

# इंटरनेट

# मानक

## 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 छोड़ 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 से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



BLANK PAGE



भारतीय मानक  
साइकिल की तली की ब्रैकेट की धुरी — विशिष्टि  
( तीसरा पुनरीक्षण )

*Indian Standard*  
**BICYCLE BOTTOM BRACKET AXLE —  
SPECIFICATION**  
( *Third Revision* )

ICS 43.150

© BIS 2006

**BUREAU OF INDIAN STANDARDS**  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

## 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:

<i>IS No.</i>	<i>Title</i>
1068 : 1993	Electroplated coatings of nickel plus chromium and copper plus nickel plus chromium — Specification ( <i>third revision</i> )
1367 (Part 3) : 2002/ ISO 898-1 : 1999	Technical supply conditions for threaded steel fasteners: Part 3 Mechanical properties of fasteners made of carbon steel and alloy steel — Bolts, screws and studs ( <i>fourth revision</i> )
1501 : 2002	Method for Vickers hardness test for metallic materials ( <i>third revision</i> )
1570 (Part 3) : 1979	Schedule for wrought steels: Part 3 Carbon and carbon-manganese free cutting steels ( <i>first revision</i> )
1573 : 1986	Specification for electroplated coatings of zinc on iron and steel ( <i>second revision</i> )
2016 : 1967	Specification for plain washers ( <i>first revision</i> )
2500 (Part 1) : 2000/ ISO 2859-1 : 1999	Sampling procedures for inspection by attributes : Part 1 Sampling schemes indexed by acceptable quality limit (AQL) for lot-by-lot inspection ( <i>third revision</i> )

### 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:

<i>Constituent</i>	<i>Percent</i>
Carbon	0.07-0.15
Manganese	0.80-1.20
Silicon	0.10, <i>Max</i>
Sulphur	0.20-0.30
Phosphorus	0.07, <i>Max</i>

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/mm<sup>2</sup>.

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/Ni10b Cr r 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 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.

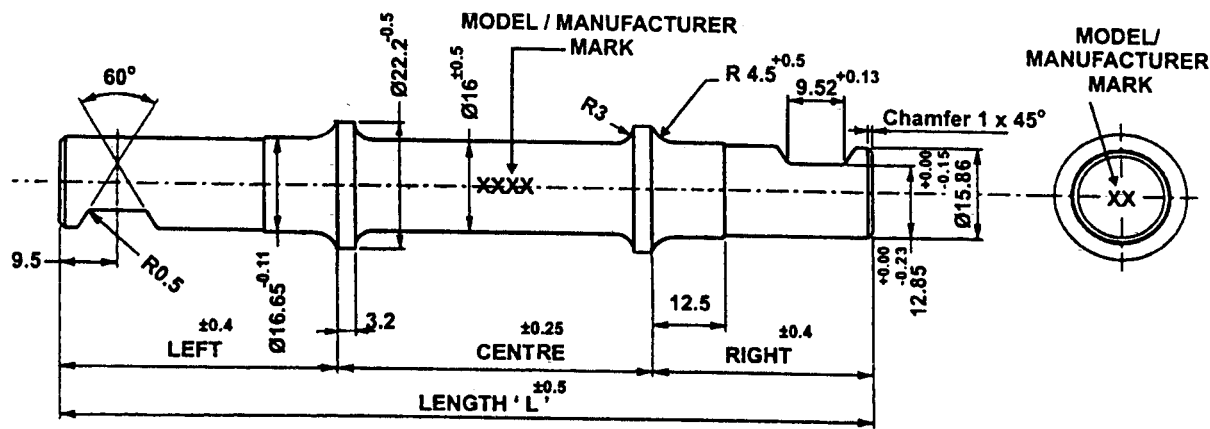


FIG. 1 COTTERED BOTTOM BRACKET AXLE

Table 1 Dimensions of Cottered Bottom Bracket Axle  
(Clause 4.1)

All dimensions in millimetres.

SI No.	Length 'L'	Left	Centre	Right
(1)	(2)	(3)	(4)	(5)
i)	137.5	37.4	53.6	46.5
ii)	144	36.1	61.4	46.5
iii)	158	45	65	48
iv)	148	45	55	48
v)	137.5	35	55	47.5
vi)	146.5	46.4	53.6	46.5
vii)	147	39.1	61.4	46.5

NOTE — SI No. (i) - is popular 'PH' - Type axle and SI No. (ii) - is popular 'R' - Type axle.

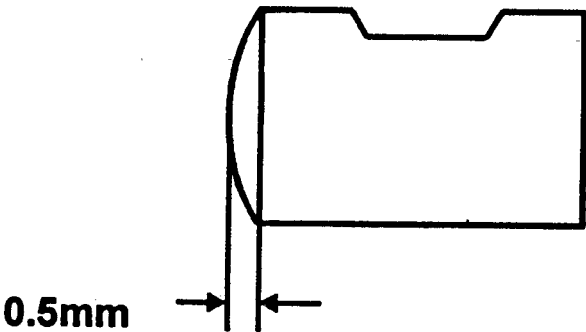
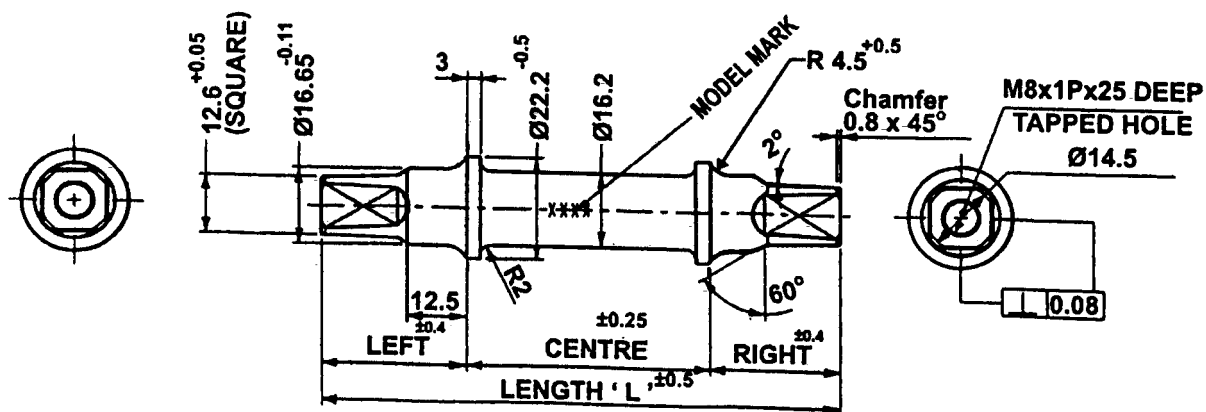


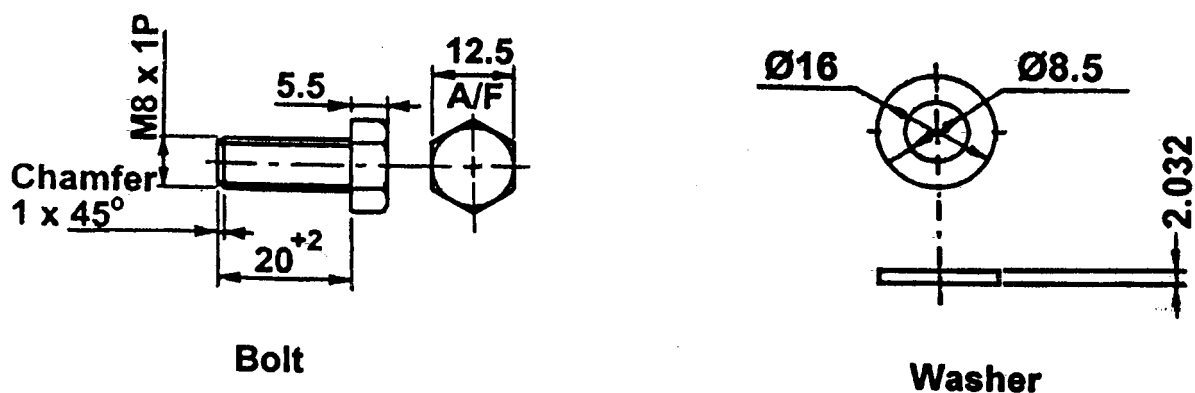
FIG. 2 ALTERNATE FOR THE SHAPE OF THE END OF COTTERED BOTTOM BRACKET AXLE





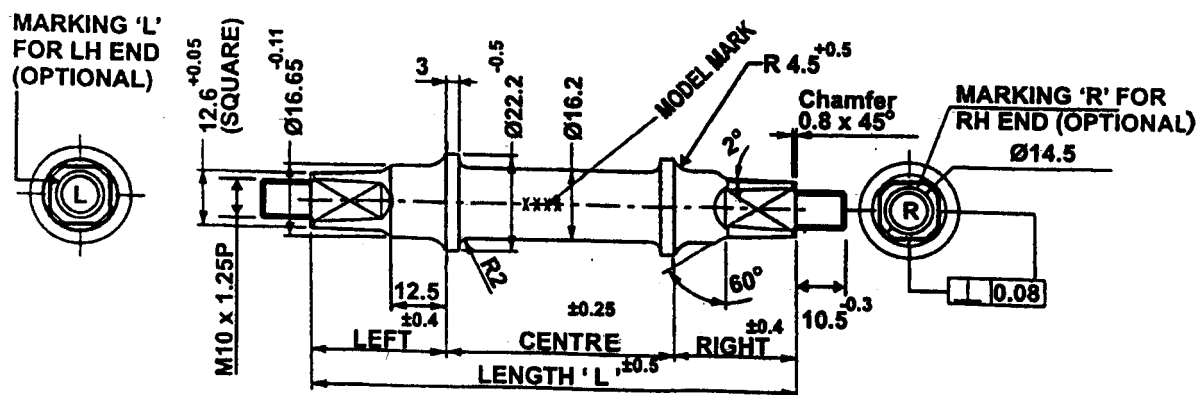
All dimensions in millimetres.

FIG. 3 SHAPE AND DIMENSIONS OF 'BOLT TYPE' COTTERLESS BOTTOM BRACKET AXLE



All dimensions in millimetres.

FIG. 4 CRANK RETAINING BOLT AND WASHER



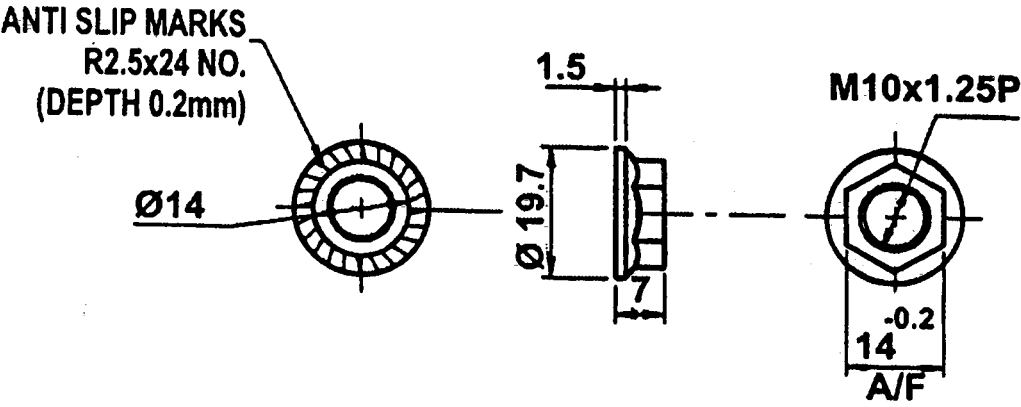
All dimensions in millimetres.

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.

Sl No. (1)	Model Mark (2)	Length 'L' (3)	Left (4)	Right (5)	Centre (6)
i)	7R	134	35	42	57
ii)	7U	132.5	35	40.5	
iii)	7T	131	35	39	
iv)	7N	125	32	36	
v)	7P	124	32	35	
vi)	5R	132	35	42	55
vii)	5RM	134.5	37.5	42	
viii)	5TM	131.5	37.5	39	
ix)	5U	130.5	35	40.5	
x)	5T	129	35	39	
xi)	5S	127.5	35	37.5	
xii)	5SS	124.5	32	37.5	
xiii)	5N	123	32	36	
xiv)	5P	122	32	35	
xv)	5L	119	32	32	
xvi)	5H	116	30.5	30.5	
xvii)	6H1	124.5	34	35.5	
xviii)	5A	119.5	32	33.5	54
xix)	6H2	128	35	39	
xx)	3RMC	134.5	40.5	42	52
xxi)	3UMC	133	40.5	40.5	
xxii)	3RMA	133	39	42	
xxiii)	3RM	131.5	37.5	42	
xxiv)	3UM	130	37.5	40.5	
xxv)	3R	129	35	42	
xxvi)	3U	127.5	35	40.5	
xxvii)	3T	126	35	39	
xxviii)	3S	124.5	35	37.5	
xxix)	3PL	122	35	35	
xxx)	3SS	121.5	32	37.5	
xxxi)	3N	120	32	36	
xxxii)	3P	119	32	35	
xxxiii)	3A	117.5	32	33.5	
xxxiv)	3L	116	32	32	
xxxv)	3H	113	30.5	30.5	
xxxvi)	3I	110.5	28	30.5	



All dimensions in millimetres.

FIG. 6 CRANK RETAINING NUT

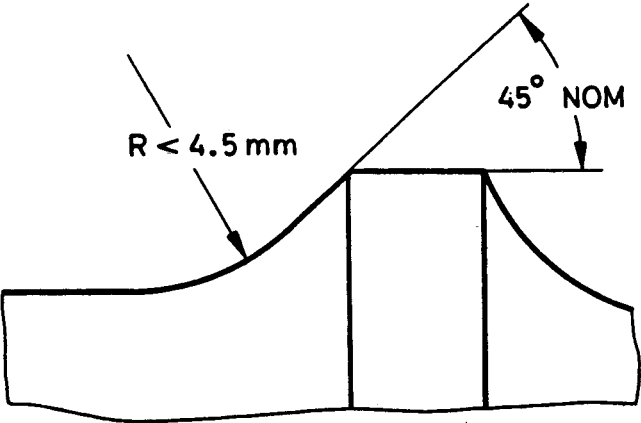


FIG. 7 DETAILS OF BALL TRACK WITH RADIUS 'R' LESS THAN 4.5 mm

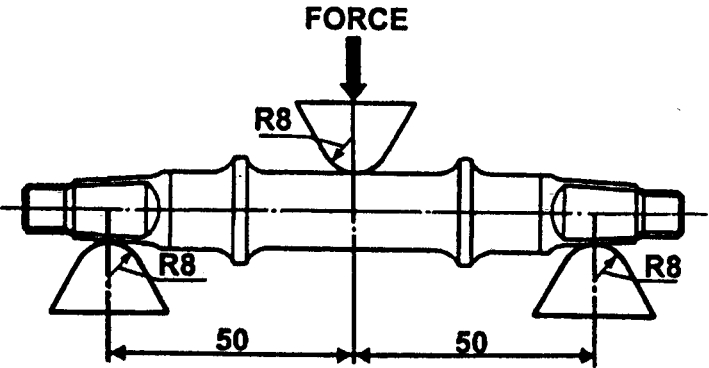


FIG. 8 STRENGTH TEST OF BOTTOM BRACKET AXLE

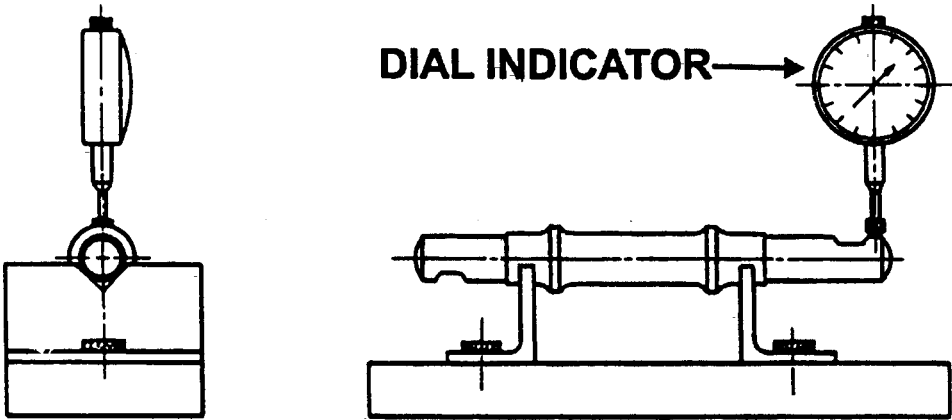
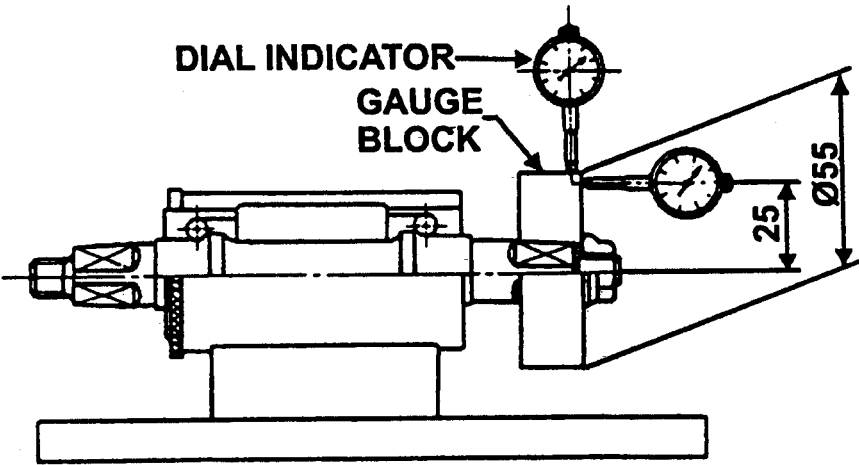


FIG. 9 RUN-OUT OF COTTERED BOTTOM BRACKET AXLE



All dimensions in millimetres.

FIG. 10 RUN-OUT OF COTTERLESS BOTTOM BRACKET AXLE

## ANNEX A

## (Foreword)

## COMMITTEE COMPOSITION

## Bicycles Sectional Committee, TED 16

<i>Organization</i>	<i>Representative(s)</i>
Hero Cycles Ltd, Ludhiana	SHRI S.K. RAJ ( <i>Chairman</i> )
Atlas Cycles (Haryana) Limited, Sonapat	SHRI BRJMOHAN LAL ( <i>Alternate</i> )
Avery Cycle Industries Ltd (Avon Group), Ludhiana	SHRI VIKRAM KAPUR
Avon Cycles Ltd, Ludhiana	SHRI ASHOK KUMAR ( <i>Alternate</i> )
Bhogal Sons (Regd.), Ludhiana	SHRI HARCHARAN SINGH
Bicycle & Sewing Machines (R&D Centre), Ludhiana	SHRI ASHWANI KUMAR BHAKHAN ( <i>Alternate</i> )
Controllerate of Quality Assurance (Vehicles), Ahmednagar	SHRI ONKAR SINGH PAHWA
Department of Industrial Policy and Promotion, New Delhi	SHRI RISHI PAHWA ( <i>Alternate</i> )
Dewan Rubber Industries Ltd, Meerut	SHRI HARINDER P. BHOGAL
Director of Industries, Ludhiana, Punjab	SHRI NAGINDER SINGH BHOGAL ( <i>Alternate</i> )
Directorate General of Supplies and Disposals, New Delhi	GENERAL MANAGER
Directorate of Industries, Government of Haryana, Chandigarh	SHRI SHAMSHER SINGH ( <i>Alternate</i> )
Eastman Industries, Ludhiana	JOINT CONTROLLER (ID-A)
Govind Rubber Ltd, Distt Ludhiana	DEPUTY CONTROLLER (ID-A) ( <i>Alternate</i> )
Hamilton Industries Pvt Ltd, Ambarnath	SHRI M. M. ALI KHAN
Hartex Rubber Ltd, Hyderabad	SHRI B. C. NAYAK ( <i>Alternate</i> )
J. K. Cycles, Ludhiana	SHRI VIVEK DEWAN
Kular Cycle Industries, Ludhiana	SHRI C. K. SAXENA ( <i>Alternate</i> )
Metro Tyres Limited, Ludhiana	GENERAL MANAGER
Nova Bicycle Industries, Ludhiana	SENIOR TECHNICAL OFFICER ( <i>Alternate</i> )
Office of the Development Commissioner (SSI), New Delhi	SHRI S. M. MUNJAL
Ralson (India) Limited, Ludhiana	SHRI W. M. WANJARI ( <i>Alternate</i> )
Sadem Industries, Ludhiana	SHRI R. N. GOYAL
Seth Industrial Corporation, Ludhiana	SHRI SUNIL CHOPRA ( <i>Alternate</i> )
T. I. Cycles of India, Chennai	SHRI JAGDEEP SINGH
United Cycle & Parts Manufacturers Association, Ludhiana	SHRI VINOD PODDAR
BIS Directorate General	SHRI S. P. SUKHRANI ( <i>Alternate</i> )
	SHRI M. R. PRAJAPATI
	SHRI P. R. RAVIKUMAR ( <i>Alternate</i> )
	SHRI K. SUBRAMANIAN
	SHRI RAVINDRA PANT ( <i>Alternate</i> )
	SHRI JOGINDER KUMAR
	SHRI AJIT SINGH
	SHRI DARSHAN SINGH ( <i>Alternate</i> )
	SHRI L. K. MATHUR
	SHRI SANJEEV SOOD ( <i>Alternate</i> )
	SHRI HARMINDER SINGH PAHWA
	SHRI ROHIT PAHWA ( <i>Alternate</i> )
	SHRI R. L. GARG
	SHRI M. B. JAYA KUMAR ( <i>Alternate</i> )
	SHRI SANJEEV PAHWA
	SHRI T. R. KUKREJA ( <i>Alternate</i> )
	SHRI SATISH KUMAR DHANDA
	SHRI B. K. SETH
	SHRI S. SADISH KUMAR
	SHRI V. DURAIRAJ ( <i>Alternate</i> )
	THE PRESIDENT
	THE SECRETARY ( <i>Alternate</i> )
	SHRI S. K. BHATIA, Director & Head (TED)
	[Representing Director General ( <i>Ex-officio Member</i> )]

Member Secretary

SHRI J. M. KHANNA

Joint Director (TED), BIS

## Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

### Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

### Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

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

#### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

#### BUREAU OF INDIAN STANDARDS

##### Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002

Telephones: 2323 0131, 2323 3375, 2323 9402

website : [www.bis.org.in](http://www.bis.org.in)

##### Regional Offices:

	Telephones
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	{ 2323 7617 2323 3841
Eastern : 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi KOLKATA 700054	{ 2337 8499, 2337 8561 2337 8626, 2337 9120
Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022	{ 260 3843 260 9285
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) MUMBAI 400093	{ 2832 9295, 2832 7858 2832 7891, 2832 7892

**Branches** : AHMEDABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD.  
GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. NAGPUR.  
NALAGARH. PATNA. PUNE. RAJKOT. THIRUVANANTHAPURAM. VISAKHAPATNAM.