Mishra Enterprise

AARYA
METALLURGICALS INDIA PRIVATE LIMITED

Basic Refractories for Copper Industry

AARYA METALLURGICALS (INDIA) PRIVATE LIMITED

We offer Customised Refractory Solutions to Cement Industry

ABOUT US

We are one of the globally recognised suppliers of high performance refractory products and other raw-materials to Iron & Steel, Foundry, Aluminium, Copper, Zinc, Cement, Oil refinery, Petrochemicals and Fertilizer industries. With Over two decades of sourcing experience from China, we bring to our valued customers very cost-effective propositions, maintaining high quality standards.

With our newly installed manufacturing facilities for monolithics and pre-cast refractories at Aarya Metallurgicals (India) Private Limited, Raigarh, Chhattisgarh (India), we are strategically positioned to reach out to our customers in the geography.

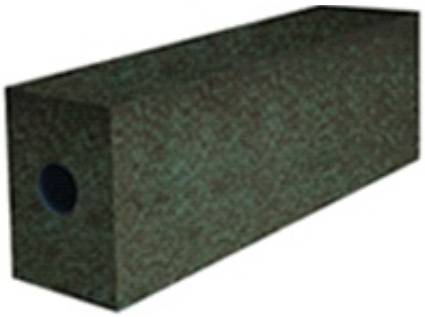
AMPL also provide Total Refractory Solutions to our valued customers with a seamless supply-chain with own high performance refractories, sourcing bricks through our Group Company www.sgssl.com; and Site Management.

We are the sole agent of a leading Chinese Refractory Maker, for Iron & Steel (Lime Kiln & RH), Cement and Copper industries – Rebonded & Direct Bonded Mag-Chrome, Mag-Alumina Spinel and their other refractory products; in India, Algeria, Bangladesh, and Zambia.

With production history of over 40 years, the Chinese company is China's one of the oldest refractory manufacturer. Direct-Bonded and Rebonded Mag-Chrome bricks have been hallmark of the Chinese company. These bricks are treated with special detoxication technique, conforming with the strict standards of the environmental protection globally.

The furnaces used for producing molten copper from concentrates and scrap - flash smelters, converters, and anode and fire-refining furnaces - present a unique combination of challenges to refractory life. Highly aggressive slags, mechanical stresses, batch operation, and increasingly higher operating temperatures all combine to destroy most refractory materials. Over the years, copper producers have adopted refractory materials biased on the MgO-Cr2O3 system to meet these challenges, to the point where 'mag-chrome' brick is used almost exclusively in the industry.

DURAMAG (FMK)

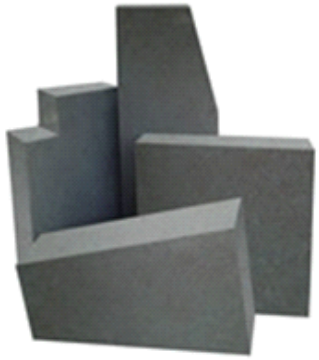


Made of fused Mag-Chrome, magnesite and chromite; processed by ultra high temperature firing, they possess properties of good thermal shock stability, oxidation-reduction resistance, thermal fatigue resistance, wear resistance and erosion resistance, especially with strong resistance to slag attack (including frequent alkalinity changes) and vacuum damages. They are widely used in the non-ferrous smelting furnaces (Outokumpu Flash Smelting Furnaces, Ausmelt Furnace, Isasmelt Furnace, Pierce Smith Converters, Slag Cleaning Furnace, Anode Furnace, Kaldo Furnace, Noranda Furnaces).

SPECIFICATION

Brand Name	MgO %	SiO_2 %	Cr_2O_3 %	A.P. %	B.D. gm/cc	C.C.S. Mpa	R.U.L. Ta ^0C	R.T.S. 1100^0C
FMK – 16AS	65.0	1.0	16 – 19	16.0	3.25	50	1700	4
FMK – 16A	65.0	1.2	16 – 19	16.0	3.20	50	1700	4
FMK – 16B	63.0	1.5	16 – 19	18.0	3.15	45	1700	6
FMK – 16C	63.0	1.8	16 – 19	18.0	3.10	40	1700	6
FMK – 20AS	62.0	1.0	20 – 23	16.0	3.25	50	1700	4
FMK – 20A	62.0	1.2	20 – 23	16.0	3.20	50	1700	4
FMK – 20B	60.0	1.5	20 – 23	17.0	3.15	45	1700	6
FMK – 20C	60.0	1.8	20 – 23	18.0	3.10	40	1700	6
FMK – 24AS	55.0	1.0	24 – 27	16.0	3.25	50	1700	4
FMK – 24A	55.0	1.2	24 – 27	16.0	3.20	50	1700	4
FMK – 24B	53.0	1.5	24 – 27	17.0	3.15	45	1700	6
FMK – 24C	53.0	1.8	24 – 27	18.0	3.10	40	1700	6
FMK – 28AS	50.0	1.0	28 – 31	16.0	3.30	50	1700	4
FMK – 28A	50.0	1.2	28 – 31	16.0	3.20	50	1700	4
FMK – 28B	48.0	1.5	28 – 31	17.0	3.15	45	1700	6
FMK – 28C	48.0	1.8	28 – 31	18.0	3.10	40	1700	6

DIBOMAG (DMK):



Made of magnesite and chromite, processed by high temperature firing, they possess properties of excellent thermal shock stability, slag attack resistance, thermal fatigue resistance, vacuum damages. In addition, they are resistance to oxidation-reduction, comparatively better wear resistance and erosion resistance. The service life is only second after DURAMAG, and even more economical furnace lining refractories. They are widely used in Non-ferrous Smelting Furnaces working linings (Outokumpu Flash Smelting Furnaces, Pierce Smith Furnaces, Kaldo Furnaces, , Reverberatory Furnaces etc.).

SPECIFICATION

Brand Name	MgO %	SiO_2 %	Cr_2O_3 %	A.P. %	B.D. gm/cc	C.C.S. Mpa	R.U.L. Ta ^0C	R.T.S. 1100^0C
DMK – 8A	78.0	1.5	8 – 11	17.0	3.10	50	1700	6
DMK – 8B	78.0	2.0	8 – 11	18.0	3.05	45	1650	7
DMK – 8C	76.0	2.5	8 – 11	19.0	3.00	40	1620	7
DMK – 8D	76.0	3.0	8 – 11	20.0	2.98	40	1600	-
DMK – 12A	72.0	1.5	12 – 15	18.0	3.10	50	1700	6
DMK – 12B	72.0	2.0	12 – 15	18.0	3.05	45	1650	7
DMK – 12C	70.0	2.5	12 – 15	19.0	3.00	40	1620	7
DMK – 12D	70.0	3.0	12 – 15	19.0	3.00	40	1600	-
DMK – 16A	60.0	1.5	16 – 19	18.0	3.10	45	1700	6
DMK – 16B	60.0	2.0	16 – 19	18.0	3.05	40	1650	7
DMK – 16C	58.0	2.5	16 – 19	20.0	3.00	35	1650	7
DMK – 16D	58.0	3.0	16 – 19	20.0	3.00	35	1620	-
DMK – 20A	55.0	1.5	20 – 23	20.0	3.10	40	1700	6
DMK – 20B	55.0	2.0	20 – 23	21.0	3.05	35	1700	7
DMK – 20C	53.0	2.5	20 – 23	21.0	3.00	30	1700	7
DMK – 20D	53.0	3.0	20 – 23	21.0	3.00	30	1650	-
DMK – 24A	48.0	1.5	24 – 27	20.0	3.15	40	1700	6
DMK – 24B	48.0	2.0	24 – 27	21.0	3.10	35	1700	7
DMK – 24C	46.0	2.5	24 – 27	22.0	3.05	30	1700	7
DMK – 24D	46.0	3.0	24 – 27	22.0	3.00	30	1650	-
DMK – 28A	42.0	1.5	28 – 31	20.0	3.20	40	1700	6
DMK – 28B	42.0	2.0	28 – 31	21.0	3.15	35	1700	7
DMK – 28C	40.0	2.5	28 – 31	22.0	3.10	30	1700	7
DMK – 28D	40.0	3.0	28 – 31	22.0	3.00	30	1700	-

MORTAR

We offer suitable grades of mortar for all grades of the bricks, both in ready to use; and dry form to be mixed with liquid (water, sodium silicate solution).

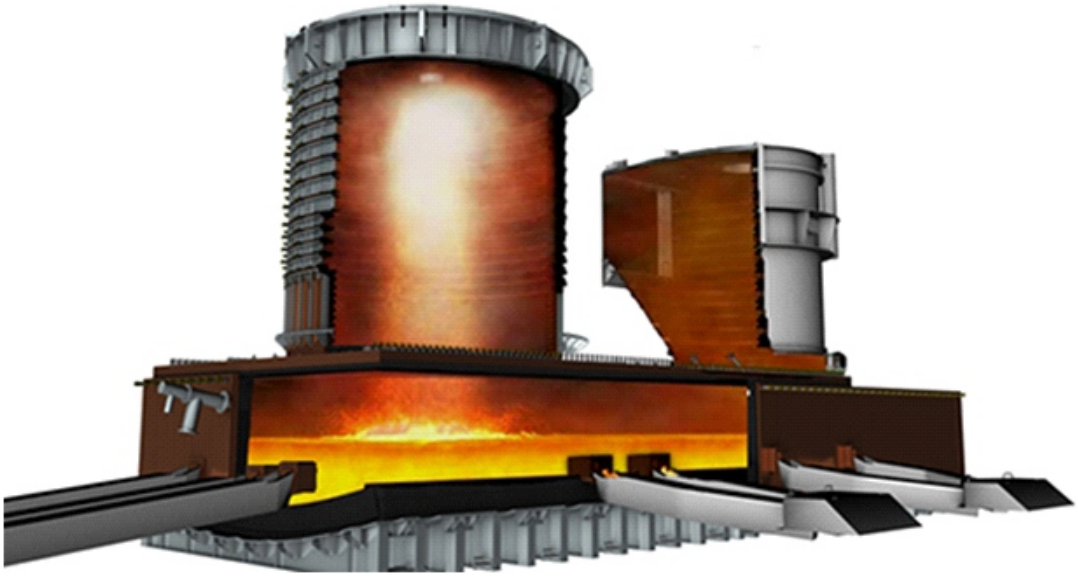
SPECIFICATION

Brand Name	MgO	SiO_2	Cr_2O_3	Grading	CCS $110^0C/24$ h	Water required
	%	%	%	mm	Mpa	%
FMK – 16M	65.0	1.5	16 – 19	0 – 0.5	5	25 – 30
FMK – 20M	62.0	1.5	20 – 23	0 – 0.5	5	25 – 30
FMK – 24M	55.0	1.5	24 – 27	0 – 0.5	5	25 – 30
FMK – 28M	50.0	1.5	28 – 31	0 – 0.5	5	25 – 30

Brand Name	MgO	SiO_2	Cr_2O_3	Grading	CCS $110^0C/24$ h	Water required
	%	%	%	mm	Mpa	25 – 30
DMK – 8M	78.0	2.0	8 – 11	0 – 0.5	5	25 – 30
DMK – 12M	72.0	2.0	12 – 15	0 – 0.5	5	25 – 30
DMK – 16M	60.0	2.0	16 – 19	0 – 0.5	5	25 – 30
DMK – 20M	55.0	2.0	20 – 23	0 – 0.5	5	25 – 30
DMK – 24M	48.0	2.0	24 – 27	0 – 0.5	5	25 – 30
DMK – 28A	42.0	2.0	28 – 31	0 – 0.5	5	25 – 30

Aarya Metallurgicals (India) Private Limited , Raigarh, Chhattisgarh, India has been given by a leading Chinese Refractory Company the exclusive rights to market, sell and service of all products for Iron & Steel (Lime Kiln & RH), Cement and Copper industries – Rebonded & Direct Bonded Mag-Chrome, Mag-Alumina Spinel and their other refractory products; in India, Algeria, Bangladesh, and Zambia.

Flash Smelting Furnace



With high Sulphur capture coupled with economy of scale, Flash Smelting technology is world's leading method for copper smelting. More than half of the world's primary coper is produced by the flash smelting process. The process was developed at Harjavalta, Finland, in 1949. While the principle has remained the same over the years, the process has been continuously improved and developed based on customer requirements and technology updates.

- Refractory requirements
  - High chemical resistance
  - High abrasion resistance
  - Thermal shock resistance

Kaldo Furnace

The Kaldo type converted is commonly known as a Top-Blown Rotary Converter (TBRC) in non-ferrous metal smelting terminology. Advantages include the ability to use a high proportion of scrap metal, and good controllability of final chemistry. The Kaldo furnace is a compact and energy-efficient reactor with high capacity. Energy is introduced with an oxygen/fuel burner lance. Converting and refining is done with a special lance using air at supersonic speed, giving high oxidizing efficiency. Instead of using different vessels for roasting, smelting, reducing and converting, all these four steps can be executed in one single vessel, the Kaldo furnace.

Refractory requirements:

- Thermal shock resistance especially in tuyere zone and converter mouth
- High erosion resistance in the tuyere zone
- High Chemical resistance
- Oxidation – Reduction resistance
- Low porosity to prevent structural spalling

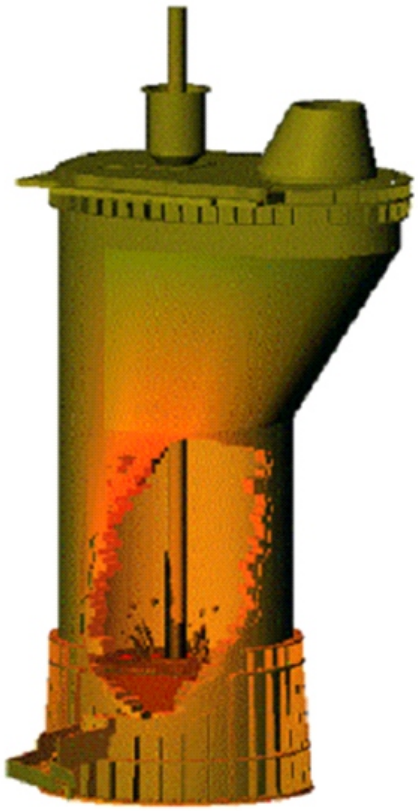
AUSMELT Furnace

The top submerged lance – TSL technology was invented in the early 1970s and permanently developed by Ausmelt to process a range of nonferrous, ferrous and waste materials. Feed materials, fluxes and reductant coal are charged through the roof of the furnace and drop directly into the molten bath. Ausmelt technology bath smelting is able to process a variety of different concentrates and secondary raw materials to produce copper, lead, nickel, tin and zinc.

Refractory requirements:

- High abrasion resistance
- High chemical resistance
- Thermal shock resistance
- Low porosity in high wear areas to prevent structural spalling

ISASMELT Furnace



The ISASMELT process is a top submerged lance (TSL) process developed by Mount Isa Mines Ltd. During 1980s and 1990s in Queensland, Australia. The versatility of this technology enables a wide variety of primary and secondary materials to be processed in either batch or continuous modes. The furnace is a stationary vertical cylinder lined with refractories. Concentrate, fluxes, metal scrap, fuel and metal-bearing residues are charged through the furnace roof and fall into a molten slag bath. The tip of the ISASMELT lance is submerged into the molten slag creating a turbulently mixed environment that ensures rapid process kinetics.

Refractory requirements:

- High abrasion resistance
- High chemical resistance
- Thermal shock resistance
- Low porosity in high wear areas to prevent structural spalling

Peirce-smith Covertor

The copper production furnace which poses the greatest refractories challenge is the converting unit. Converting refers to oxidation of molten Cu-Fe-S matte to form blister copper (~99% Cu). Copper matte is tapped with approx. 1200 °C from primary smelters and charged via transport ladles into the Peirce-Smith convertOr. Other raw materials for the converting process include silica flux, air or/and industrial oxygen. Different Cu-bearing secondary materials are also re-melted in the converter.

Refractory requirements:

- Thermal shock resistance especially in tuyere zone and converter mouth
- Hot erosion resistance in the tuyere zone
- High chemical resistance
- Low porosity to prevent structural spalling

Anode Furnace

Converted blister copper from a PS converter contains ~0.01% sulfur and ~0.5% oxygen. Blister from continuous converting processes contains approx. 0.2–0.4% oxygen and up to 1% of sulfur. If there was no refining step in the anode furnace, sulfur and oxygen would combine during solidification and form SO2 bubbles in cast anodes.

Refractory requirements:

- Thermal shock resistance especially in tuyere zone and converter mouth
- High erosion resistance in the tuyere zone
- High Chemical resistance
- Oxidation – Reduction resistance
- Low porosity to prevent structural spalling

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