DARCO INDUSTRIES

Industrial Insulation & Safety Materials

Innovation Insulation Refractory Series

Engineered for Energy Savings, Performance, and Reliability

Revised 12/06/2025

🔥 Practical & Reliable Refractory Solutions Provider

Since **2009**, Darco has focused on delivering **lightweight insulation and functional refractory materials** to global customers across the **steel, glass, cement, ceramics, aluminum, petrochemical industries, etc**. We work closely with trusted factories and provide full-chain support — from sourcing and quality control to logistics and after-sales.

In **2024**, Darco entered a deep strategic partnership with **Henan Armor Energy-Saving Technology Co., Ltd.**, a leading manufacturer located in **Xinyang's Carbon Neutral Industrial Park**. Armor currently operates **6 production lines** with advanced equipment and covers over **300 mu (approx. 200,000 m²)**. It is widely recognized in China for its **original innovations** in lightweight insulation and functional materials.

Since the start of our cooperation, Darco has become the **exclusive operator of Armor's international business**, bringing its advanced products and proven solutions to the global market.

💡 What Makes Us Different

1. High Cost-Performance Products

These materials deliver **equal or better performance** than conventional options — at **more competitive prices**, helping customers reduce costs without sacrificing quality.

- **CASI Nano Insulation Brick & Board:** Lower thermal conductivity, higher PLC temperature, and proven stability over 7+ years in China.
- **MIP-E Microporous Board:** Cost-effective choice for cement and aluminum kilns — approx. **50% lower in cost**.
- **HHG-1.35 Insulating Firebrick** — a firebrick with 35 MPa strength & excellent insulation (1.35 g/cm³, 0.47 W/m·K).
- **KJM26 Insulation Brick:** Higher RUL, PLC temperature, and strength — with **30% cost savings** over traditional insulating bricks.
- **INS Silica Insulation Brick:** 0.5 g/cm³ density — ideal for energy-saving applications in glass furnace crowns.

2. High Value-Added Solution Products

These are **exclusive innovations**, well-proven in China and now introduced globally through Darco. No alternative suppliers currently exist.

- **Steel Reheating Furnace Energy-Saving Solutions**
- **Rotary Kiln 5S Super Insulation Board** —A game-changer for rotary kiln insulation.
- **Nano Thermal Insulation Sealing Mix** — An innovative furnace roofs energy-saving & sealing solution.
- **ThermoLite Kiln Car Sand (TKS)** — ultra-lightweight fill for energy-efficient kiln cars
- **Reinforcing Modifier** — strengthens linings from within, reducing cracking and extending service life

🔍 These are just a few of our featured products. **Explore more solutions in the following pages.**



Our Vision

We believe that innovation in **insulation and refractory materials** can lead to a **true energy-saving revolution in thermal engineering**. Darco is committed to delivering **practical, reliable, and future-oriented solutions** to customers worldwide.

Why Work with Darco

- 15+ years of global refractory trade experience
- One-stop service: sourcing, quality assurance, logistics, and technical support
- Weekly production updates, inspection reports, and packing/shipment photos
- Trusted by over **160 customers in 40+ countries**

A Global Reach:

We're privileged to have connections in over 40 countries, from Southeast Asia's coastlines to the central regions of the USA, and extending to places like Europe, South America, and Africa.

HHG-1.35 High Strength Insulating Firebrick

— Strength of a Dense Brick · Insulation of a Lightweight Brick

Key Properties

- Cold Crushing Strength: 35 MPa
- Bulk Density: 1.35 g/cm³
- Superior Thermal Insulation
- **Replaces Dense Clay and Lightweight Bricks in One Step**

Product Overview

HHG-1.35 is a next-generation insulating firebrick engineered to deliver both **high mechanical strength** and **superior thermal insulation**. It solves the long-standing trade-off between strength and insulation seen in traditional bricks — where **dense firebricks** offer strength but poor insulation, and **lightweight bricks** insulate well but are fragile.
With a **bulk density of 1.35 g/cm³** and a **crushing strength 35 MPa**, HHG-1.35 combines structural reliability with thermal efficiency, making it an **ideal choice for energy-conscious industrial furnaces**.

Advantages & Benefits

- **High Cold Crushing Strength:** Provides strong structural support and reduces the risk of brick failure or cracking.
- **Low Bulk Density:** Lightweight design allows for easier installation & lowers the overall furnace lining thermal mass.
- **Excellent Insulation:** Low thermal conductivity enhances energy efficiency and helps reduce operating costs.
- **Dual-Functionality:** Combines the strength of dense bricks and the insulation of lightweight bricks, simplifying material selection and inventory management.
- **Stable Performance:** Maintains reliability under thermal cycling and chemical exposure, ensuring long service life in harsh environments.

Recommended Applications

HHG-1.35 is ideal for furnace linings requiring both mechanical strength and insulation. It performs especially well as a back-up lining behind heavy-duty refractories in high-temperature equipment such as iron ladles, torpedo cars, carbon baking furnaces, aluminum electrolytic cells, industrial boilers, rotary kilns, hot air ducts, etc.

Brand		**HHG-1.35**	
Items	Unit	Typical Value	Guarantee Value
Color		Yellowish	Yellowish
Bulk Density	g/cm³	1.35	1.35 ± 0.05
Cold Crushing Strength	MPa	35	≥ 30
Permanent Linear Change @1300°C×6h	%	0.45	≤ 0.5
Refractoriness Under Load T0.6	°C	1260	≥ 1250
Thermal Conductivity @ 400°C	W/(m·K)	0.46	≤ 0.5
Thermal Conductivity @ 800°C	W/(m·K)	0.55	≤ 0.6
Al_2O_3	%	21	
SiO_2	%	70	
Fe_2O_3	%	3.0	≤ 5.0

Note: Typical values are based on laboratory results; guaranteed values reflect minimum specifications.

KN Cost-Effective Floating Bead Insulation Brick

— A High-Performance Alternative to Diatomite & Perlite Insulation Bricks

KN Cost-Effective Floating Bead Insulation Brick is a proprietary lightweight refractory brick developed for low- to medium-temperature applications. It is produced using carefully selected **cenosphere-based raw materials**, delivering excellent insulation performance, structural strength, and dimensional accuracy.

Compared to traditional diatomite and perlite insulation bricks, this product offers:

- **Lower thermal conductivity**
- **Higher classification temperature**
- **Improved compressive strength and PLC stability**
- **Greater cost-efficiency**

This brick also performs better than conventional floating bead bricks and can serve as a replacement for certain high-alumina lightweight bricks in applications where precision masonry and load-bearing capability are required.

Key Features

- **Low Thermal Conductivity**: Enhances energy efficiency in furnace linings.
- **High Classification Temperature**: Suitable for more demanding thermal environments.
- **Excellent Strength and Stability**: Maintains integrity under mechanical load and high temperatures.
- **Precision Dimensional Control**: Supports tight construction tolerances and high-quality installation.
- **Cost-Effective**: Competitive pricing without sacrificing performance.

Applications

- Backup insulation in industrial furnaces and kilns
- Precision masonry where lightweight and high strength are required
- Replacement for traditional diatomite, perlite, and floating bead insulation bricks
- Alternative to high-alumina lightweight insulation bricks in non-critical zones

Technical Specification

Grade	KN06	KN08	KN10
Classification Temperature	1100℃	1100℃	1100℃
Color	Grey	Grey	Grey
Bulk Density	0.6g/cm³	0.8g/cm³ -0.05g/cm³ ~+0.05g/cm³	1.0g/cm³
Cold Crushing Strength	≥2.0 MPa	≥3.0 MPa	≥4.0 MPa
Permanent Linear Change	±1% (1050 ℃x6h)	±1% (1050 ℃x6h)	±1% (1050 ℃x6h)
Thermal Conductivity， W/m•K			
400℃	0.15	0.22	0.24
600℃	0.20	0.27	0.28
800℃	0.26	0.31	0.32
Chemical Composition			
SiO_2	60%	60%	60%
Al_2O_3	30%	30%	30%
Fe_2O_3	3%	3%	3%

All provided data are average outcomes from standard testing processes and may exhibit variability. These results are not intended for specification purposes or to establish any contractual commitments. For detailed information on safe usage or material specifics, please consult our sales engineers.

CASI Nano Insulation Brick

—Innovative High-Performance, Cost-Effective Lightweight Insulation Brick

The **CASI Nano Insulation Brick** is our proprietary, high-performance, and economical low-temperature series lightweight refractory insulation brick. It outperforms traditional products in key metrics such as **density, mechanical strength, thermal conductivity, and reheating linear change**, while maintaining a **more competitive price** than comparable alternatives.

Key Features & Advantages:

✓ **Ultra-Lightweight & High Strength** – With a remarkably low bulk density of **0.3 g/cm³**, our brick leads the global market in lightweight insulation solutions, while maintaining superior mechanical strength.

✓ **Exceptional Thermal Insulation**– more than **30% lower thermal conductivity** compared to traditional perlite bricks, lightweight clay bricks, or diatomite bricks.

✓**Enhanced Thermal Stability** – **100°C+ higher reheating linear change temperature** than conventional insulation materials, ensuring long-term structural integrity.

✓ **Uniform Density & Precise Dimensions** – Manufactured using **fully automated production lines**, ensuring consistency and reliability in every batch.

✓ **Eco-Friendly & Safe**– Free from fibers, asbestos, or other hazardous materials., non-polluting, and safe for handling and installation.

✓ **Extended Service Life** – Reduces maintenance frequency and lowers lifecycle costs for industrial furnaces and kilns.

Advanced Manufacturing & Material Science

Developed using **carefully selected Al_2O_3, SiO_2, and CaO raw materials**, our proprietary **nano-modification technology** refines these into **micro-nano lightweight aggregates**, achieving an optimal balance of **low thermal conductivity and high strength**.

Industry Applications & Benefits

The **CASI Nano Insulation Brick** is the ideal solution for:

- **Thermal furnaces & kilns** requiring energy-efficient insulation
- **Industrial heating equipment** where weight reduction is critical
- **High-precision thermal systems** demanding uniform thermal performance

Used as backup insulation of many industrial furnaces such as roller hearth kiln, tunnel kiln, glass tank, hot blast stove, reheating furnace, aluminum smelter, carbon baking furnace, flue, hot wind duct, etc

By **combining the high strength of traditional refractories with the ultra-low thermal conductivity of insulation wool**, our product **opens new possibilities for furnace design, energy savings, and structural optimization**, providing **a reliable material foundation for next-generation thermal engineering.**



Z1000 Brick: Ultra-lightweight (0.3 g/cm³), ideal for reducing furnace weight while maintaining low thermal conductivity and sufficient strength.

Z1100 Brick: Improved thermal stability with a reheating linear change temperature up to 1000°C, higher than conventional low-temp insulation bricks.

Z1100H Brick: A reinforced version of Z1100 with enhanced mechanical strength for demanding conditions.

Z1200 Brick: Meets ASTM Grade 20 requirements with lower density and better insulation performance than standard products.

Z1250 Brick: Equivalent to traditional Grade 23 anorthite IFB in insulation performance. Upon heating, internal $CaCO_3$ decomposes to further reduce density and thermal conductivity without affecting structure.

Technical Specification

Grade	Z1000	Z1100	Z1100H	Z1200	Z1250
Classification Temperature	1000℃	1100℃	1100℃	1200℃	1250℃
Color	White	White	White	White	Grey
Bulk Density	0.3g/cm³	0.4g/cm³	0.5g/cm³	0.5g/cm³	0.6g/cm³
			-0.02g/cm³ ~+0.04g/cm³		
Cold Crushing Strength	0.7MPa	1MPa	2MPa	1MPa	1.3MPa
Permanent Linear Change	±0.5% (950 ℃x12h)	±0.5% (1000 ℃x12h)	±0.5% (1000 ℃x12h)	±0.5% (1150 ℃x12h)	±0.5% (1230 ℃x12h)

Thermal Conductivity，W/m•K

Calorimeter, Hot Face, According to China YB/T 4130–2005 Standard					As Delivery	After 100℃×3h Sinter
400℃	0.12	0.13	0.14	0.15	0.13	0.09
600℃	0.14	0.16	0.17	0.18	0.16	0.12
800℃	0.18	0.19	0.20	0.21	0.18	0.14
1000℃	0.21	0.22	0.23	0.24	0.21	0.17
Chemical Composition						
SiO_2	42%	42%	42%	40%	30%	
Al_2O_3	15%	15%	15%	13%	10%	
CaO	37%	37%	37%	43%	50%	
Fe_2O_3	≤0.5%	≤0.5%	≤0.5%	≤0.5%	≤0.5%	

Chemical compositions are indicative only. Actual formulations may vary as we optimize both raw material selection and technical parameters during manufacturing.

All provided data are average outcomes from standard testing processes and may exhibit variability. These results are not intended for specification purposes or to establish any contractual commitments. For detailed information on safe usage or material specifics, please consult our sales engineers.




CASI Nano Insulation Board

——Next-Generation High-Performance Insulation Panel for Industrial Applications

The **CASI Nano Insulation Board** is a groundbreaking, large-format inorganic insulation panel developed using **patented nanotechnology**. It is produced with **pure inorganic raw materials** on a **fully automated production line**, ensuring consistent quality and precision.

Derived from our proprietary CASI Nano Insulation Brick technology, this ultra-lightweight yet structurally robust board combines the **exceptionally low thermal conductivity of insulation wool** with the **mechanical integrity of traditional refractories**. It significantly outperforms conventional materials such as **calcium silicate boards and ceramic fiber boards** in thermal insulation, compressive strength, and service life.

Engineered as a **high-performance backup insulation solution for industrial furnaces**, the CASI Nano Insulation Board also offers a **notably better cost-performance ratio**, making it a reliable and economical choice for demanding high-temperature applications.

Key Features & Advantages:

✓ **Optimized Lightweight Design with Enhanced Strength:** Bulk density as low as **0.35 g/cm³**, striking the perfect balance between lightweight performance and structural durability—ideal for large-format panel applications.

✓ **Zero Shrinkage & Long-Term Stability:** Heating permanent linear change **≤ -0.5%** (vs. 2–3% for conventional boards), preventing gaps and maintaining structural integrity at temperatures up to 1200°C.

✓ **Fully Inorganic & Eco-Safe:** Fiber-free**,** asbestos-free, and free of organic binders—non-polluting, non-combustible, non-smoking, and safe for handlers and the environment.

✓ **High Thermal Resistance & Durability:** Withstands thermal cycling without degradation, cracking, or powdering, extending service life and reducing maintenance costs.

✓ **Precision Manufacturing & Scalability:** Produced on fully automated lines for **uniform density**, consistent quality, and rapid large-scale delivery—unaffected by environmental regulations.

Advanced Manufacturing & Material Science

Developed using **carefully selected Al_2O_3, SiO_2, and CaO raw materials**, our proprietary **nano-modification technology** refines these into **micro-nano lightweight aggregates**, achieving an optimal balance of **low thermal conductivity and high strength**.

Industry Applications & Benefits

Ideal for high-temperature industrial equipment requiring **lightweight, durable, and non-fibrous insulation**, including:

- **Backup insulation** for furnaces, kilns, and reactors (e.g., roller hearth kilns, tunnel kilns, glass tanks).
- **Thermal barriers** in steel/glass/cement industries (e.g., reheating furnaces, hot blast stoves, decomposition kilns).
- **Energy-efficient linings** for aluminum smelters, petrochemical cracking furnaces, and flue ducts.
- **Replacements for fiber-based boards** where dust-free, non-shrinking solutions are critical.



B1050 - Alternative to standard calcium silicate boards: Lower density (0.35g/cm³), higher temperature resistance (1100℃), 0.8MPa strength, ±0.5% linear change

B1050H - Replacement for high-strength calcium silicate: 0.5g/cm³ density, enhanced 1.8MPa strength, maintains 1100℃ rating

B1200 - Superior to regular ceramic fiber boards: Fiber-free, 1200℃ rating, 0.9MPa strength, ±0.5% linear change

B1250 - Outperforms zirconia fiber boards: 1250℃ capability, 0.6g/cm³ density, 1.2MPa strength, gray color

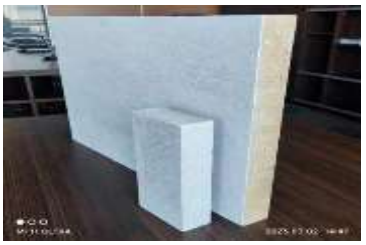
Grade	B1050	B1050H	B1200	B1250
Classification Temperature	1100℃	1100℃	1200℃	1250℃
Color	White	White	White	Grey
Bulk Density	0.35g/cm³	0.5g/cm³	0.5g/cm³	0.6g/cm³
	-0.02g/cm³ ~+0.04g/cm³			
Cold Crushing Strength	0.8MPa	1.8MPa	0.9MPa	1.2MPa
Permanent Linear Change	±0.5% (1000 ℃x12h)	±0.5% (1000 ℃x12h)	±0.5% (1150 ℃x12h)	±0.5% (1230 ℃x12h)

Thermal Conductivity ، W/m•K					
Calorimeter, Hot Face, According to China YB/T 4130–2005 Standard				As Delivery	After 1000℃×3h Sinter
400℃	0.12	0.14	0.15	0.13	0.09
600℃	0.15	0.17	0.18	0.16	0.12
800℃	0.19	0.20	0.21	0.18	0.14
1000℃	0.21	0.23	0.24	0.21	0.17
Chemical Composition					
SiO_2	42%	42%	40%	30%	
Al_2O_3	15%	15%	13%	10%	
CaO	37%	37%	43%	50%	
Fe_2O_3	≤0.5%	≤0.5%	≤0.5%	≤0.5%	

Why Choose CASI Nano Insulation Board?

- **No shrinkage problems:** It won't crack or leave gaps when heated, unlike traditional boards.
- **Safe and eco-friendly:** No harmful dust, easy to handle, and good for the environment.
- **Saves money in the long run**: Delivers better insulation that doesn't degrade over time, keeps heat in more effectively, reduces repair time, and helps lower energy costs for a higher return.
- **Easy to install:** Big panels make installation faster and smoother.






KJM26 Insulating Firebrick

— Dry pressed ASTM26 grade Insulating firebrick with 30% cost saving

KJM26 insulating brick is a high-performance thermal insulation product produced using a dry pressing method and high-temperature firing in a tunnel kiln. This process eliminates the need for added burn-out materials, cutting and grinding, resulting in over 30% lower production costs compared to traditional insulating bricks.

Material Composition

KJM26 brick is made from carefully selected magnesia raw materials, which are modified using our patented technology. The modification process enhances the properties of the raw materials, which are then combined with high-purity silica to form a stable magnesium silicate crystalline phase.

Production Process

KJM26 bricks are made using an advanced dry pressing technique and high-temperature firing in a tunnel kiln, ensuring uniformity and high density without the need for post-production cutting or grinding. Made from 100% natural minerals, the product reduces burn-out materials and environmental pollution. The process also minimizes dust emissions and improves worker safety, making KJM26 an eco-friendly solution.

Key Features & Benefits

- **Higher Service Temperature:** KJM26 bricks have a refractoriness under load of 1370°C, offering high thermal stability and performance comparable to traditional 28-grade insulating bricks, making them ideal for high-temperature applications.
- **Excellent Strength:** The stable magnesium silicate phase provides superior strength, reducing the risk of failure under mechanical stress and ensuring longer-lasting performance.
- **Cost-effective:** The dry pressing process and absence of burn-out materials and post-production grinding reduce costs by over 30%, offering competitive prices without compromising quality.
- **Sustainable and Efficient:** The production process minimizes waste, lowers energy consumption, and eliminates burn-out materials, making KJM26 an environmentally friendly choice.
- **Industry Innovation:** KJM26 opens new doors in insulation technology, offering improved performance and cost savings, marking a significant step forward for the industry.
- **Market Appeal:** With its cost-effectiveness and performance comparable to or better than traditional products, KJM26 is a strong, competitive choice for customers.

Typical Application

KJM26 Insulating Firebrick are versatile and ideal for hot face refractory lining or back-up insulation in various industries, including:

- **Ceramics:** Roller hearth kilns, tunnel kilns, shuttle kilns, electricity furnace.
- **Glass:** Melter, regenerators, distributors, tempering furnaces.
- **Aluminum:** Anode baking furnaces, primary electrolytic cells, melting furnace, holding furnace, etc.
- **Lithium-ion Battery:** Cathode and anode furnaces.
- **Iron & Steel:** Coke ovens, blast furnaces, hot blast stoves, reheating furnaces, bright metal annealing furnaces, etc.
- **Industrial Furnaces:** Carburizing furnaces, heat treating furnaces, electronic product furnaces, refractory sintering furnaces, etc.

KJM26 Brick vs Traditional ASTM /GB Standard Insulating Firebrick

ASTM C155 - 2018 & China GB/T 35845 - 2018 Standard

			New Product	Traditional Insulating Firebrick		
Grade	**Standard**		**KJM26**	**ASTM26**	**ASTM27**	**ASTM28**
Classification Group	ISO 2245		**145-0.8-L**	140-0.8-L	145-0.8-L	150-0.9-L
	ASTM C155		**26**	26	27	28
Classification Temperature		℃	**1450**	1400	1450	1540
Bulk Density	ASTM C134	g/cm3	**0.8**	0.8	0.85	0.9
Cold Crushing Strength	ASTM C133	MPa	**3.3**	2.0	2.5	2.8
Modulus of Rupture	ASTM C133	MPa	**1.8**	1.4	1.5	1.5
Permanent Linear Change @ ℃×12h		%	**+0.2**	-1.5~+0.5	-1.5~+0.5	-1.5~+0.5
			1450	1400	1450	1510
0.05MPa Refractoriness Under Load		℃	**1370**	1250	1300	1350
Thermal conductivity						
400℃			**0.26**	0.23	0.3	0.3
600℃	ASTM C182	W/m.K	**0.29**	0.27	0.32	0.32
800℃			**0.34**	0.3	0.35	0.35
Chemical Composition						
Al2O3				55	60	65
SiO2		%	**65**	42	36	33
Fe2O3			**0.5**	0.9	0.8	0.7
MgO			**27**			

MIP-E Series Economy Microporous Board
—Proven Economical Choice for Cement & Aluminum Kilns & more

Darco MIP-E Series Economy Microporous Board has been widely applied in China's cement and aluminum industries. Its excellent energy-saving performance and cost-effectiveness have delivered proven value to our customers. Now, Darco is introducing this series to the global market — providing industrial kiln users with a reliable and economical alternative for thermal insulation.

MIP-E Series Microporous Board is manufactured using carefully selected inorganic nano-scale refractory powders and formed by a proprietary fully-automated dry pressing process. This results in a board with a nano-scale microporous structure that effectively blocks all three modes of heat transfer: conduction, convection, and radiation. While maintaining the ultra-low thermal conductivity characteristic of traditional microporous insulation, the MIP-E series offers enhanced cost-efficiency — providing a new solution for industrial furnaces that require both thermal performance and budget optimization.

E1000A Microporous Board delivers **twice the insulation performance** compared to traditional ceramic fiber and micro-calcium silicate insulation materials. It offers **superior durability** at high temperatures, resisting crystallization and powdering, ensuring **long-lasting thermal insulation performance** without degradation over time.

E1000B Microporous Board is an **upgraded version of Darco's E1000A**, with significantly improved insulation properties. Under the same application conditions, its thermal conductivity is **one-third that of traditional fiber and calcium silicate products**. It provides better insulation with even **lower thermal conductivity**, making it ideal for projects requiring efficient heat retention and reduced energy loss.

E1200 Microporous Board is a **high-performance insulation material** developed using advanced nano-composite technology and upgraded raw materials. With a specially engineered nano-porous structure and radiation-shielding additives, it minimizes heat transfer to the maximum extent. Compared to traditional fiber and calcium silicate boards, its **insulation performance is twice as effective**, and it supports operating conditions up to **1200°C**. It is particularly suitable for **high-temperature industrial applications** where both **superior insulation** and **thermal durability** are required.

Typical Applications:

- **Cement Industry**: cyclone preheater, calciner, tertiary air duct, kiln hood, gas duct, grate cooler, riser pipe, etc.
- **Aluminum Industry**: Aluminum Electrolysis Cell, holding furnace, melting furnaces, Anode baking furnaces, etc.
- **Ceramics:** Roller kilns, tunnel kilns, shuttle kilns, electricity furnace.
- **Iron & Steel:** Coke ovens, blast furnaces, hot blast stoves, reheating furnaces, bright metal annealing furnaces.
- **Glass:** Melter, regenerators, annealing lehrs, tempering furnaces.
- **Industrial Furnaces:** Carburizing furnaces, heat treating furnaces, electronic product furnaces, refractory sintering furnaces, reactors, reformers, and power station boilers, etc.




MIP-E Microporous Board Product Highlights

- **Precision Manufacturing**

- Advanced production technology and refined craftsmanship
- Neat finish, sharp edges, high dimensional accuracy, tight joint fit during installation for superior integrity

- **Strong & Versatile**

- High compressive strength and excellent shaping behavior
- Easy to cut and customize for complex or irregular areas, reliable performance during construction and use

- **Top-Class Insulation**

- Scientifically categorized for different applications
- Outstanding thermal insulation performance
- Consistent protection across all product grades

- **Application-Oriented Solutions**

- Engineered for high-performance internal insulation systems

Technical Specification

Grade			E1000A	E1000B	E1200
Color			Grey	Grey	White
Classification Temperature		℃	1000	1000	1200
Nominal Density		kg/m3	600±50	500±30	750±50
Compression Strength (10% deformation)		MPa	≥0.7	≥0.7	≥0.7
Shrinkage, full soak		%	<1.5 (950°C*3h)	-1.5~0.5 (950°C*12h)	≤2 (1100°C*3h)
Shrinkage, one side		%	≤0.5 (950°C*3h)	≤0.5 (950°C*12h)	≤0.5 (1100°C*3h)
SiO2		%	>85	>85	
SiO2+ZrO2		%			>88
Others		%	<15	<15	<12
Thermal Conductivity	400℃	W/m.K	0.048	0.045	0.050
	600℃	W/m.K	0.060	0.055	0.065
	800℃	W/m.K	0.070	0.065	0.075
Standard Sizes	L* W:	mm	200×180, 200×200, 200×250, 300×300		
	Thickness:	mm	25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80		
			Other sizes can be customized.		
Surface coating			POF film-covered		





High-Strength Insulation Board for Aluminum Electrolytic Cells

This product is made entirely from inorganic materials and can be safely used at temperatures up to 1000°C for extended periods. It features precise dimensions, low thermal conductivity, high compressive strength, and excellent insulation performance.

Key Properties:

- **High Strength:** Excellent compressive strength makes it fully capable of bearing loads at the bottom of electrolytic cells, with no issues for sidewall applications either.
- **High Dimensional Accuracy:** Dimensional tolerance within 1 mm. Easy to cut and shape, ensuring high construction quality.
- **High Working Temperature:** Designed for long-term safe operation at temperatures up to 1000°C.
- **Low Thermal Conductivity:** Thermal conductivity is just 0.125 W/m·K at 400°C.
- **Fully Inorganic Material:** Will not age over time, with stable chemical properties.

Application:

Bottom & Sidewall of Aluminum Electrolytic Cells.

Technical Specification

Grade	AL 1100
Classification Temperature	1100℃
Color	White
Bulk Density	0.85g/cm^3
Cold Crushing Strength	≥6.5MPa
Modulus of Rupture	≥3.0MPa
Permanent Linear Change	≤1% (1050 ℃x12h)
Thermal Conductivity， W/m•K	
Calorimeter, Hot Face, According to China YB/T 4130–2005 Standard	
400℃	0.13
600℃	0.16
800℃	0.19
1000℃	0.22
Standard Dimension	600mm*400mm*100mm other sizes can be customized



Silica Insulating Firebrick

Darco's innovative silica insulating firebricks are crafted from carefully chosen minerals, shaped through dry pressing, and then high-temperature sintered in a tunnel kiln. Throughout the production process, no polystyrene beads or sawdust are added, thereby minimizing emissions of NOx and CO2.

Advantages:

- **Environmentally Friendly**: 100% dry pressed products made from minerals without burnout material polystyrene balls or sawdust, maximum reducing NOx & CO2 emissions.
- **Improved Insulation Performance**: Selected raw material & particle size distribution creates a lower density and more uniform pore structure, minimizing thermal conductivity and enhancing high-temperature insulation capabilities.
- **Extended Service Life**: High SiO2 content resulting in a **50°C to100°C** higher classification temperature compared to traditional products, contributes to a long-lasting insulating lining, reducing maintenance needs.
- **Dimensional Stability**: Maintains structural integrity at high temperatures without forming eutectic melts, ensuring consistent performance over time.

Application: Insulation of glass melting furnace, hot blast stove and general industrial use

Items	Unit	INS 06	INS 08	INS 10
Shaping Method		Press	Press	Press
Classification Temperature	°C	1500	1550	1600
Bulk density	g/cm3	0.6	0.8	1.0
Cold crushing strength	MPa	1.5	4.0	5.0
Permanent Linear Change	%	+0.3 (1450°C*8h)	-0.9 (1550°C*8h)	+0.2 (1600°C*8h)
0.1 MPa Refractoriness Under Load	°C	—	—	1569
Thermal conductivity				
400°C	W/m.K	0.22	0.27	0.32
800°C	W/m.K	0.33	0.37	0.52
1000°C	W/m.K	0.38	0.42	0.58
SiO2	%	93.6	94.5	94.0
Al2O3	%	3	2.2	1.5
Fe203	%	0.7	0.6	1.0
CaO	%	2.5	2.5	2.8




GSM 97 Glass Furnace Silica Mortar

GSM97 Glass Furnace Silica Mortar was developed in cooperation with customers from the glass industry in order to guarantee the stability and durability of the silica lining.In order to achieve overall homogenization of silica lining, the SiO2 content in the mortar is almost identical to the SiO2 content in dense silica shapes. This makes the mortar highly resistant to chemical attacks as well.

To achieve optimal workability, special additives were used, which guarantee the correct plasticity and handling during erection. This guarantees easy bricklaying and quick installation, which also minimizes the shutdown of glass furnace.

Items	Unit	GSM 97 Silica Mortar
SiO2	%	97.5
Al2O3	%	1.0
Fe203	%	0.15
Max Service Temperature	°C	1650
Grain Size	mm	0~0.5
Mixing water requirement	l/100kg	28-30

All data above are average test results under standard procedure and are subjected to variation. Result should not be used for specification purpose or creating any contractual obligation. For more information on the safety application or materials, please contact with our sales engineer.



High Temperature Binder — Strong Bonding Across All Temperatures

This high-performance binder is specially engineered to maintain **strong bonding strength (>2 MPa)** continuously from ambient temperature to its maximum service temperature. It overcomes the typical weakness found in most binders between **650°C and 1000°C**, delivering consistent adhesion throughout the full temperature range. The product can also bond **dissimilar materials** effectively, making it highly versatile for demanding refractory applications. Formulated from nano-grade colloidal silica, high-purity kaolin, and proprietary expansion agents, this binder is pre-mixed and ready to use with no additives required.

Product Characteristics

- Strong bonding across the full temperature range (room temperature to 1580°C)
- **Stable bond strength >2 MPa** even at critical mid-range temperatures (650–1000°C)
- Effective bonding between different types of materials
- Excellent thermal resistance
- No free water; forms **thin joints**, **ideal for insulating bricks**
- **Instant tack on contact** for efficient brick laying
- **No mixing required** — supplied as a ready-to-use paste

Typical Applications

- Bonding of refractory bricks and shapes in high-temperature kilns and industrial furnaces
- Emergency furnace repair or maintenance requiring fast-setting, high-strength adhesive
- Ideal replacement for traditional refractory mortars in insulation brick installations

Properties		Binder 1400	Binder 1600	Binder Silica
Al_2O_3		20 – 30%	20 – 30%	
SiO_2		58 – 68%	58 – 68%	95
Refractoriness		1470°C	1580°C	1710
Modulus of Rupture	After 24h at 110°C	>2.0MPa	>2.0MPa	>5
	After 3h at >650°C	>2.0MPa	>2.0MPa	>5
Appearance		Paste	Paste	Paste
Application		Ready-to-use	Ready-to-use	Ready-to-use
Packaging & Storage	Supplied in sealed barrels. Store in a cool, dry, and frost-free environment.			
Shelf life	6 months from the date of manufacture under proper storage conditions.			

Rotary Kiln 5S Super Insulation Board

—The Game-Changer Product for Rotary Kiln Insulation

Product Overview

The 5S Super Insulation Board is a high-performance insulation material composed of high-purity alumina and calcium oxide, enhanced through our patented modification technology and nano-material composite techniques. Manufactured using automated batching, automatic press molding, and high-temperature tunnel kiln sintering processes, the 5S Super Insulation Board delivers exceptional performance and consistent quality, making it the ideal choice for energy-saving insulation in rotary kilns.

Industry Challenges and the Innovation of 5S

Rotary kilns, as dynamic furnaces, have long faced significant challenges in backup lining insulation. Although the industry has attempted to use traditional two- or three-layer Zig-Zag composite bricks, these materials suffer from the following issues:

- **Poor Integrity**: Differences in brick material properties lead to uneven thermal expansion, causing bricks to fall off and posing safety risks.
- **Limited Insulation Performance**: High thermal conductivity of traditional materials results in suboptimal energy savings.
- **Complex Installation**: Multi-layer structures increase installation difficulty and maintenance costs.

The Innovation of 5S Super Insulation Board:

The 5S Super Insulation Board revolutionizes rotary kiln insulation with its unique material and process design, enabling separate installation of the insulation layer and working lining. This ensures uniform and stable refractory lining integrity, while its high strength, low thermal conductivity, and ultra-low compression rate address the shortcomings of traditional materials, offering a breakthrough solution for rotary kiln insulation.

Core Advantages: The 5S Super Performance

- **Super High Strength**:
  With a compressive strength exceeding **40MPa**, the board can withstand the mechanical and thermal stresses of rotary kiln operation, ensuring long-term use without cracking or spalling, significantly extending equipment life.
- **Super Stable Low Thermal Conductivity**:
  The thermal conductivity at 1000°C is as low as **0.25W/m·K**, with stable performance throughout its service life. Practical applications show that using the 5S Super Insulation Board can reduce the surface temperature of rotary kiln shells by 80–120°C, significantly lowering energy consumption and helping companies achieve energy-saving and carbon reduction goals.
- **Super High Service Temperature**:
  Capable of long-term operation at temperatures above **1400°C**, the board exhibits excellent thermal shock resistance, adapting to frequent temperature changes in rotary kilns and ensuring safe operation.
- **Super Low Compression Rate**:
  With a volume change rate of less than **1%** under high temperature and pressure, far superior to traditional insulation materials, the board maintains shape and performance stability over long-term use, reducing maintenance costs.
- **Super Stable Bulk Density**:
  The density is as low as **1.5g/cm³,** uniform and stable, not only reducing equipment load but also ensuring consistent insulation performance and significantly extending service life.

Core Benefits of the 5S Super Insulation Board:

1. **Significant Energy Savings**: For a 5,000-ton-per-day cement kiln, using the 5S board can reduce the temperature by **100°C**, saving **4,500 tons** of standard coal equivalent in heat energy and up to **5 million RMB** in fuel costs annually.
2. **Quick Cost Recovery**: The cost of the 5S board can be recovered within a few months through fuel savings.
3. **Extended Equipment Life**: High strength, low compression rate, and stable performance ensure long-term operation in extreme conditions.
4. **Reduced Maintenance Costs**: Ultra-low volume change rate and stable thermal conductivity minimize maintenance frequency and costs.
5. **Lightweight Design**: With a density of only 1.5g/cm³, the 5S board significantly reduces kiln weight, lowers equipment load, and improves installation efficiency.

Technical Specification of Rotary Kiln 5S Super Insulation Board

Items		Unit	Indexes
Refractoriness		℃	1830
Refractoriness Under Load		℃	>1400
Bulk Density		g/cm^3	1.55
Cold Crushing Strength		MPa	>40MPa
Thermal Conductivity	@1000℃	W/m·K	0.25
Al2O3		%	90
CaO		%	9

Contact Us:

To learn more about the 5S Super Insulation Board or to request a customized solution, please contact our sales team. We provide professional technical support and after-sales services to help your business achieve efficient and energy-saving production.




Nano Thermal Insulation Sealing Mix —Revolutionizing Furnace Roof Insulation

Nano Thermal Insulation Sealing Mix is an advanced solution that reduces furnace outside temperatures by **over 30°C** compared to traditional insulation materials, all at the same thickness. It also lightens the insulation layer and extends its lifespan, helping save energy and lower operational costs.

Our unique high-temperature nano insulation material overcomes a key industry challenge: traditional microporous materials offer excellent insulation but cannot withstand prolonged high-temperature use. Nano Thermal Insulation Sealing Mix delivers both high efficiency and durability in extreme conditions.

Key Features

- **High Temperature Resistance**: Reliable performance in extreme environments.
- **Exceptional Sealing**: Nano-structured material ensures a tight seal, reducing heat loss.
- **Flexible Application**: Suitable for a wide range of furnace types and custom designs.
- **Eco-Friendly**: Made entirely from inorganic materials, with no harmful emissions.
- **Customizable**: Available in different temperature grades to suit various working conditions.

Typical Applications

Nano Thermal Insulation Sealing Mix is versatile and works in many types of industrial furnaces, including:

- **Reheating Furnace Roofs**
- **Ceramics Roller Hearth Kiln Roofs**
- **Glass Furnace Crowns**
- **Carbon Calcining Furnaces**
- **Refractory Tunnel Kilns**
- more

Common Furnace Roof Issues

High Furnace Roof Temperature



Furnace Roof Red Leakage

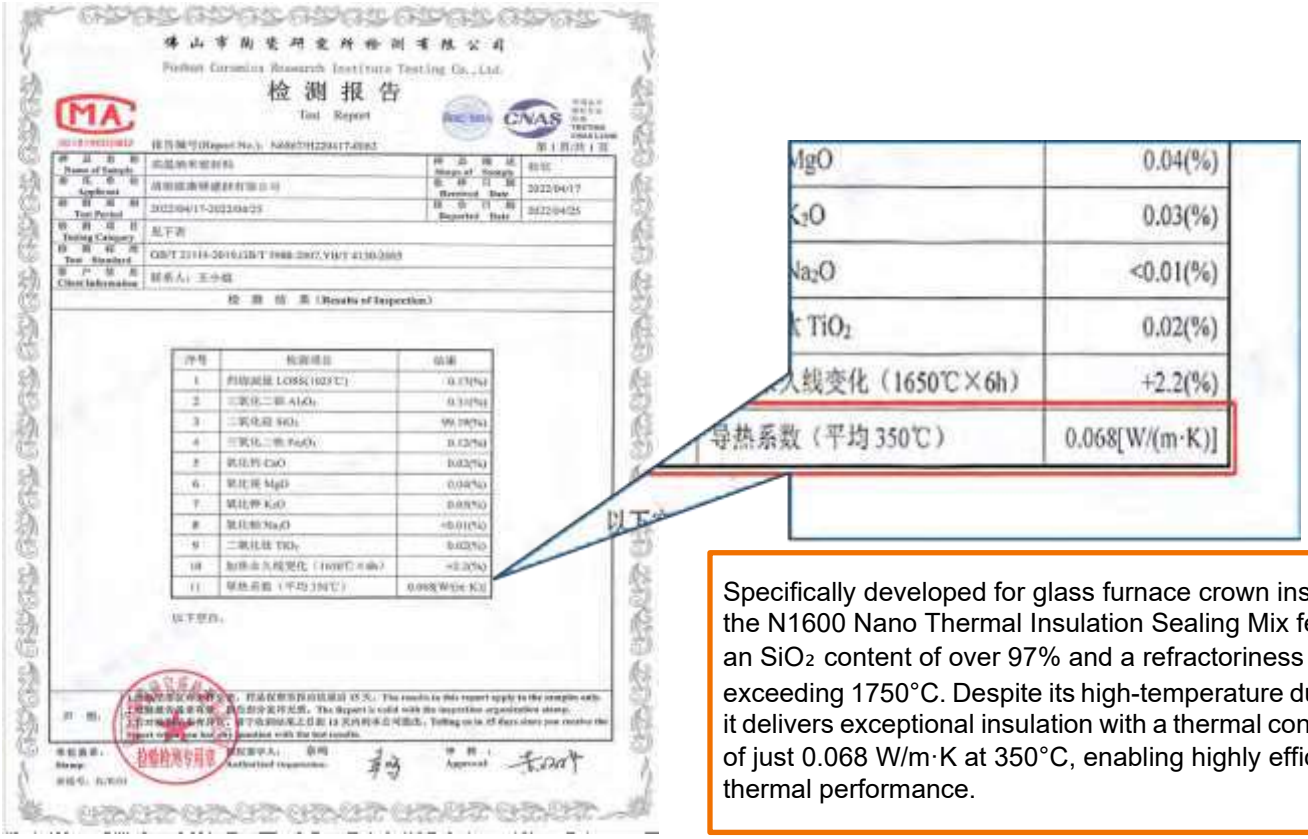


Furnace Roof Cracks

Technical Specification of Nano Thermal Insulation Sealing Mix

Grade		N1000	N1200	N1400	N1600
Bulk Density	g/cm³	0.5	0.8	0.95	1.15
Refractoriness	℃	＞1650	＞1650	＞1750	＞1750
Continuous working temperature	℃	≤1000 (hot face)	≤1200 (hot face)	≤1400 (hot face)	≤1600 (hot face)
Reheating Linear Change	%	-1~+0.5 (900℃×12h)	-1~+0.5 (1100℃×12h)	-1~+1 (1400℃×12h)	-1~+1 (1650℃×12h)
Thermal Conductivity @400℃	W/m·K	≤0.052	≤0.08	≤0.125	≤0.15
SiO2	%	≥90			≥97
SiO2+ZrO2			≥90	≥95	

N1600 Nano Thermal Insulation Sealing Mix for Glass Furnace Crowns



Specifically developed for glass furnace crown insulation, the N1600 Nano Thermal Insulation Sealing Mix features an SiO_2 content of over 97% and a refractoriness exceeding 1750°C. Despite its high-temperature durability, it delivers exceptional insulation with a thermal conductivity of just 0.068 W/m·K at 350°C, enabling highly efficient thermal performance.

Floating Glass Furnace Roof Insulation Layer Upgrade

Outer Wall Temperature: 87°C

Temperature Reduction: 33°C!

Selected Customers in Reheating Furnace Roof Applications

Customers	Application
Shanghai Baosteel Co., Ltd.	Plate Factory No. 1 Reheating Furnace, Hot Rolling 2050 Line No. 1 & No. 3 Reheating Furnaces
Baotou Iron and Steel Group Co., Ltd.	New System Plate Factory No. 1–4 Reheating Furnaces, Thin Plate and Rail Beam Factory Reheating Furnaces
Pangang Group Panzhihua Steel & Vanadium Co., Ltd.	Plate Factory No. 1 & No. 2 Reheating Furnaces, Rail Beam Factory No. 2 & No. 3 Reheating Furnaces
Pangang Group Xichang Steel & Vanadium Co., Ltd.	Hot Rolling Factory No. 1 & No. 2 Reheating Furnaces
Nanjing Iron & Steel Group Co., Ltd.	Medium Plate Factory No. 2 & No. 3 Reheating Furnaces
Jiangsu Yonggang Group Co., Ltd.	Wire Rod Factory No. 3 & No. 4 Reheating Furnaces
Xiangtan Iron & Steel Group Co., Ltd.	5m Wide Thick Plate Reheating Furnace
Ansteel Group Corporation	Medium & Thick Plate Factory 4300 Line No. 2 Reheating Furnace
Baosteel Zhanjiang Steel Co., Ltd.	Plate Factory No. 1 & No. 2 Reheating Furnaces

Case Study: Baosteel

表 5 红外热成像数据统计表

部位	预热、一加热段		二加热段		均热段	
	维修后	维修前	维修后	维修前	维修后	维修前
序号	平均值数据	平均值数据	平均值数据	平均值数据	平均值数据	平均值数据
1	80	145	106	161	107	153
2	78	146	111	155	105	160
3	90	148	95	146	119	154
4	86	142	109	146	119	142
5	96	154	106	150	112	154
6	83	154	99	142	101	146
7	107	134	111	157	113	152
8	99	148	96	165	111	147
9	103	138	93	160	93	134
10	96	149	104	151	113	136
11	101	151	107	141	113	135
12	86	151	101	140	112	134
平均	92.1	146.7	103.2	151.2	109.8	145.6
温降	54.58		48.00		35.75	

根据对维修前后平均值的全数据统计，维修前平均温度(146.7+151.2+145.6)/3=147.8℃，维修后平均温度(92.1+103.2+109.8)/3=101.7，炉顶温度平均降低 46.1℃，按温降理论计算节能效益

表 6 节能效果情况

前后对比	3#炉燃耗	备注
实施前 2022 年	37.8kg 标煤/t	下降 2.9kg 标煤/t，其中装炉温度提升 50℃，贡献约 2kg 标煤/t，技改项目贡献 0.9kg 标煤/t。
实施后 2023 年	34.9kg 标煤/t	

目前 3#炉燃耗下降 2.9kg 标煤/t，本项目在技改项目范围中，下降 0.9kg 标煤/t，年效益约为：0.9*170 万吨*2.6 元/kg 标煤*0.15=59.7 万元/年（贡献系数 0.15，3#炉年产量约 170 万吨）。

Hot Rolling 2050 Line No. 3 Heating Furnace: Before and After Retrofit
Achieved annual fuel cost savings of RMB 597,000 following the upgrade.

Nano Thermal Insulation Sealing Mix for Carbon Calcining Furnace Roof




The original roof temperature ranged between 103°C and 128°C. After applying Nano Sealing Material, the temperature dropped to 58°C–68°C, achieving a reduction of approximately **50°C**.

Nano Thermal Insulation Sealing Mix for Refractory Tunnel Furnace Roof



Refractory Tunnel Kiln Roof Temperature Achievement
With an internal temperature of 1430°C, the furnace roof remains cool to the touch at approximately 35°C.

Nano Thermal Insulation Sealing Mix for Ceramics Roller Hearth Kiln Roof




ThermoLite Kiln Car Sand (TKS)

—Ultra-lightweight Loose Fill Sand for Energy-Saving Kiln Car Bases

Product Overview

ThermoLite Kiln Car Sand (TKS) is an ultra-lightweight, loose fill insulation material specifically designed for high-temperature industrial applications, particularly in kiln car bases. Engineered to replace traditional insulation materials such as ceramic fiber, vermiculite, and perlite, TKS offers exceptional thermal efficiency, long-term stability, and energy-saving benefits. Its unique composition and granular form make it easy to handle, install, and maintain, ensuring consistent performance over its entire lifespan.

Key Features

- **Ultra-lightweight:** Low-density design reduces kiln car weight, leading to significant energy savings.
- **High Thermal Efficiency:** Excellent insulation properties minimize heat loss and improve kiln performance.
- **Long-term Stability:** Maintains thermal efficiency without degradation, even at high temperatures.
- **Easy Installation:** Free-flowing granular form allows for quick and efficient filling of complex spaces.
- **Energy-saving:** Reduces energy consumption, lowering operational costs and carbon footprint.
- **Reusable:** Can be reused after kiln car repairs or maintenance, reducing material waste.

Typical Applications

ThermoLite Kiln Car Sand (TKS) is ideal for a wide range of high-temperature industrial applications, including:

- **Ceramic Industry:** Insulation for kiln car bases in tile, brick, and sanitaryware production.
- **Refractory Industry:** High-temperature insulation for furnaces and kilns.
- **Industrial Ceramics:** Thermal insulation for sintering and firing processes.
- **Building Materials:** Energy-efficient insulation for high-temperature kilns in construction material production.

Benefits

- **Cost-effective:** Reduces energy consumption and operational costs.
- **Environmentally Friendly:** Free from hazardous materials like ceramic fiber, making it safe for disposal.
- **Durable:** Stable at high temperatures, ensuring long-term performance.
- **Versatile:** Suitable for various industrial applications and kiln designs.

Technical Specification of ThermoLite Kiln Car Sand (TKS)

Items			TKS	Remarks
Classification Temperature		℃	1250	
Refractoriness		℃	1680	
Bulk Density	As-Delivered (Wet)	g/cm³	0.25	Contains 40% liquid
	After Drying (Dry)		0.16	Liquid evaporates during initial drying
	Final State (Heated)		0.11	Gases released, creating porous structure
Thermal Conductivity	@400℃	W/m·K	0.07	Under final state
	@600℃		0.08	
	@800℃		0.09	
	@1000℃		0.11	
SiO2		%	30	
CaO+MgO		%	65	
Standard Packing			1m3 Bulk Bag, 250kg/bag	As-Delivered

Case Study: Tangshan Huida Company

Tangshan Huida Company replaced ceramic fiber blankets with **ThermoLite Kiln Car Sand (TKS)** in their #7 tunnel kiln cars.

- **Before TKS:** Kiln car bottom temperature: **119°C - 125.9°C**.
- **After TKS:** Temperature dropped to **82.5°C**, a reduction of **36.5°C - 43.4°C**.

Penetrating High-Efficiency Reinforcing Modifier

—Reinforces Fiber, Brick & Castable Internally for Crack-Free, Long-Lasting Performance

Product Overview

This penetrating modifier is developed with our proprietary patented technology. It appears as a white, milky liquid, with a blue pigment added to visually monitor application. The pigment is a heat-sensitive organic colorant that disappears when heated above 200°C, helping ensure proper spraying coverage, thickness, and uniformity.

The product contains 50% solids and 50% water, and it differs fundamentally from traditional surface coatings. Instead of forming a thick layer that may crack or peel due to dehydration or thermal mismatch, this modifier fully penetrates the substrate. It forms a gradient structure from the surface inward, with gradually decreasing bulk density. This design allows smooth thermal expansion transitions, effectively preventing cracks and delamination.

Key Features

- **Deep Penetration** – No surface buildup, ensuring long-term adhesion.
- **Crack Resistance** – Gradient layer mitigates thermal expansion stress.
- **Energy Saving** – Reduces convective heat transfer by sealing surface pores.
- **Versatility** – Tailored formulations (Darco-A/B/C) for fibers, bricks, and castables.

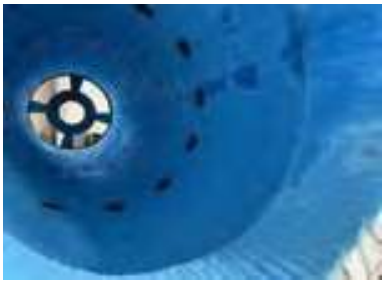
Typical Applications

Refractory Modifier is versatile and works in many types of industrial furnaces, including:

- **Industrial Furnaces:** Surface hardening for shuttle kilns, rotary kilns, hot blast stoves, and heat treatment furnaces.
- **Steel Industry:** Protects water-cooled pipes and hardens steel ladle and furnace covers.
- **Chemical Industry:** Strengthens reheating furnaces and fiber modules, reducing pollutant absorption.
- **Metal Smelting:** Prevents liquid metal penetration in aluminum and steel ladles.
- **Refractory Products:** Hardens lightweight bricks, castable and dense refractories, improving strength and reducing gas absorption.

Benefits

- **Durability:** Creates a protective layer that resists erosion, extending the lifespan of ceramic fiber components.
- **Thermal Shock Resistance:** Ensures stability and performance under rapid temperature fluctuations.
- **Operational Efficiency:** Enhances the strength of ceramic fiber products, reducing maintenance and downtime.
- **Thermal Efficiency:** Improves heat retention and minimizes heat loss, promoting energy savings.
- **Sustainability:** Reduces energy consumption and supports environmentally friendly operations

Technical Specification

Product		Penetrating Modifier
Bulk Density	g/cm3	1.2 ~ 1.4
Al2O3+SiO2	After drying	≥99.5
Refractoriness	°C	≥1650
Period of validity	0~45°C	Sealed storage 6 months
Packaging		25 kg/plastic drum. Custom sizes available.

Product Features & Application

Type - A (Fiber Applications)

Features:

- Penetrates and forms a graded density transition layer within the material, effectively mitigating thermal expansion mismatches and preventing cracking or delamination.
- Significantly enhances the surface strength of refractory fiber products, achieving a hardness comparable to lightweight mullite bricks, with improved resistance to erosion.
- The thickness of the modified layer is adjustable from 1 to 20 mm, allowing customization based on operational requirements.

Applications: Ideal for applications in the petrochemical, steelmaking, and regenerative thermal oxidizer (RTO) industries, where high surface strength and erosion resistance of fiber products are critical.

Type - B (Lightweight Bricks/Castables)

Features:

- Fully penetrates the surface of lightweight mullite bricks or castables, forming a glaze-like hardened layer that dramatically enhances surface strength.
- Effectively reduces surface porosity to near zero, minimizing the absorption of harmful volatiles in kiln environments, thereby improving lining durability and reducing contamination.

Applications: Designed for use in ceramic roller kilns and other high-temperature applications requiring strict control of harmful emission absorption.

Type - C (Dense Refractories)

Features: Treats the surfaces of dense refractory bricks or castables by penetrating and completely sealing surface pores, creating a robust protective barrier.

Prevents liquid metal infiltration, extending the service life of furnace linings and reducing material degradation.

Applications: Widely used in metal smelting industries, particularly for components that come into direct contact with molten metals, such as steel and aluminum ladles and furnace linings.




High Strength Low Thermal Conductivity Self Flow Castable

— Energy-saving Solution for Steel Reheating Furnace Water Beam

This product is a high-performance insulating refractory castable featuring **low thermal conductivity, high strength,** and excellent **self-flowing** capability. It is designed for applications requiring both mechanical integrity and superior insulation in high-temperature environments. Commonly used in water-cooled beam linings of reheating furnaces and various industrial kilns.

Key Features and Benefits

- **Excellent Insulation Performance:** Thermal conductivity as low as **0.46 W/m·K @ 1000°C**; reduces cold-face temperature by over **70°C** in actual use.
- **High Strength and Durability:** Cold crushing strength up to 4**5 MPa**, ensuring long service life under mechanical and thermal stress.
- **Proven Energy Savings:** Saves up to 5.1% of total furnace fuel; verified in retrofit cases with annual cost reduction of ¥2.5 million.
- **Self-Flowing Installation:** No vibration needed; adapts to complex geometries with a dense, uniform finish.
- **Lightweight Structure:** Bulk density around **1.6 g/cm³**, reducing thermal mass and improving energy response.

Typical Application

- Water-cooled beam linings in reheating furnaces
- Working layers in steel ladle covers, tundish covers
- Back-up lining in rotary kilns
- Energy-efficient linings in industrial kilns and thermal equipment

Items	Unit	Typical	Guarantee
Bulk Density (110℃×24h)	g/cm³	1.66	≤1.75
Bulk Density (1350℃×3h)	g/cm³	1.55	≤1.65
Cold Crushing Strength (110℃×24h)	MPa	26	≥25
Cold Crushing Strength (1350℃×3h)	MPa	45	≥40
Cold Modulus of Rupture (110℃×24h)	MPa	7	≥6
Cold Modulus of Rupture (1350℃×3h)	MPa	12	≥10
Reheating Linear Change (1400℃×6h)	%	-0.2	≥-0.3
Refractoriness Under Load (0.2MPa×0.6%)	℃	1470	≥1460
Thermal Conductivity (800℃)	W/m.k	0.44	
Thermal Conductivity (1000℃)	W/m.k	0.46	
Al_2O_3	%	50	
CaO	%	3.0	
Fe_2O_3	%	0.5	

Practical Application Results



15MPa+ High Strength Insulating Aggregate

High-strength low thermal conductivity lightweight aggregates are made from high-quality refractory raw materials, which are mixed, shaped, and then fired in tunnel kilns at temperatures around 1450°C. After crushing and screening to meet customer specifications, the product has uniform physical composition, closed pore structure with accurate particle grading.

Features

- Exceptional lightweight properties combined with high strength.
- Superior thermal insulation for reduced energy consumption.
- Exceptional refractoriness for high-temperature environments.
- Versatile applications in various manufacturing processes.
- Environmentally friendly and sustainable solution.

Typical Application

- Insulating firebrick production.
- Castables for high-temperature environments.
- Kilns, furnaces, and thermal insulation systems.
- Other high-temperature applications.

Grade	Al_2O_3	Fe_2O_3	Refracto-riness	Cold Crushing Strength	Bulk Density	Color	Thermal conductivity W/m.K			
	%	%	°C	MPa	g/cm³		400°C	600°C	800°C	1000°C
LWA55-1.25	≥52	≤0.8	1790	15	1.2-1.3	White	0.212	0.226	0.237	0.258
LWA55-1.45	≥52	≤0.8	1790	18	1.4-1.45	White	≤0.35			

Case Study: High Strength IFB made of 1.45g/cm3 Aggregate

Composite with SiC Mullite bricks, the rotary kiln outside temperature can be reduced more than 50° C.

Items	Condition	Indexes
Bulk Density , g/cm3		≤1.8
Cold Crushing Strength , MPa		≥50
PLC , %	1450℃	≤0.1
Thermal Conductivity , W/m•K	Hot face 1000℃	≤0.5
RUL , ℃	0.2MPa×0.6%	≥1480
Al2O3 , %		≥50
Fe2O3 , %		≤0.8

Case Study: Castable for reheating furnaces made of 1.25g/cm3 aggregate

Baosteel Reheating Furnace water beam

Items	Condition	Indexes
Bulk Density g/cm3	110℃×24h	≤1.75
	1400℃×3h	≤1.65
Crushing Strength MPa	110℃×24h	≥25
	1400℃×3h	≥40
Modulus of Rupture MPa	110℃×24h	≥6
	1400℃×3h	≥10
PLC %	1400℃×6h	≤-0.3
Thermal Conductivity W/ (m•K)	Hot face 1000℃	≤0.46
RUL ℃ (1400℃×3h)	0.2MPa×0.6%	≥1460

High-Strength Energy-Saving Thermal Insulation Coating

High-Strength Energy-Saving Thermal Insulation Coating is a newly developed product designed for industrial kilns and thermal equipment operating at temperatures up to 600°C. This advanced coating combines the low thermal conductivity of traditional insulation materials with enhanced mechanical strength using state-of-the-art composite technology.

Upon curing, it forms a dense, high-strength insulating layer that delivers excellent energy-saving performance and superior durability in harsh industrial environments.

Application Method: Troweling, Brushing or Spraying

Key Features

- **Low Thermal Conductivity:** 0.08 W/(m·K), ideal for reducing surface heat loss
- **High Strength:** Mohs hardness of 6H, withstands mechanical impact and wear
- **Strong Adhesion:** Bond strength up to 6 MPa
- **Corrosion Resistant:** Effective protection against acid and alkaline environments
- **Extended Service Life:** Maintains integrity under prolonged thermal exposure
- Safe Operating Temperature: Up to 600°C
- **Eco-Friendly:** Inorganic formulation, no volatile organic compounds (VOCs)

Application Areas

- **Rotary Kiln Steel Shells:** Apply 2–3 mm to the inner shell surface to reduce outer surface temperatures by 20–30°C, improving energy efficiency.
- **Metallurgical Furnaces and Vessels:** Suitable for ladles, torpedo cars, tundishes, and aluminum melt containers. A ~3 mm coating reduces heat loss and prevents acidic/alkaline gas corrosion, prolonging steel shell service life.
- **Hot Air Ducts and Flues:** Effective for steel flues in carbon calcination, small flue systems, and pre-boiler ducts for waste heat recovery—offering both thermal insulation and anti-corrosion performance.\
- **Kiln Cars and Furnace Platforms:** Used on tunnel kilns, shuttle kilns, ceramic roller kilns, and metal heat treatment furnaces to protect steel surfaces from oxidation and corrosion.
- **Operator Safety Shields:** Applied to protective boards, ladders, and bridge plates in high-temperature zones to enhance worker safety and equipment longevity.

Property		Value
Bulk Density	Wet State (ex-factory)	1g/cm³
	After Drying	0.55 – 0.60g/cm³
Hardness (Dry Layer)		Mohs 6H
Adhesion Strength		≥6 MPa
Thermal Conductivity		0.08 W/(m·K)
Max Operating Temperature		≤600°C
SiO_2		~80%
Al_2O_3		≥5%
MgO		~7%

All technical information provided above is based on laboratory tests and field experience. Performance may vary under different conditions. Please consult Darco for technical support specific to your application.

FJM Series Insulating Firebrick

Darco's FJM Series Insulating Firebricks (IFBs) are high-quality lightweight insulation refractory bricks crafted from a blend of pure refractory clays, select alumina, and specially graded organic fillers. These fillers burn out during production, resulting in a controlled and consistent pore structure.

Manufactured through casting, extrusion, or foaming methods, the bricks are sintered in natural gas-powered tunnel kilns. After undergoing meticulous grinding for accurate dimensions, the IFBs are securely packed on ISPM15 or non-fumigation plywood pallets.

From standard straight, arch, and block shapes to bespoke designs, our manufacturing capabilities cater to your unique project needs.





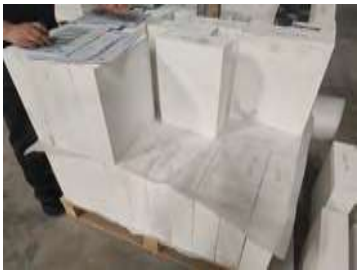












Microporous Board

Microporous Board, known for their exceptional thermal efficiency, are well-suited for high-temperature industrial and OEM applications. These boards, crafted from nano-powders through a dry compression process without binders, offer low bending and breaking strengths, ensuring minimal thermal conductivity.

Darco offers a range of products including **rigid boards & panel, flex felts & blanket, custom shapes, and granules**, each differing in fabrication method to cater to diverse working environments and specific application needs.

Rigid Microporous Board & Panel

Rigid Microporous Boards and Panels offer unparalleled thermal insulation efficiency, ideal for high-temperature industrial applications. The rigid boards provide robust and durable insulation solutions, maintaining structural integrity even under extreme conditions. Panels, on the other hand, offer a more flexible design, suitable for applications requiring both thermal efficiency and adaptability. Both are crafted using advanced microporous materials, ensuring minimal heat transfer and excellent thermal management. Their compact and lightweight nature makes them ideal for space-constrained environments, a testament to their innovative design and versatility in insulation.

Flexible Microporous Board

Flexible Microporous Board combines the versatility of soft felt and blankets into a unified solution. Designed for flexibility and ease of installation, this high-performance insulation is ideal for a variety of industrial applications. Made from advanced microporous materials, it offers excellent thermal insulation while remaining lightweight and manageable. Perfect for wrapping around irregular shapes or filling unique spaces, Microporous Flex can be easily tailored to different sizes and forms, making it a go-to choice for diverse insulation needs.

Ceramic Fiber Products

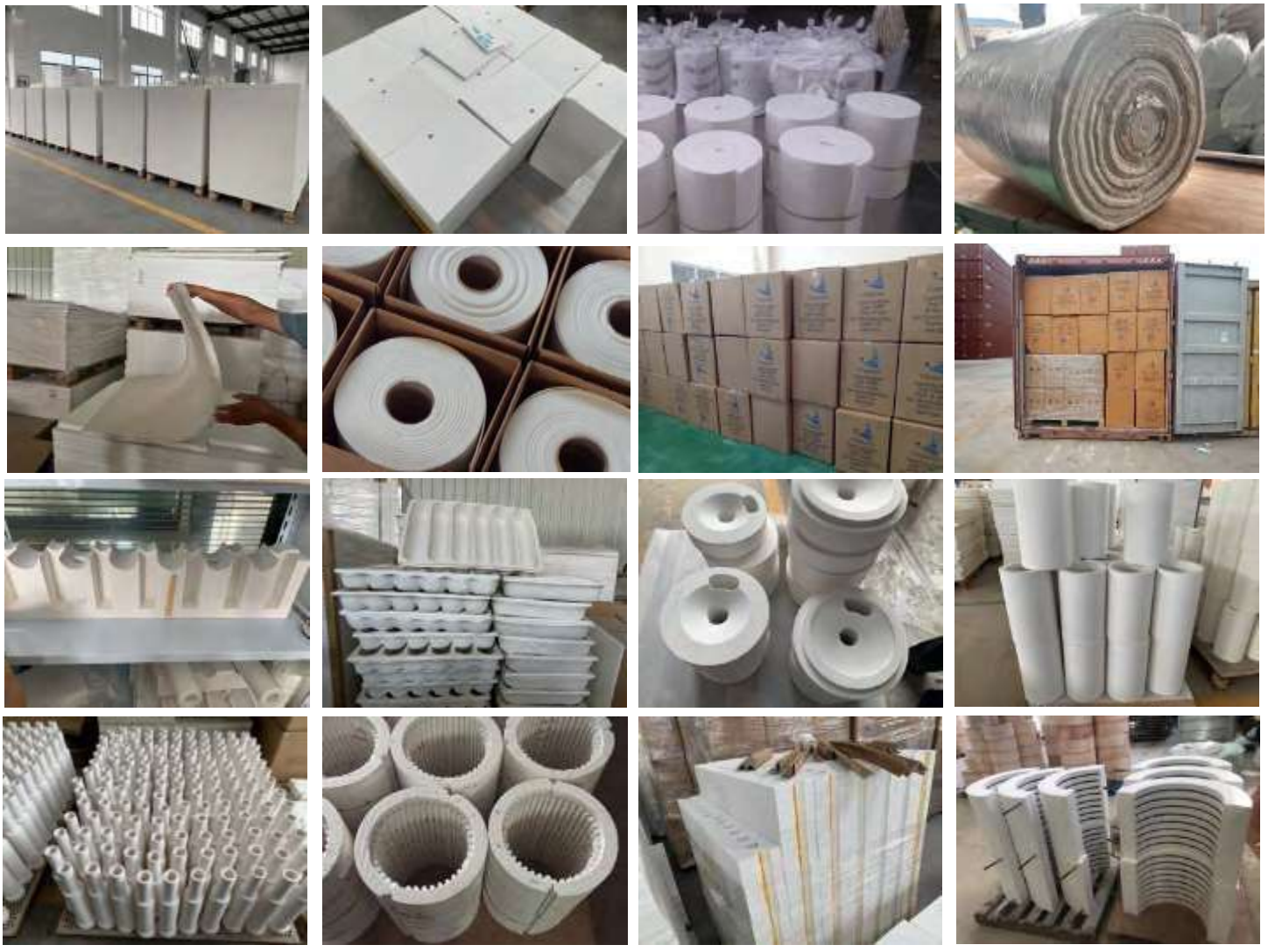
The Ceramic fiber are made from industrial minerals by spun or blown production method into bulk, then needled into a blanket, folded into modules, converted into papers, boards, and shapes, die-cut into gaskets, twisted into yarns, woven into rope and cloth, and blended into liquid binders for mastics and cements.

Darco Ceramic Fiber Products are classified into the following categories:

Fiber Types:
- Refractory Ceramic Fiber (RCF)
- Biosoluble Fiber (AES)
- Polycrystalline Fiber (PCW)

Temperature Grades:
Available in grades such as 1050°C, 1260°C, 1350°C, 1400°C, 1430°C, and 1600°C.

Product Types:
Ceramic fiber can be made into various forms including Blanket, Bulk, Board, Modules, Vacuum-Formed Shapes, Felt, Paper, Textiles, and Binding Cement.



Details Products data sheet are available upon request.

Calcium Silicate Board

Darco provided **CE certified calcium silicate board** include three kinds, which are:

a. 1000℃ Calcium Silicate Straight & Arch Board;

b. 1100℃ Calcium Silicate Board for Fireproof & Sound Insulation Door;

c. High Density Calcium Silicate Board with glass fiber or carbon fiber reinforced;

Product forms include straight & arch board, pipe cover and CNC machined shapes.




High Density Calcium Silicate Board

The **High-Density Calcium Silicate Board**, made from xonotlite-based calcium silicate, is designed for high-temperature applications requiring excellent insulation, strength, and resistance to molten non-ferrous metals like aluminum. Reinforced with glass or carbon fibers, it offers superior machinability and stability for critical industrial processes.

Application

The product is available in **glass fiber-reinforced** (comparable to **Marinite-A**, **N-14**, **M1**) and **carbon fiber-reinforced** versions (comparable to **Marinite AHP**, **N-17**, **M1A**, **G34**) to meet various aluminum processing needs. Common applications include:

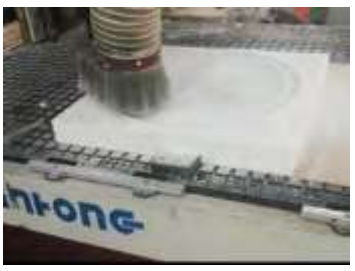
FCS-85IG Board: A cost-effective insulation product reinforced with organic and glass fibers, ideal for aluminum holding furnaces, steel ladles, tundishes, and glass furnace bottom insulation.

FCS-80C: Carbon fiber-reinforced, suitable for direct contact with molten aluminum, ideal for demanding applications.

FCS-100G: Glass fiber-reinforced, offering high strength and good high-temperature performance as a more economical option than FCS-80C.

FCS-95GC: An enhanced version of FCS-100G with added carbon fiber, significantly improving thermal shock resistance.






Quality Assurance at Darco – Where Trust is Built. We ensure transparency at every step of the process:

- Production plans are shared as soon as your order is confirmed.
- Weekly progress updates keep you informed.
- Every batch comes with a comprehensive test report.
- Appearance, dimensions, and weight are thoroughly inspected.
- Photos of your order are provided at the time of shipment.

<table>
<tr>
<td>  </td>
<td>  </td>
<td> 
FJM系列莫来石质隔热耐火砖
FJM Series Insulating Firebrick
质量控制规范
Quality Control Specification
1. General
This specification defines the quality control procedure used by Firebird New Material Technology Co., Limited for refractory insulating firebrick. This specification shall be used in conjunction with applicable specifications and drawings.
Quality control refers to the following aspects:
•Chemical and physical material properties
•Visual Inspection;
•Dimension & Shape inspection
•Quantities, marking, labelling and packing.
If there is an agreed quality control plan between Firebird and the customer, follow the acceptance specification.
2. Sampling plan
The sampling and acceptance of bricks are carried out according to the Chinese national standard GB/T 10325.
Unless otherwise specified, the visual inspection shall be carried out according to AQL=4.0, and the dimensional inspection shall be carried out according to the sampling plan of AQL=6.5.</td>
</tr>
<tr>
<td>Process Control Parameter</td>
<td>Weekly Progress Report</td>
<td>Quality Control Specification</td>
</tr>
<tr>
<td>  </td>
<td>  </td>
<td>  </td>
</tr>
<tr>
<td>Production Plan</td>
<td>Shaping</td>
<td>Drying & Sinter</td>
</tr>
<tr>
<td> 
QUALITY CERTIFICATE
Inspection report</td>
<td>  </td>
<td>  </td>
</tr>
<tr>
<td>Testing & Inspection</td>
<td>Sorting, Stamp & Packing</td>
<td>Delivery & Container loading</td>
</tr>
</table>