM)	60000*610*1;30000*610*2		
	20000*610*3;15000*610*4		
	12000*610*5;10000*610*6		
	Min Width: 5cm		
Package	Inner Plastic Bag +Outer Carton		

CCEWOOL® Polycrystalline Wool Fiber Blanket

Temperature Grade 1600℃ (2912℉)

CCEWOOL® Polycrystalline Wool Fiber Blanket is an ideal choice for high-temperature and chemically corrosive applications.

CCEWOOL® Polycrystalline Wool Fiber Blanket is

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produced using sol-gel technology to create fibers of specific dimensions, which are then formed into blankets through a double-sided needling process. The product exhibits excellent strength and flexibility. It is a refractory fiber that exists in the form of mullite crystal phases and maintains its outstanding dimensional stability and elasticity even at high temperatures. The introduction of polycrystalline fiber blankets has effectively filled the gap in the field of fibers for long-term use at temperatures ranging from 1350°C (2462℉) to 1500°C (2732℉).

Polycrystalline fiber blankets are more resistant to acids and alkalis than refractory ceramic fibers and perform exceptionally well in high-temperature environments subjected to oxidation, reduction, and chemical corrosion.

CCEWOOL® Polycrystalline Wool Fiber Blanket is virtually free of shot, resulting in extremely low thermal conductivity and excellent thermal insulation properties.

Characteristics:

Almost no shot, white color, and high purity of raw materials;

Good high temperature resistance and good high-temperature stability;

Extremely low thermal conductivity, low linear shrinkage after heating;

Stable chemical properties and strong corrosion resistance;

Uniform fiber diameter and high tensile strength;

Excellent thermal stability and thermal shock resistance;

Excellent chemical stability;

High tensile strength;

Low thermal conductivity;

Low heat capacity;

High thermal reflectance;

Excellent thermal strength.

Application:

Hot surface lining insulation of high temperature industrial furnace;

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Wrapping of burner block;

Expansion joint;

High temperature gasket in smelting furnace;

Insulation of boilers, tanks, and furnaces in the power generation industry;

Insulation of engines, mufflers, and exhaust systems in the automotive industry;

Insulation for the shipbuilding industry, ships, and oil drilling platforms;

New energy industry, battery fireproof covers, etc.

TDS

CCEWOOL® Polycrystalline Wool Fiber Blanket	
Classification Temperature(℃)(℉)	1600℃(2912℉)
Continuous Temperature Use Limit (℃)(℉)	1500℃(2732℉)
Chemical Composition (%)	
Al2O3（%）	71-73
SiO2（%）	27-29
Leachable Chlorides	Trace
Color	White
Density (kg/m3)	96/128（6,8lb/ft3）
Tensile Strength(kPa)	≥80
Permanent Linear Shrinkage (%)	1400℃ x24h<1.0
Thermal Conductivity (W/m-K)	
400℃	0.09
600℃	0.16
800℃	0.22
1000℃	0.28
1200℃	0.36
1400℃	0.45

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CCEWOOL® Polycrystalline Wool Fiber Board

Temperature Grade 1600℃（2912℉）

CCEWOOL® Polycrystalline Wool Fiber Board is manufactured in a wet forming process using CCEWOOL® Polycrystalline fiber bulk and binders. This product is designed for various applications that require excellent stability and high temperature resistance. It has excellent insulation performance and unparalleled heat resistance, wear resistance, and chemical erosion resistance.

CCEWOOL® Polycrystalline Wool Fiber Board has superior thermal stability and insulation performance compared with refractory ceramic fiber board at extremely high working temperatures, which can reduce energy costs and enhance efficiency.

CCEWOOL® Polycrystalline Wool Fiber Board has higher rigidity and fracture resistance compared to refractory ceramic fiber board, making it very suitable for applications where sag resistance is critical

We offer standard sizes and shapes required in the market. We also make customized sizes as per your specific application.

Characteristics:

High rigidity and lightweight;

Resistance to particle and hot gas erosion;

High strength;

High temperature resistance;

Low thermal conductivity and low heat capacity;

Highly resistant to thermal shock;

Can resist most chemical attacks;

No wetting to molten aluminum, non-ferrous metals and other substances;

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Easy to cut, handle, and install;

Excellent thermal shock resistance;

Low thermal conductivity;

Low heat capacity.

Application:

High temperature laboratory;

High temperature furnaces and kilns;

Aerospace Industry;

Spare insulation layer for dense refractory lining;

Expansion joint;

Hot surface lining of furnace;

Alternative insulation materials for amorphous refractory materials and brick refractory materials;

Ladle lining and cover;

Aluminum groove liner and special shapes;

Riser sleeve, tapping cone, and hot top;

Combustion chamber of boiler and heater;

Hot gas pipeline, flue, and chimney lining;

Heat treated insulation;

Rounded ceramic tiles;

Burner block;

Thermal insulation for glass regenerators, tank sides, end walls, and port necks;

Backup insulation for ladle, tundish, and torpedo car.

TDS

CCEWOOL® Polycrystalline Wool Fiber Board				
Description	PCW1400 Board	PCW1450 Board	PCW1600 LD Board	PCW1600 HD Board

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Classification Temperature (℃)	1600(2912℉)	1600(2912℉)	1700(3092℉)	1700(3092℉)
Continuous Temperature Use Limit (℃)	1400(2552℉)	1450(2642℉)	1600(2912℉)	1600(2912℉)
Chemical Composition (%)				
AlO	60	62	70	70
Al,O,+SiO	98	98	98.5	98.5
Color	White	White	White	White
Density (kg/m³)(lb/ft³)	300	300	250	400
Modules of Rupture(MPa)	≥0.3	≥0.3	≥0.3	≥0.3
Compressive Strength (MPa,10% relative deformation)	0.25	0.25	0.15	0.3
Loss of lanition (%%)	≤8	≤8	≤8	≤8
Permanent Linear Shrinkage (%)	1400℃ x 24h ≤2.0	1450℃ x 24h ≤2.0	1600℃ x 24h ≤1.5	1600℃ x 24h ≤1.5
Thermal Conductivity (W/m-K)				
400℃	0.08	0.08	0.08	0.08
600℃	0.1	0.1	0.12	0.09
800℃	0.13	0.13	0.14	0.12
1000℃	0.16	0.15	0.17	0.15
1200℃	0.19	0.19	0.2	0.19

CCEWOOL® Polycrystalline Wool Fiber Paper

Temperature Grade 1600℃（2912℉）

CCEWOOL® Polycrystalline Wool Fiber Paper is designed for high temperature applications up to 1600°C. Manufactured from high purity Alumina fibres, using advanced production techniques to ensure

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uniform fibre distribution and close control of thickness and density.

CCEWOOL® Polycrystalline Wool Fiber Paper is produced using Alumina fibres with the minimum addition of carefully selected bonds, which burn out in service. The ultra-clean 'shot' free properties of the product promote excellent handling and strength characteristics. CCEWOOL® Polycrystalline Wool Fiber Paper has significant benefits as a separating and parting media for vacuum brazing applications and heat treatment. Other applications include gaskets and seals in furnaces with reducing atmospheres and hot isostatic pressing.

Characteristics:

Almost no shot, white color, and high purity of raw materials;

Good high temperature resistance and good high-temperature stability;

Extremely low thermal conductivity, low linear shrinkage after heating;

Stable chemical properties and strong corrosion resistance;

Uniform fiber diameter and high tensile strength;

Excellent thermal stability and thermal shock resistance;

Excellent chemical stability.

Application:

Expansion joints in industrial furnace linings;

Strips in new fiber module lining overcome shrinkage;

Gap filling for lining maintenance/repair;

High Temperature Gaskets and Seals.

TDS

CCEWOOL® Polycrystalline Wool Fiber Paper	
Typical Chemical Analysis (fibre wt. %)	
Al2O3	95–97
SiO2	3–5

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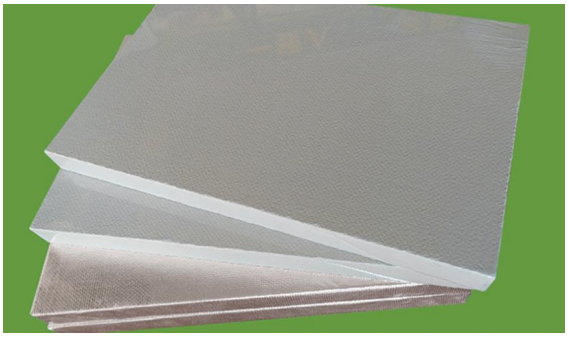
Trace	<0.5
Physical Properties	
Colour	White
Classification Temperature (°C)*	1600(2912℉)
Product Density (kg/m3)	160
Product Thickness (mm)+	8
Loss on Ignition (wt. %)	
from Fibre	0
from Felt	<12

CCEWOOL® M60 Microporous Insulation Board



Temperature Grade: 600℃ (1112℉)

CCEWOOL® M60 Microporous Insulation Board is an efficient insulation product based on advanced microporous insulation technology. At low temperature, it has a lower thermal conductivity than still air. The thermal conductivity increases very little with the increase of temperature. At high temperature, its insulation effect is 3-4 times higher than traditional insulation materials. CCEWOOL® M60 Microporous Insulation Board has high compressive strength, covered with aluminum foil or glass fiber cloth. It is an excellent choice for the lightweight and energy-saving application of kiln.

Characteristics:

Good fit to curved surfaces

Low thermal conductivity

Low heat storage

Non-combustibility

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Application:

Typical Applications

Back-up insulation in high-temperature furnaces

Appliances insulation

Fire protection equipment

Electronic devices

Nonferrous Metal Furnace

Rotary & Shaft Kiln

Various Incinerator

Reheating Furnace

Permanent Lining For EAF Ladle

General Industrial Furnace etc.

TDS

CCEWOOL® M60 Microporous Insulation Board	
Description	M60 Board
Recommended Temperature of Use (℃)	600 (1112℉)
Density (kg/m³)	300/320
Modules of Rupture (MPa)	≥0.15
Compressive Strength (MPa, 10% relative deformation)	≥0.3
Permanent Linear Shrinkage (%)	600℃ x 24h ≤2.0
Thermal Conductivity (W/m·K)	
100℃	0.022
200℃	0.024
300℃	0.028
400℃	0.029
500℃	-

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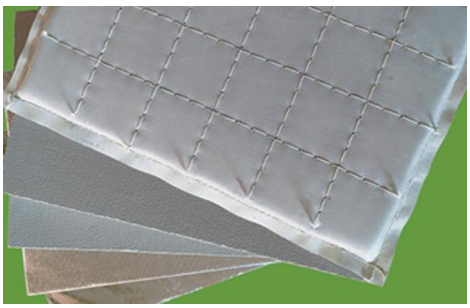
600℃	-
Covering Material	Aluminum Foil / PE Foil / Glass Fiber Cloth
Standard Size (mm)	600 x 400 x (10-50)
	1000 x 500 x (10-50)

CCEWOOL® M90 Microporous Insulation Board



Temperature Grade: 900℃ (1652℉)

CCEWOOL® M90 Microporous Insulation Board is an efficient insulation product based on advanced microporous insulation technology. It has a lower thermal conductivity than stagnant air, making it an ideal high-temperature insulation material. The surface of the board can be coated with aluminum foil or PE shrink film. The nano board can also be coated with high-temperature glass fiber materials on the surface of nano-microporous insulation materials using a special process, giving it low thermal conductivity while maintaining moderate flexibility, allowing for multidimensional bending to meet the requirements of special space applications.

Characteristics:

Good fit to curved surfaces

Excellent thermal shock resistance

Excellent thermal stability

Low thermal conductivity

Low heat storage

Non-combustibility

Application:

Typical Applications

Back-up insulation in high-temperature furnaces

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Appliances insulation

Fire protection equipment

Electronic devices

Nonferrous Metal Furnace

Rotary & Shaft Kiln

Various Incinerator

Reheating Furnace

Permanent Lining For EAF Ladle

General Industrial Furnace etc.

TDS

CCEWOOL® M90 Microporous Insulation Board	
Description	M90 Board
Recommended Temperature of Use (℃)	900(1652℉)
Density (kg/m³)	280/300
Modules of Rupture (MPa)	≥0.15
Compressive Strength (MPa, 10% relative deformation)	≥0.3
Permanent Linear Shrinkage (%)	900℃ x 24h ≤2.0
Thermal Conductivity (W/m·K)	
100℃	0.02
200℃	0.023
300℃	0.026
400℃	0.027
500℃	0.033
600℃	-
Covering Material	Aluminum Foil / PE Foil / Glass Fiber Cloth
	600 x 400 x (10-50)

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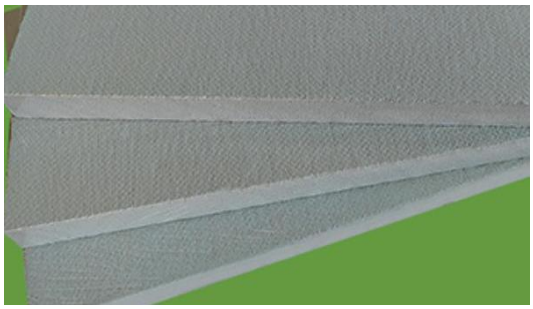
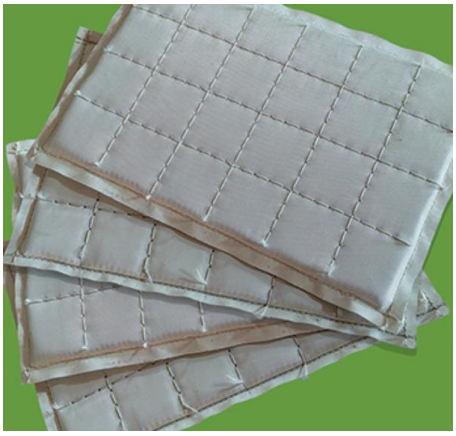
Standard Size (mm)	1000 x 500 x (10-50)

CCEWOOL® M110 Microporous Insulation Board



Temperature Grade: 1100℃(2012℉)

CCEWOOL® M110 Microporous Insulation Board is a nanoscale microporous insulation material and is the best high-temperature solid insulation material with superior insulation performance to date. The surface can be covered with outer materials such as aluminum foil, glass fiber cloth, etc., to reduce dust, decrease damage, increase strength, and prevent moisture damage. At low temperatures, the product has a lower thermal conductivity than stagnant air, with a slight increase in thermal conductivity as the temperature rises. It provides 3-4 times better insulation performance at high temperatures compared to traditional insulation materials.



CCEWOOL® M110 Microporous Insulation Board is an ideal material for reducing heat loss and improving energy efficiency, making it an excellent choice for applications such as kilns and other lightweight and energy-saving applications.

Characteristics:

Extremely low thermal conductivity, significantly reduces insulation layer thickness and improves insulation efficiency.

Low heat dissipation and heat storage, increases heating and cooling rates.

Environmentally friendly, non-toxic, and harmless.

Durable material, capable of self-support.

Excellent thermal stability.

Superior resistance to rapid temperature changes.

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Application:

Back-up insulation in high-temperature furnaces

Appliances insulation

Fire protection equipment

Electronic devices

Nonferrous Metal Furnace

Rotary & Shaft Kiln

Various Incinerator

Reheating Furnace

Permanent Lining For EAF Ladle

General Industrial Furnace etc.

TDS

CCEWOOL® M110 Microporous Insulation Board	
Description	M110 Board
Recommended Temperature of Use (℃)	1100(2012℉)
Density (kg/m³)	320
Modules of Rupture (MPa)	≥0.15
Compressive Strength (MPa, 10% relative deformation)	≥0.3
Permanent Linear Shrinkage (%)	1050℃ x 24h ≤2.5
Thermal Conductivity (W/m·K)	
100℃	0.022
200℃	0.024
300℃	0.031
400℃	0.036
500℃	0.04
600℃	0.048
Covering Material	Aluminum Foil / PE Foil / Glass Fiber Cloth

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	600 x 400 x (10-50)
Standard Size (mm)	1000 x 500 x (10-50)