

**CORPORATE PURCHASING SPECIFICATION**

AA 107 21

Rev. No. 07

PREFACE SHEET**STAINLESS STEEL BARS (MARTENSITIC), Gr: X 20 Cr 13,
HARDENED AND TEMPERED**FOR INTERNAL USE ONLY
REMOVE THIS PREFACE SHEET BEFORE ISSUE TO SUPPLIERS**Comparable Standards:**

- | | | |
|-------------|---|---|
| 1. EUROPEAN | : | EN 10088-3
Gr : X 20 Cr 13, H&T |
| 2. AMERICAN | : | a) AISI 420, Hot rolled, H&T
b) ASTM A 276, S 42000, Hot rolled, H&T |

Suggested/Probable Suppliers And Grades:

Refer Plant Vendors list

User Plant References:

- | | | |
|------------------|---|--|
| 1. BHOPAL | : | 105 15 |
| 2. HYDERABAD | : | BS 970, Gr.:420 S 37 (En 56C), Condition: R
ASEA 22303-03 |
| 3. HEER, HARDWAR | : | -- |
| 4. TIRUCHY | : | BM-S2 |

Revisions :
Cl.29.5.0.-(e) of MOM of 29th MRC-S&GPS**APPROVED :**
**INTERPLANT MATERIAL RATIONALISATION
COMMITTEE-MRC (S&GPS)**

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**STAINLESS STEEL BARS (MARTENSITIC) Gr:X 20 Cr 13,
HARDENED AND TEMPERED**

1.0 GENERAL :

This specification governs the quality requirements of Stainless Steel Bars (Martensitic), Hardened and Tempered.

2.0 APPLICATION :

For general engineering purposes involving stresses under corrosive conditions.

3.0 CONDITION OF DELIVERY :

Hot rolled and hardened and tempered.

For size above 100 mm, forgings in H&T condition are also acceptable.

Bars shall be supplied in the descaled condition.

The ends of bars shall be square and true.

The bars shall be supplied in straight lengths without twists and bends.

4.0 COMPLIANCE WITH NATIONAL STANDARDS :

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

EN 10088-3, Gr. X 20 Cr 13 : General Purpose Semi-finished Products, Bars,
Hardened and Tempered : Rods and Sections

5.0 DIMENSIONS AND TOLERANCES :

5.1 Sizes: The bars shall be supplied to the dimensions specified in BHEL order.

5.2 Tolerances:

5.2.1 For Forged bars: The tolerances shall be + 8 mm - 0 mm.

5.2.2 Tolerances on rolled bars shall comply with following specifications:

EURONORM 58: Hot rolled flats for general purposes

EURONORM 59: Hot rolled square bars for general purposes

EURONORM 60: Hot rolled round bars for general purposes

Tolerances as per equivalent IS Standards are also acceptable

Revisions:

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**5.3 Length :**

Unless otherwise specified, hot rolled bars shall be supplied in lengths of 3 to 6 meters or in multiples with maximum of 10% shorts down to 1 meter.

Forged bars shall be supplied in lengths of 1.5 to 3 metres.

6.0 MANUFACTURE :

Process used for the manufacture of the bars is left to the discretion of the manufacturer. Material shall be manufactured from fully killed steel. Sufficient reduction and discard shall be made from each ingot to ensure freedom from pipe, harmful segregation and other defects.

7.0 HEAT TREATMENT :

The recommended heat treatment is as follows:

Harden in oil / air at temperature of 950-1050°C.

Temper at suitable temperature between 650-750°C.

Details of the actual heat treatment cycle followed shall be specified in the test certificate.

8.0 FREEDOM FROM DEFECTS :

The bars shall be free from internal and surface defects. Bars shall be free from twist and bends.

9.0 CHEMICAL COMPOSITION :

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

Element	<u>Melt analysis, percent</u>		Permissible variation, percent,
	min.	max.	
Carbon	0.16	0.25	- 0.01 + 0.02
Silicon	--	1.00	+ 0.05
Manganese	--	1.50	+ 0.04
Chromium	12.00	14.00	± 0.20
Sulphur	---	0.030	+ 0.005
Phosphorus	---	0.040	+ 0.005

Note: Elements not listed in this table shall not be intentionally added to the steel without the agreement of the purchaser except for finishing the cast. All appropriate precautions are to be taken to avoid the addition of such elements from scrap and other materials used in production which would impair mechanical properties and the suitability of the steel.

**10.0 TEST SAMPLES :**

The test samples shall be selected as per EN 10088 Part 3.

11.0 MECHANICAL PROPERTIES :**11.1 Tensile and impact:**

The test pieces shall show the following properties:

Ruling section, mm	Tensile strength, N/mm ²	Yield strength, min N/mm ²	Percent Elongation, min	Impact Strength at Room Temperature, ISO – V, Joules	Hardness BHN
Upto 160mm (Inclusive)	700-850	500	13	25	208-252

Note:

1. The mechanical properties required for sizes above 160 mm shall be as per mutual agreement between BHEL and manufacturer.
2. The tensile test shall be carried out in accordance with IS: 1608 or any reputed National Standard.
3. The charpy impact test shall be performed in accordance with IS: 1499 or any reputed National Standard.

An impact test shall consist of three specimens from a single test location, the average value of which shall be as specified above.

Only one value of the three can be below the specified minimum but in no case below 2/3 of the specified minimum value.

- 4 Hardness shall be informed in the test certificates for information.

12.0 ULTRASONIC TEST:

- 12.1 Each bar above 100 mm shall be tested ultrasonically in accordance with BHEL standard AA 085 01 18 to ensure freedom from internal defects. The norms of acceptance shall be as per category 2 of the above standard.

12.2 Optional tests:

If specified in order, each bar > 40 to 100mm shall be tested ultrasonically in accordance with BHEL standard AA 085 01 18 to ensure freedom from internal defects and the norms of acceptance shall be as per category 2.



13.0 TEST CERTIFICATES :

Three copies of test certificates shall be supplied, unless otherwise stated in the order.

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:

BHEL References:

AA 107 21 (Rev. No. 07) : Stainless steel bars (martensitic), Gr: X 20 Cr 13, H&T
BHEL order No.

Supplier's References :

Name
Identification No.
Melt No.
Details of heat treatment.

Result of Tests:

Dimensional inspection.
Results of chemical analysis, mechanical tests and Hardness check called for in this specification.

14.0 PACKING AND MARKING:

The material shall be suitably packed in bundles-Hessian wrapped-to prevent sagging and damage during transit.

Each bar/flat 50 mm in diameter/width across flats shall be stamped with 'AA 107 23', melt No., BHEL order No., at one end or on the end face.

Bars bar/flat upto and including 50 mm in diameter/width across flats shall be bundled together and tied with wire at 3 to 4 places along the length of the bars.

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

AA107 21 : Stainless steel bars (martensitic), Gr: X 20 Cr 13, H&T
BHEL Order No.
Consignment/Identification No.
Melt No.
Size and Weight.
Supplier's Name.

15.0 REFERRED STANDARDS (Latest Publications Including Amendments):

1. EN 10088-3
2. AA 0850118
3. EURONORM 58, 59 & 60