	CORPORATE PURCHASING SPECIFICATION	AA 101 13
		Rev. No. 05
		PREFACE SHEET

HOT ROLLED CARBON STEEL SHEET (330 N/mm^2 TENSILE)

FOR INTERNAL USE ONLY
REMOVE THIS PREFACE SHEET BEFORE ISSUE TO SUPPLIERS

Comparable Standards:

1.	INDIAN	:	IS: 5986-2002, Gr: Fe 330

Suggested/Probable Suppliers And Grades:

1.	M/s SAIL	:	IS : 5986, Gr.: Fe 330
2.	Refer plant vendors list		

User Plant References:

1. HEEP, HARDWAR	:	0500.004, Gr.: St.34
2. HYDERABAD	:	HY 021 22 99
3. BHOPAL	:	PS 10113
4. TRICHY	:	BM –C10

Revisions : Cl: 27.6.6 of MOM of MRC-S&GPS			APPROVED : INTERPLANT MATERIALRATIONALISATION COMMITTEE-MRC-(S&GPS)		
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HOT ROLLED CARBON STEEL SHEET (330 N/mm^2 TENSILE)

1.0 GENERAL:

This specification governs the quality requirements of Hot Rolled Carbon Steel Sheet of thickness of 2.5 mm to 4.0 mm (both inclusive).

2.0 APPLICATION:

Suitable for cold forming/drawing/ fabrication by welding..

3.0 CONDITION OF DELIVERY:

Sheets shall be supplied in hot rolled, descaled and oiled condition. Imported sheets shall be supplied in straight lengths. The edges shall be flattened and sheared. Mill edges are not acceptable. Sheets shall be free from waviness and shall have a uniformly dull (matt) finish.

Oil used for rust prevention should be free from pungent smell. The following oils are suggested:

a) SERVO RP 125 of M/s. IOC.

b) RUSTOP 387/388 of M/s. HPC

c) Bharat TCPF of M/s. Bharat Petroleum

d) Any other TRP conforming to IS : 1154

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

The material shall comply with the requirements of the following National standards and also meet the requirements of this specification.

IS: 5986-2002, Gr.: Fe 330 : Hot Rolled Steel Plates, Sheets, Strips and Flats for flanging and forming operation.

5.0 DIMENSIONS AND TOLERANCES:

5.1 Sizes:

Hot rolled carbon steel sheets shall be supplied to the dimensions in BHEL order.

5.2 Tolerances:

The tolerances on sheets shall comply with the following:

5.2.1 Thickness (IS:1852):

Thickness, mm	Tolerance, mm
2.50	± 0.20
3.15	± 0.22
4.0	± 0.25

5.2.2 Width (IS:1852):

Width, mm	Tolerance, mm
Upto & incld. 1250 mm	+ 6 mm - 0 mm
Over 1250 mm & upto and incld.1550 mm	+ 0.5 percent - 0.0 percent
Over 1550 mm	+ 0.6 percent - 0.0 percent

5.2.3 Length (Continuous mill) IS:1852:

Length, mm	Tolerance, mm
Upto & incld. 2500 mm	+ 25 mm - 00 mm
Over 2500 mm	+ 1 percent subject to a maximum of 70 mm - 0 percent

5.2.4 Flatness (for cut lengths):

Thickness, mm	Width, mm	Flatness tolerance, mm
From 2.5 to 4.0	Upto & incld. 1200	15
	Over 1200 & upto incld. 1500	20
	Over 1500	25

5.2.5 Edge camber IS:5986:

The edge camber (i.e. lateral departure of the edge of the material from a straight line forming a chord) of sheets in cut lengths and coil shall not exceed the following values:

5.2.5.1 For Cut Lengths:

Length in meters		Tolerance, mm
Over	Upto & incld.	
--	1.25	5
1.25	1.80	6
1.80	2.50	8
2.50	3.15	10
3.15	3.55	12
3.55	4.00	16
4.00	5.00	19

5.2.5.2 For Coils:

25 mm in any 5000 mm length.

6.0 MANUFACTURE :

Process of manufacture is left to the discretion of the manufacturer except Bessemer process.

Material shall be manufactured from semi killed or killed steel.

7.0 FREEDOM FROM DEFECTS:

The sheets shall be free from harmful defects, twists, buckle, rust, scale and waviness and shall be reasonably smooth, flat and square.

8.0 CHEMICAL COMPOSITION :

The melt analysis of steel and the permissible variation in the composition of the material from the melt analysis shall be as follows:

Element	Melt analysis, percent, max.	Permissible variation, percent, max.
Carbon	0.15	0.03
Manganese	0.80	0.05
Sulphur	0.040	0.005
Phosphorus	0.040	0.005

9.0 TEST SAMPLES:

9.1 Tensile Test:

One sample shall be taken per thickness per consignment from each melt.

As far as possible test pieces shall be cut transverse to the direction of rolling and shall be of full thickness of the sheet rolled.

9.2 Bend Test:

One sample shall be taken per thickness per consignment from each melt.

Bend test pieces shall be cut so that the axis of the bend is parallel to the direction of rolling viz. transverse.

Note: When more than one thickness is rolled from the same melt, one additional test piece for each thickness shall be taken.

10.0 MECHANICAL PROPERTIES :

10.1 Bend:

When tested in accordance with IS : 1608, the test pieces shall be capable of being bent cold through 180^0 close. The outer convex surface of the test piece shall be free from cracks.

10.2 Tensile:

When tested as per IS : 1608, the test pieces shall show the following properties:

Tensile strength : 330 – 440 N/mm^2

Yield strength : 205 N/mm^2, min.

Elongation:

For sheets upto & Incl. 3 mm, thick : 18 %, minimum on 80 mm gauge length
For sheets above 3 mm, thick : 28 %, minimum in 5.65 $\sqrt{So}$ gauge length

11.0 HARDNESS (VICKERS):

When tested in accordance with IS:1501, the material shall show a Vickers hardness in the range of 100 – 140 HV.

Note: Hardness test shall be conducted only when tensile test cannot be performed.

12.0 TEST CERTIFICATES:

Unless otherwise specified, three copies of test certificates shall be supplied.

In addition, the supplier shall ensure to enclose one copy of the test certificate along with their dispatch documents to facilitate quick clearance of the material.

The test certificate shall bear the following information:

AA 101 13, Rev 05: Hot rolled carbon steel sheet (330 N/mm^2 Tensile)

BHEL Order No,

Supplier's name,

Identification No

Melt No,

Process of manufacture

Details of pickling, descaling and oiling

Results of dimensional inspection

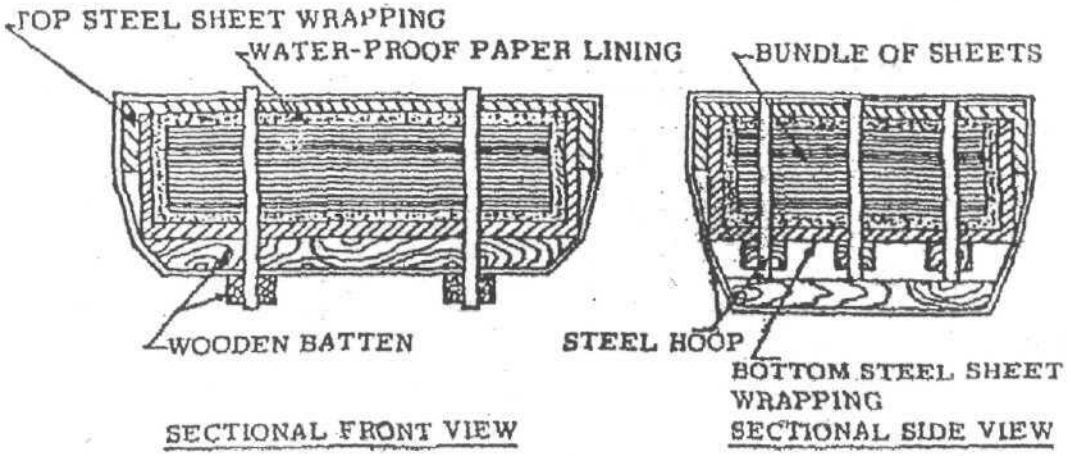
Results of Chemical analysis and Mechanical tests,

Note: Material procured, supplied and certified as AA 101 13, rev 05/IS:5986, Gr.:Fe 330 and comply with the requirements of this specification is acceptable.

13.0 PACKING AND MARKING:

Steel sheets shall be supplied in bundles and shall be suitably packed in bundles to prevent corrosion and damage during transit.

The recommended packing for imported material shall be as shown below.



DETAILS OF PACKING FOR MAGNETIC STEEL SHEET

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.

A metal label shall be securely attached to each bundle and shall bear the following information :

AA 101 13: Hot rolled carbon steel sheet
BHEL Order No,
Supplier's Name & Identification No,
Size & Thickness of sheets
Weight

14.0 REFERRED STANDARDS (Latest Publications Including Amendments) :

1. IS : 1154 2. IS:1501 3. IS : 1608 4. IS:1852
5. IS : 5986