



CORPORATE PURCHASE SPECIFICATION

AA 101 09

Rev. No. 03

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HOT ROLLED CARBON STEEL BARS (CLOSE TOLERANCES)

1.0 GENERAL

This specification governs the quality requirements of Hot Rolled Carbon Steel Bars having closed tolerances.

2.0 APPLICATION :

Production of machined parts (Note: AA 101 08 for general engineering purposes where close tolerances are not required).

3.0 CONDITION OF DELIVERY :

Hot Rolled .

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

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.

IS : 1570, (Part 2-Sec.1)-1979	:	Schedules for Wrought Steels- Part 2 :
(Reaffirmed 1998)	:	Carbon Steels (Unalloyed Steels) -Sec.1:
Gr : 20 C8 (C20), Hot rolled	:	Wrought products (other than wire) with
		specified Chemical Composition
		and related Properties.

5.0 DIMENSIONS AND TOLERANCES :

5.1 Dimensions:

5.1.1 Sizes:

Bars shall be supplied to the dimensions specified on BHEL order.

5.1.2 Length :

Bars shall be supplied in lengths of not less than 2.5 metres.

Revisions :

CI 24.4.3 of MOM of MRC-S&GPS

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**5.2 Tolerances :**

The tolerances on bars shall be as follows:

5.2.1 On Size:

Diameter / width across flats, mm	Tolerance
Upto and including 20	— 0 + 0.38
Above 20	— 0 + 2 percent

5.2.2 Straightness :

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

6.0 MANUFACTURE:

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

Material shall be manufactured from killed steel.

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

7.0 FREEDOM FROM DEFECTS :

The bars shall be sound, straight and free from cracks, surface flaws, laminations, rough, jagged and imperfect wedges and internal & surface defects such as seams, laps and injurious imperfections. Bars shall be free from twists and bends.

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 follows :

Element	Melt analysis, percent,		Permissible variation, percent,
	Min.	Max.	
Carbon	0.15	0.25	± 0.02
Silicon	0.05	0.35	± 0.03
Manganese	0.60	0.90	± 0.04
Sulphur	---	0.045	+ 0.005
Phosphorus	---	0.045	+ 0.005



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9.0 TEST SAMPLES :

9.1 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 40 mm, 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 40 mm the longitudinal axes of the test pieces shall not be less than 12.5 mm from the surface of the bars selected for test.

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

9.2 Bend Test:

One bend test shall be carried out for every 40,000 kg or part thereof the bars of the same size and from the same melt.

The bend test pieces shall preferably be cut from bars already selected for tensile test.

Bars of sizes upto and including 20mm shall be tested full size and the edges may be rounded to a radius not exceeding 1.6mm.

Bars of sizes over 20mm shall be turned down to a diameter of 20mm.

10.0 MECHANICAL PROPERTIES :

10.1 Tensile:

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

Tensile strength : 440 - 520 N/mm²

Elongation on $5.65 \sqrt{S_o}$ gauge length : 24 percent , min.

10.2 Bend:

Bend test shall be conducted in accordance with IS:1599. The test piece shall be bent through an angle of 180°, until the internal radius is equal to the size of the test piece. It shall not break and shall be free from cracks on the outside as seen by an unaided eye. No account need be taken of small cracks appearing at the edges.

11.0 HARDNESS (BRINELL):

When tested in accordance with IS:1500, the material shall show a Brinell hardness in the range of 126 - 179 HB.

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

**12.0 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 :

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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 and mechanical tests.

13.0 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 over 50 mm shall be stamped at one end with "AA 101 09", melt no., BHEL order No., at one end or on the end face.

Bars 50 mm 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 :

AA 101 09: Hot rolled carbon steel bars (Close tolerance).

BHEL Order No.

Consignment/Identification No.

Melt No.

Size and Weight.

Supplier's Name.

14.0 REFERRED STANDARDS (Latest Publications Including Amendments):

1. IS: 1500

2. IS : 1570, Part II, Sec.1

3. IS :1599

4. IS : 1608