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भारतीय मानक मसौदा

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(आई एस 623 का चौथा पुनरीक्षण)

Draft Indian Standard

BICYCLES — BICYCLE FRAMES — SPECIFICATION

(Fourth Revision of IS 623)

ICS 43.150

Bicycles Sectional Committee, TED 16

**Last date for receipt of comments is
22/01/2024**

FOREWORD

(Formal clause will be added later)

This standard was initially issued in 1955 and revised in 1963, 1993 and 2008. The present revision has been taken up with a view to incorporating the modifications found necessary as a result of experience gained on the use of this standard.

In this revision besides frames of steel, frames of all suitable materials including that of aluminium alloy, carbon fibre reinforced polymer, titanium alloy, and magnesium alloy, have been included. Further in this revised standard, frame shape restrictions have been removed. The frame can be of any shape. Nevertheless, few illustrative shapes have been given for guidance. Besides the standard frames, the revised standard includes requirements for suspension frames.

Traditionally steel has been in use for the manufacturing of frames. New materials such as aluminium alloy, carbon fibre-reinforced polymer, titanium alloy, and magnesium alloy are also being used. Because of little knowledge and experience on these materials, specific requirements of materials have not been included. However, frames of any materials need to conform to all test requirements specified in this standard. Material requirements for these materials may be included at a later date.

The composition of the Committee responsible for the formulation of this standard will be added later.

For the purpose of deciding 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 : 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.

Draft Indian Standard

BICYCLES — BICYCLE FRAMES — SPECIFICATION

(*Fourth Revision*)

1 SCOPE

This standard specifies requirements for frames suitable for being fitted in all types of bicycles such as ‘Young children’s bicycles’, ‘Young Adult bicycles’, ‘City and Trekking’, ‘Roadster’, ‘Sports light Roadster (SLR) bicycles’, ‘Mountain bicycles’, ‘Racing bicycles’, ‘BMX bicycles’, and ‘Electrically power-assisted bicycles (EPAC)’.

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.

<i>IS No.</i>	<i>Title</i>
1131 :2006	Bicycle bottom bracket axle - specification (<i>third revision</i>)
1132 : 2009	Bicycle - Bottom Bracket Adjustable Ball Cup (PH Type) (<i>third revision</i>)
1134 : 2004	Bicycles bottom bracket lock ring - specification (<i>third revision</i>)
2039 (Parts I to 3) : 1991	Steel tubes for bicycle and cycle rickshaws - Specification (<i>second revision</i>)
10613 : 2023	Cycles - Safety and performance requirements for bicycles (<i>third revision</i>)
15533 : 2018/ ISO 8098 : 2014	Cycles - Safety requirements for bicycles for young children (<i>first revision</i>)
14329: 1995	Malleable iron casting
DOC: TED 16 (18837)	BMX bicycles - Safety requirements and test methods (<i>under development</i>)
DOC: TED 16 (23339)	Cycles — Electrically power-assisted cycles (EPAC) Part 1 Pedal-assisted bicycles (<i>under development</i>)

3 TERMS AND DEFINITIONS

For this standard, the terms and definitions are given in IS 10613, IS 15533/ISO 8098, DOC: TED 16 (18837), and DOC: TED 16 (23339) shall apply.

4 MATERIALS

The bicycle frame material may be steel, aluminium alloy, carbon fibre-reinforced polymer, titanium alloy, magnesium alloy, or any other suitable material.

4.1 Frame Tubes

4.1.1 If steel is used, it shall be cold drawn seamless or electric resistance butt welded conforming to IS 2039 (Parts 1 to 3).

4.1.2 The manufacturer may use any other suitable material subject to their conformity with the requirements/ tests specified in this standard.

4.1.3 The tubes can be of any suitable profile subject to their conformity with requirements/ tests specified in this standard.

4.2 Liners

4.2.1 If mild steel is used, sulphur and phosphorus content each shall not exceed 0.060 percent.

4.2.2 The manufacturer may use any other suitable material subject to its conformity with tests specified in this standard.

4.3 Lugs

4.3.1 If mild steel is used, sulphur and phosphorus content each shall not exceed 0.060 percent. If whitehart malleable iron casting is used, it shall conform to WM350 grade of IS 14329.

4.3.2 The manufacturer may use any other suitable material subject to its conformity with tests specified in this standard.

5 SHAPES AND DIMENSIONS

5.1 Frame Shapes

5.1.1 The commonly used frame shapes are given in Fig. 1 for reference. These frame shapes can be used for all types of bicycles.

5.1.2 Any other suitable shape for the frame may be adopted but should conform to the requirements given in this standard.

5.1.3 Frames can either be standard frames or suspension frames. Frame suspension as shown in Fig.2 can assemble with any shape of the frame. The design of the suspension frame shall be such that if the spring or damper fails, the tyre shall not contact any part of the frame or the assembly carrying the rear wheel shall become detached from the rest of the frame.

5.2 Dimensions

The frame shall conform to the dimensions specified in Fig. 3, Table 1 or Table 2 as applicable.

5.3 Screw Threads

5.3.1 The dimensions of screw threads on threaded bottom bracket shells for fixed and adjuster cups may conform to IS 1131, IS 1132 and IS 1134.

5.3.2 Bottom bracket shells may be press fitted. For press-fit bottom bracket shells, no internal threads are required.

5.3.3 The use of 'threaded bottom bracket shells' or 'press-fit bottom bracket shells' may be as per agreement between manufacturer and purchaser.

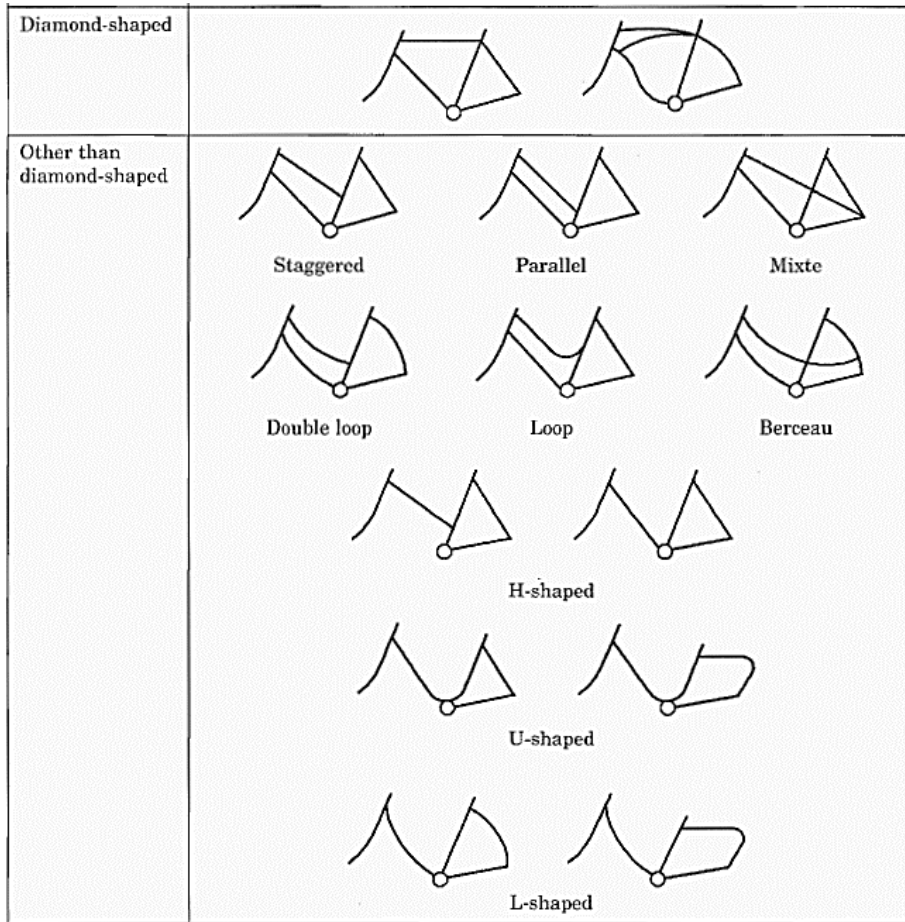
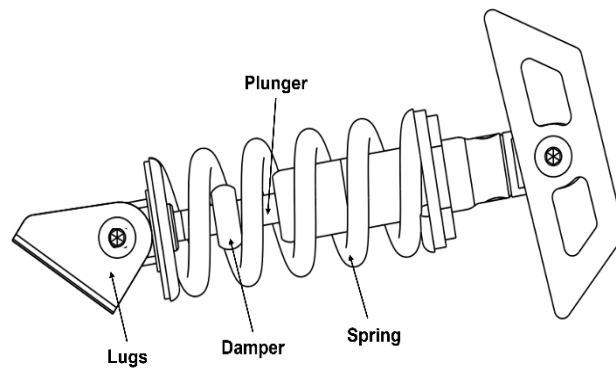


FIG 1 EXAMPLES OF FRAME SHAPES



All dimensions in millimetre

FIG. 2 SCHEMATIC REPRESENTATION OF FRAME SUSPENSION

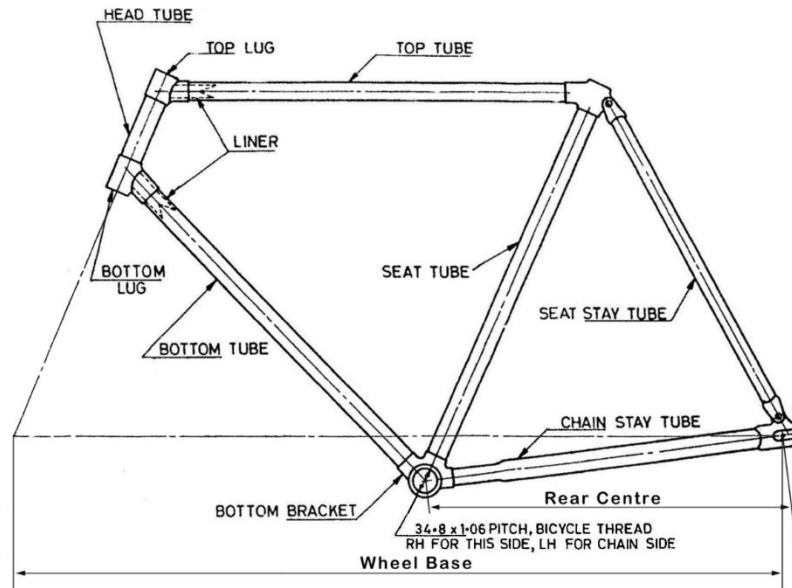


FIG. 3 STANDARD FRAME WITH THREADED BOTTOM BRACKET SHELL

**Table 1 Frame Dimensions for Bicycles
 Except Roadster and SLR Bicycles
 (Clause 5.2)**

Sl. No.	Saddle height	Tire size	Rear centre	Wheel base
(1)	(2)	(3)	(4)	(5)
i)	435-635	304.80 (12T)	235-255	560-620
ii)	435-635	355.60 (14T)	265-285	630-660
iii)	435-635	406.40 (16T)	305-330	695-760
iv)	435-635	457.20 (18T)	340-360	805-860
v)	435-635	508.00 (20T)	365-395	845-945
vi)	635-750	609.60 (24T)	420-450	960-1020
vii)	635-750	660.40 (26T)	430-500	1030-1170
viii)	635-750	698.50 (27.5T)	445-470	1030-1130
ix)	635-750	736.60 (29T)	465-500	1035-1150
x)	635-750	700.00 (700C)	435-480	1015-1120

All Dimensions are in millimetre

**Table 2 Frame Dimensions For Roadster and SLR Bicycles
 (Clause 5.2)**

Sl. No.	Saddle height	Frame size	Tire size	Rear centre	Wheel base
(1)	(2)	(3)	(4)	(5)	(6)
i)	435-635	406 (16")	508.00 (20")	360-380	870-890
ii)	635-750	450 (18")	609.60 (24")	440-460	1010-1030
iii)	635-750	500 (20")	660.40 (26")	465-485	1070-1090
iv)	635-750	550 (22")	711.20 (28")	490-510	1050-1070
v)	635-750	600 (24")	711.20 (28")	490-510	1050-1070

All Dimensions are in millimetre

6 MANUFACTURE

6.1 The tubes shall be fitted squarely to their respective lugs (if used). The frame tubes may be joined using suitable welding, brazing, adhesive or any other joining technique. During the joining process, the frame assembly shall be securely held to prevent the relative movement of its members. The tubes shall be so fitted as to be in one plane and the axis of the bottom bracket shall be perpendicular to the plane of the frame.

6.2 Suspension bicycles include springs as a shock absorber in their frame or fork or both. Suspension frames shall not be used for young children's bicycles and BMX bicycles.

6.3 Lugs, liners, or bridges may be used in frames made of steel, aluminium, composite or any other suitable material, as per agreement between purchase and supplier.

7 FINISH

The frame shall be free from rust, scale and oily substances. It shall be suitably pre-treated and plated or powder-coated or painted to give a glossy or matt finish.

8 ACCEPTANCE TESTS

8.1 Trueness of Frame

The frame shall be fixed on a suitable surface plate with the bottom bracket perpendicular (*see* Fig. 4). The heights of the centre lines of the tubes and the chain and seat stays shall be measured from the surface plate. These heights shall not vary by more than ± 1.5 mm with respect to the horizontal plane passing through the centre of the bottom bracket.

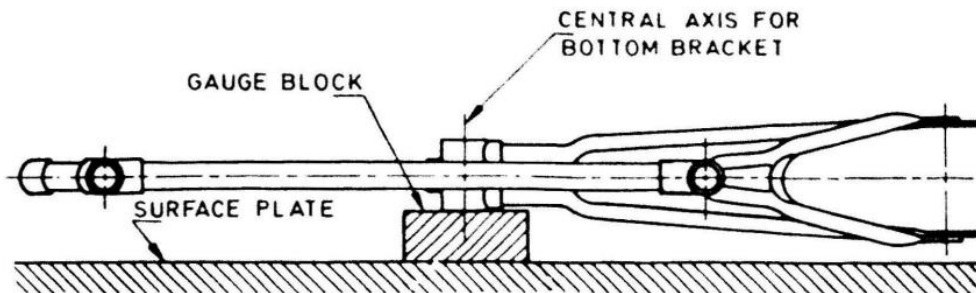


FIG. 4 TEST FOR TRUENESS OF BICYCLE FRAME

8.2 Impact Test on Frame-Fork Assembly

For the load test, the frame shall be assembled with a dummy fork meeting the requirements of **Annex G** of IS 10613.

8.2.1 Impact test (Falling Mass)

8.2.1.1 For bicycles for young children, the frame shall pass the test as specified in **4.9.1** of IS 15533/ISO 8098.

8.2.1.2 For 'Young adult bicycles', 'City and Trekking', 'Roadster', 'SLR bicycles', 'Mountain bicycles', and 'Racing bicycles', the frame shall pass the test as specified in **4.6.2** of IS 10613.

8.2.1.3 For BMX bicycles, the frame shall pass the test as specified in **4.10.2** of DOC: TED 16 (18837).

8.2.1.4 For EPAC bicycles, the frame shall pass the test as specified in **4.3.7.2** of DOC: TED 16 (23339).

8.2.2 Impact test (Falling Frame and Fork assembly)

8.2.2.1 For bicycles for young children, the frame shall pass the test as specified in **4.9.2** of IS 15533/ISO 8098.

8.2.2.2 For ‘Young adult bicycles’, ‘City and Trekking’, ‘Roadster’, ‘SLR bicycles’, ‘Mountain bicycles’, and ‘Racing bicycles’, the frame shall pass the test as specified in **4.6.3** of IS 10613.

8.2.2.3 For BMX bicycles, the frame shall pass the test as specified in **4.10.3** of DOC: TED 16 (18837).

8.2.2.4 For EPAC bicycles, the frame shall pass the test as specified in **4.3.7.3** of DOC: TED 16 (23339).

8.3 Fatigue Test on Frame-Fork Assembly

For the fatigue test, the frame shall be assembled with a dummy fork meeting the requirements of **Annex G** of IS 10613.

8.3.1 *Fatigue test with Pedalling Forces (Not applicable to young children’s bicycles)*

8.3.1.1 For ‘Young adult bicycles’, ‘City and Trekking’, ‘Roadster’, ‘SLR bicycles’, ‘Mountain bicycles’, and ‘Racing bicycles’, the frame shall pass the test as specified in **4.6.4** of IS 10613.

8.3.1.2 For BMX bicycles, the frame shall pass the test as specified in **4.10.4** of DOC: TED 16 (18837).

8.3.1.3 For EPAC bicycles, the frame shall pass the test as specified in **4.3.7.4** of DOC: TED 16 (23339).

8.3.2 *Fatigue test with Horizontal Forces (Not applicable to young children’s bicycles)*

8.3.2.1 For ‘Young adult bicycles’, ‘City and Trekking’, ‘Roadster’, ‘SLR bicycles’, ‘Mountain bicycles’, and ‘Racing bicycles’, the frame shall pass the test as specified in **4.6.5** of IS 10613.

8.3.2.2 For BMX bicycles, the frame shall pass the test as specified in **4.10.5** of DOC: TED 16 (18837).

8.3.2.3 For EPAC bicycles, the frame shall pass the test as specified in **4.3.7.5** of DOC: TED 16 (23339).

8.3.3 *Fatigue test with Vertical Forces (Not applicable to young children’s bicycles & BMX bicycles)*

8.3.3.1 For ‘Young adult bicycles’, ‘City and Trekking’, ‘Roadster’, ‘SLR bicycles’, ‘Mountain bicycles’, and ‘Racing bicycles’, the frame shall pass the test as specified in **4.6.6** of IS 10613.

8.3.3.2 For EPAC bicycles, the frame shall pass the test as specified in **4.3.7.6** of DOC: TED 16 (23339).

8.4 Vibration Test on Frame-Fork Assembly

8.4.1 For ‘Young adult bicycles’, ‘City and Trekking’, ‘Roadster’, ‘SLR bicycles’, ‘Mountain bicycles’, and ‘Racing bicycles’, the frame shall pass the test as specified in **4.6.7** of IS 10613.

8.4.2 For BMX bicycles, the frame shall pass the test as specified in **4.10.6** of DOC: TED 16 (18837).

8.4.3 For bicycles for young children, the frame shall pass the test as specified in National Annex C of IS 15533/ISO 8098.

8.4.4 For EPAC bicycles, the frame shall pass the test as specified in **4.3.7.7** of DOC: TED 16 (23339).

8.5 Suspension Frames — Tyre Clearance Test (Applicable for Suspension frames only)

This test is applicable for suspension frames only. This test is not applicable for young children’s bicycle & BMX bicycles.

8.5.1 For ‘Young adult bicycles’, ‘City and Trekking’, ‘Roadster’, ‘SLR bicycles’, ‘Mountain bicycles’, and ‘Racing bicycles’, the frame shall pass the test as specified in **Annex F** of IS 10613.

8.5.2 For EPAC bicycles, the frame shall pass the test as specified in **4.3.8.3.1** of DOC: TED 16 (23339).

8.6 Test for Finish

8.6.1 Physical test

A solid steel ball measuring 13 mm in diameter shall be dropped from a height of 1.5 m on any painted, powder-coated or plated portion of the frame. The frame shall withstand the impact without any sign of tear or peeling off.

8.6.2 Chemical test

8.6.2.1 Painted, powder-coated, or plated frames shall be tested according to one of the applicable tests as described in Table 3.

8.6.2.2 In the case of the painted surface, the paint shall not soften, peel off or show any colour change when tested as per **8.6.2.1**.

8.6.2.3 In the case of powder-coating or plating, there shall be no adhesion loss, blisters or flaking on an area more than 3mm on either side from X-cut when tested as per **8.6.2.1**.

Table 3 Chemical Tests
 (Clause 8.6.2.1)

Sl. No.	Test/Test conditions/Suitability	Dip Coating Test	Salt Spray Test	
			Neutral Salt Spray (NSS)	Copper-accelerated Acetic acid Salt Spray (CASS)
(1)	(2)	(3)	(4)	(5)
i)	Temperature	Black enamel paint 80°C	(35 ± 2) °C	(50 ± 2) °C
ii)		other enamel paints 60°C		
iii)	Concentration of Salt Solution	5% NaCl	5% NaCl	5% NaCl
iv)	pH (Solution)	6.5 to 7.2	6.5 to 7.2	3.1 to 3.3
v)	Test duration	1 h	96 ¹⁾ h	168 ¹⁾ h
vi)	Recovery period	Nil	1 h	1 h
vii)	Air Pressure	Atmospheric Pressure	70 to 170 kPa	70 to 170 kPa
viii)	Suitability ²⁾	Painted, Coating with metals and their alloys, Metallic coatings (Anodic & Cathodic)	Coating with metals and their alloys, Metallic coatings (Anodic & Cathodic), Conversion coatings Anodic oxide coatings.	Copper + Nickel + Chromium coatings, Nickel + Chromium coatings, Anode coating on Aluminium.

Note 1 Subject to agreement between customer and manufacturer, the duration of salt spray test both for NSS and CASS can be 2, 6, 24, 48, 96, 168, 240, 480, 720 or 1 000 h. Wherever there is no such agreement, the duration of the test indicated in Table 3 shall apply.

Note 2 In case of suitability of more than one test, only one test as per manufacturer and supplier agreement shall be done.

9 MARKING

Each frame shall be marked with the manufacturer's name, initials or trade-mark, and the country of origin. The manufacturer's serial number shall also be stamped suitably.

9.1 BIS Certification Marking

Each frame may also be marked with the Standard Mark.

9.1.1 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 there under, and the products may be marked with the Standard Mark.

Doc: TED 16 (23299) WC
IS 623 : XXXX
November 2023

ANNEX A
(Foreword)

COMMITTEE COMPOSITION

BICYCLES SECTIONAL COMMITTEE, TED 16

Will be added Later