

# COSMO KRAFT

REFRACTORY INDIA PRIVATE LIMITED



**KOSMOKRAFT REFRACTORY  
INDIA PRIVATE LIMITED**

[WWW.KOSMOKRAFT.IN](http://WWW.KOSMOKRAFT.IN)

*COSMOS POWER  
IN REFRACTORIES*

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# PROFILE

KOSMOKRAFT Refractory India Private Limited, with combination of global expertise and local knowledge, aim to flourish as a cosmos power in supplying range of refractory products, services and solutions to the global Iron, Steel, Non-Ferrous, Cement, Glass, Incinerator, Energy, Petrochemical and other Chemical Industries.

KOSMOKRAFT utilize the availability of rich & high pure natural mineral resources of India and understands the exact intelligence of the customers world wide to design, offer, manufacture and market high quality & performance oriented refractory products with a team of Techno Creative Commercial Engineers.

As an integral part of our system, we anticipate customer's timely requirements and personalize our service so that each of our customers are rest assured with the fact that all products are tested at each of our production and development stages handled by capable and committed technicians working round the clock with a range of production capacity up to 40,000 Mt / Year, well equipped with all sophisticated & essential production, infrastructure and in house research and development facilities. Our product range includes Magnesita Carbon Bricks, Alumina Magnesita Carbon Bricks, Magnesita Chrome Bricks, Magnesite Bricks, Alumina Bricks, Silica Bricks, Silicon Carbide Bricks, Alumina Silicon Carbide Carbon Bricks, Clay Bricks, Special Products like Slide Plates, Nozzles, Well Blocks, Seating Blocks, Porous Plugs, Tap Hole Sleeves, Monolithics and Castables in the application zones of Blast Furnace, Torpedo Ladle, Charging Ladle, Basic Oxygen Furnace, Electric Arc Furnace, Ladle Furnace, Tundish, Cement Rotary Kilns, Glass Furnaces, Lead Rotary Kilns, Copper Converters and so on.

We take pride to be unique in our supplies and to be a cosmos power conquering the frequent global challenges by developing skillful and tailor-made refractory products with hand on experiences suiting the exact requirement and operational conditions of various metallurgical furnaces.

We vow for a long lasting mutually benefitted cooperation with all our industrial customers in facilitating their production in order to offer a most cost effective & quality products to the wonderful global society.

## VISION MISSION POLICY

### Vision

Endeavor to be a cosmos power with creativity, innovation and originality in selected business fields.

### Mission

Continues efforts in providing real value & impression to the customers and contributing ourselves to the development of global society.

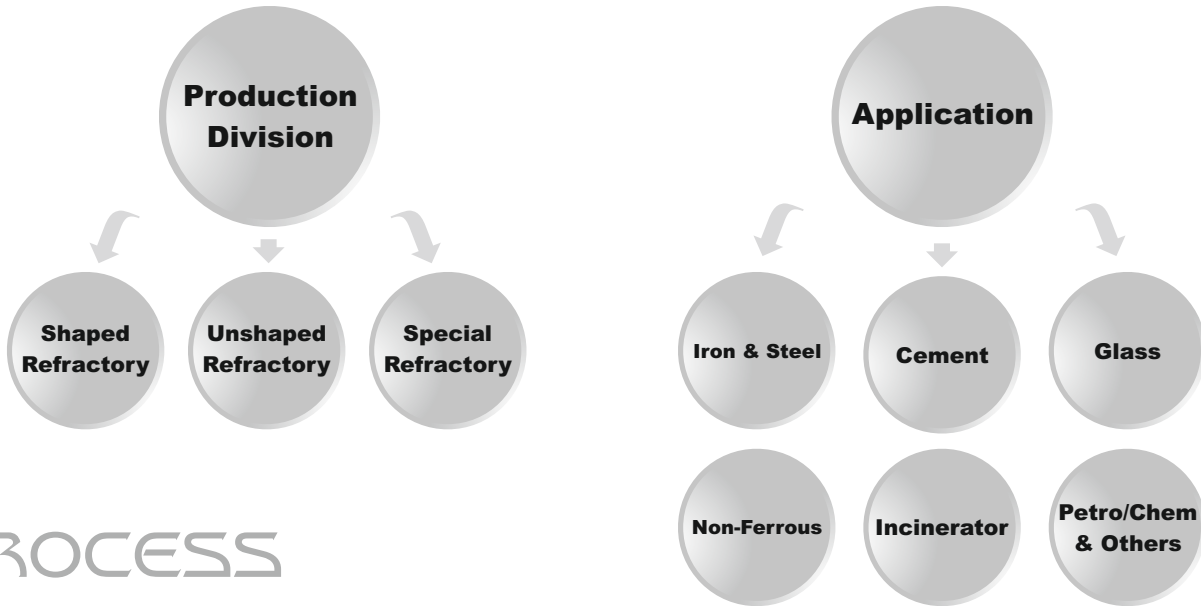
### Policy

Entertain diversification, rationalize investment, practice direct trade and adopt recycling technology for cost effective production.

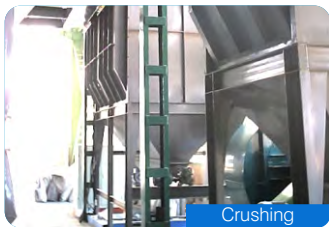
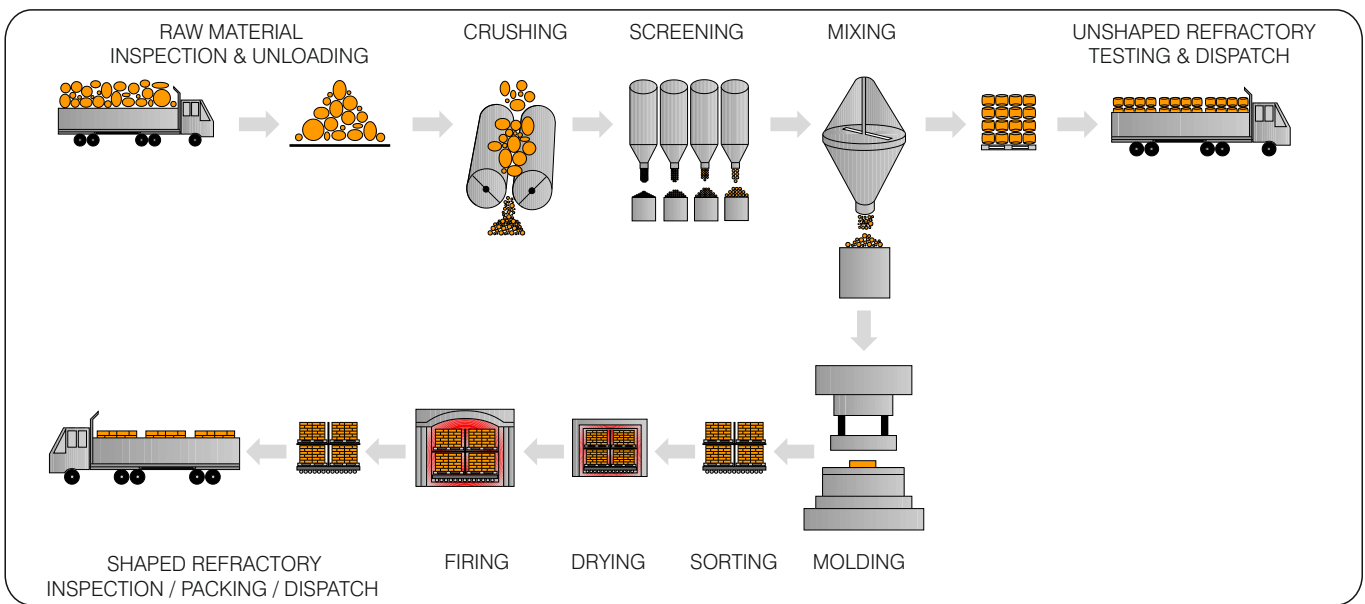




# PRODUCTION



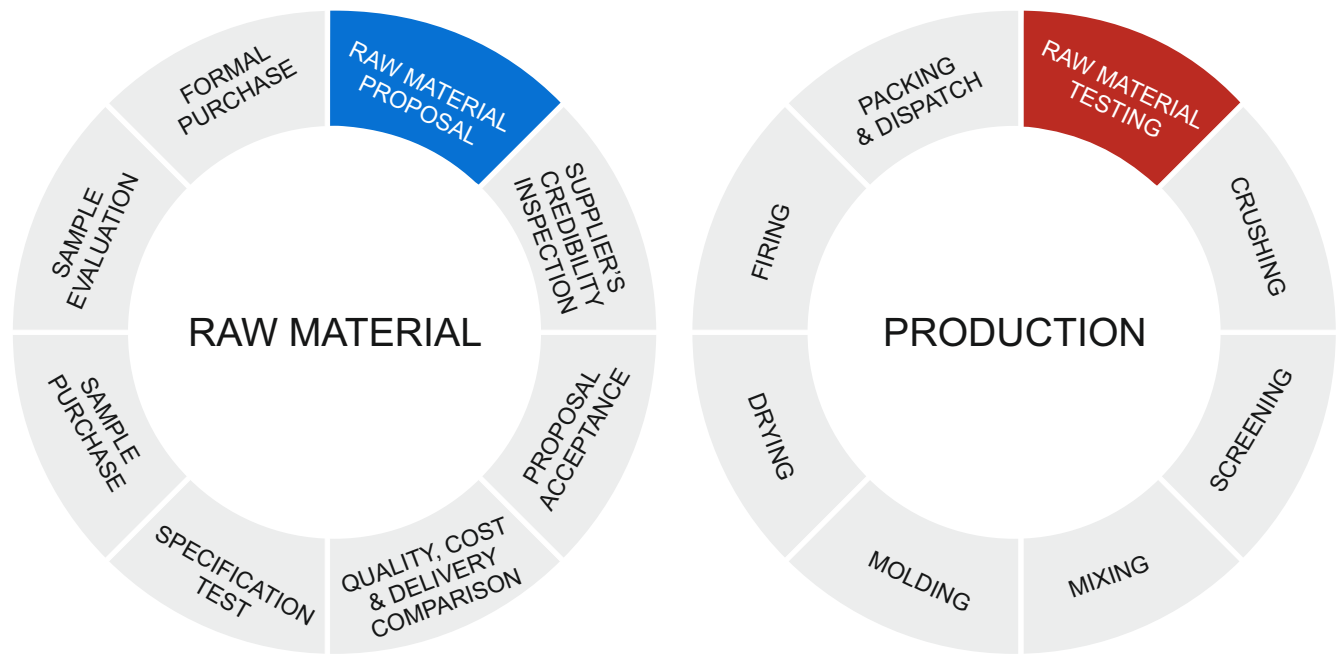
# PROCESS





# QSE SYSTEM

Our integrated management system covers the areas of Q (Quality), S (Safety) & E (Environment). The basic effectiveness of our QSE System is to regularly monitor, discuss and evaluate the key performance indicators. Our co-equal aim of optimization of quality, safety and environment open up the potential for process optimization and cost reduction.



## R & D

Our well equipped R&D center, leading in the field of High Temperature Refractories designates ourselves to be an innovated driven company, investing in long-term business relationship with the customers and to ensure they get all the supports they in designing new products & applications.

## Key Factors Includes:

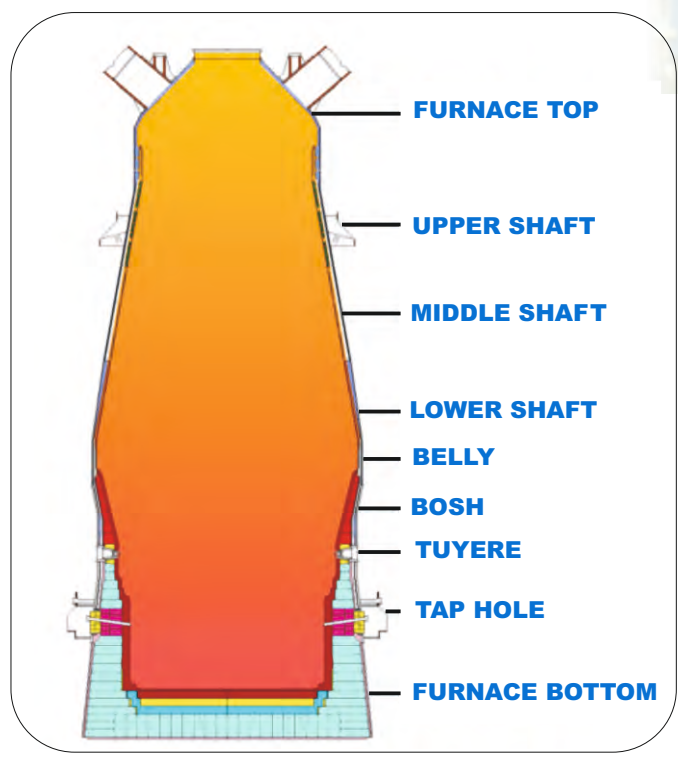
- Developing materials for new products
- Researching new manufacturing processes and for integrated facilities
- Gathering information & Data processing for technical know-how
- Research of updated technical information at worldwide level





# IRON INDUSTRY

## REFRACTORIES FOR BLAST FURNACE



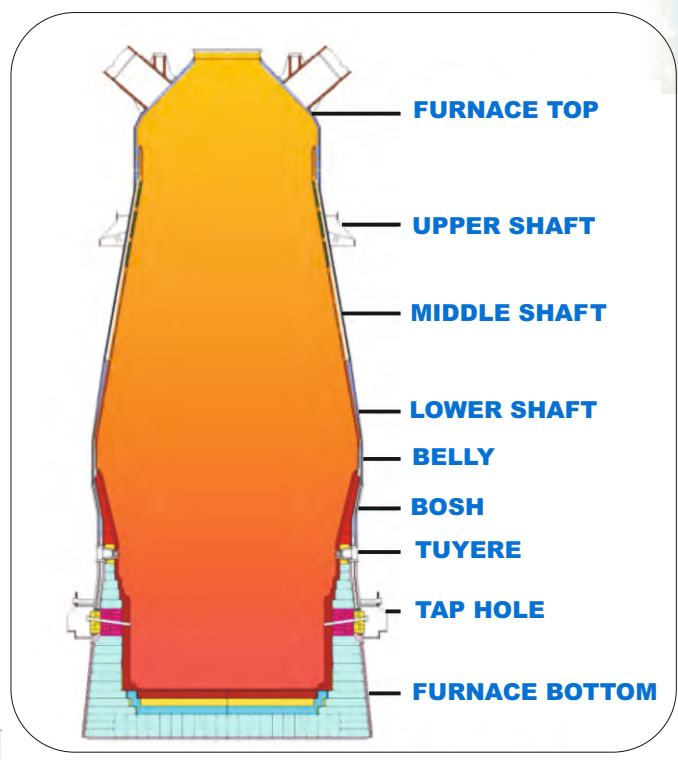
### SPECIFICATION

Quality		KA BF 95 AL	KA BF 90 AL	KA BF 90 ACR	KA BF 90 SIC	KA BF 75 SIN	
Physical Properties	Refractoriness (SK)	40<	40<	40<	-	-	
	AP (%)	16	13	15	14	14	
	BD (g/cm <sup>3</sup> )	3.25	3.15	3.2	2.66	2.61	
	CCS (kg/cm <sup>2</sup> )	1200	2000	1500	2100	1800	
	TE (%)	@ 1000°C	0.72	0.72	0.74	0.43	0.42
		@ 1500°C	-	-	-	-	-
	PLC (%)	@ 1650°C	0	0	0	-	-
		RUL (2kg/cm <sup>2</sup> , T2°C)	1700<T1	1700<T1	1700<T1	1700	1700
TC (kcal/m.hr.°C)	@ 200°C	-	-	-	16	15	
	@ 1000°C	2.7	2.8	2.6	-	-	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	99	93	89	-	-	
	SiC	-	-	-	90	77	
	Si <sub>3</sub> N <sub>4</sub>	-	-	-	-	16	
	Cr <sub>2</sub> O <sub>3</sub>	-	-	10	-	-	
	Fe <sub>2</sub> O <sub>3</sub>	0.1	0.3	0.1	0.2	0.2	
	MgO	-	-	-	-	-	
Main Application		Bosh, Belly			Bosh, Belly, Tuyere, Shaft		



# IRON INDUSTRY

## REFRACTORIES FOR BLAST FURNACE



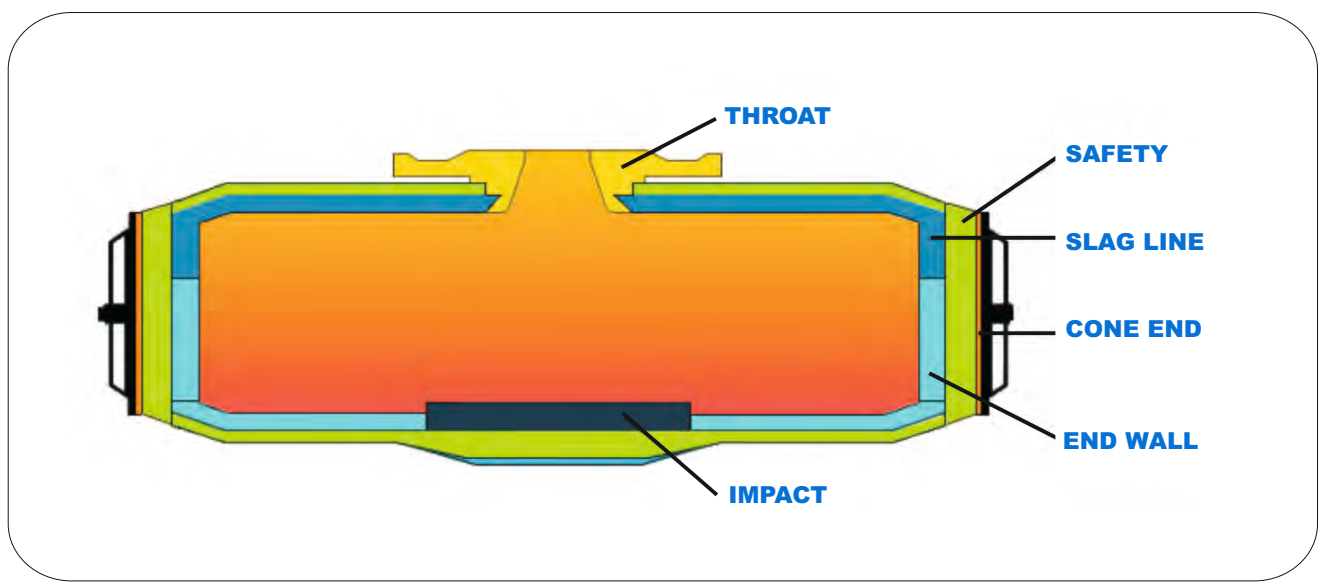
### SPECIFICATION

Quality		KA BF 20 SIC	KA BF 70 AL	KA BF 72 AL	KA BF 65 AL	KA BF 60 AL	
Physical Properties	Refractoriness (SK)	-	37	38	37	36	
	AP (%)	15	14	15	14	15	
	BD (g/cm <sup>3</sup> )	2.82	2.6	2.62	2.6	2.52	
	CCS (kg/cm <sup>2</sup> )	1100	1200	900	1100	500	
	TE (%)	@ 1000°C	0.47	0.48	0.55	0.53	0.42
	PLC (%)	@ 1500°C	-	0	0	0	0
		@ 1650°C		-	-	-	-
	RUL (2kg/cm <sup>2</sup> , T2°C)		1700	1650	1650	1650	1650
TC (kcal/m.hr.°C)	@ 200°C	4.5	1.6	1.6	1.5	1.5	
	@ 1000°C	-	-	-	-	-	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	68	70	72	65	63	
	Sic	19	-	-	-	-	
	Si <sub>3</sub> N <sub>4</sub>	-	-	-	-	-	
	Cr <sub>2</sub> O <sub>3</sub>	-	-	-	-	-	
	Fe <sub>2</sub> O <sub>3</sub>	-	-	1.1	0.9	1.0	
	MgO	-	-	-	-	1.2	
Main Application		Runner Outside	Ceramic Cup, Pad	Tuyere, Tap hole	Upper Shaft	Stave	



# IRON INDUSTRY.

## REFRACTORIES FOR TORPEDO CAR



## SPECIFICATION

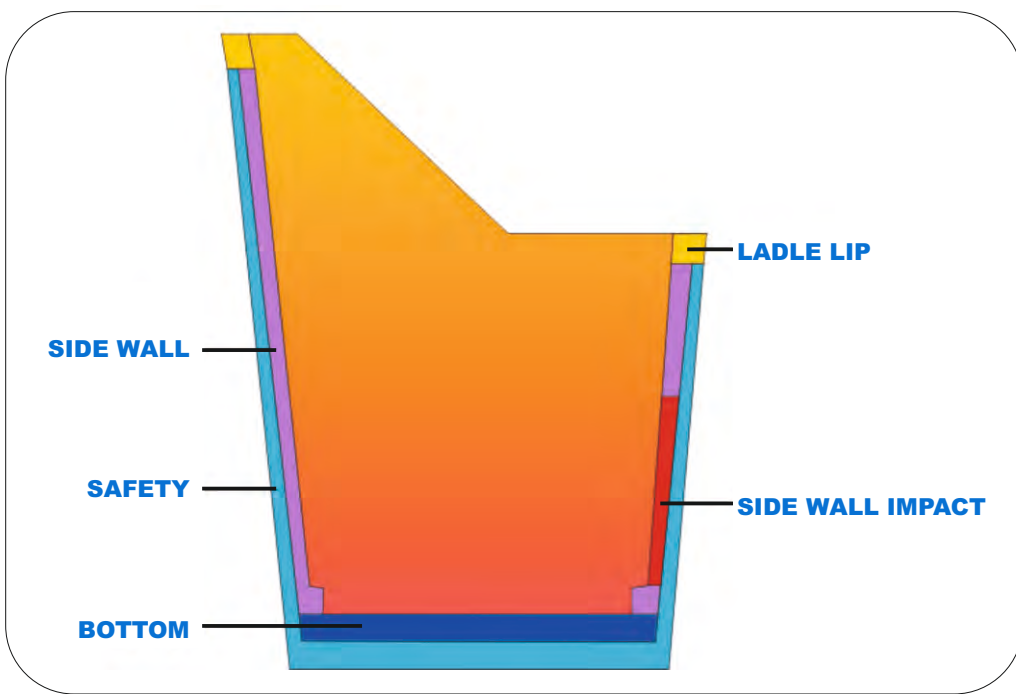
Quality		KA TC SZ	KA TC MZ	KA TC BI	KA TC TR	
Physical Properties	AP (%)	6	7	7	8	
	BD (g/cm <sup>3</sup> )	3	2.98	2.98	2.93	
	CCS (kg/cm <sup>2</sup> )	550	500	550	550	
	TE (%)	@ 1000°C	0.58	0.55	0.55	0.52
	RUL (2kg/cm <sup>2</sup> , T2°C)	1750	1700	1700	1650	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	72	68	67	65	
	SiC	11	10	10	10	
	FC	13	12	11	10	
Main Application		TLC S/L	TLC M/L	TLC Impact	TLC Roof	





# IRON INDUSTRY.

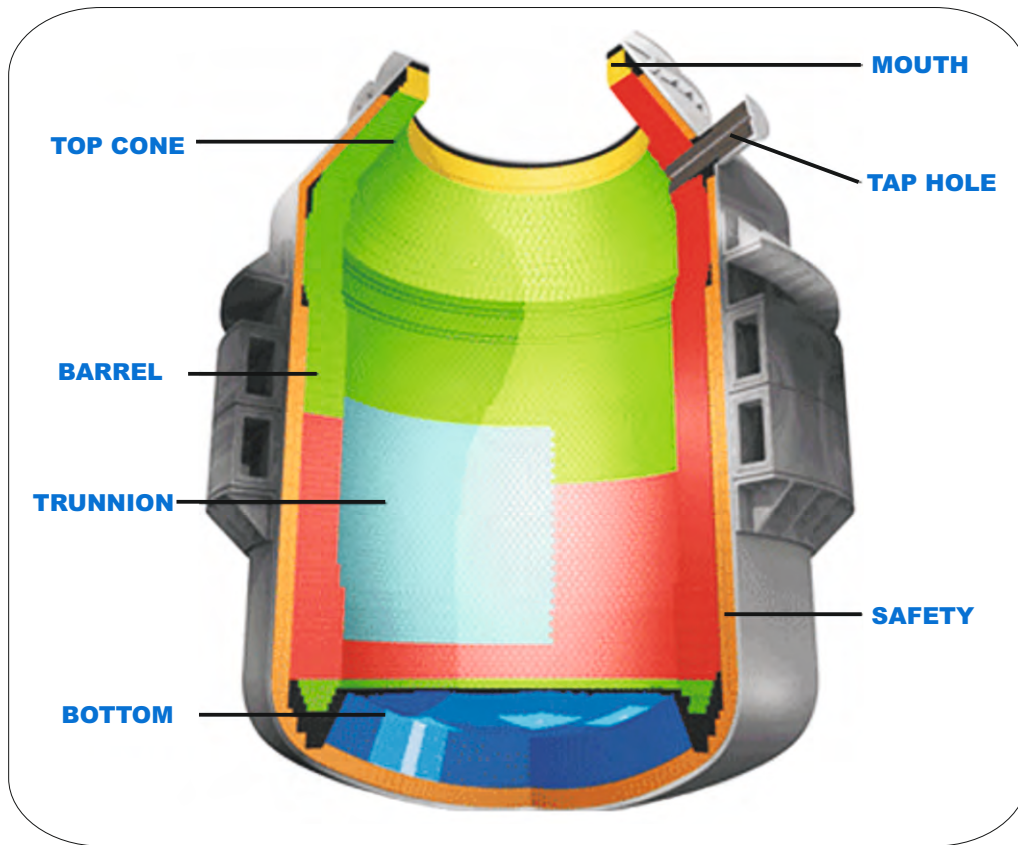
## REFRACTORIES FOR IRON LADLE



## SPECIFICATION

Quality		KA IL SZ	KA IL MZ	KA IL BI	
Physical Properties	AP (%)	7	7.5	7.6	
	BD (g/cm <sup>3</sup> )	3	2.95	2.94	
	CCS (kg/cm <sup>2</sup> )	550	550	550	
	TE (%)	@ 1000°C	0.58	0.55	0.54
	RUL (2kg/cm <sup>2</sup> , T2°C)	1,750	1,650	1,650	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	73	68	67	
	SiC	8	8	7.5	
	FC	11	11	10	
Main Application		Slag Zone	Metal Zone	Bottom	

## REFRACTORIES FOR BASIC OXYGEN FURNACE



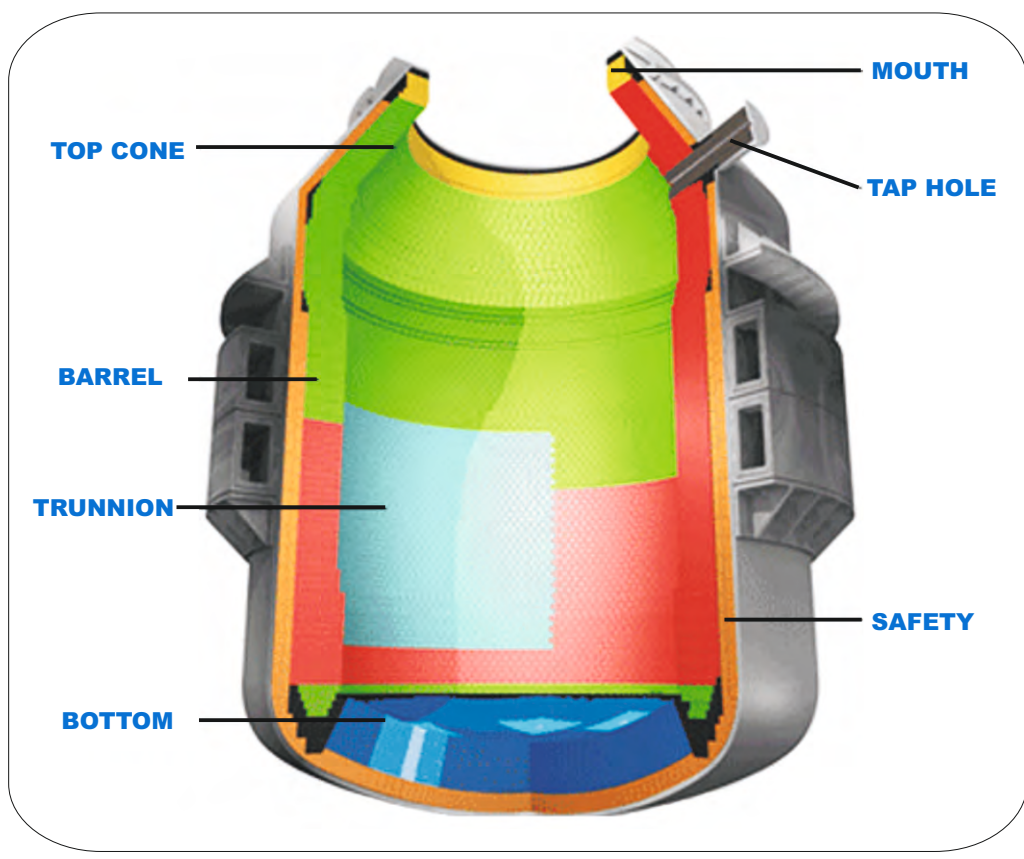
### SPECIFICATION: WEAR LINING BRICKS

Quality	Chemical Properties (%)			Physical Properties				Main Application
	MgO	FC	Al <sub>2</sub> O <sub>3</sub>	AP (%)	BD (gm / cm <sup>3</sup> )	CCS (Mpa)	HMOR (1400°CX0.5hr)	
KA BOF 10 BI	86	10	4	3	3	45	12	Bottom
KA BOF 10 LC	84	12	4	3	3.05	45	12	Lower Cone
KA BOF 14 BL	83	14	3	3	3.1	45	10	Barrel
KA BOF 12 CP	85	12	3	3	3.05	50	10	Charge Pad
KA BOF 16 TN	80	16	4	3	3.1	45	14	Trunnion
KA BOF 15 TH	81	15	4	3	3.1	45	14	Tap Hole
KA BOF 14 TC	84	14	2	3	3.05	40	10	Top Cone



# STEEL INDUSTRY.

## REFRACTORIES FOR BASIC OXYGEN FURNACE

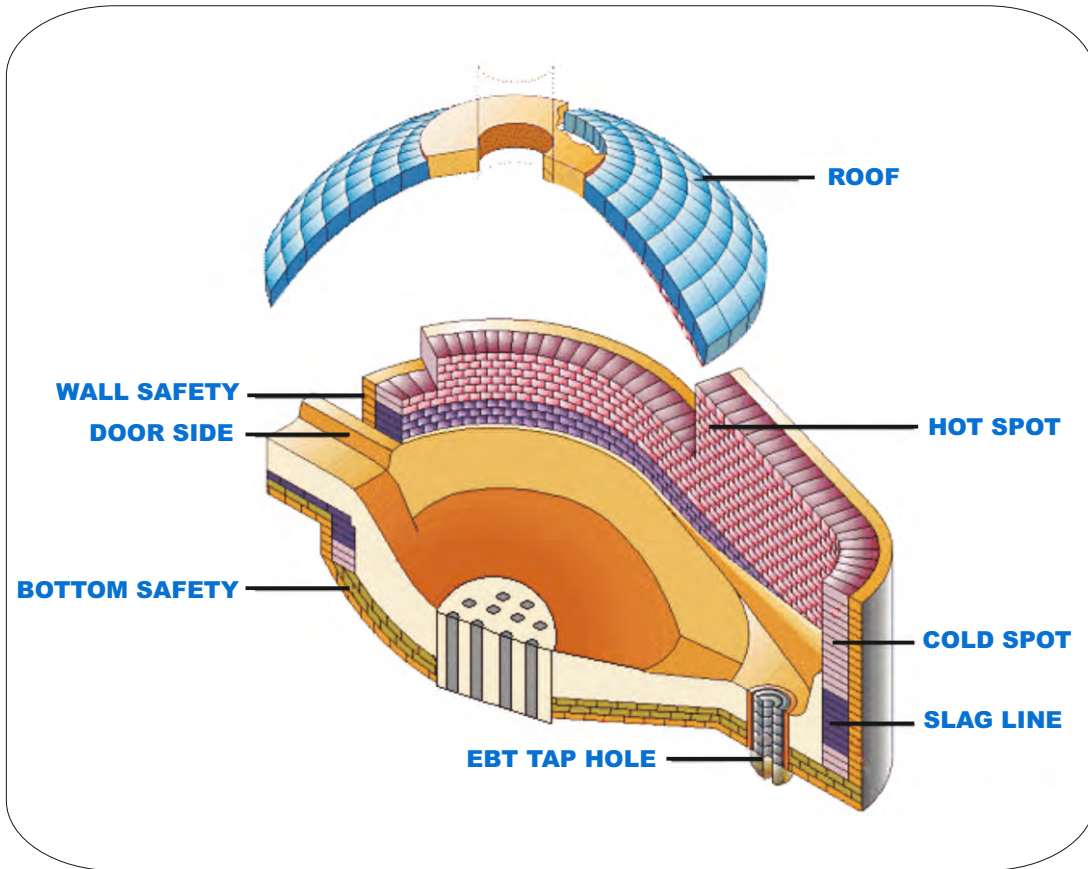


### SPECIFICATION: PRE-ASSEMBLED TAP HOLE SYSTEM

Quality	Chemical Properties (%)				Physical Properties				Main Application
	MgO	FC	Al <sub>2</sub> O <sub>3</sub>	SiC	AP (%)	BD (gm/cm <sup>3</sup> )	CCS (Mpa)	HMOR (1400°CX0.5hr)	
KA BOF 10 SV	86	10	3	1	3	3.05	40	12	Sleeves
KA BOF 12 SV	84	12	3	1	3	3.05	40	12	
KA BOF 15 SV	81	15	3	1	3	3.05	40	14	
KA BOF 8 NB	91	8	1	0	4	2.99	40	6	Nest Blocks



# REFRACTORIES FOR ELECTRIC ARC FURNACE



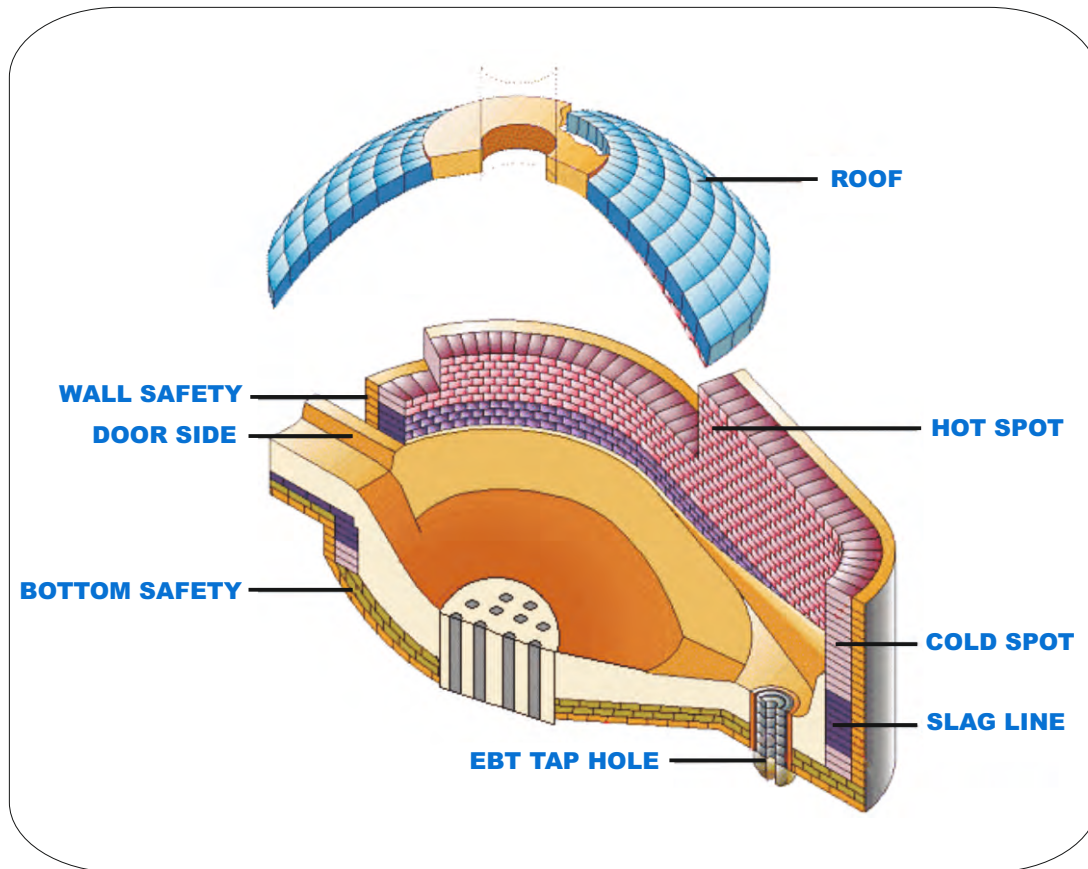
## SPECIFICATION: WEAR LINING BRICKS

Quality	Chemical Properties (%)			Physical Properties				Main Application
	MgO	FC	Al <sub>2</sub> O <sub>3</sub>	AP (%)	BD (gm / cm <sup>3</sup> )	CCS (Mpa)	HMOR (1400°CX0.5hr)	
KA EAF 12 SL	85	12	3	3	3.05	40	12	Slag Line
KA EAF 14 HS	83	14	3	3	3.1	40	12	Hot Spot
KA EAF 12 CS	85	12	3	3	3.05	42	12	Cold Spot
KA EAF 14 DE	83	14	3	3	3.1	42	12	Door End



# STEEL INDUSTRY

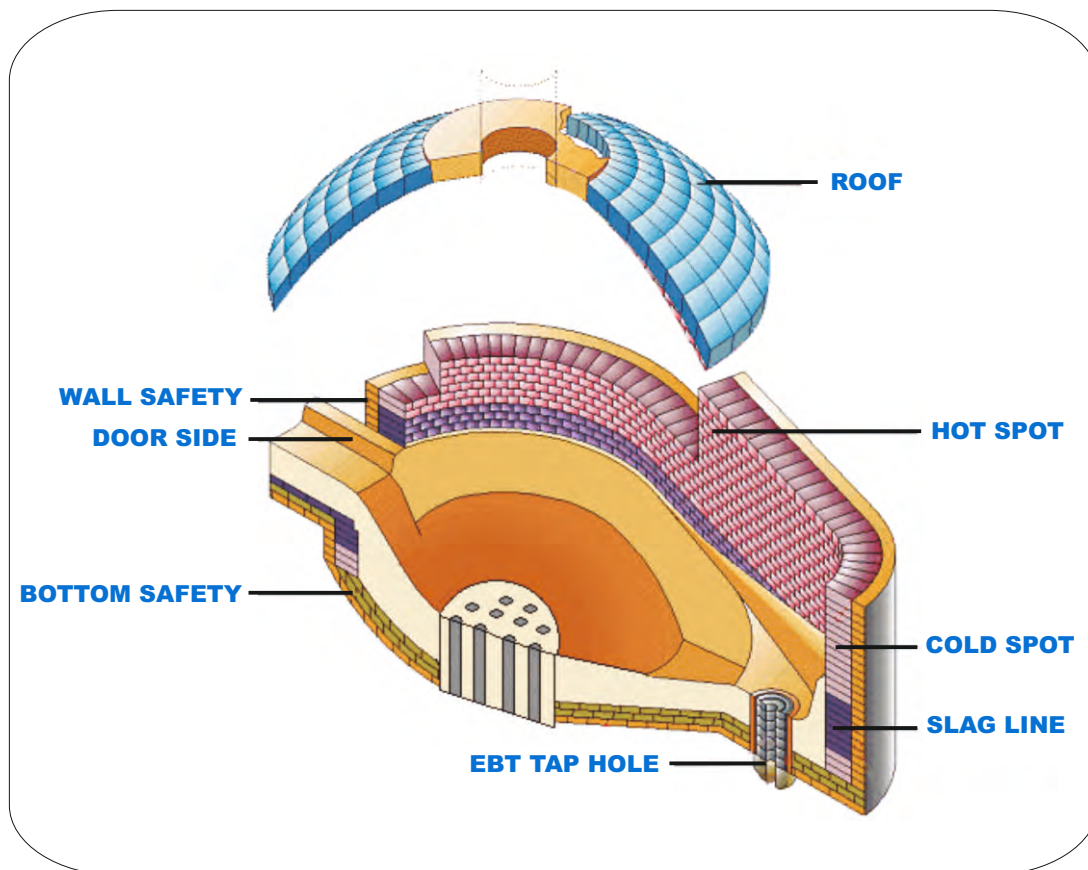
## REFRACTORIES FOR ELECTRIC ARC FURNACE



### SPECIFICATION: PRE-ASSEMBLED EBT SYSTEM

Quality	Chemical Properties (%)				Physical Properties				Main Application
	MgO	FC	Al <sub>2</sub> O <sub>3</sub>	SiC	AP (%)	BD (gm/cm <sup>3</sup> )	CCS (Mpa)	HMOR (1400°CX0.5hr)	
KA EAF 12 SV	86	12	3	1	3	3	40	12	Sleeves
KA EAF 15 SV	84	15	3	1	3	3	40	14	
KA EAF 70 EB	-	12	70	8	2	3.05	40	12	End Block
KA EAF 10 EB	86	10	3	1	3	3	40	12	
KA EAF 68 EB	-	12	68	8	2	3.05	40	12	
KA EAF 12 EB	84	12	3	1	3	3	40	12	
KA EAF 8 NB	90	8	1	0	4	2.99	40	6	Nest Blocks

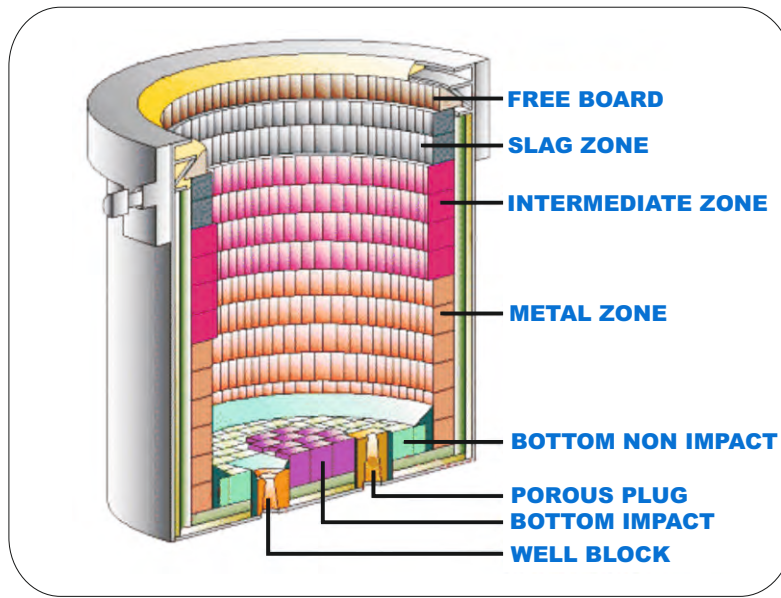
## REFRACTORIES FOR ELECTRIC ARC FURNACE



### SPECIFICATION: ROOF LINING BRICKS

Quality		KA EAF 7 RF	KA EAF 12 RF
Physical Properties	AP (%) @ 300°C x 24hrs	14	17
	BD (g/cm <sup>3</sup> )	3.15	3
	CCS (kg/cm <sup>2</sup> ) @ 300°C x 24hrs	650	650
	PLC (%) @ 1500°C x 3hrs	0.7	0.5
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	88	88
	SiO <sub>2</sub>	7	12
	MgO	-	-
Main Application		EAF Roof	

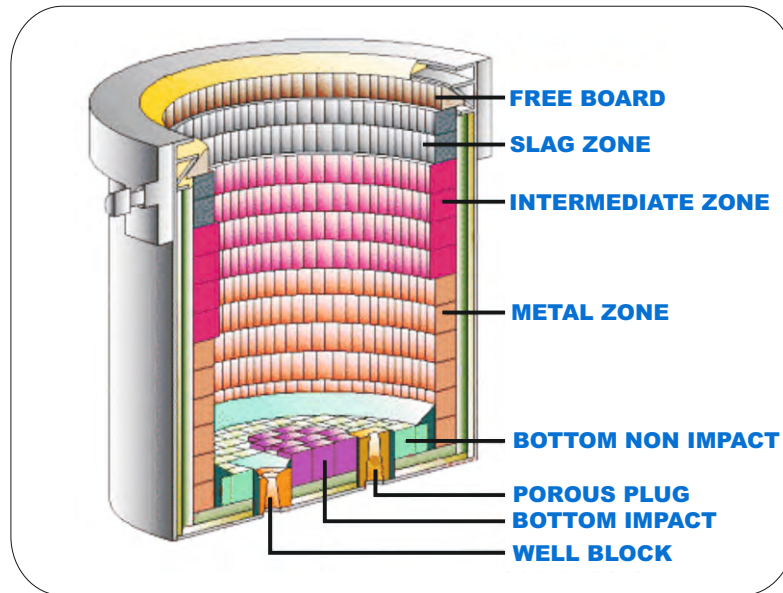
## REFRACTORIES FOR STEEL LADLE



## SPECIFICATION: MgO - C BRICKS

Quality	Chemical Properties (%)			Physical Properties				Main Application
	MgO	FC	Al <sub>2</sub> O <sub>3</sub>	AP (%)	BD (gm / cm <sup>3</sup> )	CCS (Mpa)	HMOR (1400°CX0.5hr)	
KA LF 8 BI	90	8	2	4	3	45	8	Bottom Impact
KA LF 8 BN	90	8	2	4	3	45	6	Bottom Non Impact
KA LF 10 BC	88	10	2	4	3	45	8	Bottom Conical / Splash Pad
KA LF 12 MP	86	12	2	4	3.05	45	10	Metal Zone Purging
KA LF 12 MN	86	12	2	5	3.05	40	6	Metal Zone Non Purging
KA LF 14 SP	84	14	2	3	3.1	40	10	Slag Zone Purging
KA LF 14 SN	84	14	2	3	3.1	40	8	Slag Zone Non Purging
KA LF 13 FB	85	13	2	5	3	40	6	Free Board

## REFRACTORIES FOR STEEL LADLE



### SPECIFICATION: Al<sub>2</sub>O<sub>3</sub> - MgO - C BRICKS

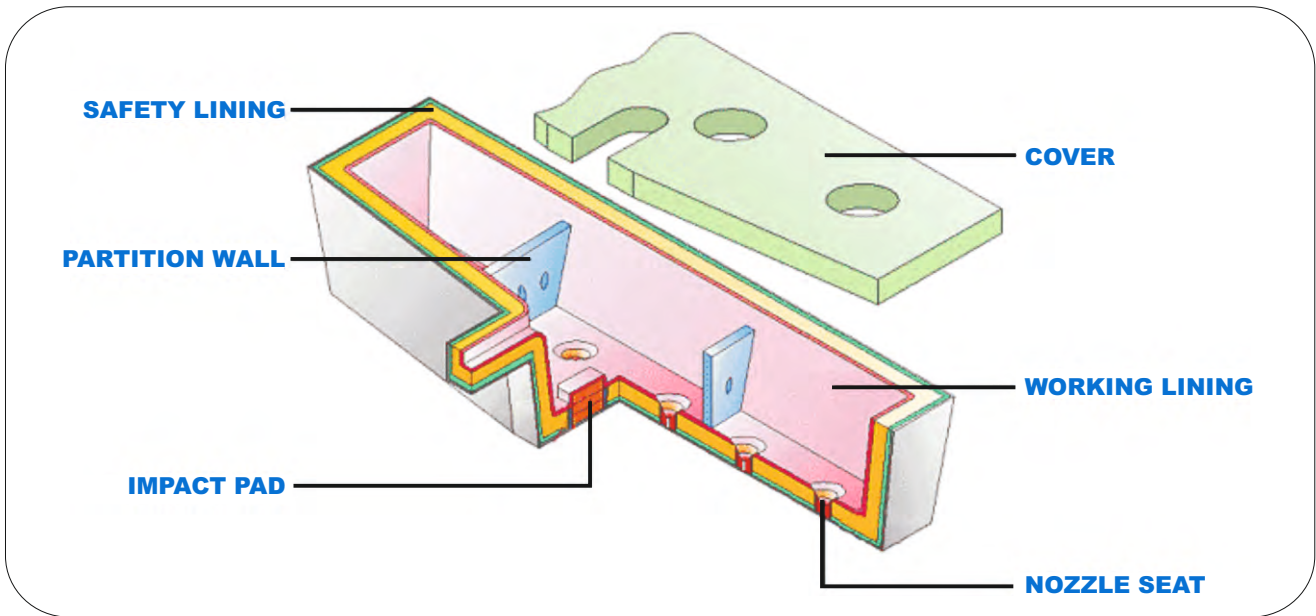
Quality	Chemical Properties (%)			Physical Properties				Main Application
	MgO	FC	Al <sub>2</sub> O <sub>3</sub>	AP (%)	BD (gm / cm <sup>3</sup> )	CCS (Mpa)	HMOR (1400°CX0.5hr)	
KA AMC 7 BI	10	7	70	5	3.15	45	6	Bottom Impact
KA AMC 7 BN	10	7	70	6	3.1	40	6	Bottom Non Impact
KA AMC 8 MZ	10	8	74	4	3.15	45	6	Metal Zone
KA AMC 10 SZ	10	10	72	5	3.15	45	6	Slag Zone





# STEEL INDUSTRY

## REFRACTORIES FOR TUNDISH



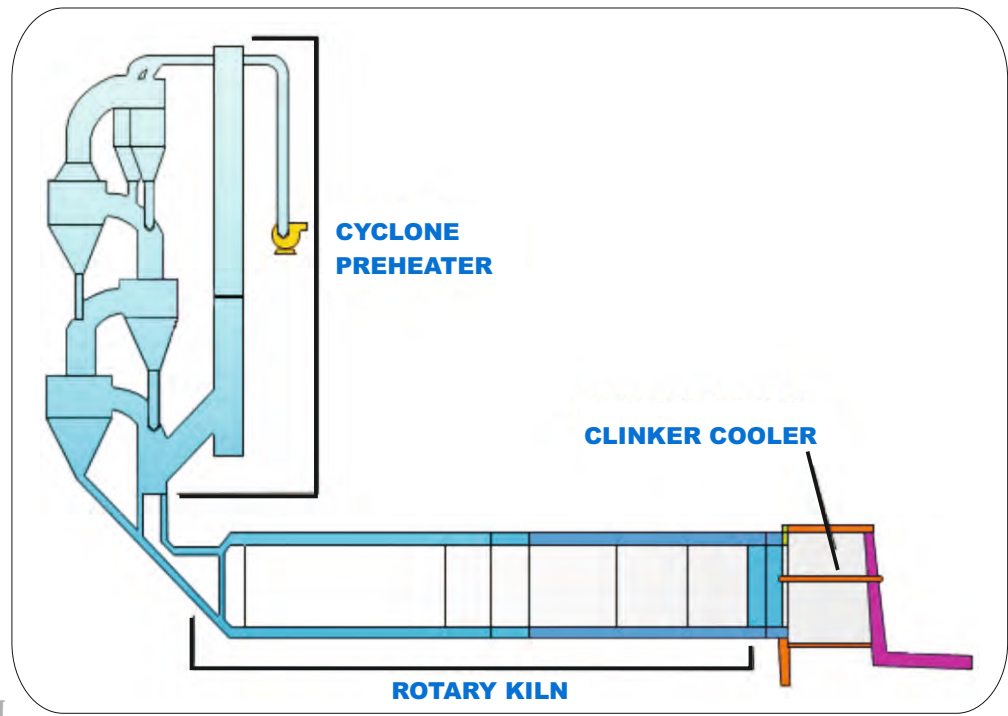
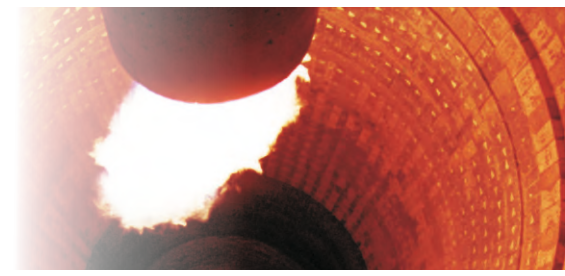
## SPECIFICATION

Quality		KA TD 85 SI	KA TD 60 AL	KA TD 50 AL	
Physical Properties	Refractoriness (SK)	-	37	36	
	AP (%)	14	15	20-24	
	BD (g/cm <sup>3</sup> )	2.27	2.6	2.30 - 2.40	
	CCS (kg/cm <sup>2</sup> )	350	500	450	
	TE (%)	@ 1000	0.53	0.55	0.6 - 0.8
	PLC (%) @ 1500°C x 2hrs	±4	±0.5	±0.3	
	RUL (2kg/cm <sup>2</sup> , T2°C)	1530	1600	1450	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	13	63	50	
	SiO <sub>2</sub>	85	-	-	
	Fe <sub>2</sub> O <sub>3</sub>	0.3	1.2	2	
Main Application		Tundish Lining			



# CEMENT INDUSTRY

## REFRACTORIES FOR CEMENT KILN



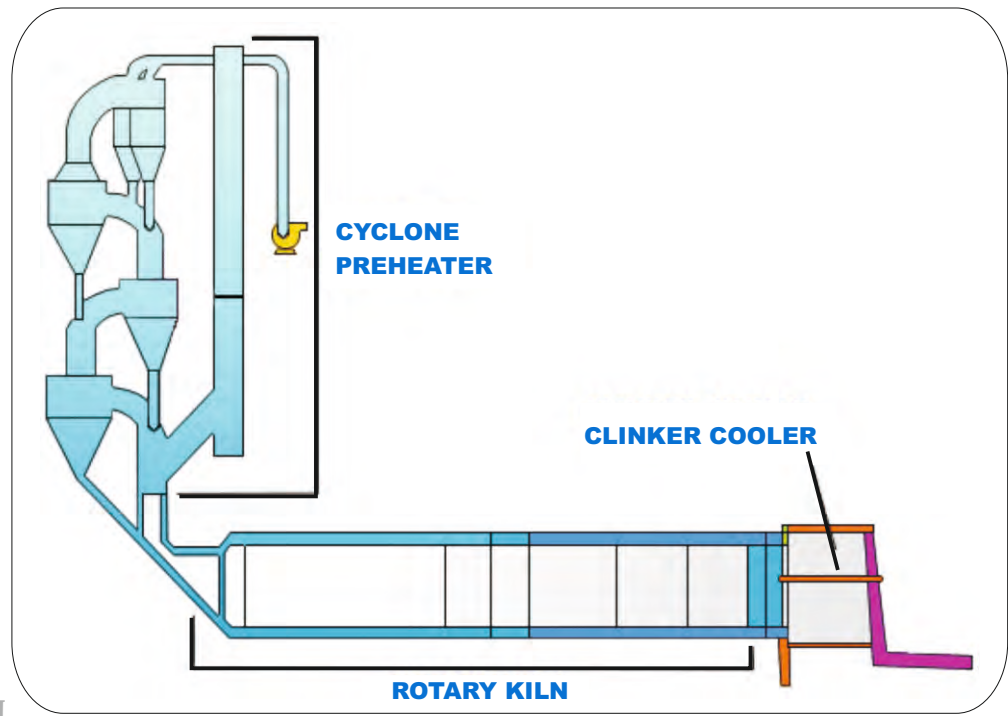
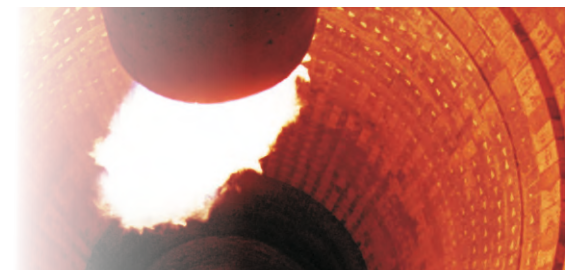
### SPECIFICATION

Quality		KA MASPIL 87	KA MASPIL 89	KA MASPIL 85	KA MASPIL 88	KA MASPIL 92	KA MASPIL 90	
Physical Properties	AP (%)	16 - 18	16 - 18	16 - 18	16 - 18	17 - 21	16 - 18	
	BD (g/cm <sup>3</sup> )	2.90 - 3.05	2.92 - 2.98	2.92 - 2.98	2.92 - 2.98	2.90 - 3.05	2.92 - 2.98	
	CCS (kg/cm <sup>2</sup> )	450	500	550	550	400	500	
	TC (kcal/mh°C)	@ 500°C	2.9	2.9	2.95	2.95	3	2.95
		@ 1000°C	2.4	2.4	2.5	2.5	2.5	2.45
	TE (%)	@ 1000°C	1.2	1.2	1.2	1.2	1.25	1.2
		@ 1400°C	1.7	1.7	1.7	1.7	1.7	1.7
RUL (°C)	T <sub>a</sub>	1700	1700	1700	1700	1700	1700	
	T <sub>b</sub>	1750	1750	1750	1750	1750	1750	
TSR (950°C/air)		120 min	120 min	120 min	120 min	120 min	120 min	
Chemical Properties (%)	MgO	87 - 89	87 - 89	85	86 - 88	90 - 92	90	
	Al <sub>2</sub> O <sub>3</sub>	8 - 12	8 - 12	10 - 15	10 - 15	4 - 6	6 - 8	
	Fe <sub>2</sub> O <sub>3</sub>	0.5	0.5	0.8	0.8	0.5	0.5	
	CaO	1.6	1	1.4	1.2	2.5	1	
	SiO <sub>2</sub>	0.8	0.5	0.9	0.5	1	0.5	
Main Application		Upper & Lower Transition Zones and Tyre Section of Rotary Kiln, also suitable at Sintering Zone based on Thermo - Chemical & Thermo - Mechanical Loads of Kilns using Alternative Materials and Fuels						



# CEMENT INDUSTRY

## REFRACTORIES FOR CEMENT KILN



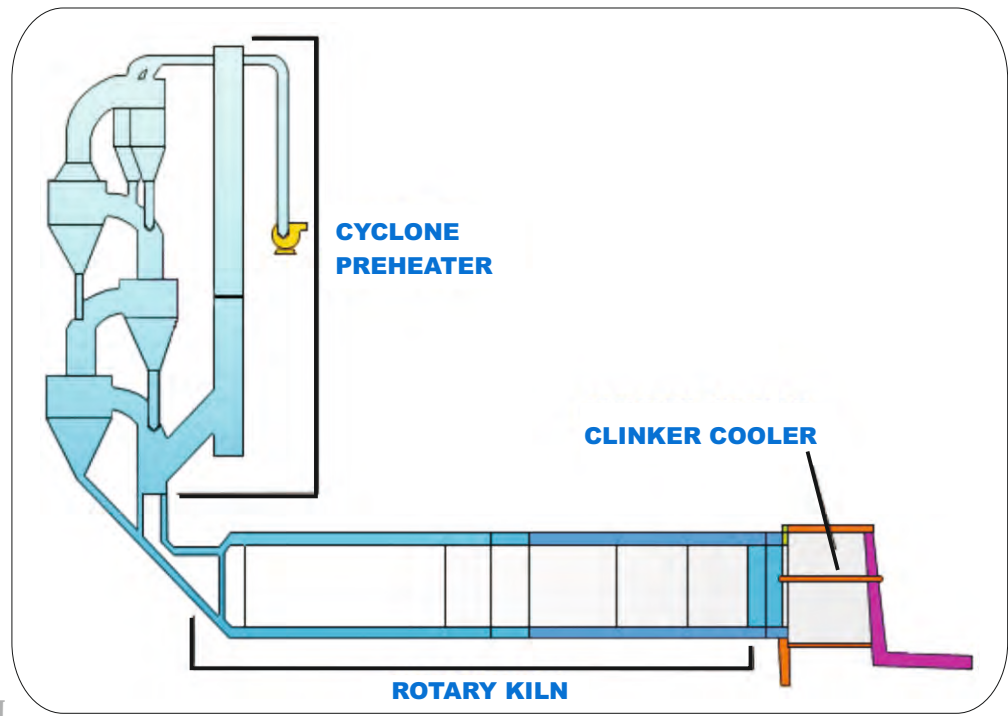
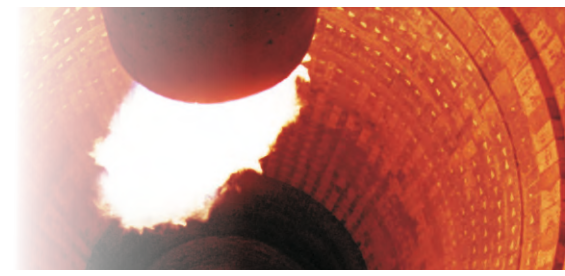
### SPECIFICATION

Quality		KA CRK 80 AL	KA CRK 70 AL	KA CRK 60 AL	KA CRK 50 AL	KA CRK 45 AL	KA CRK 50 SA	
Physical Properties	Refractoriness (SK)	39	38	37	36	35	36	
	AP (%)	24	24	24	25	26	20	
	BD (g/cm <sup>3</sup> )	2.65	2.5	2.4	2.3	2.2	2.35	
	CCS (kg/cm <sup>2</sup> )	350	300	300	250	200	400	
	TE (%)	@ 1000°C	0.7	0.7	0.6	0.6	0.5	0.6
	PLC (%)	@ 1400°Cx2hrs	-	-	-	-	±0.3	-
		@ 1500°Cx2hrs	±0.3	±0.3	±0.3	±0.3	-	-
@ 1600°Cx2hrs		-	-	-	-	-	±0.3	
RUL (2kg/cm <sup>2</sup> , T2°C)		1700	1550	1480	1450	1400	1550	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	80	70	60	50	45	50	
	Fe <sub>2</sub> O <sub>3</sub>	2	2	2.5	2.5	2.5	2	
Main Application		Cyclone Preheater, Rotary Kiln & Clinker Cooler						



# CEMENT INDUSTRY

## REFRACTORIES FOR CEMENT KILN



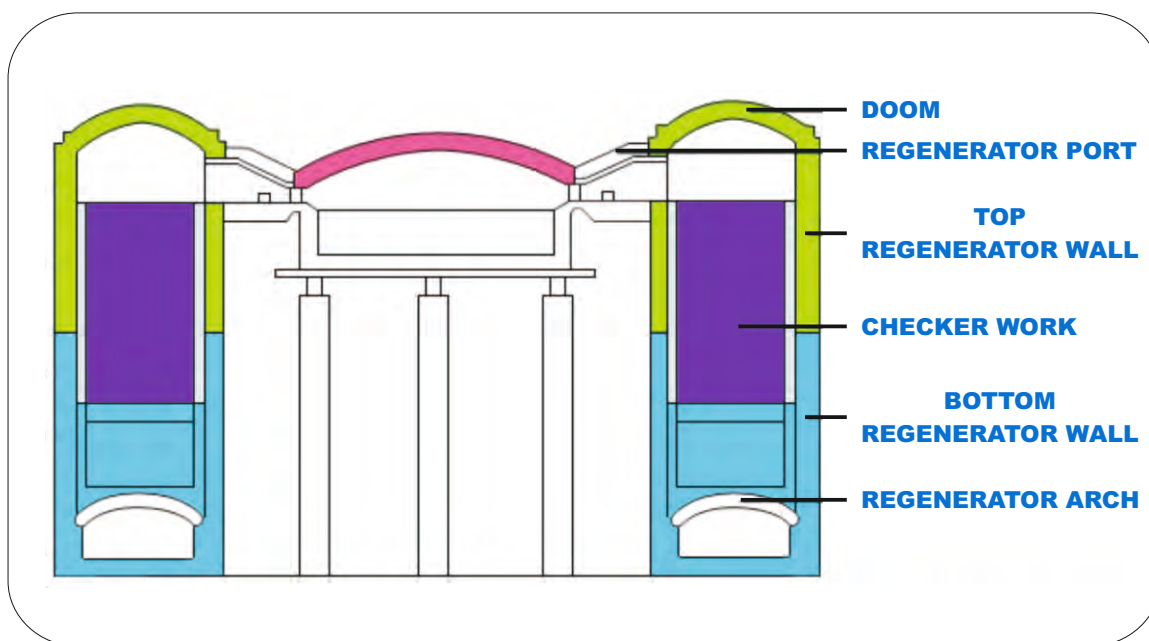
## SPECIFICATION

Quality		KA CRK 12 MCR	KA CRK 9 MCR	KA CRK 10 MCR	KA CRK 17 MCR	
Physical Properties	Refractoriness (SK)	40	40	40	40	
	AP (%)	18	17	16	15.5	
	BD (g/cm <sup>3</sup> )	3.15	3.02	3	3.1	
	CCS (kg/cm <sup>2</sup> )	600	450	450	600	
	TE (%)	@ 1000°C	1.3	1.2	1.2	1
	PLC (%)	@ 1400°Cx2hrs	-	-	-	-
		@ 1500°Cx2hrs	0	-	±0.2	±0.2
@ 1600°Cx2hrs		-	±0.1	-	-	
RUL (2kg/cm <sup>2</sup> , T2°C)	1650	1730	1650	1650		
Chemical Properties (%)	MgO	88	78	75	70	
	Cr <sub>2</sub> O <sub>3</sub>	12	9	10	17	
Main Application		Cyclone Preheater, Rotary Kiln & Clinker Cooler				



# GLASS INDUSTRY

## REFRACTORIES FOR GLASS FURNACE



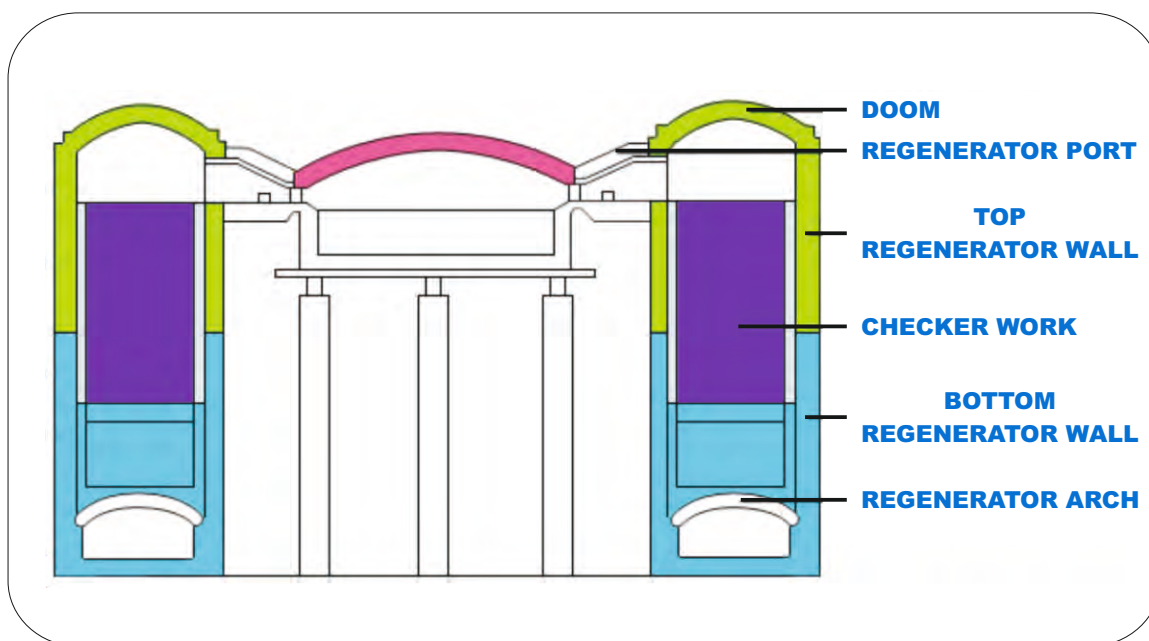
## SPECIFICATION: REGENERATOR

Quality		KA GF 74 MUL	KA GF 98 MAG	KA GF 93 MAG	KA GF 9 MCR	KA GF 12 MCR	
Physical Properties	Refractoriness (SK)	38	40	40	40	40	
	AP (%)	17	16	16	16	18	
	BD (g/cm <sup>3</sup> )	2.55	2.9	2.85	3	3	
	CCS (kg/cm <sup>2</sup> )	900	700	650	500	400	
	TE (%)	@ 1000°C	0.35	1.3	1.3	1.25	1.1
	PLC (%)	@ 1500°Cx2hrs	0	0	0	±0.1	±0.1
	RUL (2kg/cm <sup>2</sup> , T2°C)		1650	1700	1650	1700	1650
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	74	-	-	-	-	
	Fe <sub>2</sub> O <sub>3</sub>	0.2	-	-	-	-	
	MgO	-	98	93	78	70	
	Cr <sub>2</sub> O <sub>3</sub>	-	-	-	9	12	
Main Application		Regenerator of Glass Melting Tank					



# GLASS INDUSTRY

## REFRACTORIES FOR GLASS FURNACE



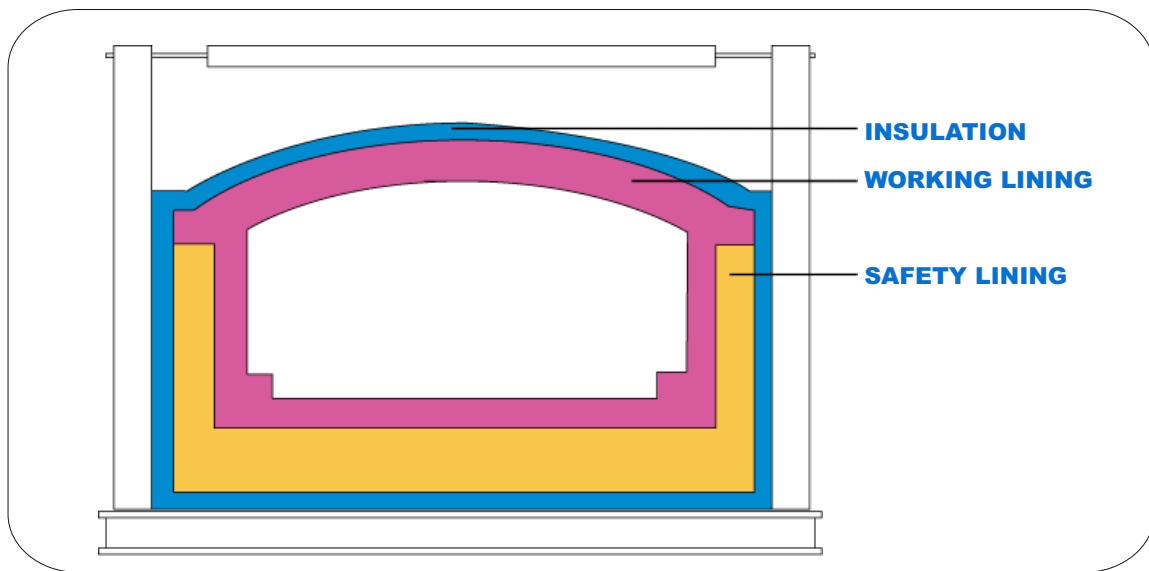
## SPECIFICATION: REGENERATOR

Quality		KA GF 20 SPL	KA GF 14 SPL	KA GF 64 AL	KA GF 48 AL	KA GF 43 AL	
Physical Properties	Refractoriness (SK)	spinel	spinel	37	35	34	
	AP (%)	16	17	19	17	18	
	BD (g/cm <sup>3</sup> )	2.95	2.9	2.35	2.3	2.2	
	CCS (kg/cm <sup>2</sup> )	450	450	600	600	500	
	TE (%)	@ 1000°C	1	1.1	0.6	0.6	0.6
	PLC (%)	@ 1500°Cx2hrs	0	0	±0.1	±0.1	±0.1
	RUL (2kg/cm <sup>2</sup> , T2°C)		1750	1750	1600	1500	1450
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	20	14	64	48	43	
	Fe <sub>2</sub> O <sub>3</sub>	-	-	1	1.5	1.5	
	MgO	79	85	-	-	-	
	Cr <sub>2</sub> O <sub>3</sub>	-	-	-	-	-	
Main Application		Regenerator of Glass Melting Tank					



# GLASS INDUSTRY

## REFRACTORIES FOR GLASS FURNACE



### SPECIFICATION: GLASS TANK

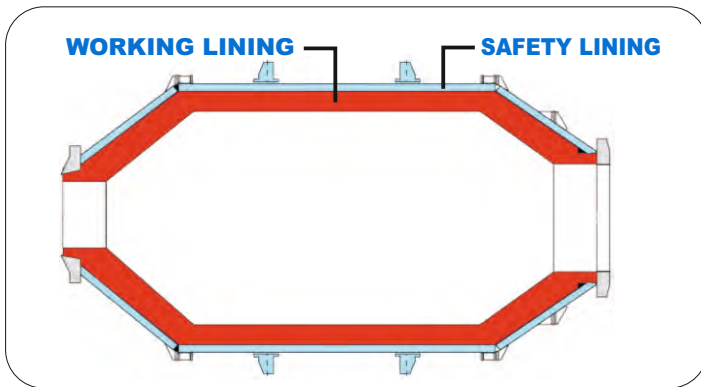
Quality		KA GF 65 ZR	KA GF 63 ZR	KA GF 10 AZ	
Physical Properties	Refractoriness (SK)	40	36	35	
	AP (%)	18	20	20	
	BD (g/cm <sup>3</sup> )	3.75	3.5	3.2	
	CCS (kg/cm <sup>2</sup> )	600	600	800	
	TE (%)	@ 1000°C	0.45	0.5	0.55
	PLC (%)	@ 1500°Cx2hrs	-	±0.2	-
		@ 1600°Cx2hrs	-	-	±0.1
RUL (2kg/cm <sup>2</sup> , T2°C)		-	1500	1650	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	34	-	10	
	Fe <sub>2</sub> O <sub>3</sub>	-	-	69	
	MgO	-	-	0.5	
	Cr <sub>2</sub> O <sub>3</sub>	2	-	-	
	ZrO <sub>2</sub>	65	63	19.5	
Main Application		Glass Tank Sub Paving			



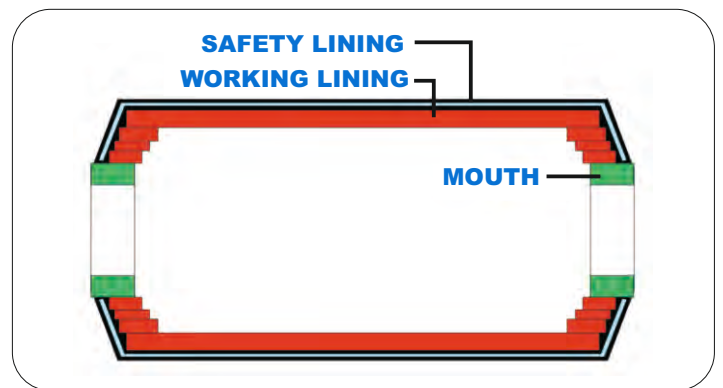
# NON-FERROUS INDUSTRY

## REFRACTORIES FOR NON-FERROUS FURNACE

### COPPER FURNACE



### LEAD FURNACE



## SPECIFICATION

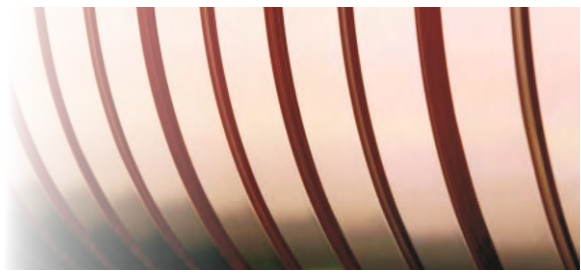
Quality		KA NF 96 MAG	KA NF 95 MAG	KA NF 90 MAG	KA NF 20 MCR	KA NF 18 MCR	KA NF 14 MCR	
Physical Properties	Refractoriness (SK)	40	40	40	40	40	40	
	AP (%)	18	18	20	16	17	18	
	BD (g/cm <sup>3</sup> )	2.85	2.85	2.78	3.2	3.15	3.1	
	CCS (kg/cm <sup>2</sup> )	600	600	600	450	400	350	
	TE (%)	@ 1000°C	1.3	1.25	1.2	1.2	1.1	1
	PLC (%)	@ 1500°Cx2hrs	-0.1	-0.1	-0.1	±0.1	±0.1	±0.1
	RUL (2kg/cm <sup>2</sup> , T2°C)		1600	1570	1540	1750	1700	1650
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	-	-	-	-	-	-	
	Fe <sub>2</sub> O <sub>3</sub>	-	-	-	-	-	-	
	MgO	96	95	90	60	65	70	
	Cr <sub>2</sub> O <sub>3</sub>	-	-	-	20	18	14	
Main Application		Copper Furnace, Nickel Furnace and Lead Furnace						



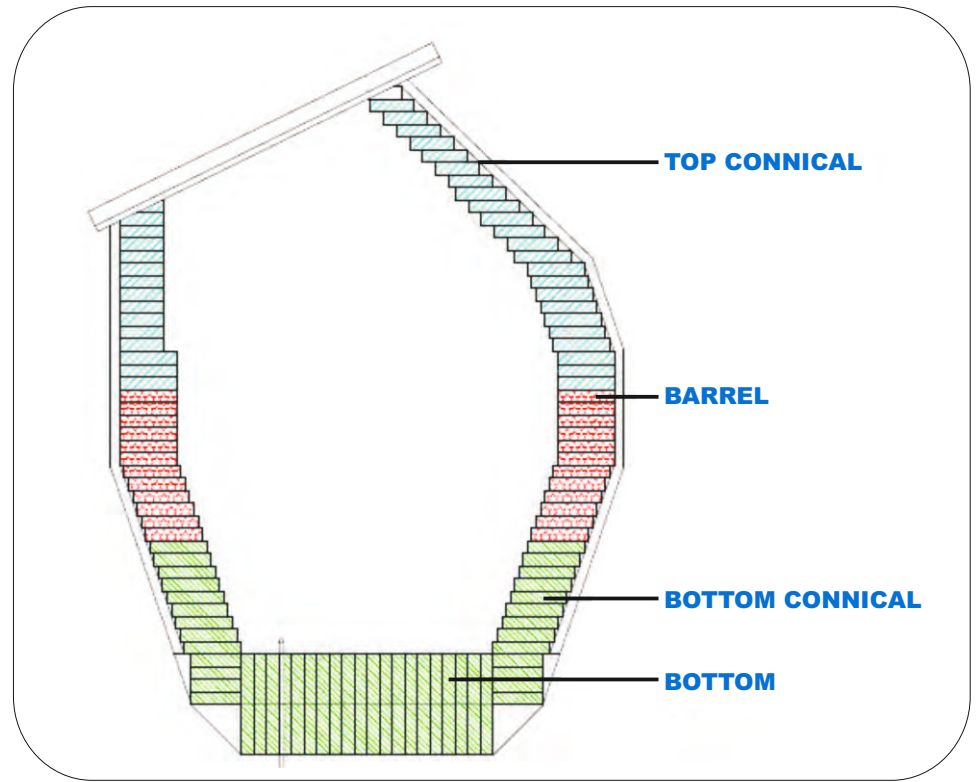


# NON-FERROUS INDUSTRY

## REFRACTORIES FOR NON-FERROUS FURNACE



### NICKEL CONVERTER



### SPECIFICATION

Quality		KA NF 64 AL	KA NF 48 AL	KA NF 43 AL	
Physical Properties	Refractoriness (SK)	37	35	34	
	AP (%)	19	17	18	
	BD (g/cm <sup>3</sup> )	2.35	2.3	2.2	
	CCS (kg/cm <sup>2</sup> )	600	600	500	
	TE (%)	@ 1000°C	0.6	0.6	0.6
	PLC (%)	@ 1500°Cx2hrs	±0.1	±0.1	±0.1
	RUL (2kg/cm <sup>2</sup> , T2°C)	1600	1500	1450	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	64	48	43	
	Fe <sub>2</sub> O <sub>3</sub>	1	1.5	1.5	
	MgO	-	-	-	
	Cr <sub>2</sub> O <sub>3</sub>	-	-	-	
Main Application		Copper Furnace, Nickel Furnace and Lead Furnace			



## MAGNESIA CARBON (MgO - C) BRICKS

BASIC OXYGEN FURNACE								
Quality	Chemical Properties (%)			Physical Properties				Main Application
	MgO	FC	Al <sub>2</sub> O <sub>3</sub>	AP (%)	BD (gm / cm <sup>3</sup> )	CCS (Mpa)	HMOR (1400°CX0.5hr)	
KA BOF 10 BI	86	10	4	3	3	45	12	Bottom
KA BOF 10 LC	84	12	4	3	3.05	45	12	Lower Cone
KA BOF 14 BL	83	14	3	3	3.1	45	10	Barrel
KA BOF 12 CP	85	12	3	3	3.05	50	10	Charge Pad
KA BOF 16 TN	80	16	4	3	3.1	45	14	Trunnion
KA BOF 15 TH	81	15	4	3	3.1	45	14	Tap Hole
KA BOF 14 TC	84	14	2	3	3.05	40	10	Top Cone

ELECTRIC ARC FURNACE								
Quality	Chemical Properties (%)			Physical Properties				Main Application
	MgO	FC	Al <sub>2</sub> O <sub>3</sub>	AP (%)	BD (gm / cm <sup>3</sup> )	CCS (Mpa)	HMOR (1400°CX0.5hr)	
KA EAF 12 SL	85	12	3	3	3.05	40	12	Slag Line
KA EAF 14 HS	83	14	3	3	3.1	40	12	Hot Spot
KA EAF 12 CS	85	12	3	3	3.05	42	12	Cold Spot
KA EAF 14 DE	83	14	3	3	3.1	42	12	Door End

STEEL LADLE								
Quality	Chemical Properties (%)			Physical Properties				Main Application
	MgO	FC	Al <sub>2</sub> O <sub>3</sub>	AP (%)	BD (gm / cm <sup>3</sup> )	CCS (Mpa)	HMOR (1400°CX0.5hr)	
KA LF 8 BI	90	8	2	4	3	45	8	Bottom Impact
KA LF 8 BN	90	8	2	4	3	45	6	Bottom Non Impact
KA LF 10 BC	88	10	2	4	3	45	8	Bottom Conical / Splash Pad
KA LF 12 MP	86	12	2	4	3.05	45	10	Metal Zone Purging
KA LF 12 MN	86	12	2	5	3.05	40	6	Metal Zone Non Purging
KA LF 14 SP	84	14	2	3	3.1	40	10	Slag Zone Purging
KA LF 14 SN	84	14	2	3	3.1	40	8	Slag Zone Non Purging
KA LF 13 FB	85	13	2	5	3	40	6	Free Board



## ALUMINA MAGNESIA CARBON (Al<sub>2</sub>O<sub>3</sub> - MgO - C) BRICKS

STEEL LADLE								
Quality	Chemical Properties (%)			Physical Properties				Main Application
	MgO	FC	Al <sub>2</sub> O <sub>3</sub>	AP (%)	BD (gm / cm <sup>3</sup> )	CCS (Mpa)	HMOR (1400°CX0.5hr)	
KA AMC 7 BI	10	7	70	5	3.15	45	6	Bottom Impact
KA AMC 7 BN	10	7	70	6	3.1	40	6	Bottom Non Impact
KA AMC 8 MZ	10	8	74	4	3.15	45	6	Metal Zone
KA AMC 10 SZ	10	10	72	5	3.15	45	6	Slag Zone

## LOW CARBON BRICKS

Quality	Chemical Properties (%)			Physical Properties				Main Application
	MgO	FC	Al <sub>2</sub> O <sub>3</sub>	AP (%)	BD (gm / cm <sup>3</sup> )	CCS (Mpa)	HMOR (1400°CX0.5hr)	
KA LC LF 3	90	3	3	5	3.05	40	5	Secondary Refinery Ladle
KA LC LF 5	88	5	3	5.5	3.02	40	5	
KA LC LF 7	86	7	3	5.5	3	40	5	

## ALUMINA SILICON CARBIDE CARBON (Al<sub>2</sub>O<sub>3</sub> - SiC - C) BRICKS

Quality		KA ALSIC 1	KA ALSIC 2	KA ALSIC 3	KA ALSIC 4	KA ALSIC 5	KA ALSIC 6	KA ALSIC 7	KA ALSIC 8	
Physical Properties	AP (%)	6	6.8	7.3	7.6	8	7.8	7.6	8.3	
	BD (g/cm <sup>3</sup> )	3	2.96	2.93	2.88	2.85	2.94	3.01	2.93	
	CCS (kg/cm <sup>2</sup> )	500	450	450	400	400	550	600	600	
	TE (%)	@ 1000°C	0.5	0.5	0.5	0.55	0.55	0.6	0.6	0.6
	BS (kg/cm <sup>2</sup> )	@ R.T.	150	130	130	100	100	160	160	150
		@1400°C	100	70	65	55	50	75	90	80
RUL (2kg/cm <sup>2</sup> , T2°C)		>1730	>1710	>1700	>1680	>1650	>1680	>1700	>1650	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	71	67	64	62	60	65	68	64	
	C	13	13	13	13	13	8	8	8	
	SiC	9	11	15	17	19	20	19	20	
Main Application		Torpedo Car Ladle (S/L, M/L, Impact)					Roofs	Open Ladle		



## MAGNESIA CHROME (MgO - Cr<sub>2</sub>O<sub>3</sub>) BRICKS

Quality		KA 11 MCR	KA 12 MCR	KA 14 MCR	KA 56 MCR	KA 50 MCR	KA 54 MCR	
Physical Properties	Refractoriness (SK)	40	40	40	40	40	40	
	AP (%)	13	13	13	13	13	13	
	BD (g/cm <sup>3</sup> )	2.99	3	3.05	3.05	3.05	3.05	
	CCS (kg/cm <sup>2</sup> )	400	400	450	450	450	450	
	TE (%)	@ 1000°C	1.2	1.2	0.85	1.2	0.85	1.2
	PLC (%)	@ 1500°Cx2hrs	-0.1	-0.1	-0.1	0	0.3	0.2
	RUL (2kg/cm <sup>2</sup> , T2°C)	1500	1500	1540	1500	1540	1500	
Chemical Properties (%)	MgO	71	62	58	56	49	54	
	Cr <sub>2</sub> O <sub>3</sub>	11	12	14	12	19	15	
Main Application		EAF Side Wall			Glass melting Furnace, EAF			

Quality		KA 9 MCR	KA 5 MCR	KA 9 CMR	KA 10 MCR	KA 17 MCR	
Physical Properties	Refractoriness (SK)	40	40	40	40	40	
	AP (%)	13	18	17	16	15.5	
	BD (g/cm <sup>3</sup> )	2.98	3.05	3.02	3.1	3.15	
	CCS (kg/cm <sup>2</sup> )	450	600	450	450	600	
	TE (%)	@ 1000°C	1.2	1.3	1.2	1.2	1
	PLC (%)	@ 1500°Cx2hrs	0.1	0	0.1	0.2	0.2
	RUL (2kg/cm <sup>2</sup> , T2°C)	1500	1650	1730	1650	1650	
Chemical Properties (%)	MgO	74	88	78	75	70	
	Cr <sub>2</sub> O <sub>3</sub>	9	5	9	10	17	
Main Application		EAF Roofs	Cement Rotary Kiln		Steel Refining Furnace		

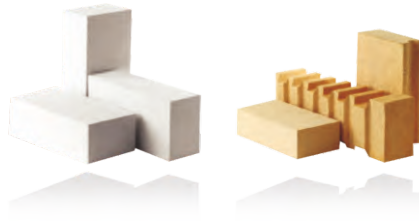


## MAGNESITE (MgO) BRICKS

Quality		KA 96 MGO	KA 95 MGO	KA 90 MGO	KA 97 MGO	KA 94 MGO	KA 92 MGO	
Physical Properties	Refractoriness (SK)	40	40	40	40	40	40	
	AP (%)	18	18	20	13	13	13	
	BD (g/cm <sup>3</sup> )	2.98	2.95	2.9	2.98	2.95	2.9	
	CCS (kg/cm <sup>2</sup> )	600	600	600	450	450	450	
	TE (%)	@ 1000°C	1.3	1.25	1.2	1.3	1.3	1.3
	PLC (%)	@ 1500°Cx2hrs	-0.1	-0.1	-0.1	-0.4	-0.4	-0.5
	RUL (2kg/cm <sup>2</sup> , T2°C)		1600	1570	1540	1500	1550	1500
Chemical Properties (%)	MgO	96	95	90	97	94	92	
Main Application		Glass melting Furnace, EAF, Nonferrous metal melting Furnace			Glass melting Furnace, EAF, Nonferrous metal melting Furnace			

## MAGNESIA SPINEL BRICKS

Quality		KA MASPIL 87	KA MASPIL 89	KA MASPIL 85	KA MASPIL 88	KA MASPIL 92	KA MASPIL 90	
Physical Properties	AP (%)	16 - 18	16 - 18	16 - 18	16 - 18	17 - 21	16 - 18	
	BD (g/cm <sup>3</sup> )	2.90 - 3.05	2.92 - 2.98	2.92 - 2.98	2.92 - 2.98	2.90 - 3.05	2.92 - 2.98	
	CCS (kg/cm <sup>2</sup> )	450	500	550	550	400	500	
	TC (kcal/mh°C)	@ 500°C	2.9	2.9	2.95	2.95	3	2.95
		@ 1000°C	2.4	2.4	2.5	2.5	2.5	2.45
	TE (%)	@ 1000°C	1.2	1.2	1.2	1.2	1.25	1.2
		@ 1400°C	1.7	1.7	1.7	1.7	1.7	1.7
	RUL (°C)	T <sub>a</sub>	1700	1700	1700	1700	1700	1700
T <sub>b</sub>		1750	1750	1750	1750	1750	1750	
TSR (950°C/air)		120 min	120 min	120 min	120 min	120 min	120 min	
Chemical Properties (%)	MgO	87 - 89	87 - 89	85	86 - 88	90 - 92	90	
	Al <sub>2</sub> O <sub>3</sub>	8 - 12	8 - 12	10 - 15	10 - 15	4 - 6	6 - 8	
	Fe <sub>2</sub> O <sub>3</sub>	0.5	0.5	0.8	0.8	0.5	0.5	
	CaO	1.6	1	1.4	1.2	2.5	1	
	SiO <sub>2</sub>	0.8	0.5	0.9	0.5	1	0.5	
Main Application		Upper & Lower Transition Zones and Tyre Section of Rotary Kiln, also suitable at Sintering Zone based on Thermo - Chemical & Thermo - Mechanical Loads of Kilns using Alternative Materials and Fuels						

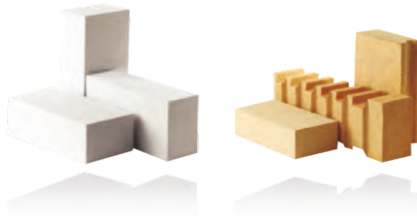


## HIGH SILICA BRICKS

Quality		KA 83 HISI	KA 78 HISI
Physical Properties	AP (%)	14	14
	BD (g/cm <sup>3</sup> )	2.25	2.23
	CCS (kg/cm <sup>2</sup> )	350	350
	PLC (%)	@ 1500°Cx2hrs	4~7
	RUL (2kg/cm <sup>2</sup> , T2°C)	1530	1500
Chemical Properties (%)	SiO <sub>2</sub>	83	78
	Al <sub>2</sub> O <sub>3</sub>	15	21
Main Application		Ladle	

## ACID PROOF BRICKS

Quality		KA AP 65 A	KA AP 65 B	KA AP 65 C	KA AP 60 A	KA AP 60 B
Physical Properties	Water Absorption (%)	0.5	1.5	3	5	8
	BD (g/cm <sup>3</sup> )	2	2	2.1	2.1	2.1
	CCS (kg/cm <sup>2</sup> )	700	700	600	500	500
	Maximum Service Temp (°C)	-	-	1200	1200	1200
	Acid-Proof Resistance (%)	0.3	0.5	0.7	1	1.5
Chemical Properties (%)	SiO <sub>2</sub>	65<	65<	65<	60<	60<
	Al <sub>2</sub> O <sub>3</sub>	25>	25>	25>	25>	25>
	Cr <sub>2</sub> O <sub>3</sub>	1.5	1.5	2	2	2
Main Application		Chemical processing Equipment		Stack		



## ZIRCON BRICKS

Quality		KA 65 ZR	KA 63 ZR	KA 20 ZR	
Physical Properties	Refractoriness (SK)	40	36	35	
	AP (%)	18	20	20	
	BD (g/cm <sup>3</sup> )	3.75	3.5	3.2	
	CCS (kg/cm <sup>2</sup> )	600	600	800	
	TE (%)	@ 1000°C	0.45	0.5	0.55
	PLC (%)	@ 1500°Cx2hrs	-	±0.2	±0.1
	RUL (2kg/cm <sup>2</sup> , T2°C)	-	1500	1650	
Chemical Properties (%)	SiO <sub>2</sub>	34	-	10	
	Al <sub>2</sub> O <sub>3</sub>	-	-	69	
	Fe <sub>2</sub> O <sub>3</sub>	-	-	0.5	
	Cr <sub>2</sub> O <sub>3</sub>	2	-	-	
	Zr <sub>2</sub> O <sub>3</sub>	65	63	20	
Main Application		Glass Tank Subpaving			

## ZIRCONIA BRICKS

Quality		KA ZRC 1A	KA ZRC 2A
Physical Properties	Water Absorption (%)	16	13.3
	BD (g/cm <sup>3</sup> )	4.75	4.83
	CCS (kg/cm <sup>2</sup> )	-	-
Chemical Properties (%)	SiO <sub>2</sub>	0.9	0.9
	Al <sub>2</sub> O <sub>3</sub>	0.3	0.5
	P <sub>2</sub> O <sub>5</sub>	-	-
	CaO + MgO	2.69	2.7
	ZrO <sub>2</sub>	95.5	95.5
Main Application		Open Nozzle	



## FIRE CLAY BRICKS

Quality		KA 38 FC A	KA 38 FC B	KA 35 FC A	KA 35 FC B	
Physical Properties	Refractoriness (SK)	34	34	32	32	
	AP (%)	24	28	26	28	
	BD (g/cm <sup>3</sup> )	2.15	2.1	2.1	2.05	
	CCS (kg/cm <sup>2</sup> )	200	150	200	150	
	TE (%)	@ 1000°C	0.5	0.5	0.5	0.5
	PLC (%)	@ 1350°Cx2hrs	-	-	±0.5	±0.5
		@ 1400°Cx2hrs	+0.1~ -0.5	+0.1~ -0.5	-	-
RUL (2kg/cm <sup>2</sup> , T2°C)	1350	1300	1350	1280		
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	38	38	35	35	
	Fe <sub>2</sub> O <sub>3</sub>	2.5	2.5	2.5	2.5	
Main Application		Blast furnaces, Hot Blast Stove, Incinerators & Glass furnaces				

Quality		KA 44 FC A	KA 40 FC A	KA 36 FC A	KA 44 FC B	KA 40 FC B	KA 36 FC B	
Physical Properties	Refractoriness (SK)	35	34	32	35	34	32	
	AP (%)	18	18	18	20	20	20	
	BD (g/cm <sup>3</sup> )	2.3	2.25	2.15	2.3	2.25	2.15	
	CCS (kg/cm <sup>2</sup> )	500	450	350	400	350	250	
	TE (%)	@ 1000°C	0.6	0.5	0.5	0.55	0.5	0.5
	PLC (%)	@ 1400°Cx2hrs	-	±0.2	±0.2	-	±0.2	±0.2
		@ 1500°Cx2hrs	±0.2	-	-	±0.2	-	-
RUL (2kg/cm <sup>2</sup> , T2°C)	1500	1480	1400	1450	1400	1350		
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	44	40	36	44	40	36	
	Fe <sub>2</sub> O <sub>3</sub>	2	2	2	2	2	2	
Main Application		Blast furnaces, Hot Blast Stove, Incinerators & Glass furnaces						





## HIGH ALUMINA BRICKS

Quality		KA 80 HAA	KA 70 HAA	KA 60 HAA	KA 50 HAA	KA 45 HA	KA 90 HA	KA 85 HAA	
Physical Properties	Refractoriness (SK)	39	38	37	36	35	40	40	
	AP (%)	24	24	24	25	26	19	19	
	BD (g/cm <sup>3</sup> )	2.65	2.5	2.4	2.3	2.2	3	2.85	
	CCS (kg/cm <sup>2</sup> )	350	300	300	250	200	700	700	
	TE (%)	@ 1000°C	0.7	0.7	0.6	0.6	0.5	0.7	0.7
	PLC (%)	@ 1400°Cx2hrs	-	-	-	-	±0.3	0	0
		@ 1500°Cx2hrs	±0.3	±0.3	±0.3	±0.3	-	-	-
RUL (2kg/cm <sup>2</sup> , T2°C)		1700	1550	1480	1450	1400	1700	1700	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	80	70	60	50	45	90	85	
	Fe <sub>2</sub> O <sub>3</sub>	2	2	2.5	2.5	2.5	0.8	1	
Main Application		Various Industrial Furnaces							

Quality		KA 75 HA	KA 85 HA B	KA 70 HA B	KA 80 HA B	KA 60 HA B	KA 50 HA B	
Physical Properties	Refractoriness (SK)	39	38	38	37	37	36	
	AP (%)	20	17	20	17	20	20	
	BD (g/cm <sup>3</sup> )	2.7	2.85	2.6	2.8	2.5	2.35	
	CCS (kg/cm <sup>2</sup> )	600	1,200	550	1,000	450	400	
	TE (%)	@ 1000°C	0.7	0.7	0.7	0.7	0.65	0.6
	PLC (%)	@ 1600°Cx2hrs	±0.2	0	±0.2	0	±0.3	±0.3
		@ 1650°Cx2hrs	-	-	-	-	-	-
RUL (2kg/cm <sup>2</sup> , T2°C)		1680	1600	1650	1600	1600	1550	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	75	85	70	80	60	50	
	Fe <sub>2</sub> O <sub>3</sub>	1	1	1.5	1	2	2	
	Cr <sub>2</sub> O <sub>3</sub>	-	-	-	-	-	-	
Main Application		Various Industrial Furnaces						

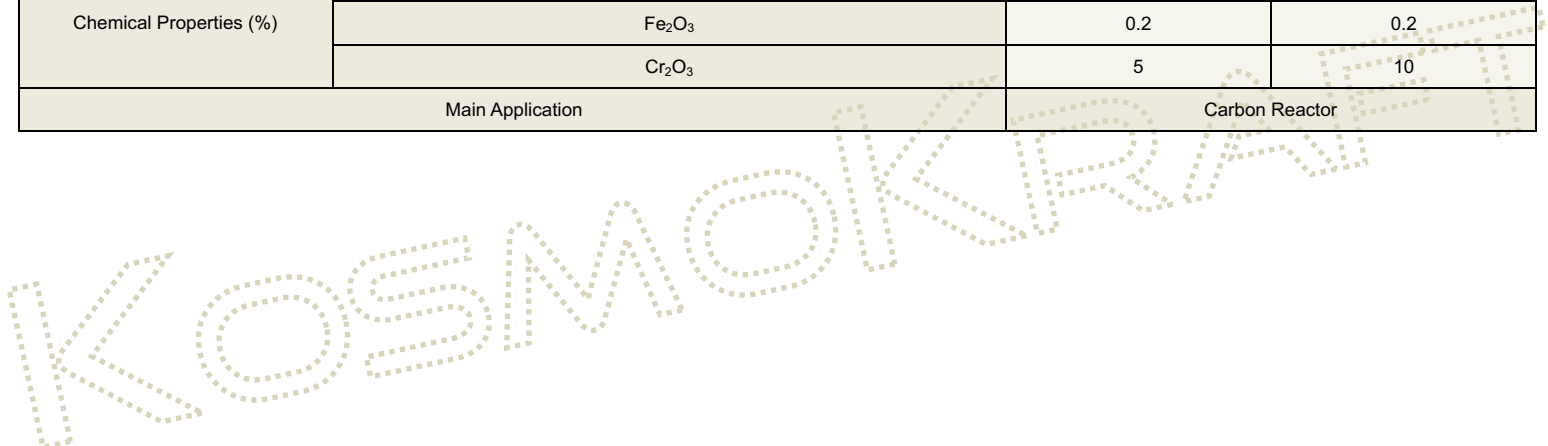


## SILICON CARBIDE (SiC) BRICKS

Quality		KA 88 SiC	KA 85 SiC	KA 95 SiC	KA 91 SiC	
Physical Properties	AP (%)	17	18	13	17	
	BD (g/cm <sup>3</sup> )	2.6	2.55	2.6	2.55	
	CCS (kg/cm <sup>2</sup> )	800	600	1000	1000	
	TE (%)	@ 1000°C	0.5	0.5	0.45	0.45
	TC (kcal/m.hr.°C)	@ 350°C	14.5	14.4	15	15
	Max Service Temp (°C)		1470	1450	1600	1550
	RUL (2kg/cm <sup>2</sup> ,T2°C)		1600	1550	1700	1700
	Spalling Resistance(20cycles at 1000°C)		1470	1450	1600	1550
Chemical Properties (%)	SiC	88	85	95	91	
	Si <sub>3</sub> N <sub>4</sub>	-	-	-	3	
Main Application		Cupola Lining, Incinerator		Nonferrous Metal Melting Furnace		

## ALUMINA CHROME (Al<sub>2</sub>O<sub>3</sub> - Cr<sub>2</sub>O<sub>3</sub>) BRICKS

Quality		KA 88 ALCR	KA 83 ALCR	
Physical Properties	Refractoriness (SK)	42	42	
	AP (%)	17	18	
	BD (g/cm <sup>3</sup> )	3.3	3.25	
	CCS (kg/cm <sup>2</sup> )	1000	1000	
	TE (%)	@ 1000°C	0.79	0.77
	PLC (%)	@ 1650°Cx2hrs	0	0
	RUL (2kg/cm <sup>2</sup> ,T2°C)		1700	1700
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	88	83	
	Fe <sub>2</sub> O <sub>3</sub>	0.2	0.2	
	Cr <sub>2</sub> O <sub>3</sub>	5	10	
Main Application		Carbon Reactor		





## CASTABLE REFRACTORY

General Castable						
Quality		Alumina				
		KAALCAST 90	KAALCAST 85	KAALCAST 80	KAALCAST 60	
Physical Properties	Application Limit Temp. (°C)		1800	1800	1750	1700
	Required quantity (t/m <sup>3</sup> )		2.9	2.85	2.8	2.5
	Water Required for Casting (%)		9 - 10	9 - 10	11 - 12	10 - 13
	CCS (kg/cm <sup>2</sup> )	@ 110°Cx24h	550(90)	300(60)	300(60)	250(50)
		@ 1200°Cx3h	500(80)	350(70)	350(70)	200(40)
		@ 1500°Cx3h	600(100)	500(80)	600(100)	500(120)
	PLC (%)	@ 110°Cx24h	-0.03	-0.03	-0.06	-0.06
		@ 1200°Cx3h	-0.1	-0.1	-0.15	-0.2
		@ 1500°Cx3h	-0.2	-0.2	-1	-0.8
	TC (kcal/mh°C)	@ 400°C	0.95	0.95	0.92	0.8
@ 1000°C		1.1	1.05	1.02	0.9	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>		92	88	82	62
	SiO <sub>2</sub>		-	-	10	29
Main Applications			Nonferrous Metal Furnace, Various Incinerator, Reheating Furnace, EAF, Ladle, Tundish, Various Industrial Furnace			

Quality		Alumina			
		KAALCAST 55	KAALCAST 50	KAALCAST 45	
Physical Properties	Application Limit Temp. (°C)		1650	1600	1550
	Required quantity (t/m <sup>3</sup> )		2.3	2.15	2.1
	Water Required for Casting (%)		11 - 14	12 - 15	13-16
	CCS (kg/cm <sup>2</sup> )	@ 110°Cx24h	250(50)	200(40)	200(45)
		@ 1200°Cx3h	170(35)	150(35)	150(25)
		@ 1500°Cx3h	450(80)	400(70)	400(70)
	PLC (%)	@ 110°Cx24h	-0.06	-0.06	-0.06
		@ 1200°Cx3h	-0.2	-0.16	-0.3
		@ 1500°Cx3h	-1	-1	-0.7
	TC (kcal/mh°C)	@ 400°C	0.72	0.68	0.68
@ 1000°C		0.85	0.88	0.8	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>		55	50	47
	SiO <sub>2</sub>		40	43	45
Main Applications			Nonferrous Metal Furnace, Various Incinerator, Reheating Furnace, EAF, Ladle, Tundish, Various Industrial Furnace		



## General Castable

Quality		Clay			
		KA CLCAST 50	KA CLCAST 55	KA CLCAST 60	
Physical Properties	Application Limit Temp. (°C)	1500	1400	1300	
	Required quantity (t/m <sup>3</sup> )	2.1	2	1.9	
	Water Required for Casting (%)	13-16	13-17	15-18	
	CCS (kg/cm <sup>2</sup> )	@ 110°Cx24h	250(50)	200(50)	200(40)
		@ 1200°Cx3h	170(40)	140(30)	140(20)
		@ 1500°Cx3h	320(75)	-	-
	PLC (%)	@ 110°Cx24h	-0.06	-0.06	-0.06
		@ 1200°Cx3h	-0.25	-0.3	-0.6
		@ 1500°Cx3h	-	-	-
	TC (kcal/mh°C)	@ 400°C	0.65	0.6	0.56
@ 1000°C		0.76	0.71	0.68	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	44	35	30	
	SiO <sub>2</sub>	50	55	60	
Main Applications		Nonferrous Metal Furnace, Various Incinerator, Reheating Furnace, EAF, Ladle, Tundish, Various Industrial Furnace			

## Silicon Carbide (SiC) Castable

Quality		KA SICAST 85	KA SICAST 80	KA SICAST 60	KA SICAST 40	KA SICAST 20	KA SICAST 25	
Physical Properties	Required quantity (t/m <sup>3</sup> )	2.68	2.6	2.5	2.78	2.15	2.6	
	Water Required for Casting (%)	6 - 7	6 - 7	7 - 8	7 - 8	15-16	8 - 9	
	CCS (kg/cm <sup>2</sup> )	@ 110°Cx24h	650(140)	500(90)	450(70)	450(70)	80(20)	530(80)
		@ 1000°Cx3h	850(150)	600(150)	550(100)	550(90)	130(25)	780(150)
		@ 1350°Cx3h	1100(250)	1000(250)	1000(250)	900(150)	-	1100(250)
	PLC (%)	@ 110°Cx24h	-0.06	-0.06	-0.06	-0.06	-0.1	-0.06
		@ 1000°Cx3h	-0.1	-0.1	-0.2	-0.2	0.1	-0.12
		@ 1350°Cx3h	-0.1	-0.1	-0.12	-0.1	-	-0.2
	TC (kcal/mh°C)	@ 350°C	11.5	11	8	6	3.5	8
	Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	9	9	20	32	25	25
SiC + C		83	78	58	42	18	58	
Main Applications		Nonferrous Metal Furnace, Incinerator, Cement Furnace & other Industrial Furnace						



## Insulating Castable

Quality		KA INCAST 90	KA INCAST 75	KA INCAST 60	KA INCAST 40	KA INCAST 45	
Physical Properties	Application Limit Temp. (°C)	1700	1600	1500	1400	1300	
	Required quantity (t/m <sup>3</sup> )	1.45	1.5	1.55	1.45	1.35	
	Water Required for Casting (%)	18-23	20-25	21-25	28-35	35-40	
	CCS (kg/cm <sup>2</sup> )	@ 110°Cx24h	150(40)	100(30)	120(35)	115(33)	100(30)
		@ 1200°Cx3h	140(40)	105(30)	110(35)	50(25)	45(21)
		@ 1500°Cx3h	150(50)	144(81)	220(108)	150(30) @ 1400°C	-
	PLC (%)	@ 110°Cx24h	-0.08	-0.06	-0.12	-0.06	-0.09
		@ 1200°Cx3h	-0.1	-0.1	-0.18	-0.4	-0.7
		@ 1500°Cx3h	0.1	-0.5	0.1	-1 @ 1400°C	-
	TC (kcal/mh°C)	@ 400°C	0.6	0.5	0.52	0.32	0.25
@ 1000°C		0.8	0.6	0.64	0.41	0.27	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	90	75	60	43	43	
	SiO <sub>2</sub>	-	15	30	40	42	
Main Applications		Nonferrous Metal Furnace, Incinerator, Reheating Furnace, Petrochemical plants, Heater & Boilers					

Quality		KA INCAST 35	KA INCAST 33	KA INCAST 30	KA INCAST 50	KA INCAST 43	
Physical Properties	Application Limit Temp. (°C)	1200	1100	1000	1000	1000	
	Required quantity (t/m <sup>3</sup> )	1.25	1.15	1.05	0.85	0.55	
	Water Required for Casting (%)	40-45	45-50	45-55	55-65	110-130	
	CCS (kg/cm <sup>2</sup> )	@ 110°Cx24h	80(30)	80(25)	50(25)	40(15)	15(4)
		@ 1200°Cx3h	40(20)	38(20) @ 1000°C	37(20) @ 1000°C	30(10) @ 1000°C	8(3) @ 1000°C
		@ 1500°Cx3h	-	-	-	-	-
	PLC (%)	@ 110°Cx24h	-0.09	-0.09	-0.09	-0.1	-0.12
		@ 1200°Cx3h	-0.8	-0.65 @ 1000°C	-0.7 @ 1000°C	-0.9 @ 1000°C	-1.2 @ 1000°C
		@ 1500°Cx3h	-	-	-	-	-
	TC (kcal/mh°C)	@ 400°C	0.18	0.16	0.15	0.14	0.1
@ 1000°C		0.24	0.21	0.2	0.2	0.15	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	35	33	30	30	35	
	SiO <sub>2</sub>	47	49	48	50	43	
Main Applications		Nonferrous Metal Furnace, Incinerator, Reheating Furnace, Petrochemical plants, Heater & Boilers					



## High Strength Castable

Quality		Alumina				
		KA HACAST 90	KA HACAST 75	KA HACAST 60	KA HACAST 50	
Physical Properties	Application Limit Temp. (°C)	1800	1700	1600	1500	
	Required quantity (t/m <sup>3</sup> )	2.95	2.45	2.3	2.15	
	Water Required for Casting (%)	8 - 11	10 - 14	10 - 14	11 - 15	
	CCS (kg/cm <sup>2</sup> )	@ 110°Cx24h	600(100)	450(85)	400(80)	400(80)
		@ 1200°Cx3h	550(95)	500(90)	450(85)	500(90)
		@ 1400°Cx3h	800(150) @ 1500°C	550(100)	500(90)	550(95)
	PLC (%)	@ 110°Cx24h	-0.03	-0.06	-0.06	-0.06
@ 1200°Cx3h		-0.1	-0.2	-0.2	-0.15	
@ 1400°Cx3h		0.4 @ 1500°C	-0.3	-0.2	-0.3	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	91	76	63	52	
	SiO <sub>2</sub>	1.5	15	27	40	
Main Applications		Glass Melting & Cement Furnace, Various Incinerator, Reheating Furnace, EAF, Ladle, Tundish, Various Industrial Furnace				

Quality		Alumina			
		KA HACAST 48	KA HACAST 80	KA HACAST 55	
Physical Properties	Application Limit Temp. (°C)	1400	1600	1600	
	Required quantity (t/m <sup>3</sup> )	2.1	2.65	2.4	
	Water Required for Casting (%)	11 - 15	7 - 7.5	7 - 7.5	
	CCS (kg/cm <sup>2</sup> )	@ 110°Cx24h	350(60)	400(80)	300(50)
		@ 1200°Cx3h	400(80)	500(90)	400(70)
		@ 1400°Cx3h	450(85) @ 1300°C	800(95)	700(80)
	PLC (%)	@ 110°Cx24h	-0.06	-0.04	-0.05
@ 1200°Cx3h		-0.15	-0.1	-0.1	
@ 1400°Cx3h		-0.4 @ 1300°C	0.1	0.15	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	48	78	58	
	SiO <sub>2</sub>	44	15	32	
Main Applications		Glass Melting & Cement Furnace, Various Incinerator, Reheating Furnace, EAF, Ladle, Tundish, Various Industrial Furnace			



## Vibrating & Free Flow Castable

Quality		Tundish			
		KA TCAST 75	KA TCAST 65	KA TCAST 60	
Physical Properties	Application Limit Temp. (°C)	1700	1700	1700	
	Required quantity (t/m <sup>3</sup> )	2.8	2.65	2.6	
	Water Required for Casting (%)	7.5	7.5	7.5-8.5	
	BD (g/cm <sup>3</sup> )	2.75	2.6	2.55	
	CCS (kg/cm <sup>2</sup> )	@ 110°Cx24h	500(85)	500(70)	450(70)
		@ 1000°Cx3h	600(100)	550(80)	500(70)
		@ 1500°Cx3h	800(140)	750(120)	700(150)
	TE (%)	@ 1000°C	0.71	0.7	0.7
	PLC (%)	@ 110°Cx24h	-0.03	-0.03	-0.06
		@ 1000°Cx3h	0.05	0.15	0.09
@ 1500°Cx3h		0.2	0.5	0.18	
TC (kcal/mh°C)	@ 400°C	1.2	1.1	1.1	
	@ 1000°C	1.3	1.3	1.3	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	76	65	60	
	SiO <sub>2</sub>	20	30	35	
Main Applications		Tundish Vibrating (Casting)		Tundish Free Flow	

Quality		Ladle					
		KA LCAST 88	KA LCAST 85	KA LCAST 86	KA LCAST 90	KA LCAST 91	
Physical Properties	Application Limit Temp. (°C)	1800	1800	1700	1800	1800	
	Required quantity (t/m <sup>3</sup> )	3.01	3.2	2.95	3.3	3.35	
	Water Required for Casting (%)	8	5.5	10	6	6.0-6.5	
	BD (g/cm <sup>3</sup> )	2.95	3.05	2.85	3.05	2.93	
	CCS (kg/cm <sup>2</sup> )	@ 110°Cx24h	150(30)	200(50)	150(20)	300(40)	380(120)
		@ 1000°Cx3h	-	300(100)	-	-	-
		@ 1500°Cx3h	300(120) @ 1400°C	800(250)	180(30) @ 1400°C	600(200)	750(180)
	TE (%)	@ 1000°C	-	-	-	-	-
	PLC (%)	@ 110°Cx24h	-0.2	-0.1	-0.06	-0.01	-0.01
		@ 1000°Cx3h	-	-	-	-	-
@ 1500°Cx3h		1.5 @ 1400°C	0.1	-0.15 @ 1400°C	0	0.19	
TC (kcal/mh°C)	@ 400°C	-	-	-	-	-	
	@ 1000°C	-	-	-	-	-	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	88	86	86	90	90	
	MgO	5	9	-	6	5	
	CaO	2	-	-	-	-	
Main Applications		Ladle Bottom, Around Well Block of Ladle & RH degasser			Wall lining of Ladle		



## RAMMING REFRACTORY

Quality		Alumina					
		KA ALRAM 85	KA ALRAM 87	KA ALRAM 80	KA ALRAM 82	KA ALRAM 86	KA ALRAM 90
Physical Properties	Application Limit Temp. (°C)	1800	1800	1800	1800	1800	1800
	Required quantity (t/m <sup>3</sup> )	2.8	2.8	2.75	2.75	2.85	2.8
	Max. Granularity (mm)	5	5	5	5	5	5
	Min. Granularity (mm)	0	0	0	0	0	0
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	87	87	82	82	86	92
	SiO <sub>2</sub>	0.35	0.40	0.50	0.60	5	-
	MgO	10	10	15	16	-	6
	SiC	-	-	-	-	3	-
Main Applications		Various Industrial Furnace					

Quality		MgO+Al <sub>2</sub> O <sub>3</sub>		Silica	
		KA MARAM 90	KA MARAM 95	KA SIRAM 98	KA SIRAM 75
Physical Properties	Application Limit Temp. (°C)	1800	1800	1800	1650
	Required quantity (t/m <sup>3</sup> )	2.8	2.75	2.75	1.8
	Max. Granularity (mm)	5	5	5	5
	Min. Granularity (mm)	0	0	0	0
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	10	5	1	20
	SiO <sub>2</sub>	-	-	98	75
	MgO	90	95	-	-
	SiC	-	-	-	-
Main Applications		Various Industrial Furnace			Cupola Gunning materials

Quality		MgO				Dolomite
		KA MGRAM 97	KA MGRAM 95	KA MGRAM 90	KA MGRAM 85	KA DORAM 85
Physical Properties	Application Limit Temp. (°C)	1800	1800	1800	1800	1750
	Required quantity (t/m <sup>3</sup> )	2.75	2.65	2.4	2.3	2.65
	Max. Granularity (mm)	5	5	5	5	8
	Min. Granularity (mm)	0	0	0	0	0
Chemical Properties (%)	Fe <sub>2</sub> O <sub>3</sub>	-	-	-	-	4
	SiO <sub>2</sub>	-	-	-	4.5	-
	MgO	97	94	90	85	83
	CaO	-	-	-	-	13
Main Applications		EAF Hearth				





## RAMMING MIX REFRACTORY

Quality		Alumina						
		KA ALRAMIX 95	KA ALRAMIX 90	KA ALRAMIX 80	KAALRAMIX 60	KA ALRAMIX 88	KA ALRAMIX 85	
Physical Properties	Application Limit Temp. (°C)	1800	1750	1700	1650	1800	1750	
	Required quantity (t/m <sup>3</sup> )	3.1	2.9	2.85	2.6	3.1	2.8	
	Max. Granularity (mm)	5	5	5	5	5	5	
	Min. Granularity (mm)	0	0	0	0	0	0	
	CCS (kg/cm <sup>2</sup> )	@ 110°Cx24h	(100)	(170)	300(50)	300(50)	350(70)	300(50)
		@ 1000°Cx3h	(170)	(300)	200(40)	150(30)	250(65)	200(40)
		@ 1400°Cx3h	(250)	(300)	300(50)	250(20)	400(80)	400(80)
	PLC (%)	@ 110°Cx24h	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2
		@ 1000°Cx3h	-0.3	-0.5	-0.5	-0.35	-0.2	-0.3
@ 1400°Cx3h		-0.4	-0.6	-0.4	-0.6	-0.3	-0.4	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	93	87	80	60	88	84	
	SiO <sub>2</sub>	-	10	15	30	6	10	
	MgO	-	-	-	-	-	-	
	SiC + C	-	-	-	-	-	-	
	Cr <sub>2</sub> O <sub>3</sub>	-	-	-	-	3.5	2.9	
Main Applications		Conduction Furnace, Ladle Bottom, Flange, Around Well Block & Around Tundish Impact						

Quality		SiC				MgO - C	
		KA SICRAMIX 75	KA SICRAMIX 70	KA SICRAMIX 55	KA SICRAMIX 60	KA MCRAMIX 80	
Physical Properties	Application Limit Temp. (°C)	1700	1700	1600	1600	1750	
	Required quantity (t/m <sup>3</sup> )	2.84	2.75	2.3	2.2	2.45	
	Max. Granularity (mm)	5	5	5	5	5	
	Min. Granularity (mm)	0	0	0	0	0	
	CCS (kg/cm <sup>2</sup> )	@ 110°Cx24h	350(90) @ 200°C	300(80) @ 200°C	70	40	-
		@ 1000°Cx3h	-	-	165	115	-
		@ 1400°Cx3h	460(110)	450(100)	-	-	-
	PLC (%)	@ 110°Cx24h	-0.1	-0.1	-0.28	-0.28	-
		@ 1000°Cx3h	-	-	1.15	1.09	-
@ 1400°Cx3h		0.12	0.2	-	-	0.24	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	75	70	23	15	-	
	SiO <sub>2</sub>	7	10	56	60	-	
	MgO	-	-	-	-	78	
	SiC + C	14	13	14	18	15	
	Cr <sub>2</sub> O <sub>3</sub>	-	-	-	-	-	
Main Applications		Nonferrous Metal Furnace, Cupola & Ladle Bottom				Ladle & EAF	



## GUNNING REFRACTORY

Quality		EAF		Ladle		
		KA MAGUN 90	KA MAGUN 85	KA ALGUN 85	KA ALGUN 75	
Physical Properties	Application Limit Temp. (°C)	1750	1700	1700	1700	
	Required quantity (t/m <sup>3</sup> )	2.4	2.35	2.7	2.8	
	Max. Granularity (mm)	5	5	5	5	
	Min. Granularity (mm)	0	0	0	0	
	CCS (kg/cm <sup>2</sup> )	@ 110°Cx24h	25	25	30	70
		@ 1500°Cx3h	160	180	240 @ 1400°C	600 @ 1400°C
PLC (%)	@ 110°Cx24h	-	-	-0.03	-0.03	
	@ 1500°Cx3h	-1.5	-1.9	0.53 @ 1400°C	0.7 @ 1400°C	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	-	-	85	75	
	SiO <sub>2</sub>	6	8	-	-	
	MgO	90	85	7	20	
Main Applications		Spray Coating materials for AC,DC EAF		Shot-Cast materials for Ladle Wall		

Quality		Tundish				
		KA MAGUN 75	KA MAGUN 80	KA MAGUN 86	KA MAGUN 76	
Physical Properties	Application Limit Temp. (°C)	1700	1700	1700	1700	
	Required quantity (t/m <sup>3</sup> )	1.7	1.7	1.7	2	
	Max. Granularity (mm)	1	1	1	1	
	Min. Granularity (mm)	0	0	0	0	
	CCS (kg/cm <sup>2</sup> )	@ 110°Cx24h	20	20	30	25
		@ 1500°Cx3h	50	60	70	65
PLC (%)	@ 110°Cx24h	-	-	-	-	
	@ 1500°Cx3h	-	-	-	-	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	-	-	-	-	
	SiO <sub>2</sub>	12	10	8	12	
	MgO	74	80	86	76	
Main Applications		Cold & Hot Gunning materials for Tundish (Spray Coating materials)				



## MORTAR REFRACTORY

### Heat Setting Refractory Mortar

Quality			Alumina					
			KA ALMOR 90	KA ALMOR 80	KA ALMOR 70	KA ALMOR 60	KA ALMOR 55	KA ALMOR 50
Physical Properties	Refractoriness (SK)		40	39	38	37	36	35
	Grain size (%)	-1.00 mm	100	100	100	100	100	100
		-0.074 mm	-	70	50	50	50	40
Bonding Time (min)		1 ~ 3						
Chemical Composition (%)	Al <sub>2</sub> O <sub>3</sub>		90	80	72	59	54	47
	SiO <sub>2</sub>		-	10	18	32	36	45
Main Applications			Alumina brick joint					

Quality			Clay		
			KA CLMOR 50	KA CLMOR 55	KA CLMOR 60
Physical Properties	Refractoriness (SK)		34	33	32
	Grain size (%)	-1.00 mm	100	100	100
		-0.074 mm	40	40	40
Bonding Time (min)		1 ~ 3			
Chemical Composition (%)	Al <sub>2</sub> O <sub>3</sub>		36	33	31
	SiO <sub>2</sub>		54	58	60
Main Applications			Clay brick joint		

Quality			Clay			
			KA CLMOR 62	KA CLMOR 63	KA CLMOR 67	KA CLMOR 70
Physical Properties	Refractoriness (SK)		31	30	29	28
	Grain size (%)	-1.00 mm	100	100	100	100
		-0.074 mm	40	50	40	40
Bonding Time (min)		1 ~ 3				
Chemical Composition (%)	Al <sub>2</sub> O <sub>3</sub>		29	27	23	20
	SiO <sub>2</sub>		62	63	67	71
Main Applications			Clay brick joint			



## Air Setting Refractory Mortar

Quality		Alumina					
		KA AS MOR A1	KA AS MOR A2	KA AS MOR A3	KA AS MOR A4	KA AS MOR A5	
Physical Properties	Refractoriness (SK)	39	38	37	36	35	
	Grain size (%)	-1.00 mm	100	100	100	100	
		-0.074 mm	55	50	40	40	
	Bonding Time (min)		1 ~ 3				
	Bonding Strength (kg/cm <sup>2</sup> )	@ 105°Cx24h	15	15	15	15	15
@ 1000°Cx3h		15	15	20	20	20	
@ 1400°Cx3h		30	30	35	35	35	
Chemical Composition (%)	Al <sub>2</sub> O <sub>3</sub>	80	72	62	55	45	
	SiO <sub>2</sub>	10	18	28	34	45	
Main Applications		Alumina & Insulating brick					

Quality		Clay			
		KA AS MOR CL 1	KA AS MOR CL 2	KA AS MOR CL 3	
Physical Properties	Refractoriness (SK)	34	33	32	
	Grain size (%)	-1.00 mm	100	100	
		-0.074 mm	45	45	
	Bonding Time (min)		1 ~ 3		
	Bonding Strength (kg/cm <sup>2</sup> )	@ 105°Cx24h	10	10	15
@ 1000°Cx3h		15	15	15	
@ 1400°Cx3h		-	-	-	
Chemical Composition (%)	Al <sub>2</sub> O <sub>3</sub>	43	40	35	
	SiO <sub>2</sub>	47	50	55	
Main Applications		Clay & Insulating brick			

Quality		Clay			Insulating			
		KA AS MOR CL 4	KA AS MOR CL 5	KA AS MOR CL 6	KA ASMOR IN1	KA ASMOR IN2	KA ASMOR IN3	
Physical Properties	Refractoriness (SK)	31	30	28	-	-	-	
	Grain size (%)	-1.00 mm	100	100	100	100	100	
		-0.074 mm	45	45	45	30	30	
	Bonding Time (min)		1 ~ 3			1 ~ 3		
	Bonding Strength (kg/cm <sup>2</sup> )	@ 105°Cx24h	15	15	15	5	5	5
@ 1000°Cx3h		15	15	15	15	6	6	
@ 1400°Cx3h		-	-	-	-	-	-	
Chemical Composition (%)	Al <sub>2</sub> O <sub>3</sub>	30	28	28	-	-	-	
	SiO <sub>2</sub>	60	62	64	-	-	-	
Main Applications		Clay & Insulating brick			Insulating brick			



## MORTAR REFRACTORY

Special Refractory Mortar							
Quality		Silica		MgO			
		KA SIMOR 96	KA SIMOR 94	KA MGMOR 90	KA MGMOR 85	KA MGMOR 70	
Physical Properties	Refractoriness (SK)		32	30	28	38	38
	Grain size (%)	-1.00 mm	100	100	100	100	100
		-0.074 mm	50	50	50	30	35
Bonding Time (min)		1 ~ 3					
Chemical Composition (%)	Al <sub>2</sub> O <sub>3</sub>		-	-	-	-	-
	SiO <sub>2</sub>		96	94	90	-	-
	MgO		-	-	-	87	72
	Cr <sub>2</sub> O <sub>3</sub>		-	-	-	-	-
	ZrO <sub>2</sub>		-	-	-	-	-
	C		-	-	-	-	-
Main Applications			Silica Brick		MgO Brick		

Quality			MgO - Cr <sub>2</sub> O <sub>3</sub>		Zircon		MgO - C	Unburned Al <sub>2</sub> O <sub>3</sub>
			KA MCRMOR 15	KA MCRMOR 25	KA ZIMOR 65	KA ZIMOR 40	KA MCMOR 75	KA UALMOR 80
Physical Properties	Refractoriness (SK)		38	37	36	30	40	38
	Grain size (%)	-1.00 mm	100	100	100	100	100	100
		-0.074 mm	40	40	40	40	40	50
	Bonding Time (min)		1 ~ 3				1 ~ 3	
Chemical Composition (%)	Al <sub>2</sub> O <sub>3</sub>		-	-	-	-	-	80
	SiO <sub>2</sub>		-	-	-	-	-	15
	MgO		50	30	-	-	75	-
	Cr <sub>2</sub> O <sub>3</sub>		15	25	-	-	-	-
	ZrO <sub>2</sub>		-	-	64	38	-	-
	C		-	-	-	-	15	-
Main Applications			MgO-Cr Brick		Zircon Brick		MgO-C Brick	Unburned Al <sub>2</sub> O <sub>3</sub> Brick



## PLASTIC REFRACTORY

Quality		Normal				
		KA PREF 85	KA PREF 70	KA PREF 60	KA PREF 45	
Physical Properties	Application Limit Temp. (°C)	1800	1700	1650	1600	
	Required quantity (t/m <sup>3</sup> )	2.9	2.75	2.5	2.3	
	CCS (kg/cm <sup>2</sup> )	@ 110°Cx24h	300(60)	200(50)	120(30)	120(35)
		@ 1000°Cx3h	500(80)	250(50)	250(35)	250(30)
		@ 1500°Cx3h	600(100)	400(70)	700(40)	600(90)
	PLC (%)	@ 110°Cx24h	-0.7	-0.8	-0.9	-0.9
		@ 1000°Cx3h	-0.6	-0.7	-0.5	-0.5
		@ 1500°Cx3h	0.15	0	0.15	0.15
TC (kcal/mh°C)	@ 500°C	1.2	1.05	0.81	0.81	
	@ 1000°C	1.37	1.2	1.03	0.9	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	85	73	60	46	
	SiO <sub>2</sub>	11	20	33	47	
Main Applications		Nonferrous Metal Furnace, Incinerator, Reheating Furnace, Petrochemical plants, Heater & Boilers				

Quality		Normal			Special			
		KA PREF 40	KA PREF 50	KA PREF 55	KA SPREF 90	KA SPREF 85	KA SPREF 80	
Physical Properties	Application Limit Temp. (°C)	1550	1500	1450	1700	1650	1600	
	Required quantity (t/m <sup>3</sup> )	2.25	2.2	2.15	3	2.9	2.8	
	CCS (kg/cm <sup>2</sup> )	@ 110°Cx24h	80(20)	80(20)	60(20)	350(80)	300(70)	300(70)
		@ 1000°Cx3h	250(30)	250(30)	250(30)	500(110)	500(100)	450(100)
		@ 1500°Cx3h	600(90) @ 1400°C	550(80) @ 1400°C	-	600(150) @ 1400°C	600(140) @ 1400°C	550(13) @ 1400°C
	PLC (%)	@ 110°Cx24h	-1	-1	-1	-0.6	-0.6	-0.7
		@ 1000°Cx3h	-0.3	-0.3	-0.25	-0.7	-0.7	-0.8
		@ 1500°Cx3h	0.2 @ 1400°C	0.2 @ 1400°C	-	-0.5 @ 1400°C	-0.5 @ 1400°C	-0.6 @ 1400°C
TC (kcal/mh°C)	@ 500°C	0.78	0.75	0.73	1.9	1.8	1.7	
	@ 1000°C	0.87	0.84	0.82	1.8	1.4	1.3	
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	40	39	37	90	85	80	
	SiO <sub>2</sub>	50	53	55	5	7	15	
Main Applications		Nonferrous Metal Furnace, Incinerator, Reheating Furnace, Petrochemical plants, Heater & Boilers						



## SLIDE PLATES

Quality		Alumina Carbon Series		Alumina Zirconia Carbon Series			Basic Series	
		KA SPAC 90	KA SPAC 85	KA SPAZ 90	KA SPAZ 80	KA SPAZ 75	KA SPMC 90	KA SPMC 30
Physical Properties	AP (%)	9	5	5	9	4.5	3	3.5
	BD (g/cm <sup>3</sup> )	2.73	3.05	2.7	2.55	3.07	2.48	2.48
	CCS (Mpa)	135	150	150	170	150	85	150
Chemical Properties (%)	SiO <sub>2</sub>	-	-	-	-	-	-	-
	Al <sub>2</sub> O <sub>3</sub>	94	84	90	80	75	4	67
	MgO	-	-	-	-	-	90	30
	ZrO <sub>2</sub>	-	-	2.8	4	4.5	-	-
	C	4	8	4.5	9	8	3	3.5

## UPPER & LOWER NOZZLES

Quality		Al <sub>2</sub> O <sub>3</sub> + MgO Series		Al <sub>2</sub> O <sub>3</sub> Series
		KA NZAM 90	KA NZAM 65	KA NZAL 95
Physical Properties	AP (%)	12	4	12
	BD (g/cm <sup>3</sup> )	3.16	3.05	3.2
	CCS (kg/cm <sup>2</sup> )	-	-	-
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	90	67	95
	MgO	5	28	-
	CaO	1.5	-	1.5
	ZrO <sub>2</sub>	-	-	-
	C	-	4.5	-

Quality		Al <sub>2</sub> O <sub>3</sub> + C Series		
		KA NZAC 90	KA NZAC 85	KA NZAC 75
Physical Properties	AP (%)	7	6	5
	BD (g/cm <sup>3</sup> )	3.03	3	2.95
	CCS (kg/cm <sup>2</sup> )	-	-	-
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	90	85	75
	MgO	-	-	-
	CaO	-	-	-
	ZrO <sub>2</sub>	-	-	-
	C	4.5	5	8



## WELL BLOCKS

Quality		Al <sub>2</sub> O <sub>3</sub> Series	Al <sub>2</sub> O <sub>3</sub> + MgO Series	Al <sub>2</sub> O <sub>3</sub> + C Series
		KA WBAL 90	KA WBAM 90	KA WBAC 90
Physical Properties	AP (%)	12	15	8
	BD (g/cm <sup>3</sup> )	3.15	3.13	2.97
	CCS (kg/cm <sup>2</sup> )	50	50	70
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	93	93	90
	MgO	-	4	-
	CaO	1.5	1.5	-
	ZrO <sub>2</sub>	-	-	-
	C	-	-	5

## POROUS PLUGS

Quality		Porous Plug	Gas Purging Nozzle	
		KA PP 96	KA GPNZ 80	KA GPNZ 85
Physical Properties	AP (%)	14.2	23.9	23
	BD (g/cm <sup>3</sup> )	3.09	2.46	2.62
	CCS (kg/cm <sup>2</sup> )	472	332	363
	Permeability (cm <sup>3</sup> ,cm/cm <sup>2</sup> ,sec,H <sub>2</sub> O cm)	1.9	0.7	1.3
	Flow Rate(@ 1kg/cm <sup>2</sup> )NL/min	260	-	-
Chemical Properties (%)	Al <sub>2</sub> O <sub>3</sub>	96	82	87
	MgO	-	-	-
Main Application		L/D Bottom Blowing Plug	T/D Upper Nozzle	





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***COSMOS POWER  
IN REFRACTORIES***