



CORPORATE PURCHASE SPECIFICATION

AA 107 23

Rev. No. 08

PREFACE SHEET

STAINLESS STEEL BARS (MARTENSITIC), Gr: X17CrNi 16-2, H & T

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

Comparable Standards:

- | | | |
|-------------|---|---|
| 1. EUROPEAN | : | EN 10088-3
Gr : X 17 Cr Ni 16 - 2, H&T |
| 2. AMERICAN | : | a) AISI 431
b) ASTM A 276
Type 431, H&T |
| 3. INDIAN | : | IS 6603 Grade 15 Cr 16 Ni 2 |

Suggested/Probable Suppliers And Grades:

Refer Plant Vendors list

User Plant References:

1. BHOPAL : 105 02

Revisions :

Cl. 31.2.0 of MOM of MRC-S&GPS

APPROVED :

INTERPLANT MATERIAL RATIONALISATION
COMMITTEE-MRC (S&GPS)

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STAINLESS STEEL BARS (MARTENSITIC), Gr: X17CrNi 16-2, H & T

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, 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.

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 17 Cr Ni 16 - 2: General Purpose Semi-finished Products, Bars, Rods and Sections

5.0 DIMENSIONS AND TOLERANCES :

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

5.1.1 Length:

Unless otherwise specified, hot rolled bars shall be supplied in 3 to 6 metres lengths or in multiples with maximum of 10 per cent, shorts down to 1 metre.

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

5.2 Tolerances:

5.2.1 Hot rolled bars:

The bars shall not vary from specified diameter or distance across flats by more than $\pm 2\frac{1}{2}$ %.

Revisions:

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**5.2.2 Forged bars:**

The tolerance on the forged bars shall be as follows:

<u>Diameter, mm</u>	<u>Tolerance, mm</u>
50 to 125	+ 6.0
125 to 175	+ 8.0
175 ---	+ 12.5

Note: (FOR HOT ROLLED & FORGED BARS)

Insignificant surface defects in the form of dent and ripple marks are permissible provided their depth does not exceed half the tolerances on each size.

6.0 MANUFACTURE :

Process used for the manufacture of the bars is left to the discretion of the manufacturer. Bars 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 :

Following heat treatment cycles are suggested.

- 1) Hardening at : 980-1030°C followed by oil quenching.
- 2) Double tempering at : 640-680°C followed by 590-620°C.

Details of actual heat treatment cycles 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 twists 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 as follows :

Element	Melt analysis, percent		Permissible variation, percent,
	min.	max.	
Carbon	0.12	0.22	+ 0.01
Silicon	--	1.00	+ 0.05
Manganese	--	1.50	+ 0.03
Nickel	1.50	2.50	+ 0.07
Chromium	15.00	17.00	± 0.20
Sulphur	--	0.030	+ 0.005
Phosphorus	--	0.040	+ 0.005



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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 10088-3.

11.0 MECHANICAL PROPERTIES :

11.1 Tensile and impact:

The test samples when heat treated and tested in longitudinal direction in accordance with IS : 1608 or any other reputed equivalent International Standard 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 Temp.
Upto 60mm (Inclusive)	900-1050	700	12	20
Above 60 mm to 160 mm	900-1050	700	10	15

* (Average of 3 ISO-V samples in Joules).

The above properties are valid for ruling section upto and including 160 mm. The mechanical properties required for sizes above 160 mm shall be as per mutual agreement between BHEL and manufacturer.

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.

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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 despatch documents to facilitate quick clearance of the material. The test certificate shall bear the following information:

BHEL References :

AA 10723 Rev. No.08: Stainless Steel Bars, Gr.X17CrNi 16-2 – H&T.
BHEL Order No.

Supplier's References :
Name
Identification No.
Melt No.

Details of heat treatment followed.

Result of Tests:
Dimensional inspection.
Results of chemical analysis, mechanical tests and ultrasonic test 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/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 23: Stainless steel bars Gr: X17CrNi 16-2, 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. IS 1608

3. AA 085 01 18