



**GOVT. OF INDIA
MINISTRY OF RAILWAYS**

SPECIFICATION NO.M&C/MTD/101/2007

FOR

**BRAKE BLOCK MATERIAL MADE FROM PHOSPHORIC
IRON FOR TRACTIVE AND TRAILING STOCK**

ISSUED BY

**METALLURGICAL & CHEMICAL DIRECTORATE
RESEARCH DESIGNS AND STANDARDS ORGANISATION
MINISTRY OF RAILWAYS
MANAK NAGAR, LUCKNOW- 226 011.**

NOVEMBER 2007

PRICE Rs.440/-

ALT No.	A2
VALIDATED	ADE
CHD. SSE/D	
DRN.	
ALTERATION	SPEC. REVISED & REDRAWN AS PER DLW ALT-R3.
SSE	
ADE	
DATE	13/11/09

BASED ON DLW SPEC D10011 Rev-R3. (SUPERSEDES DMW SPEC D10011 Alt-A1).

MATERIAL STANDARDS DIESEL LOCO MODERNISATION WORKS PATIALA	NUMBER	D10011
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PURCHASE SPECIFICATION	SHEET	1 OF 3
	DATE	13-11-2009

1 DESCRIPTION

This specification covers steel casting, conforming to IS: 1030-1998, Grade 280-520 w or corresponding current Grade.

2 APPLICATION

For critical application in diesel locomotive.

3 PROCESS

The steel shall be made by through electric arc furnace/induction furnace/open heart furnace in order of preference.

4 CHEMISTRY: By

- Preferably spectrometric analysis of each melt or Wt method (conventional) of each melt
- For Wt Method, on drillings taken from the grip of tensile test bars or from the casting and the chemical composition shall conform to the IS: standard. Each of the involved melt is to be checked
- While quoting the manufacturer shall intimate the approximate extent of the elements maximum % intentionally present in the steel proposed for supply.

5 MECHANICAL PROPERTIES

- To be checked on preferably, cast on or integral test bar else on separately cast test bars of commensurate thickness of the casting and simultaneously heat treated with the casting they represent. Checking is to be done @ at least one sample/H.T.Batch.

UTS (Min) 520 MPa

Yield Stress 0.2% Proof Stress (Min) 280 MPa

Elongation % (on gauge length=5.65√a) 18 (min)

Reduction in area (% min) 36

Angle of bend (min) 60° (mandrel dia 50 mm)

6 CARBON EQUIVELENT

Each H/T Batch shall be checked for its carbon equivalent and the same shall be ≤0.40

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7 PURCHASE CONDITION

The casting shall be supplied in dressed, machined heat-treated, and sand/grit blasted and painted with anti-rust material. Casting – meant to be welded subsequently, shall be painted with weldable primer and the chamfered

Location shall have to be suitably marked.

8. HEAT TREATMENT

The castings are to be supplied in suitably heat treated condition, to achieve the specified Mechanical Properties.

9. WORKMANSHIP & FINISH

Casting shall be sound, smooth, Well cleaned, and free from of cracks, Blow-holes, Porosity, Shrinking Hot –tears, Scabs, adverse extent of Inclusion, Cold shuts, distortion and any other defects detrimental to Machinability, Appearances to finish to drawing sizes. The casting shall be cleaned by sand or grit blasting.

Any casting showing defects during subsequent manufacturing operations shall stand rejected, notwithstanding any previous certificate of satisfactory test result or acceptance of the rough castings. the rejected castings shall have to be replaced by the manufacturer free of cost.

10. MACHINABILITY.

All casting must be readily machine able at reasonable speeds and feeds and they must be free from sand or other hard inclusions foreign material.

11. PATTERN/ROUGH CASTING DRAWING.

Pattern drawing or rough casting drawing wherever available, may be furnished to the manufacturer in addition to the machining drawings. The manufacture may adopt them or suggest alternatives. The manufacturer shall submit a print of the drawing of the rough casting tolerance, draft angles, machining allowance and other relevant data and get approval prior to commencing bulk manufacture.

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1 2. INSPECTION & TESTING

- (a) The manufacturer shall indicate whether the test bars will be cast separately or integrally with the castings, and confirms the test bar particulars such as size, number, and location if integrally cast etc and get approval from DMW prior to commencement of bulk production.
- (b) Sample castings must be submitted for approval to check machine ability conformity to drawing sizes, machining allowances, etc. And for metallurgical inspection including ability checks.
- (c) The manufacturer shall submit test bars in accordance with clause 13 and its sub-clauses of IS: 1030-98.
- (d) The test bars shall under go Heat Treatment along with the lot of casting they represents before dispatch.
- (e) The prototype shall be checked & cleared by design before bulk manufacturing. The final inspection and acceptance will be made at DMW/PATIALA.
- (f) The manufacturer shall afford all the facilities to DMW representative to satisfy that the castings are being manufactured in accordance with the specification.
- (g) clause (a) & (c) shall be applicable for new vender only
- (h) Radiographic Examination shall be applicable for all castings as follows.
- (i) Radiographic examination is to be performed as per ASTM E -142 and acceptance Stnd. Shall be up to level – III of ASTM E-446, for casting defects of category A to C and no cracks, hot tears or unused inserts are allowed. Marking shall be made as per clause 15 of IS: Specification no IS:1030-1998. The location of these identification marks is indicated in the drawings. If not, the manufacturer shall suggest suitable location and get prior approval.

13 STANDERDS & PRACTICE

All other condition not specifically mentioned herein ,must meet the relevant IS:Standers

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SPECIFICATION NO. M&C/MTD/101/2007

SPECIFICATION FOR BRAKE BLOCK MATERIAL MADE FROM PHOSPHORIC IRON FOR TRACTIVE AND TRAILING STOCKS

1. SCOPE :

- 1.1 This standard covers the requirements for brake blocks made from Phosphoric Iron for all tractive and trailing stock of all gauges.
- 1.2 For the purpose of deciding whether a particular requirement of this standard complied with, the final value shall be rounded off in accordance with IS:2-1960.

2. MANUFACTURE :

Unless agreed to between the Purchaser and the Supplier, the Brake Blocks shall be cast in **Sand Moulds**

3. CHEMICAL PROPERTIES OF THE PRODUCT :

- 3.1 Chemical composition of the cast iron when tested in accordance with IS:228 shall be as under :

Total Carbon %	-	2.9 – 3.3
Combined Carbon %	-	0.5 – 0.8
Manganese %	-	0.5 – 0.7
Silicon %	-	1.2 – 2.2
Phosphorous %	-	0.8 – 1.1
Carbon Equivalent	-	Below 4.3

The chemical analysis shall be conducted on shavings by planing or drilling the cast iron portion of the brake shoe.

- 3.2 The steel for back plate shall conform to IS:2062 Grade A.

4. PHYSICAL CHARACTERISTICS (Appearance) :

The brake block must be suitably scrapped and cleaned. It must be free from defect like porosity, blow holes, hard spots, cold shut, distortions and sand and slag inclusions whether visible or not, which is likely to be pre-judicial to assembly or use.

5. MECHANICAL CHARACTERISTICS:

The average Brinell hardness of the Cast Iron Brake blocks, when tested in accordance with IS:1500-1983 shall be within 210-250 HB, the average shall be determined of two hardness measurements made on ground surface on the side of the test block at locations shown as A in Annexure-1 after 2mm of material has been removed by grinding or machining.

6. **MICRO STRUCTURE:**
The un-etched micro-specimen at 100 magnifications must show graphite conforming to distribution "A" , size 4 or finer to IS:77545-75. Rosset grouping (form B) up to 15% may be allowed.
- The etched specimen must show pearlite and uniformly distributed steadite. A small amount of ferrite distribution (maximum 5%) can however, be allowed.
7. **DIMENSIONS:**
The shape, dimension and tolerances of the brake blocks shall be as laid down in relevant drawings.
8. **RETOUCHING:**
All repairs are forbidden.
9. **MARKINGS:**
Manufacture's Name(or Railway Workshop code Name) shall be punched on steel hook of each brake block at location shown as B in Annexure-1.
10. **SELECTION FOR TEST:**
A minimum of one brake block from a batch of 200 castings or part shall be selected for tests as stipulated in clauses 3, 4, 5 and 6. The selected shoes shall pass the tests specified in clause 3, 4, 5 and 6.
- 10.1 **RETEST:**
For every shoe having failed in these tests, two more shoes from the same batch shall be selected and tested. If any one of these two brake shoes fails, the batch shall be rejected.
11. **INSPECTION:**
- 11.1 The Inspecting Officer or the purchaser shall have free access to the Works of the Manufacturer at all reasonable times. He shall be at liberty to inspect the manufacture at any stage and to reject any material that does not conform to the terms of this specification.
- 11.2 Inspecting Officer or the purchaser shall reserve authority to be present at the time of manufacture and take such part, as he thinks, fit, in all analysis and other chemical & Physical examination which the manufacture may make for his own purpose or under the terms of this specification at all stages of manufacture.
12. **TESTING FACILITIES:**
The manufacture shall supply the material required for testing, free of cost, and shall furnish and prepare necessary test pieces and supply labour and appliances at his own cost for such testing as may be carried out in his own premises in accordance with this specification. Failing in providing facilities at his own works for making the prescribed tests, the manufacturer shall bear the cost of carrying out the tests elsewhere.

Annexure-I

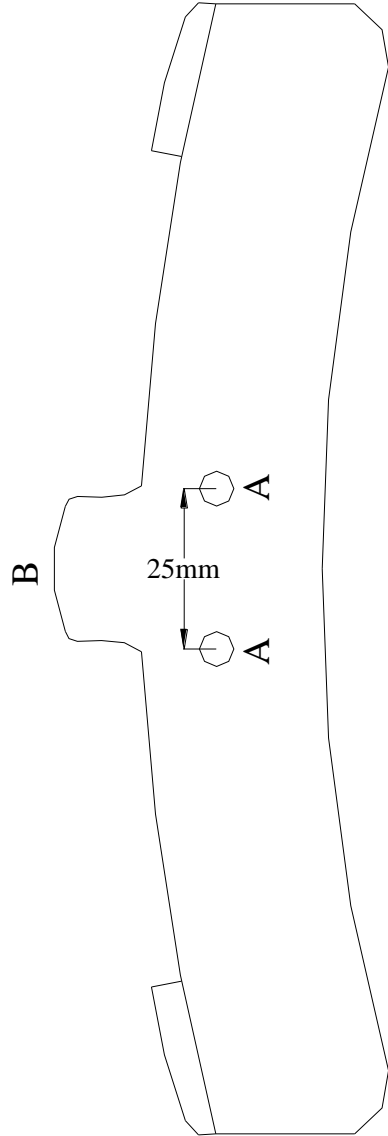


FIGURE SHOWING LOCATIONS FOR
MEASUREMENT OF HARDNESS ON BRAKE BLOCK

NOT TO SCALE

ALT. NO.	ALTERATION	CHD	SUPER CHD SSE	VALIDATED ADE	DATE
A4	SPECIFICATION REVISED & RETYPED (VIDE DLW ALT-R4)	/	<i>[Signature]</i>	<i>[Signature]</i>	28/08

MATERIAL STANDARDS DIESEL LOCO MODERNISATION WORKS PATIALA	NUMBER	NUMBER D99999 Va
	INDEX	MATERIAL TREATMENT
	SHEET	1 of 1
	DATE	28-8-2008
MATERIAL TREATMENT STANDARD OF FERROUS ITEMS USED IN ENVIRONMENT OF LUBE OIL/REGULAR OPEN ATMOSPHERE, FOR PROTECTION AGAINST CORROSION.		
<p>SCOPE: This Standard covers Type, Class and Code of procedure for protection of Ferrous Components from corrosion. The protection is made effective through Phosphating Treatment to IS: 3618. The pertinent details are mentioned hereunder:</p> <ul style="list-style-type: none"> (i) Class of Phosphating:- A-1 (ii) Type of Phosphating: - Manganese Phosphate. (iii) Minimum Coating Weight: - 7.5gm/m². (iv) Code of Procedure: - As per IS: 6005, in general. (v) Prior to application of sealant (Ref.IS:3618), it must be ensured that the treated items are made totally free of any remnant Acid/Alkali/Corrosive Chemical /Rust/Corrosion Products etc. (vi) Inspection & tests: - The specified Inspections, Tests and Examinations in IS: 3618; must be met with for Quality Requirements. 		
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