	CORPORATE PURCHASE SPECIFICATION	AA 102 08
		Rev. No. 07
		PREFACE SHEET

HOT ROLLED / FORGED CARBON STEEL BARS, Gr : 40C8 - NORMALISED

FOR INTERNAL USE ONLY
REMOVE THIS PREFACE BEFORE ISSUE TO SUPPLIERS

Comparable Standards:

1. INDIAN — IS : 1570, Part II, Section I - 1979
   Gr: 40C8(c40) Normalised

Suggested/Probable Suppliers and Grades:

Refer Plant Vendors list

User Plant References:

1. BHOPAL	:	PS 10208
2. HEEP, HARDWAR	:	0500.007 Gr: C40, Hot Rolled
3. HYDERABAD	:	HY 021 02 99
4. TIRUCHY	:	BM - CQ 35

Revisions :			APPROVED : INTERPLANT MATERIAL RATIONALISATION COMMITTEE-MRC (S&GPS)		
Cl 26.6.18 of MOM of MRC-S&GPS					
Rev. No. 07	Amd.No.	Reaffirmed	Prepared BHOPAL	Issued Corp. R&D	Dt. of 1st Issue AUGUST, 1976
Dt: 15.01.2004	Dt :	Year :			

HOT ROLLED / FORGED CARBON STEEL BARS, Gr: 40 C8-NORMALISED

1.0 GENERAL

This specification governs the quality requirements of Hot Rolled / forged Carbon Steel Bars, Normalised.

2.0 APPLICATION

Production of machined parts for general engineering purposes.

3.0 CONDITION OF DELIVERY

Hot Rolled / forged and Normalised.

Note: Sizes upto 100mm in hot rolled
>100 to 180mm in hot rolled or forged
abov 180mm in forged.

Bars shall be supplied in straight lengths with ends square and true.

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.

IS : 1570-Part II, Section 1-1979 : Schedule for wrought Steels-Carbon steels
Gr:40C8 (C40), Normalised : (Unalloyed Steels)

5.0 DIMENSION AND TOLERANCES

5.1 Sizes

Bars shall be supplied to the dimensions in BHEL order.

5.2 Length:

Unless otherwise specified, hot rolled bars shall be supplied in 3 to 6 metres length and forged bars shall be supplied in lengths of 1.5 to 3 metres

5.2 Tolerances:

5.2.1 For Forged bars: The tolerances shall be as per Cl 5.2.2 for bars ≤100mm. The tolerances shall be +8 mm -0 mm for bars > 100 mm

5.2.2 Tolerances on hot rolled bars shall comply with those of Grade 2 of IS:3739: Dimensional Tolerances for Carbon and Alloy Constructional Steel Products, reproduced below:

5.2.2.1 Round Square Bars:

Nominal Size mm		Tolerances, mm	
Over	Up to & Including	Permissible deviation	Out of round / square
--	25	± 0.50	0.50
25	50	± 0.75	0.75
50	80	± 1.00	1.00
80	100	± 1.25	1.25
> 100		± 1.6% of diameter or width of side	75 % of total tolerance (+ and -)

5.2.2.2 Flats:

Nominal width, mm			Tolerance, mm		
Over	Up to & Including	On width	On thickness		
			6 to 13	Over 13 to 25 including	Over 25 to 50 including
--	50	± 1.0	± 0.5	± 0.8	± 1.0
50	100	± 2.0	± 0.5	± 1.0	± 1.5
100	150	± 3.0	---	---	± 2.0

5.2.3 Straightness:

Unless otherwise agreed to, the permissible deviation shall not exceed 5mm in any 1000mm length.

6.0 MANUFACTURE:

Material shall be manufactured from fully killed steel.

7.0 FREEDOM FROM DEFECTS :

The bars shall be sound, straight and free from internal and surface defects such as seams, laps, cracks or any other defects which may impair the end use.

Bars shall be free from twists and bends.

8.0 HEAT TREATMENT :

The bars shall be normalised at a temperature of 830 - 860^{0}C

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 specified below :

Element	Melt analysis, percnt		Permissible Variation, percent
	Min.	Max.	
Carbon	0.35	0.45	± 0.02
Silicon	0.10	0.35	± 0.03
Manganese	0.60	0.90	± 0.04
Sulphur	---	0.035	+ 0.005
Phosphorus	---	0.035	+0.005

10.0 TEST SAMPLES :

10.1 One sample shall be taken from each melt for chemical analysis.

10.2 One sample shall be taken from each heat treatment batch for testing of mechanical properties. Test pieces for mechanical tests shall be taken in the longitudinal direction of the piece.

10.3 For ruling section upto & including 40mm, the test piece shall be machined coaxially from the test bars. For ruling section above 40mm the longitudinal axis shall be atleast 12.5 mm from surface of the test bars.

Test methods for determining mechanical properties shall be as per IS:1608 (For tensile test).

11.0 MECHANICAL PROPERTIES (IN NORMALISED CONDITION) :

Mechanical properties of the material shall be as follows:

Tensile strength : 580 - 680 N/mm^2

Yield strength : 320 N/mm^2, min

Elongation on 5.65 √So : 18%, min.

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 on 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 on 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 :

AA 102 08; Rev. No. 07: Hot rolled /forged carbon steel bars, Gr.:40 Normalised
BHEL order No,
Supplier's Reference :
Name
Identification No.
Melt No.
Details of heat treatment.
Results of Tests :
Results of Dimensional inspection.
Results of chemical analysis, mechanical tests & Ultrasonic test.

14.0 PACKING AND MARKING :

The material shall be suitably packed in bundles-hessian wrapped to prevent sagging, corrosion and damage during transit. A suitable clear temporary rust preventive shall be applied on all the bars. Each bar of 50 mm and above shall be stamped with AA 102 08, melt no, BHEL order no, at one end or on the end face.

Bars below 50mm 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 :

AA 102 08 : Hot Rolled / Forged Carbon Steel Bars, 40C8-Normalised.
BHEL Order No.
Consignment/Identification No.
Melt No.
Size and Weight.
Supplier's Name.

15.0 REFERRED STANDARDS (Latest Publications Including amendments):

1. IS : 1570 Part II 2. IS : 1608 3. IS : 3739 4. AA 085 01 18