

Aluminum - Vertical Kiln

Function and Characteristics:

Vertical kilns are primarily used for roasting bauxite. Roasting involves heating bauxite to high temperatures to change its chemical composition and convert it into alumina. This process is a crucial step in aluminum production. Vertical kilns are suitable for small to medium-scale production lines, characterized by compact design and good thermal efficiency.



Insulation Materials for Vertical Kilns:

CCEFIRE® DJM Insulating Fire Brick



CCEFIRE® DJM Series Mullite insulation brick is a new type of refractory material, which can directly contact with fire, characterized with high temperature resistance, lightweight, low thermal conductivity, good energy saving effect, specially suitable for cracking furnace, hot blast furnace, ceramic roller kiln, porcelain kiln extraction, glass crucible and various electric furnaces as lining. It is an ideal product of energy efficiency and longevity.

Characteristics:

1. Low thermal conductivity, with good thermal insulation effect;
2. Low heat capacity, due to low thermal conductivity, mullite lightweight insulation brick accumulate little heat energy, and shows obvious energy saving effect in intermittent operation.
3. Low impurity content, with very low content of iron and alkali metal oxide, our mullite insulation brick is characterized with high refractory performance; higher aluminum content enables our product remains good performance in the reducing atmosphere;
4. High compressive strength under high temperature;
5. Accurate appearance size speeds up the bricks laying, saves the use of refractory mortar and also ensures the strength and stability of brickwork and extend the life of the furnace lining.

6. Can be processed into a special shape, in order to reduce the number of bricks and joints.

Application:

Mullite insulation brick can be directly used for high temperature furnace lining; Mullite insulation brick has been widely used in shuttle kiln, roller kiln, glass and petrochemical furnace lining.

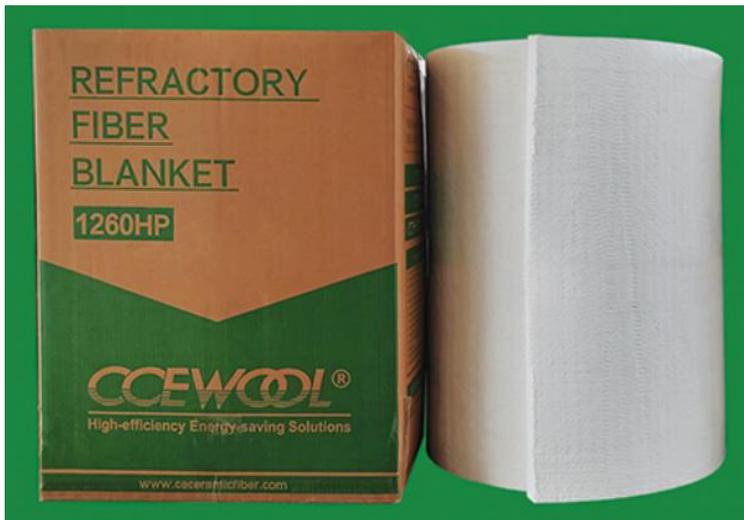
Mullite insulation brick is a kind of high-alumina refractories with mullite ($3\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$) as its main crystal phase.

TDS

CCEFIRE® DJM series mullite insulating brick								
Item		DJM20	DJM-23	DJM-24	DJM-26	DJM-28	DJM-30	DJM-32
Classification Temp(°C)		1200	1260	1300	1430	1540	1650	1760
Bulk Density(g/cm ³)		0.5	0.6	0.7	0.8	0.9	1	1.25
Crushing Strength(MPa)		1.1	1.2	1.4	1.6	2.1	2.5	3.5
Modulus of Rupture(MPa)		1.0	0.9	1.2	1.4	1.6	2.1	2.1
Permanent linear change (CT-30°Cx24h)%		0.5	0.5	0.6	0.4	0.5	0.9	0.9
Reversible thermal expansion at 1100°C		0.5	0.5	0.6	0.7	0.8	0.9	1.1
Thermal conductivity (W/m.k)	400 °C	0.12	0.12	0.14	0.27	0.32	0.41	0.49
	600 °C	0.14	0.14	0.16	0.29	0.34	0.43	0.5
	800 °C	0.16	0.17	0.18	0.31	0.36	0.44	0.51
	1000 °C	0.18	0.19	0.2	0.33	0.38	0.45	0.53
	1200 °C	-	-	-	0.3	0.41	0.47	0.56
Chemical Analysis(%)	Al ₂ O ₃	37	37	44.5	58	67	73	77
	SiO ₂	47	44.4	41.2	39.1	31	25.1	21.5
	Fe ₂ O ₃	0.7	0.7	0.7	0.7	0.6	0.5	0.4

Common size of insulation brick	230x114x65/75mm or customized size
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CCEWOOL® Ceramic Fiber Blanket HPS



Temperature Grade 1260° C (2300° F)
CCEWOOL® Ceramic Fiber Blanket HPS, purified from raw materials with fewer impurities, is made from high-purity refractory ceramic fiber spun fiber. Compared to RCF Blanket S, this product is whiter and has a lower thermal conductivity. It contains no organic binders. Manufactured through a unique internal needle punching process, with tensile strength exceeding 85KPa, providing higher performance and

longer lifespan in applications involving heat flow or chemical corrosion. CCEWOOL® Ceramic Fiber Blanket HPS insulation material offers a variety of thickness, width, and density.

Characteristics:

- Excellent handling strength
- Excellent hot strength
- Low thermal conductivity
- Low heat storage
- Light weight
- Resiliency
- Thermal shock resistance
- High heat reflectance
- Excellent corrosion resistance
- Excellent thermal stability

Application:

Furnace, kiln, reformer and boiler linings;



Investment casting mold wrappings;
 Removable insulating blankets for stress relieving welds;
 Reusable insulation for steam and gas turbines;
 Flexible high-temperature pipe insulation;
 Pressure and cryogenic vessel fire protection;
 High-temperature kiln and furnace insulation;
 Furnace door linings and seals;
 Soaking pit seals;
 Furnace repairs;
 Thermal reactor insulation;
 Expansion joint seals;
 Primary reformer header insulation;
 High-temperature gasketing;
 Glass furnace crown insulation;
 Incineration equipment and stack linings;
 Annealing cover seals;
 High-temperature filtration;
 Nuclear insulation applications;
 Atmosphere furnace lining;
 Field steam generator lining;
 Chemical process heaters.

STD:

CCEWOOL® Ceramic Fiber Blanket HPS	
Classification temperature	1260 (2300°F)
Operation Temp(°C)(°F)	1100 (2012°F)
Density (kg/m3)	64/ 96/ 128/160(4,6,8,10lb/ft3)
Shot Content(%)	≤15
Color	White
Chemical Composition of refractory ceramic blanket (%)	
Al2O3	≥44
SiO2	≥55
ZrO2	-

Permanent Change on Heating (%), EN1094-1 After 24 hours	
@950°C (1742°F)	-
@1000°C (1832°F)	1.5
@1100°C (2012°F)	2.2
@1200°C (2192°F)	3
@1300°C (2372°F)	-
@1400°C (2552°F)	-
Tensile Strength(Kg/m3), EN1094-1 KPa	
64kg/m3(4lb/ft3)	45
96kg/m3(6lb/ft3)	65
128kg/m3(8lb/ft3)	85
160kg/m3(10lb/ft3)	125
Heat Conductive Co-efficient W/(m·k)(128kg/m3)	
200°C (392°F)	0.07
400°C (752°F)	0.12
600°C (1112 °F)	0.2
800°C (1472°F)	0.3
1000°C (1832°F)	0.4

Thickness	Density kg/m3				Length	Width
	64	96	128	160		
mm	64	96	128	160	mm	mm
6	-	-	○	○	7200	610, 1220
13	-	√	√	○	14640	
19	-	√	√	○	9760	
25	○	√	√	√	7320	
38	○	√	√	√	4880	
50	○	√	√	-	3660	

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

CCEWOOL® Ceramic Fiber Module

Temperature Grades: 1100°C (2012°F), 1260°C (2300°F), 1400°C (2550°F), 1430°C (2600°F)

CCEWOOL® Ceramic Fiber Module is made from spun refractory ceramic fiber blanket, mechanically processed, and produced according to customer drawings. The product is pure white in color, with uniform dimensions, and can be directly fastened to the steel plate anchor pins on the industrial kiln shell, providing excellent fire resistance and insulation, thereby improving the overall refractory insulation of the kiln. We can design and manufacture modules and shaped modules of corresponding specifications for customers based on the kiln type and specifications, and we can also produce modules of various specifications based on customer-provided drawings.



Characteristics:

Excellent chemical stability and thermal stability;

Low thermal conductivity, low thermal capacity;

Supporting both soldiers-march-based arrangement and assembly-based arrangement with the help of anchor in various forms in the back of the module;

Module will squeeze with each another in different directions after unbinding, to produce no gap;

Elastic fiber blanket resists to external mechanical forces;

Fiber blanket's elasticity can compensate for the deformation of furnace shell, so that no gap is generated between modules;

Light weight, and absorbing less heat as insulation materials;

Low thermal conductivity brings strong energy-saving effects;

Able to withstand any thermal shock;

Lining need no drying or curing, ready to use immediately after installation;

Anchoring system is far away from hot surface of component, to allow metal anchor member to be in a relatively low temperature.

Application:

All kinds of industrial furnace and heating device linings for metallurgy, machinery; construction materials, petrochemicals, non-ferrous metal industries;



Low mass kiln cars;
Roller hearth furnace linings;
Gas Turbine exhaust ducts;
Duct linings;
Furnace hearths;
Boiler insulation;
Furnace lining insulation for high-temperature applications.

TDS

CCEWOOL® Ceramic Fiber Module					
Item	1100	1260S	1260HPS	1400	1430HZ
Operation Temp	950°C (1742°F)	1050°C (1922°F)	1100°C (2012°F)	1200°C (2192°F)	1350°C (2462°F)
Density	160-220 kg/m3				
Linear Shrinkage EN1094-1 (%)					
@950°C, 24hrs	1.5	-	-	-	-
@1000°C, 24hrs	2	1.5	1.5	-	-
@1100°C, 24hrs	3	2.5	2	1.5	-
@1200°C, 24hrs	-	3	3	2	1
@1300°C, 24hrs	-	-	-	3	2
@1400°C, 24hrs	-	-	-	-	3
Tensile Strength (Mpa)					
Density-64kg/m3	0.039	0.039	0.039	0.039	0.039
Density-96kg/m3	0.078	0.078	0.078	0.078	0.078
Density-128kg/m3	0.103	0.103	0.103	0.103	0.103
Density-160kg/m3	0.127	0.127	0.127	0.127	0.127
Thermal Conductivity W/(m·k) 128kg/m3-1000°C	0.45	0.43	0.4	0.35	0.3
Chemical Composition (%)					
Al2O3	≥43	≥44	≥44	≥52	≥35

SiO ₂	≥52	≥52	≥55	≥47	≥49
ZrO ₂	-	-	-	-	≥15
Al ₂ O ₃ +SiO ₂ +ZrO ₂	-	-	-	-	≥99
Fe ₂ O ₃	≤1.0	≤0.8	≤0.2	≤0.2	≤0.2
Na ₂ O+K ₂ O	≤0.4	≤0.3	≤0.2	≤0.2	≤0.2
CaO+MgO	≤0.3	≤0.1	≤0.1	≤0.1	≤0.1
Specification (mm)	L*W: 300*300;450*300;600*300				
	H: 100;150;200;250;300				
Package	Carton Box or Pallet				

