

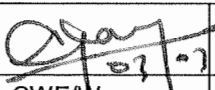
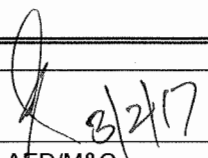
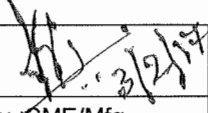
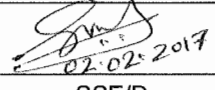
**GOVERNMENT OF INDIA  
(Ministry of Railways)**

**SPECIFICATION FOR  
HIGH ALUMINA 70% STANDARD  
BRICKS FOR LADLE BOTTOM LINING  
(PL No. 84980503)**

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

Issued by

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RAIL WHEEL FACTORY  
YELAHANKA, BANGALORE-560 064  
INDIA**

			
CWEM	AED/M&C	Dy. CME/Mfg.	SSE/D
APPROVED BY	REVIEWED BY	VERIFIED BY	PREPARED BY

**SPECIFICATION FOR H.A.70 % STANDARD BRICKS  
FOR LADLE BOTTOM LINING**

**1.0 SCOPE**

- 1.1 The specification covers the manufacture and supply of the HA 70% standard bricks for ladle bottom lining to Rail Wheel Factory, Yelahanka, Bangalore 560 064, Karnataka state.
- 1.2 Suppliers shall have proven technical capability for having supplied the ladle bricks for similar applications. Evidences shall be furnished by the supplier along with the offer to corroborate the performance.

**2.0 GENERAL DESCRIPTION & JOB REQUIREMENT**

70% High Alumina Bricks are used for lining the bottom of the ladle in which molten metal is poured from the Electric Arc Furnace at temperature upto 1715°C. Steel is killed in the ladle. Upward Pressure pouring technique is practised for casting Railway wheels.

Prospective tenderer can see the actual usage before making his offer.

**3.0 MATERIAL**

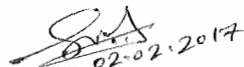
**a. CHEMICAL COMPOSITION**

- 1) Al<sub>2</sub>O<sub>3</sub> : 70% Minimum.
- 2) Fe<sub>2</sub>O<sub>3</sub> : 2.5% Maximum.
- 3) Alkalis : 1.0% Maximum.

**b. PHYSICAL PROPERTIES**

- i) Pyrometric Cone Equivalent (PCE) : +36  
(As per ASTM Std. Pyrometric cone.)
- ii) Cold Crushing Strength (CCS) : 550 Kg/cm<sup>2</sup> (Min.)
- iii) Apparent porosity (AP) : 20% (Max.)
- iv) Permanent Linear Change (PLC)  
after heating at 1600°C for 2 hours : +1 to +2.25%
- v) Size Tolerance : ±1.5% or ±2 mm, whichever is  
greater.
- vi) Refractoriness Under Load (RUL) : 1550 °C (Min.)
- vii) Bulk Density (BD) : 2.60 gm/cc (Min.)
- viii) Warp on 230 x115 mm face : 0.50 mm (Max)
- ix) Spalling Resistance : 30 cycles (Min.) –{ IS 1528: Part 3 -  
1974, Cl. 4 (small prism test in air  
quenching method at 1000°C)}

(Physical properties will be tested as per IS1528 relevant parts)


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**c. SIZE**

Size of the bricks used is as follows:

230 X 115 X 76mm Standard.

**4.0 REFRACTORY PARTICLE SIZE**

Bricks should be compact having close grains. The raw material should not have more than 3 mm size refractory particles. When bricks are cut either for sampling or for lining purpose, they should not show any sign of lamination or refractory particle loosening due to large grains or inadequate bonding, or coring, due to improper firing.

**5.0 TESTING FACILITIES**

The firm should have complete testing facilities to check the material as per the specification given above.

**6.0 INSPECTION NORM**

a. **SAMPLING NORM:** IS-1528 Pt. VII – 1974.

b. **ACCEPTANCE CRITERIA:** IS-1528 Pt. VII - 1974.

**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 that are chipped off are liable to be rejected and would have to be replaced by the firm at their expense.

**8.0 STORAGE**

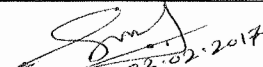
The supplier should have arrangement to store the subject item under covered accommodation to protect them from water.

**9.0 PACKING**

The bricks shall be packed in disposable wooden base and top pallets of 1 to 1.5 MT capacity, capable of being handled by 3 Ton Forklifts as shown in Annexure- I. The edges of the bricks should be protected with cardboard paper and strapped on to the base and top pallets. Additional corrugated cardboard of adequate thickness has to be used on all faces including inter layers to avoid damage to brick edges due to strapping force, handling and transportation.

**10.0 TRANSPORT**

The bricks should be transported to RWF stores by road directly from the firm's premises to avoid any damages to the bricks. Utmost care should be


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taken during the transportation of these bricks by adequately covering them with tarpaulin, etc to avoid bricks getting exposed to rain water during transit.

**11.0 EXPECTED LIFE**

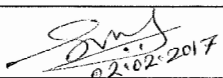
Expected life of ladle lined with the bricks is 24 heats in RWF critical working conditions.

**12.0 QUALITY ASSURANCE PLAN (QAP)**

The manufacturer shall submit their QAP along with their bid for approval by RWF, which will be followed in the manufacturing of High Alumina 70% standard bricks to satisfy the technical requirement as required under this specification. Manufacturer shall get their QAP approved from RWF in advance, unless a waiver is given to this effect.

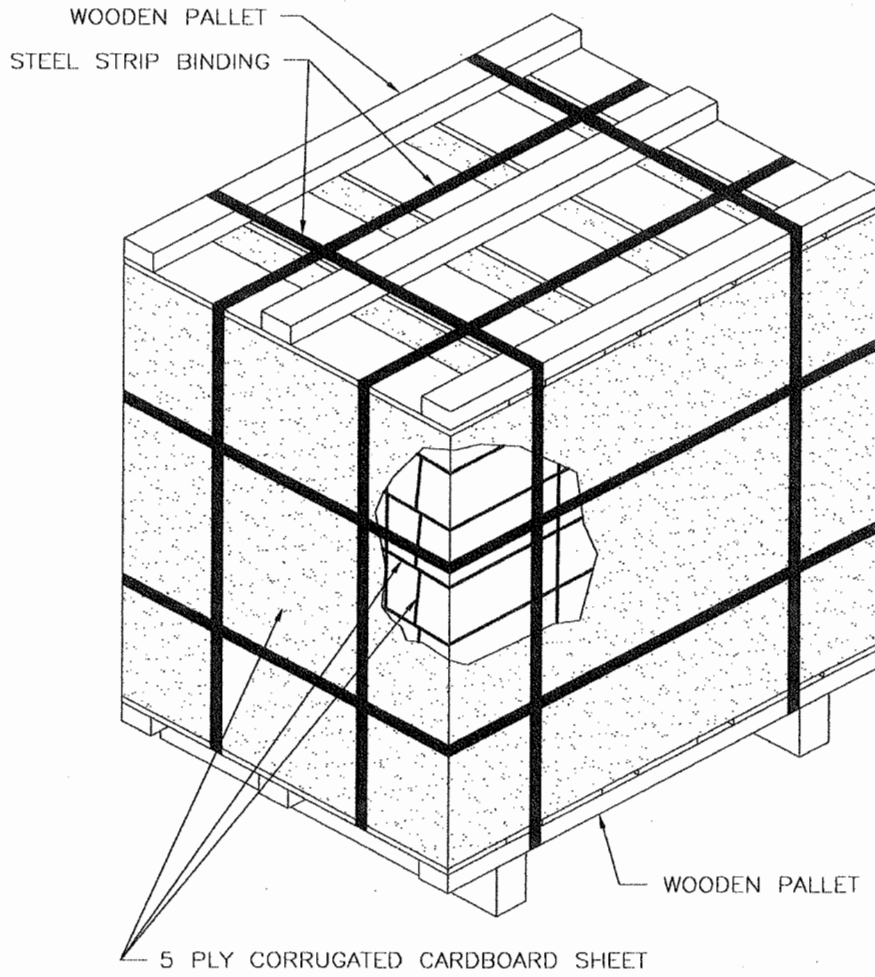
**13.0 TRIAL OF THE SUPPLY**

The material for trial shall necessarily meet all the requirements mentioned elsewhere in this specification prior to shop floor trial. Only after this, the material will be taken up for shop floor trial by RWF as per trial scheme at Annexure-2 and the corresponding trial report shall be prepared as per Annexure-3.


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ANNEXURE-1

### PACKING ARRANGEMENT FOR HA70 BRICKS



NOTE: USE CORRUGATED CARDBOARD SHEETS FOR PACKING ALL FACES.

*[Signature]*  
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**TRIAL SCHEME OF HA 70% STANDARD BRICKS FOR LADLE BOTTOM LINING**

1	Trial scheme No.	RWF/M/SPECN-1/009/1991 alt --- / Trial Scheme PL NO.....
2	Objective of Trial	To establish the suitability of HA 70% standard bricks for ladle bottom lining as per above specification.
	Description of Material	HA 70% standard bricks for ladle bottom lining
	PO Number & PO date	.....
	PO Qty.	.....
	Supplier	.....
4	IDN Number & Date	.....
	IDN Qty.	.....
5	Authority for conducting Trial	Dy.CME/ Mfg
6	Earlier trial details	First Time Supply/ Second time/ Third time ...../...../.....
7	Trial Parameters	As mentioned in Trial Scheme.
8	Specification	RWF/M/SPECN-1/009/1991 alt ---
9	Pre-trial Testing details	Met. Lab Report & MTC
10	Trial qty	Full IDN Qty/ 5% of the tendered quantity
11	Equipment / Station process	Ladle lining

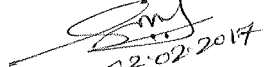
( ..... to be filled by Team Members)

**Trial Parameters:**

1. Total quantity of HA 70% standard bricks for ladle bottom lining to be drawn and trial conducted on the entire quantity under the purchase order/5% of the tendered quantity, whichever is less.
2. Inspection & testing by shop and whenever required by laboratory completely in line (not in part) with the specification. Sampling for inspection as per specification.
3. Examination of MTC (Manufacturer's Test Certificate) and comments on its suitability.

**Specific Requirements:**

The overall performance w.r.t shrinkage, erosion, spalling, life should be at par with established brands already in use, when tried in matching number by ensuring same process parameter during use and in the same period (or just preceding/succeeding period).

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**TRIAL REPORT OF HA 70% STANDARD BRICKS FOR LADLE BOTTOM LINING**

1	Trial No.	RWF/M/SPECN-1/009/1991 alt --- / Trial Scheme PL NO.....
2	Objective of Trial	To establish the suitability of HA 70% standard bricks for ladle bottom lining as per above specification.
3	Description of Material PO Number & PO date PO Qty. Supplier	HA 70% standard bricks for ladle bottom lining ..... ..... .....
4	IDN Number & Date IDN Qty.	..... .....
5	Authority for conducting Trial	Dy. CME/ Mfg
6	Earlier trial details	First Time Supply/ Second time/ Third time ...../...../.....
7	Trial Parameters	As mentioned in Trial Scheme.
8	Specification	RWF/M/SPECN-1/009/1991 alt ---
9	Pre-trial Testing details	Met. Lab Report & MTC
10	Trial qty	Full IDN Qty/ 5% of the tendered quantity
11	Equipment / Station process	Ladle lining
12	Nominated Officers	ACMT/W & AWM/SMS

( ..... to be filled by Team Members)

**Application Test:** Shop Floor test conducted from date \_\_\_\_\_ to date \_\_\_\_\_ & H. No. \_\_\_\_

**Trial Parameters:**

- Total quantity of HA 70% standard bricks for ladle bottom lining to be drawn and trial conducted on the entire quantity under the purchase order/5% of the tendered quantity, whichever is less.

Comments:

- Inspection & testing by shop and whenever required by laboratory completely in line (not in part) with the specification. Sampling for inspection as per specification.

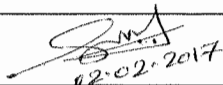
Enclosure Details:

- Examination of M Lab report & MTC (Manufacturer's Test Certificate) and comments on its suitability

Comments :

- The relevant Production & XC Data shall be compared with a similar quantity in use of other make, in addition to any specific performance requirement given in specification.

Comments with documents:

  
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**Specific Requirements:**

The overall performance w.r.t. shrinkage, erosion, spalling, life should be at par with established brands already in use, when tried in matching number by ensuring same process parameter during use and in the same period (or just preceding/succeeding period).

**Observations:**


AWM/WM

ACMT/W

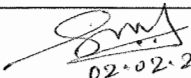
SSE/SMS

WM/W

Remarks of Dy CME/Mfg.


Remarks of AED/M&C

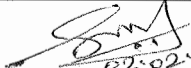
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## AMENDMENT SHEET

Alt. 'g' Clause No.	Alt. 'h' Clause No.	Description	Job No.	Sign
--	13	Clause added: <b>13.0 TRIAL OF THE SUPPLY</b> The material for trial shall necessarily meet all the requirements mentioned elsewhere in this specification prior to shop floor trial. Only after this, the material will be taken up for shop floor trial by RWF as per trial scheme at Annexure-2 and the corresponding trial report shall be prepared as per Annexure-3.	6927	
--	Annexure-2	Added Annexure-2 <b>TRIAL SCHEME OF HA 70% STANDARD BRICKS FOR LADLE BOTTOM LINING</b>		
--	Annexure-3	Added Annexure-3 <b>TRIAL REPORT OF HA 70% STANDARD BRICKS FOR LADLE BOTTOM LINING</b>		

  
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