

## **CCEWOOL® Ceramic Fiber Module**

### **Description:**

Temperature degree: 1260°C (2300°F), 1400°C (2550°F), 1430°C (2600)

CCEWOOL® Ceramic Fiber Modules is made from the corresponding ceramic fiber material acupuncture blanket processed in dedicated machines according to fiber component structure and size. In the process, a certain proportion of compression is maintained, in order to ensure modules expand to the different directions after completion of ceramic fiber folded module wall lining, to create mutual extrusion among modules and form a seamless whole unit. Various shapes of SS304/SS310 are available.

### **Technical data and Size:**

<b>CCEWOOL® Ceramic Fiber Module</b>					
<b>Item</b>	1050	1260STD	1260HP	1400	1430HZ
<b>Operation Temp</b>	950°C	1050°C	1100°C	1200°C	1350°C
<b>Density</b>	160-220 kg/m <sup>3</sup>				
<b>Linear Shrinkage EN1094-1 (%)</b>					
<b>@950°C, 24hrs</b>	1.5	-	-	-	-
<b>@1000°C, 24hrs</b>	2	1.5	1.5	-	-
<b>@1100°C, 24hrs</b>	3	2.5	2	1.5	-

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@1200℃,24hrs	-	3	3	2	1
@1300℃,24hrs	-	-	-	3	2
@1400℃,24hrs	-	-	-	-	3
<b>Tensile Strength (Mpa)</b>					
Density-64kg/m <sup>3</sup>	0.039	0.039	0.039	0.039	0.039
Density-96kg/m <sup>3</sup>	0.078	0.078	0.078	0.078	0.078
Density-128kg/m <sup>3</sup>	0.103	0.103	0.103	0.103	0.103
Density-160kg/m <sup>3</sup>	0.127	0.127	0.127	0.127	0.127
Thermal Conductivity W/(m·k) 128kg/m <sup>3</sup> -1000℃	0.45	0.43	0.4	0.35	0.3
<b>Chemical Composition (%)</b>					
Al <sub>2</sub> O <sub>3</sub>	44	45-46	47-49	52-55	35-38
Al <sub>2</sub> O <sub>3</sub> +SiO <sub>2</sub>	≥96	≥98	≥99	≥99	-
ZrO <sub>2</sub>	-	-	-	-	15-17
Al <sub>2</sub> O <sub>3</sub> +SiO <sub>2</sub> +ZrO <sub>2</sub>	-	-	-	-	≥99
Fe <sub>2</sub> O <sub>3</sub>	≤1.0	≤0.8	≤0.2	≤0.2	≤0.2
Na <sub>2</sub> O+K <sub>2</sub> 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				

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Note: 1. Product which is classified in accordance with temperature range, can also be divided into ceramic fiber cutout, ceramic fiber module and ceramic fiber folded module by different production methods.

Types of anchor: SS304, SS310(2520)

## Raw Materials

CCEWOOL ceramic fiber modules are made of high-quality CCEWOOL ceramic fiber blankets.

Controlling the content of impurities is an important step to ensure the heat resistance of ceramic fibers. High impurity content can cause the coarsening of crystal grains and the increase of linear shrinkage, which is the key reason for the deterioration of fiber performance and the reduction of its service life.

Through strict control at each step, we reduce the impurity content of the raw materials to less than 1%. The CCEWOOL ceramic fiber modules are pure white, and the linear shrinkage rate is lower than 2% at the hot surface temperature of 1200°C. The quality is more stable, and the service life is longer.

With the imported high-speed centrifuge of which the speed reaches up to 11000r/min, the fiber formation rate is higher. The thickness of the produced CCEWOOL ceramic fiber is uniform and even, and the slag ball content is lower than 10%, leading to better flatness of the CCEWOOL ceramic fiber blankets. The content of the slag ball is an important index that determines the thermal conductivity of the fiber, and the thermal conductivity of CCEWOOL ceramic fiber blanket is only 0.22w/m.k at the hot surface temperature of 1000°C.

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## Production Process

The use of the self-innovated double-sided inner-needle-flower punching process and the daily replacement of the needle punching panel ensure the even distribution of the needle punch pattern, which allows the tensile strength of CCEWOOL ceramic fiber blankets to exceed 70Kpa and the product quality to become more stable.

The CCEWOOL ceramic fiber module is to fold the cut ceramic fiber blanket in a mold with a fixed specification, so it has good flatness on surface and accurate sizes with a very slight error.

CCEWOOL ceramic fiber blankets are folded to the required specifications, compressed by a 5t press machine, and bundled in a compressed state. Therefore, the CCEWOOL ceramic fiber modules have excellent elasticity. As the modules are in a preloaded state, after the furnace lining is completed, the expansion of the modules makes the furnace lining seamless and can compensate for the shrinkage of the fiber lining, which can improve the thermal insulation performance of the fiber lining.

The maximum operating temperature of the CCEWOOL ceramic fiber modules can reach 1430 °C, and the temperature grade is 1260 to 1430 °C. Various special-shaped CCEWOOL ceramic fiber modules, ceramic fiber cut blocks and ceramic fiber folded blocks can be customized and produced, equipped with anchors of various sizes according to the designs.

## Quality Control

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Each shipment has a dedicated quality inspector, and a test report is provided prior to the departure of products from the factory to ensure the export quality of each shipment of CCEWOOL.

A third-party inspection (such as SGS, BV, etc.) is accepted.

Production is strictly in accordance with ISO9000 quality management system certification.

Products are weighed before packaging to ensure that the actual weight of a single roll is greater than the theoretical weight.

The outer packaging of each carton is made of five layers of kraft paper, and the inner packaging is a plastic bag, suitable for long-distance transportation.

## **Application Performance**

### **The CCEWOOL ceramic fiber module has a low volume density**

The ceramic fiber module lining is more than 75% lighter than the light heat-insulating brick lining, and about 90% lighter than the light castable lining. It greatly reduces the load-bearing capacity and extends the service life of the furnace.

### **The CCEWOOL ceramic fiber modules have very low heat capacity**

The heat capacity of CCEWOOL ceramic fiber modules is about 1/10 of that of light castable and traditional refractory materials, and the heat capacity of lining materials is proportional to the weight of the lining. Therefore,

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CCEWOOL ceramic fiber modules can save energy during use, allowing the furnace body to heat up quickly and save a lot of economic costs.

### **CCEWOOL ceramic fiber modules have very low thermal conductivity**

The thermal conductivity of the CCEWOOL ceramic fiber module is only 0.22w/m.k at 1000°C, so the thermal insulation effect is remarkable.

### **CCEWOOL ceramic fiber module has good resistance to thermal shock and mechanical shock**

The ceramic fiber module has good flexibility and elasticity, so it can maintain good performance in the case of either rapid cold and hot temperature changes or high-speed wind scouring.

### **CCEWOOL ceramic fiber modules have stable chemical performances**

Ceramic fiber modules are a neutral and slightly acidic material. Except for the reaction with strong acid and alkali, they are not etched by other weak acids, alkalis, water, oil, and steam, nor are they infiltrated by lead, aluminum, and copper.

### **CCEWOOL ceramic fiber modules are widely used**

CCEWOOL ceramic fiber modules are widely used for the lining insulation of furnaces in petrochemical industries; the lining insulation of furnaces in metallurgical industries; the lining insulation of industries of ceramics, glass and other building materials; the lining insulation of heat treatment furnaces in the heat treatment industry; the lining of other industrial furnaces.

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## Application Installation

### Central hole hoisting type:

The central hole hoisting fiber component is installed and fixed by bolts welded on the furnace shell and a hanging slide embedded in the component.

The characteristics include:

1. Each piece is fixed individually, which allows it to be disassembled and replaced at any time, making maintenance very convenient.
2. Because it can be installed and fixed individually, the installation arrangement is relatively flexible, for instance, in a “parquet floor” type or arranged in the same direction along the folding direction.
3. Because the fiber component of single pieces corresponds to a set of bolts and nuts, the inner lining of the component can be fixed relatively firmly.
4. It is especially suitable for the installation of the lining at the furnace top.

### Insertion type: the structure of embedded anchors and the structure of no anchors

#### Embedded anchor type:

This structural form fixes ceramic fiber modules through angle iron anchors and screws and connects the modules and the furnace wall's steel plate with bolts and nuts. It has the following characteristics:

1. Each piece is fixed individually, which allows it to be disassembled and replaced at any time, making maintenance very convenient.
2. Because it can be installed and fixed individually, the installation arrangement is relatively flexible, for instance, in a “parquet floor” type or arranged in the same direction sequentially along the folding direction.
3. The fixation with screws makes the installation and fixing relatively firm, and the modules can be processed into combination modules with blanket strips and special-shaped combination modules.
4. The big gap between the anchor and the working hot surface and the very few contact points between the anchor and the furnace shell contribute to the good heat insulation performance of the wall lining.
5. It is especially used for the installation of wall lining at the furnace top.

### **No anchor type:**

This structure requires the installation of modules on site while fixing screws. Compared with other modular structures, it has the following characteristics:

1. The anchor structure is simple, and the construction is quick and convenient, so it is especially suitable for the construction of large-area straight furnace wall lining.
2. The big gap between the anchor and the working hot surface and the very few contact points between the anchor and the furnace shell contribute to the good heat insulation performance of the wall lining.

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3. The fiber folding module structure connects adjacent folding modules into a whole through screws. Therefore, only the structure of arrangement in the same direction sequentially along the folding direction can be adopted.

### **Butterfly-shape ceramic fiber modules**

1. This module structure is composed of two identical ceramic fiber modules between which a heat-resistant alloy steel pipe penetrates the fiber modules and is fixed by bolts welded to the furnace wall steel plate. The steel plate and the modules are in seamless contact with each other, so the entire wall lining is flat, beautiful and uniform in thickness.

2. The rebound of the ceramic fiber modules in both directions is same, which fully guarantees the uniformity and tightness of the module wall lining.

3. The ceramic fiber module of this structure is screwed as an individual piece by bolts and heat-resistant steel pipe. The construction is simple, and the fixed structure is firm, which fully guarantees the service life of the modules.

4. The installation and fixing of individual pieces allow them to be disassembled and replaced at any time, making maintenance very convenient. Also, the installation arrangement is relatively flexible, which can be installed in a parquet-floor type or arranged in the same direction along the folding direction.