

4. COMPLIANCE WITH NATIONAL STANDARDS :

The material shall comply with the requirement of

IS: 3748-1990

Gr XT160Cr12 (annealed)

Tool and die steel

5.0 DIMENSIONS & TOLERANCE :

5.1 Sizes :

Bars shall be supplied to be the dimension specified on the order.

5.2 Tolerance :

5.2.1 Straightness For Cold Rolled Bars :

The permissible deviation shall not exceed 3 mm in any 1000 mm length of the bar.

5.2.1.1 Dimensional Tolerances for Cold Drawn Bars — Rounds, Octagons, Quarter Octagons and Hexagons

Size Range Tolerance

SIZE RANGE IN MM	TOLERANCE IN MM
Over 6 up to. and including 12	± 0.05
Over 12 up to and including 25	± 0.06
Over 25 up to and including 68	± 0.08
Over 68	± 0.1

5.2.1.2 Tolerances for Cold Drawn Square and Flat Bars

Size Range Tolerance

SIZE RANGE IN MM	TOLERANCE IN MM
Over 6 up to and including 18	± 0.05
Over 18 up to and including 38	± 0.08
Over 38	± 0.1

5.2.2 Forged bars :

The tolerance on size for forged bars shall be ± 1.5 % of the size.

5.3 Length :

Bars shall be supplied in 2 to 4 meters length or in multiplies with maximum of 10 percent short down to 1 meter.

6. MANUFACTURE :

Material shall be manufactured from fully killed steel. Sufficient reduction and discard shall be made from each ingot to ensure freedom from piping, segregation and other defects.

The material shall be rough machined, chipped or ground to remove all surface Imperfections which are likely to produce defects in the finished product.

If the material is conditioned by grinding or chipping, depth of conditioning shall not exceed half the machining allowance per side and width of conditioning shall be at least four times its greatest depth.

7. FREEDOM FROM DEFECTS :

The material shall be free from defects such as seams, flakes, laps, cracks, pipes, bursts, excessive non-metallic inclusions and injurious metallic segregate.

Total decarburization shall be kept at the minimum level and in no case shall exceed 80 percent of the machining allowance.

8. CHEMICAL COMPOSITION :

The melt analysis of steel and the permissible variation in the composition of the finished product from the melt analysis shall as follows:

ELEMENT	PERCENT		PERMISSIBLE
	MIN.	MAX.	PERCENT MAX.
Carbon	1.5	1.7	± 0.04
Silicon	0.10	0.35	± 0.03
Manganese	0.25	0.55	± 0.04
Chromium	11.0	13.0	± 0.15
Molybdenum		0.8	± 0.05
Vanadium		0.8	± 0.04
Tungsten		0.6	± 0.04
Sulphur		0.035	± 0.005
Phosphorus		0.035	± 0.005

Optional :

Note :

Elements not quoted above shall not be added to the steel. Other than for the purpose of finishing the melt and shall not exceed the following limits:

ELEMENT	PERCENTAGE MAX.
NICKEL	0.25
COPPER	0.35
TIN	0.05
COBALT	0.10

9. TEST SAMPLES:

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

For hardness test 5 percent of the number of pieces in the charge up to a maximum of 10 and minimum of 2 covering all sizes shall be taken.

10. MECHANICAL PROPERTIES :

Hardness (Brinell) : **as received condition :**

When tested in accordance with IS: 1500 the test pieces shall show a Brinell hardness of 255 FIB maximum.



TSD 6207 A

PLANT PURCHASING SPECIFICATION BHOPAL

BP10890

Rev. No. 01

PAGE 4 OF 4

11. RESPONSE OF HEAT TREATMENT :

Bars shall be capable of responding to the heat treatment specified below and the material must achieve a minimum Rockwell hardness of 60 HRC without showing any sign of overheating.

Pre-heat slowing to a temperature of 750-800°C raise the temperature to 980-1030°C and soak adequately. Quench in oil.

Temper at a suitable temperature between 150-300°C.

12. TEST CERTIFICATES :

Three pieces of heat certificates shall be supplied unless otherwise stated on the order.

Temper at a suitable temperature shall bear the following information:

BHEL references :

BP 10890, REV. NO. 01

Supplier's references :

Name.

Identification no.

Melt no.

Details of heat treatment.

Results of Tests :

Results of dimensional inspection.

Results of chemical analysis and hardness tests in annealed and hardened and tempered conditions.

13. PACKING & MARKING :

The bars shall be suitably packed in bundles to prevent corrosion and Damage during transit. Bars of size up to & inci. 45 mm shall be bundled together.

Bars above 45 mm in dia. or of equivalent cross section area shall be stamped BP 10890 and 'melt number" on the side near the end or on the end face.

A metal label shall be securely attached to each other bundle and shall bear the following Information.

BP 10890 : HIGH CARBON HIGH CHROMIUM TOOL STEEL BARS-ANNEALED.

BHEL ORDER NO

Consignment or identification no.:

Melt NO. :

Size & Weight.

Supplier Name :