

**GOVERNMENT OF INDIA
(Ministry of Railways)**

**SPECIFICATION FOR
MAGNESIA CARBON BRICKS FOR
ARC FURNACE LINING**

Issued by

**MECHANICAL DRAWING OFFICE
RAIL WHEEL FACTORY
YELAHANKA, BANGALORE - 560 064
INDIA**

Issued by
SSE/D

<i>Regin Jankar</i>	<i>Approved Letells</i>	<i>S.Pa 2/6.15</i>	<i>W.M.W 8/6/15</i>
CME	CWE/W	Dy. CME/Mfg	W/M/W
APPROVED BY	REVIEWED BY	VERIFIED BY	PROPOSED

SPECIFICATION FOR MAGNESIA CARBON BRICKS FOR ARC FURNACE LINING

1.0 SCOPE

The specification covers the manufacture and supply of the Magnesia Carbon (MgOC) bricks for Arc Furnace lining to Rail Wheel Factory, Yelahanka, Bangalore - 560064, Karnataka state.

Supplier/manufacturer shall be an ISO 9001 certified company. Supplier/manufacturer shall have proven technical capability and experience of having supplied Magnesia Carbon Bricks for similar applications. Evidences shall be furnished by the supplier along with the offer to corroborate the performance.

2.0 GENERAL DESCRIPTION AND JOB REQUIREMENT

These Magnesia Carbon Bricks are used for lining the sidewalls of the Electric Arc Furnace. High power Electric Arc Furnace of 22 MT capacity is used for basic medium carbon steel making process. Oxygen lancing is also carried out during steel making. Heavy melting steel scrap charge is dropped into the hearth from the charging bucket. The MC bricks shall be strong enough to withstand the impact during charging. The Magnesia Carbon bricks shall have adequate resistance to reaction with basic slag containing around 8 to 15% FeO during steel melting & refining operation upto a temperature of 1730 °C. The bricks shall be able to withstand the high thermo-mechanical stresses encountered in the operations, round the clock working in three shifts, for a minimum period of 6 working days continuously, during which about 50 heats will be tapped.

3.0 MANUFACTURE

3.1 CHARACTERISTICS OF RAW MATERIALS USED

The Magnesite used shall contain a minimum 50% fused magnesite and MgO content in the magnesite shall be 96% minimum. The SiO₂ shall not exceed 3%.

Graphite used in the manufacture of Magnesia Carbon bricks shall be of Flake type & having 94% or more Fixed Carbon. No harmful fillers or harmful oxidants shall be used

3.2 MANUFACTURING FACILITIES REQUIRED

The manufacturer shall have their in-house size reduction & grading devices. The mixing of MgOC mixture shall be carried out in Counter Current type mixers. The MC bricks shall be moulded in heavy-duty presses of high capacity. The baking of MgOC bricks shall be carried out in a controlled condition using hot air.

Bricks shall be segregated for physical damages like cracks, corner breakages etc. and stacked properly before offering for inspection.

<i>Amritha</i> CME	<i>Amritha</i> CWE/W	<i>Amritha</i> Dy. CME/Mfg	<i>Amritha</i> WM/W
APPROVED BY	REVIEWED BY	VERIFIED BY	PROPOSED

3.3 TESTING FACILITIES

The manufacturer shall have facilities to test the properties of MgOC Bricks specified in clause 4.1

4.0 MATERIAL

Magnesia Carbon Bricks shall meet following properties.

4.1 CHEMICAL COMPOSITION, PHYSICAL PROPERTIES & SIZE

Sl. No.	Test	Specified Value	Test Method *
1	MgO (in fused / dead Burnt Magnesite mix used)	Not less than 96%	IS 1760
2	Fixed Carbon	10-15%	IS 14852/2000
3	Bulk Density (BD)	2.8 gm/cm ³ Min.	IS 1528 (Part 12)
4	Apparent Porosity (AP)	5% Max.	IS 1528 (Part 8)
5	Cold Crushing Strength (CCS)	600 kg/cm ² Min.	IS 1528 (Part 4)
6	Modulus of Rupture (MoR)	130 kg/cm ² Min.	IS 1528 (Part 5)
7	Size	305X115/100X75 mm	-----
8	Variation in Size	± 1.5% or ± 1mm whichever is greater	-----

* As specified else latest revision

5.0 REFRACTORY PARTICLE SIZE AND GRANULOMETRY

Bricks should be compact having close grains. When bricks are cut either for sampling or for lining purpose, they should not show any signs of lamination or refractory particle loosening due to larger grains or inadequate bonding. The manufacturer shall establish the grain distribution and size of raw materials in the recipe so as to achieve the optimum specified properties and performance.

6.0 INSPECTION NORM

a. **SAMPLING NORM** : IS 1528 (Part VII) – 1974.

Sample shall be selected as per IS 1528 (Part VII) – 1974 and the selected sample shall be tested for the properties as given in clause 4.1 above.

b. **ACCEPTANCE CRITERIA** : As per Clause 4.1

<i>Regin. Sankh</i>	<i>A. Arora</i> <i>1.10.15</i>	<i>A. Pa</i> <i>6.6.15</i>	<i>A. Pa</i> <i>6.6.15</i>
CME	CWE/W	Dy. CME/Mfg	WMW
APPROVED BY	REVIEWED BY	VERIFIED BY	PROPOSED

7.0 HANDLING

Special care should be taken by the supplier to ensure that the edges do not get chipped off during manufacturing and subsequent handling. The bricks which are badly chipped off are liable to be rejected and would have to be replaced by the firm at their expense.

8.0 STORAGE

The supplier should have arrangement to store the subject item under covered accommodation in their premises. Special care shall be taken to avoid hydration of magnesia during storage.

9.0 PACKING

The bricks shall be packed in a disposable wooden base pallet of 200 nos. capacities, capable of being handled by 3 Ton FLT's. The edges of the bricks should be protected with cardboard paper to prevent damage to brick edges and strapped on to the base pallets.

10.0 TRANSPORT

The bricks should be transported to RWF stores depot by road directly from the firm's premises to avoid any damages to the bricks. Care should be taken during the transportation of these bricks by adequately covering them with tarpaulin, etc to avoid getting exposed to rain.

			
CME	CWE/W	Dy. CME/Mfg	VMM/W
APPROVED BY	REVIEWED BY	VERIFIED BY	PROPOSED