BUREAU OF INDIAN STANDARDS

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भारतीय मानक **मसौदा**

साइकिल - रबर ट्यूब्स – विशिष्टता
(पांचवां पुनरीक्षण)

Draft *Indian Standard*

CYCLE — RUBBER TUBES — SPECIFICATION
(*Fifth Revision)*

Bicycles Sectional Committee TED 16 | Last Date of comments **03/02/2025**

ICS 43.150

B U R E A U O F I N D I A N S T A N D A R D S
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FOREWORD
(*Adoption clause will be added later*)

This standard was first published in 1963 and subsequently revised in 1969, 1992, 2004 and 2015. This revision of standard is being taken to update the standard and to incorporate requirements of moulded and jointed rubber tubes being used in the bicycle industry.

To decide whether a particular requirement of this Standard has complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off as per 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.

Notwithstanding what is stated in this standard, applicable National, State, and Local bodies regulations shall apply. In the case of exports, corresponding regulations of exporting countries shall apply.

The composition of the committee responsible for formulation of this standard is given in Annex B (To be added later).

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 2:2022 'Rules for rounding off numerical values (second revision)'. 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

This standard covers the dimensions and other requirements for cycle rubber tubes (moulded and jointed) intended for use with tyres prescribed in DOC:TED 16(XXXXX9).

2 REFERENCES

The following standards contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All 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 standards indicated below.

IS No.	Title
532 : 2006	Bicycle tube valves and valve tubing — Specification
DOC:TED 16(XXXXX9).	Cycle and rickshaw pneumatic tyres (fourth revision)
3400	Methods of test for vulcanized rubbers:
(Part 1): 2021	Tensile stress-strain properties (fourth revision)
(Part 4): 2012	Accelerated ageing and heat resistance (third revision)
(Part 13):2021	Tension set (second revision)

3 DEFINITIONS

3.1 Moulded Tube — Tube vulcanized in heated mould or by any other method having butt joint.

3.2 Jointed Tube — Tube vulcanized in vulcanizer (autoclave) or cured by any other method and having overlap joint.

3.3 Tube Size Designation — The cycle rubber tube shall have marked upon it the nominal size designation, which is the same as the size designations marked on the tyre with which the tube is to be used.

3.4 Flat Length — It is approximately half of the total circumferential length of the tube measured when laid flat in the deflated condition. It is also called as double fold length.

3.5 Flat Width — It is approximately half of the sectional periphery of the tube when measured in the flat deflated condition.

3.6 Thickness — It is a measuring parameter of the tube wall when measured at any point.

NOTE -The joints are excluded from these measurements as the gauge is generally higher at the joints.

3.7 Valve — A device to enable inflation and retention of air. (For details see IS 532).

4 CLASSIFICATIONS AND DESIGNATION

4.1 Classification

Moulded or jointed tubes shall be classified according to rubber material used in compounding as per Table 1.

Table 1 Classification of Bicycle Rubber Tubes
(*Clause* 4.1)

Sl.No.	Class	Classification
(1)	(2)	(3)

i)	Class A	Butyl rubber or the equivalent
ii)	Class B	Synthetic rubbers other than butyl rubber
iii)	Class C	Natural rubber blended with compatible synthetic rubber
iv)	Class D	Natural rubber or the equivalent

4.2 Designation

The tube shall be designated according to the designation of the corresponding tyres.

5 DIMENSIONS

5.1 Flat Length and Flat Width

The flat length (*see* **3.4**) and flat width (*see* **3.5**) when measured as per method described in Annex A of the different sizes of tubes shall be as given in Table 2.

NOTE — Where tube dimensions are not specified for Class A tubes in Table 2, it shall be as per the agreement to between the purchaser and the supplier.

Table 2 Dimension of Cycle Rubber Tubes
(*Clause* 5.1)

Sl.No.	**Nominal Tube Size Designation**		**Flat Length of Double Folded Tube (Class A, B, C, D) mm**	**Flat Width (Class A, B, C, D) mm**
	New Marking	**Old Marking**	**±15**	**±2.0**
(1)	**(2)**	**(3)**	**(4)**	**(5)**
1	47/57-152	10x1.75/2.25	306	44
2	47/57-203	12.5x1.75/2.25	386	44
3	58/75-203	12.5x2.35/2.90	400	58
4	47/57-254	14x1.75/2.25	466	44
5	58/75-254	14x2.35/2.90	480	58
6	47/57-305	16x1.75/2.25	546	44
7	58/75-305	16x2.35/2.90	560	58
8	47/57-355	18x1.75/2.25	625	44
9	58/75-355	18x2.35/2.90	639	58
10	47/57-406	20x1.75/2.25	705	44
11	58/75-406	20x2.35/2.90	719	58
12	76/98-406	20x3.0/3.90	739	77
13	100/125-406	20x4.0/5.125	764	100
14	47/57-457	22x1.75/2.25	785	44
15	32/44-501/507	22x1⅜	848	38
16	47/57-507	24x1.75/2.25	864	44

17	58/75-507	24x2.35/2.90	878	58
18	76/98-507	24x3.0/3.90	898	77
19	100/125-507	24x4.0/5.125	922	100
20	32/44-534/540	24x1⅜ 24x1½	909	38
21	47/57-559	26x1.75/2.25	945	44
22	58/75-559	26x2.35/2.90	959	58
23	76/98-559	26x3.0/3.90	979	77
24	100/125-559	26x4.0/5.125	1004	100
25	47/57-571	26x2x1¾	964	44
26	32/44-584/590	26x1⅜ 26x1½	988	38
27	47/57-584	27.5x1.75/2.25	985	44
28	58/75-584	27.5x2.35/2.90	999	58
29	76/98-584	27.5x3.0/3.90	1009	68
30	24/30-622	700x18/28C	1023	24
31	32/44-622/630	27x1¼ 700x32C - 44C	1038	38
32	58/75-622	29x2.35/2.90	1058	58
33	47/57-622	28x1.75/2.25	1044	44
34	32/44-635/642	28x1½ 28x1⅜	1059	38

5.2 Thickness

Thickness of cycle rubber tubes when measured according to the method described in Annex A shall be 0.8 mm, Min.

NOTE — For tube designation as per new marking (ETRTO) >57 mm and old marking >2.125, the thickness of tube shall be as agreed to between the purchaser and the supplier.

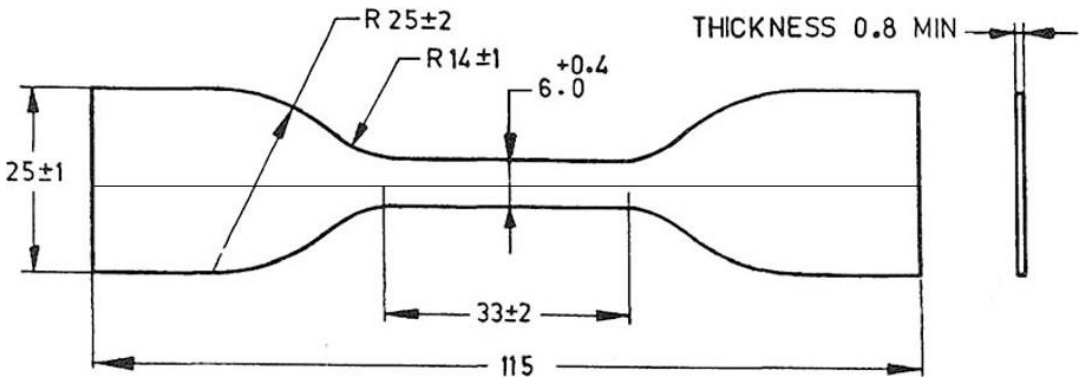
5.2.1 *Uniformity of Thickness*

Except for the region at or near lap or splice the thickness of the tube when measured along the longitudinal direction of the tube, shall not vary from the arithmetic mean of the readings by ± 15 percent at any point. The arithmetic mean of the tube thickness shall be determined for the points which lie in the same circumferential line of the length of the tube. The thickness variation shall be determined for circumferential lines (*see* A-3, in Annex A).

6 REQUIREMENTS

6.1 Tensile Strength and Elongation at Break

The tensile strength and elongation of a rubber sample when cut from a tube and tested as per IS 3400 (Part 1) employing a dumb-bell test piece as shown in Fig.1 shall be as given in Table 3.



All dimension in millimetres.

FIG. 1DIMENSION OF DUMB-BELL TEST PIECE

Table 3Tensile Strength and Elongation at Break
(*Clause* 6.1)

Sl.No.	Class of Tube	Tensile strength, Min		Elongation at break, Min
		kgf/cm^2	MPa	Percent
(1)	(2)	(3)	(4)	(5)
i)	Class A	81.5	8	450
ii)	Class B and C	61.2	6	350
iii)	Class D	102	10	430
NOTE — Measure the dumb-bell thickness at three places on the narrow portion of the dumb-bell and take the minimum value for calculation of tensile strength.				

6.2 Tension Set

Tension set of the rubber sample, cut from a tube when tested as per IS 3400 (Part 13) at 300 ± 10 percent stretch, using a Type A dumb-bell test piece, shall not be more than 20 percent.

NOTE — This test is applicable for Class B, Class C and Class D (natural rubber/natural rubber blended with other compatible synthetic rubber/synthetic rubber other than butyl rubber).

6.3 Ageing Test

Ageing shall be done in an air oven as per IS 3400 (Part 4) on a dumb-bell test piece as shown in Fig. 1 at 70 ± 1° C for 168 h (for tube of Class B, C and D) and 125 ± 1°C for 72 h (for tube of Class A). Tensile strength and elongation at break of a rubber sample cut from tube shall not vary after ageing by more than:

a) For tensile strength ± 20 percent

b) For elongation at break + 20 / - 25 percent

6.4 Joint Adhesion Strength

6.4.1 When tested as per **6.4.2** joint adhesion strength shall be 3.05 kg/cm (3 000 N/m), Min.

6.4.2 The test involves cutting a dumb-bell as shown in Fig. 1 from a tube and tested as per IS 3400 (Part 1). The dumb-bell shall be cut from the tube longitudinally with the joint in the middle. Test two pieces from each joint of the tube.

6.4.2.1 Calculation

$$\text{Joint strength} = \frac{F}{W} \times 10^3$$

Where:

F = Breaking force in Newton, and

W = Initial width in mm.

6.4.3 *Strength of Splice on Moulded Tube*

The average joint strength of minimum two test specimens throughout the cross section of the tube with respect to body strength shall be 45 percent minimum (for Class D) and 40 percent minimum (for Class A, B and C).

Tensile strength of the butt or lap splice shall be determined on 6 mm dumb-bell test pieces at joint area and test shall be done as per IS 3400 (Part 1).

6.5 Leak Test

Cycle rubber tube when inflated to a pressure sufficient to increase tube cross-sectional circumference by 20 percent maximum from its initial cross-sectional circumference shall not show any sign of leakage when immersed in water for 1 min.

6.6 Valve Test

A suitable valve conforming to IS 532 shall be provided in each tube.

6.7 Manufacture and Workmanship

6.7.1 Tube shall consist of any inflatable annular torroidal ring made of an elastic material natural, butyl, synthetic (other than butyl) rubber or a blend thereof suitably compounded and vulcanized and shall have valve fitted to it to enable inflation and retention of air.

6.7.2 The tube shall be clean and free from blemishes.

6.7.3 The tube shall retain a uniform cross-section when inflated to increase the cross-section by 20 percent.

6.7.4 A tube shall not have more than one joint.

7 MARKING

7.1 The following shall be marked by printing on the sidewall of each tube:

a) Manufacturers name, initials or trade-mark;
b) Tube class
c) Nominal tube size, designation;
d) Country of origin;
e) The butyl rubber tube shall be marked ‘butyl’ by embossing on the valve base and by blue colour lining throughout the body. In addition to the above, ‘Butyl’ may be printed on the tube surface; and
f) Month and year of manufacture.

Note - In the case of nominal size marking the new size marking shall appear on the tube and the old markings may be provided, if required, in parenthesis, for example 40-635 (28 × 1½).

7.2 BIS Certification Marking

The material may also be marked with the Standard Mark.

7.2.1 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 maybe granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

ANNEX A
(*Clause* 5.1, 5.2 and 5.2.1)

MEASUREMENT OF FLAT LENGTH, WIDTH AND THICKNESS

A-1 FLAT LENGTH

Deflate the tube completely and place flat on a table. The tube shall be folded lengthwise with the valve pointing upwards and approximately in the middle of the length. Stretch the tube lengthwise just enough to straighten the tube from waviness and measure the length with the help of a tape, avoiding the valve stem.

A-2 FLAT WIDTH

Place the deflated tube on a table as mentioned in **A-1** and measure the flat width by placing a ruler perpendicularly cross the tube length and just depressing the loose folds at the edges. Take measurements at 3 places along the length and average the results. The average tube flat width range with referenced tyre width range corresponding to tube size is mentioned in Table 4.

Table 4 Nominal Tyre Sectional Width Range vs Tube Flat width
(Annex A-2)

Sl.No. (1)	**Nominal Tyre Sectional Width (mm)** (2)	**Tube Flat Width (mm) ±2** (3)
1	24 - 30	24
2	32 - 44	38
3	44 - 57	44
4	58 - 75	58
5	76 - 98	77
6	100 - 130	100

A-3 THICKNESS

Slit the tube body lengthwise and open out the cut edges to form a flat sheet of rubber. Measure the gauge of the flat sheet at six places around the tube and average the results. Measurements shall not be made within 50 mm of a joint and valve fixing area.

ANNEX B
(*Foreword*)

COMMITTEE COMPOSITION