



CORPORATE PURCHASING SPECIFICATION

AA10305

Rev No. 08

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HOT ROLLED / FORGED CARBON STEEL BARS, Gr: 55C8 - NORMALISED

1 GENERAL:

This specification governs the quality requirements of Hot Rolled / Forged Carbon Steel Bars Gr: 55C8, Normalised.

2 APPLICATION:

General engineering purposes.

3 CONDITION OF DELIVERY:

Hot Rolled / Forged and normalised.

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

Bars shall be supplied in straight lengths without twists and bends and with the ends square and true.

4 COMPLIANCE WITH NATIONAL STANDARDS:

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

IS : 1570, (Part 2-Sec.1) – 1979	:	Schedules for Wrought Steels- Part 2: Carbon Steels
Gr: 55C8 (C55Mn75)	:	(Unalloyed Steels) -Sec.1: Wrought products (other
Normalised.	:	than wire) with specified Chemical Composition and
	:	related Properties.

5 DIMENSIONS AND TOLERANCES:

5.1 Sizes:

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

5.2 Tolerances:

5.2.1 Hot Rolled Bars:

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:

Nominal Size. mm		Tolerance, mm	
Over	Upto & 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

Revisions:

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Nominal Size. mm		Tolerance, mm	
Over	Upto & Including	Permissible deviation	Out of round / square
100	125	± 1.50	1.50
125	160	± 2.00	2.00
160	200	± 2.50	2.50

5.2.2 Flats:

Nominal size, mm		Tolerance, mm			
Over	Upto & Incl.	On width	On thickness		
			6 to 13 Incl.	Over 13 to 25 Incl.	Over 25 to 50 Incl.
--	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 Hexagonal Bars:

Nominal Size, mm		Tolerance, mm	
Over	Upto & Including	Permissible deviation	Out of hexagon
--	25	± 0.50	0.75
25	50	± 0.80	1.20
50	85	± 1.60	2.40

5.2.4 Forged Bars:

Tolerance on size for forged bars shall be + 8.0mm -0mm.

5.2.5 Straightness for Hot Rolled Bars:

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

6 MANUFACTURE:

The steel shall be manufactured by the open hearth, electric, basic oxygen or a combination of these processes.

Sufficient discard shall be made from each ingot to ensure freedom from piping, harmful segregation and internal and surface defects.

Material shall be manufactured from killed steel.

7 HEAT TREATMENT:

The bars shall be normalised at a temperature of 810-840°C.

8 FREEDOM FROM DEFECTS:

The bars shall be sound, straight and free from internal and surface defects, such as seams, laps and injurious imperfections. Bars shall be free from twists and bends.

9 CHEMICAL COMPOSITION:

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

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Element	Melt analysis, percent,		Permissible variation, percent,
	min.	max.	
Carbon	0.50	0.60	± 0.03
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 TEST SAMPLES:

10.1 Tensile:

Bars from the same melt and of the same size shall be grouped in batches of 40,000 kg or part thereof. One tensile test piece shall be cut from a selected bar from each batch.

For bars of sizes upto and including 40mm, the test pieces shall be machined concentrically from the bars selected for test. Alternatively the full cross-section of the bars may be tested.

For bars of sizes over 40mm, the longitudinal axes of the test pieces shall not be less than 12.5mm from the surface of the bars selected for test.

Tensile test pieces shall have a gauge length equal to $5.65 \sqrt{S_o}$.

10.2 Ruling section above 200mm, tensile test samples can be taken in longitudinal or transverse direction.

11 MECHANICAL PROPERTIES:

When tested in accordance with IS:1608, the test pieces shall show the following properties :

Tensile strength	:	720N/mm ² , min.
Yield strength	:	396 N/mm ² , min
Elongation on $5.65 \sqrt{S_o}$ gauge length	:	13 percent, min.

12 ULTRASONIC TEST:

12.1 Each bar above 100mm shall be tested ultrasonically in accordance with BHEL standard AA0850118 to ensure freedom from internal defects.

The norms of acceptance shall be category 2 of the above standard.

12.2 Optional Test:

If specified in order, each bar >40 to 100mm shall be tested ultrasonically in accordance with BHEL standard AA0850118 to ensure freedom from internal defects and the norms of acceptance shall be as per category 2.

13 TEST CERTIFICATES:

Unless otherwise stated in the order, 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:

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BHEL References:

AA10305, Rev. No. 08: HOT ROLLED / FORGED CARBON STEEL BARS, Gr: 55C8 - NORMALISED.
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 and ultrasonic tests.

14 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 over 50mm shall be stamped at one end with "AA10305", melt no., BHEL order No., at one end or on the end face.

Bars 50mm and below 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:

- AA10305: HOT ROLLED / FORGED CARBON STEEL BARS, Gr: 55C8 - NORMALISED.
- BHEL Order No.
- Consignment/Identification No.
- Melt No.
- Size and Weight.
- Supplier's Name.

15 REFERRED STANDARDS (Latest publications including amendments):

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|--------------|---------------------|------------|------------|
| 1. AA0850118 | 4) IS:1570, Part 2, | 5) IS:1608 | 6) IS:3739 |
|--------------|---------------------|------------|------------|