

भारतीय मानक

मृत्यु इस्पात की नलियाँ, नलिकाकार सामग्रियाँ पिटवाँ
इस्पात की अन्य फिटिंगें — विशिष्टि

भाग 1 मृत्यु इस्पात की नलियाँ
(पाँचवाँ पुनरीक्षण)

Indian Standard

MILD STEEL TUBES, TUBULARS AND OTHER
WROUGHT STEEL FITTINGS — SPECIFICATION

PART 1 MILD STEEL TUBES

(Fifth Revision)

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BUREAU OF INDIAN STANDARDS
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FOREWORD

This Indian Standard (Part 1) (Fifth Revision) was adopted by the Bureau of Indian Standards on 20 April 1990, after the draft finalized by the Steel Tubes, Pipes, and Fittings Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first published in 1958 and subsequently revised in 1964, 1968, 1973 and 1979 respectively.

In this revision, the following main modifications have been made:

- a) Eddy current test as a part of non-destructive testing has been introduced in this specification as an alternate to hydraulic test based on the international practice and experience gained in the country. Other methods of non-destructive testing may be considered for inclusion in the specification, as and when sufficient experience is gained in the country.
- b) Requirements of sockets have been deleted from this Indian Standard and are being covered suitably through amendment No. 2 to IS 1239 (Part 2) : 1982.
- c) Reference has been given to IS 10748 : 1984 for manufacture of steel tubes.

Where the use of tubes is not controlled by byelaws or regulations, a reference should be made to the code of practice relating to the particular application.

In this country, the regulations governing the use of tubes for conveying steam are laid down in the Indian Boiler Regulations published by the Central Boilers Board.

While formulating this standard, due consideration has been given to the trade practices followed in the country in this field. Due consideration has also been given to international coordination among the standards prevailing in different countries. Assistance has been derived from the following publications:

- ISO 65 : 1981 Carbon steel tubes suitable for screwing in accordance with ISO 7/1. International Organization for Standardization.
- BS 1387 : 1985 Screwed and socketed steel tubes and tubulars and for plain end steel tubes suitable for welding or for screwing to BS 21 : 1985 Pipe threads for tubes and fitting where pressure-tight joints are made on the threads. British Standards Institution.

This standard contains clauses **6.3, 7.1, 11.2, 13.1, 16.2** and **17.2.1** which call for an agreement between the manufacturer and the purchaser.

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 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

MILD STEEL TUBES, TUBULARS AND OTHER WROUGHT STEEL FITTINGS—SPECIFICATION

PART 1 MILD STEEL TUBES

(Fifth Revision)

1 SCOPE

1.1 This standard (Part 1) covers the requirements for welded and seamless plain end or screwed and socketed mild steel tubes intended for use in water, gas, airlines and steam.

1.2 Medium and heavy tubes only are, recommended for carrying steam services. The maximum permissible pressure and temperatures for different sizes of tubes are given in Annex A for guidance only.

2 REFERENCES

2.1 The Indian Standards listed in Annex B are necessary adjuncts to this standard.

3 TERMINOLOGY

3.0 For the purpose of this standard, the following definitions shall apply.

3.1 Black Tube

Tube as manufactured, without any subsequent surface treatment.

3.2 Nominal Bore

A size reference denoting the approximate bore of the tube. For each size of tube, the outside diameter is fixed by the corresponding screw thread dimensions of IS 554 : 1985, and therefore, the actual bore of each size of tube will vary according to the thickness.

3.3 Plain End

The ends are cleanly finished by normal deburring process.

3.4 Tube Pipe

A long, hollow, open-ended object of circular or other cross-section. The term tube is synonymous with the term pipe.

3.5 Socket

The screwed coupling utilized in jointing the tubes together.

NOTE — The term socket is synonymous with the term coupler.

3.6 Length

3.6.1 Random Length

Normal manufacturing lengths which may vary over a wide range; alternatively, a length range may be agreed to between the purchaser and the manufacturer.

3.6.2 Exact Length of Screwed and Socketed Tube

The length of the tube inclusive of the socket.

3.6.3 Length of Screwed and Socketed Tube

The length of the tube exclusive of the socket on one end with handling-tight.

NOTE — Handling-tight means that the socket is so tight fitted that it should not fall down during handling or transit.

4 DESIGNATION

4.1 Mild steel tubes covered by this standard shall be designated by their nominal bore, and shall be further classified as light, medium and heavy depending on the wall thickness; and screwed and socketed or plain-end to denote end condition, and black or galvanized to denote surface condition.

5 SUPPLY OF MATERIALS

5.1 General requirements relating to the supply of mild steel tubes shall conform to IS 1387 : 1967.

6 MANUFACTURE

6.1 Seamless Steel Tubes

Shall be made from tested quality steel manufactured by any approved process and shall be fully killed. The sulphur and phosphorus requirements in steel shall not exceed 0.05 percent each. The welded tubes shall be manufactured from hot-rolled steel skelp/strips conforming to IS 10748 : 1984.

6.2 Steel tubes shall be manufactured by one of the following processes:

- a) Hot-finished seamless (HFS);
- b) Electric resistance welded (ERW);
- c) High frequency induction welded (HFIW);
- d) Hot finished welded (HFW); and
- e) Cold finished seamless (CDS).

NOTE — Tubes made by manual welding are not covered by this specification.

6.3 'Light', 'Medium' and 'Heavy' tubes shall be either welded or seamless as agreed to between the purchaser and the manufacturer.

6.4 If so specified by the purchaser, the height of the internal weld fin shall not be greater than 60 percent of the specified thickness.

6.5 All electric welded tubes used for steam services shall be normalized. Only medium and heavy class of tubes shall normally be used for steam services.

NOTE — HFS and HFW tubes need not be normalized.

7 CHEMICAL COMPOSITION

7.1 The chemical analysis of steel tubes shall be carried out only for sulphur and phosphorus requirements.

7.1.1 The analysis of steel shall be carried out either by the method specified in IS 228 and its relevant parts or any other established instrumental/chemical methods. In case of dispute the procedure given in IS 228 and its relevant parts shall be the referee method. However, where the method is not given in IS 228 and its relevant parts, the referee method shall be as agreed to between the purchaser and the manufacturer.

7.1.2 Product Analysis

The maximum permissible variation of sulphur and phosphorus in the case of product analysis from the limits stated in 6.1 shall be 0.005 percent each.

8 DIMENSIONS

8.1 The dimensions and nominal mass of tubes shall be in accordance with Tables 1, 2 and 3, subject to the tolerances permitted in 9.

8.1.1 Thickness and mass mentioned in Tables 1, 2 and 3 are applicable to both black and galvanized tubes.

9 TOLERANCES ON THICKNESS AND MASS

9.1 The following manufacturing tolerances

shall be permitted on the tubes and sockets:

a) Thickness:

- | | |
|------------------------|----------------|
| 1) Seam welded | + Not limited |
| Light tubes | — 8 percent |
| Medium and heavy tubes | + Not limited |
| | — 10 percent |
| 2) Seamless tubes | + Not limited |
| | — 12.5 percent |

b) Weight

- | | |
|---|---------------|
| 1) Single tube (light series) | + 10 percent |
| | — 8 percent |
| 2) Single tube (medium and heavy series) | ± 10 percent |
| 3) For quantities per load of 10 tonnes, <i>Min</i> (light series) | ± 5 percent |
| 4) For quantities per load of 10 tonnes, <i>Min</i> (medium and heavy series) | ± 7.5 percent |

NOTE — For the purpose of a minimum weightment of 10 tonnes lot, the weightment may be done in convenient lots at the option of the manufacturer.

10 JOINTS

10.1 All screwed tubes shall be supplied with pipe threads conforming to IS 554:1985. Gauging in accordance with IS 8999:1979 shall be considered as an adequate test for conformity of threads of IS 554:1975.

10.1.1 Unless specified otherwise, tubes shall be supplied screwed with taper threads.

10.1.1.1 However, in the case of 'light' tubes, the application of taper pipe threads may be modified by permitting the outside diameter of the tubes to be within the limits shown in col 2 and 3 of Table 1. Where the tube approaches the lower limit of outside diameter, some incomplete threads (perfect at root and imperfect at the crest) may be expected from and beyond the gauge plane. Such incomplete threads shall not be regarded as justification for rejection of the tubes. Also, the minimum length of threads in 'light' tubes shall be 80 percent of that specified in IS 554:1985.

10.2 Each tube shall be supplied with one socket conforming to IS 1239 (Part 2):1982.

11 LENGTHS

11.0 Following tolerances shall be applied on lengths of tubes.

Table 1 Dimensions and Nominal Mass of Steel Tubes — Light
(Clauses 8.1 and 10.1.1.1)

Nominal Bore	Outside Diameter		Thickness	Mass of Tube	
	Maximum	Minimum		Plain End	Screwed and Socketed
(1)	(2)	(3)	(4)	(5)	(6)
mm	mm	mm	mm	kg/m	kg/m
6	10.1	9.7	1.8	0.360	0.363
8	13.6	13.2	1.8	0.515	0.519
10	17.1	16.7	1.8	0.670	0.676
15	21.4	21.0	2.0	0.947	0.956
20	26.9	26.4	2.3	1.38	1.39
25	33.8	33.2	2.6	1.98	2.00
32	42.5	41.9	2.6	2.54	2.57
40	48.4	47.8	2.9	3.23	3.27
50	60.2	59.6	2.9	4.08	4.15
65	76.0	75.2	3.2	5.71	5.83
80	88.7	87.9	3.2	6.72	6.89
100	113.9	113.0	3.6	9.75	10.0

Table 2 Dimensions and Nominal Mass of Steel Tubes — Medium
(Clause 8.1)

Nominal Bore	Outside Diameter		Thickness	Mass of Tube	
	Maximum	Minimum		Plain End	Screwed and Socketed
(1)	(2)	(3)	(4)	(5)	(6)
mm	mm	mm	mm	kg/m	kg/m
6	10.6	9.8	2.0	0.404	0.407
8	14.0	13.2	2.3	0.641	0.645
10	17.5	16.7	2.3	0.839	0.845
15	21.8	21.0	2.6	1.21	1.22
20	27.3	26.5	2.6	1.56	1.57
25	34.2	33.3	3.2	2.41	2.43
32	42.9	42.0	3.2	3.10	3.13
40	48.8	47.9	3.2	3.56	3.60
50	60.8	59.7	3.6	5.03	5.10
65	76.6	75.3	3.6	6.42	6.54
80	89.5	88.0	4.0	8.36	8.53
100	115.0	113.1	4.5	12.2	12.5
125	140.8	138.5	4.8	15.90	16.4
150	166.5	163.9	4.8	18.9	19.5

11.1 Random Length

4 to 7 m, unless otherwise specified. Includes one socket for screwed and socketed tubes.

11.1.1 For orders of over 150 m of any one size of tube, it shall be permissible to supply short random lengths from 2 to 4 m, provided that the number of such lengths does not exceed 5 percent of the total numbers of lengths for sizes

below 65 mm nominal bore and 7.5 percent of the total number of lengths for sizes 65 mm nominal bore and above. In addition, it shall be permissible for two lengths to be jointed together to make a random length, provided that the number of such jointed lengths does not exceed 5 percent of the total numbers of lengths for sizes below 65 mm nominal bore and 7.5 percent of the total number of lengths for sizes 65 mm and above.

Table 3 Dimensions and Nominal Mass of Steel Tubes — Heavy
(Clause 8.1)

Nominal Bore	Outside Diameter		Thickness	Mass of Tube	
	Maximum	Minimum		Plain End	Screwed and Socketed
(1)	(2)	(3)	(4)	(5)	(6)
mm	mm	mm	mm	kg/m	kg/m
6	10.5	9.8	2.6	0.487	0.490
8	14.0	13.2	2.9	0.765	0.769
10	17.5	16.7	2.9	1.02	1.03
15	21.8	21.0	3.2	1.44	1.45
20	27.3	26.5	3.2	1.87	1.88
25	34.2	33.3	4.0	2.93	2.95
32	42.9	42.0	4.0	3.79	3.82
40	48.8	47.9	4.0	4.37	4.41
50	60.8	59.7	4.5	6.19	6.26
65	76.6	75.3	4.5	7.93	8.05
80	89.5	88.0	4.8	9.90	10.40
100	115.0	113.1	5.4	14.5	14.8
125	140.8	138.5	5.4	17.9	18.4
150	166.5	163.9	5.4	21.3	21.9

11.2 Exact Length

Unless otherwise agreed to between the manufacturer and the purchaser, where exact lengths are specified, either for screwed and socketed tubes or for plain-end tubes, each tube shall be within ± 6 mm of the specified length.

11.3 Approximate Length

Where approximate lengths are required, either for screwed and socketed tubes or for plain end tubes, each tube shall be within ± 150 mm of the specified length.

12 GALVANIZING

12.1 Where tubes are required to be galvanized, the zinc coating on the tubes shall be in accordance with IS 4736 : 1986.

12.1.1 Tubes which are to be screwed shall be galvanized before screwing.

13 LEAK TIGHTNESS TEST

13.1 Each tube shall be tested for hydrostatic test for leak tightness as an in-process test at the manufacturer's works. Eddy current test may be done in place of hydrostatic test as per the procedure given in Annex C, subject to mutual agreement between the purchaser and the manufacturer.

13.1.1 Hydrostatic test shall be carried out at a pressure of 5 MPa, maintained for at least 3

seconds and shall not show any leakage in the pipe.

14 TEST ON FINISHED TUBES

14.0 The following tests shall be conducted by the manufacturer on finished tubes.

14.1 The tensile strength of length or strip cut from selected tubes, when tested in accordance with IS 1894 : 1972, shall be at least 320 MPa (320 N/mm²).

NOTES

1. For welded tubes, the strip tensile test specimen shall not contain the weld.

2. For galvanized tubes, zinc coating may be removed by stripping prior to tensile test.

14.1.1 The elongation percentage on a gauge length of 5.65/S₀, where S₀ is the original cross-sectional area of the test specimen, shall be as follows:

Nominal Bore	Elongation Percent, Min
a) For steam and gas services for all sizes	20 percent
b) For other services:	
Up to and including 25 mm	12 percent
Over 25 mm up to and including 150 mm	20 percent

14.2 Bend Test on Tubes Up to and Including 50 mm Nominal Bore

When tested in accordance with IS 2329 : 1985,

the finished tubes shall be capable of withstanding the bend test without showing any signs of fracture or failure. Welded tubes shall be bent with the weld at 90° to the plane of bending. The tubes shall not be filled for this test.

14.2.1 Ungalvanized tubes shall be capable of being bent cold, without cracking, through 180° round a former having a radius at the bottom of groove, in the plane of bending, equal to six times the outside diameter of the tube.

14.2.2 Galvanized tubes shall be capable of being bent cold, without cracking of the steel, through 90° round a former having a radius at the bottom of the groove equal to eight times the outside diameter of the tube.

14.3 Flattening Test on Tubes Above 50 mm Nominal Bore

Rings, not less than 40 mm in length, cut from the ends of selected tubes, shall be flattened between parallel plates with the weld if any at 90° (point of maximum bending) in accordance with IS 2328 : 1983. No opening shall occur by fracture in the weld until the distance between the plates is less than 75 percent of the original outside diameter of the pipe and no cracks or breaks in the metal elsewhere than in the weld shall occur until the distance between the plates is less than 60 percent of the original outside diameter.

14.3.1 The test rings may have the inner and outer edges rounded.

14.4 Retest

Should any one of the test pieces first selected fail to pass any of the tests specified above, two further samples shall be selected for testing in respect of each failure. Should the test pieces from both these additional samples pass, the material shall be deemed to comply with the requirements of that particular test. Should the test pieces from either of these additional samples fail, the material represented by the test samples shall be deemed as not complying with the standard.

15 WORKMANSHIP

15.1 All pipes shall be cleanly finished and reasonably free from injurious defects. The ends shall be cleanly cut and reasonably square with axis of the pipe. The tubes shall be

reasonably straight.

16 SAMPLING OF TUBES

16.1 Lot

For the purpose of drawing samples all mild steel tubes bearing same designation and manufactured under a single process shall be grouped together to constitute a lot. Each lot shall be sampled separately and assessed for conformity to this specification.

16.2 Sampling and Criterion for Conformity

Unless otherwise agreed to between the manufacturer and the purchaser the procedure for sampling of tubes for various tests and criteria for conformity shall be as given in IS 4711 : 1974.

17 MARKING

17.1 Each tube shall bear legibly the identity of the source of manufacturer.

17.2 The different classes of tubes shall be distinguished by colour bands which shall be applied as follows before the tubes leave the manufacturer's works:

'Light' tubes, Yellow*
'Medium' tubes, Blue
'Heavy' tubes, Red.

17.2.1 Unless otherwise mutually agreed to between the manufacturer and the purchaser, a white colour band shall be applied at each end of the tubes for steam services.

17.3 All long random lengths shall each have two 75 mm bands, one near each end; all other lengths shall each have one 75 mm band.

17.3.1 The tubes may also be marked with the Standard Mark, details for which may be obtained from the Bureau of Indian Standards.

18 PROTECTION AND PACKING

18.1 Black tubes not otherwise protected shall be varnished or suitably painted externally throughout the length unless ordered unvarnished or unpainted. Where tubes are bundled for transport, all qualities of tubes shall be packed in accordance with IS 4740 : 1979.

*For export purposes the tubes may be painted yellow or brown.

ANNEX A

(Clause 1.2)

MAXIMUM PERMISSIBLE PRESSURE AND TEMPERATURE FOR TUBES FOR CONVEYING STEAM

A-1 The maximum permissible pressure and temperature for tubes with screwed and socketed joints shall be as given in Table 4.

A-2 For tubes fitted with appropriate flanges or suitably butt welded together, the maximum permissible pressure shall be 2.06 MPa and the maximum permissible temperature 260°C.

**Table 4 Maximum Permissible Pressure and Temperature For Tubes With
Steel Couplings or Screwed and Socketed Joints**

(Clause A-1)

Nominal Bore	Maximum Permissible Pressure	Maximum Permissible Temperature
(1)	(2)	(3)
mm	MPa	°C
Up to and including 25 mm	1.20	260
Over 25 mm up to and including 40 mm	1.03	260
Over 40 mm up to and including 80 mm	0.86	260
Over 80 mm up to and including 100 mm	0.69	260
	0.83	177
Over 100 mm up to and including 125 mm	0.69	171
Over 125 mm up to and including 150 mm	0.50	160

NOTE — 1 MPa = 1 N/mm² = 0.102 0 kg/mm²

ANNEX B

(Clause 2.1)

LIST OF REFERRED INDIAN STANDARDS

IS No.	Title	IS No.	Title
228	Methods for chemical analysis of steels	2329 : 1985	Method for bend test on metallic tubes (in full section) (<i>first revision</i>)
554 : 1985	Dimensions for pipe threads where pressure-tight joints are made on threads (<i>third revision</i>)	4711 : 1974	Methods for sampling of steel pipes, tubes and fittings (<i>first revision</i>)
1239 (Part 2) : 1982	Mild steel tubes, tubulars and other wrought steel fittings : Part 2 Mild steel tubulars and other wrought steel pipe fittings (<i>third revision</i>)	4736 : 1986	Hot dip zinc coatings on mild steel tubes (<i>first revision</i>)
1387 : 1967	General requirements for the supply of metallurgical materials (<i>first revision</i>)	4740 : 1979	Code of practice for packaging of steel tubes (<i>first revision</i>)
1894 : 1972	Method for tensile testing of steel tubes (<i>first revision</i>)	8999 : 1979	Gauging practice for pipe threads where pressure tight joints are required on the threads
2328 : 1983	Method for flattening test on metallic tubes (<i>first revision</i>)	10748 : 1984	Hot rolled steel skelp/strip for welded tubes and pipes

ANNEX C

(Clause 13.1)

EDDY CURRENT TESTING OF TUBES AS AN ALTERNATIVE TO
THE HYDRAULIC LEAK TIGHTNESS TEST**C-1 METHODS OF TEST**

C-1.1 The tubes shall be tested for imperfections using a concentric coil or a rotating tube or rotary probe eddy current technique in accordance with this Annex.

C-1.2 The tube shall be sufficiently straight to ensure the validity of the test and the surface shall be free from any foreign matter that would interfere with the interpretation of the test.

C-1.3 Two methods of test are permitted (at the manufacturer's option). The equipment may be located 'on' or 'off' the tube mill.

Method A

The tube to be tested is passed through the (a) concentric test coil (applicable to welded or seamless tubes), or (b) segmental coil covering the weld and $\pm 15^\circ$ arc from weld line (applicable to welded tubes) on either side.

Method B

The tube to be tested or the test coil assembly is rotated and translated relative to each other so the test coil describe a helical path over the tube surface. The pitch of the helical scan shall ensure that the whole of the tube surface is effectively covered. This method is applicable to seamless tubes only.

C-2 CALIBRATION OF TEST EQUIPMENT

C-2.1 The equipment shall be calibrated using standard tube containing holes as defined in C-2.3 for Method A or standard notches as defined in C-2.4 for Method B. The test piece for off-line equipment shall have similar electromagnetic properties and same diameter and thickness as the tube to be tested. For online equipment, running tube may be considered as standard tube.

C-2.2 Method A

The standard defect shall be a circular hole drilled radially completely through the tube wall on the welding. The diameter of the drill required to make these holes shall be as

follows:

Nominal Bore of Tubes mm	Drill Diameter
Up to and including 15	1.2
20, 25-32	1.7
40-50	2.2
65-80	2.7
100-125	3.2
150	3.7

C-2.3 Method B

The standard test piece shall have a longitudinal notch 0.8 mm or less in width machined parallel to the tube axis on the outer surface of the tube. The depth of the notch shall not exceed 12 1/2 percent of the specified thickness of the tube or 0.3 mm whichever is greater. The length of the notch at full depth shall not exceed 50 mm.

C-3 CALIBRATION PROCEDURE

C-3.1 The equipment and test coils shall be adjusted to produce in a consistent manner a clearly identifiable signal from the standard(s) defect on the standard tube and this signal shall be used to set the trigger/alarm level of the equipment. For calibration purposes the relative speed between the standard tube containing standard defect and the test coils shall be the same as that used during the production.

C-3.2 The calibration of the equipment shall be checked at the commencement and at the end of each working period and at intervals not exceeding 2 h.

C-3.3 If on checking during production testing the reference standard is not detected even after changing the sensitivity by 2dB to allow for equipment drift, the equipment shall be recalibrated. Following recalibration, all tubes tested since the previous check shall be retested, unless recordings from individually identified tubes are available that permit classification of those tubes into 'suspect' and 'acceptable' categories.

C-4 TEST PROCEDURE

C-4.1 Pass the pipe or tubing to be inspected through the test unit at the appropriate

production speed, maintaining the production speed constant within ± 10 percent under conditions identical to those used in the calibration of the equipment.

NOTE — Identical conditions include all instrument settings, mechanical motion, positioning of the encircling coil(s) in relation to the tube and any other factor that affect the validity of the technique.

C-5 ACCEPTANCE

C-5.1 Any tube producing a signal lower than the signals from the standard shall be deemed

to have passed this test.

C-5.2 Since NDT systems are known to be sensitive to some features which do not cause a leak, the tubes rejected by NDT may be retested hydraulically and whatever tubes pass the hydraulic test shall be accepted.

C-5.3 The tubes rejected in **C-5.1** may also be retested off-line NDT equipment. Those which do not produce reject level signals shall be accepted. Others may be accepted after cropping of the portion producing reject level signals.

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards : Monthly Additions'.

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Amendments Issued Since Publication

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**AMENDMENT NO.1 JUNE 1992
TO
IS 1239 (Part 1) : 1990 MILD STEEL TUBES,
TUBULARS AND OTHER WROUGHT STEEL
FITTINGS — SPECIFICATION**

PART 1 MILD STEEL TUBES

(Fifth Revision)

(Cover page, Hindi title, first word) — Substitute the following for the existing word:

' मृदु ' for ' मृत्यु '.

(Page 1, clause 3.6.2) — Substitute the word 'exclusive' for 'inclusive'.

(Page 1, clause 3.6.3) — Substitute the word 'inclusive' for 'exclusive'.

(Page 4, clause 14.1.1) — Substitute ' $5.65 \sqrt{S_0}$ ' for ' $5.65/S_0$ '.

(Page 5, clause 17.2) — Explanation for asterisk to be substituted by the following text:

'For export purposes, the colour band on the tubes may be yellow or brown.'

(MTD 19)

AMENDMENT NO. 2 DECEMBER 1992
TO
IS 1239 (Part 1) : 1990 MILD STEEL TUBES,
TUBULARS AND OTHER WROUGHT STEEL
FITTINGS — SPECIFICATION

PART 1 MILD STEEL TUBES

(Fifth Revision)

(Page 1, clause 3.4) — Substitute 'Tube/Pipe' for 'Tube Pipe'.

(Page 1, clause 6.1) — Substitute the following for the existing clause:

'Seamless steel tubes shall be made from tested quality steel manufactured by any approved process and shall be fully killed. The sulphur and phosphorus requirements in steel shall not exceed 0.05 percent each.

The welded tubes shall be manufactured from hot-rolled steel skelp/strips conforming to IS 10748 : 1984.'

(Page 7, clause C-2.1) :

a) *Line 3* — Substitute 'C-2.2' for 'C-2.3'.

b) *Line 4* — 'C-2.3' for 'C-2.4'.

c) *Line 4* — Substitute 'standard tube' for 'test piece'.

(Page 7, clause C-2.3, line 1) — Substitute 'tube' for 'test piece'.

(Page 7, clause C-3.1) :

a) *Line 3* — Substitute 'standard' for 'standard(s)'.

b) *Line 4* — Substitute 'defect(s)' for 'defect'.

(Page 7, clause C-4.1, line 1) — Substitute 'tube' for 'pipe or tubing'.

(Page 8, clause C-5.3, line 5) — Substitute 'off' for 'of'.

AMENDMENT NO. 3 OCTOBER 1993
TO
IS 1239 (Part 1) : 1990 MILD STEEL TUBES,
TUBULARS AND OTHER WROUGHT STEEL
FITTINGS — SPECIFICATION
PART 1 MILD STEEL TUBES

(Fifth Revision)

(Page 1. clause 6.1) — Add a new para after this clause:

'Tubes may also be manufactured from sheet/strip conforming to IS 513 : 1988 Cold rolled low carbon steel sheet and strip.'

(Page 2. clause 10.2) — Substitute the following for the existing clause:

'Each tube shall be supplied with one socket. Socket shall conform to all requirements of IS 1239 (Part 2) : 1992 except clause 6.4.'

(Page 4. Table 3, col 6) — Substitute '10.10' for '10.40'.

**AMENDMENT NO . 4 DECEMBER. 1995
TO
IS 1239 (Part 1) : 1990 MILD STEEL TUBES,
TUBULARS AND OTHER WROUGHT STEEL
FITTINGS — SPECIFICATION**

PART 1 MILD STEEL TUBES

(Fifth Revision)

(Page 1, clause 2.1) — Insert the following after 2.1:

'2.1.1 Latest version of the standard should be referred to.'

(Page 1, clause 6.1) — Substitute '10748 : 1995' for '10748 : 1984' and also wherever it occurs in the standard.

[Page 4, clause 14.1.1(a)] — Substitute the following for the existing:

<i>Nominal Bore</i>	<i>Elongation Percent, Min</i>
a) For steam services for all sizes	20

AMENDMENT NO. 5 FEBRUARY 1999
TO
IS 1239 (PART 1) : 1990 MILD STEEL TUBES,
TUBULARS AND OTHER WROUGHT STEEL FITTINGS
— SPECIFICATION

PART 1 MILD STEEL TUBES

(Fifth Revision)

[Page 1, clause 2.1 (see also Amendment No. 4)] — Substitute the following for the existing clause:

'The Indian Standards listed in Annex B contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All Indian Standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the Indian Standards indicated in Annex B.'

(Page 2, clause 10.1, line 5) — Substitute 'IS 554 : 1985' for 'IS 554 : 1975'.

(Page 4, clause 14.1, line 3) — Substitute 'IS 1608 : 1995' for 'IS 1894 : 1972'.

(Page 6, Annex B) — Substitute the following matter for the existing:

<i>IS No.</i>	<i>Title</i>
228	Methods for chemical analysis of pig iron, cast iron and plain carbon and low alloy steels
513 : 1994	Cold rolled low carbon steel sheets and strips (<i>fourth revision</i>)
554 : 1985	Dimensions for pipe threads where pressure tight joints are required on the threads (<i>third revision</i>)
1239 (Part 2) : 1992	Mild steel tubes, tubulars and other wrought steel fittings : Part 2 Mild steel sockets tubular and other wrought steel pipe fittings (<i>fourth revision</i>)

Amend No. 5 to IS 1239 (Part 1) : 1990

<i>IS No.</i>	<i>Title</i>
1387 : 1993	General requirements for the supply of metallurgical materials (<i>second revision</i>)
1608 : 1995	Mechanical testing of metals — Tensile testing (<i>second revision</i>)
2328 : 1983	Method for flattening test on metallic tubes (<i>first revision</i>)
2329 : 1985	Method for bend test on metallic tubes (in full section) (<i>first revision</i>)
4711 : 1974	Methods for sampling of steel pipes, tubes and fittings (<i>first revision</i>)
4736 : 1986	Hot dip zinc coatings on mild steel tubes (<i>first revision</i>)
4740 : 1979	Code of practice for packaging of steel tubes (<i>first revision</i>)
8999 : 1979	Gauging practice for pipe threads where pressure tight joints are required on the threads
10748 : 1995	Hot rolled steel strips for welded tubes and pipes (<i>first revision</i>)

(MTD 19)