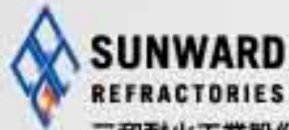




三和耐火工業股份有限公司

SUNWARD REFRACTORIES CO., LTD



SUNWARD
REFRACTORIES

三和耐火工業股份有限公司

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SUNWARD REFRACTORIES



品質 技術 服務

QUALITY
TECHNOLOGY
SERVICE

品質 技術 服務

QUALITY
TECHNOLOGY
SERVICE





SUNWARD
REFRACTORIES



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營業項目 Products and Service

本公司供應鋼鐵、水泥、玻璃、石化、焚化爐及其他金屬、非金屬等行業所需耐火材料，係重工業之基礎工業，營業項目如下：

- 各種耐火築爐有關工程承包業務。
- 磁磚及陶器有關製品之製造買賣。
- 耐火器材製造及買賣業。
- 定型與不定型耐火物之製造買賣。
- 開採窯業有關原料及買賣。
- 有關前列業務之進出口代辦業務。
- 上列有關業務之經營與投資。

關於三和耐火 Company Profile

公司簡介

三和耐火工業股份有限公司Sunward Refractories Co. Ltd. 創立自1968年，專業生產製造高溫耐火材料，行銷國內外市場。三和耐火工業股份有限公司長久以來累積產品、技術、客戶、投資、品牌等五大優勢。這五大優勢彼此交織共存，與三和核心競爭能力產生加乘效果，永續為全球高溫行業提供優質、專業的服務。



品質政策

品質第一：持續維護並不斷改善品質，以最適切的产品供應客戶。
 技術領先：藉由製程自動化、作業標準化、管理合理化，並持續自主改善以精進生產技術。
 服務至上：準時交貨、配合施工、技術交流，以滿足客戶的期望與需求。

About Sunward Refractories

Sunward Refractories Co., Ltd. was established in 1968 which concentrates in producing high temperature refractory materials for both domestic and oversea markets. We have accumulated advantages in product, technology, client, investment and brand over the past years. By weaving these top five advantages together with our core competency, we are pleased to provide our best and professional services continuously in the field of global high temperature refractory.

Best Quality Policy:

In order to continuously maintain and improve quality continually to supply the most suitable products for our customers.

Leading Technology

In order to enhance the level of production technology by means of automating manufacturing procedures, work standardization and humanizing management as well as continuous improvement.

Best Service:

In order to meet customers' expectations and requirements by punctual delivery, construction with requests and communication of technology.



Sunward Refractories Co., Ltd. is the foundation of the heavy industries to supply refractory materials for steel industry, cement industry petrochemical industry, incineration industry and other metal & non-ferrous industry.

Our business areas are listed below:

- The engineering and design contracting of refractory furnaces
- The manufacturing and trading of porcelain tiles and pottery
- The manufacturing and trading of refractory equipment
- The manufacturing and trading of shaped and monolithic refractories
- The excavating and trading raw materials of kiln
- Import/export and agency in the above business areas
- Management and investment in the above business areas.

三和大事記 Milestones

2010年

無水泥冷熱間濕式噴漿材開發, 中鋼試用成功。

2008年

設立資材廠, 加工使用再生物資。

2007年

2800噸全自動壓磚機投產。

2006年1月

本公司秉持著永續經營的理念, 繼通過ISO9001:2000後, 於95年01月經英國標準協會BSI驗證通過ISO14001:2004 & OHSAS18001:1999管理系統, 以落實環境、安全、品質並重的營運目標。

2005年5月

合資公司『張家港三和沙鋼高溫科技有限公司』正式投產。

2005年3月

成立工程部門, 整合設計、施工、材料供應等能力, 提供客戶完整服務。

2003年10月

三和公司, 與國立聯合大學材料系在陶瓷材料、耐火材料及玻璃等方面的卓越研究成果, 於92年10月23日由董建三董事長, 與聯大校長金重勳共同簽署合作協定。未來將由三和提供聯大材料系學生獎學金及寒暑假實習機會, 聯大教師則在設備條件許可下, 協助三和辦理在職員工講習與共同進行專題研究, 作為三和改進技術的參考。聯合大學表示, 這次三和與該校材料系合作, 希望共同帶動國內材料產業的進步、發展, 創造出更大的研究產值。

2002年9月

三采精密陶瓷股份有限公司通過ISO9001:2000版之品質系統認證(含設計開發)。

2001年3月

創設『三采精密陶瓷股份有限公司』, 發展精密陶瓷事業。

2010

Development Non-Cement gunning material. It also passes the testing and applied of China Steel Co.

2008

Founding Material factory processes, reprocess materials.

2007

2800MT Automatic Press Machine started producing.

2006-January

In order to create a safety, quality environment and sustainable development, Sunward Refractories Co., Ltd, was certificated by ISO9001:2000 in 2001, BSI (British Standards Institution) for ISO14001:2004 and OHSAS18001:1999 manage system.

2005-May

Our joint venture, ZHANGJIAGANG SANHE SHAGANG REFRACTORIES CO., LTD. officially started its operation and production.

2005-March

Establishing Engineering Technology Department provides our customers the most comprehensive services from integrating design, construction, and supplying materials.

2003-October

Sunward and National United University have excellent and successful cooperating research reports on ceramic, refractory materials and glass products. Our Chairman, Mr. Henny Tong has signed a cooperating contract with NUU, Sunward is going to offer the scholarship and internship opportunities to the students of NUU' s Material college; the professors of NUU will help and cooperate thesis research with Sunward' s engineers for the reference of technique improvement. NUU believes the cooperating scenario with Sunward will help the improvement and development of material industry in China and create great research value.

2002-September

Sunward Ceramic Corporation was approved by ISO 9001:2000 quality systems for quality assurance in design, manufacturing and production.

2001-March

Sunward Ceramic Corporation was established. We strive to develop the market of fine ceramic products.



安全衛生環保政策 S.H.E. Policy

本公司在生產過程中主要產生的環境議題有粉塵、廢氣與廢棄物。我們秉持著永續經營之理念，落實環境、安全、品質並重之營運目標，致力營造安全衛生舒適之工作環境，讓每位員工在決策與行動中，都能落實環境安全衛生要求，並承諾：

- 落實源頭管制、預防污染發生、提高資源使用效率。
- 加強溝通與訓練，提升全員環安衛認知。
- 符合環境及安全衛生法令之要求。
- 持續監督、改善，提升環境安全管理成效。
- 加強作業管制、強化操作技能、降低危害風險。

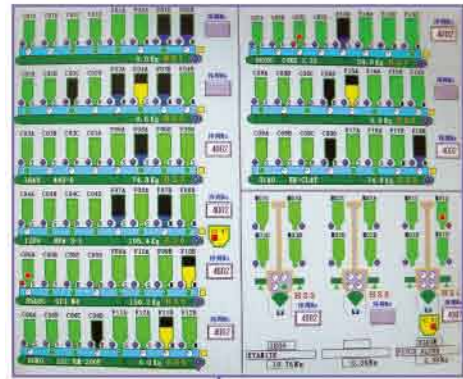
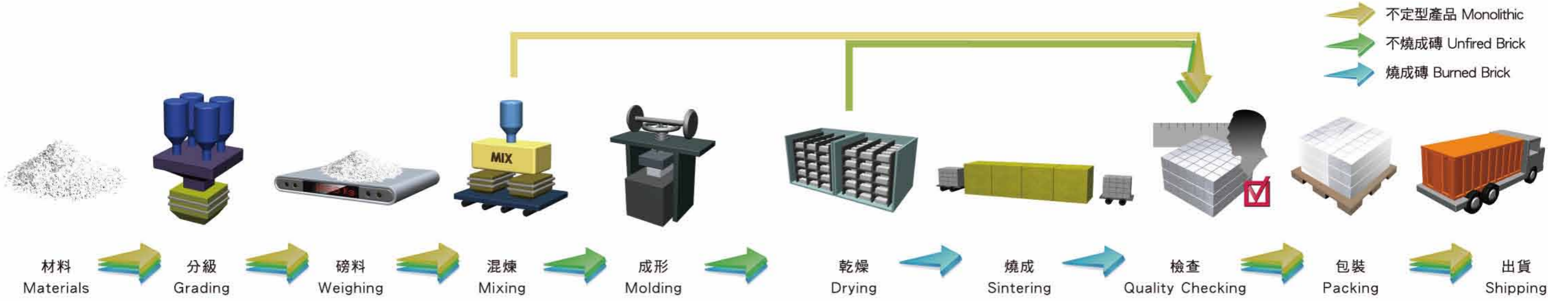
The mainly environmental issues may occur when producing our products are dust, exhaust gas, and rejection. Sunward holds the ideal of sustainable development, to put environment, safety, and quality into practice as our operation goals.

We aim at creating a safe, sanitary, and comfortable working environment. All the employees are personally responsible for S.H.E at the workplace in their every decision-making and action. Below are our commitments:

- Carried head control into execution, preventing of pollution, improving the efficiency of resources recycling.
- Enhanced communication and training for staffs in Safe and Sanitary knowledge.
- Conformed with the government policy to the safety and sanitation.
- Continued to supervise, improve, and promote the effect on Environment Safety Management.
- Enhanced the process control, operating skills and reduced the risks of danger.



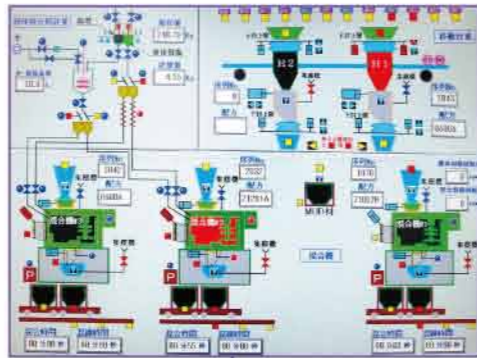
生產流程 Manufacturing Processes



分級 Grading



磅料 Weighing



混煉 Mixing



成形 Molding



乾燥 Drying



燒成 Sintering



檢驗 Quality Checking

全球化市場 Globalization Market



● 出口國家 Export Country

▲ 合資企業 Joint Venture

築爐工程

Furnace Construction

為滿足各行業客戶之需求，本公司積極研發全新之耐火材料且更優質之施工技術，全面朝機械化、自動化、安全施工的目標邁進。並提供客戶經濟實惠的窯爐設計，以達到最省能源及延長爐齡之要求。

本公司提供客戶各式工業窯爐之耐火材料施工及設計，服務範圍包括：

- 爐體耐火材料之設計、規劃及耐火磚之分割。
- 各式窯爐耐火材料之配置、施工及監工管理。
- 耐火材料設計選用及施工技術服務。
- 各式窯爐熱傳導現象模擬分析技術服務。
- 其他相關耐火材料產品應用服務。

In order to satisfy the needs of our customers, our group progressively researches and develops whole new refractory materials and premium construction techniques. Our goals are that make our construction to be mechanization, automation and safe construction and offer inexpensive furnace designs to achieve the goal of save energy and expand the life time of furnaces.

Sunward provide our clients the designs and refractory materials of variety industry furnaces, which include;

- The design, planning and refractories separating of furnaces.
- The installation, construction, and supervise work of variety furnace refractories.
- Refractories design and technical service of construction.
- The analysis and technical services of furnaces' heat equation simulating.
- The technical services relate to refractories.



● 玻璃窯爐蓄熱室磚施工 Construction of the regenerator of glass furnace.



● 窯爐拱磚施工 Construction of furnace' s arch bricks.



● 圓筒型窯爐施工 Construction of Cylinder furnace.



● 搗固材施工 Ramming.



● 鋼鐵廠蓄熱塔施工 Construction of the heat accumulation Tower of Steel plant.



● 保溫材料(棉毯)施工 Construction of Insulating Material (blanket).



● 保溫材料施工 Construction of Insulating Material.



● 爐頂噴漿施工 The gunning of EAF Roof.



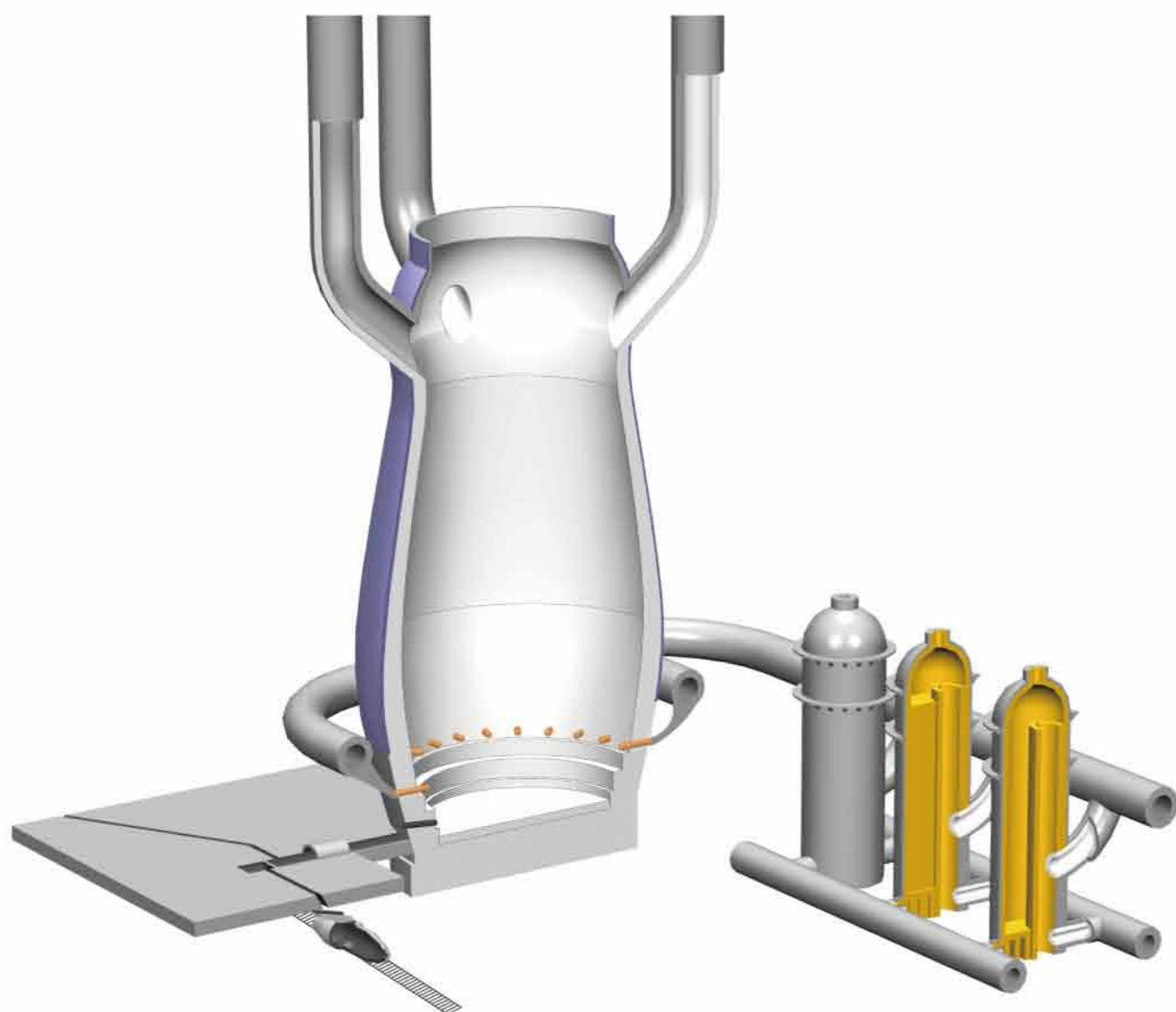
● 電爐耐火材料施工 Construction of EAF Refractories.



● 砌磚與搗固施工完成圖 Brick Installing and Ramming Constructure.

高爐、熱風爐耐火材料

Refractories for Blast Furnace and Hot Stove



- Hot Stove : SGM-1300、SGM-A45、SGM-AR、SGM-1600LI、SCA-151、SCA-1300、SCA-1300HS、SCA-1600LI
- Tuyere Stocks : SCA-1550

Product Specification

Properties	Brand	SCA-1550	MCC-160H	Non-Expansion Silicon Brick
Apparent Porosity (%)		≤15	≤17 ***	≤22
Bulk Density (g/cm ³)		≥2.30	≥2.35 ***	≥1.70
Cold Crushing Strength(Kg/cm ²)		≥500	≥500 ***	≥150
Chemical Composition(%)	Al ₂ O ₃	≥46	≥55	≤3
	SiO ₂	≤45	≤39	≥94
	CaO	3.0~8.0	≤2.9	---
	Fe ₂ O ₃	---	≤0.6	≤0.5
Characteristics		Precasted block		Brick
Application		Tuyere Stocks	Cooling Box	Coke Oven

** At 1500°C X 3Hrs *** At 1400°C X 5Hrs

Properties	Brand	SGM-1300	SGM-A45	SGM-AR	SGM-1600LI	SCA-151	SCA-1300	SCA-1300HS	SCA-1600LI
Apparent Porosity (%)		≤25	≤30 **	≤20	≤25	≥40	≤25	≤25	≤20
Bulk Density (g/cm ³)		≥1.95	≥1.80 **	≥2.30	≥1.90	≥1.50	≥2.10	≥2.05	≥2.10
Cold Crushing Strength (Kg/cm ²)		≥160	≥250 **	≥370	≥160	≥80	≥150	≥350	≥350
Chemical Composition(%)	Al ₂ O ₃	≥36	≥45	≥36	≥45	≥26	≥36	≥37	≥45
	SiO ₂	≤47	≤51	≤9	≤43	≤54	≤47	≤49	≤47
	CaO	≤15***	---	≤40 ***	3.0~8.0	6.0~15.0	4.0~9.0	8.0~14.0	3.0~8.0
	Fe ₂ O ₃	---	---	≤18	≤1	---	---	---	≤1
Characteristics		Dry Gunning			Castable	Casting			
Application		Hot Stove							

** At 1500°C X 3Hrs *** CaO+MgO

Properties	Brand	STA-01	STA-02	STA-03	STA-04
After heat treatment for 3 hours at 600°C	Bulk Density (g/cm ³)	≥1.9	≥1.9	≥1.9	≥1.9
	Cold Crushing Strength (Kg/cm ²)	≥60	≥65	≥60	≥60
	Modulus of Rupture (Kg/cm ²)	≥25	≥27.5	≥27	≥26.5
Chemical Composition (%)	Al ₂ O ₃	≥37	≥43	≥40	≥39
	SiC+Si ₃ N ₄	≥13	≥13	≥15	≥15
Application		Mud for Blast Furnace			

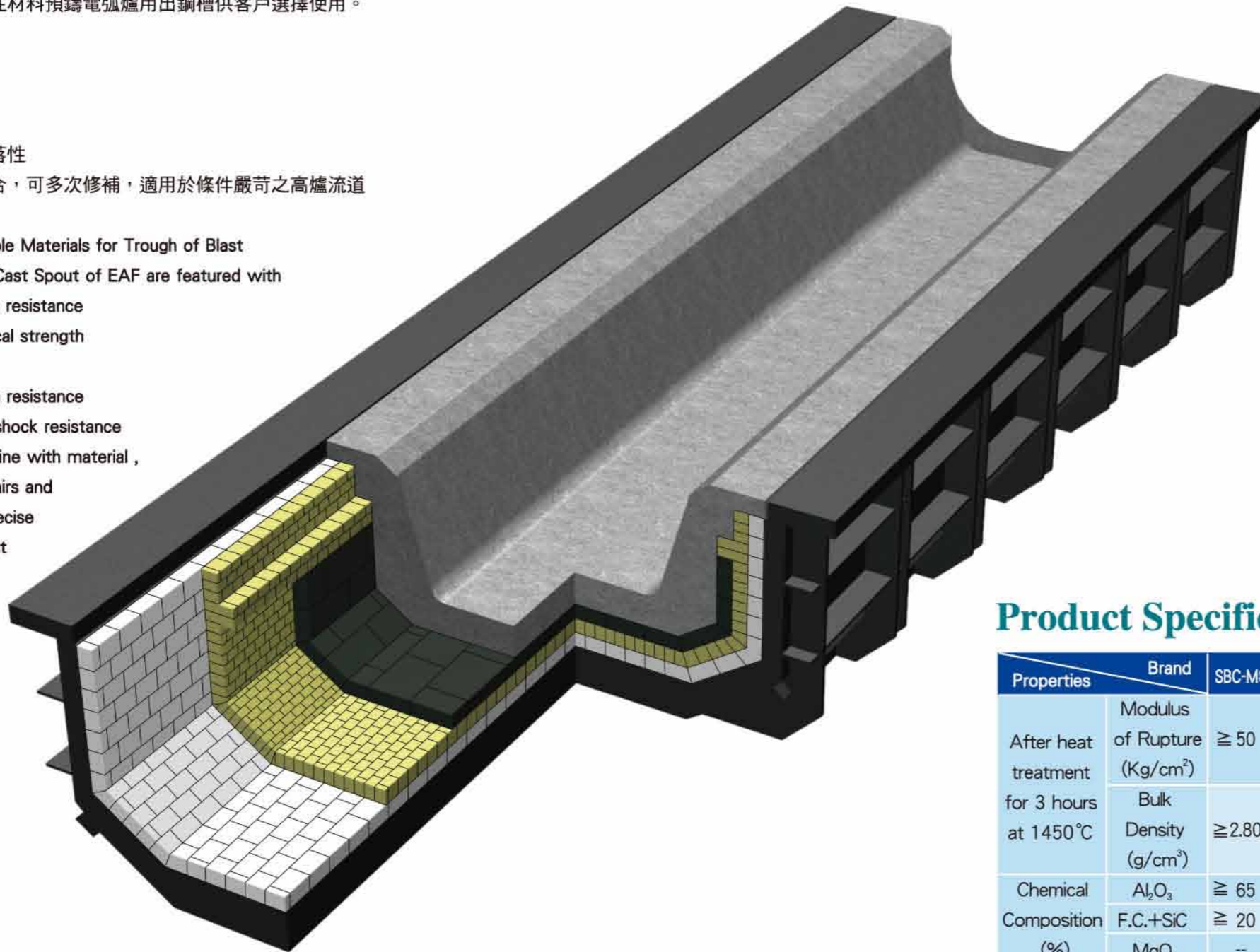
高爐流道耐火材料

本公司開發製造之高爐流道具有下列特性：
本公司並以澆注材料預鑄電弧爐用出鋼槽供客戶選擇使用。

1. 高耐蝕性
2. 高機械強度
3. 低氣孔率
4. 高耐氧化鋅
5. 耐熱震、剝落性
6. 易與原料結合，可多次修補，適用於條件嚴苛之高爐流道

Sunward Castable Materials for Trough of Blast Furnace & Pre-Cast Spout of EAF are featured with

- 1.High corrosion resistance
- 2.High mechanical strength
- 3.Low porosity
- 4.High oxidation resistance
- 5.High thermal shock resistance
- 6.Easy to combine with material , numerous repairs and suitable for precise Trough of Blast Furnace



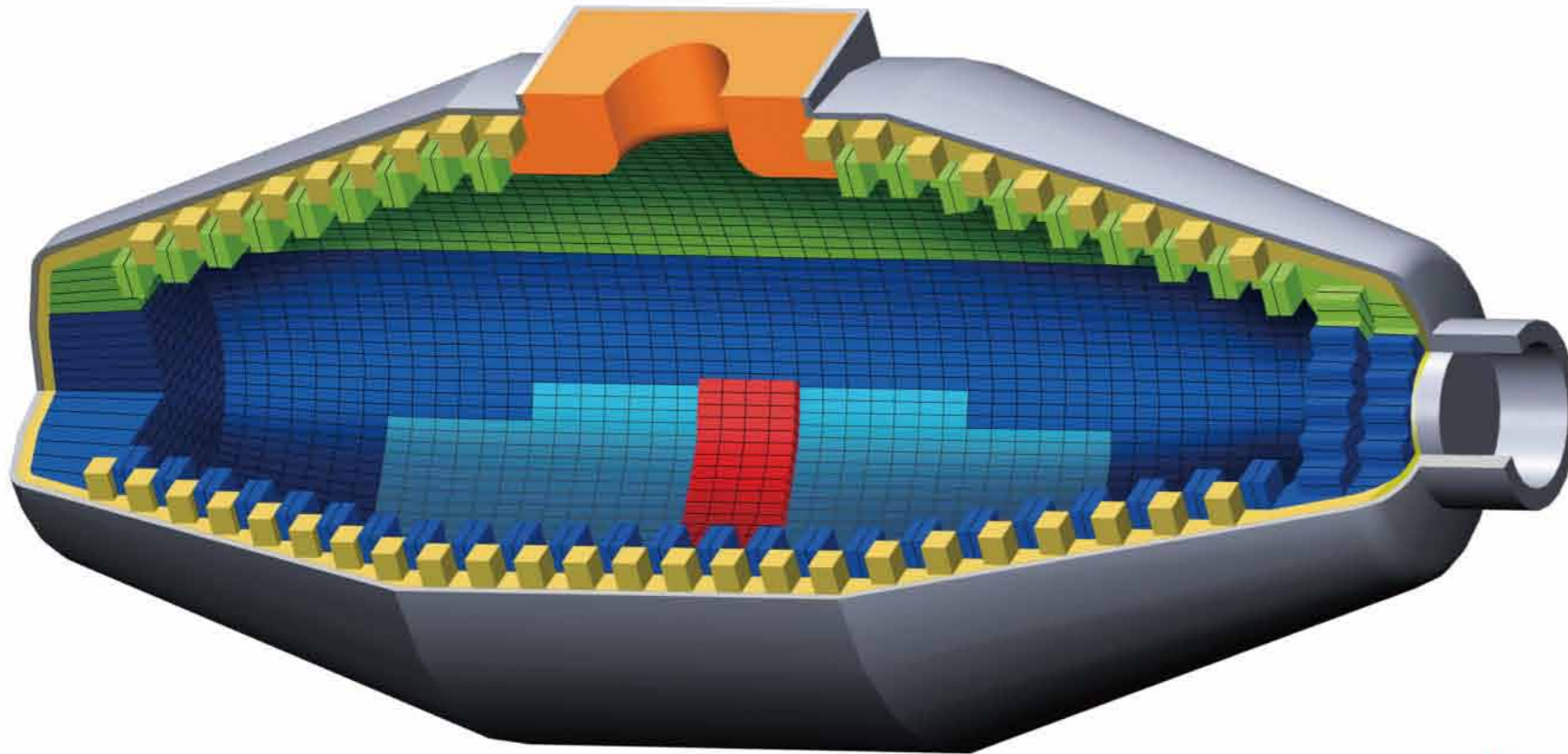
- Slag & Iron Zone : SBC-M81、SBC-M82、BFR-MTA、BFR-MTH
- Safety Lining : MRL-75L
- Repairing : MT-RG2、SPNG-TS1、SPNG-TM2

Product Specification

Properties	Brand	SBC-M81	SBC-M82	SNC-B20	SNC-B17	BFR-MTA	BFR-MTH	MT-RG2	SPNG-TS1	SPNG-TMZ	MRL-75L
After heat treatment for 3 hours at 1450°C	Modulus of Rupture (Kg/cm ²)	≥ 50	≥ 70	≥ 65	≥ 100	≥ 29	≥ 25	≥ 10	≥ 50	≥ 50	≥ 800 Cold Crushing Strength(Kg/cm ²)
	Bulk Density (g/cm ³)	≥ 2.80	≥ 2.80	≥ 2.7	≥ 2.82	≥ 2.50	≥ 2.50	≥ 2.20	≥ 2.80	≥ 2.85	≥ 2.5
Chemical Composition (%)	Al ₂ O ₃	≥ 65	≥ 55	≥ 65	≥ 75	≥ 60	≥ 60	≥ 60	≥ 52	≥ 65	≥ 72
	F.C.+SiC	≥ 20	≥ 35	≥ 10	≥ 13	≥ 20.5	≥ 23	≥ 22	≥ 30	≥ 10	--
	MgO	--	--	≤ 10	--	--	--	--	--	≥ 5	--
Characteristics		Casting	Casting	Casting	Casting	Ramming	Ramming	Gunning	Wet-Gunning	Wet-Gunning	Brick
Application		Slag & Iron Zone of Main-Trough	Slag Zone of Main-Trough	Iron Zone of Main-Trough	Iron Runner	Iron Zone of Main-Trough	Slag Zone of Main-Trough	Repairing	Slag Zone of Main-Trough	Iron Zone of Main-Trough	Safety Zone

魚雷車耐火材料

Refractories for Torpedo Car



- Mouth : SNC-W60
 - Safety Lining : F1
 - Slag Zone : SAS-TS1
 - Impact Zone : SAS-TP1
 - Roof Zone : SAS-TR1
 - Iron Line : SAS-TC1
- Repairing : SGM-A60、SPNG-ASC60、SPNG-ASC70、TL-WG

Product Specification

Properties	Brand	SAS-TP1	SAS-TR1	SAS-TS1	SAS-TC1	F1	Desulfurization Tube
	Refractoriness (SK)		----	----	----	----	34
Apparent Porosity (%)		≤11	≤7	≤11	≤7	≤24	≤20 **
Cold Crushing Strength(kg/cm ²)		≥300	≥300	≥300	≥300	≥200	≥500 **
Modulus of Rupture(kg/cm ²)		----	----	----	----	----	----
Bulk Density (g/cm ³)		≥2.85	≥2.9	≥2.9	≥2.9	≥2	≥2.10 **
Chemical Composition(%)	Al ₂ O ₃	≥60	≥63	≥65	≥62.5	≥40	≥55
	SiC+C	≥13.5	≥14	≥15	≥13	----	≤30(SiO ₂)
	CaO	----	----	----	----	----	----
	Fe ₂ O ₃	----	----	----	----	≤3	----
Characteristics		Brick	Brick	Brick	Brick	Brick	Precasted block
Application		Impact Zone	Roof Zone	Slag Zone	Iron Zone	Safety Zone	Torpedo Car

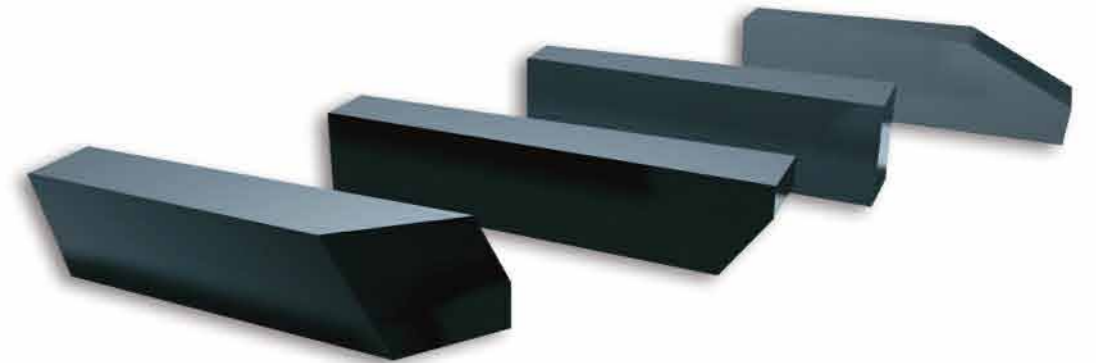
** At 1500°C X 3Hrs *** At 1400°C X 5Hrs

Product Specification

Properties	Brand	SMO-AS1	SNC-W60	SGM-A60	SPNG-ASC60	SPNG-ASC70	TL-WG
Refractoriness (SK)		---	---	---	---	---	---
Apparent Porosity (%)		---	≤23	≤25	≤23	≤23	≤22
			1500°Cx3hrs	1500°Cx3hrs	1450°Cx3hrs	1450°Cx3hrs	1450°Cx3hrs
ColdCrushing Strength(kg/cm ²)		---	≥400	≥200	≥500	≥300	≥400
			1500°Cx3hrs	1500°Cx3hrs	1450°Cx3hrs	1450°Cx3hrs	1450°Cx3hrs
Modulus of Rupture(kg/cm ²)		≥3	≥60	≥50	≥100	≥50	≥10
		1400°Cx2hrs in Coke	1500°Cx3hrs	1500°Cx3hrs	1500°Cx3hrs	1450°Cx3hrs	1450°Cx3hrs
Bulk Density (g/cm ³)		---	≥2.40	≥2.10	≥2.75	≥2.85	≥2.35
			1450°Cx3hrs	1450°Cx3hrs	1450°Cx3hrs	1450°Cx3hrs	1450°Cx3hrs
Chemical Composition (%)	Al ₂ O ₃	≥70.0	≥60.0	≥60.0	≥64.0	≥72.0	≥50
	SiC+C	≥5.0	---	---	≥12.5	≥15.0	≥10
	CaO	---	≤2.0	---	---	---	---
	Fe ₂ O ₃	---	---	---	---	---	---
Characteristics		Mortar	Casting	Gunning	Wet-Gunning	Wet-Gunning	Wet-Gunning
Application		---	Mouth	Repair	Repair	Repair	Repair

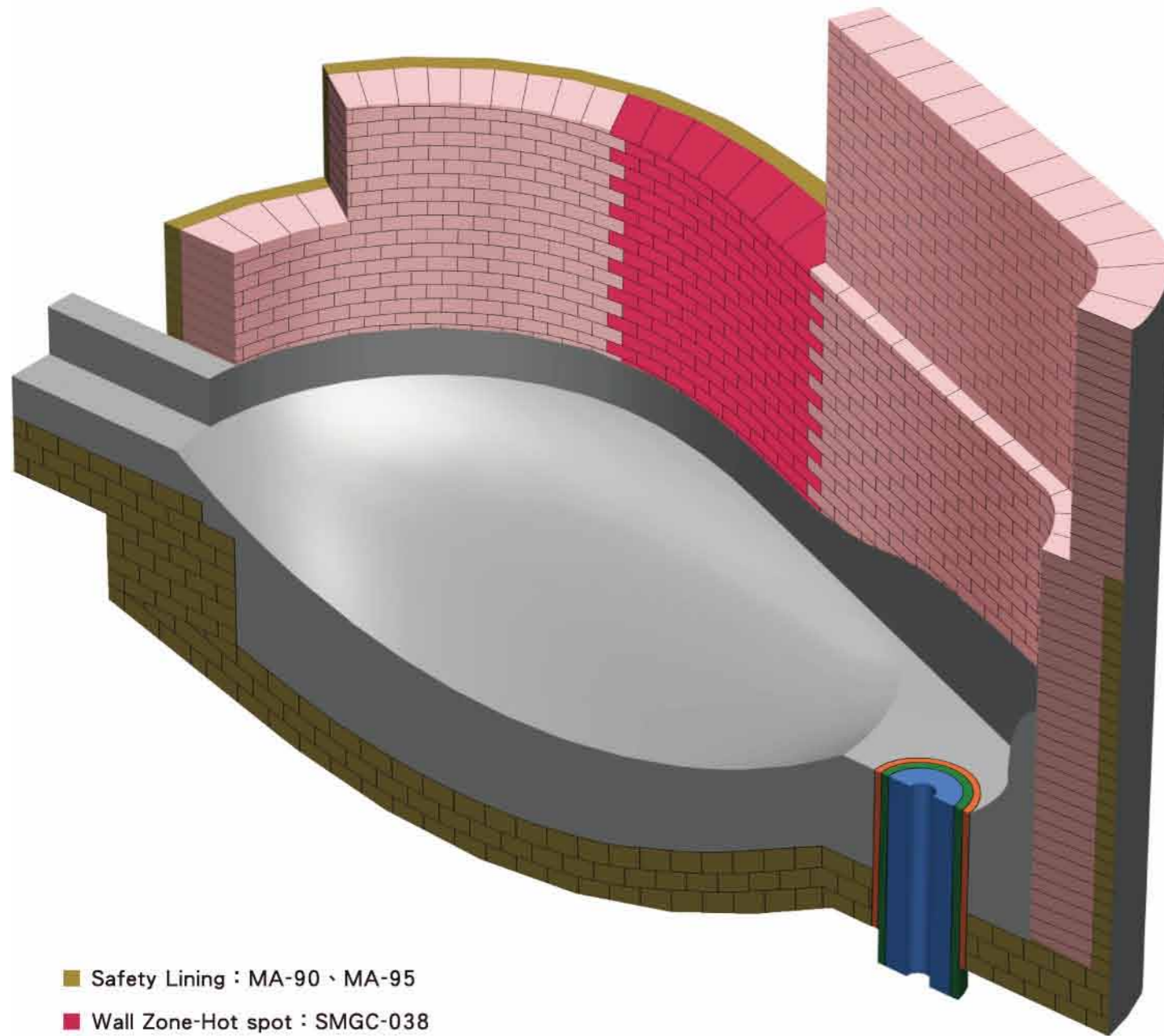


- Safety Lining : MA-90、MA-95
- Upper Cone : SMGC-038
- Wall Zone : SMGC-032、SMGC-033、SMGC-035、SMGC-036



Product Specification

Properties	Brand	SMGC-032	SMGC-033	SMGC-035	SMGC-036	SMGC-038	MA-90	MA-95
Refractoriness		---	---	---	---	---	40	40
Apparent Porosity (%)		≤5	≤5	≤5	≤4	≤4	≤20	≤20
Bulk Density (g/cm ³)		≥2.80	≥2.80	≥2.82	≥2.9	≥2.84	≥2.75	≥2.80
Cold Crushing Strength (Kg/cm ²)		≥300	≥300	≥300	≥300	≥310	≥400	≥400
Chemical Composition (%)								
MgO		≥76.0	≥76.0	≥76.0	≥81.0	≥75.0	≥90	≥94
F.C.		≥17.0	≥17.5	≥17	≥12.0	≥15.0		
Characteristics		Brick						
Application		Wall Zone			Upper Cone		Safety Lining	



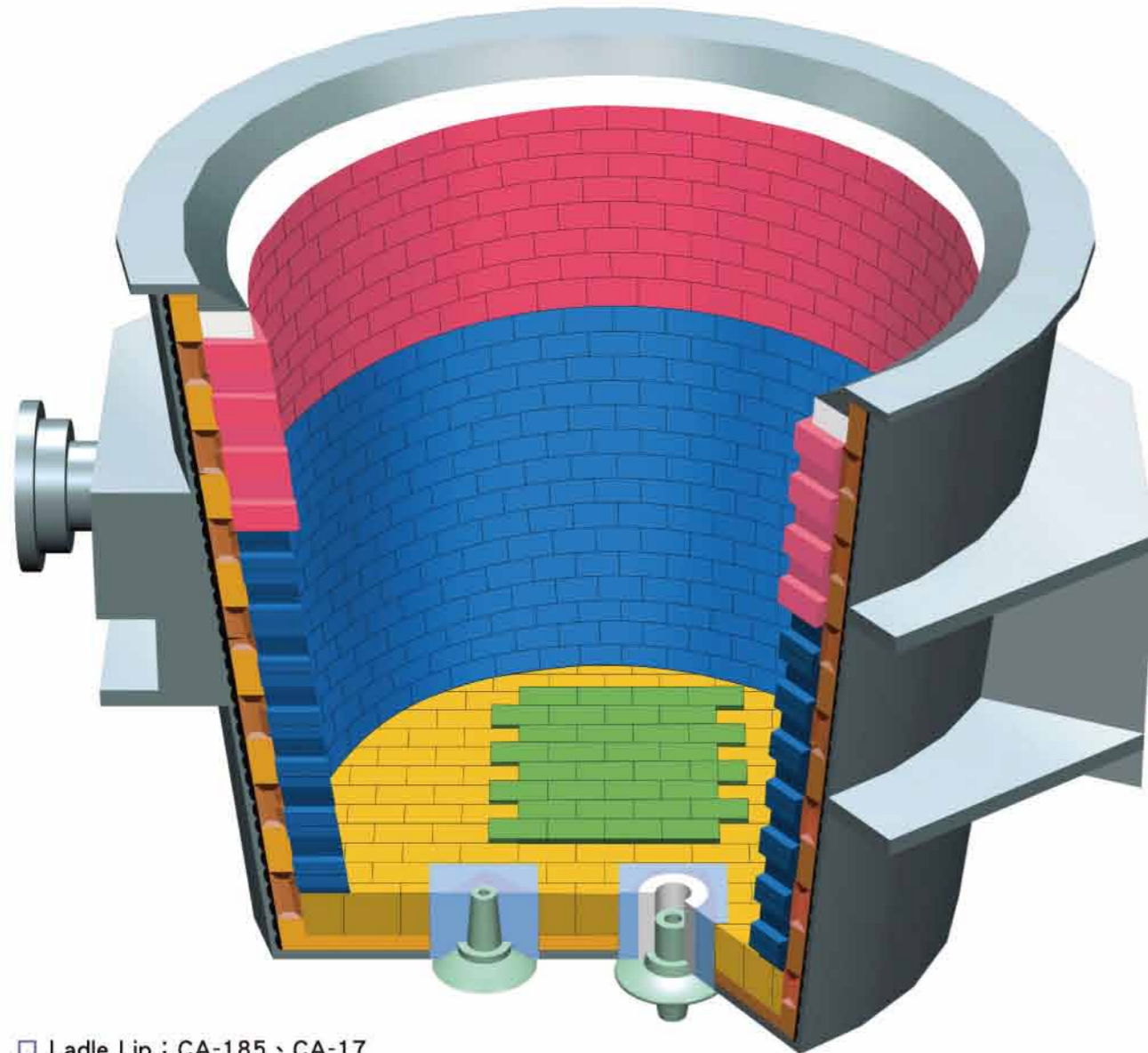
- Safety Lining : MA-90 、MA-95
- Wall Zone-Hot spot : SMGC-038
- Wall Zone : SMGC-025
- Tapping Hole : ZGK-A 、ZGK-B

Product Specification

Properties	Brand	SMGC-025	SMGC-038	MA-90	MA-95	SGM-M12	SGM-M15	SGM-M19
Refractoriness (SK)		—	—	40	40	—	—	---
Apparent Porosity (%)		≤4	≤4.0	≤20	≤20	—	—	≤25
Bulk Density (g/cm ³)		≥2.92	≥2.84	≥2.75	≥2.80	≥2.45 at 1500°Cx3hrs	≥2.20 at 1500°Cx3hrs	≥2.10 at 1500°C x3hrs
Cold Crushing Strength (kg/cm ²)		≥350	≥310	≥400	≥400	≥60 at 1500°Cx3hrs	≥80 at 1500°Cx3hrs	≥80 at 1500°C x3hrs
Characteristics Composition (%)	MgO	≥80.0	≥75.0	≥90	≥94	≥85	≥80	≥70
	F.C.	≥10.0	≥15.0	—	—	—	—	≥4(CaO)
Characteristics		Brick			Gunning			
Application		Wall Zone			Bottom Zone	Wall Zone		

Properties	Brand	ZGK-A	ZGK-B
Cold Crushing Strength(Mpa)		≥45	≥45
Modulus of Rupture at Temperature,1400°C×30min(Mpa)		≥12	≥12
Bulk Density(g/cm ³)		≥2.98	≥2.95
Application Porosity(%)		≤3	≤3
Chemical composition(%)	MgO	≥80	≥75
	C	≥10	≥15
Application		Topping Hole Brick	

盛鋼桶及精煉爐耐火材料



- Ladle Lip : CA-185、CA-17
- Slag Zone : SMGC-026、SMGC-029、MG-15C
- Wall Zone : SHA-L08、SSP-001、SAM-007、RK-28、SAMG-007、SAMG-008
- Bottom : SSP-001、SAM-007、SAS-P10
- Impact Zone : SSP-001、SAM-007、SAS-P10
- Well Block : SNC-90C
- Repairing : SGM-A70、SPNG-LDI
- Safety Lining : HA、HS、H1-1、H1、H2-1、H2、H3-1

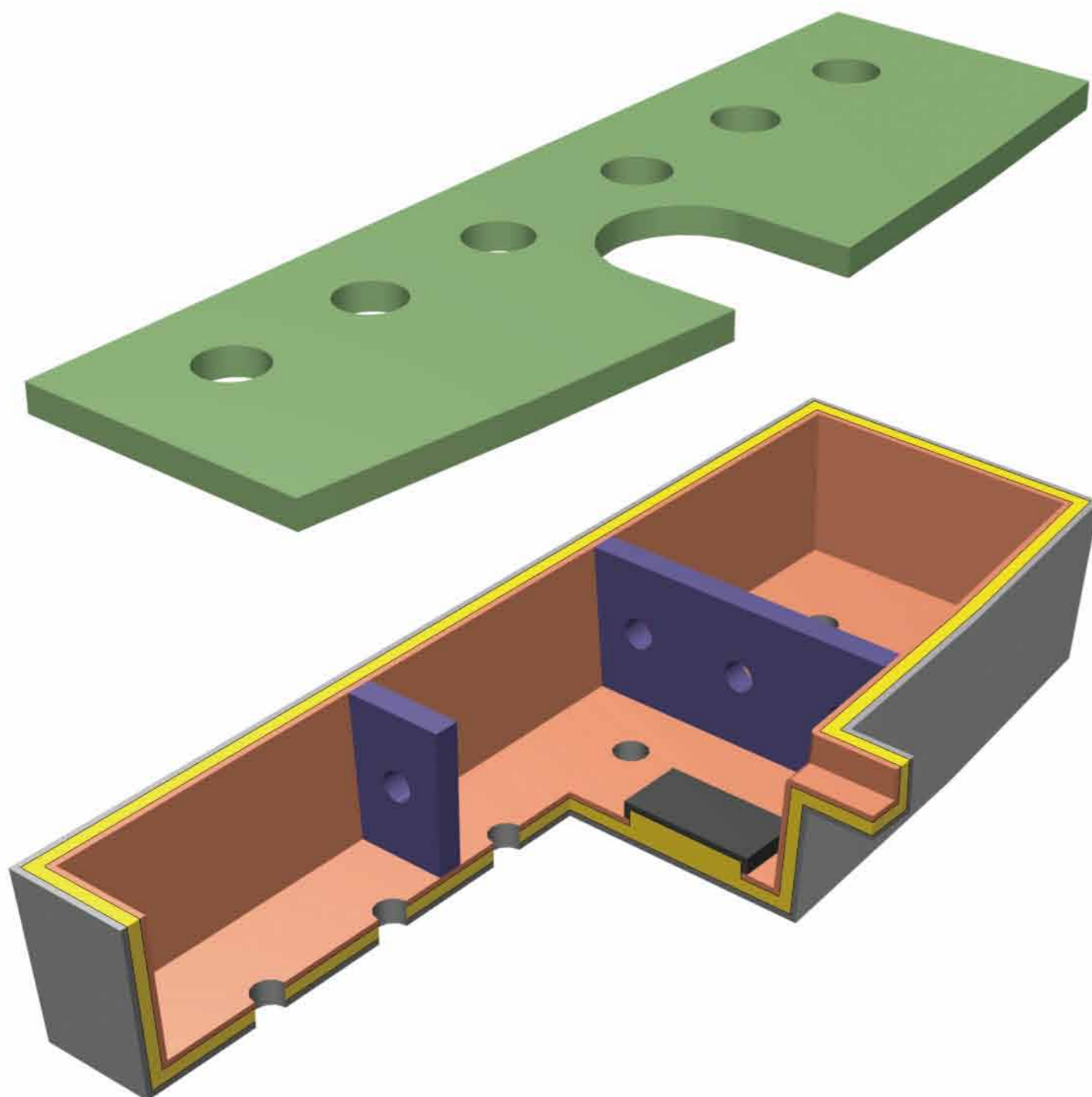
Refractories for Ladle (Furnace) and Refining Furnace

Product Specification

Properties	Brand	HA	HS	H1-1	H1	H2-1	H2	H3-1
Refractoriness (SK)		39	38	38	38	37	37	36
Apparent Porosity (%)		≤20	≤27	≤22	≤27	≤22	≤27	≤25
Bulk Density (g/cm ³)		≥2.6	≥2.4	≥2.5	≥2.3	≥2.4	≥2.2	≥2.3
Cold Crushing Strength(kg/cm ²)		≥600	≥249	≥500	≥294	≥500	≥294	≥300
Chemical Composition(%)								
Al ₂ O ₃		≥90	≥80	≥70	≥70	≥60	≥60	≥50
Fe ₂ O ₃		≤2.0	≤2.0	≤2.5	≤2.5	≤2.5	≤2.0	≤2.5
Application		safety Lining						

Properties	Brand	SSP-001	SAM-007	CA-185	CA-18	CA-17	SGM-A70	SPNG-LD1	HMO	MGM
Cold Crushing Strength (kg/cm ²) at °C x 3hrs		≥300 1500°C	≥400 1500°C	≥300 1500°C	≥450 1500°C	≥300 1400°C	≥200 1500°C	≥500 1500°C	-	-
Modulus of Rupture(kg/cm ²) at °C x 3hrs		≥100 1500°C	≥150 1500°C	≥80 1500°C	≥90 1500°C	≥75 1400°C	-	≥150 1500°C	≥50 (Bonding Strength) 1500°C	≥35 (Bonding Strength) 1500°C
Bulk Density (g/cm ³) at °C x 3hrs		≥2.75 1500°C	≥2.70 1500°C	≥2.65 1500°C	≥2.75 1500°C	≥2.20 1400°C	≥2.15 1500°C	≥2.70 1500°C	-	-
Chemical Composition (%)										
Al ₂ O ₃		≥90	≥90	≥95	≥89	≥60	≥70	≥80	≥85	≥92
MgO		≥5	≥5	-	-	-	-	≥5	-	-
SiO ₂		-	-	-	-	-	-	-	-	-
F.C.		-	-	-	-	-	-	-	-	-
Characteristics		Casting	Casting	Castable			Gunning	Wet-Gunning	Mortar	Mortar
Application		Wall & Bottom	Wall & Bottom	Coner of Wall & Bottom ,Mouth			Repair	Repair	-	-

Properties	Brand	RK-28	SHA-L08	SMGC-026	SMGC-029	SAS-P10	SAMG-007	SAMG-008
Cold Crushing Strength (kg/cm ²)		≥250	≥600	≥330	≥250	≥500	≥400	≥450
Bulk Density (g/cm ³)		≥2.18	≥2.80	≥2.88	≥2.80	≥3.10	≥2.85	≥3.00
Chemical Composition (%)								
Al ₂ O ₃		≤18	≥80	-	-	≥75	≥75	≥60
MgO		-	-	≥75	≥75	-	≥15	≥25
SiO ₂		≥78	-	-	-	-	-	-
F.C.		-	-	≥12.5	≥13	≥5	≥7	≥8
Characteristics		Brick	Shape-Brick	Shape-Brick	Shape-Brick	Shape-Brick	Shape-Brick	Shape-Brick
Application		Wall-Zone	Wall-Zone	Slag-Zone	Slag-Zone	Bottom	Wall-Zone	Wall-Zone



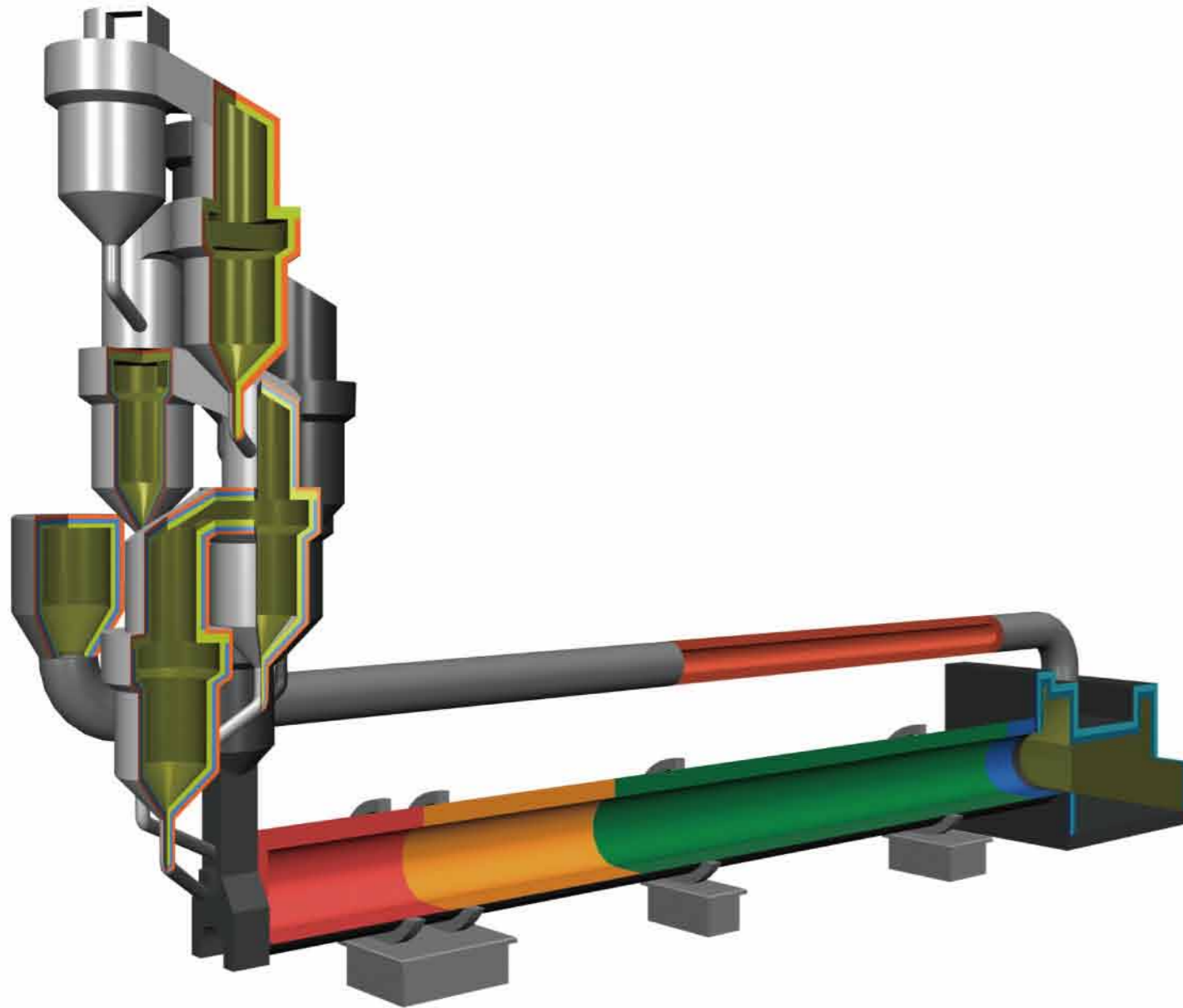
- Coating for Working-Lining : TD-C-L1
- Working-Lining : SNC-W60、SNC-W70
- Dam : SNC-W45、SNC-W55
- Cover : SNC-W60、SNC-W70
- Impact Brick : SAS-P07、SAS-P10

Product Specification

Properties	Brand	SK38	SAS-P10	SAS-P07
Cold Crushing Strength (kg/ cm ²) at 1500°Cx 3hrs		≥ 500	≥ 500	≥ 400
Bulk Density (g/ cm ³) at 1500°Cx 3hrs		≥ 2.60	≥ 3.10	≥ 3.05
Apparent Porosity (%) at 1500°C x3hrs		≤ 22	≤ 6	≤ 6
Chemical Composition (%)	Al ₂ O ₃	≥ 70	≥ 75	≥ 75
	Fe ₂ O ₃	≤ 1.5	---	---
	F.C.	---	≥ 5.0	≥ 5.0
Characteristics		Brick		
Application		Impact Zone		

Properties	Brand	SNC-W45	SNC-W55	SNC-W60	SNC-W70	TD-C-L1	SPNG-TD1
Cold Crushing Strength (kg/cm ²) at 1500°Cx3hrs		≥ 600	≥ 600	≥ 550	≥ 500	≥ 50	≥ 50
Modulus of Rupture(kg/cm ²) at 1500°Cx3hrs		≥ 100	≥ 100	≥ 80	≥ 80	≥ 20	≥ 10
Bulk Density (g/cm ³) at 1500°Cx3hrs		≥ 2.10	≥ 2.30	≥ 2.40	≥ 2.65	≤ 1.87	≤ 2.00
Chemical Composition (%)	Al ₂ O ₃	≥ 45	≥ 55	≥ 60	≥ 70	—	—
	MgO	—	—	—	—	≥ 82	≥ 82.5
	CaO	≤ 2.0	≤ 2.0	≤ 2.0	≤ 2.0	—	—
Water Require (%)		7.8~8.5	6.5~7.5	6.5~7.5	6.0~7.0	20~25	20-25
Characteristics		Casting				Coating	Cunning
Application		Dam		Working-Lining,Cover		Coating for Working-Lining	

水泥旋窯耐火材料



- HA、H1-1、H2-1、H3、CA-150、CA-180、SGM-A50、SGM-A60、SGM-A70
- L1
- HA、H1-1、H2-1、H3
- MC-65、MC-75、UMC-65、UMC-75
- CA-150、CA-180、SNC-70

Refractories for Cement Rotary Kiln

Product Specification

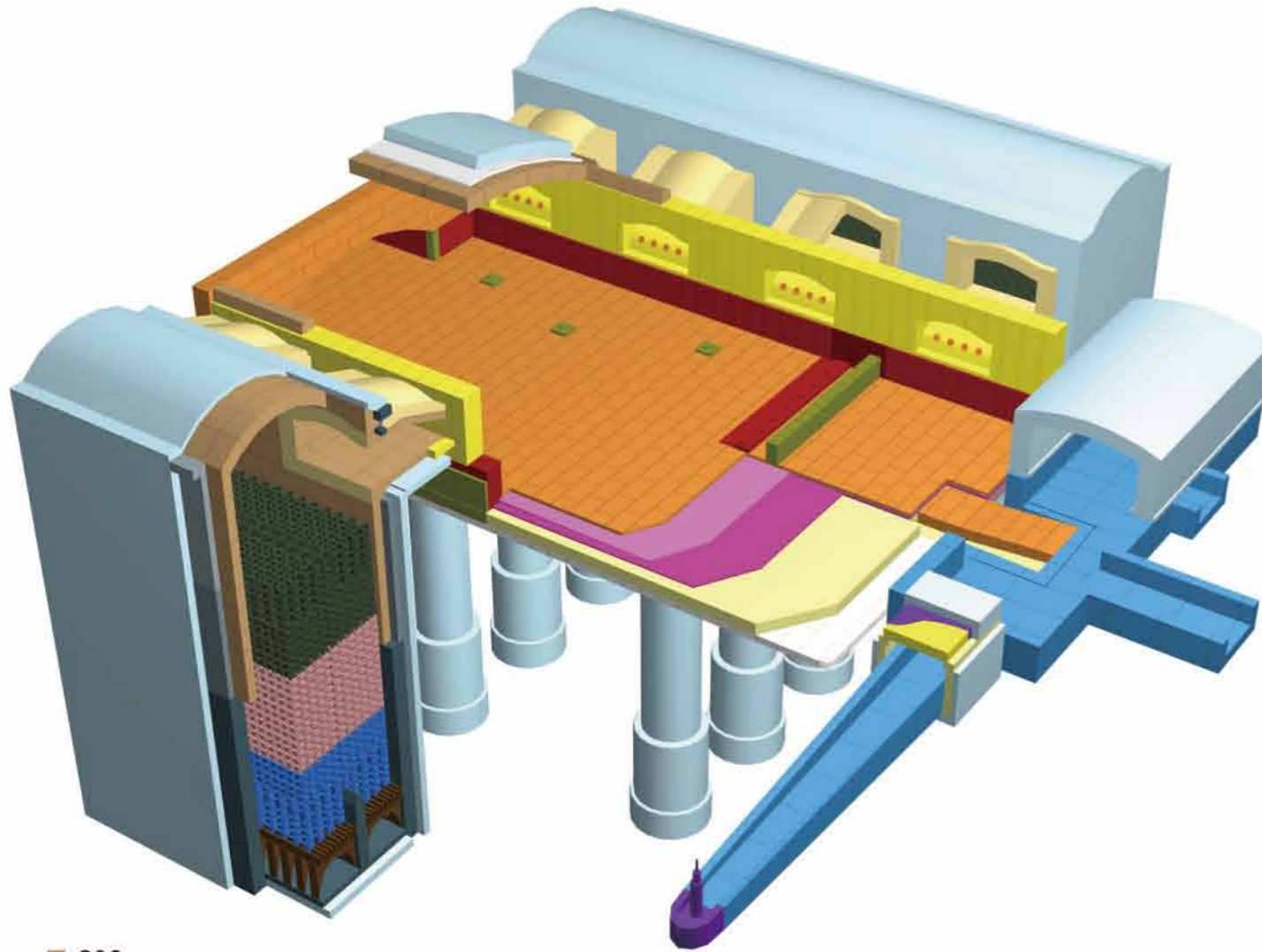
Properties	Brand	MC-65	MC-75	UMC-65	UMC-75	MS42	SGM-A50	SGM-A60	SGM-A70
Refractoriness(SK)		40	40	40	40	40	----	----	----
Apparent Porosity(%)		≤20	≤20	≤21	≤21	≤14	----	----	----
Bulk Density(g/cm ³)		≥2.8	≥2.8	≥2.9	≥2.9	----	≥2.0 (1400°Cx3hrs)	≥2.1 (1500°Cx3hrs)	≥2.15 (1500°Cx3hrs)
Cold Crushing Strength(kg/cm ²)		≥300	≥350	≥250	≥250	≥550	≥200 (1400°Cx3hrs)	≥200 (1500°Cx3hrs)	≥200 (1500°Cx3hrs)
Chemical Composition(%)	MgO	≥65	≥75	≥65	≥75	≥80	----	----	----
	Cr ₂ O ₃	≥9	≥6	≥12	≥8	≥2.5	----	----	----
	Al ₂ O ₃	----	----	----	----	≥15	≥50	≥60	≥70
Characteristics		Brick			Gunning				
Application		Rotary Kiln			Cooler、Head Exchanger、Kiln Hood				

Properties	Brand	CA-150	CA-180	SNC-70	PL-150
Cold Crushing Strength (kg/cm ²) at °C x 3hrs		≥300 1400°C	≥250 1500°C	≥500 1500°C	≥180 1500°C
Modulus of Rapture (kg/cm ²) at °C x 3hrs		≥60 1400°C	≥60 1500°C	≥80 1500°C	≥60 1500°C
Bulk Density (g/cm ³) at °C x 3hrs		≥2.05 1400°C	≥2.35 1500°C	≥2.65 1500°C	≥2 1500°C
Chemical Composition (%)	Al ₂ O ₃	≥45	≥70	≥70	≥40
	CaO	----	----	≤20	----
Water Require (%)		12~14	9~13	6~7	----
Characteristics		Casting			Plastic
Application		Head Exchanger	Cooler、Head Exchanger Kiln Hood	Cooler、Head Exchanger	Cooler

Properties	Brand	L1	F1	F3	H3	H2-1	H1-1	HA
Refractoriness(SK)		34	34	32	35	37	38	39
Apparent Porosity(%)		≥40	≤26	≤26	≤27	≤22	≤22	≤26
Cold Crushing Strength(kg/cm ²)		≥150	≥300	≥300	≥245	≥500	≥500	≥500
Bulk Density(g/cm ³)		≤1.6	≥2.2	≥2.0	≥2.1	≥2.4	≥2.5	≥2.5
Chemical Composition (%)	Al ₂ O ₃	≥40	≥40	≥30	≥50	≥65	≥70	≥80
	Fe ₂ O ₃	≤3	≤3.0	≤3.0	≤2.5	≤2.5	≤2.5	≤2.0
Characteristics		----	Brick	Brick	Brick	Brick	Brick	Brick
Application		Tertiary Air Duct	Cooler Head Exchanger	Head Exchanger	Rotary Kiln	Rotary Kiln Kiln Head	Kiln Head Calciner	Calciner

玻璃窯耐火材料

Refractories for Glass Melting Furnace



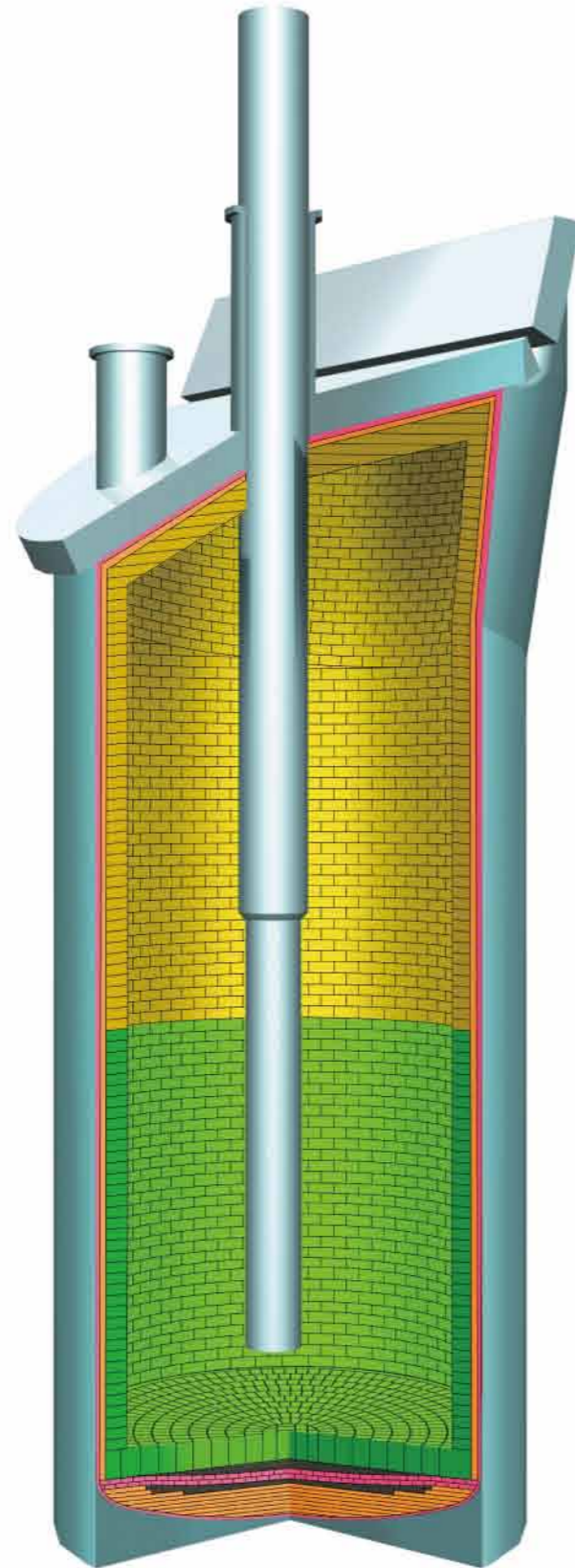
- S96
- ZA33、ZA36、ZA41
- ZA33、ZA36、ZA41
- ZR60、ZR65
- PL-ZR
- F3、F2
- MA-98
- MA-95
- H3、H2
- F3、F2

Product Specification

Properties	Brand	F3	F2	H3	H2-1	H1-1	HS	MA-95	MA-98
Refractoriness (SK)		32	33	35	37	38	38	40	40
Apparent Porosity (%)		≤26	≤26	≤27	≤22	≤22	≤27	≤20	≤20
Cold Crushing Strength(kg/cm ²)		≥300	≥300	≥245	≥500	≥500	≥249	≥400	≥400
Bulk Density (g/cm ³)		≥2.0	≥2.1	≥2.1	≥2.4	≥2.5	≥2.4	≥2.8	≥3.0
Chemical Composition (%)	Al ₂ O ₃	≥30	≥35	≥50	≥60	≥70	≥80	----	----
	Fe ₂ O ₃	≤3.0	≤3.0	≤2.5	≤2.5	≤2.5	≤2.0	----	----
	MgO	----	----	----	----	----	----	≥94	≥98
Application		Melter Sidewall	Melter	Regenerater	Melter Sidewall	Melter	Regenerater		

Properties	Brand	ZA33	ZA36	ZA41	ZR40	ZR60	ZR65	S96	PL-ZR
Apparent Porosity(%)		----	----	----	≤22	≤22	≤22	≤2.0	≤20 1500°Cx3hrs
Bulk Density(g/cm ³)		≥3.75	≥3.85	≥3.95	≥3.05	≥3.35	≥3.45	≥1.8	≥3.0 1500°Cx3hrs
Cold Crushing Strength(kg/cm ²)		≥900	≥950	≥1000	≥500	≥500	≥500	≥300	≥500 1500°Cx3hrs
Chemical Composition(%)	Al ₂ O ₃	≥48	≥46.5	≥42.5	----	----	----	----	≥70
	ZrO ₂	≥33	≥36	≥41	≥40	≥58	≥60	----	≥20
	SiO ₂	----	----	----	----	----	----	≥96	≥10
Characteristics		Fused Cast			Brick				Plastics
Application		Canal、Melter		Melter	Melter Sidewall、Pave	Melter Sidewall、Pave、Canal	Melter Sidewall、Pave	Crown	Melter

非鐵金屬耐火材料



- MC-75
- AC-80、AC-90
- CA-170、CA-180、CA-185

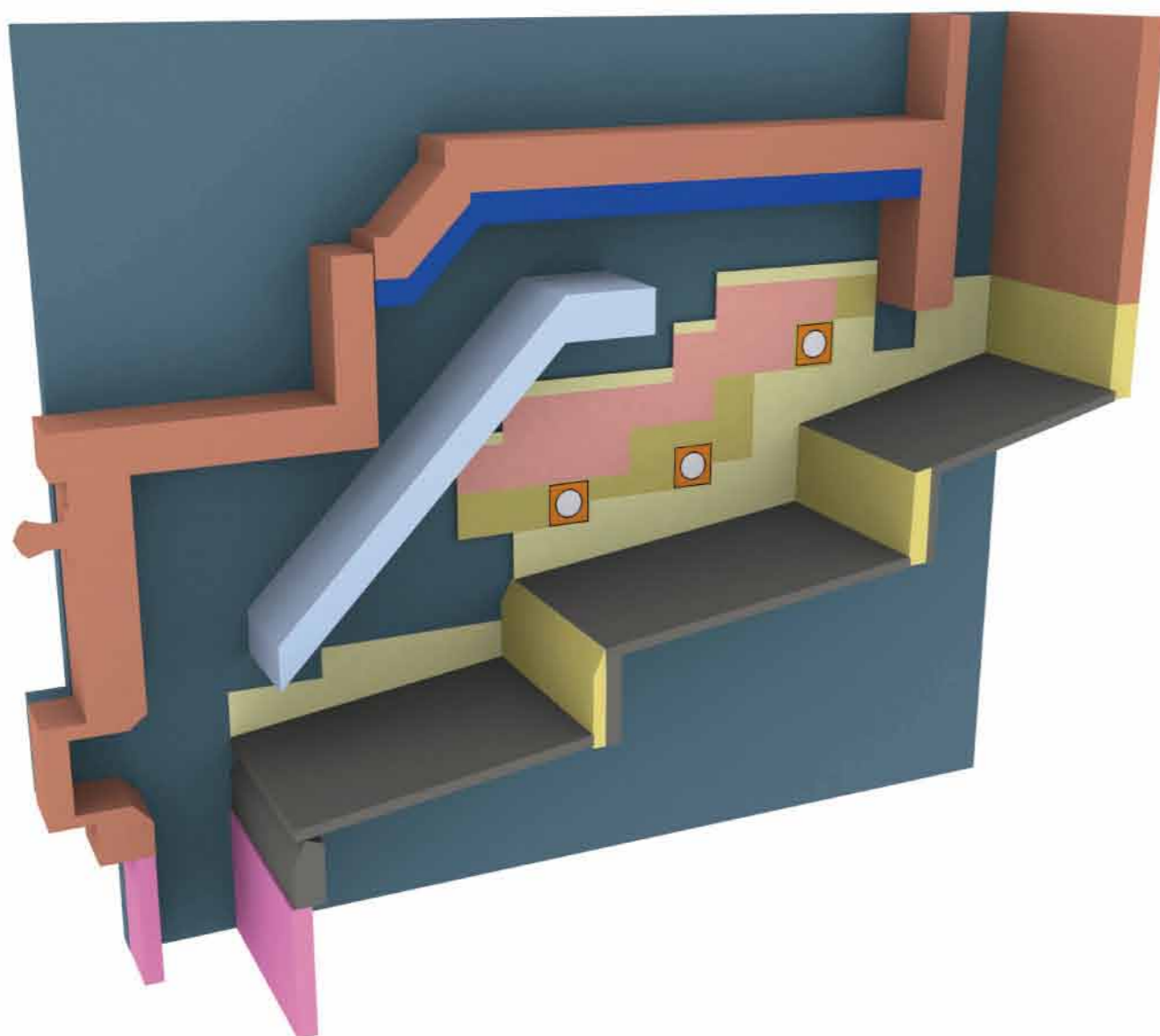
Refractories for Nonferrous Metal Melting Furnace

Product Specification

Properties	Brand	AC-80	AC-90	MC-75	MC-80	DA-100	DA-90
Refractoriness (SK)		≥ 40	≥ 40	≥ 40	≥ 40	≥ 40	≥ 40
Cold Crushing Strength (kg/cm ²)		≥ 700	≥ 1000	≥ 350	≥ 400	≥ 900	≥ 1000
Bulk Density (g/cm ³)		≥ 2.8	≥ 3.25	≥ 2.9	≥ 3.0	≥ 3.20	≥ 3.0
Apparent Porosity (%)		≤ 20.0	≤ 16.0	≤ 20.0	≤ 15.0	≤ 14.5	≤ 12.5
Chemical Composition (%)	Al ₂ O ₃	≥ 80	≥ 86.0	-----	-----	≥ 95	≥ 92
	Cr ₂ O ₃	≥ 2.5	≥ 9.5	≥ 6	≥ 9.0	≤ 0.4	≤ 0.4
	MgO	-----	-----	≥ 75	≥ 78	-----	-----
Characteristics		Brick					

Properties	Brand	AM-34	AM-36	AM-38	AM-40
Refractoriness (SK)		34	36	38	40
Bonding Strength (kg/cm ²) at °C x 3hrs		≥ 20 (1400°C)	≥ 20 (1400°C)	≥ 30 (1500°C)	≥ 30 (1500°C)
Grain Size (%)	+0.5mm	≤ 2	≤ 2	≤ 2	≤ 2
	-0.074mm	≥ 60	≥ 60	≥ 60	≥ 65
Chemical Composition (%) Al ₂ O ₃		≥ 45	≥ 60	≥ 75	≥ 90
Characteristics		Mortar			

Properties	Brand	CA-185	CA-180S	CA-180	CA-170
Max. Service Temp(°C)		1800	1800	1800	1700
Cold Crushing Strength(kg/cm ²) at °C x 3hrs		≥ 2.65 (1500°C)	≥ 2.50 (1500°C)	≥ 2.35 (1500°C)	≥ 2.20 (1400°C)
Bulk Density(g/cm ³) at °C x 3hrs		≥ 300 (1500°C)	≥ 280 (1500°C)	≥ 250 (1500°C)	≥ 300 (1400°C)
Modulus of Rupture(kg/cm ²) at °C x 3hrs		≥ 80 (1500°C)	≥ 80 (1400°C)	≥ 60 (1400°C)	≥ 60 (1400°C)
Chemical Composition(%) Al ₂ O ₃		≥ 95	≥ 90	≥ 75	≥ 60
Water Required(%)		8~9	9~11	11~13	11~13
Installation Method		Casting, Trowelling			



- SIC-80T
- SIC-60、SIC-85
- SSA-50、SSC-80、SSC-85、SSC-90、SSF-70
- F1、H2
- CA-12I、CA-150、CA-160
- PL-170

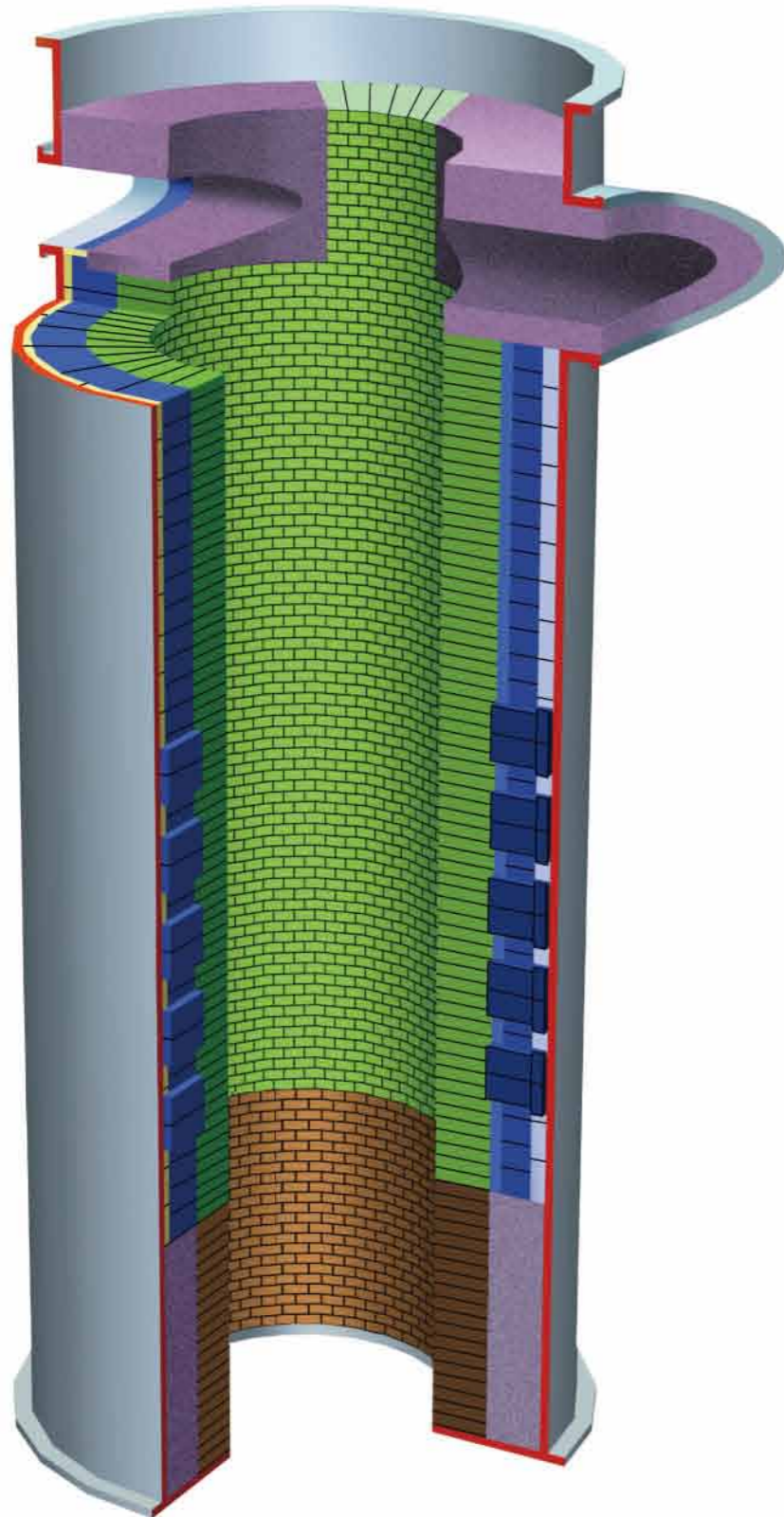
Product Specification

Properties	Brand	CA-12I	CA-150	CA-160	PL-170	F1	H3	H2
Refractoriness(SK)		—	—	—	—	34	35	37
Apparent Porosity(%)		—	—	—	—	≤26	≤27	≤27
Cold Crushing Strength (kg/cm ²) at °C x 3hrs		≥30 1200°C	≥300 1400°C	≥350 1500°C	≥120 1500°C	≥300	≥245	≥294
Modulus of Rapture (kg/cm ²) at °C x 3hrs		≥10 1200°C	≥60 1400°C	≥80 1500°C	≥25 1500°C	—	—	—
Bulk Density (g/cm ³) at °C x 3hrs		≤1.30 1200°C	≥2.05 1400°C	≥2.10 1500°C	≥2.05 1500°C	≥2.20	≥2.10	≥2.20
Chemical Composition (%)	Al ₂ O ₃	≥30	≥45	≥53	≥53	≥40	≥50	≥60
	Fe ₂ O ₃	—	—	—	—	≤3.0	≤2.5	≤2.0
Water Require (%)		30~40	12~14	11~13	—	—	—	—
Characteristics		Casting	Casting	Casting	Plastic	Brick	Brick	Brick
Application		Safety Zone	Inlet Zone		Burners	Inlet Zone、Burners Ared Dried Area		

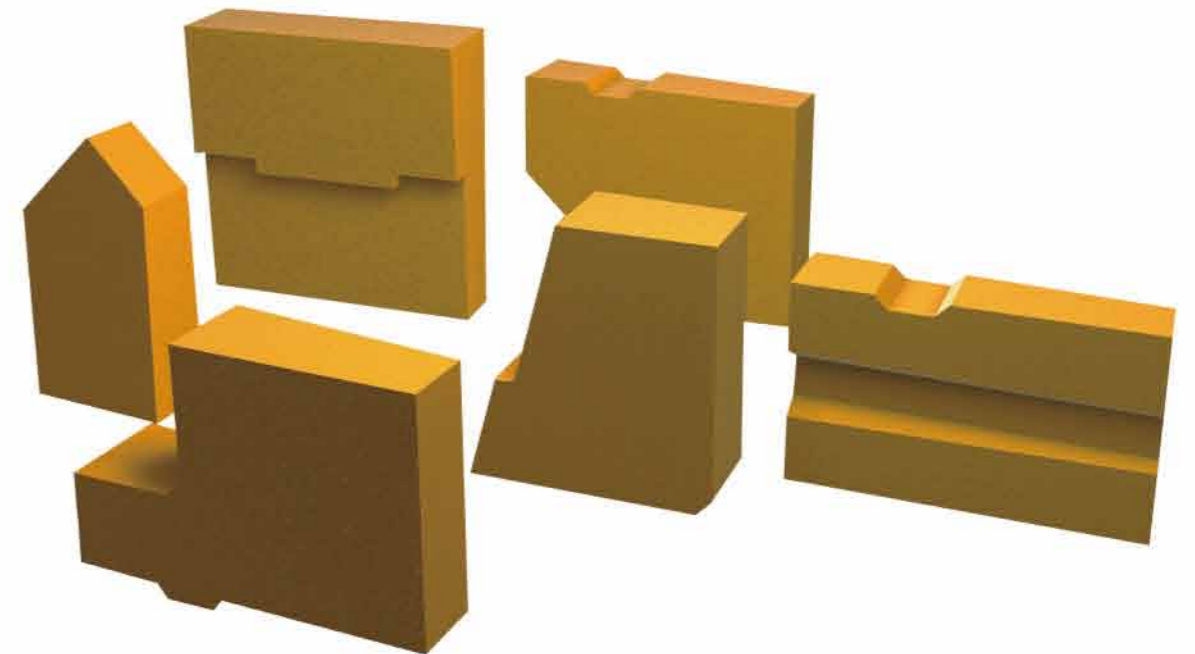
Properties	Brand	SSA-50	SSC-80	SSC-85	SSC-90	SSF-70	SiC60	SiC85	SiC80T
Apparent Porosity(%)		≤18	≤18	≤15	≤15	≤15	≤15	≤22	≤28
Cold Crushing Strength (kg/cm ²)		≥600	≥600	≥1000	≥900	≥1000	≥350	≥300	≥300
Bulk Density(g/cm ³)		≥2.65	≥2.45	≥2.60	≥2.60	≥2.60	≥2.40	≥2.40	≥2.20
Chemical Composition (%)	Al ₂ O ₃	≥35.0	—	—	—	—	—	—	—
	SiC	≥47.0	≥80.0	≥85.0	≥88.0	≥70.0	≥60.0	≥85.0	≥80.0
	Si ₃ N ₄	—	—	—	—	≥20.0	—	—	—
Water Require (%)		—	—	—	—	—	7.0~8.0	7.5~8.5	13~15
Characteristics		Brick	Brick	Brick	Brick	Brick	Casting	Casting	Troweling
Application		Dried Area	Burned Area				Grate Sidewall		

石灰豎窯耐火材料

Refractories for Lime Shaft Kiln



- H3、H2、H1-1
- MC-65、MC-75、MB-90
- H3、H2、H1-1
- H4、H3、H2、H1-1



Product Specification

Properties	Brand	H1-1	H2	H3	H4	F1	F3	MC-65	MC-75	MB-90	MS-42
Refractoriness(SK)		38	37	35	35	34	32	40	40	40	40
Apparent Porosity(%)		≤22	≤27	≤27	≤28	≤26	≤26	≤19	≤17	≤16	≤14
Cold Crushing Strength(kg/cm ²)		≥500	≥294	≥245	≥196	≥200	≥300	≥300	≥350	≥450	≥550
Bulk Density(g/cm ³)		≥2.5	≥2.20	≥2.10	≥2.10	≥2.20	≥2.00	≥3.35	≥3.05	≥2.95	—
Chemical Composition (%)	Al ₂ O ₃	≥70	≥60	≥50	≥45	≥40	≥28	—	—	—	≥15
	Fe ₂ O ₃	≤2.5	≤2.00	≤2.50	≤2.00	≤3.00	≤3.00	—	—	—	—
	MgO	—	—	—	—	—	—	≥65.0	≥75.0	≥95	≥80
	Cr ₂ O ₃	—	—	—	—	—	—	≥24.0	≥10	—	≥2.5
Characteristic		Brick									

火黏土磚

Fireclay Bricks

三和的火黏土磚係以精選的矽~鋁原料所製造，具有優異的熱穩定性，可廣泛使用於各種工業用窯爐，且可按客戶品質需求生產、供應特殊之產品。

Sunward's fireclay bricks are made by silica-alumina materials and are widely used in the various type of industrial kilns. The advantages of Sunward's fireclay bricks are:

1. Superior stability of volume over a wide temperature range.
2. We can be follow the unique specifications of customers' requirement.



Product Specification

Properties	Brand	F1-1	F1	F2-1	F2	F3-1	F3	F4	F5
Refractoriness (SK)		34	34	33	33	32	32	31	30
Apparent Porosity (%)		≧22	≧26	≧22	≧26	≧22	≧26	≧26	≧26
Bulk Density (g/cm ³)		≧2.3	≧2.2	≧2.2	≧2.1	≧2.1	≧2.0	≧2.0	≧1.95
Cold Crushing Strength(kg/cm ²)		≧400	≧300	≧400	≧300	≧400	≧300	≧300	≧300
Chemical Composition(%)									
Al ₂ O ₃		≧42	≧40	≧37	≧35	≧32	≧30	≧28	≧26
Fe ₂ O ₃		≧3	≧3	≧3	≧3	≧3	≧3	≧3	≧3

高鋁磚

High Alumina Bricks

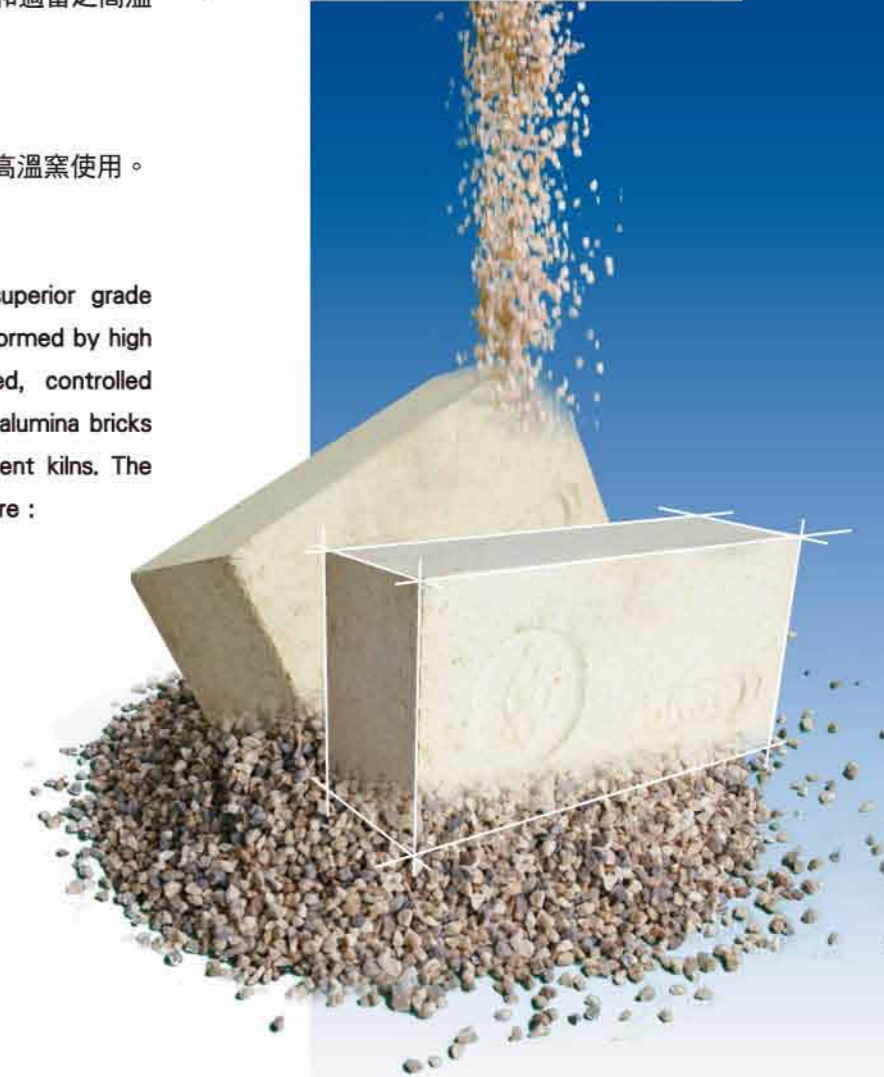
本公司使用高鋁骨材，以高壓力成型機成型，和適當之高溫燒成，開發製造，具有：

1. 高耐侵蝕力。
2. 高耐剝落性。

之高鋁磚提供盛鋼桶、魚雷車、水泥窯及其它高溫窯使用。

Sunward's high alumina bricks are made by superior grade mullite, bauxite and fused alumina. Each brick is formed by high pressure press and undergoes a sophisticated, controlled temperature firing process. These high-tech high alumina bricks are often used for ladles, torpedo car and cement kilns. The characteristics of Sunward's high alumina bricks are :

1. Excellent spalling resistance
2. Excellent corrosion resistance



Product Specification

Properties	Brand	HA	HS	H1-1	H1	H2-1	H2	H3-1	H3	H4
Refractoriness (SK)		39	38	38	38	37	37	36	35	35
Apparent Porosity (%)		≧20	≧27	≧22	≧27	≧22	≧27	≧25	≧27	≧28
Bulk Density (g/cm ³)		≧2.6	≧2.4	≧2.5	≧2.3	≧2.4	≧2.2	≧2.3	≧2.1	≧2.1
Cold Crushing Strength(kg/cm ²)		≧600	≧249	≧500	≧294	≧500	≧294	≧300	≧245	≧196
Chemical Composition(%)										
Al ₂ O ₃		≧90	≧80	≧70	≧70	≧60	≧60	≧50	≧50	≧45
Fe ₂ O ₃		≧2.0	≧2.0	≧2.5	≧2.5	≧2.5	≧2.0	≧2.5	≧2.5	≧2.0

氧化鋁-碳化矽-碳磚

Alumina-Silicon Carbide-Carbon Bricks

本公司使用高鋁骨材，配合耐磨性佳之碳化矽及耐蝕性最優之石墨，開發製造具：

1. 高強度
2. 高耐蝕性
3. 高耐剝落性

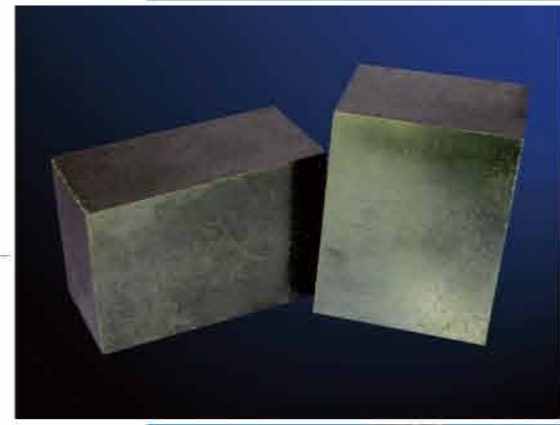
之鋁矽碳磚提供魚雷車(脫矽、脫硫、脫磷製程)、盛銹桶使用。

Sunward offers a series of unburned alumina-silicon carbide-carbon bricks. These bricks are made of high-purity alumina clinker, Graphite, and Silicon Carbide. The advantages of Sunward's alumina-silicon carbide-carbon bricks are:

1. High mechanical strength.
2. High corrosion resistance to slag.
3. High abrasion resistance to molten pig iron.
4. High thermal and structure spalling resistance.

Product Specification

Properties	Brand	SAS-TP1	SAS-TR1	SAS-TS2	SAS-TC1	SRASC-B1	SRASC-W1
Apparent Porosity(%)		≤11.0	≤7.0	≤7.0	≤7.0	≤10.0	≤10.0
Bulk Density(g/cm ³)		≥2.85	≥2.90	≥2.90	≥2.90	≥2.35	≥2.60
Cold Crushing Strength(kg/cm ²)		≥300	≥300	≥300	≥300	≥250	≥300
Chemical Composition(%)							
Al ₂ O ₃		≥60.0	≥63	≥65.0	≥62.5	≥27.5	≥45
SiC+F.C.		≥13.5	≥14.0	≥17.0	≥13.0	≥14.0	≥18.0
Application		Torpedo Car Impact Zone	Torpedo Car Roof Zone	Torpedo Car Slag Zone	Torpedo Car Iron Zone	Iron Ladle Wall	Iron Ladle Wall & Slag Zone



鎂碳磚

Magnesia-Carbon Bricks

本公司針對轉爐、電弧爐、盛鋼桶、精鍊爐等嚴苛操作環境需要，以高純度氧化鎂、鱗狀石墨、金屬配合高壓力脫氧真空成型機開發製造，具有：

1. 高耐侵蝕力(尤其對鹼性渣)。
2. 高耐剝落性。

之各種鎂碳磚供應中鋼及民間鍊鋼廠使用。

For the demand of operating conditions of converter, E.A.F. and L.F, S.W develops and manufactures various types of MgO-C bricks. These bricks are composed of high purity magnesia clinker, graphite and additives then molded by high pressure vacuum de-gassing press. Features:

1. Superior Corrosion resistance to basic-slag.
2. Superior thermal-shock resistance.

Product Specification

Properties	Brand	SMGC-025	SMGC-026	SMGC-027	SMGC-029	SMGC-032
Apparent Porosity (%)		≤4	≤6	≤5	≤5	≤5
Bulk Density (g/cm ³)		≥2.92	≥2.88	≥2.8	≥2.80	≥2.80
Cold Crushing Strength(Kg/cm ²)		≥350	≥330	≥300	≥250	≥300
Chemical Composition (%)						
MgO		≥80.0	≥75.5	≥75.0	≥75.0	≥76.0
F.C.		≥10.0	≥13.0	≥15	≥13	≥17.0
Application		LF	LF	LF	LF	BOF

Properties	Brand	SMGC-033	SMGC-035	SMGC-036	SMGC-037	SMGC-038
Apparent Porosity (%)		≤5	≤5	≤4	≤5	≤6.5
Bulk Density (g/cm ³)		≥2.78	≥2.82	≥2.9	≥2.85	≥2.8
Cold Crushing Strength(Kg/cm ²)		≥300	≥300	≥300	≥300	≥310
Chemical Composition (%)						
MgO		≥76.0	≥76.0	≥81.0	≥73.0	≥75.0
F.C.		≥17.5	≥17	≥12.0	≥17.5	≥15.0
Application		BOF	BOF	BOF	BOF	BOF



鋁鎂碳磚

Alumina-Magnesia Carbon Bricks

本公司採用優質電熔剛玉、電熔鎂砂、高碳石墨為主要原料，以酚醛樹脂為結合劑高壓成形。其特性有：

1. 低氣孔率
2. 高耐侵蝕性
3. 高耐剝落性

之鋁鎂碳磚提供盛鋼桶使用。

Sunward chooses premium fused corundum, fused Magnesite, and high carbide graphite as the main material, to produce Alumina-Magnesia Carbon bricks for Ladle.

Characters:

1. Low porosity ratio.
2. High corrosion resistance to slag.
3. High abrasion resistance to molten pig iron.



Product Specification

Properties	Brand	SAMG-006	SAMG-007	SAMG-008	SAMG-AM6C	SAMG-AM8C	SLD-AM1
Cold Crushing Strength(kg/cm ²)at1500°Cx3hrs		≥ 400	≥ 400	≥ 450	≥ 600	≥ 500	≥ 500
Bulk Density(g/cm ³)at1500°Cx3hrs		≥ 2.85	≥ 2.85	≥ 3.00	≥ 3.18	≥ 2.85	≥ 3.16
Apparent Porosity(%)at1500°Cx3hrs		≤ 8.0	≤ 8.0	≤ 8.0	≤ 7.5	≤ 6.0	≤ 11.0
Chemical Composition (%)	Al ₂ O ₃	≥ 60	≥ 75	≥ 60	≥ 75	≥ 75	≥ 8.7
	MgO	≥ 15	≥ 15	≥ 25	≥ 6	≥ 6	≥ 6
	F.C.	≥ 6	≥ 7	≥ 8	≥ 5	≥ 7	---
Characteristics		Brick					
Application		Wall, Bottom-Zone				Wall-Zone	

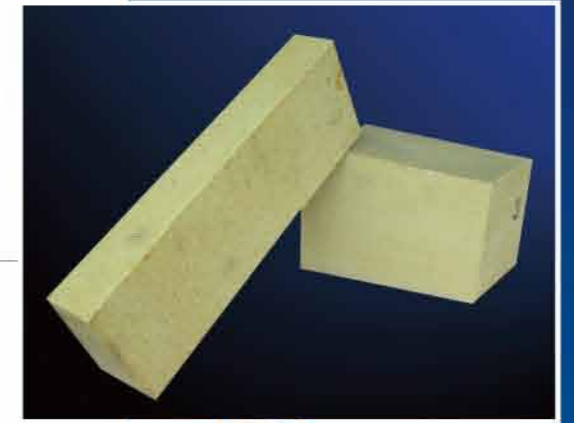
鎂磚/鎂鉻磚

Magnesia / Magnesia-Chrome Bricks

本公司精選各種鎂砂、鉻礦並經高溫燒成，製造出適合轉爐及電爐使用之高品質鎂磚及鎂鉻磚。

Sunward's high quality magnesia and magnesia-chrome bricks are made from high grade magnesia clinker and chrome ore. Each brick undergoes a high temperature firing process these high-tech bricks are often used for BOF and EAF. The advantages of Sunward's Magnesia/ magnesia-chrome bricks are:

1. Excellent thermal shock resistance.
2. Little volume change at high temperature.



Product Specification

Properties	Brand	MA-90	MA-95	MC-65	MC-75	UMC-65	UMC-75
Refractoriness (SK)		40	40	40	40	40	40
Apparent Porosity (%)		≤ 20	≤ 20	≤ 20	≤ 20	≤ 21	≤ 21
Bulk Density (g/cm ³)		≥ 2.75	≥ 2.8	≥ 2.90	≥ 2.90	≥ 2.80	≥ 2.80
Cold Crushing Strength(Kg/cm ²)		≥ 400	≥ 400	≥ 300	≥ 350	≥ 250	≥ 250
Chemical Composition(%)	MgO	≥ 90	≥ 94	≥ 65	≥ 75	≥ 65	≥ 75
	Cr ₂ O ₃	---	---	≥ 9	≥ 6	≥ 12	≥ 8
	Characteristics	---	---	---	---	Unburned	Unburned

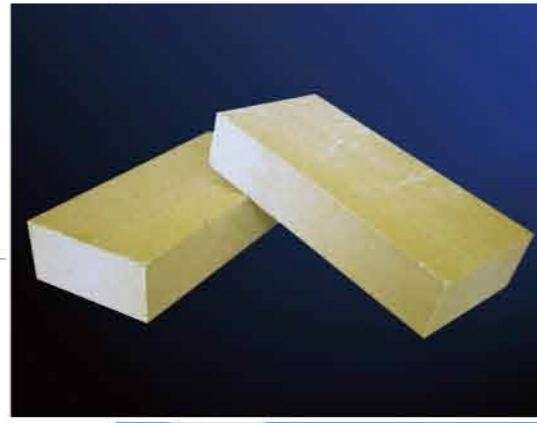
鋯磚、腊石磚

Zircon Bricks, Pyrophyllite Bricks

本公司生產的鋯磚具有高耐蝕性、耐剝落性等優點，腊石磚具有氣孔率低，抗熔渣侵蝕力佳等特性，適用於盛鋼桶。

Sunward's zircon bricks and Pyrophyllite are made from zircon and pyrophyllite widely used in ladle linings. The advantage of Sunward's zircon and Pyrophyllite bricks are:

1. Good erosion resistance to slag
2. Excellent resistance to spalling



Product Specification

Properties	Brand	ZR-40	ZR-60	ZR-65	RK-28
Refractoriness (SK)		34	35	35	28
Apparent Porosity (%)		≤22	≤22	≤22	≤15.5
Bulk Density (g/cm ³)		≥3.05	≥3.35	≥3.45	≥2.2
Cold Crushing Strength(Kg/cm ²)		≥500	≥500	≥500	≥300
Chemical Composition(%)					
ZrO ₂		≥40	≥58	≥60	---
SiO ₂		---	---	---	≥78
Al ₂ O ₃		---	---	---	≤18

保溫磚 耐火斷熱磚

Insulating Bricks, Insulating Fire Bricks

本公司針對各種窯爐之維護及作業環境需求，提供多樣保溫斷熱產品供客戶使用。

如：保溫/斷熱磚、陶瓷纖維類產品(毯、板、磚)...等，並可依客戶需求訂作。

Sunward offers variety of insulating products to suit the maintenance request of various kiln and furnace. The products such like insulating bricks and ceramic fiber products (blanket、board and brick, etc) can follow the cheed of customers.

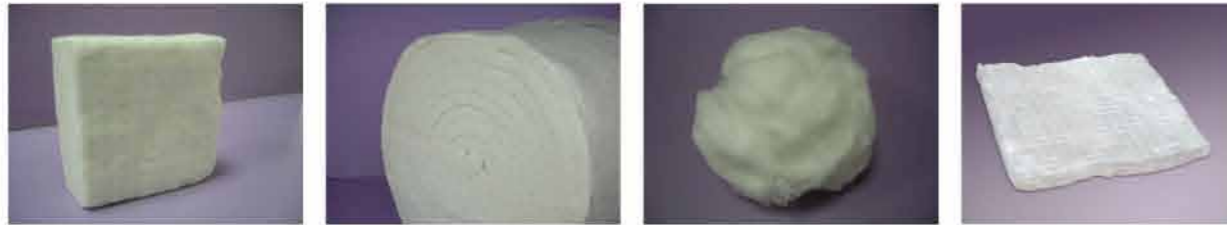


Product Specification

Brand	Properties	Temp. (°C) Reheating Shrinkage Less Than 2%	Bulk Density (g/cm ³)	Cold Crushing Strength(Kg/cm ²)	Thermal Conductivity (Kcal/m.h.°C adv. 350±10)
Insulating Brick	A1	900	≤0.50	≥5	≤0.13
	A2	1000	≤0.50	≥5	≤0.14
	A3	1100	≤0.50	≥5	≤0.15
	A4	1200	≤0.55	≥8	≤0.16
	A5	1300	≤0.60	≥8	≤0.17
	A6	1400	≤0.70	≥10	≤0.20
	A7	1500	≤0.75	≥10	≤0.22
Insulating Fire Brick	B1	900	≤0.70	≥25	≤0.17
	B2	1000	≤0.70	≥25	≤0.18
	B3	1100	≤0.75	≥25	≤0.20
	B4	1200	≤0.80	≥25	≤0.22
	B5	1300	≤0.80	≥25	≤0.23
	B6	1400	≤0.90	≥30	≤0.27
	B7	1500	≤1.00	≥30	≤0.31
Insulating Brick	C1	1300	≤1.10	≥50	≤0.30
	C2	1400	≤1.20	≥70	≤0.38
	C3	1500	≤1.25	≥100	≤0.45

陶瓷纖維

本公司針對各種窯爐之維護及作業環境需求，提供多樣保溫斷熱產品供客戶使用。
如：保溫/斷熱磚、陶瓷纖維類產品(毯、板、磚)...等，並可依客戶需求訂作。



Product Specification

Properties	Brand	Ceramic Fiber Board									
		1000°C	1260°C	1400°C	1600°C	1600°C (HA Board)	1700°C	1000°C 1100°C 1400°C 1400°C (H Board)			
Max. Service temp. (°C)		1000°C	1260°C	1400°C	1600°C	1600°C (HA Board)	1700°C	1000°C	1100°C	1400°C	1400°C
Bulk Density (kg/m³)		0.25	0.25	0.25	0.18	0.18	0.30	1.00	1.00	1.00	1.50
Reheating Shrinkage (%) (at °C × 24hrs)		-0.3(800°C)	-0.8(900°C)	-0.8(1000°C)	-0.7(1300°C)	+0.4	-0.6	-1.4	-1.4	-0.6	-3.4
		-1.3(900°C)	-1.1(1000°C)	-1.4(1200°C)	-1.2(1400°C)	(1600°C)	(1700°C)	(900°C)	(1000°C)	(1200°C)	(1200°C)
Thermal Conductivity (kcal/mh°C)	400°C	0.07	-----	-----	-----	0.11 (800°C)	0.10	0.24	0.24	0.26	0.49
	600°C	0.11	0.08	0.10	0.10	0.14(1000°C)	0.12	0.26	0.26	0.29	0.52
	800°C	0.17	0.12	0.14	0.14	0.18(1200°C)	0.15	0.29	0.29	0.32	0.55
	1000°C	-----	0.16	0.20	0.18	----- (1400)	0.18	0.18	0.18	0.37	0.62
Standard size (mm)		900×600×20 (Available 5-50 mm thick, in additions of 5 mm)					900×600×25	600×300×10, 15, 20, 25			

Properties	Brand	Ceramic Fiber Block										
		1260°C	1400°C	1500°C	1600°C	1260°C	1400°C	1500°C	1600°C	1260°C	1400°C	1600°C
Max. Service temp. (°C)		1260°C 1400°C 1500°C 1600°C (UNIFELT-B)				1260°C 1400°C 1500°C 1600°C (UNIBLOK)				1260°C 1400°C 1600°C (SABER BLOC)		
Bulk Density (kg/m³)		0.13	0.16	0.16	0.13	0.13	0.16	0.16	0.13	0.13	0.15	0.13
Reheating Shrinkage (%) (at °C × 24hrs)		-0.5	-1.5	-1.2	-0.4	-0.5(900°C)	-----	-----	-----	-----	-0.2(1000°C)	-----
		(900°C)	(1200°C)	(1300°C)	(1400°C)	-1.0(1000°C)	-----	-----	-----	-----	-1.0(1100°C)	-----
Thermal Conductivity (kcal/mh°C)	400°C	0.09	0.08	0.19	0.20	0.09	0.08	-----	-----	0.08	0.08	-----
	600°C	0.08	0.12	0.17	0.20	0.13	0.12	-----	0.12	0.13	0.12	-----
	800°C	0.08	0.11	0.15	0.20	0.19	0.17	-----	0.18	0.19	0.18	-----
	1000°C	-----	0.12	0.18	0.20	0.27	0.24	-----	0.25	0.27	0.25	-----
Standard size (mm)		300×150×50、75 200×200×50、75				300×300×150~300				300×300×150~300		

Ceramic Fiber Products

Sunward offers variety of insulating products to suit the maintenance request of various kiln and furnace. The products such like insulating bricks and ceramic fiber products (blanket、board and brick, etc) non-standard property are acceptable for the customer request.



Product Specification

Properties	Brand	Ceramic Fiber Blanket										Ceramic Fiber Bulk			
		1000°C			1260°C			1260°C (Ace BLanket)		1500°C (Ace BLanket)		1600°C		1260°C	1400°C
Max. Service temp. (°C)		1000°C			1260°C			1260°C (Ace BLanket)		1500°C (Ace BLanket)		1600°C		1260°C	1400°C
Bulk Density (kg/m³)		96 (6P)	128 (8P)	64 (4P)	96 (6P)	128 (8P)	160 (10P)	128 (8P)	160 (10P)	128 (8P)	160 (10P)	96 (6P)	128 (8P)	0.06~0.20 (Pack Density)	
Reheating Shrinkage (%) (at °C × 24hrs)		-----			-1.3(1000°C)			-1.3(1000°C)		-1.6(1300°C)		-0.6(1400°C)		-----	
		-----			-1.8(1100°C)			-1.8(1100°C)		-2.0(1400°C)		-0.5(1500°C)		-----	
Thermal Conductivity (kcal/mh°C)	400°C	0.08(8P)			0.06(8P)			0.06(8P)		-----		-----		0.07	
	600°C	0.13(8P)			0.10(8P)			0.10(8P)		0.08(10P)		0.08(6P)		0.10	
	800°C	0.19(8P)			0.14(8P)			0.14(8P)		0.12(10P)		0.12(6P)		0.14	
	1000°C	0.27(8P)			0.20(8P)			0.20(8P)		0.16(10P)		0.16(6P)		0.20	
Standard size (mm)	3600×600×25 7200×600×50			1200×600×6, 12.5, 25 3600×600×50 7200×600×6, 12.5, 25			1200×600×6, 12.5, 25 7200×600×6, 12.5, 25		3600×620×25		5Kg, 20kg				

Properties	Brand	Ceramic Fiber Paper			Ceramic Fiber Felt				
		1260°C	1260°C (ACE Paper)	1500°C (ACE Paper)	1000°C	1260°C	1400°C	1600°C	1200°C (WET Felt)
Max. Service temp. (°C)		1260°C	1260°C (ACE Paper)	1500°C (ACE Paper)	1000°C	1260°C	1400°C	1600°C	1200°C (WET Felt)
Bulk Density (kg/m³)		0.32	0.16	0.16	0.20	0.16	0.16	0.13	0.35 (105°C After Dried)
Reheating Shrinkage (%) (at °C × 24hrs)		-----			-1.5 (900°C)	-1.1 (1000°C)	-1.4 (1200°C)	-1.5 (1400°C)	-----
		-----			-----	-----	-----	-----	-----
Thermal Conductivity (kcal/mh°C)	400°C	0.08	0.06	-----	0.08	0.07	0.07	-----	-----
	600°C	0.11	0.09	0.08	0.12	0.11	0.11	0.11	-----
	800°C	0.15	0.12	0.12	0.18	0.15	0.15	0.16	-----
	1000°C	-----	0.17	0.16	-----	0.20	0.20	0.20	-----
Standard size (mm)	60(m)×600、1200×0.5 60(m)×600、1200×1.0 15(m)×600、1200×2.0			30(m)×600、1200×2.5		900×600×20 (Available 5-50 mm thick, in additions of 5 mm)			600×300×10,13,15,20,25

● 製品規範未經預告得變更之。數值僅供參考而非正式規格。熱傳導率依「ASTM C201」為準。
● Specifications are subject to change without notice. Values are for reference only. Thermal conductivity data are based on "ASTM C201".

濕式噴漿材

本公司針對各種工業窯爐之嚴苛維護條件需求，我們特別與日本黑崎播磨公司技術合作，開發最新的耐火材料技術－濕式噴漿材。

1. 特性：
 - a. 極低之反彈噴附損失量
 - b. 無粉塵
 - c. 極佳之耐用性可媲美澆鑄材使用
 - d. 無須模具、節省工時
2. 適用窯爐：
 - a. 高爐流道
 - b. 魚雷車
 - c. 盛鋼桶
 - d. 水泥窯
 - e. 焚化爐

Product Specification

Properties	Brand	SPNG-TMZ	SPNG-TS1	SPNG-ASC60	SPNG-ASC70	SPNG-LD1
Bulk Density (g/cm ³) 1450°Cx3hrs		≥2.85	≥2.80	≥2.75	≥2.85	≥2.70 (1500°C)
Apparent Porosity (%) 1450°Cx3hrs		≤20	≤20	≤23	≤23	≤25 (1500°C)
Modulus of rupture (kg/cm ²) 1450°Cx3hrs		≥50	≥50	≥100	≥50	≥150 (1500°C)
Cold Crushing Strength (kg/cm ²) 1450°Cx3hrs		≥350	≥300	≥500	≥300	≥500 (1500°C)
Chemical Composition(%)						
Al ₂ O ₃		≥65	≥52	≥64	≥72	≥80
MgO		≥5	---	---	---	≥5
SiC + C		≥10	≥30	≥12.5	≥15	---
Application		Trough metal zone	Trough slag zone	Torpedo car	Torpedo car	Steel ladle

Wet-Gunning Refractories

Sunward accordingly the maintains feature from various of industrial, we cooperate Japan Krosaki Harima Corporation and develop the new technique: Wet Gunning products

1. Feature
 - a. Low loss from the re-bound
 - b. No powder pollution
 - c. Good durable, compare favorably to the castable
 - d. Short working days, no mold request during the producing
2. Suitable Equipments
 - a. Trough of blast furnace
 - b. Torpedo car
 - c. Ladle furnace
 - d. Cement Kiln
 - e. Incinerator



Product Specification

Properties	Brand	SPNG-A45	SPNG-A55	SPNG-A75	SPNG-SC50	SPNG-SC80
Bulk Density (g/cm ³)1450°Cx3hrs		≥2.20	≥2.30	≥2.50	≥2.30	≥2.40
Apparent Porosity (%)1450°Cx3hrs		≤20	≤21	≤25	≤24	≤22
Modulus of rupture (kg/cm ²)1450°Cx3hrs		≥125	≥175	≥120	≥170	≥250
Cold Crushing Strength (kg/cm ²)1450°Cx3hrs		≥700	≥900	≥750	≥750	≥800
Chemical Composition(%)						
Al ₂ O ₃		≥45	≥55	≥75	≥22	≥5
SiC		----	----	----	≥50	≥80
Application		Incinerator / Cement-Kiln		Incinerator		

氣硬性耐火泥

Air-Set Mortar

本公司針對各種耐火磚，提供各種適用之耐火泥，以完整爐襯提高耐火磚使用之壽命具有：

1. 高連結強度。
2. 具良好的作業性。

Sunward offers a variety of high quality air-set mortar. Each type of mortar is designed to maximize the life time of particular type of bricks. The advantages of Sunward's airset mortars are:

1. High bonding strength.
2. Easy laying.



Product Specification

Properties	Brand										
	AM-32	AM-33	AM-34	AM-35	AM-36	AM-37	AM-38	AM-39	AM-40	Insulation	
Refractoriness(SK)	32	33	34	35	36	37	38	39	40	----	
GrainSize(%)		≤2	≤2	≤2	≤2	≤2	≤2	≤2	≤2	≤3	
											+0.5mm
											-0.074mm
Bonding Strength(kg/cm ²)		≥60	≥60	≥60	≥60	≥60	≥60	≥65	≥65	≥70	
											1500°Cx3hrs
											1400°Cx3hrs
Chemical Composition(%)	Al ₂ O ₃	≥32	≥35	≥45	≥55	≥65	≥70	≥75	≥80	≥90	≥60

熱硬性耐火泥

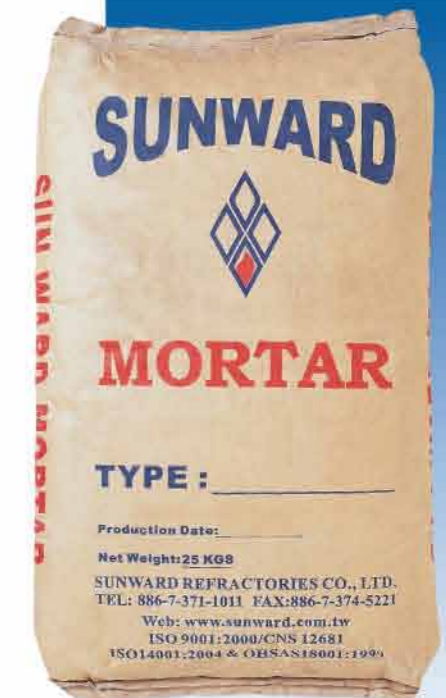
Heat-Set Mortar

本公司針對各種耐火磚，提供各種適用之耐火泥，以完整爐襯提高耐火磚使用之壽命具有：

1. 高連結強度。
2. 具良好的作業性。

Sunward provides a variety of high quality heat-set mortar. Each mortar type of is designed to maximize the life time of particular type of bricks. The advantages of Sunward's heatset mortar are:

1. High bonding strength.
2. Easy laying.



Product Specification

Properties	Brand						
	HM-32	HM-34	HM-36	HM-37	HM-38	Acid-Proof	
Refractoriness (SK)	32	34	36	37	38	----	
GrainSize(%)		≤2	≤2	≤2	≤2	≤2	
							+0.5mm
							-0.074mm
Bonding Strength(kg/cm ²)		≥60	≥60	≥60	≥60	≥60	
							1500°Cx3hrs
							1400°Cx3hrs
Chemical Composition (%)	Al ₂ O ₃	≥32	≥45	≥50	≥60	≥70	----
		SiO ₂	----	----	----	----	≥60

可塑性/搗固材/ 拋射修補耐火材料

Plastic / Ramming / Patching Refractories

本公司精選高鋁原料、碳化矽、石墨及粘土，以自動化製程生產出高塑性、易施工之塑性材及搗固材，其中搗固材適用於高爐之主流道、鐵水流道及渣流道，可塑性材適用於各類工業窯爐。

Sunward's plastic, ramming, and patching refractories are made from high-purity alumina, silicon-carbide, carbon, and plastic clay with a special mixing process. Ramming refractories are applied to main-troughs, slag-runners, and iron-runners of BF. Plastics refractories are suitable for industrial furnace.

The advantages of Sunward's plastic, ramming, and patching refractories.

1. Excellent plasticity.



Product Specification

Properties	Brand	PL-150	PL-170	PL-175	BFR-MTA	BFR-MTH	PC-1A-S
Bulk Density(g/cm ³)		≥2.0	≥2.05	≥2.25	≥2.5	≥2.5	≥2.5
1500°Cx3hrs					(1450°Cx3hrs)	(1450°Cx3hrs)	(1450°Cx3hrs)
Cold Crushing Strength(kg/cm ²)					≥180	≥180	≥20
1500°Cx3hrs		≥120	≥120	≥140	(1450°Cx3hrs)	(1450°Cx3hrs)	(1450°Cx3hrs)
Chemical Composition(%)							
Al ₂ O ₃		≥40	≥53	≥60	≥60	≥60	≥60
SiC+C		----	----	----	≥20.5	≥23	≥24
Characteristics		Plastic			Ramming		Patching

可鑄性耐火材料

Castable Refractories

本公司生產之可鑄性耐火物，具有：

1. 施工容易
2. 可施工於任何形狀之結構體
3. 具有良好的耐剝落性

The advantages of Sunward's castable refractories are :

1. Easy laying.
2. Can be formed with any shape.
3. Great spalling resistance.



Product Specification

Properties	Brand	CA-185	CA-180S	CA-180	CA-170	CA-160	CA-150	CA-140	CA-130
Max. Service Temp (°C)		1800	1800	1800	1700	1600	1800	1800	1800
Bulk Density (g/cm ³)									
1500°Cx3hrs		≥2.65	≥2.50	≥2.35	----	----	≥2.05	----	----
1400°Cx3hrs		----	----	----	≥2.2	≥2.1	≥2.1	≥2.0	----
1200°Cx3hrs		----	----	----	----	----	----	----	≥1.95
Cold Crushing Strength (kg/cm ²)									
1500°Cx3hrs		≥300	≥280	≥250	----	----	----	----	----
1400°Cx3hrs		----	----	----	≥300	≥300	≥300	≥250	----
1200°Cx3hrs		----	----	----	----	----	----	----	≥150
Modulus of Rupture (kg/cm ²)									
1500°Cx3hrs		≥80	≥80	≥60	----	----	----	----	----
1400°Cx3hrs		----	----	----	≥60	≥60	≥60	≥50	----
1200°Cx3hrs		----	----	----	----	----	----	----	≥15
Chemical Composition (%)									
Al ₂ O ₃		≥95	≥90	≥75	≥60	≥60	≥45	≥42	≥30
Water Required (%)		8~9	9~11	11~13	11~13	11~13	12~14	12~14	12~15
Installation Method		Casting, Trowelling							

Properties	Brand	CA-13I	CA-12I	CA-11I	CA-10I	CA-9I	CA-8I	CA-7I	CA-6I	CA-5I
Max. Service Temp (°C)		1300	1200	1100	1000	200	800	700	600	500
Bulk Density (g/cm ³)										
110°Cx24hrs		≤1.4	≤1.3	≤1.2	≤1.1	≤1.0	≤0.9	≤0.8	≤0.7	≤0.6
Cold Crushing Strength (kg/cm ²)										
1200°C		≥30	≥30	≥25	≥25	≥20	≥15	≥10	≥10	≥8
1000°C		1200°C	1200°C	1000°C	1000°C	800°C	800°C	600°C	600°C	500°C
Modulus of Rupture (kg/cm ²)										
1200°C		≥10	≥10	≥8	≥8	≥7	≥6	≥5	≥5	≥4
1000°C		1200°C	1200°C	1000°C	1000°C	800°C	800°C	600°C	600°C	500°C

低水泥可鑄性耐火材料

Low Cement Castable

高強度水泥可鑄材是以高級骨材配合超細微粉原料及特殊添加劑所製造，由於其低水泥量及低施工加水量，使其具有：

1. 於各溫度範圍，皆具有高強度。
2. 高耐磨力及高耐侵蝕力。
3. 良好的體積穩定性。

Sunward's high strength low cement castables are made from superior refractory aggregate, ultra-fine powder, and special binder with low water content.

The advantages of Sunward's low cement castable are:

1. High strength over a broad temperature range.
2. Excellent wear and corrosion resistance.
3. Excellent volume stability.



Product Specification

Brand Properties	SNC-W45	SNC-W55	SNC-W60	SNC-W70	SNC-W80	SNC-W90	SNC-S85	SNC-S60	SNC-M81	SNC-M82
Bulk Density (g/cm ³) 1500(1450)°C×3hrs	≥2.1	≥2.3	≥2.4	≥2.65	≥2.7	≥2.85	1450°C (≥2.4)	1450°C (≥2.3)	1450°C (≥2.8)	1450°C (≥2.8)
Cold Crushing Strength (kg/cm ²) 1500°C×3 hrs	≥600	≥600	≥550	≥500	≥600	≥500	1450°C (≥500)	1450°C (≥500)	1450°C (≥300)	1450°C (≥300)
Modulus of Rupture (kg/cm ²) 1500°C×3hrs	≥100	≥100	≥80	≥80	≥120	≥200	1450°C (≥200)	1450°C (≥180)	1450°C (≥50)	1450°C (≥70)
Chemical Composition(%)										
Al ₂ O ₃	≥45	≥55	≥60	≥70	≥80	≥90	----	----	≥65	≥55
CaO	≤2	≤2	≤2	≤2	≤2	≤2.5	----	----	----	----
F.C.+SiC	----	----	----	----	----	----	----	----	≥20	≥35
SiC	----	----	----	----	----	----	≥85	≥60	----	----
Water Required (%)	7.5~8.5	6.5~7.5	6.5~7.5	6.0~7.0	5.5~6.5	5.0~5.5	7.5~8.5	7.5~8.5	5.0~5.5	5.0~5.5
Installation Method	Vibrating									

噴漿耐火材料

Gunning Refractories

本公司以最適之粒度配比，特殊添加劑的使用，來達到最低的噴附掉落量及良好的耐侵蝕力，公司分別生產輕質、高鋁質、鎂質及鋁碳質的噴漿材，供水泥窯、魚雷車、盛鋼桶、主流道及各種工業用窯爐使用。

Sunward offers four main types of gunning refractories: light-weight, high-alumina, magnesia, and alumina-carbon. Each type of gunning aserrals uses a special binder and precisely controlled grain size. Sunward's gunning refractories are often used for Cement kilns, Torpedo car, Ladles, main-troughs of BF, and other industrial kilns. The advantages of Sunward's gunning refractories are:

1. Low rebound-loss
2. Good wear resistance



Product Specification

Brand Properties	SGM-06I	SGM-12I	SGM-A40	SGM-A50	SGM-A60	SGM-A70	SGM-M12	SGM-M15	MT-RG2	SGM-S80
Bulk Density (g/cm ³) After heat treatment at °C×3hrs	≤0.7 1000°C	≤1.3 1000°C	≥1.75 1400°C	≥2.00 1400°C	≥2.1 1500°C	≥2.15 1500°C	≥2.45 1500°C	≥2.20 1500°C	≤2.20 in Coke	≥2.25 in Coke
Cold Crushing Strength(kg/cm ²) ×3hrs	≥5 1000°C	≥25 1000°C	≥200 1400°C	≥200 1400°C	≥200 1500°C	≥200 1500°C	≥60 1500°C	≥80 1500°C	≥100 1450°C	≥250 1450°C
Chemical Composition (%)									in Coke	in Coke
Al ₂ O ₃	≥30	≥35	≥40	≥50	≥60	≥70	----	----	≥60	≤8
MgO	----	----	----	----	----	----	≥87	≥83	----	≥80(SiC)
SiC+C	----	----	----	----	----	----	----	----	≥22	----
Application	Industrial Furnace						EAF	EAF	BF Main-Trough	Incinerator

高爐堵泥材

Tap-Hole Mud for Blast Furnace

本公司針對高爐需求，開發適合各高爐操作條件之堵泥材，具有下列特性：

1. 能使用於交互與連續出銑
2. 易開孔，能使用於預先開孔條件
3. 高耐蝕性
4. 與舊材結合性佳

For the demand of operating condition of Blast-Furnace, MUD materials with the following features:

- 1.Can be applied to alternative and continuous tapping
- 2.Easily dig
- 3.High corrosion resistance to molten iron and slag
- 4.Easy adhere to old material



Product Specification

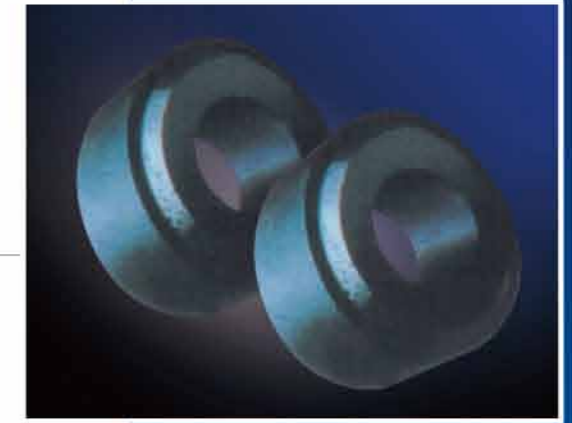
Properties		Brand	STA-01	STA-02	STA-03	STA-04
After heat treatment for 3 hours at 600°C	Bulk Density (g/cm ³)		≥ 1.9	≥ 1.9	≥ 1.9	≥ 1.9
	Cold Crushing Strength (Kg/cm ²)		≥ 60	≥ 65	≥ 60	≥ 60
	Modulus of Rupture (Kg/cm ²)		≥ 25	≥ 27.5	≥ 27	≥ 26.5
Chemical Composition (%)	Al ₂ O ₃		≥ 37	≥ 43	≥ 40	≥ 39
	SiC+Si ₃ N ₄		≥ 13	≥ 13	≥ 15	≥ 15

出鋼口磚

Tapping Hole Bricks

本公司生產的出鋼口磚是一種組合型不燒耐火功能材料，以高純電熔鎂砂加高純石墨為主要原料，添加多種添加劑。產品具有優良的抗侵蝕性和抗沖刷性。適用於煉鋼轉爐和電爐出口部位、出鋼口襯磚和外套磚。可以單件供應，也可以組裝後成套供應。

The Tapping Hole Brick is a sort of combination refractory and manufactured without burning. Its main raw material includes high-pure electric-smelting magnesia and pure graphite, it also contains multitude of reagents. The Tapping Hole Brick has characteristics of good resistance for corrosion and erosion. This products is mainly used for discharge port, converter, ,tapping hole line, wrapping of converter and electric arc. It can be supplied with single piece and a whole set after combination.



Product Specification

Properties		Brand	ZGK-A	ZGK-B
Cold Crushing Strength (Mpa)			≥ 45	≥ 45
Modulus of Rupture at Elevated Temperature, 1400°Cx30min(Mpa)			≥ 12	≥ 12
Bulk Density (g/cm ³)			≥ 2.98	≥ 2.95
Apparent Porosity (%)			≤ 3	≤ 3
Chemical Composition (%)	MgO		≥ 80	≥ 75
	C		≥ 10	≥ 15

滑板/嵌鑲滑板

Plate, Mosaic Plate

流鋼孔用滑板、鑲嵌滑板，可保證管線鋼等，鈣處理鋼的澆注。

Plate and Mosaic Plate are used for steel flowing hole to ensure the casting of calcium processing steel, such as pipeline steel.



Product Specification

Properties	Kind	Al ₂ O ₃ -ZrO ₂ , Al ₂ O ₃ -C						MgO-C	ZrO ₂ -C
		3.17	3.12	3.14	3.33	3.24	3.13		
Bulk Density (g/cm ³)		3.17	3.12	3.14	3.33	3.24	3.13	3.10	4.80
Apparent Porosity (%)		5.5	5.0	4.5	4.0	4.0	5.5	8.5	15.5
Cold Crushing Strength (Mpa)		240	230	280	280	300	150	120	100
Chemical Composition (%)	Al ₂ O ₃	79	70	71	75	74	95	95	10
	ZrO ₂	6	10	13	9	8	---	---	(MgO 89)
	F.C	9	12	10	7	10	4	4	4
Hot modulus of rupture (Mpa) at 1400°C		23	25	28	21	25	35	45	44
Thermal expansion (%) at 1500°C		1.05	0.99	0.96	1.01	1.01	1.30	1.20	1.98

透氣磚

Porous Plug

本公司的透氣磚，採用先進的生產技術，分狹縫式和擴散型兩種類型。產品應用於爐外精煉和頂底復合吹煉等。本系列產品具有優良的抗熱震穩定性、耐侵蝕性和抗氧化性。

Porous Plug, made with advanced technology, the type of Porous Plug have into slit type and diffused type. It is applied in outside furnace smelting and top & bottom blowing smelting and so on. It possesses good high thermal shock resistance, erosion resistance and oxidation resistance.



Product Specification

Properties	Kind	Porous bricks					Outer sleeves	
		Alumina					Alumina	Al ₂ O ₃ -C
Bulk Density(g/cm ³)		2.51	2.49	2.80	3.05	3.22	3.00	2.90
Apparent Porosity (%)		35.0	26.5	27.5	21.2	15.3	17.8	13.3
Cold Crushing Strength (Mpa)		65	65	110	180	150	70	90
Permeability (C.G.S)		1.0	0.8	2.0	1.0	---	---	---
Chemical Composition (%)	Al ₂ O ₃	91	82	91	91	94	95	95
	MgO	---	---	---	---	3	---	---
	F.C	---	---	---	---	---	---	---

分鋼槽水口

Tundish Nozzle

用於分鋼槽底部，讓鋼液能順利流入模具內。高強度與高抗剝落性為其特性。

The Tundish Nozzle of Sunward are used in the bottom of Tundish to make molten steel smoothly pour into mould. The characteristics are high strong and spall resistance.



Product Specification

Properties	Kind	Zircon				
		Zircon	Zircon-Zirconia		Zirconia	
Cold Crushing Strength (Mpa)		120	120	120	140	140
Bulk Density (g/cm ³)		3.7	4.0	4.4	4.8	4.8
Apparent Porosity (%)		20.0	17.5	14.5	15.5	16.0
Chemical Composition (%)						
ZrO ₂		65.0	75.5	82.0	96.0	96.0
SiO ₂		33.0	22.0	16.0	—	—

長水口

Long Nozzle

本公司長水口按功能分主要有預熱/非預熱及吹氬/不吹氬型；按材質分主要有鋁碳質、鋁鋯碳質、鎂碳質等。本產品在使用過程中具有良好的耐鋼水沖刷性能，能有效防止鋼水的氧化和飛濺。

Long nozzles can be classified by:

- 1.Functions: Preheating/ non-preheating, blowing argon/non-argon.
- 2.Materials: Alumina-carbon, alumina-zirconia-carbon, magnesia-carbon, etc.

It possesses good capacity of erosion resistance, anti-oxidation and anti-splashing.



Product Specification

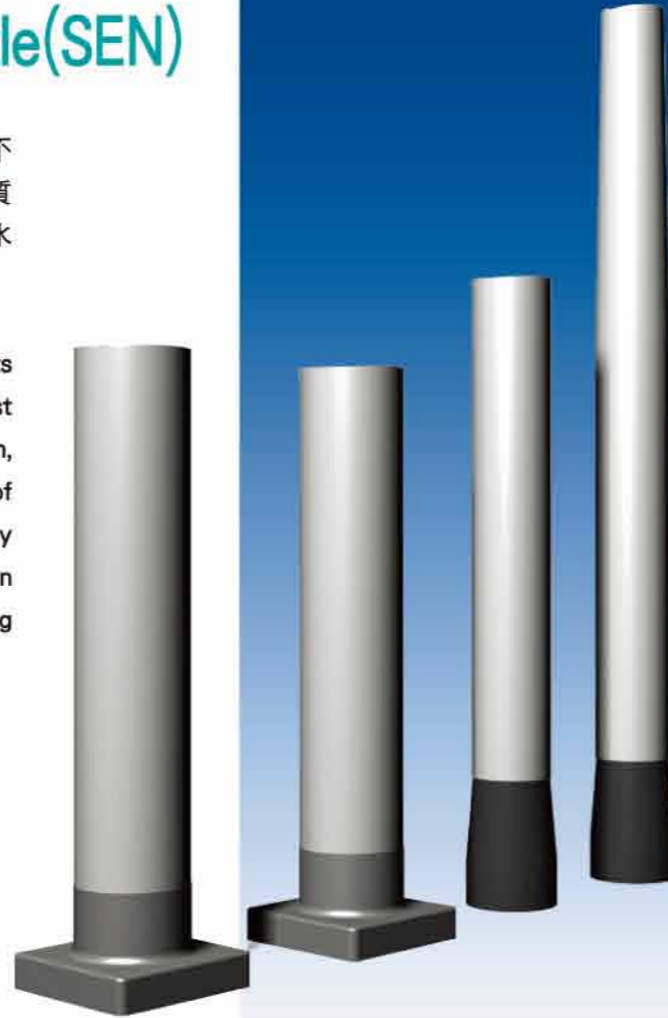
Properties	Kind	Body				Slag Line	
		Alumina-Graphite				Zirconia-Graphite	Alumina-Zirconia-Graphite
Bulk Density (g/cm ³)		2.08	2.31	2.37	2.46	3.20	3.00
Apparent Porosity (%)		16.5	16.3	18.0	17.6	17.0	18.5
Cold Crushing Strength (Mpa)		26	27	24	27	24	24
Modulus of Rupture (Mpa) at R.T		9.2	9.9	8.0	8.5	7.0	8.0
Modulus of Rupture (Mpa) at 1400°C		9.1	8.8	8.7	9.9	---	---
Modulus of elasticity (GPa)		7.9	9.1	6.5	8.3	7.1	10.6
Thermal expansion at 1000°C (%)		+0.28	+0.30	+0.37	+0.40	+0.33	+0.47
Chemical Composition (%)	Al ₂ O ₃	37	56	62	69	---	18
	ZrO ₂	---	---	---	---	68	48
	SiO ₂	24	11	5	---	---	---
	F.C+SiC	35+1	29+0	31+0	29+0	27	27

浸入式水口

Submerged Entry Nozzle (SEN)

本公司浸入式水口按材質和功能分主要有吹氬/不吹氬、快速更換型、鋁碳質、鋁鎂碳質、鎂碳質等類型。本產品在使用過程中具備良好的耐鋼水沖刷性能、抗鋼水氧化和渣侵蝕性能。

Classified by materials and functions, our products can be grouped into blowing argon/ non-argon, fast replacement, alumina-zirconia-carbon, alumina-carbon, magnesia-carbon, etc. It possesses good capacity of erosion resistance to molten steel, anti-oxidation by molten steel and anti-corrosion by slag. We can provide products made of various materials according to the specific conditions of the steel companies.



Product Specification

Properties	Kind	Body				Powder Zone		
		Alumina-Graphite				Zirconia-Graphite		
Cold Crushing Strength (Mpa)		21	27	27	27	20	31	29
Modulus of Rupture (Mpa)		7.0	9.0	9.0	8.5	8.0	10.5	8.5
Bulk Density (g/cm ³)		2.18	2.29	2.34	2.46	3.23	3.46	3.60
Apparent Porosity (%)		16.9	17.5	17.5	17.6	18.0	15.8	16.5
Modulus of elasticity (GPa)		7.5	10.2	10.5	8.3	12.5	13.0	12.9
Thermal expansion at 1000°C (%)		+0.22	+0.29	+0.36	+0.40	+0.35	+0.47	+0.48
Chemical Composition (%)	F.C+SiC	30	33	33	29	24	21	15
	Al ₂ O ₃	41	40	49	69	---	---	---
	SiO ₂	25	18	10	---	---	---	---
	ZrO ₂	3	17	5	---	70	75	80

塞棒

Monoblock Stopper

本公司之塞棒按材質分類主要有鋁碳質、鋁鎂碳質、鋁鎂碳質等。由於本產品具有良好的抗渣侵蝕性能、常溫抗折強度、優良的耐鋼水侵蝕和沖刷性能，進而保證了本產品使用過程中的可靠性。

Classified by materials, our monoblock stoppers can be grouped into Alumina-Carbon, Alumina-Zirconia-Carbon, Alumina-Magnesia-Carbon sistance to the slag、corrosion、rupture and erosion, it ensure reliable during operating procedure.



Product Specification

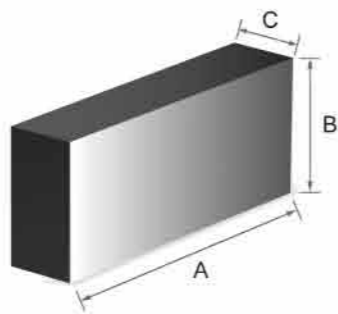
Properties	Kind	Stopper Heads		Long Stoppers		
		Alumina-Graphite	Burned Alumina	Alumina-Graphite		
Cold Crushing Strength (Mpa)		30	40	32	31	26
Modulus of Rupture (Mpa)		---	---	10.0	10.0	7.0
Bulk Density (g/cm ³)		2.80	2.35	2.47	2.52	2.46
Apparent Porosity (%)		14.5	18.0	16.3	17.3	19.3
Modulus of elasticity (GPa)		---	---	12.0	13.5	10.8
Thermal expansion at 1000°C (%)		---	---	+0.40	+0.55	+0.55
Chemical Composition (%)	F.C+SiC	9(F.C)	---	28	28	28
	Al ₂ O ₃	89	56	52	69	69
	SiO ₂	---	---	9	---	---
	ZrO ₂	---	---	9	---	---

JIS標準磚的尺寸及形狀

JIS Standard Sizes & Shapes

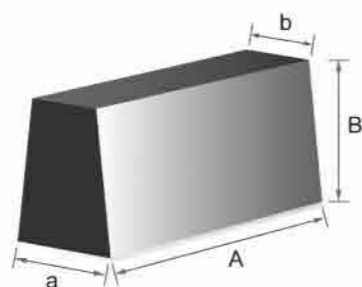
標準型Standard(mm) :

	A	B	C
Straight 並型磚	230	114	65
Sood 半條磚	230	57	65
Split Brick 半片磚	230	114	32



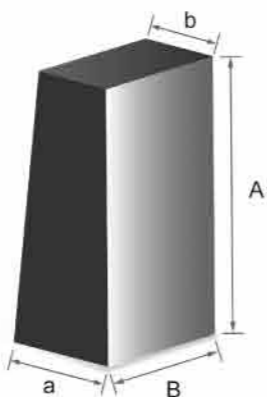
橫楔型Arch(mm) :

	A	B	a	b
Y0	230	114	65	61
Y1	230	114	65	59
Y2	230	114	65	50
Y3	230	114	65	32



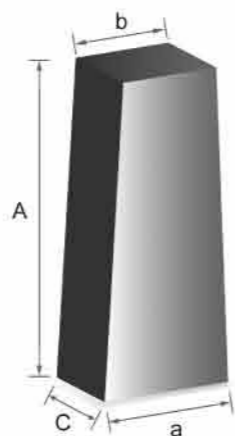
縱楔型Wedge(mm) :

	A	B	a	b
T0	230	114	65	60
T1	230	114	65	55
T2	230	114	65	45
T3	230	114	65	35



Key(mm) :

	A	a	b	C
B0	230	114	108	65
B1	230	114	105	65
B2	230	114	85	65
B3	230	114	65	65

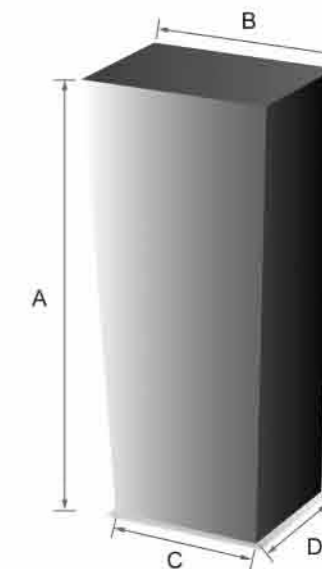


Minikey系列尺寸一覽表

The Table of Minikey Sizes

品名	A	B	C	D
127/10	127	155	145	100
127/20	127	160	140	100
127/30	127	165	135	100
152/10	152	155	145	100
152/20	152	160	140	100
152/30	152	165	135	100
178/10	178	155	145	100
178/20	178	160	140	100
178/30	178	165	135	100
210/10	210	155	145	100
210/20	210	160	140	100
210/30	210	165	135	100
230/10	230	155	145	100
230/20	230	160	140	100
230/30	230	165	135	100
250/10	250	155	145	100
250/20	250	160	140	100
250/30	250	165	135	100
300/20	300	160	140	100
300/40	300	170	130	100
350/0	350	150	150	100

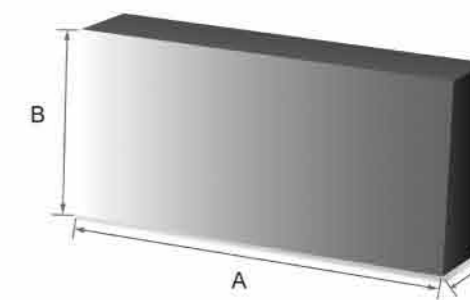
品名	A	B	C	D
350/8	350	154	146	100
350/40	350	170	130	100
350/80	350	190	110	100
400/0	400	150	150	100
400/8	400	154	146	100
400/40	400	170	130	100
400/80	400	190	110	100



其他

Other Bricks

尺寸 Measure			備註
A	B	C	Remark
230 mm	171 mm	65 mm	橫一丁半磚
345 mm	114 mm	65 mm	縱一丁半磚
460 mm	114 mm	65 mm	二丁磚
460 mm	230 mm	65 mm	四丁磚
390 mm	230 mm	114 mm	六丁磚
520 mm	230 mm	114 mm	八丁磚
650 mm	230 mm	114 mm	十丁磚
780 mm	230 mm	114 mm	十二丁磚

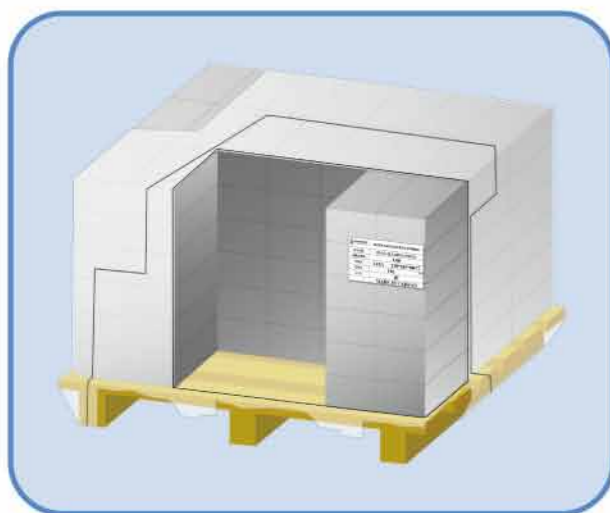


包裝方式

Package Types



Standard : 1MT/Big bag
500kg/Big bag
300kg/Big bag



Standard : 25kg/paper bag