

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

**SPECIFICATION FOR  
MAGNESITE DRY RAMMING MASS  
(PL No. 84983152)**

Issued by

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

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CME	CWE/W	Dy. CME/Mfg.	SSE/D
APPROVED	REVIEWED	VERIFIED	PREPARED

## SPECIFICATION FOR MAGNESITE DRY RAMMING MASS

### 1.0 PURPOSE AND SCOPE

The Specification covers supply of Magnesite Dry Ramming Mass to be used for hearth building of electric arc furnace.

### 2.0 JOB REQUIREMENT

2.1 Magnesite Dry Ramming Mass (DRM) is intended for use in High Powered Electric Arc furnaces of 20 MT capacity for building working hearth. The hearth should withstand all working conditions like temperatures up to 1750°C, thermal and mechanical shocks while top loading of heavy steel scraps like railway wheels, foundry returns etc. Steel produced in EAF is generally medium carbon steel, with a melting period of 60 minutes and a refining period of 60 minutes.

2.2 The product should be such that the material after first heat sinters to a sufficient thickness to withstand shock loads, thermal and chemical attacks, and then progressively sinters to the full depth during subsequent heats.

### 3.0 WORKING CONDITIONS

- 3.1 High Powered Electric Arc Furnace Capacity : 20 T with 12.6 MVA transformer.
- 3.2 Melt down time : 1 hour
- 3.3 Power on to tap time : 2 hours
- 3.4 Scrap used : Medium and Heavy, with light scrap only for cushioning purpose.
- 3.5 Tapping temperature : 1680 to 1730°C
- 3.6 Process : Basic, single slag process; FeO in the slag is around 15% and basicity around 2.5% right upto the time of tapping.
- 3.7 High Temperature : 1660 to 1730°C. Holding time of liquid metal in furnace will be around 20 to 30 minutes.
- 3.8 Flux used : Calcined lime (90% CaO), along with the charge (40 kg per ton of LM).

<i>As per Spec</i>	<i>Approved 30/6/15</i>	<i>A.P.R. 30.6.15</i>	<i>Chaudhary 27/6/15</i>
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3.9 Gunning material used : Wet gunning mix,  
for hot repair of the MgO > 80% and Fe<sub>2</sub>O<sub>3</sub> < 3.0%.  
furnace banks

**4.0 TECHNICAL REQUIREMENT**

4.1 The Dry Ramming Mass shall be manufactured from sintered magnesia of Alpine origin, oil free, low in iron with high CaO content and capable of withstanding a minimum working temperature of 1750°C. All CaO should be present in combined phase with MgO. No free CaO should be present.

**5.0 CHEMICAL COMPOSITION**

- 5.1 Magnesium Oxide (MgO) 75% Min.
- 5.2 Silica (SiO<sub>2</sub>) 1.0% Max.
- 5.3 Calcium Oxide (CaO) 10% Min
- 5.4 Iron Oxide (Fe<sub>2</sub>O<sub>3</sub>) 5.0% Max.
- 5.5 Alumina (Al<sub>2</sub>O<sub>3</sub>) 0.4% Max.
- 5.6 Chromium Oxide (Cr<sub>2</sub>O<sub>3</sub>) Absent
- 5.7 Bonding Ceramic

**6.0 PHYSICAL PROPERTIES**

- 6.1 Bulk Density (gm/cc) 2.3 min
- 6.2 Granulation (Typical Values)

PARTICLE SIZE	PERCENTAGE
<0.1mm	15- 30%
<1.0mm	40-60%
<5.0mm	90% min.

Over size: Granulation oversize (>6mm) should not be more than 10% of the total quantity by weight.

**7.0 ADDITIONAL INFORMATION TO BE SUBMITTED BY THE SUPPLIER**

7.1 Information to be submitted by the supplier while quoting against the RWF's tender for the item:

- a) Source of sintered magnesia
- b) Typical and guaranteed values of granulation

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- c) Type of bond
- d) Typical values of Cold Crushing Strength in kg/cm<sup>2</sup> after firing at 1400°C.
- e) Sintering temperature range of the material.
- f) Shelf Life

## 8.0 INSPECTION

Final inspection and acceptance shall be at Rail Wheel Factory, Yelahanka, Bangalore based on sampling and testing as per IS 1760 (Part 1): 1991, IS 1760 (Part 2): 1991 and IS 1760 (Part 3): 1992. The material will also be subjected to field trial to establish that it meets with the job requirement specified vide Clause 2.0.

## 9.0 TEST CERTIFICATE

The manufacturer's test certificate indicating all tested (physical and chemical) properties of the product required under Clause 4.0, 5.0 and 6.0 is to be enclosed along with the supply. Tests are required to be conducted as per IS 1760 (Part 1): 1991, IS 1760 (Part 2): 1991 and IS 1760 (Part 3): 1992. or ASTM C: 574/1971 or any other equivalent internationally accepted standard. The certificate shall also indicate the source of sintered magnesia.

## 10.0 PACKAGING

- 10.1 The Magnesite Dry Ramming Mass shall be supplied in multi-walled paper sacks capable of withstanding conditions of handling, transit and storage.
- 10.2 Enough care shall be taken to pack the material to avoid the ingress of moisture available in ambient conditions and sea and coastal geographic conditions as sintered Magnesite products are susceptible for water (high humidity) absorption causing damage to Dry Ramming Mass. Each bag shall bear the supplier's name, quantity, product name, grade, date of manufacture and shelf life of the material.
- 10.3 Individual bags of 25kg packed in jumbo bags capable of handling by a 3T forklift.
- 10.4 Date of Manufacture and Batch No. to be legibly stamped on each bag.

## 11.0 SHELF LIFE

The material should have a minimum shelf life of 6 months from the date of manufacture.

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