Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”
Mazdoor Kisan Shakti Sangathan
“The Right to Information, The Right to Live”

“पुराने को छोड नये के तरफ”
Jawaharlal Nehru
“Step Out From the Old to the New”

IS 1131 (2006): Bicycle Bottom Bracket Axle (Amalgamating IS 11685) [TED 16: Bicycles]

“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”
Bhartrhari—Nitisatakam
“Knowledge is such a treasure which cannot be stolen”
FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Bicycles Sectional Committee had been approved by the Transport Engineering Division Council.

This standard was first published in 1958 and subsequently revised in 1968 and then in 1985. In this revision:

a) IS 11685:1986 ‘Specification for bicycle bottom bracket axle, R type’ has been amalgamated;

b) Types of bottom bracket axles like cottered type and cotterless type have been added; and

c) Dimensions as per latest trade/manufacturing practices have been included. Length of axle has been increased as per the latest practice being used in the industry.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

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

BICYCLE BOTTOM BRACKET AXLE — SPECIFICATION
(Third Revision)

1 SCOPE

This standard covers the dimensional and other requirements for bicycle bottom bracket axles of cottered type and cotterless type.

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:

<table>
<thead>
<tr>
<th>IS No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>1068 : 1993</td>
<td>Electroplated coatings of nickel plus chromium and copper plus nickel plus chromium — Specification (third revision)</td>
</tr>
<tr>
<td>1570 (Part 3) : 1979</td>
<td>Schedule for wrought steels: Part 3 Carbon and carbon-manganese free cutting steels (first revision)</td>
</tr>
<tr>
<td>1573 : 1986</td>
<td>Specification for electroplated coatings of zinc on iron and steel (second revision)</td>
</tr>
<tr>
<td>2016 : 1967</td>
<td>Specification for plain washers (first revision)</td>
</tr>
<tr>
<td>2500(Part 1) : 2000/ISO 2859-1 : 1999</td>
<td>Sampling procedures for inspection by attributes: Part 1 Sampling schemes indexed by acceptable quality limit (AQL) for lot-by-lot inspection (third revision)</td>
</tr>
</tbody>
</table>

3 MATERIAL

3.1 The axle shall be manufactured from steel of grade designation 11C410 S 25 of IS 1570 (Part 3) or from steel having following chemical composition:

<table>
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<th>Constituent</th>
<th>Percent</th>
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<tr>
<td>Carbon</td>
<td>0.07-0.15</td>
</tr>
<tr>
<td>Manganese</td>
<td>0.80-1.20</td>
</tr>
<tr>
<td>Silicon</td>
<td>0.10, Max</td>
</tr>
<tr>
<td>Sulphur</td>
<td>0.20-0.30</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>0.07, Max</td>
</tr>
</tbody>
</table>

3.2 Alternatively any case hardening steel may be used. Such steels shall have a tensile strength of not less than 500 MPa in the core after case hardening.

NOTE — 1 Mpa = 0.1 kgf/mm².

3.3 Steels suitable for cold forging be used for bottom bracket axles manufactured by cold forging process.

3.4 Crank retaining bolt/nut for cotterless axles to conform to property Class 8.8 of IS 1367 (Part 3).

3.5 Steel washer for bolt type cotterless axles to conform to IS 2016.

4 SHAPE AND DIMENSIONS

4.1 Cottered Bottom Bracket Axle

The cottered bottom bracket axle shall conform to the shape and dimensions given in Fig. 1 and corresponding Table 1.

4.1.1 Alternate for the shape of the end of cottered bottom bracket axle shall be as per Fig. 2.

4.2 Cotterless Bottom Bracket Axle

4.2.1 Cotterless Bottom Bracket Axle — Bolt Type

The cotterless bottom bracket axle—bolt type shall conform to the shape and dimensions given in Fig. 3 and corresponding Table 2 and the associated crank retaining bolt and washer shall be as per Fig. 4.

4.2.2 Cotterless Bottom Bracket Axle — Nut Type

The cotterless bottom bracket axle—nut type shall conform to the shape and dimensions given in Fig. 5 and corresponding Table 2 and the associated crank retaining nut shall be as per Fig. 6.

4.2.3 If radius ‘R’ is chosen as less than 4.5 mm in
Fig. 1, Fig. 3 and Fig. 5; the shape of ball track for the bottom bracket axle cottered/cotterless type shall conform to Fig. 7.

4.3 The axle shall be free from any manufacturing or machining defects. The ball track/bearing portion shall be finished smooth, for hot forged bottom bracket axles. For cold forged bottom bracket axles, precision of the cold forging die must be periodically checked and maintained so as to achieve desired smoothness of ball tracks of the bottom bracket axles.

5 HARDNESS

5.1 The axle shall be suitably case-hardened to a minimum depth of 0.6 mm so as to attain a hardness of 600-800 HV (see IS 1501) or its equivalent on other scales.

5.2 For the determination of hardness, any recognized type of hardness tester may be used.

6 FINISH

6.1 The axle shall be finished smooth free from burrs, scratches and other manufacturing defects.

6.2 The bottom bracket axle, crank retaining bolt/nut/washer shall be entirely chemically coloured or zinc plated to Service Condition No. 2 (Classification No. FeZn12.5) of IS 1573, or nickel plus chromium plated to Service Condition No. 1 with designation Fe/Nilob Cr of IS1068.

7 STRENGTH

When a force is applied on the bottom bracket axle, as shown in Fig. 8, with a tendency to bend/break it, the force shall be not less than 2 000 kgf, and the product of the force and the deflection at the centre of the bottom bracket axle shall not be less than 3 000 kgf-mm.

8 ECCENTRICITY/RUN-OUT

8.1 Cottered Bottom Bracket Axle

The run-out measured at the end of chain-wheel side, with supporting arrangement as shown in Fig. 9, shall not exceed 0.3 mm.

8.2 Cotterless Bottom Bracket Axle

When assembled in a testing bottom bracket, and fitted with a cylindrical gauge block of 55 mm in outer diameter on the chain-wheel side end, the radial run-out measured on the periphery of the gauge block and the axial run-out measured at 25 mm radius on its plane, as shown in Fig. 10, shall not exceed 0.3 mm, respectively.

8.3 The angular deviation between the right and left cotter pin abutting flats of the cottered bottom bracket axle and the phase difference between the right and the left square tapered faces of the cotterless bottom bracket axle shall not exceed 2°, respectively.

9 MARKING

9.1 The axle shall be clearly and legibly marked with the following:

a) Manufacturer's name or trade-mark;

b) Batch number; and

c) Country of manufacture.

9.2 BIS Certification Marking

The material may also be marked with the Standard Mark.

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

10 SAMPLING

10.1 Unless otherwise agreed to between the supplier and the purchaser, the procedure given in IS 2500 (Part 1) shall be followed for sampling inspection. The inspection level, acceptable quality limit (AQL) and the type of sampling plan for various characteristics shall be as given in 10.1.1 and 10.1.2.

10.1.1 For shape and dimensions, workmanship and finish a single sampling plan with Special Inspection Level S-4 and AQL of 2.5 as given in Tables 1 and 2A of IS 2500 (Part 1) shall be followed.

10.1.2 For hardness a single sampling plan with Special Inspection Level S-3 and AQL of 2.5 as given in Tables 1 and 2A of IS 2500 (Part 1) shall be followed.

11 PACKING

The packing shall be as per best prevalent trade practice. The country of origin shall be marked on the packing.
Table 1 Dimensions of Cottered Bottom Bracket Axle
(Clause 4.1)
All dimensions in millimetres.

<table>
<thead>
<tr>
<th>SI No.</th>
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<td>(3)</td>
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<td>i)</td>
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<td>ii)</td>
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<td>iii)</td>
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<td>147</td>
<td>39.1</td>
<td>61.4</td>
<td>46.5</td>
</tr>
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</table>

NOTE — SI No. (i) - is popular 'PH' - Type axle and SI No. (ii) - is popular 'R' - Type axle.
FIG. 3 SHAPE AND DIMENSIONS OF ‘BOLT TYPE’ COTTERLESS BOTTOM BRACKET AXLE

All dimensions in millimetres.

Fig. 3 Shape and Dimensions of ‘Bolt Type’ Cotterless Bottom Bracket Axle

Bolt

Washer

All dimensions in millimetres.

FIG. 4 CRANK RETAINING BOLT AND WASHER

Fig. 4 Crank Retaining Bolt and Washer

FIG. 5 SHAPE AND DIMENSIONS OF ‘NUT TYPE’ COTTERLESS BOTTOM BRACKET AXLE

All dimensions in millimetres.

Fig. 5 Shape and Dimensions of ‘Nut Type’ Cotterless Bottom Bracket Axle
### Table 2 Dimensions of Cotterless Bottom Bracket Axles

*Clauses 4.2.1 and 4.2.2*

All dimensions in millimetres.

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IS 1131 : 2006

ANTI SLIP MARKS
R2.5x24 NO.
(DEPTH 0.2mm)

\( \Phi 14 \)

\( \Phi 19.7 \)

1.5

M10x1.25P

-0.2

14

A/F

All dimensions in millimetres.

FIG. 6 CRANK RETAINING NUT

\[ R < 4.5 \text{ mm} \]

\[ 45^\circ \text{ NOM} \]

FIG. 7 DETAILS OF BALL TRACK WITH RADIUS 'R' LESS THAN 4.5 mm

FORCE

FIG. 8 STRENGTH TEST OF BOTTOM BRACKET AXLE
Fig. 9 Run-out of Cottered Bottom Bracket Axle

Fig. 10 Run-out of Cotterless Bottom Bracket Axle

All dimensions in millimetres.
ANNEX A
(Foreword)

COMMITTEE COMPOSITION
Bicycles Sectional Committee, TED 16

Organisation

Hero Cycles Ltd, Ludhiana
Atlas Cycles (Haryana) Limited, Sonepat
Avery Cycle Industries Ltd (Avon Group), Ludhiana
Avon Cycles Ltd, Ludhiana
Bhogal Sons (Regd.), Ludhiana
Bicycle & Sewing Machines (R&D Centre), Ludhiana
Controllerate of Quality Assurance (Vehicles), Ahmednagar
Department of Industrial Policy and Promotion, New Delhi
Dewan Rubber Industries Ltd, Meerut
Director of Industries, Ludhiana, Punjab
Directorate General of Supplies and Disposals, New Delhi
Directorate of Industries, Government of Haryana, Chandigarh
Eastman Industries, Ludhiana
Govind Rubber Ltd, Distt Ludhiana
Hamilton Industries Pvt Ltd, Ambarnath
Hartex Rubber Ltd, Hyderabad
J. K. Cycles, Ludhiana
Kular Cycle Industries, Ludhiana
Metro Tyres Limited, Ludhiana
Nova Bicycle Industries, Ludhiana
Office of the Development Commissioner (SSI), New Delhi
Ralson (India) Limited, Ludhiana
Sadem Industries, Ludhiana
Seth Industrial Corporation, Ludhiana
T. I. Cycles of India, Chennai
United Cycle & Parts Manufacturers Association, Ludhiana
BIS Directorate General

Representative(s)

SHRI S. K. Rai (Chairman)
SHRI B. M. LAL (Alternate)
SHRI VIRENDRA KAPUR
SHRI ASHOK KUMAR (Alternate)
SHRI HARICHANDRA SINGH
SHRI ASHWAN KUMAR BHAKTHAN (Alternate)
SHRI ONKAR SINGH PAWAN
SHRI RISHI PAWAN (Alternate)
SHRI HARIKENDR P. BHOGAL
SHRI NAGENDR SINGH BHOGAL (Alternate)

GENERAL MANAGER

SHRI SHAMSHIR SINGH (Alternate)

JOINT CONTROLLER (ID-A)

SHRI M. M. ALI KHAN

DEPUTY CONTROLLER (ID-A) (Alternate)

SHRI B. C. NAYAK (Alternate)

SHRI VIVEK DEWAN

SHRI C. K. SAXENA (Alternate)

GENERAL MANAGER

SHRI SUBRAMANIAN (Alternate)

SPECIAL TECHNICAL OFFICER (Alternate)

SHRI S. M. MUNDAL

SHRI W. M. WANIABI (Alternate)

SHRI R. N. GOYAL

SHRI SUNEET CHOPRA (Alternate)

SHRI JAGDEEP SINGH

SHRI VINOD POODHAR

SHRI S. P. SURIKANTH (Alternate)

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SHRI K. SUBRAMANIAN

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SHRI JAGDEEP KUMAR

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SHRI L. K. KHATHUR

SHRI SANDEEP SODH (Alternate)

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SHRI SATISH KUMAR DHANDA

SHRI B. K. SETH

SHRI S. SADHIB KUMAR

SHRI V. DURAIKAL (Alternate)

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THE SECRETARY (Alternate)

SHRI S. K. BHATT, Director & Head (TED)
[Representing Director General (Ex-officio Member)]

Member Secretary
SHRI J. M. KHAJANA
Joint Director (TED), BIS
Bureau of Indian Standards

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This Indian Standard has been developed from Doc: No. TED 16 (397).

### Amendments Issued Since Publication

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| Southern  | C.I.T. Campus, IV Cross Road, CHENNAI 600113 | 2254 1216, 2254 1442, 2254 2519, 2254 2315 |
| Western   | Manakalaya, E9 MIDC, Marol, Andheri (East)  
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