www.wonjinref.co.kr

WONJIN Worldwide

YOUR GLOBAL
REFRACTORIES
PARTNER

Wonjin Worldwide Co., Ltd.

KOREA

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WONJIN Worldwide
WONJIN Group

Frontier in Creating Value From Resource Development

원진그룹은 자원의 가치 창조를 통한 초일류 소재 기업으로 도약하고 있습니다.

내화 사업부 REFRACTORIES DIVISION

에너지 사업부 ENERGY DIVISION

중앙연구소 CENTRAL RESEARCH AND DEVELOPMENT CENTER

광물재생 사업부 MINERALS AND RECYCLING DIVISION

신소재 사업부 ENGINEERED MATERIAL DIVISION

CONTENTS

연혁 I Brief History

1967	(주)왕표연탄 설립	Founded Wangpyo Coal Briquette Co., Ltd.
1977	동종업계 최초 KS인증 획득 - KS L 3201 내화 점토질 벽돌 - KS L 3202 내화 모르타르 - KS L 3205 고알루미나질 내화벽돌 - KS L 3301 내화 단열 벽돌	The first to be KS certified in the Korean refractories industry - KS L 3201 Clay refractories brick - KS L 3202 Mortar refractories - KS L 3205 High alumina refractories brick - KS L 3301 Insulating refractories brick
1979	(주)왕표내화 설립	Founded Wangpyo Refractories Co., Ltd.
1994	업계 최초 ISO9002 인증 획득	The first to be ISO9002 certified in the Korean refractories industry
1995	산업표준화 대상 수상	Winner of Korea Industry Standardization Award
1996	하리마세라믹(Japan)과 기술 협약 체결	Technical cooperation with Harima Ceramics, Japan
1998	업계 최초 중국 법인 설립 및 진출 대석교공장 설립(영구원진내화재료유한공사)	The first Korean refractories manufacturer to enter into China via wholly owned subsidiaries Established Yingkou Wonjin Refractories Co., Ltd.
1999	업계 최초 유럽시장 진출	The first Korean refractories manufacturer to enter into European market
2001	금탑산업훈장 수상 중국 청도 1, 2공장 설립(청도원진내화재료유한공사, 청도원진특수내화재료유한공사) 일본법인 설립(Wonjin JP)	Winner of Gold Tower Industry Award Established Qingdao Wonjin Refractories Co., Ltd. and Qingdao Wonjin Special Refractories Co., Ltd. Established Wonjin JP Co., Ltd.
2004	유럽법인 설립(Wonjin Europe BV)	Established Wonjin Europe BV
2011	영국 축로 전문 기업 Total Refractories Management(TRM)설립	Established refractories technical consulting and installation company Total Refractories Management Co., Ltd., UK
2014	신소재(친환경 건축자재)사업 출범 (주)경동과의 공동 신규사업 종료 후 에너지사업 법인 분할 "(주)경동개발, PT. KD Mineral IDN, 영구경동생물질유한공사", 원진그룹 내 에너지사업부로 편입 (주)경동에너지 법인 설립 (주)원진월드와이드, (주)경동월드와이드로 상호 변경 (주)경동에너지, 토양개량제(Bio-char) 개발	Started Engineered material (environment friendly building material) business After the joint new business with "Kyungdong Co., Ltd", separated out "Kyungdong Development Co., Ltd.", "PT. KD Mineral IDN" and "Yingkou Kyungdong Biomass Energy Co., Ltd." related in Energy business. Established of Kyungdong Energy Co., Ltd. Changed name "Wonjin Worldwide Co., Ltd.", "Kyungdong Worldwide Co., Ltd." Kyungdong Energy Co., Ltd. developed soil improvement additive(Bio-Char)
2015	PT. KD MINERAL 우드펠릿 공장 준공 (주)경동에너지, 아마존 숯 상표 등록	PT. KD MINERAL, established a wood pallet factory Kyungdong Energy Co., Ltd, registerd the brand 'Amazon charcoal'
2016	신소재 사업, 경동 S-우드 브랜드 런칭, "경동순마루" 신제품 출시	Engineered material business, New brand "Kyungdong S-WOOD" started , lunched "Kyungdong Sunmaru"
2017	(주)경동개발, (주)경동에너지를 흡수 합병 ㈜원진월드와이드, ㈜경동월드와이드로부터 내화사업부문 분할 신설	Kyungdong Development Co., Ltd. merged Kyungdong Energy Co., Ltd. Established Wonjin Worldwide Co., Ltd.(Refractory division) divided from Kyungdong Worldwide Co., Ltd.
2019	중국 내 투자합자생산법인 설립 (쯔보헝선내화재료유한공사)	Establishment of joint investment production corporation in China (Zibo Hengsen Refractory Material Co., Ltd.)

WONJIN'S GLOBAL NETWORK

글로벌 네트워크

ONE-STOP SOLUTION

원료공급부터 생산, 판매, AS까지

판매기지 I Sales Base

원진월드와이드
Wonjin Worldwide Co., Ltd.

원진EUROPE B.V.
Wonjin Europe B.V. Co., Ltd.

원진JP
Wonjin JP Co., Ltd.

생산기지 I Production Base

원진월드와이드
Wonjin Worldwide Co., Ltd.

생산량(Capa) : 54,000ton
Monolithics, Casting

청도원진특수내화재료유한공사
Qingdao Wonjin Special Refractory Technology Co., Ltd.

생산량(Capa) : 18,000ton
Monolithics, Special products, Casting

쯔보부방원진내화재료과기유한공사
Zibo Fubang Wonjin Refractory Technology Co., Ltd.

생산량(Capa) : 12,000ton
Hollowware, High Alumina bricks, Clay bricks

영구홍위원진내화재료유한공사
Yingkou Hongyu Wonjin Refractory Material Co., Ltd.

생산량(Capa) : 100,000ton
Magnesia-Carbon bricks, Alumina-Magnesia-Carbon bricks,
Magnesia-Alumina-Carbon bricks etc.

원진Vina
Wonjin BAC Co., Ltd.

생산량(Capa) : 7,200ton
Magnesia-Carbon bricks, Alumina-Magnesia-Carbon bricks etc.

Research and **Development Center**

자원 가치 창조 Frontier, **중앙 연구소**

1987년 기업 부설 기술연구소 설립
원진그룹의 중앙연구소로 독립 운영되며, 자원의 가치 창조라는 공통의 비전을 목표로 원진그룹의 미래 성장 동력을 발굴하고 고객 만족을 실현하기 위해 끊임없는 연구활동에 매진하고 있습니다. 중앙연구소는 내화 사업, 에너지 사업, 신소재사업, 광물 재생사업, 친환경 사업 5개 파트로 연구 개발 활동 중입니다.

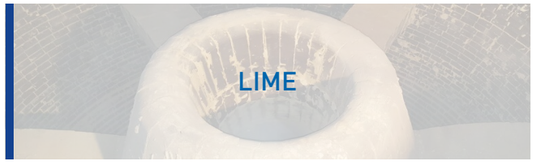
Wonjin Research and Development (R&D) center was established in 1987.
Wonjin Group's R&D center is an independent institute that operates to reach the group companies' common goal of becoming the frontier in creating value from resource development. There are five research and development.

연구소 I R&D CENTER

원진그룹의 뿌리로서 **원진월드와이드**는 1987년 국내 양산공장 준공, 기술연구소를 설립하고, 2000년대 초반에는 국내 업계 최초로 중국에 진출하여 내화물 사업의 수직 계열화를 완성하였습니다. **원진월드와이드**는 내수뿐만 아니라, 유럽, 일본, 중국에도 판매 법인을 두는 등 세계를 무대로 "소재 분야 초일류 기업"을 목표로 사업을 추진해오고 있습니다.

As the root of the Wonjin Group, **Wonjin Worldwide** completed the construction of a domestic Yangsan plant in 1987 and established a technology research center. In the early 2000s, we entered China for the first time in the domestic industry and completed the vertical integration of the refractory business.
Wonjin Worldwide has sales subsidiaries in Europe, Japan and China as well as domestic sales. We have been promoting our business with the goal of becoming a "first-class company in the material field" on the global stage.

내화사업부 I REFRACTORIES DIVISION

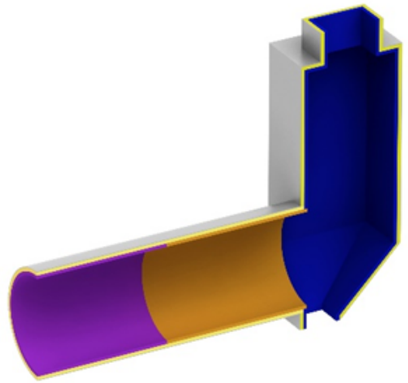


소각로

INCINERATOR

소각로용 내화물은 설비별 특성에 따라 Alumina질에서 Chrome질까지 다양한 내화물이 사용됩니다.
당사는 오랜 자재공급 및 시공경험을 바탕으로, 각 설비별 내화물의 특성과 사용조건 등을 감안한
최적의 내화물을 선정, 공급, 소각로의 신설 및 유지보수를 지원하고 있습니다.

Refractories are chosen according to the type of incinerator and commonly chosen qualities are alumina based or chrome based refractories. With Wonjin's extensive knowledge and experience in the supply of materials and installation, we will provide the best technical solution for your refractories needs.



로터리 소각로 I ROTARY KILN

유동층 소각로 I FLUID BED INCINERATOR

Low Cement Castable(High-strength)

Division				General Low Cement Casteble						
				WSC-15	WSC-16	WSC-165	WSC-17	WSC-18	WSC-19	WSC-19S
Physical Properties	Max service temperature		ºC	1550	1600	1650	1700	1800	1900	2000
	Density	at 110ºC 24Hr	kg/m³	2260	2320	2500	2630	2920	3050	3120
	CCS	at 110ºC 24Hr	MPa	58	61	72	70	66	65	100
	MoR	at 110ºC 24Hr	MPa	10	11	9.5	13	12	12	17
	PLC	at 110ºC 24Hr	%	-0.04	-0.04	-0.03	-0.03	-0.03	-0.02	-0.03
Chemical Analysis	Al_2O_3		%	52.2	54.5	64.1	72.3	84.6	84.2	96.9
	SiO_2		%	40.6	40.7	28.7	21.8	10.6	4.29	1.27
	Fe_2O_3		%	1.1	1	1.3	1.2	0.9	0.5	0.04
	CaO		%	2.4	2.2	2.8	2.3	1.3	1.2	1.2
Water addition (by weight)			%	5~8	5~8	4~7	4~7	4~6	4~6	5~6
Installation				Vibrating						

Division				General Low Cement Casteble			
				SFC-16	SFC-17	SFC-18	SFC-19
Physical Properties	Max service temperature		ºC	1600	1700	1800	1900
	Density	at 110ºC 24Hr	kg/m³	2430	2570	2790	3160
	CCS	at 110ºC 24Hr	MPa	45.0	51.2	30.0	45.0
	MoR	at 110ºC 24Hr	MPa	7	9.1	5	8
	PLC	at 110ºC 24Hr	%	-0.05	-0.03	-0.06	-0.06
Chemical Analysis	Al_2O_3		%	66.5	75.5	82.9	92.2
	SiO_2		%	26.2	18.3	10.2	2.6
	Fe_2O_3		%	1.1	0.9	-	-
	CaO		%	-	2.5	2.7	2.1
Installation				Slef Flowing			

*The technical data represent the typicality of the current production.
*Please contact the head office for specifications on products that are not supplied.

Alumina & Mullite Brick

Division		Alumina - Mullite Brick							
		SA-37	SA-38	SA-40	SA-40F	SA-40P	SA-40S	SA-40TS	SA-40CZ
Physical Properties	SK	37	38	40	40	40	40	40	40
	Density	2500	2650	2950	3050	3150	3250	3000	3200
	A.P(%)	18	18	17	16	16	16	13	15
	CCS(MPa)	70	80	90	90	90	95	120	125
	RUL	1580	1600	1700	1700	1700	1700	1700	1700
	Thermal/E	0.6	0.65	0.75	0.75	0.75	0.75	0.72	0.72
Chemical Analysis	Al_2O_3	63	73	86	88	92	95	85	86
	SiO_2	31	22	12	10	6	4	-	-
	Fe_2O_3	1.7	1.5	0.7	0.5	0.4	0.4	0.6	0.3
	Cr_2O_3	-	-	-	-	-	-	-	3.8
	ZrO_2	-	-	-	-	-	-	-	3.5
	SiC	-	-	-	-	-	-	2.5	-

Division		Mullite – Alumina Brick							
		WIB-60	WIB-60S	WIB-60P	WIB-70	WIB-70S	WIB-70P	WIB-80	WIB-85
Physical Properties	SK	37	37	37	38	38	38	39	40
	Density	2520	2550	2550	2650	2700	2700	2850	3050
	A.P(%)	17	16	15	17	16	15	18	16
	CCS(MPa)	75	75	110	80	90	110	80	90
	RUL	1600	1650	1600	1650	1650	1650	1670	1700
	Thermal/E	0.6	0.5	0.6	0.6	0.6	0.6	0.65	0.7
Chemical Analysis	Al_2O_3	63	64	63	73	75	74	82	88
	SiO_2	33	32	31	23	22	21	15	10
	Fe_2O3	1.5	1.3	1.3	1.2	1	1	0.8	0.6
	P_2O_5	-	-	1	-	-	1	-	-

*The technical data represent the typicality of the current production.
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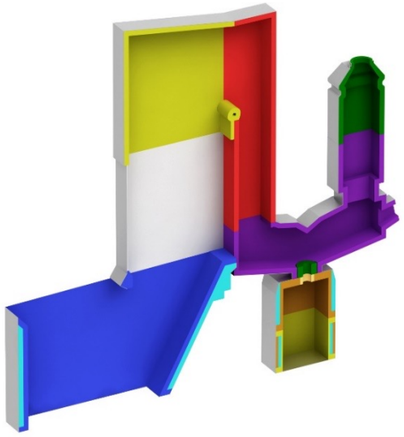
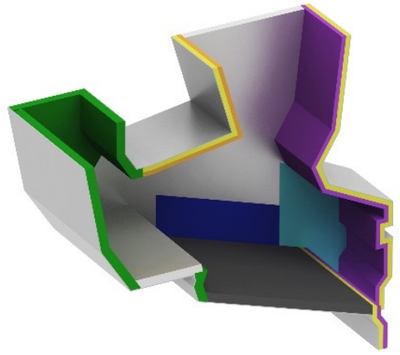
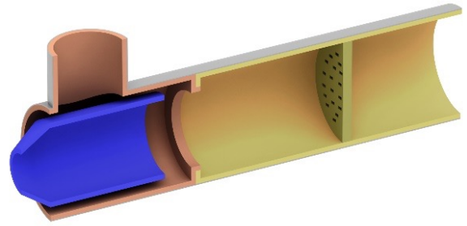


용융로 I MELTING FURNACE

다단식소각로 I MULTIPLE HEARTH INCINERATOR



스토커 소각로 I STOKER INCINERATOR



탈취로 I FUME INCINERATOR

Alumina - Chrome Castable

Division				Alumina - Chrome Castable				
				WSC-10CR	WSC-20CR	WSC-30CR	WSC-40CR	WSC-60CR
Physical Properties	Max service temperature		°C	2000	2000	2000	2100	2100
	Density	at 110°C 24Hr	kg/m³	3200	3290	3300	3450	3560
	CCS	at 110°C 24Hr	MPa	95.0	100.0	80.0	66.0	55.0
	MoR	at 110°C 24Hr	MPa	18.0	20.0	15.0	12.0	9.5
	PLC	at 110°C 24Hr	%	-0.04	-0.03	-0.06	-0.04	-0.05
Chemical Analysis	Al_2O_3		%	84.4	77.7	64.5	54.8	37.1
	SiO_2		%	1.0	0.8	2.1	0.4	1.9
	Fe_2O_3		%	0.5	0.5	0.4	0.4	0.4
	CaO		%	2.3	2.2	2.4	1.7	1.8
	Cr_2O_3		%	11.7	18.8	30.1	40.8	55.6
Water addition (by weight)			%	4~7	4~7	5~8	4~7	4~7
Installation				Vibrating				

Pure Alumina & Alumina - Chrome Brick

Division		Pure Alumina Brick		Alumina - Chrome Brick						
		WA-99	WT-99	PAB-90C	PAB-85C	PAB-80C	PAB-70C	PAB-60C	PAB-50C	PAB-40C
Physical Properties	SK	42	42	42	42	42	42	42	42	42
	Density	3250	3280	3270	3280	3380	3460	3560	3670	3780
	A.P(%)	17.0	18.0	16.0	17.0	15.0	14.0	15.0	15.0	15.0
	CCS(MPa)	100	95	100	100	100	110	115	120	120
	RUL(°C)	1750	1750	1750	1750	1750	1800	1850	1850	1850
	Thermal/E	0.78	0.78	0.79	0.80	0.80	0.80	0.80	0.80	0.80
Chemical Analysis	Al_2O_3	99.2	99.4	93.0	87.0	73.0	66.0	56.0	46.0	36.0
	Fe_2O_3	0.1	0.1	0.2	0.3	0.3	0.2	0.3	0.3	0.3
	Cr_2O_3	-	-	5.0	10.0	20.0	30.0	40.0	50.0	60.0
Location		High-Temp Furnace								

*The technical data represent the typicality of the current production.
*Please contact the head office for specifications on products that are not supplied.

Dense Castable

Division				General Castable					
				CT-130	CT-130S	CT-140	CT-140S	HACT-150	HACT-150H
Physical Properties	Max service temperature		°C	1300	1350	1400	1400	1500	1500
	Density	at 110°C 24Hr	kg/m³	1940	1980	2090	2080	2050	2130
	CCS	at 110°C 24Hr	MPa	24.0	32.0	36.2	38.5	22.4	45.0
	MoR	at 110°C 24Hr	MPa	5.8	6.3	6.8	8.1	5.1	8.5
	PLC	at 110°C 24Hr	%	-0.04	-0.04	-0.06	-0.05	-0.03	-0.04
Chemical Analysis	Al_2O_3		%	45.7	49.3	52.9	50.5	52.6	53.6
	SiO_2		%	44.3	39.3	34.4	35.5	33.2	30.4
	CaO		%	5.5	6.0	7.4	9.4	9.2	10.8
Water addition (by weight)			%	11~15	11~15	10~16	10~17	10~17	12~15
Installation				Pouring					

Division				Hi - Alumina Castable					
				HACT-160	HACT-160S	HACT-165	HACT-170	HACT-180	HACT-180S
Physical Properties	Max service temperature		°C	1600	1600	1650	1700	1800	1800
	Density	at 110°C 24Hr	kg/m³	2150	2150	2210	2450	2760	2770
	CCS	at 110°C 24Hr	MPa	34.1	35.3	30.0	36.2	38.0	44.0
	MoR	at 110°C 24Hr	MPa	7.1	7.6	6.0	5.3	7.3	8.2
	PLC	at 110°C 24Hr	%	-0.07	-0.07	-0.09	-0.06	-0.05	-0.06
Chemical Analysis	Al_2O_3		%	58.9	54.3	60.9	78.1	92.3	95.3
	SiO_2		%	28.7	31.1	28.7	8.9	1.0	0.1
	CaO		%	7.6	7.3	6.3	7.4	2.3	3.2
Water addition (by weight)			%	12~15	11~15	11~14	7~12	5~10	5~10
Installation				Pouring					

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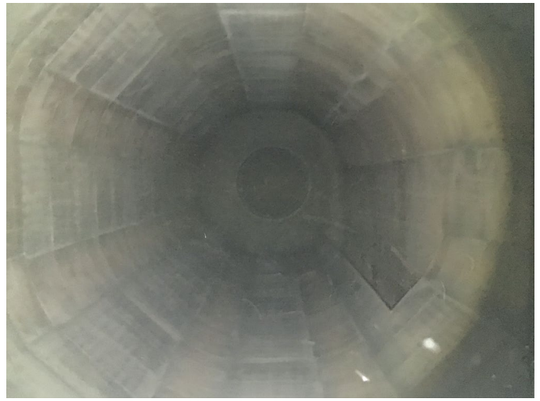
발전소

POWER PLANT

당사는 열 회수율을 높이기 위해 Silicon Carbide 함량이 높은 Castable,
공기 단축 및 시공 편의성을 위해 Gunning 시공을 추천합니다.

Wonjin recommends castables containing high silicon-carbide content to increase heat recovery efficiency and the gunning installation method for easier and faster installation.



Silicon Carbide Castable

Division				Silicon Carbide Castable				
				WSC-15SC	WSC-30SC	WSC-50SC	WSC-60SC	WSC-85SC
Physical Properties	Max service temperature		ºC	1700	1700	1700	1700	1700
	Density	at 110ºC 24Hr	kg/m³	2000	2700	2650	2700	2660
	CCS	at 110ºC 24Hr	MPa	11.0	70.0	41.0	90.1	105.0
	MoR	at 110ºC 24Hr	MPa	4.0	11.0	8.5	13.2	13.5
	PLC	at 110ºC 24Hr	%	-0.06	-0.06	-0.06	-0.05	-0.04
Chemical Analysis	Al_2O_3		%	45.5	55.8	40.6	28.4	7.2
	SiO_2		%	29.6	4.9	6.1	6.0	2.9
	Fe_2O_3		%	1.0	0.8	0.3	0.1	0.1
	CaO		%	4.8	2.4	1.5	1.5	1.9
	SiC		%	16.5	33.5	49.5	60.2	83.5
Water addition (by weight)			%	14~16	4~7	4~7	4~7	4~6
Installation				Vibrating				

Division				Silicon Carbide Castable				
				SFC-30SC	SFC-60SC	SFC-85SC	WSC-60SCG	WSC-85SCG
Physical Properties	Max service temperature		ºC	1700	1700	1700	1600	1600
	Density	at 110ºC 24Hr	kg/m³	2640	2500	2460	2260	2250
	CCS	at 110ºC 24Hr	MPa	60.0	43.0	42.0	28.0	35.0
	MoR	at 110ºC 24Hr	MPa	10.0	9.0	8.0	7.0	4.9
	PLC	at 110ºC 24Hr	%	-0.03	-0.05	-0.06	-0.06	-0.05
Chemical Analysis	Al_2O_3		%	54.2	28.3	8.7	20.6	9.1
	SiO_2		%	7.8	6.1	3.4	7.2	2.3
	Fe_2O_3		%	0.9	0.3	0.1	0.3	0.1
	CaO		%	2.5	2.2	2.1	7.5	2.3
	SiC		%	31.2	61.1	83.5	60.1	85.1
Water addition (by weight)			%	7~9	9~12	9~12	-	-
Installation				Slef Flowing			Gunning	

*The technical data represent the typicality of the current production.
*Please contact the head office for specifications on products that are not supplied.

Silicon Nitride & Silicon Carbide Brick

Division			Silicon Nitride Brick			Silicon Carbide Brick			
			SN-1	SN-2	SN-3	SC-1	SC-90	SC-85	SC-50
Physical Properties	Density		2650	2550	2700	2650	2650	2600	2600
	A.P(%)		15.0	17.0	17.0	13.5	13.5	14.0	15.0
	CCS(MPa)		165	100	200	110	160	120	65
	RUL(ºC)		1700	1700	1700	1750	1700	1700	1600
	Thermal/E		0.45	0.45	0.45	0.78	0.78	0.80	0.79
Chemical Analysis	Al_2O_3		75.4	91.0	74.0	90.0	90.0	85.0	50.0
	Si_3N_4		22.6	3.0	24.0	-	-	-	-
SiC			High-temp Furnace						

Dense Castable

Division				Hi-Alumina Castable					
				HACT-15SRG	HACT-16SRG	WSC-16G	WSC-16GS	WSC-17G	WSC-17GS
Physical Properties	Max service temperature		ºC	1550	1650	1600	1600	1700	1700
	Density	at 110ºC 24Hr	kg/m³	2050	2050	2320	2340	2350	2370
	CCS	at 110ºC 24Hr	MPa	23.4	25.0	80.0	70.0	67.0	65.0
	MoR	at 110ºC 24Hr	MPa	7.6	7.6	11.0	12.0	12.0	13.0
	PLC	at 110ºC 24Hr	%	-0.06	-0.06	-0.08	-0.05	-0.08	-0.06
Chemical Analysis	Al_2O_3		%	54.3	58.3	67.2	65.9	74.3	73.6
	SiO_2		%	32.7	27.6	21.9	18.9	14.8	11.7
	Fe_2O_3		%	1.1	1.1	0.9	1.3	0.87	1.06
	CaO		%	9.2	8.5	7.1	7.3	7.0	7.5
	SiC		%	-	-	-	4.2	-	3.8
Installation				Gunning					

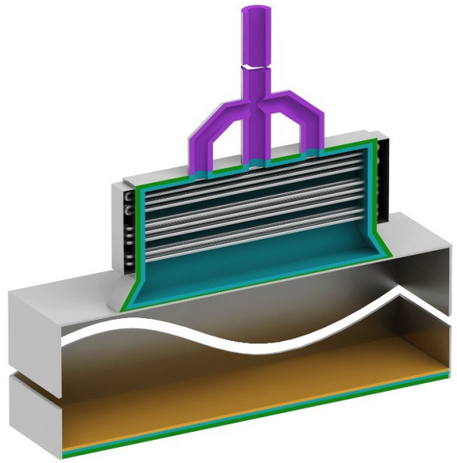
*The technical data represent the typicality of the current production.
*Please contact the head office for specifications on products that are not supplied.

석유화학

PETROCHEMICAL

석유화학 제조 설비의 각종 반응로, Stack, Convection 부위용으로 다양한 내화물이 사용되고 있습니다.
통상적으로 내산 및 점토질 연와 이외에도 다양한 부정형 내화물이 사용되고 있으며, 중요한 반응로에는 내마모성이 우수한 치밀질 Castable이 사용되고 있습니다.
User와의 지속적인 협업을 통하여 국산화 및 제품 개선·개발로 안정성을 인정받고 있으며, 오랜 기간 쌓인 Know-How를 바탕으로 최선의 제품을 공급하고 있습니다.

A variety of refractories are used for petrochemical facilities such as reactor, stack and convector. Alumina, clay bricks and various monolithics are commonly used.
For important reactors, dense castables are chosen for wear and corrosion. Our satisfied customers have chosen Wonjin as a long-term partner in Korea and we surely will continue to provide the best products and services for our customers in the future.



Insulating Castable

Division		Max. Service Temp(°C)	Bulk Density (Kg/m³)	Al_2O_3	SiO_2	Installation	REMARKS
1:4 MIX	PIC-1	1000	1380	47	39	Pouring	-
LHV=1:2:4	PIC-2SF	1100	850	28	44	Pouring	Heater Hot Face, Stack
LHV=1:2:4	PIC-2SF	1100	1060	28	44	Gunning	Heater Hot Face, Stack
LV=1:6	PIC-3S	1000	550	29	49	Pouring	Heater Clod Face
LV=1:6	PIC-3S	1000	720	29	49	Gunning	Heater Clod Face
LHV=1:2:3	INCT-110	1100	1090	38	43	Pouring	-
IN' CASTABLE	INCT-110S	1100	930	32	46	Pouring	-
IN' CASTABLE	INCT-110LF	1100	670	31	46	Pouring	NCC,Reformer
IN' CASTABLE	INCT-110RF	1100	1190	52	25	Pouring	NCC,Reformer
IN' CASTABLE	INCT-120	1200	1170	40	41	Pouring	ASTM Class P
IN' CASTABLE	INCT-120S	1200	940	32	44	Pouring	ASTM Class O
IN' CASTABLE	INCT-120LF	1210	1020	38	43	Pouring	NCC,Reformer
IN' CASTABLE	INCT-125S	1260	950	41	38	Pouring	-
IN' CASTABLE	INCT-130	1300	1230	41	43	Pouring	-
IN' CASTABLE	INCT-130SP	1300	940	41	39	Pouring	-
IN' CASTABLE	INCT-130LF	1300	1080	41	38	Pouring	NCC,Reformer
IN' CASTABLE	INCT-135LF	1355	1250	48	32	Pouring	NCC,Reformer
IN' CASTABLE	INCT-140	1400	1300	46	38	Pouring	ASTM Class Q
IN' CASTABLE	INCT-140S	1400	1060	42	39	Pouring	-
IN' CASTABLE	INCT-140LF	1400	1350	59	26	Pouring	NCC,Reformer
IN' CASTABLE	INCT-140RF	1400	1380	61	24	Pouring	NCC,Reformer
IN' CASTABLE	INCT-145LF	1450	1330	57	29	Pouring	NCC,Reformer
IN' CASTABLE	INCT-150LF	1500	1380	59	27	Pouring	NCC,Reformer
IN' CASTABLE	INCT-160	1650	1580	60	32	Pouring	-
IN' CASTABLE	INCT-170	1750	1730	94	0	Pouring	Carbon Black, Secondary Cell

*The technical data represent the typicality of the current production.
*Please contact the head office for specifications on products that are not supplied.

Fire Brick

Division		Refractoriness (SK)	Bulk Density (Kg/m³)	Al_2O_3	SiO_2	REMARKS
Super Duty Fire Brick	SK-33	33	2060	41	55	Radiant Floor
First Quality Fire Brick	SK-34	34	2170	44	51	Radiant Floor
High Alumina Brick	SA-36	36	2500	52	42	Incinerator
High Alumina Brick	SA-38	38	2650	73	22	Incinerator
High Alumina Brick	SA-40	40	2950	86	12	Incinerator
High Alumina Brick	SA-40R	40	2950	86	12	Incinerator
High Alumina Brick	SA-40S	40	3250	95	4.0	Incinerator
High Alumina Brick	SA-42	42	3.28	99	0.1	Incinerator

Special Insulating Fire Brick

Division		Max. Service Temp(°C)	Bulk Density (Kg/m³)	Al_2O_3	SiO_2	REMARKS
Insulating Fire Brick	SIB-125	1260	600	45	50.0	NCC
Insulating Fire Brick	SIB-125L	1260	510	43	50.0	Reformer
Insulating Fire Brick	SIB-140	1400	780	54	41.0	Secondary Cell
Insulating Fire Brick	SIB-145	1430	800	56	39.0	Reformer
Insulating Fire Brick	SIB-155	1550	880	65	32.0	NCC, Secondary Cell
Insulating Fire Brick	HIB-160	1650	1010	71	26.0	Ferrite Klin Car
Insulating Fire Brick	HIB-170	1700	1200	77	21.0	Carbon Black
Insulating Fire Brick	HIB-180	1800	1630	99	0.5	Secondary Cell
Insulating Fire Brick	FIB-99S	1800	1650	99.7	-	Secondary Cell

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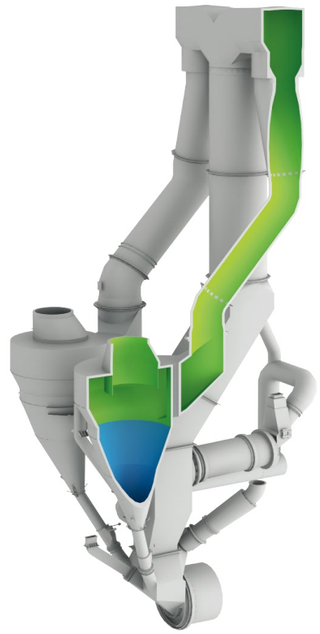
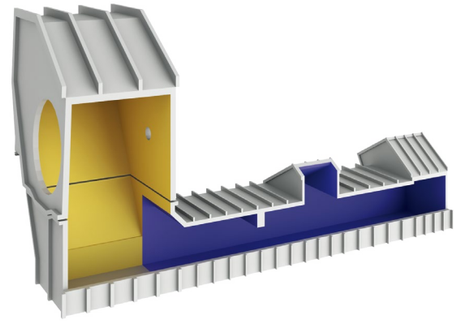
시멘트

CEMENT

Rotary Kiln에는 Silicon carbide -Alumina와 소성 Magnesia-spinel 내화물이 주로 사용되고 있으며,
소각량의 증가로 pyrorotor를 증설하여 치밀질 Alumina 내화물이 사용되고 있습니다.

Silicon carbide-alumina and fired magnesia-spinel refractories are mainly used for rotary kilns, and dense aluminum refractories are used by expanding the pyrorotor due to the increase in incineration amount.





Rotary Kiln / Suspension Preheater Brick

Division		Rotary Kiln / Suspension Preheater BRICK						
		WMS-15AS	WCB-1680	GMH-H2	WIB-70P	WIB-70PC	CH-1C	WCB-WIRE
Physical Properties	SK		38	38	38	38	34	34
	Density	2950	2680	2770	2650	2730	2320	3020
	A.P(%)	17	17	16	13	13	17	16.4
	CCS(MPa)	70	95	80	100	100	45	123
	RUL(°C)	1700	1500	1650	1650	1650	1350	-
	RUL(°C)	1.2	0.5	0.5	0.6	0.6	0.5	-
Chemical Analysis	Al_2O_3	13-15	62	62.4	74	74	55	68.8
	SiO_2	0.3	24.8	21.3	21	21	30	0.1
	Fe_2O_3	0.5	1.2	-	1	1	1.6	0.1
	SiC	(MgO) 80.0	9	7.7	(P_2O_5) 1.0	(P_2O_5) 1.0	-	(CaO) 10.7
Location		R.K Transition Zone	Transition Security Zone	Transition Security Zone	Suspension Preheater Wall			Impact Zone
Remark		Magnesia-Spinel Brick	Alumina-Silicon Carbide Brick		Alumina-Mullite Brick		Hi-AluminaBrick	Abrasion ResistanceCasting Block

*The technical data represent the typicality of the current production.
*Please contact the head office for specifications on products that are not supplied.

Rotary Kiln/ Suspension Preheater Castable

Division				Alumina – Silicon Carbide Castable					
				WSC-17C	WSC-19B	WSC-19BS	WSC-15SCG	WSC-30SC	WSC-30SCG
Physical Properties	Max service temperature		°C	1700	1900	1900	1700	1700	1700
	Density	at 110°C 24Hr	kg/m³	2520	2850	2890	2000	2300	1800
	CCS	at 110°C 24Hr	MPa	70.0	103.0	95.8	11.0	90.0	8.0
	MoR	at 110°C 24Hr	MPa	12.0	19.0	20.2	4.0	16.0	3.0
	PLC	at 110°C 24Hr	%	-0.03	-0.06	-0.01	-0.06	-0.06	-0.06
Chemical Analysis	Al_2O_3		%	72.1	83.6	77.3	45.5	49.9	43.6
	SiO_2		%	20.6	2.9	5.0	29.6	9.7	15.8
	Fe_2O_3		%	1.8	0.4	-	1.0	0.6	0.4
	CaO		%	2.4	2.1	(ZrO_2) 3.6	4.8	5.3	5.2
	SiC		%	2.6	11.0	9.5	16.5	32.1	33.3
Water addition (by weight)			%	5~8	4~7	4~6	14~16	4~7	16~19
Installation				Vibrating			Gunning	Vibrating	Gunning
Location				Preheater	Burner		Preheater, Cooler		

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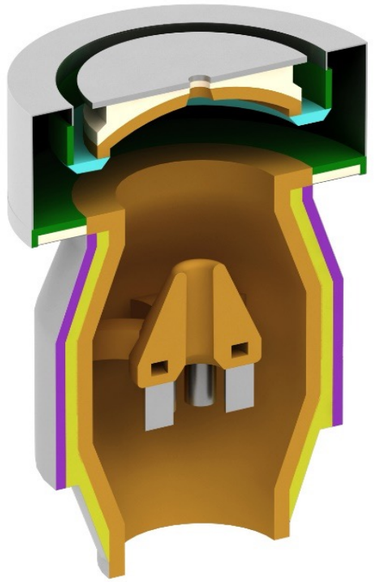
*Please contact the head office for specifications on products that are not supplied.

석회소성로

LIME

석회소성로는 현재 단순한 구조인 자립로부터 로터리 킬른, 유동식, 로체회전식, 경사형 종형로 등 다양한 개량이 더해져서 복잡화되었습니다. 다양한 용도의 석회석에 따라 석회의 품질도 변화하고 각각의 특징적인 소성법이 출현하여 현재에 이르고 있습니다. 원진은 각종 석회소성로의 형태와 조업에 적합한 재질의 내화물을 공급하고 있습니다.

There are various types of kiln for lime production and these kilns have evolved in order to improve productivity and fuel cost saving. Users of lime kilns also vary according to the end product they produce, such as iron-making, chemical and paper(pulp). Wonjin is continuously working towards developing the best quality for our customers, whether they have Maerz, Cimprogetti, Koma of any other type of kiln.



Magnesia Brick

Division		Magnesia Brick					
		WMG-95A	WMG-95B	WMG-96A	WMG-96B	WMG-97A	WMG-97B
Physical Properties	Density	2980	2950	2930	2900	3020	3000
	A.P(%)	17.0	18.0	17.0	18.0	16.0	17.0
	CCS(MPa)	60	55	60	55	65	60
	RUL(°C)	1650	1620	1660	1650	1700	1680
Chemical Analysis	MgO	95.0	94.5	96.0	95.5	97.0	96.5
	SiO_2	2.0	2.0	1.0	1.2	0.8	1.0
	CaO	2.0	2.0	1.5	1.5	1.2	1.5
Location		Koma, Maerz, Cimprogetti, ETC					

Magnesia-Spinel Brick

Division		Magnesia-Spinel Brick					
		WMS-5A	WMS-5B	WMS-10A	WMS-10B	WMS-15A	WMS-15B
Physical Properties	Density	2950	2920	2930	2920	2900	2900
	A.P(%)	18.0	19.0	18.0	19.0	18.0	20.0
	CCS(MPa)	65	60	65	60	65	60
	RUL(°C)	1680	1650	1680	1650	1680	1650
Chemical Analysis	MgO	88.0	87.0	84.0	82.0	80.0	78.0
	Al_2O_3	5-7	5-7	9-11	9-11	13-15	13-15
Location		Koma, Maerz, Cimprogetti, ETC					

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*Please contact the head office for specifications on products that are not supplied.

Magnesia-Chrome Brick

Brick Division		Magnesia-Chrome Brick			
		SDB-70	SDB-80	HDB-75	HDB-80
Physical Properties	Density	3200	3150	3100	3100
	A.P(%)	16.0	17.0	18.0	17.0
	CCS(MPa)	55	50	50	50
	RUL(°C)	1700	1700	1700	1700
Chemical Analysis	MgO	65.0	63.0	72.0	78.0
	SiO_2	1.2	1.5	1.5	1.5
	Cr_2O_3	16-19	16-19	12-15	8-11
Location		Koma, Maerz, Cimprogetti, ETC			

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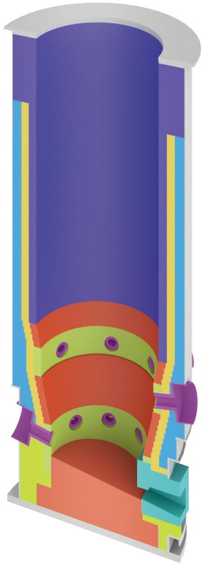
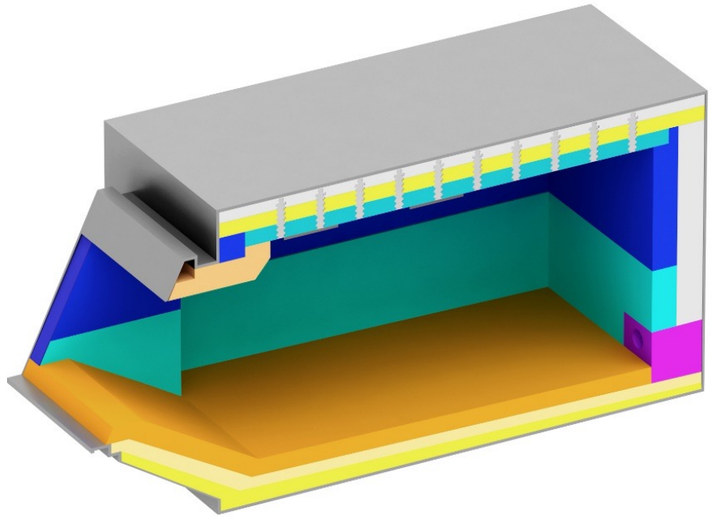
비철금속

NON-FERROUS METALS

비철금속은 일반적으로 Molten Steel에 비해 내화물 조직으로 침투되는 특성이 높기 때문에 비교적 기공경이 작고 치밀한 내화물의 선택이 요구됩니다. Aluminum 용해로는 치밀질의 부정형 내화물이 사용되고 Cu, Zn, Pb 등을 취급하는 용해로는 Alumina-Silicon Carbide질, Magnesia-chrome질 내화물이 주로 사용됩니다. 당사는 비철금속 업체의 조업조건에 맞추기 위하여 제품을 선정, Test 및 개발을 진행해왔으며, 다양한 업종별 업체의 요구에 맞추어 제품군을 전문화하고 있습니다.

Penetration is a more significant issue for non-ferrous metal producers than steel producers and, therefore, refractories with smaller pore size are required. Aluminum smelters commonly use denser refractories, while copper, zinc and lead producers choose alumina-silicon carbide of magnesia-chrome qualities. Wonjin is constantly developing new qualities to suit different metal producing customers' needs.





Low Cement Castable (High-strength)

Division				Plastic Refractories						
				WSC-16AL	WSC-17AL	WSC-17ALF	WSC-17ALR	WSC-17ALS	WSC-17ALZ	WSC-18AL
Physical Properties	Density	at 110°C 24Hr	kg/m³	2290	2590	2580	2450	2610	2610	2970
	CCS	at 110°C 24Hr	MPa	40.0	60.0	80.0	80.0	75.0	100.0	40.0
	MoR	at 110°C 24Hr	MPa	8.0	10.0	15.0	15.0	14.8	15.0	8.0
	PLC	at 110°C 24Hr	%	-0.03	-0.04	-0.06	-0.06	-0.03	-0.03	-0.03
Chemical Analysis	Al_2O_3		%	55.1	70.3	73.5	68.6	75.1	67.0	84.2
	SiO_2		%	37.4	17.5	16.9	21.2	13.8	18.0	4.2
	Fe_2O_3		%	2.2	1.3	1.3	1.3	1.2	1.0	1.1
	CaO		%	3.0	2.2	4.2	4.2	2.9	2.6	1.8
Water addition (by weight)			%	5.6	4.9	6.5	7~8	5~7	5.9	4.8
Installation				Vibrating						
Remark				Aluminum Melting Furnace						

*The technical data represent the typicality of the current production.
*Please contact the head office for specifications on products that are not supplied.

Magnesia-Chrome Brick

Brick Division		Magnesia-Chrome Brick			
		SDB-70	SDB-80	HDB-75	HDB-80
Physical Properties	Density	3200	3150	3100	3100
	A.P(%)	16.0	17.0	18.0	17.0
	CCS(MPa)	55	50	50	50
	RUL(°C)	1700	1700	1700	1700
Chemical Analysis	MgO	65.0	63.0	72.0	78.0
	SiO_2	1.2	1.5	1.5	1.5
	Cr_2O_3	16-19	16-19	12-15	8-11
Remark		Copper & Lead Melting Furnace			

Silicon Carbide & Silicon Nitride Brick

Division		Silicon Carbide Brick		Silicon Nitride Brick		
		SC-90	SC-85	SN-1	SN-2	SN-3
Physical Properties	Density	2650	2600	2650	2550	2700
	A.P(%)	13.5	14.0	15.0	17.0	17.0
	CCS(MPa)	160	120	165	100	200
	RUL(°C)	1700	1700	1700	1700	1700
	Thermal/E	0.78	0.80	0.45	0.45	0.45
Chemical Analysis	SiC	90.0	85.0	75.4	91.0	74.0
	Si_3N_4	-	-	22.6	3.0	24.0

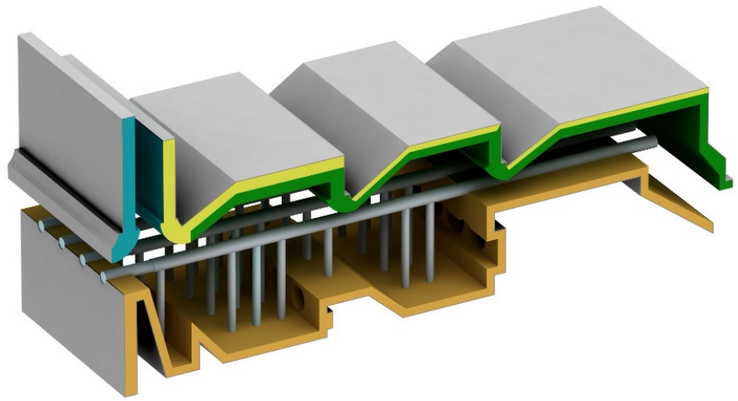
*The technical data represent the typicality of the current production.
*Please contact the head office for specifications on products that are not supplied.

제강가열로

REHEATING FURNACE

제철, 제강 및 각종 열처리 업체에서 사용 중인 가열로는 크게 연속식, Batch식으로 구분되며 이송하는 방법에 따라 Pusher Type과 Working Beam Type으로 구분됩니다. 사용되는 내화물로는 종래의 연와 구조에서 최근에는 부정형 구조로 대체되었습니다. 당사는 Plastic 내화물이나 Castable을 추천하고 있으며, 최근에는 Ceramic Fiber로 대체되는 추세입니다.

There are two types of reheating furnace for the steel industry : continuous and batch. According to the transferring method, reheating furnace can be defined as the pusher type or the working beam type. Monolithics have become a more popular choice over bricks. Wonjin recommends castables or plastic refractories for reheating furnaces. Recently, Ceramic fiber is also gaining popularity in the industry.



Plastic Refractories

Division				Plastic Refractories					
				PT-160	PT-165	PT-170	PT-175	PT-180	PT-180S
Physical Properties	Max service temperature		ºC	1600	1650	1700	1750	1800	1800
	Density	at 110ºC 24Hr	kg/m³	2150	2150	2400	2500	2700	2800
	CCS	at 110ºC 24Hr	MPa	10.0	10.0	10.0	12.0	12.0	15.0
	MoR	at 110ºC 24Hr	MPa	3.0	3.0	3.0	4.0	4.0	5.0
	PLC	at 110ºC 24Hr	%	-0.09	-0.09	-0.06	-0.05	-0.03	-0.07
Chemical Analysis	Al_2O_3		%	41.9	42.8	59.8	75.1	78.2	86.2
	SiO_2		%	51.8	50.4	34.4	19.0	18.0	10.2
	Fe_2O_3		%	2.7	2.2	1.9	1.9	1.1	1.0
	CaO		%	1.8	1.7	0.8	0.5	0.4	0.3

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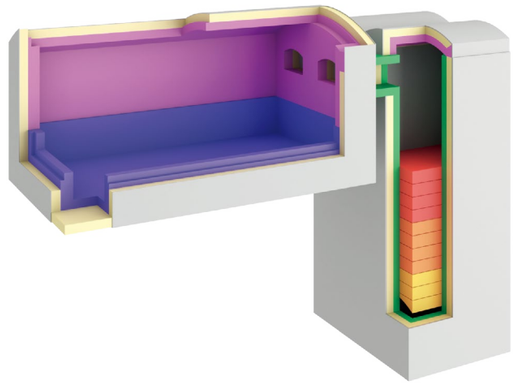
유리용해로

GLASS

유리는 원료의 가열, 용융, 청정, 소지 온도 조정, 성형의 공정을 거쳐 제작되며, 대부분의 유리 용해로는 이러한 공정이 연속적으로 수행되도록 설계되어 있습니다. 다양한 형식으로 용도와 특성에 맞도록 운영되고 있으며 당사는 용해로 유리접촉부에 Alumina-Zirconia-Silica계 전주 내화물, crown 부위는 High-Silica질 내화물, 그리고 축열실은 부위에 따라 점토질, Magnesia-Chrome질, Magnesia-Spinel질 등의 내화물을 각각 추천하고 있습니다.

Glass is made through processes of heating, melting, refining, tempering and forming. Most of glass melting furnaces are designed for continuous production and operated differently for specified purposes. Wonjin proposes Alumina-Zirconia-Silica-based refractories for the melting pool, high-silica refractories for the crown, and Magnesia-Chrome, Magnesia-Spinel or clay refractories for the regenerator.



Alumina-Mullite& Magnesia Brick

Division		Alumina-Mullite Brick			
		GRB-38	GRB-37	GRB-35	GRB-34
Physical Properties	SK	38	37	35	34
	Density	2550	2350	2300	2200
	A.P(%)	17.0	19.0	17.0	18.0
	CCS(MPa)	90	60	60	50
	RUL(ºC)	1650	1600	1500	1450
	Thermal/E	0.35	0.60	0.60	0.60
Chemical Analysis	Al_2O_3	74.0	64.0	48.0	43.0
	Fe_2O_3	0.2	1.0	1.5	1.5
Remark		Regenerator of Glass Melting Tank			

Division		Magnesia Brick					
		HUB-98G	HDB-93G	HDB-78G	HDB-70G	SPL-1	SPL-2
Physical Properties	SK	40	40	40	40	40	40
	Density	2900	2850	3000	3000	2950	2900
	A.P(%)	16.0	16.0	16.0	18.0	16.0	17.0
	CCS(MPa)	70	65	50	40	45	45
	RUL(ºC)	1700	1650	1700	1650	1750	1750
	Thermal/E	1.30	1.30	1.25	1.10	1.00	1.10
Chemical Analysis	Al_2O_3	-	-	-	-	20.0	14.0
	MgO	98.0	93.0	78.0	70.0	79.0	85.0
	Cr_2O_3	-	-	9.0	12.0	-	-
Remark		Regenerator of Glass Melting Tank					

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내화연와

REFRACTORY BRICKS

Fire-clay & Hi-Alumina Brick

Division		Fire-Clay Brick			Hi-Alumina Brick				
		SK-34	SB-34	SB-35	SK-36	SA-36	SK-37	SK-38	H-1
Physical Properties	SK	34	34	35	36	36	37	38	38
	Density	2170	2250	2280	2300	2320	2500	2390	2610
	A.P(%)	21.3	18.0	18.0	23.5	17.0	23.0	21.1	20.5
	CCS(MPa)	40.0	43.0	44.0	37.5	60.0	60.0	45.2	65.0
	RUL(°C)	1350	1350	1500	1450	1500	1480	1520	1580
	Thermal/E	0.50	0.55	0.60	0.53	0.55	0.60	0.75	0.65
Chemical Analysis	Al_2O_3	44.0	44.0	46.0	59.5	54.0	67.0	72.3	76.7
	Fe_2O_3	2.3	2.2	2.1	2.2	1.7	1.2	1.9	1.1

Silica Brick

Division		Acid Proof Brick				Hi-Silica Brick	
		AP-1	AP-2	AP-10	AP-11	WJHS-80	WJHS-83
Physical Properties	Water Absorption(%)	0.5	1.5	3.0	5.0	-	-
	A.P(%)	-	-	-	-	14.5	14.5
	Density	2000	2000	2100	2100	2220	2250
	CCS(MPa)	70	70	60	50	35	33
Chemical Analysis	Al_2O_3	25.0≥	25.0≥	25.0≥	25.0≥	15.8	14.3
	SiO_2	65.0≤	65.0≤	65.0≤	60.0≤	82.4	84.1
	Fe_2O_3	2.0	2.0	2.0	2.0	0.4	0.2
Acid-Proof Resistance(%)		0.3	0.5	0.7	1.0	-	-

Zircon Brick

Division		Zirconia Bricks(ZrO_2)				
		ZRG-1	ZRG-2	AZ-1	AZ-2	AZ-3
Physical Properties	SK	36	36	-	-	-
	Density	3750	3650	3200	3150	3500
	A.P(%)	18.0	19.0	19.0	20.0	11.0
	CCS(MPa)	100	85	90	80	150
	RUL(°C)	1700	1700	1690	1680	1690
	Thermal/E	0.45	0.45	0.55	0.55	0.60
Chemical Analysis	Al_2O_3	-	0.5	70.0	69.0	69.0
	SiO_2	32	33.0	9.5	10.0	10.0
	Fe_2O_3	0.2	0.2	0.5	0.5	0.5
	ZrO_2	66	64.0	19.5	19.5	19.5

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Insulating Fire Brick

Division		A Type						
		A-1	A-2	A-3	A-4	A-5	A-6	A-7
Physical Properties	Temp (°C) Reheating Shrinkage less than 2.0%	900	1000	1100	1200	1300	1400	1500
	Bulk Density (Kg/m³)	500	500	500	550	600	700	750
	CCS (MPa)	0.5	0.5	0.5	0.8	0.8	1.0	1.0
	Thermal Conductivity at 350°C (W/Mk)	0.13	0.14	0.15	0.16	0.17	0.2	0.22

Division		B Type						
		B-1	B-2	B-3	B-4	B-5	B-6	B-7
Physical Properties	Temp (°C) Reheating Shrinkage less than 2.0%	900	1000	1100	1200	1300	1400	1500
	Bulk Density (Kg/m³)	700	700	750	800	800	900	1000
	CCS (MPa)	2.5	2.5	2.5	2.5	2.5	3.0	3.0
	Thermal Conductivity at 350°C (W/Mk)	0.17	0.18	2.00	0.23	0.23	0.27	0.31

Division		C Type		
		C-1	C-2	C-3
Physical Properties	Temp (°C) Reheating Shrinkage less than 2.0%	1300	1400	1500
	Bulk Density (Kg/m³)	1100	1200	1250
	CCS (MPa)	5.0	7.0	10.0
	Thermal Conductivity at 350°C (W/Mk)	0.30	0.38	0.45

Magnesia & Magnesia-Chrome Brick

Division		Magnesia Brick		Magnesia – Chrome Brick			
		NMB-94	NMB-90	NMB-75	NMB-70	NMB-60	NMB-50
Physical Properties	Density	2900	2850	2900	2900	2950	3000
	A.P(%)	16.0	16.0	19.0	19.0	19.0	20.0
	CCS(MPa)	80	75	40	40	40	40
	RUL(°C)	1600≤	1450≤	1550≤	1550≤	1550≤	1550≤
Chemical Analysis	MgO	94.2	90.5	75.0	70.5	62.2	50.0
	SiO_2	1.2	1.5	1.2	1.5	1.5	1.5
	Cr_2O_3	-	-	8.5	10.5	12.4	19.9

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모르타르

MORTAR

Air Setting Mortar

Division				Air Setting Mortar				
				AM-34	AM-36	AM-38	AM-40	AM-42
Physical Properties	Refractories(SK)		SK	34	36	38	40	42
	Density	at 110°C 24Hr	kg/m³	1600	1700	1800	2000	2100
Chemical Analysis	Al_2O_3		%	41.0	54.0	73.0	59.0	94.0
	SiO_2		%	54.0	39.0	21.0	8.0	4.0

Division				Air Insulating Mortar		
				AIM-130	AIM-160	AIM-180
Physical Properties	Max. Service Temp(°C)			1300	1600	1800
	Density	at 110°C 24Hr	kg/m³	1500	1950	2000
Chemical Analysis	Al_2O_3		%	24.0	80.0	92.0
	SiO_2		%	71.0	13.0	7.0

Division				Wet Type Air Setting Mortar		
				AMS-38	AMS-38CR	AMS-40
Physical Properties	Refractories(SK)		SK	38	38	40
	Density	at 110°C 24Hr	kg/m³	1800	1800	2000
Chemical Analysis	Al_2O_3		%	80.0	75.0	92.0
	SiO_2		%	23.0	(Cr_2O_3) 7.8	1.2

Heat Setting Mortar

Division				Heat Setting Mortar		
				HM-34	HM-36	HM-38
Physical Properties	Refractories(SK)		SK	34	36	38
	Density	at 110°C 24Hr	kg/m³	1600	1700	1800
Chemical Analysis	Al_2O_3		%	43.0	55.0	77.0
	SiO_2		%	53.0	40.0	15.0

Special Air Setting Mortar

Division			Special Air Setting Mortar			
			MMT-98	AP-MT	AM-HS	M-AX
Chemical Analysis	Al_2O_3	%	(MgO)97	-	7.0	73.0
	SiO_2	%	-	87.0	89.0	21.0
Remarks			Magnesia Brick	Acid-Proof Brick	Hi-Sillica Brick	Hi-Alumina Brick

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특수 내화물

SPECIAL REFRACTORY

Special Castable

Division				Special Castable					
				ALPHA	ALPHA-V1	ALPHA-V2	CC-1	SIPAT-90	APCT-120
Physical Properties	Density	at 110°C 24Hr	kg/m³	2850	2680	2630	2640	2440	1850
	CCS	at 110°C 24Hr	MPa	(1500°C)5	(1500°C)45	(1500°C)35	40.0	38.0	21.2
	MoR	at 110°C 24Hr	MPa	(1500°C)2	-	-	8.0	8.0	6.5
	PLC	at 110°C 24Hr	%	(1500°C)1.99	-	-	-0.05	-0.12	-0.07
Chemical Analysis	Al_2O_3		%	87.0	86.6	86.6	94.3	4.0	16.8
	SiO_2		%	0.3	0.3	0.3	0.0	7.4	75.0
	Fe_2O_3		%	0.08	0.04	0.04	-	0.1	1.1
	CaO		%	0.2	(MgO)12.4	(MgO)12.4	5.1	(SiC)90.0	1.3
Installation				Ramming			Troweling		Pouring
Remark				Induction Furnace				Patching	Acid-Proof

Division				Special Castable				
				GR-95W	GR-95WS	GR-95WH	GR-95CR	RM-180
Physical Properties	Density	at 110°C 24Hr	kg/m³	2350	2600	2740	2540	2890
	CCS	at 110°C 24Hr	MPa	7.0	-	14.0	20.0	43.0
	MoR	at 110°C 24Hr	MPa	-	-	-	4.0	6.7
	PLC	at 110°C 24Hr	%	-0.06	-	(1450°C)0.75	-0.06	-0.09
Chemical Analysis	MgO		%	96.5	94.6	81.2	95.4	2.0
	SiO_2		%	1.0	1.8	(Carbon)3.5	1.0	0.5
	Fe_2O_3		%	0.8	0.3	-	0.5	0.2
	CaO		%	1.5	(P_2O_5)1.0	-	1.6	(Al_2O_3)94.7
Remark				Dry		Wet	Dry	Dry
Location				Vessel Furnace			E.A.F, Ladle	
Installation				Ramming				

Mastic Coating

Division		Flash Point	Bulk Density	Asphalt	Fiber & Filler	REMARKS
		°C	kg/m³			
MASTIC COATING	PASTE-92S	35	1280	27	48	20Kg/CAN, 200Kg/DRUM

Properties	Spray Type	Remark	Properties	Spray Type
Color	Black	-	Suggested Coating Thickness	Wet surface : 500μm Dry surface : 300μm
Bulk density	1.28	Kg/L		
SVR(Solid volume ration)	60%	-	Recoating Interval (At 20°C)	Minimum : Until dry Maximum : No limit
Theoretical spreading rate	2 ($2m^2$/L/300μm/one time)	-		
Flash point	>35°C	-	Coating Method	Airless spray or brush
Set dry time	10 hours	At 20°C	Make diameter/Spray pressure	231" - 235"/200atm
Shelf life time	1 year	At 20°C	Diluents	Xylene (CAS NO 1330-02-7)
Dry contraction rate	40%	-	Cleansing the used instruments	Oil type cleansing

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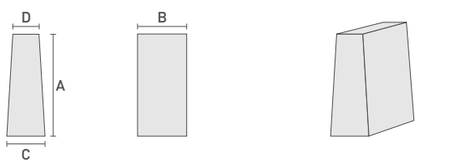
내화연와의 형상 및 치수

SHAPES & SIZE

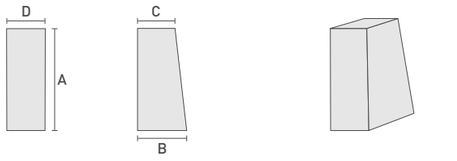
*상기 제품 규격은 당사의 대표적 양산품에 대한 것이며, 이외로 다양한 제품들이 있고, 고객의 요구 조건에 적합한 재질 및 design에 응할 수 있는 준비가 되어 있습니다.
Above Products are our typical shapes only. Other shapes and customized designs are also available upon request.

규격(Shape)	Division	A	B	C
보통형 STRAIGHT	KS형	230	114	65
	작은형	215	105	65
	동경형	228	110	60
	독일형	250	123	65
SPLIT SOAP	1/2형	230	114	32
	1/2형	230	57	65

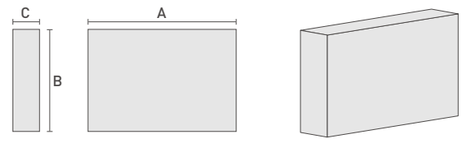
규격(Shape)	Division	A	B	C	D	대응JIS
가로형 ARCH	K1	230	114	65	59	Y1
	K2	230	114	65	50	Y2
	K3	230	114	65	32	Y3



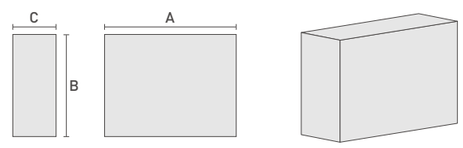
규격(Shape)	Division	A	B	C	D	대응JIS
세로형 WEDGE	J1	230	114	65	55	T1
	J2	230	114	65	45	T2
	J3	230	114	65	35	T3



규격(Shape)	Division	A	B	C	D	대응JIS
쐐기형 KEY	S1	230	114	105	65	B1
	S2	230	114	85	65	B2
	S3	230	114	65	65	B3

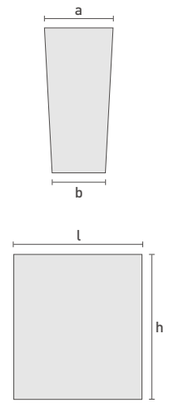


규격(Shape)	Division	A	B	C
평4정		456	230	65
평5정		570	230	65
평6정		684	230	65



규격(Shape)	Division	A	B	C
입6정		390	230	114
입8정		520	230	114
입10정		650	230	114

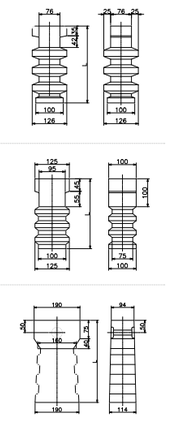
Standard Rotary Kiln Brick Shapes (selection)



적용	DIMENSIONS (mm)				VOLUME	MARKING (Basic Bricks)
VDZ-Shapes	a	b	h	l	dm³	COLOR
B322	78	66.5	220	198	3.115	Violet
B422	76.5	68	220	198		Yellow
B622	75	69	220	198		Red
B822	74	69.5	220	198		Blue
B425	76.5	66.5	250	198	3.539	Yellow
B625	74.5	68.5	250	198		Red
B825	73.5	69.5	250	198		Blue
ISO-Shapes						
K-322	103	88	220	198	4.160	Violet
K-422	103	91.5	220	198	4.236	Yellow
K-622	103	95.5	220	198	4.323	Red
K-822	103	97.3	220	198	4.363	Blue
K-425	103	90	250	198	4.777	Yellow
K-625	103	94.5	250	198	4.888	Red
K-825	103	96.5	250	198	4.938	Blue

Standard Anchor Brick

표준 앵커 연와



적용	규격 Shape	길이 L (mm)	체적 V (cc)	단중 Unit Wt. (kg)
천정용 Roof	RHB-250	230	2,168	4.8
	RHB-280	280	2,805	6.2
	RHB-350	350	3,433	7.6
	RHB-400	400	3,897	8.6
	RHB-450	450	4,465	9.8
	RHB-500	500	5,072	11.2
특수용 Other	SAB-250	250	2,616	5.8
	SAB-300	300	3,104	6.8
	SAB-350	350	3,591	7.9
	SAB-400	400	4,078	9.0
	SAB-450	450	4,566	10.0
	SAB-500	500	5,054	11.1
벽체용B Sidewall B	WAB-22B	220	3,834	8.5
	WAB-29B	290	5,009	11.3
	WAB-34B	340	5,942	13.4
	WAB-42B	420	7,310	16.4
	WAB-45B	450	7,941	17.9
	WAB-55B	550	9,671	21.8

Setting Method for Roof anger Brick

천정용 행거 연와 설치 방법