

भारतीय मानक
Indian Standard

IS 13098 : 2024

स्वचल वाहन — वायवीय टायरों के लिए
ट्यूब — विशिष्टि
(दूसरा पुनरीक्षण)

Automotive Vehicles — Tubes for
Pneumatic Tyres — Specification
(Second Revision)

ICS 83.160.01

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Price Group 5

Automotive Tyres, Tubes and Rims Sectional Committee, TED 07

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Tyres, Tubes and Rims Sectional Committee had been approved by the Transport Engineering Division Council.

This standard was first published in 1991. The standard was first revised in 2012 after due consideration of the practices prevalent in the industry and also to keep pace with the latest technological advancement in the field of tubes for automotive vehicles.

In the first revision, following were some of the salient features:

- a) Requirement of rubber content in the raw polymer has been done away with;
- b) Requirements of tensile strength of body of tube and air permeability test have been done away with;
- c) Requirements of accelerated ageing test have been added; and
- d) Marking clause has been made more explicit by adding identification scheme for month and year of manufacturing.

In this revision, marking width has been changed.

In the formulation of this standard, considerable assistance has been derived from JIS D 4231 : 1995 'Inner tubes for automobiles tyres', issued by the Japanese Industrial Standards Committee (JISC).

The composition of the Committee responsible for the formulation of this standard is given in [Annex E](#).

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.

Indian Standard

AUTOMOTIVE VEHICLES — TUBES FOR PNEUMATIC TYRES — SPECIFICATION

(Second Revision)

1 SCOPE

This standard specifies the requirements of tubes for pneumatic tyres for automotive vehicles covered by L1, L2, L5, M, N and T categories of vehicles as defined in [IS 14272](#).

2 REFERENCES

The standards given below 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 these standards:

IS No.	Title
IS 3400	Methods of test for vulcanized rubber:
(Part 1) : 2021/ ISO 37 : 2017	Tensile stress-strain properties (fourth revision)
(Part 4) : 2012/ ISO 188 : 2011	Accelerated ageing and heat resistance (third revision)
IS 9081 : 2017	Automotive vehicles — Valves and valve accessories for pneumatic tyres — Specification (fifth revision)
IS 14272 : 2011	Automotive vehicles — Types — Terminology

3 MATERIALS, FORM AND FIT

3.1 The tubes shall be manufactured from an appropriate rubber compound and vulcanized to an endless annular ring shape and shall be with a valve or spud conforming to [IS 9081](#).

3.2 The tubes shall be classified into the following two classes:

- a) Class A — Butyl rubber/halo-butyl rubber and its derivative and blends; and
- b) Class B — Natural rubber and its derivatives and blends.

3.2.1 A blend shall be named after prime rubber whose percentage by volume is more than 60 percent

in the compound.

3.3 The tube shall be uniform in thickness, free from flaws and designed to fit in a tyre of the corresponding nominal size.

3.3.1 Thickness Uniformity

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 ± 17.5 percent at any point.

3.3.2 The arithmetic mean of the tube thickness shall be determined for the points which lie in the same circumferential line or the length of the tube (see [Fig. 1](#)). The thickness variation shall be determined for each of the four circumferential lines, that is crown centre, base centre, right side wall centre and left side wall centre.

4 TEST REQUIREMENTS

4.1 Each type of tube shall conform to the following requirements.

4.1.1 Elongation

Dumb-bell test pieces punched out in circumferential direction of the tube when tested in accordance with [IS 3400 \(Part 1\)](#) and [Annex A](#) shall have elongation at break not less than 450 percent for 'Class A' tubes and not less than 500 percent for 'Class B' tubes.

4.1.2 Strength of Splice

Tensile strength of splice determined on dumb-bell in accordance with [IS 3400 \(Part 1\)](#) and [Annex A](#) shall not be less than 35 kgf/cm² for Class A tubes and 85 kgf/cm² for Class B tubes.

4.1.3 Set After Ageing

Dumb-bell test pieces punched out in circumferential direction of the tube when subjected to test conditions and test procedure in accordance with [Annex B](#) shall have set after aging not more than 35 percent for Class A tubes and not more than 25 percent for Class B tubes.

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https://www.services.bis.gov.in/php/BIS_2.0/bisconnect/knowyourstandards/Indian_standards/isdetails/

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4.1.4 Accelerated Ageing

Dumb-bell test pieces punched out in circumferential direction of the tube body when subjected to accelerated ageing test as $(100 \pm 2)^\circ\text{C}$ for 48 h and tested in accordance with [IS 3400 \(Part 1\)](#), [IS 3400 \(Part 4\)](#) and [Annex C](#) shall not have drop in elongation at break more than 35 percent from original, for both Class A and Class B tubes.

5 AIR TIGHTNESS

Each type of tube with valves attached shall be inflated to just round out and tested in water for the evidence of any leakage. Alternatively, vacuum leak or pressure-less detection method may be used as per the manufacturers' practice in lieu of the water test method. The tube shall not show any leakage.

6 MARKING

6.1 Tubes shall be permanently and legibly marked on the outside with the following:

- a) Manufacturer's name or trade-name;
- b) Tyre size designation or designations for which the tube is applicable. The size designation description shall contain:

- 1) Nominal tyre section width code;
 - 2) Nominal rim diameter code;
 - 3) Nominal aspect ratio, if applicable;
 - 4) 'R' to identify radial tyre application; and
 - 5) Character '-' or the letter 'D' to identify bias tyre application.
- c) Indication of month and year of manufacturing as per scheme given in [Annex D](#); and
 - d) Word 'BUTYL' and or blue line of 2.0 mm Min width to identify tube of Class A.

6.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

7 SAMPLING

The scale of sampling and the criteria of acceptance shall be as agreed to between the manufacturer and the purchaser.

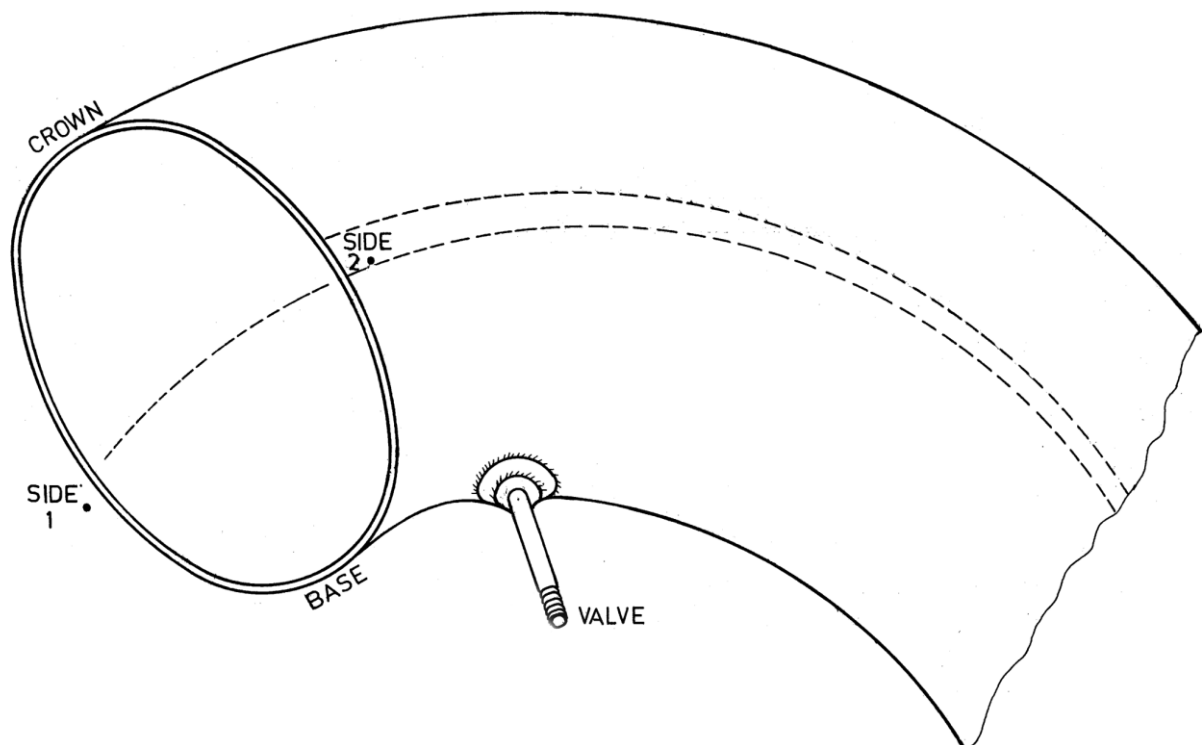


FIG. 1 MEASUREMENT OF TUBE THICKNESS UNIFORMITY

ANNEX A

(Clauses 4.1.1 and 4.1.2)

PREPARATION OF DUMB-BELL TEST SPECIMEN FROM TUBE

A-1 PREPARATION OF TEST PIECES

A-1.1 Test pieces shall be dumb-bell shape and to be taken in the circumferential direction of a tube, from portion except the splice joint for the elongation test. For testing strength of joint splice, dumb-bell shall be punched out from the splice joint as the centre as shown in the [Fig. 2](#).

A-1.2 The number of test pieces shall be 4 each from a tube. Size of test pieces shall be 6 mm (or 13 mm)

dumb-bell test pieces, for measurement of tensile strength of splice and elongation of body.

A-1.3 The mean value of both ends of parallel parts shall be used as the thickness of test pieces for calculating the tensile strength of splice joints.

A-1.4 For elongation and tensile strength of joints, measured median value of 4 test pieces shall be used.

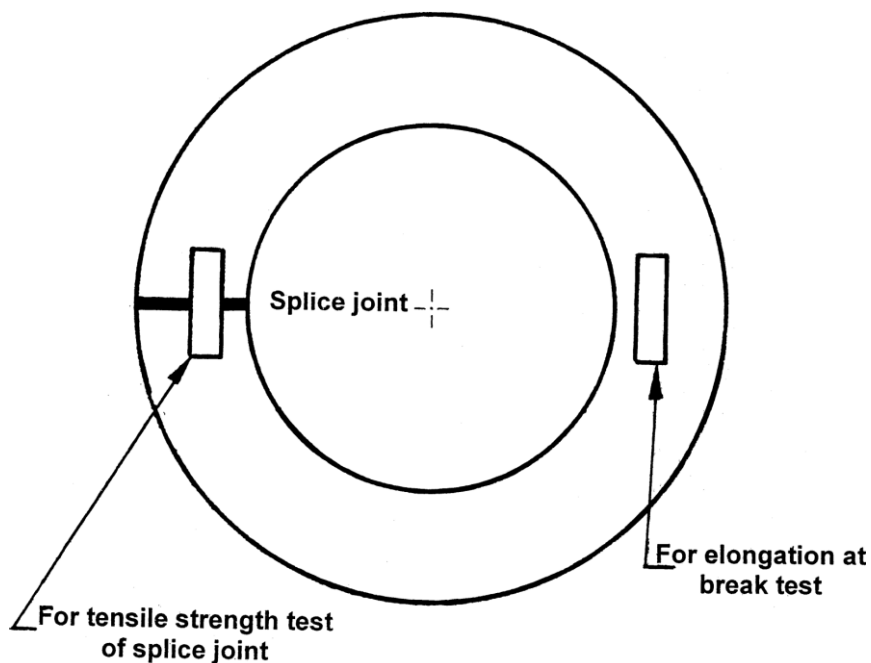


FIG. 2 METHOD OF TAKING TEST PIECES

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ANNEX B

(Clause 4.1.3 and C-1)

TEST CONDITIONS AND TEST PROCEDURE FOR SET AFTER AGEING

B-1 TEST CONDITIONS FOR AGEING

- Type of oven — Air oven;
- Temperature — 104 °C to 110 °C;
- Time to be kept — 5 h in oven;
- Dimensions of test piece — 6 mm wide 25 mm test piece long measured on 6 mm dumb-bell; and

- Stretch of test piece — 50 percent during ageing.

B-2 DETERMINATION OF THE SET

The test piece shall be removed from oven and allowed to cool under tension for 2 h. The tension shall be released and percentage set measured after a rest of not less than 8 h or not more than 24 h.

ANNEX C

(Clause 4.1.4)

ACCELERATED AGEING TEST

C-1 PREPARING THE TEST PIECES

Prepare 4 test pieces as specified in [Annex B](#) and subject them to the accelerated ageing for (100 ± 2) °C for 48 h.

C-2 MEASURING THE ELONGATION AT BREAK AND CALCULATION OF PERCENTAGE DROP IN ELONGATION

Measure the elongation at break in accordance with [IS 3400 \(Part 1\)](#) and then calculate the percentage drop in elongation at break compared with

respective un-aged elongation at break from the following formula:

$$PDEB = \frac{(L_a - L_o)}{L_o} \times 100$$

where

$PDEB$ = percent drop in elongation at break after ageing;

L_a = median value of elongation at break percentage after ageing test; and

L_o = median value of elongation at break percentage before ageing test.

ANNEX D

[Clause 6.1(c)]

IDENTIFICATION SCHEME FOR MONTH AND YEAR OF MANUFACTURING

D-1 IDENTIFICATION SCHEME

D-1.1 Manufacturing month and year are engraved as per scheme depicted in [Fig. 3](#) or printed as per [D-1.6](#).

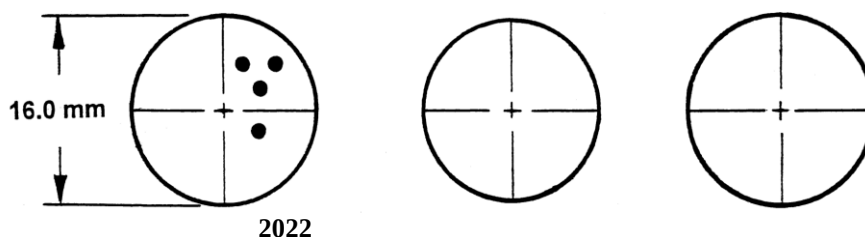
D-1.2 Month code circle and year to be engraved not more than 100 mm away from the valve.

D-1.3 Each month should be identified by a punch marking of at least 0.5 mm diameter in the respective quarter.

D-1.4 After completing one-year, fresh identification shall be started again for the next year with next circle.

D-1.5 After completing all three circles, re-engraving can be done after masking the previous engraving/punch marking.

D-1.6 Alternative method which clearly indicates the week and year or month and year of manufacturing is also acceptable.



NOTE — Identification for April 2022 depicted in the drawing above. However, the four dots can be in any quadrant.

FIG. 3 SCHEME OF MARKING MONTH AND YEAR ON TUBE

ANNEX E

(Foreword)

COMMITTEE COMPOSITION

Automotive Tyres, Tubes and Rims Sectional Committee, TED 07

<i>Organization</i>	<i>Representative(s)</i>
In Personal Capacity (302, Celestina Apts. S N 1841, Rambhu Kambale Path Shivajinagar, Pune 411005)	SHRI D. P. SASTE (Chairperson)
All India Motor Transport Congress, New Delhi	SHRI CHARAN SINGH SHRI M. MURLI (<i>Alternate</i>)
Ashok Leyland Limited, Chennai	SHRI V. P. GAUTAM SHRI MUTHU KUMAR N. (<i>Alternate</i>)
Association of State Road Transport Undertaking, New Delhi	SHRI R. CHANDRABABU SHRI ULLAS BABU (<i>Alternate</i>)
Automotive Components Manufacturers Association (ACMA), New Delhi	SHRI UDAY HARITE MS SEEMA BABAL (<i>Alternate</i>)
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Automotive Tyre Manufacturers Association, New Delhi	SHRI RAJIV BUDHIRAJA SHRI T. C. KAMATH (<i>Alternate</i>)
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Indian Rubber Manufacturers Research Association, Mumbai	DR K. RAJ KUMAR
Indian Tyre Technical Advisory Committee, New Delhi	SHRI V. K. MISRA SHRI NITEESH SHUKLA (<i>Alternate</i>)
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Kalyani Maxion Wheels Chakan Private Limited, Pune	SHRI SUNIL BHATAMBREKAR
Mahindra & Mahindra Limited, Mumbai	SHRI RAM SINGH SHRI VISHWANATHAN T. (<i>Alternate</i>)
Maruti Suzuki India Limited, Gurugram	SHRI GURURAJ RAVI SHRI RAJ KUMAR DWIVEDI (<i>Alternate</i>)

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<i>Organization</i>	<i>Representative(s)</i>
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Ministry of Road Transport & Highways, New Delhi	DIRECTOR (TECHNICAL)
National Automotive Testing and R and D Infrastructure Project, Indore	DR P. P. CHATTARAJ
Renault India Private Limited, Mumbai	SHRI RAJENDRA KHILE
Society of Indian Automobile Manufactures (SIAM), Delhi	SHRI P. K. BANERJEE SHRI AMIT KUMAR (<i>Alternate</i>)
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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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