



PLANT PURCHASE SPECIFICATION

(CFFP - HARDWAR)

FF 05066 Rev 5

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HEAVY DUTY RESIN BONDED MAGNESIA CARBON BRICKS (RBMC SPL) BRICKS FOR EAF & VAD, VOD & LRF LADLES

1.0 GENERAL:

This specification governs the quality requirements of RBMC-Special bricks for EAF, VAD, VOD & LRF ladles.

2.0 APPLICATION:

- * **Metal and slag zone of Electric Arc Furnaces.** Oxygen lancing is done in EAF for melting and reducing **Phosphorous to 0.004%.**
- * **Bottom, metal and slag zone of ladles.** Oxygen lancing in ladles during VOD operation.
- * Degassing under vacuum at ≤ 1 Tor for 30 minute at Temp. 1720°C (max) to reduce gas contents and achieve Sulphur $\approx 0.002\%$.
- * Typical final slag composition after secondary refining is as follows: Cao 40-45%, SiO_2 13- 17%, MgO 10-12%, Al_2O_3 20-25%, Fe_2O_3 1.5-3%, $\text{Cr}_2\text{O}_3 + \text{MnO} < 1.2\%$

3.0 CONDITION OF DELIVERY

The different types of bricks shall be supplied as per sizes and drawings indicated at page number 5 and 6 of this specification.

- * Used to brick slag and metal zone of
 - 6.1: EAF of capacity of 10T and 30T
 - 6.2.1: VAD, VOD and LRF ladles
 - 6.2.2: Bottom bricks of VAD, VOD & LRF
 - 6.3: EAF of 70T
 - 6.4: Tap hole refractory for EBT of 70T EAF

4.0 COMPLIANCE WITH NATIONAL STANDARDS

There is no Indian standard of resin bonded Magnesia Carbon bricks.

5.0 PROPERTIES:

When tested in accordance with the relevant clauses of **IS-1528 or any other International Standard/ Validated instrumental analysis traceable to international standards**, the test samples shall show the following values.

5.1: PHYSICAL PROPERTIES:

Bulk Density (gm /cc)	3	(Min)
Apparent Porosity	5%	(Max)
C.C.S (N/mm ²)	35	(Min)
Refractoriness Under Load	1600°C	(Min)
Thermal expansion up to 1400°C	2%	(Max)
HMOR, (Kg/Cm ²) AT 1400C*30 minutes	125	(Min)

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CHAIRMAN CPSC	V K AGARWAL	<i>[Signature]</i>	SUPERVIDED BY	P.K.ROY	<i>[Signature]</i>
			APPROVED : PLANT STANDARDS COMMITTEE		
			PREPARED : SMS TECH	ISSUED : Steel Melting Shop	DATE 27-04-16



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5.2 CHEMICAL COMPOSITION:

SL NO.	ELEMENTS	CONTENT	
		%(Min)	%(Max)
a)	MgO (in fused magnesia used)	97	
b)	MgO (in finished product)	82	
c)	Residual carbon (British cocking test)	8	12
d)	Al ₂ O ₃		2.0
e)	CaO		2.0
f)	SiO ₂		1.5
g)	Fe ₂ O ₃		0.5

6.0: TYPES OF BRICK.

	DESCRIPTION	SIZE	a mm	b mm	h mm	l mm	r mm	A deg
6.1	Bricks for Lining of 30t and 10T EAF	30/20	160	140	300	100	2100	-
		30/40	170	130	300	100	-	-
6.2.1	Bricks for side wall lining of ladles	SU 745	210	185.2	100	177.8	-	8
6.2.2	Bricks for bottom lining of ladles	Bottom Bricks	225	250	100	-	-	-

Drawing of bricks are given in page no 4

6.3: Bricks for lining of 70TEAF:

Quantity indicated below is for one set of lining

Sl no	Bricks size	Quantity(Numbers)
1	400x190/110x100mm	150
2	400x170/130x100mm	500
3	400x160/140x100mm	360
4	350x170/130x100mm	100
5	350x160/140x100mm	342
6	400x150/100mm	402
7	350x150/100mm	128

(Dimensional tolerances: ±1.5% or 2mm which is greater)

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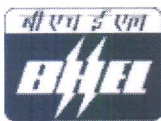
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COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company		6.4. TAP HOLE REFRACTORIES FOR 70T EAF: Size and set as per drawing given at page no 5 of 7. 7.0 INSPECTION AT SUPPLIER'S WORKS: - CFFP reserves the right to witness the testing of the material at supplier works and therefore the supplier shall notify the readiness of the material in advance. - CFFP may, at its discretion, test the material after receipt and acceptance of the material will be based on the CFFP's test results. <i>In case of any dispute in chemical analysis referee method shall be IS.</i> - For result of analysis and properties of material the decision of CFFP shall be final and binding on the supplier. 8.0 TEST CERTIFICATES: One Original and three copies of Test Certificate from the Manufacturer containing the following information along with test result of all properties given in clause no 5 should be provided. The T.C should contain the packing details of material. Manufacturer's Name Name of the material Batch/Lot No. Quantity. The TC should also contain the BHEL's P.O. No. and Challan No. and packing detail of the material. 9.0 PACKING AND MARKING: Packing should be such as to prevent loss / deterioration in quality during handling, transport and storage. It should be in the Manufacturer's packing. Each package should be marked with the following details. Name of the material Manufacturer's Name / Trade mark Batch/Lot No. Net weight.				
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10.0 PERFORMANCE OF MATERIAL:

Guaranteed heat in working lining (**Slag zone + Metal zone**) of EAF and VAD/VOD/LRF, under working conditions mentioned below against types of bricks.

Equipment.	Bricks	Working condition	LIFE
30T&10T EAF	30/20 & 30/40	Oxygen lancing, removal of P to 0.004%	80 heats minimum with intermediate repair near tap hole area and arch cooler area.
70T EAF	SET	Oxygen lancing, removal of P to 0.004%	25 Heats minimum
VAD/VOD/LRF Ladles	SU 745	Temp achieved-1720°C Max Degassing at Vacuum level ≤ 1 torr for ≈ 30 minutes	Minimum 5000 minutes of purging with one slag line repair.

Record of Life:

Furnace life → Record from **Heat Process Sheet/Furnace Log Book**.

Ladle life → Record from **Heat Process Sheet/Ladle Life Record Book** in pit side.

11.0 ACCEPTANCE OF MATERIAL:

Acceptance of material will be based on conditions defined in clause number 5 and 6 and drawings mentioned in page 5 and 6 of the specification.

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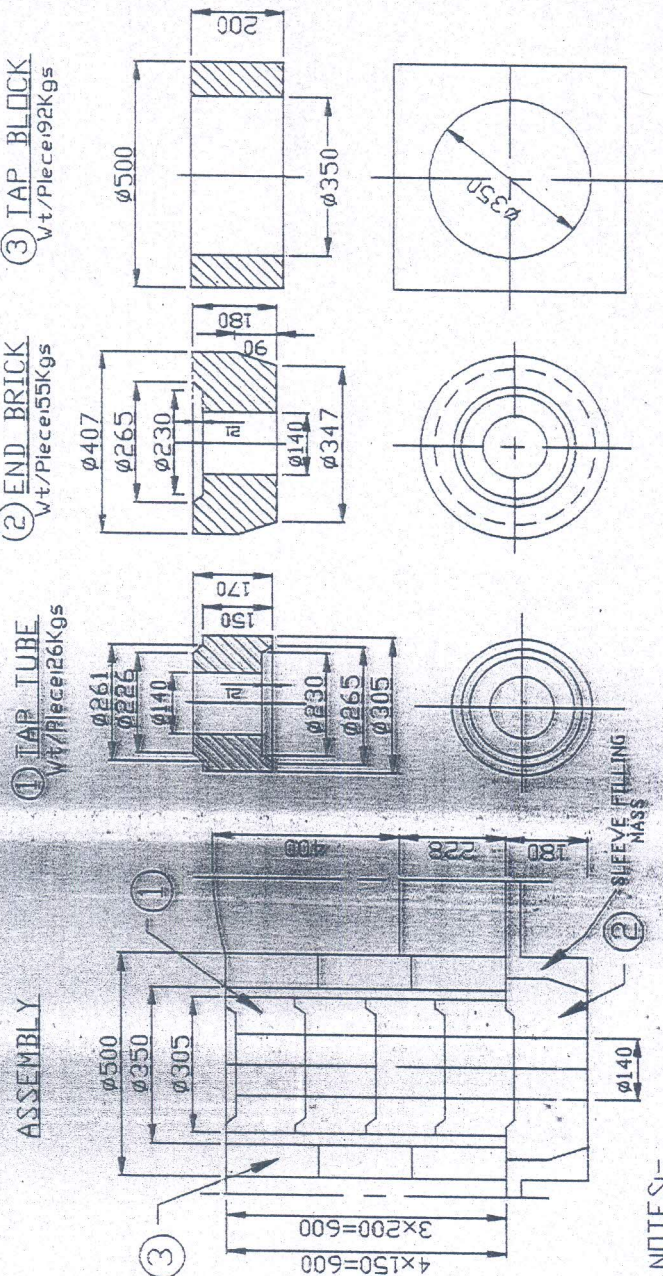


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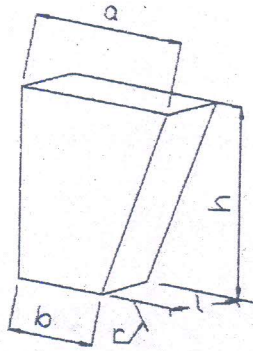
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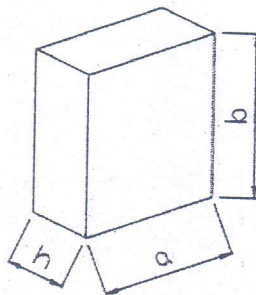
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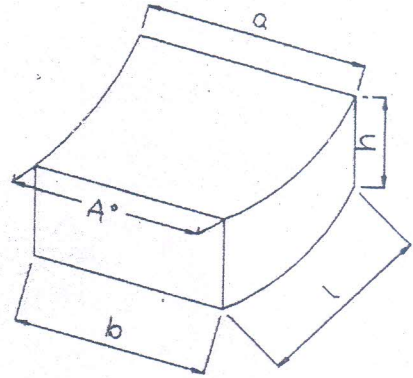
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SIZE: 30/20 & 30/40



BOTTOM BRICK



SIZE: SU 745

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REVISION RECORD SHEET

SL NO	REVISION NO	DATE	
1	03	17.07.2006	-Packing clause modified
2	04	20.04.2010	1- Clause 5 modified. 1. MgO % changed from 94.5%min to 97% min and this is in used magnesia. Residual carbon % changed to 8-12%from max of 12%.Al ₂ O ₃ content changed to 2.0% max from 0.65%max.Fe ₂ O ₃ content limited to 0.5%. 2- DBMC spl. bricks removed from spec. Tap hole Refractory for 70TEAF incorporated in the spec. SU 645 size removed. 3- Clause no 7: inspection by third party included. 4- Clause no 8: All properties mentioned at Clause no % are to be given in T.C. The T.C should contain the packing details.
3	05	23/04/2016	1. Clause no 02 modified, working condition, temp and vacuum level specified. Final slag composition mentioned. 2.- Clause no 05 modified: Validated instrumental Analysis traceable to internal standards added. 3.- clause no 5.3 chemical composition MgO in finished product added. 4.- Clause no 6.3: number of bricks at sl. No 1,2 and 4 (for 70T) increased. 4.- Clause no 7 modified: in case of any dispute in chemical analysis referee method shall be IS 5.- Clause no 10 performance of material : life of bricks in EAF & Ladles mentioned. 6.- Clause no 11, acceptance criteria added.

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