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भारतीय मानक मसौदा

साइकिल — सामने के कांटे - विशिष्टि

(आई एस 2061 का दूसरा पुनरीक्षण)

Draft Indian Standard

BICYCLES — FRONT FORKS — SPECIFICATION

(Second Revision of IS 2061)

ICS 43.150

Bicycles Sectional Committee, TED 16

**Last date for receipt of comments is
08/04/2024**

FOREWORD

(Formal clause will be added later)

This standard was initially issued in 1962 and revised in 1995. 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 front forks of steel, front forks 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, fork-shape restrictions have been removed. The fork can be of any shape, nevertheless, few illustrative shapes have been given for guidance. Besides the rigid forks, the revised standard includes requirements for suspension forks as well.

Traditionally steel has been in use for manufacturing front forks. 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, forks of any materials need to conform to all the 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 — FRONT FORKS — SPECIFICATION

(*Second Revision*)

1 SCOPE

This standard specifies requirements for front forks 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/ISO No.</i>	<i>Title</i>
513 (Part 1): 2016	Cold Reduced Carbon Steel Sheet and Strip Part 1 Cold Forming and Drawing Purposes
2039 (Parts I to 3): 1991	Steel tubes for bicycle and cycle rickshaws — Specification (<i>second revision</i>)
2108: 1977	Blackheart malleable iron casting (<i>first revision</i>)
2927: 1975	Specification for brazing alloys (<i>first revision</i>)
3074: 2013	Steel tubes for automotive purposes (<i>third 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>)
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, terms and definitions are given in IS 10613, IS 15533/ISO 8098, DOC: TED 16 (18837) & DOC: TED 16 (23339) shall apply.

4 MATERIALS

Bicycle front fork material may be steel, aluminium alloy, carbon fibre-reinforced polymer, titanium alloy, magnesium alloy, or any other suitable material.

4.1 Fork Column and Fork Blades

4.1.1 If steel is used for fork column and fork blades, it may conform to IS 2039 (Parts 1 to 3) or IS 3074.

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 may be of any suitable profile subject to their conformity with requirements/ tests specified in this standard.

4.2 Fork Liners (if provided)

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

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

4.3 Fork Crown (if provided)

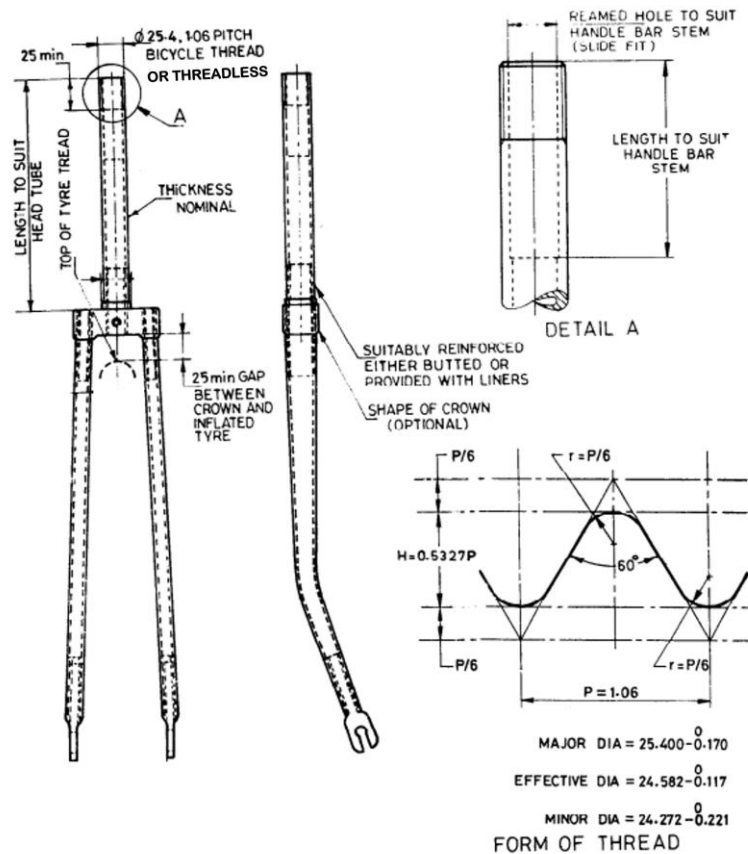
4.3.1 If steel is used, it shall conform to CR3 grade of IS 513 (Part 1). If malleable cast iron is used, it shall conform to grade BM 340 of IS 2108.

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

5 CONSTRUCTION AND DIMENSIONS

5.1 The front forks may be rigid forks or suspension forks, depending on the construction. The front forks shall conform to the dimensions and tolerances given in Fig. 1 or Fig. 2 as applicable.

5.2 The dimensions of screw threads shall conform to Fig. 1. Other screw threads may be used subject to agreement between the purchaser and the supplier.

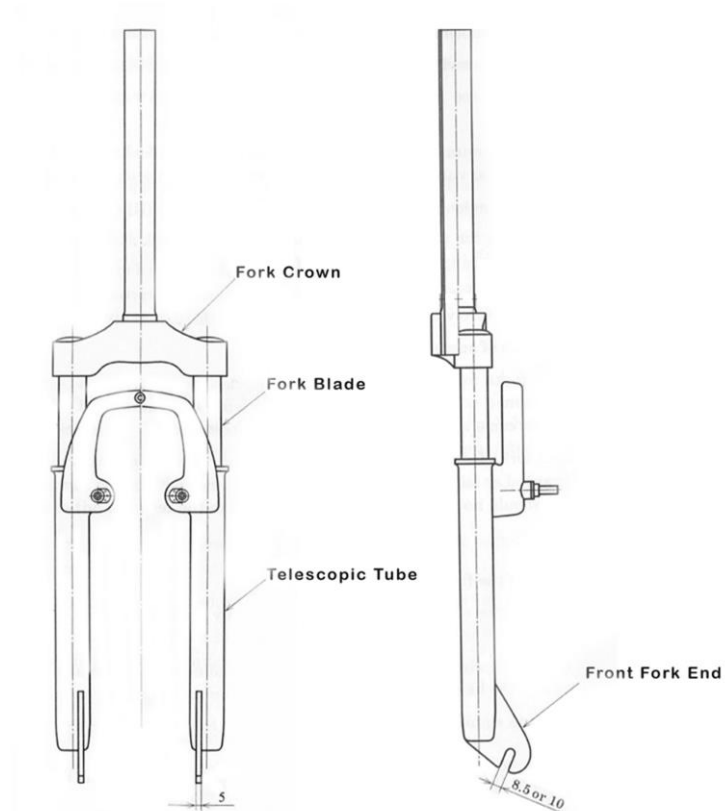


All dimensions in millimetres

NOTES

- 1 This figure is only illustrative and does not specify any design details.
- 2 Other threads may be permitted as per agreement between the purchaser and the supplier.

FIG. 1 RIGID FORK (SCHEMATIC)



All dimensions in millimetres

NOTES

- 1 This figure is only illustrative and does not specify any design details.
- 2 Other threads may be permitted as per agreement between the purchaser and the supplier.

FIG. 2 SUSPENSION FORK (SCHEMATIC)

6 MANUFACTURE

6.1 The stem and the two legs of the fork shall be fitted squarely through liners (if used) into the fork crown, and the joints shall be properly brazed with solder conforming to Grade B of IS 2927 or by any suitable joining method according to their materials.

6.2 The legs shall be symmetrical with the centre line of the stem. The axis of the hub shall be parallel and square. The threads shall be so formed as to facilitate easy fitting and replacement.

6.3 The suspension fork includes a spring component as a shock absorber in the fork. The illustrative shapes of rigid forks and suspension forks are given in Fig. 1 and Fig. 2 respectively. Any other suitable shape for the fork may be used subject to its conformity with tests specified in this standard.

7 FINISH

The fork shall be thoroughly cleaned, 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 Static Bending Test (Not applicable to Young children's bicycles)

8.1.1 For bicycles for ‘Young adult bicycles’, ‘City and Trekking’, ‘Roadster’, ‘SLR bicycles’, ‘Mountain bicycles’, and ‘Racing bicycles’, the fork shall pass the test as specified in **4.7.4** of IS 10613.

8.1.2 For BMX bicycles, the fork shall pass the test as specified in **4.11.2** of DOC: TED 16 (18837).

8.1.3 For EPAC bicycles, the fork shall pass the test as specified in **4.3.8.4** of DOC: TED 16 (23339).

NOTE The suspension fork shall be tested in its free, uncompressed length condition.

8.2 Expansion Test

The distance between the free ends of fork legs, when expanded by 13 mm by pushing them over a mandrel or any suitable device shall not show any measurable permanent increase under ordinary methods of measurement.

8.3 Bending Fatigue Test on front fork

8.3.1 For bicycles for young children, the fork shall pass the test as specified in **4.10.2** of IS 15533/ISO 8098.

8.3.2 For ‘Young adult bicycles’, ‘City and Trekking’, ‘Roadster’, ‘SLR bicycles’, ‘Mountain bicycles’, and ‘Racing bicycles’, the fork shall pass the test as specified in **4.7.6** of IS 10613.

8.3.3 For BMX bicycles, the fork shall pass the test as specified in **4.11.4** of DOC: TED 16 (18837).

8.3.4 For EPAC bicycles, the fork shall pass the test as specified in **4.3.8.6** of DOC: TED 16 (23339).

8.4 Impact Test on Frame-Fork Assembly

8.4.1 Impact test (Falling Mass)

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

8.4.1.2 For ‘Young adult bicycles’, ‘City and Trekking’, ‘Roadster’, ‘SLR bicycles’, ‘Mountain bicycles’, and ‘Racing bicycles’, the fork shall pass the test as specified in **4.6.2** of IS 10613.

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

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

8.4.2 Impact test (Falling Frame and Fork Assembly)

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

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

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

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

8.5 Rearward Impact Test on Fork (Not applicable to young children’s bicycles)

8.5.1 For bicycles for ‘Young adult bicycles’, ‘City and Trekking’, ‘Roadster’, ‘SLR bicycles’, ‘Mountain bicycles’, and ‘Racing bicycles’, the fork shall pass the test as specified in **4.7.5** of IS 10613.

8.5.2 For BMX bicycles, the fork shall pass the test as specified in **4.11.3** of DOC: TED 16 (18837).

8.5.3 For EPAC bicycles, the fork shall pass the test as specified in **4.3.8.5** of DOC: TED 16 (23339).

8.6 Suspension Fork - Tyre Clearance Test (Applicable for Suspension Frames only)

This test is not applicable for young children's and BMX bicycles.

8.6.1 For bicycles for 'Young adult bicycles', 'City and Trekking', 'Roadster', 'SLR bicycles', 'Mountain bicycles', and 'Racing bicycles', the fork shall pass the test as specified in Annex F of IS 10613.

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

8.7 Tensile Test on Fork

8.7.1 *Tensile test on suspension fork (Not applicable for young children's and BMX bicycles)*

8.7.1.1 For bicycles for 'Young adult bicycles', 'City and Trekking', 'Roadster', 'SLR bicycles', 'Mountain bicycles', and 'Racing bicycles', the fork shall pass the test as specified in **4.7.3.3** of IS 10613.

8.7.1.2 For EPAC bicycles, the fork shall pass the test as specified in **4.3.8.3.2** of DOC: TED 16 (23339).

8.7.2 *Tensile test on non-welded fork (Not applicable for young children's and BMX bicycles)*

8.7.2.1 For bicycles for 'Young adult bicycles', 'City and Trekking', 'Roadster', 'SLR bicycles', 'Mountain bicycles', and 'Racing bicycles', the fork shall pass the test as specified in **4.7.8** of IS 10613.

8.7.2.2 For EPAC bicycles, the fork shall pass the test as specified in **4.3.8.8** of DOC: TED 16 (23339).

8.8 Torque Test on Fork Used with Hub/Disc Brake

8.8.1 *Static torque test on fork (Not applicable for young children's and BMX bicycles)*

8.8.1.1 For bicycles for 'Young adult bicycles', 'City and Trekking', 'Roadster', 'SLR bicycles', 'Mountain bicycles', and 'Racing bicycles', the fork shall pass the test as specified in **4.7.7.2** of IS 10613.

8.8.1.2 For EPAC bicycles, the fork shall pass the test as specified in **4.3.8.7.2** of DOC: TED 16 (23339).

8.8.2 *Fatigue torque test on fork (Not applicable for young children's and BMX bicycles)*

8.8.2.1 For bicycles for 'Young adult bicycles', 'City and Trekking', 'Roadster', 'SLR bicycles', 'Mountain bicycles', and 'Racing bicycles', the fork shall pass the test as specified in **4.7.7.3** of IS 10613.

8.8.2.2 For EPAC bicycles, the fork shall pass the test as specified in **4.3.8.7.4** of DOC: TED 16 (23339).

8.9 Test of Finish

8.9.1 *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 fork. The fork shall withstand the impact without any sign of tear or peeling off.

8.9.2 *Chemical test*

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

8.9.2.2 In the case of the painted surface, the paint shall not soften, peel off or show any colour change when tested as per **8.9.2.1**.

8.9.2.3 In the case of powder-coating or plating, there shall be no adhesion loss, blisters or flaking on an area more than 3 mm on either side from X-cut when tested as per **8.9.2.1**.

Table 3 Chemical Tests
(Clause 8.9.2.1)

Sl. No.	Test/Test conditions/Suitability	Dip Coating Teat	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 1000 h. Wherever there is no such agreement, the duration of 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 fork shall be marked with the manufacturer's name, initials or trade-mark and the country of origin. The manufacturer's lot number/batch number shall also be marked suitably.

9.1 BIS Certification Marking

Each fork 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 (23300) WC
IS 2061 : XXXX
February 2024

ANNEX A
(Foreword)

COMMITTEE COMPOSITION

BICYCLES SECTIONAL COMMITTEE, TED 16

Will be added Later