



CORPORATE PURCHASING SPECIFICATION

AA 109 13

Rev. No. 05

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MAGNETIC STEEL SHEET - HOT ROLLED , Gr: 600 - TG 178

1.0 GENERAL:

This specification governs the quality requirements of high permeability magnetic steel sheet, Hot rolled having a minimum 0.2% Proof stress value of 600 N/mm².

2.0 APPLICATION:

Rim Laminations of Electrical Machines.

3.0 CONDITION OF DELIVERY:

Hot rolled with trimmed edges in straight lengths (sheet form) in the ordered thickness, as specified on BHEL order.

Material shall be supplied with a tight adherent oxide coating on both sides, in bundles and shall not contain any welds. The sheets shall be stacked so that their edges are superimposed in a regular manner.

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

Material shall comply with the requirements of the following national standards and also meet the requirements of this specification.

BS EN 10265 - 1996, Grad: 600-TG 178 (Material No. 1. 0277)

Material offered to International Standard - IEC 404 - 8.5 -1989 Gr: 600-TG 178 is also acceptable.

5.0 DIMENSIONS AND TOLERANCES:

5.1 Sizes:

Magnetic steel sheet shall be supplied to the dimensions specified on BHEL order.

The thickness shall preferably be selected from the following standard sizes, 1.6, 1.8, 2.0 & 3.0mm.

5.2 Tolerances on hot rolled sheets:

The material shall be inspected in line with BS EN 10265 and shall comply to the following.

Note: Tolerance as per JIS C 2555 is also acceptable, if agreed to BHEL.

Revisions :

Cl 33. 5.2 of MOM of MRC-E

APPROVED :

INTERPLANT MATERIAL
RATIONALISATION COMMITTEE-MRC (E)

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**5.2.1 Thickness:****5.2.1.1 Nominal Thickness:**

Nominal Thickness(mm)	Permitted thickness tolerances for widths (mm)	
	Upto 600	From 600 Upto 1200
1.5 2.0	± 0.20	± 0.29
2.0 2.5	± 0.24	± 0.31
2.5 3.0	± 0.24	± 0.32

5.2.1.2 The variation in thickness within a sheet, in a direction parallel to the direction of rolling shall not exceed 5% of the permitted tolerance for nominal thickness specified in clause 5.2.1.1(above).

5.2.1.3 The variation in thickness, in a direction perpendicular to the direction of rolling shall not exceed the values in the table, given below:

Nominal thickness (mm)	Permitted thickness difference for widths (mm)	
	Above 150 & Upto 600	From 600 & Upto 1200
1.5	± 0.12	± 0.14

5.2.2 Width (Trimmed Edges):

Width (mm)		Permitted Width Tolerance,(mm)	
From	Upto	Plus	Minus
200	400	1.4	0
400	600	1.8	0
600	1200	6.0	0

5.2.3. Length:

Length (mm)	Permitted Length Tolerance (mm)	
	Plus	Minus
Upto 1000	10	0
Above 1000	1% of Length	0



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5.2.4 Flatness:

The maximum distance between the lower face of the sheet and the flat horizontal surface shall not exceed the values given below:

Length, mm	Maximum distance for nominal thickness,mm	
	Upto & including 2	Above 2
Less than 1000	6	6
1000 & above	0.008 X Length	0.007 x Length

5.2.5 Edge Camber:

The gap which characterises the edge camber shall not exceed 0.5% x Length of sheet for material supplied with trimmed edges and above 150 mm width.

6.0 FREEDOM FROM DEFECTS:

The surface of the material shall be smooth and clean, free from grease, rust, loose scale and other surface defects such as burrs, cutting distortions, dents, waviness, scratches, blisters, cracks etc.

7.0 MANUFACTURE:

The production process of the steel and its chemical composition are left to the discretion of the manufacturer.

8.0 TEST SAMPLES:

Test samples of the same heat/melt and thickness shall be selected from the consignment is follows:

Upto 30 tonnes	: 1 sample
Above 30 to 60 tonnes	: 2 samples
Above 60 tonnes	: 3 samples

The test samples shall be sufficient in size to provide the necessary test pieces. The sample shall be preferably be taken from upper part of the bundle.

9.0 PROPERTIES:

The material when tested as detailed in BS EN 10265 at a temperature of $27 \pm 2^{\circ}\text{C}$ shall show the following properties:

9.1 Mechanical:

Tensile strength	: 700 - 850 N/mm ²
0.2% proof stress	: 600 N/mm ² , min.
Elongation on 80mm gauge length	: 10 percent, min.

**9.2 Magnetic:**

The material when tested on a Epstein frame at an AC magnetic field in amperes/metre shall show the following minimum corresponding values of magnetic flux density in Tesla:

Magnetic field strength A/m	Magnetic flux density Tesla (Minimum)
5000	1.50 for information
15000	1.78 Guaranteed

10.0 TEST CERTIFICATES:

Three copies of test certificates shall be supplied, unless otherwise specified on order. In addition, the supplier shall ensure to enclose one copy of the test certificate along with their despatch documents to facilitate quick clearance of the material.

The test certificate shall bear the following information:

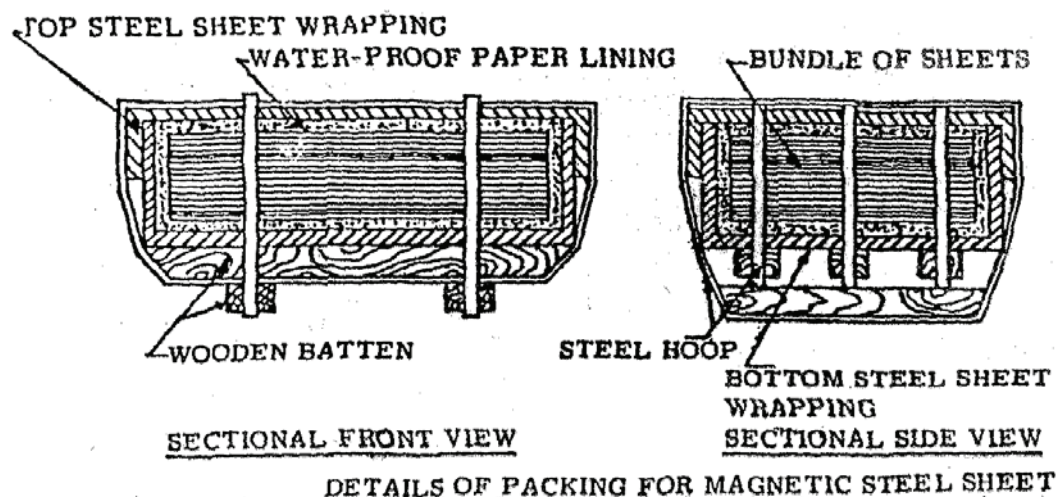
AA 10913-Rev 05 / BS EN 10265, Gr:600-TG178 / IEC 404-8.5 Gr:600-TG178, BHEL Order No, Supplier's Name/Grade/Identification No., Size & Weight, Melt No., Packet/ Bundle No.

Test results of a) Dimensions & Tolerances, b) Mechanical & c) Electromagnetic properties viz. Magnetic Flux density in Tesla - Guaranteed at 15000 A/m and for information at 5000 A/m.

11.0 PACKING AND MARKING:**11.1 Packing:**

Magnetic steel sheets shall be supplied in bundles. The packing shall be seaworthy and shall protect the material from damage during transit. A typical packing which would be suitable is shown below.

Each sheet shall be marked with supplier's grade/reference. These markings shall be along the rolling direction.





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Note:

- a) Water proof paper lining shall be preferably Volatile Corrosion Inhibitor (V.C.I.) Coated Paper with an additional polythene (100 micron) enveloped.
- b) Approximate weight of each bundle shall be 2 to 3 tonnes. Bundle weighing 2 metric tonnes is however preferred.
- c) The packing should ensure that there is no seepage of moisture and the sheets reach BHEL completely rust free condition. It shall be strong enough to withstand handling at the docks, at sea and on the road.

11.2 Marking:

A metal label/tag shall be securely attached with each bundle outside its wrapping and shall be legibly marked with the following information.

AA 10913, BHEL Order No, Supplier's Name/Grade/Identification No., Size & Weight, Melt No., Packet/Bundle No.

12.0 REFERRED STANDARDS (Latest Publications Including Amendments):

- 1) IEC 404- 8.5
- 2) JIS C 2555
- 3) BS EN 10265