	CORPORATE PURCHASING SPECIFICATION	AA10911 Rev No. 07 PAGE 1 of 5																		
MAGNETIC STEEL SHEET - HOT ROLLED / COLD ROLLED Gr. 350 - TG 179																				
<p>1 GENERAL:</p> <p>This specification governs the quality requirements of permeability magnetic steel sheet, Hot rolled / Cold rolled having a minimum 0.2% Proof stress value of 350 N/mm².</p> <p>2 APPLICATION:</p> <p>Rim Laminations of Electrical Machines.</p> <p>3 CONDITION OF DELIVERY:</p> <p>Hot / Cold rolled will be with trimmed edges in straight lengths (sheet form in the ordered thickness, as specified on BHEL order.</p> <p>Sheets above 1mm shall be delivered in hot rolled and ≤1mm sheet shall be delivered in cold rolled condition.</p> <p>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.</p> <p>4 COMPLIANCE WITH NATIONAL STANDARDS:</p> <p>Material shall comply with the requirements of the following national standards and also meet the requirements of this specification.</p> <p>BS EN 10265 - 1996, Gr: 350-TG 179 (Material No. 1.0272)</p> <p>Material offered to International Standard - IEC 404 - 8.5 -1989 Gr: 350-TG 179 is also acceptable.</p> <p>5 DIMENSIONS AND TOLERANCES:</p> <p>5.1 Sizes:</p> <p>Magnetic steel sheet shall be supplied to the dimensions specified on BHEL order.</p> <p>The thickness shall preferably be selected from the following standard sizes, 1.0, 1.6, 1.8, & 2.0 mm.</p> <p>1mm sheet shall be supplied in cold rolled condition.</p> <p>5.2 Tolerances on hot rolled sheets:</p> <p>The material shall be inspected in line with BS EN 10265 and shall comply to the following.</p> <p>Note: Tolerance as per JIS C2555 is also acceptable, if agreed to BHEL.</p>																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="3" style="padding: 5px;"> Revisions: CI 33.5.2 of MOM of MRC-E </td> <td colspan="3" style="text-align: center; padding: 5px;"> APPROVED: INTERPLANT MATERIAL RATIONALISATION COMMITTEE – MRC(S&GPS) </td> </tr> <tr> <td style="width: 20%; padding: 5px;">Rev No.07</td> <td style="width: 20%; padding: 5px;">Amd No.</td> <td style="width: 20%; padding: 5px;">Reaffirmed</td> <td style="width: 20%; padding: 5px;">Prepared</td> <td style="width: 20%; padding: 5px;">Issued</td> <td style="width: 20%; padding: 5px;">Dt. of 1st Issue</td> </tr> <tr> <td style="padding: 5px;">Dt: 05-10-2003</td> <td style="padding: 5px;">Dt:</td> <td style="padding: 5px;">Year:2020</td> <td style="padding: 5px;">HEP, Bhopal</td> <td style="padding: 5px;">Corp.R&D</td> <td style="padding: 5px;">September, 1976</td> </tr> </table>			Revisions: CI 33.5.2 of MOM of MRC-E			APPROVED: INTERPLANT MATERIAL RATIONALISATION COMMITTEE – MRC(S&GPS)			Rev No.07	Amd No.	Reaffirmed	Prepared	Issued	Dt. of 1 st Issue	Dt: 05-10-2003	Dt:	Year:2020	HEP, Bhopal	Corp.R&D	September, 1976
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CORPORATE PURCHASING SPECIFICATION**5.2.1 Thickness:****5.2.1.1 Nominal Thickness:**

Nominal Thickness(mm)		Permitted thickness tolerances for widths(mm)	
Above	Up to	Up to 600	From 600 Up to 1200
1.5	2.0	± 0.18	±0.23

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	Above 150 & up to 600	From 600 up to 1200
1.5	±0.06	±0.08

5.2.2 Width (Trimmed Edges):

Width, mm		Permitted Width Tolerance, mm	
From	Up to	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
Up to 1000	10	0
Above 1000	1% of Length	0

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 Upto & including 2mm
Less than 1000	6
1000 and above	0.006 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.



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5.3 Tolerances on cold rolled sheets:

5.3.1 Thickness:

5.3.1.1 The variation in thickness within a sheet or a length of coil of 2 meters in a direction parallel to the direction of rolling shall not exceed 8% of the nominal value for the thickness ≤ 1.5 mm.

5.3.1.2 The following tables gives the permitted tolerances for all grades:

Nominal width l, (mm)	Permitted tolerances for nominal thickness 'e' (mm) 0.8 to ≤ 1 mm
$l \leq 600$	± 0.05
$600 < l \leq 1200$	± 0.10
$l > 1200$	± 0.11

5.3.1.3 The variation in thickness in a direction perpendicular to the direction of rolling shall not exceed the values as given below:

Proof stress	Nominal thickness, mm	Permitted differences for width, l (mm)		
		$150 < l \leq 600$	$600 < l \leq 1200$	$l > 1200$
> 350 N/mm ²	> 0.7	± 0.06	± 0.07	± 0.08

5.3.2 Tolerances on width (Trimmed edges):

Nominal width l, (mm)	Permitted Tolerance (mm) thickness ≤ 1.5 mm	
$200 < l \leq 400$	+ 0.6	— 0
$400 < l \leq 600$	+ 1.0	— 0
$600 < l \leq 1200$	+ 5.0	— 0
$l > 1200$	+ 7.0	— 0

Note: Tolerances for other widths refer BS EN 10265.

5.3.3 Tolerances on length:

Nominal length, L (mm)	Permitted Tolerance (mm)	
$L \leq 1000$	+ 10	— 0
$L > 1000$	+ 1 % of L	— 0

5.3.4 Flatness:

Length, L (mm)	Maximum distance for nominal thickness 'e' (mm) $0.7 < e \leq 1.2$
$L \leq 1000$	9
$L > 1000$	$0.009 \times L$

5.3.5 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 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 MANUFACTURE:

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

**8 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 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	:	450 - 550 N/mm ²
0.2% proof stress	:	350 N/mm ² , min.
Elongation on 80mm gauge length	:	18 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	1.55 for information
15000	1.79 Guaranteed

10 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:

AA10911-Rev 07 / BS EN 10265, Gr:350-TG179 / IEC 404-8.5 Gr:350-TG179, BHEL Order No, Supplier's Name/Grade/Identification No., Size & Weight, Melt No., Packet/Bundle No.

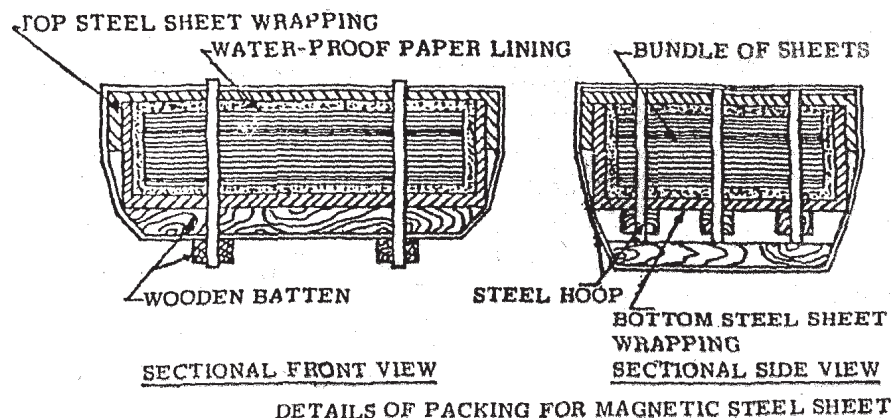
Test results of a) Dimensions & Tolerances, b) Mechanical and c) Electromagnetic properties viz. Magnetic Flux density in Tesla - Guaranteed at 15000 A/m and for information at 5000 A/m.

11 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.



Note:

- Water proof paper lining shall be preferably Volatile Corrosion Inhibitor (V.C.I.) Coated Paper with an additional polythene (100 micron) enveloped.
- Approximate weight of each bundle shall be 2 to 3 tonnes. Bundle weighing 2 metric tonnes is however preferred.
- 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.

AA10911, BHEL Order No, Supplier's Name/Grade/Identification No., Size & Weight, Melt No., Packet/Bundle No.

12 REFERRED STANDARDS (Latest Publications Including Amendments):

1. IEC 404- 8.5

3) JIS C 2555

4) BS EN 10265