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“Knowledge is such a treasure which cannot be stolen”

IS 320 (1980): High Tensile Brass Rods and Sections (Other Than Forging Stock) [MTD 8: Copper and Copper Alloys]
Indian Standard

SPECIFICATION FOR HIGH TENSILE BRASS RODS AND SECTIONS (OTHER THAN FORGING STOCK)

(Second Revision)

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

Gr 2

November 1980
AMENDMENT NO. 1 JUNE 2004
TO
IS 320 : 1980 SPECIFICATION FOR
HIGH TENSILE BRASS RODS AND SECTIONS
(OTHER THAN FORGING STOCK)
(Second Revision)

(Page 3, clause 2.1, line 2) — Substitute ‘IS 3288 (Part 3) : 1986†’ for
‘IS 3288 : (Part I)-1973†’.

(Page 3, footnote marked ‘†’) — Substitute the following for the existing
footnote:
‘†Glossary of terms relating to copper and copper alloys : Part 3 Wrought forms.’

(Page 4, clause 3.1, line 2) — Substitute ‘IS 1387 : 1993*’ for ‘IS : 1387
-1967*’.

(Page 4, footnote marked ‘*’) — Substitute the following for the existing:
‘*General requirements for the supply of metallurgical materials (second revision).’

(Page 5, clause 6.1.1, line 1) — Substitute ‘IS 1608 : 1995*’ for ‘IS : 2654
-1964*’.

(Page 5, footnote marked ‘*’) — Substitute the following for the existing
footnote:
‘*Mechanical testing of metals — Tensile testing (second revision).’

(Page 6, clause 6.2.1, line 2) — Substitute ‘IS 2305 : 1988*’ for ‘IS : 2305
-1962*’.

(Page 6, footnote marked ‘*’) — Substitute the following for the existing
footnote:
‘*Method for mercurous nitrate test for copper and copper alloys (first revision).’

(Page 6, clause 8.1, line 2) — Substitute ‘IS 2826 : 1986†’ for ‘IS : 2826
-1980†’.

(Page 6, footnote marked ‘†’) — Substitute the following for the existing
footnote:
Amend No. 1 to IS 320 : 1980

*Dimensions and tolerances for copper and copper alloys, rods and bars for general engineering purposes (third revision).*

( Page 6, clause 8.2.1, line 1 ) — Substitute ‘IS 2826 : 1986† for ‘IS : 2826-1980†’.

( Page 6, footnote marked † ) — Substitute the following for the existing footnote:

‘†Dimensions and tolerances for copper and copper alloys, rods and bars for general engineering purposes (third revision).’

( Page 6, clause 8.2.2, line 1 ) — Substitute ‘IS 2826 : 1986† for ‘IS 2826 : 1980†’.

( Page 6, footnote marked † ) — Substitute the following for the existing footnote:

‘†Dimensions and tolerances for copper and copper alloys, rods and bars for general engineering purposes (third revision).’

( Page 7, clause 11.1, line 3 ) — Substitute ‘IS 1608:1995 * for ‘IS : 2654 - 1964*’

( Page 7, footnote marked * ) — Substitute the following for the existing footnote:

‘*Mechanical testing of metals — Tensile testing (second revision).’

( MTD 8 )
Indian Standard

SPECIFICATION FOR HIGH TENSILE BRASS RODS AND SECTIONS (OTHER THAN FORGING STOCK)

(Second Revision)

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Indian Standard

SPECIFICATION FOR
HIGH TENSILE BRASS RODS AND SECTIONS
(OTHER THAN FORGING STOCK)
(Second Revision)

0. FOREWORD

0.1 This Indian Standard (Second Revision) was adopted by the Indian Standards Institution on 25 August 1980, after the draft finalized by the Copper and Copper Alloys Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This standard was first published in 1951 and revised in 1962. In this revision, only two grades have been specified namely HT 1 which replaces Alloys 1 and 2 and HT 2 which replaces Alloy 3. Mechanical properties of HT 1 and HT 2 have also been modified. HT 1 is suitable for soldering and HT 2 is suitable for machining.

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 : 2-1960*. 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 rods and sections of high tensile brasses.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions as given in IS : 3288 (Part I)-1973† shall apply.

*Rules for rounding off numerical values (revised).
†Glossary of terms for copper and copper alloys: Part I Cast form and wrought form (main types) (first revision).
IS : 320 - 1980

3. SUPPLY OF MATERIAL

3.1 General requirements relating to the supply of material shall be as laid down in IS : 1387-1967*.

4. CHEMICAL COMPOSITION

4.1 The material, when analyzed in accordance with IS : 3685-1966† shall have the chemical composition as given in Table 1.

<table>
<thead>
<tr>
<th>CONSTITUENT</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grade HT 1</td>
</tr>
<tr>
<td>Copper plus incidental nickel</td>
<td>56.0-60.0</td>
</tr>
<tr>
<td>Tin</td>
<td>0.2-1.0</td>
</tr>
<tr>
<td>Lead</td>
<td>*0.20-1.5</td>
</tr>
<tr>
<td>Iron</td>
<td>0.20-1.25</td>
</tr>
<tr>
<td>Manganese</td>
<td>0.25-2.0</td>
</tr>
<tr>
<td>Aluminium</td>
<td>0.20 Max</td>
</tr>
<tr>
<td>Antimony, Max</td>
<td>†0.02</td>
</tr>
<tr>
<td>Total other elements, Max</td>
<td>0.50</td>
</tr>
<tr>
<td>Zinc</td>
<td>Remainder</td>
</tr>
</tbody>
</table>

**Note** — The chemical analysis for total impurities is not required if the supplier undertakes and certifies that the material does not contain impurities in excess of the limits specified.

*If material is required with lower lead content than that specified, it may be ordered with a maximum lead content of either 0.1 percent (lead free grade) or 0.5 percent.
†If required.

4.2 The supplier shall, when required, supply free of charge a copy of the manufacturer's works analysis of the material.

5. CONDITION OF DELIVERY

5.1 The rods and sections shall be delivered in the as-manufactured condition and finished by such cold-rolling, annealing or straightening as may be necessary to meet the properties as specified by the purchaser.

*General requirements for the supply of metallurgical materials (first revision).
†Methods of chemical analysis of brasses.
6. PHYSICAL PROPERTIES

6.1 Tensile Test

6.1.1 The material, when tested in accordance with IS: 2654-1964*, shall have the tensile properties as given in Table 2.

**TABLE 2 TENSILE PROPERTIES**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Condition</th>
<th>Size</th>
<th>Tensile Strength, Min</th>
<th>0.2% Proof Stress, Min</th>
<th>Elongation Percentage on 5.65/\sqrt{S_o} Gauge Length, Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>M</td>
<td>mm</td>
<td>430</td>
<td>240</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>(As-manufactured)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HT 1</td>
<td>Cold-worked and stress-</td>
<td>Over 10 up to and including 40</td>
<td>480</td>
<td>-</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>relieved</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Over 40</td>
<td>460</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>HT 2</td>
<td>M</td>
<td>For all sizes</td>
<td>460</td>
<td>280</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>(As-manufactured)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HT 2</td>
<td>Cold-worked and stress-</td>
<td>Over 10 up to and including 40</td>
<td>520</td>
<td>-</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>relieved</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Over 40</td>
<td>500</td>
<td>-</td>
<td>15</td>
</tr>
</tbody>
</table>

Note — 1 MPa = 0.102 kgf/mm².

*To be agreed between the purchaser and the supplier.

6.1.2 The fractured test piece shall be free from pipe and other harmful defects.

6.1.3 Should a tensile test piece break outside the middle third of its gauge length and the elongation percentage obtained be lower than the minimum specified, the test may be discarded and another test made.

*Method for tensile testing of copper and copper alloys.
6.2 Mercurosus Nitrate Test

6.2.1 If required, the material may be subjected to the test as specified in IS : 2305-1962*.

6.2.2 The rods and sections shall not show any sign of cracking when subjected to this test.

7. FREEDOM FROM DEFECTS

7.1 The material shall be clean, smooth, free from surface defects, reasonably straight and free from twist.

8. SIZES AND TOLERANCES

8.1 Sizes — The material shall be supplied in sizes selected from IS : 2826-1980† as required by the purchaser.

8.2 Tolerances

8.2.1 For rods, the tolerances shall be as given in IS : 2826-1980†.

8.2.2 For rods other than those covered in IS : 2826-1980† and for sections, the tolerances shall be as agreed between the purchaser and the supplier, and shall be stated on the order.

9. SAMPLING

9.1 When tests are specifically called for by the purchaser, material (of the same type, size and temper) shall be grouped in batches as follows and one sample shall be selected from each batch or part thereof to provide the necessary test pieces:

<table>
<thead>
<tr>
<th>Specified Size (Diameter or Width Across Flats) of Materials</th>
<th>Mass of Each Batch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over Up to and Including</td>
<td>mm</td>
</tr>
<tr>
<td>mm</td>
<td></td>
</tr>
<tr>
<td>—</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>40</td>
</tr>
<tr>
<td>40</td>
<td>80</td>
</tr>
<tr>
<td>80</td>
<td>—</td>
</tr>
</tbody>
</table>

*Method for mercurosus nitrate test for copper and copper alloys.
†Dimensions for wrought copper and copper alloy rods and bars (for general engineering purposes) (second revision).
10. RETEST

10.1 Should any of the test pieces first selected fail in any of the prescribed tests, two further samples from the same batch shall be selected for testing, one of which shall be from the rod or section from which the original test sample was taken, unless the rod or section has been withdrawn by the supplier.

10.1.1 Should the test pieces from both these additional samples pass, the batch represented by the test samples shall be deemed to comply with this standard. In case the test pieces from either of these additional samples fail, the batch represented by the test samples shall be deemed not to comply with this standard.

11. PREPARATION OF TEST PIECES

11.1 Test Pieces for Tensile Test — Tensile tests shall be made on test pieces machined to the largest dimensions practicable. The test shall be done in accordance with IS : 2654-1964*.

11.2 Preparation of Test Pieces for Mercurous Nitrate Test — The test piece for mercurous nitrate test shall be of 150 mm length.

12. PACKING

12.1 The method of packing shall be as agreed to between the purchaser and the manufacturer.

13. MARKING

13.1 Suitable tag marked with grade, size, mass, name of the manufacturer and other information required by the purchaser shall be attached to each bundle of the material.

13.1.1 The product may also be marked with Standard Mark.

13.1.2 The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufactures or producers may be obtained from the Bureau of Indian Standards.

*Method for tensile testing of copper and copper alloys.
BUREAU OF INDIAN STANDARDS

Headquarters:
Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002
Telephones: 23230131, 23233375, 23239402  Fax: 91-011 23239399, 23239382
E - Mail : info@bis.org.in  website : http://www.bis.org.in

Central Laboratory:
Plot No. 20/9, Site IV, Sahibabad Industrial Area, SAHIBABAD 201010  Telephone 277 0032

Regional Offices:
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002  2323 7617
*Eastern : 1/14 CIT Scheme VII M, V.I.P. Road, Kankurgachi, KOLKATA 700054  2337 8662
Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022  260 9285
Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600113  2254 1984
†Western: Manakalaya, E9, MIDC, Behind Marol Telephone Exchange,
Andheri (East), MUMBAI 400093  2832 9295

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53/5 Ward No. 29, R.G. Barua Road, 5th By-lane, Apurba Sinha Path,
GUWAHATI 781003  245 6508
5-8-56C, L.N. Gupta Marg, Nampally Station Road, HYDERABAD 500001  2320 1084
Prithvai Raj Road, Opposite Bharat Overseas Bank, C-Scheme, JAIPUR 302001  222 3282
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Sethi Bhawan, 2nd Floor, Behind Leela Cinema, Naval Kishore Road,
LUCKNOW 226001  261 8923
H. No. 15, Sector-3, PARWANOOP, Distt. Solar (H.P.) 173220  235 436
Plot No A-20-21, Institutional Area, Sector 62, Goutam Budh Nagar, NOIDA 201307  240 2206
Pattiputra Industrial Estate, PATNA 800013  226 2808
Plot Nos. 657-660, Market Yard, Gultkdi, PUNE 411037  2427 4804
*Sahajanand House* 3rd Floor, Bhaktinagar Circle, 80 Feet Road,
RAJKOT 360002  237 8251

T.C. No. 2/275 (1 & 2), Near Food Corporation of India, Kesavadasapuram-Ulloor Road,
Kesavadasapuram, THIRUVANANTHAPURAM 695004  255 7914
1st Floor, Udyog Bhavan, VUDA, Siripuram Junction, VISHAKHAPATNAM-03  271 2833

*Sales Office is at 5 Chowringhee Approach, P.O. Princep Street, KOLKATA 700072  355 3243
†Sales Office (WRO) Plot No. E-9, MIDC, Rd No. 8, Behind Telephone Exchange,
Andheri (East), Mumbai-400 0093  2832 9295

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