

Indian Standard
SPECIFICATION FOR
HIGH TENSILE STEEL RIVET BARS FOR
STRUCTURAL PURPOSES
(*Third Revision*)

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

SPECIFICATION FOR HIGH TENSILE STEEL RIVET BARS FOR STRUCTURAL PURPOSES

(Third Revision)

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Indian Standard

**SPECIFICATION FOR
HIGH TENSILE STEEL RIVET BARS FOR
STRUCTURAL PURPOSES**

(Third Revision)

0. FOREWORD

0.1 This Indian Standard (Third Revision) was adopted by the Indian Standards Institution on 25 November 1982, after the draft finalized by Wrought Steel Products Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This standard was first published in 1957 and was revised in 1964 and 1973. In view of the experience gained during the subsequent years the committee has decided to revise this Indian Standard incorporating the following main modifications:

- a) Strengths have been specified in term of MPa, in alignment with adoption of SI units both nationally and internationally; and
- b) Clause on retest has been deleted as it is duly covered in IS : 8910-1978*

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1560†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements for high tensile steel rivet bars in sizes up to 40 mm diameter for structural purposes.

*General technical delivery requirements for steel and steel products.

†Rules for rounding off numerical values (*revised*).

2. SUPPLY OF MATERIAL

2.1 General requirements relating to the supply of high tensile steel rivet bars shall conform to IS : 8910-1978*.

3. MANUFACTURE

3.1 Rivet bars shall be made from the steel manufactured by open-hearth, electric, duplex, basic oxygen or a combination of these processes. In case any other process is employed by the manufacturer, prior approval of the purchaser should be obtained.

3.1.1 Steel shall be supplied semi-killed or killed.

3.1.2 Unless specified otherwise, bars shall be supplied in hot-rolled condition.

4. CHEMICAL COMPOSITION

4.1 **Ladle Analysis** — Ladle analysis of the steel, when carried out either by the method specified in the relevant parts of IS : 228† or any other established instrumental/chemical method shall be as given below. In case of dispute the procedure given in the relevant part of IS : 228† shall be the referee method:

<i>Constituent</i>	<i>Percent, Max</i>
Carbon	0.23
Sulphur	0.050
Phosphorus	0.050

4.2 **Product Analysis** — Permissible variation in the case of product analysis, from the limits specified under 4.1 shall be as follows:

<i>Constituent</i>	<i>Variations Over the Specified Maximum Limit, Percent</i>
Carbon	0.02
Sulphur	0.005
Phosphorus	0.005

4.3 When steel is required in copper bearing quality, copper content shall be between 0.20 to 0.35 percent. In case of product analysis, permissible variation shall not exceed ± 0.03 percent.

*General technical delivery requirements for steel and steel products.

†Methods of chemical analysis of steels (*issued in several parts*).

4.4 When the steel is silicon-killed, silicon content in the product analysis, shall not be less than 0.10 percent. When the steel is silicon-aluminium-killed or aluminium-killed the requirement regarding minimum silicon content shall not apply.

5. FREEDOM FROM DEFECTS

5.1 Rivet bars shall be well and cleanly rolled to the dimensions and tolerances specified. The finished material shall be free from such surface and internal flaws as would be detrimental to the end use of the material.

6. LENGTHS

6.1 Unless agreed to otherwise between the purchaser and the manufacturer, rivet bars shall be ordered only in multiples of 250 mm length.

7. DIMENSIONAL TOLERANCES

7.1 The bars shall comply with the following dimensional tolerances:

<i>Diameter of Bar</i>	<i>Total Tolerance</i>
mm	mm
Below 20	0.40
20	0.45
22 and 24	0.50
Over 24	2 percent of diameter

7.1.1 All the tolerances specified under **7.1** shall be minus tolerances. When special plus and minus tolerances are required by the purchaser, the sum of such tolerances shall not be specified as less than the above total tolerances.

8. SELECTION OF TEST SAMPLES

8.1 Test samples may be selected by the purchaser from the cuttings of the bars.

8.2 The test samples shall not be cut from the bars except in the presence or with the approval of the purchaser.

8.3 Before the test samples are selected full particulars regarding cast number, size, weight and number of bars in each cast shall be furnished by the manufacturer to the purchaser.

8.4 The test samples shall not be annealed or otherwise subjected to heat treatment unless the material from which they are cut is similarly treated, in which case the test samples shall be similarly and simultaneously treated, with the material before testing. Any slight straightening of test samples, which may be required, shall be done cold.

9. TENSILE TEST

9.1 One tensile test shall be made from the finished steel for every 10 tonnes of a cast or part thereof. When more than one diameter of the bar is specified, one additional test shall be made for each variation in diameter.

9.2 The tensile properties of steel bar when determined in accordance with IS : 1608-1972* shall be as given below:

<i>Characteristic</i>	<i>Requirement</i>
Tensile strength, <i>Min</i> , MPa	460
<i>Min</i> Yield stress, MPa	
a) 6 mm up to and including 12 mm	310
b) Over 12 mm up to and including 20 mm	300
c) Over 20 mm up to and including 40 mm	280
Elongation percent, <i>Min</i> , gauge length $5.65\sqrt{S_0}$	22

NOTE — 1 MPa = 1N/mm² = 1 MN/m² = 0.102 0 kgf/mm².

9.3 No tensile test shall be carried out on bars below 6 mm.

10. BEND TEST

10.1 One bend test shall be carried out for every 10 tonnes of a cast or part thereof. One additional test shall be made for each variation in diameter.

10.2 The bend test shall be carried out in accordance with IS : 1599-1974†.

10.2.1 In case of bars over 25 mm in diameter, the test piece, when cold, shall withstand, without fracture, being doubled over, either by pressure or by slow and steady blows from a hammer, till the internal diameter is not greater than three times the diameter of the test piece and the sides are parallel.

*Method for tensile testing of steel products (*first revision*).

†Method for bend test for steel products other than sheet, strip, wire and tube (*first revision*).

10.2.2 For bars 25 mm in diameter and under, the internal diameter of the bend shall be not greater than twice the diameter of the bar.

11. SHEAR TEST

11.1 One shear test shall be carried out for every 10 tonnes of a cast or part thereof. One additional test shall be made for each variation in diameter.

11.2 The ultimate shear strength of the bars as rolled shall be not less than 370 MPa. The shear test shall be carried out in accordance with IS : 5242-1979*.

12. HOT COMPRESSION TEST

12.1 One hot compression test shall be made for every 10 tonnes of cast or part thereof. One additional test shall be made for each variation in diameter.

12.2 A test piece, having a length equal to twice its diameter, shall be cut from a bar and shall, without cracking or showing signs of fracture withstand being heated to a forging temperature and hammered or compressed on the end till its length has been reduced to its original diameter.

13. PACKING AND MARKING

13.1 Rivet bars shall be securely bundled, and a metal tag attached to each bundle shall be marked with the following:

- a) Manufacturer's name or trade-mark, and
- b) Cast number or identification mark by which the steel can be traced to the cast from which it was made.

13.2 Rivet bars, when not secured in bundles, shall each be legibly marked as specified in **13.1**.

13.3 The material may also be marked with the Standard Mark

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1936 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

*Method of test for determining shear strength of mild steel (*first revision*).

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*Sales Office Calcutta is at 5 Chowringhee Approach, P. O. Princep Street, CALCUTTA	27 68 00
† Sales Office is at Novelty Chambers, Grant Road, BOMBAY	89 65 28
‡ Sales Office is at Unity Building, Narasimharaja Square, BANGALORE	22 39 71

AMENDMENT NO. 1 NOVEMBER 2002
TO
IS 1149 : 1982 SPECIFICATION FOR HIGH TENSILE
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(Page 3, clause 0.2) — Insert the following new clause after 0.2 and renumber the subsequent clause:

'0.3 For all the tests specified in this standard (chemical/physical/others), the method as specified in relevant ISO standard may also be followed as an alternate method.'

(MTD 4)

Reprography Unit, BIS, New Delhi, India