BUREAU OF INDIAN STANDARDS

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भारतीय मानक ***मसौदा***

साइकिलें - हब असेंबली – विशिष्टता
(*चौथा पुनरीक्षण*)

Draft Indian Standard

BICYCLES - HUB ASSEMBLY – SPECIFICATION
(Fourth Revision)

ICS 43.150

Bicycles Sectional Committee TED 16	Last Date of comments 06/02/2025

Bicycles Sectional Committee, TED 16

FOREWORD
(*Adoption clause will be added later*)

Bicycle hub assemblies were earlier covered under two standards, namely IS 629:1988 'Specification for bicycle hub assembly—R Type' and IS 12205:1988 'Specification for bicycle hub assembly — PH Type'. The third revision in 2013, had amalgamated IS 12205 with IS 629 and also included other type of hubs being used in the bicycle industry.

In this revision besides hubs of steel, hubs of all suitable materials including that of aluminum alloy, carbon fibre reinforced polymer, titanium alloy, magnesium alloy, have been included. Following other significant changes have been made:

1) New types of hubs have been included.
2) Higher number of Spoke Holes in Flange have been permitted
3) Hub assemblies equipped with sealed bearings have been included
4) Hub assemblies equipped with quick release levers have been included.
5) Rear Hub assemblies equipped with back pedal brake (Coaster brake) system, included
6) New finishes such as powder coated, ED Coated have been included
7) Chemical test for determination of appropriateness of finish included

Traditionally steel have been in use for manufacturing of hubs. Newer materials such as aluminum alloy, carbon fibre reinforced polymer, titanium alloy, magnesium alloy are also being used. In view of little knowledge and experience on these materials, specific requirements of materials have not been included. However, hubs of any materials need to conform to all the test requirements specified in this standard irrespective of material. Material requirement for these materials may be included at a later date.

In the formulation of this standard, assistance has been derived from the following:

JIS D 9419:2021 Bicycle hubs- Published by Japanese Industrial Standard

The composition of the Committee responsible for the formulation of this standard is given at **Annex A (Will be added later)**.

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.

Notwithstanding what is stated in this standard, applicable National, State, Local bodies regulations shall apply. In case of exports corresponding regulations of exporting countries shall apply.

Draft *Indian Standard*
BICYCLES - HUB ASSEMBLY - SPECIFICATION

1 SCOPE

This Standard specifies the requirements for the hubs to be used for all bicycles including bicycles for young children, except electric power assisted bicycles in which a driving power assisting device is integrated with a hub.

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.

IS No.	Title
513 (Part 1):2016	Cold Reduced Carbon Steel Sheet and Strip Part 1 Cold Forming and Drawing Purposes (*sixth revision*)
734:1975	Specification for wrought aluminum and aluminum alloy forging stock and forgings (for generalengineering purposes) (*second revision*)
1068:1993	Electroplated coatings of nickel plus chromium and copper plus nickel plus chromium (*third revision*)
1079:2017	Hot Rolled Carbon Steel Sheet, Plate and Strip – Specification (*sixth revision*)
1572:1986	Specification for electroplated coatings of cadmium on iron and steel (*second revision*)
1573:1986	Specification for electroplated coatings of zinc on iron and steel (*second revision*)
2039 (Parts I to 3) :1991	Steel tubes for bicycle and cycle rickshaws - Specification (second revision)
2062:2011	Hot Rolled Medium and High Tensile Structural Steel (*seventh revision*)
4218 (Part 1): 2001 (Part 3): 1999	ISO General purpose metric screw threads: Basic profile (*second revision*) Basic dimensions (*second revision*)
IS 4454 (Part 1):2001	Steel Wires for Mechanical Springs - Part I: Patented and Cold Drawn Steel Wires - Unalloyed Steel Wire (*third revision*)
10613: 2023	Cycles - Safety and performance requirements for bicycles (third revision)
IS 15184: 2002	Bicycles - Steel Balls - Specification
DOC: TED (23113)	Cycles - Safety requirements for bicycles for young children (Second revision of IS 15533:2018/ISO 8098: 2014)
DOC: TED 16 (23339)	BMX bicycles – Safety requirements and test methods

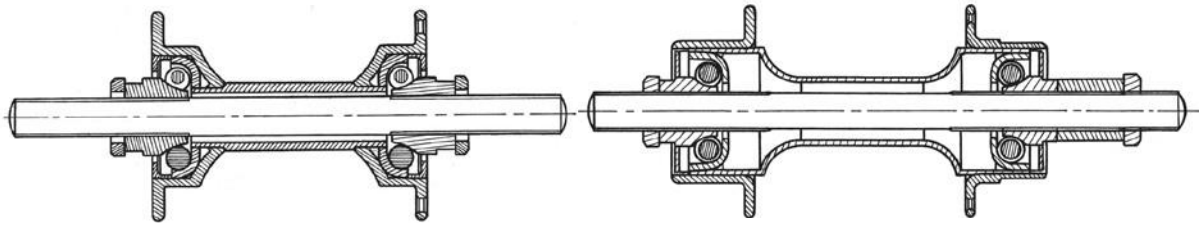
3 TYPES OF HUBS

3.1 The types of hubs are detailed in Table 1 and Fig. 1 to Fig.10.

Table 1 Types of Hubs
(*Clause* 3.1)

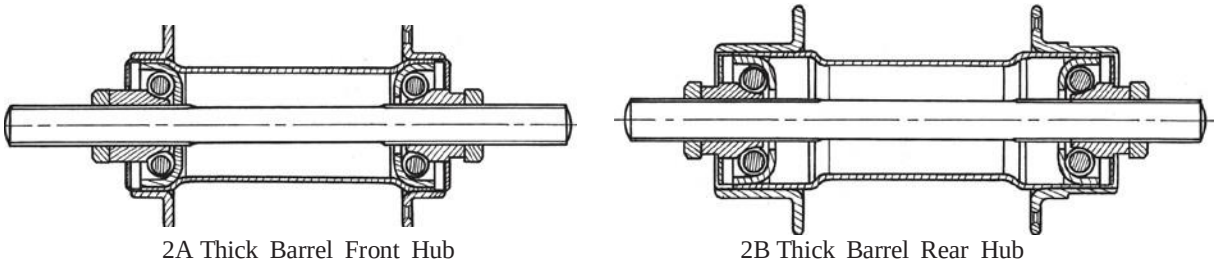
Sl No (1)	Type of Hub (2)	Figure No. (3)	Use (4)
i	Thin barrel hub	1	Front wheel Rear wheel
ii	Thick barrel hub	2	Front wheel Rear wheel
iii	Oval barrel hub	3	Front wheel Rear wheel
iv	Parallax barrel hub	4	Front wheel Rear wheel
v	Bearing hubs	5	Front wheel Rear wheel
vi	Disc mounting hubs	6	Front wheel Rear wheel
vii	Double side threaded hubs	7	Rear wheel
viii	Quick release hubs	8	Front wheel
ix	Quick release hubs	9	Rear wheel (For Cassette Sprocket Mounting)
x	Rear Coaster Hub	10	Rear Wheel

3.1.1 Rear hubs shall be suitable for single speed or multiple speeds as per the configuration of the bicycle.



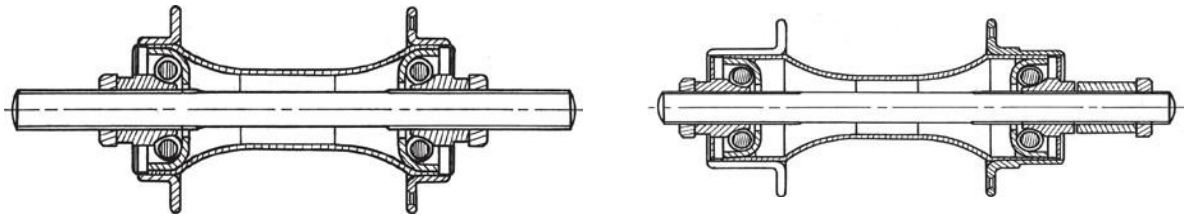
1A Thin Barrel Front Hub 1B Thin Barrel Rear Hub

FIG. 1 THIN BARREL HUBS

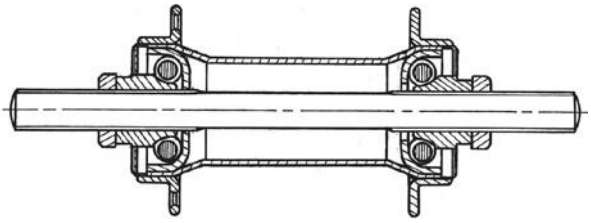


2A Thick Barrel Front Hub 2B Thick Barrel Rear Hub

FIG. 2 THICK BARREL HUBS



3A Oval Barrel Front Hub



3B Oval Barrel Rear Hub

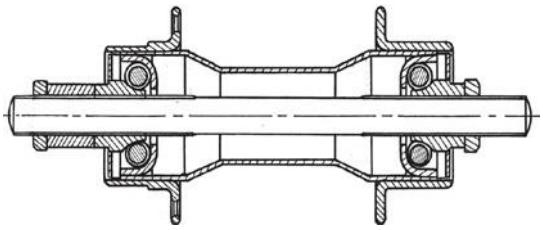
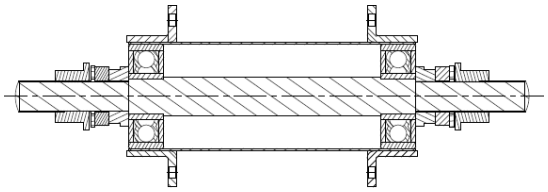


FIG. 3 OVAL BARREL HUBS

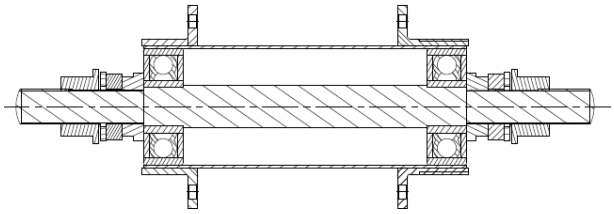
4A Parallax Barrel Front Hub

4B Parallax Barrel Rear Hub

FIG. 4 PARALLAX BARREL HUBS

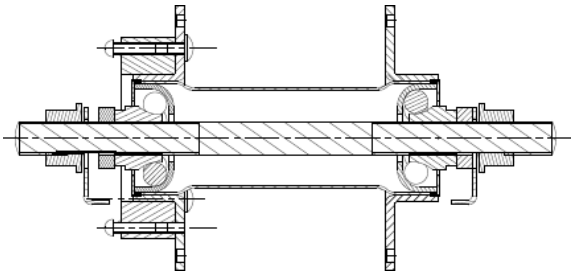


5A Bearing hub - Front

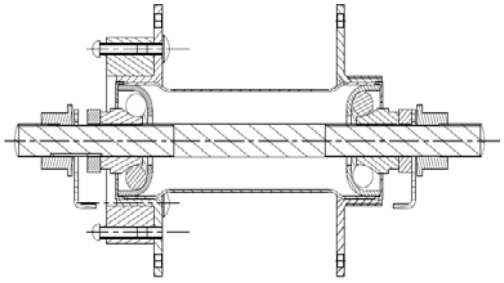


5B Bearing Hub - Rear

FIG. 5 BEARING HUBS



6A Disc hub - Front



6B Disc Hub - Rear

FIG. 6 DISC MOUNTING HUBS

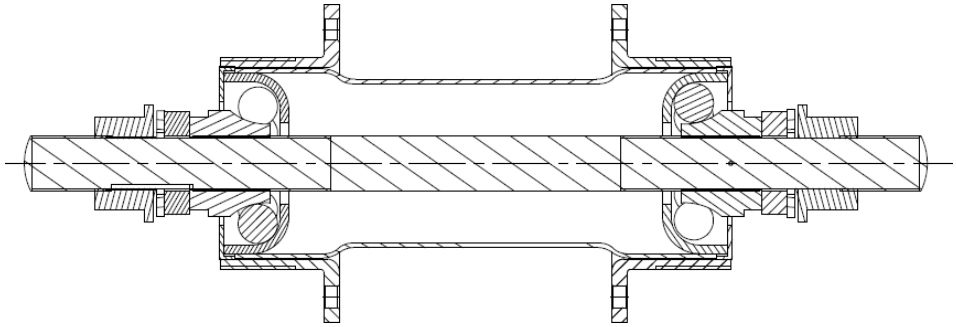


FIG. 7 DOUBLE SIDE THREADED HUBS

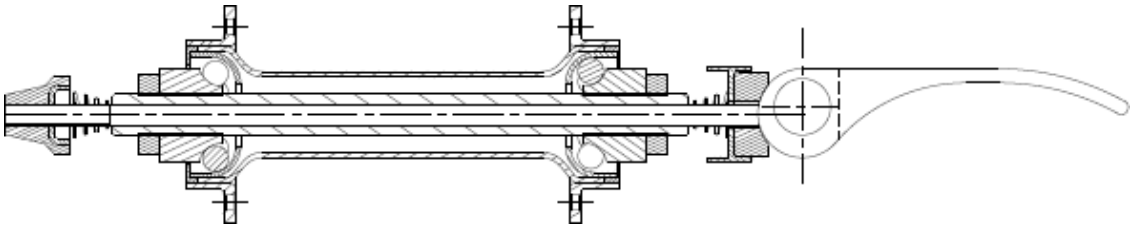


FIG. 8 QUICK RELEASE HUB - FRONT

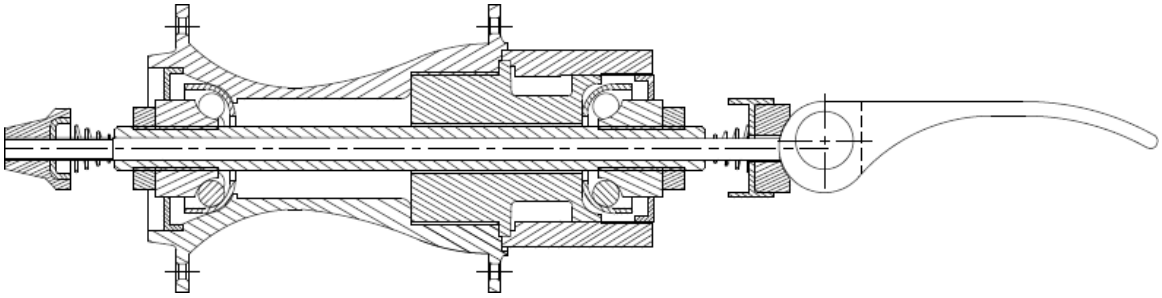


FIG.9 QUICK RELEASE HUB – REAR (FOR CASSETTE SPROCKET MOUNTING)

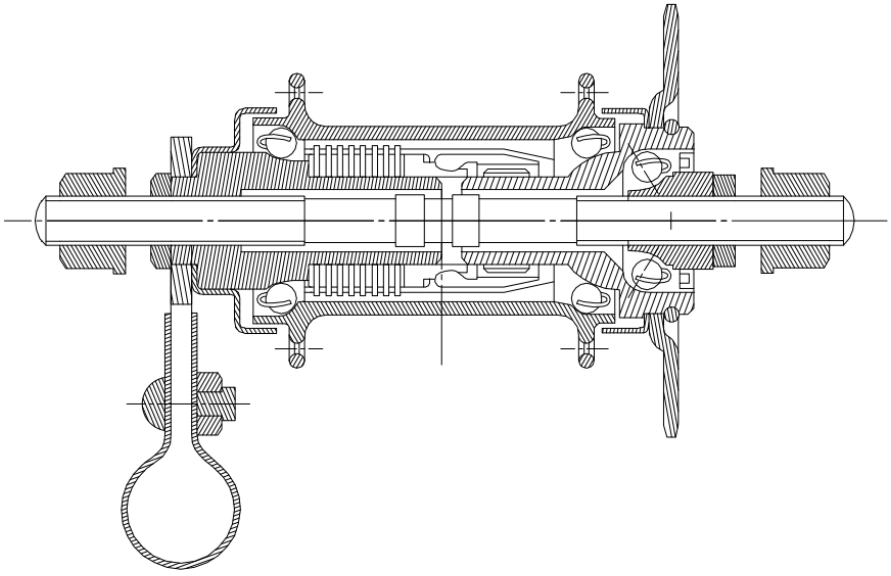


FIG.10 COASTER HUB – REAR

NOTE-- Hub designs illustrations are for visual reference only. Actual construction may differ from the

Visual representation.

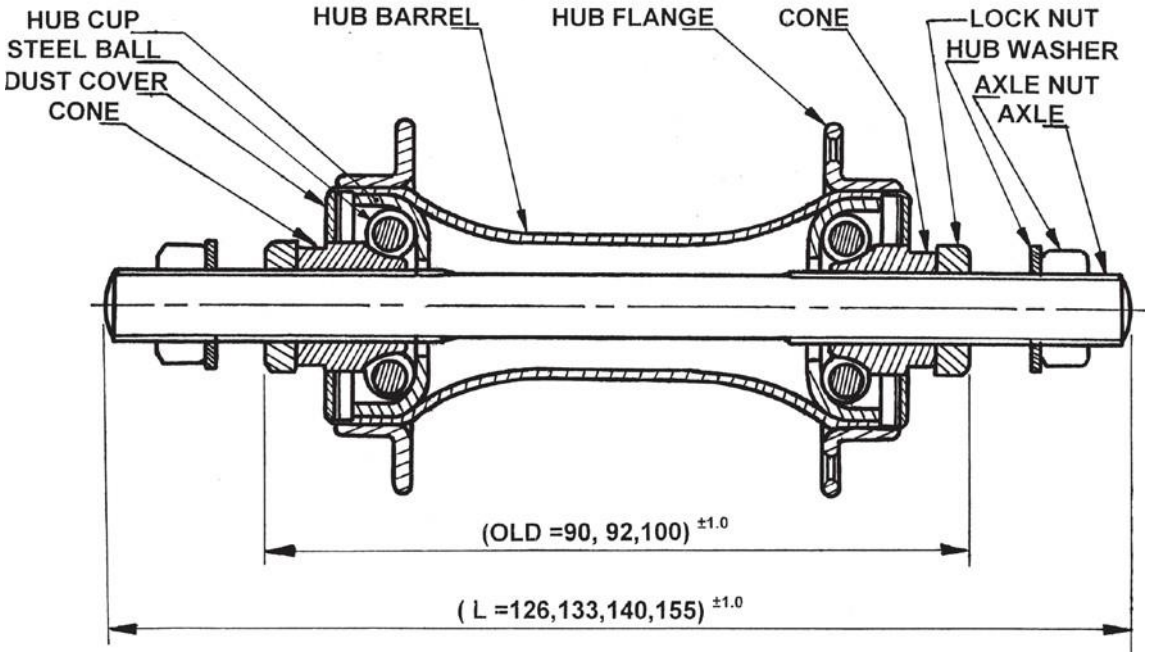
4 DIMENSIONS

4.1 Front Hub Assembly

Details of various components of front hub, axle dimensions and dimensions (OLD) across lock nuts to lock nuts over covers shall be as described in Fig. 11. The dimensions of most popular type of front hub assemblies shall be as per Table 2 and Fig. 11.

The overall lengths of axle mus t be chosen in accordance with the number and type of accessories required to be mounted on the axle. The dimension (OLD) across lock nuts to lock nuts over cones on both ends must be in accordance with the type of bicycle/ its number of speeds

Note- OLD refers to 'Outer lock nut distance'



All dimensions in millimetres OLD refers to 'Outer lock nut distance'

FIG. 11 COMPONENTS OF FRONT HUBS

Table 2 Front Hub Axle Thread Size '*D*'

(*Clause* 4.1)

Sl No.	Type of Hub Axle	Type of Threads	
		Popular BSCY	Alternate Metric as per IS 4218 (Parts 1 and 3)
(1)	(2)	(3)	(4)
i	Thin barrel	5/16 BSCY × 26TPI	M8 × 1P
ii	All other hubs	3/8 BSCY × 26TPI	M10 ×1.25P

NOTES:

1 Thin barrel front hub with 5/16" x 133 long hub axle and 90 mm OLD is popular R-Type hub.

2 Thick barrel front hub with 3/8" x 140 long hub axle and 92 mm OLD is popular PH-Type hub.

3 The dimensions are given for reference only which are subject to change based on the fork design and fitting parts or as per the agreement between manufacturer and buyer.

4 OLD refers to 'Outer lock nut distance'

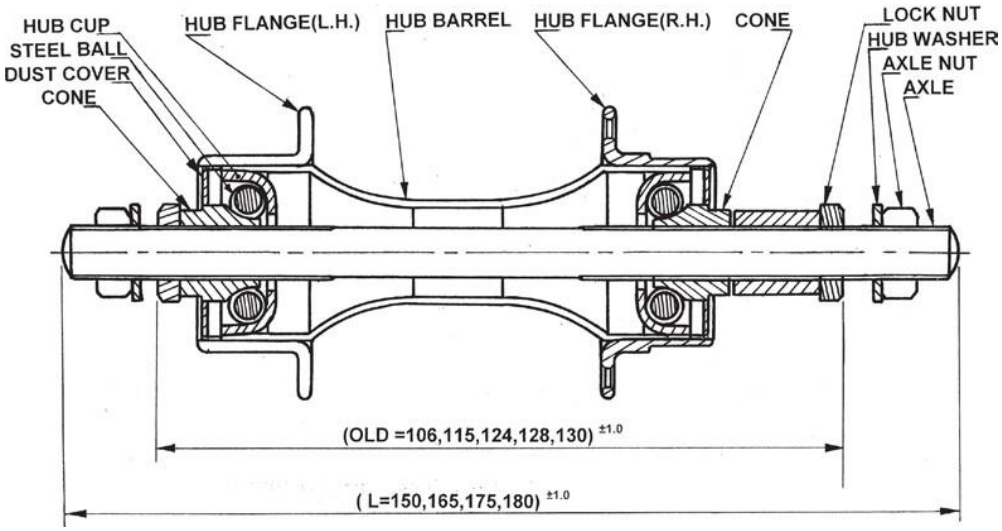
4.2 Rear Hub Assembly

Details of various components of rear hub, axle dimensions and dimensions (OLD) across lock nuts to lock nuts over covers shall be as described in Table 3 and Fig. 12.

Note- OLD refers to 'Outer lock nut distance'

Table 3 Rear Hub Axle Thread Size '*D*'
(*Clause* 4.2)

Popular BSCY	Alternate Metric as per IS 4218 (Parts 1 and 3)
(1)	(2)
3/8BSCY × 26TPI	M10 × 1.25P
NOTES **1.** Thin barrel rear hub 3/8" × 165 long hub axle and 106 mm OLD is popular R-Type hub. **2.** Thick barrel rear hub 3/8" × 165 long hub axle and 106 mm OLD is popular PH-Type hub. **3.** The dimensions are given for reference only. This is subject to change based on the fork design and fitting parts or as per the agreement between manufacturer and buyer. **4.** OLD refers to 'Outer lock nut distance'	

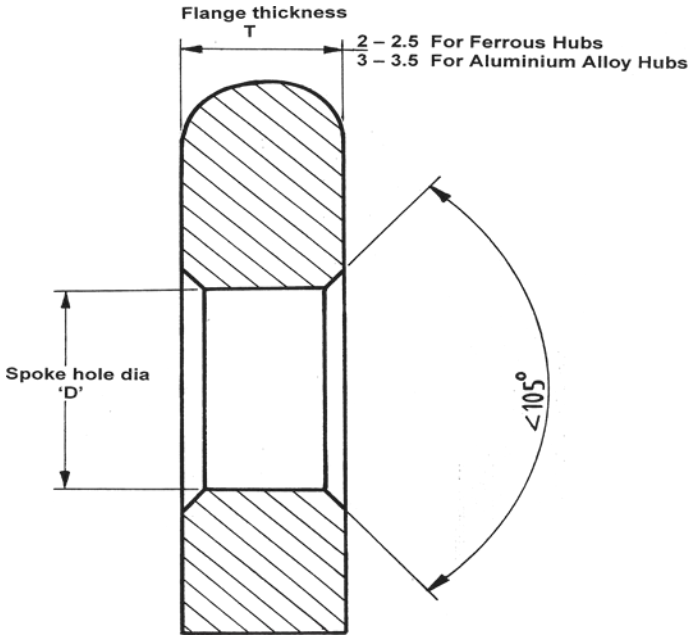


All dimensions in millimetres. OLD refers to 'Outer lock nut distance'

FIG. 12 COMPONENTS OF REAR HUBS

4.3 Spoke Holes

Details of spoke holes shall be as per Table 4 and Fig. 13.



All dimensions in millimeters

FIG. 13 HUB FLANGE DETAILS

Table 4 Spoke Holes

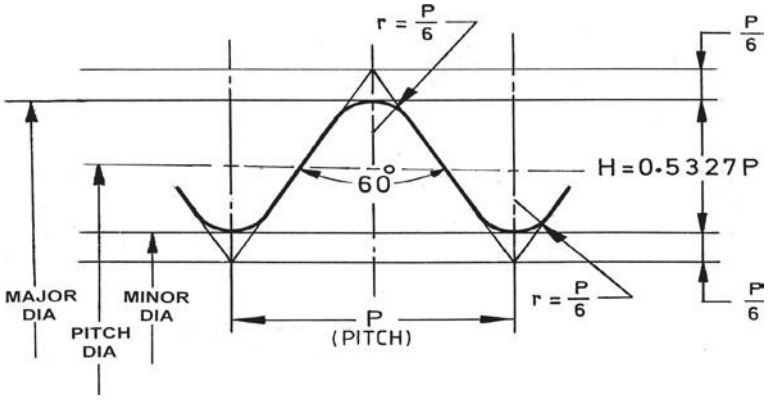
(*Clause* 4.3)

(All dimensions in millimetres).

Sl No.	Type of Hub	No. of Spoke Holes in Each Flange	Spoke Hole Diameter '*D*'	Compatible Spoke Diameter
(1)	(2)	(3)	(4)	(5)
i)	Front hub	8, 10, 14, 16	2.5	2.032
		18, 20 and 24	2.8	2.336
			3.0	2.642
			3.6	3.251
ii)	Rear hub	8, 10,14,16,18, 20, 24 and 32	2.5	2.032
			2.8	2.336
			3.0	2.642
			3.6	3.251

4.4 Screw Threads

The screw thread dimensions shall be as per Table 5 and Fig. 14



All dimensions in millimetres.

FIG. 14 FORM OF THREADS

Table 5 Sizes of Threads

(*Clause* 4.4)

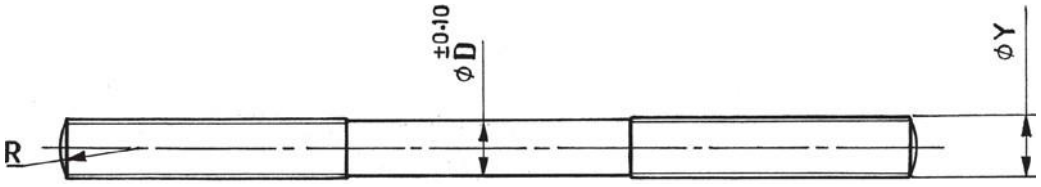
(All dimensions in millimeters)

Sl No.	Size	Pitch *P*	Popular BSCY											Alternate Metric	
			External Threads						Internal Threads						
			Major Diameter		Pitch Diameter		Minor Diameter		Major Diameter	Pitch Diameter		Minor Diameter		Thread Size	Ref to IS Standard
			Max	*Min*	*Max*	*Min*	*Max*	*Min*	*Min*	*Max*	*Min*	*Max*	*Min*		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
i)	7.94 × 0.98	0.977	7.938	7.798	7.417	7.325	6.896	6.706	7.938	7.508	7.417	7.192	6.896	M8 × 1P	IS

ii)	9.52 × 0.98	0.977	9.525	9.380	9.004	8.908	8.484	8.288	9.525	9.101	9.004	8.781	8.484	M10 × 1.25P	4218 (Part 3)
iii)	34.80 × 1.06	1.058	34.798	34.620	34.234	34.107	33.670	33.442	—	—	—	—	—	M35 × 1P	IS 4218 (Part 1)

4.5 Hub Axle

The dimensions of Hub axle shall conform to Table 6 and Fig. 15. Axle sizes specified in the table 6 are most common sizes used across bicycles categories.



All dimensions in millimetres.

Note-Radius 'R' can be maintained based on the axle size or manufacturing process to avoid sharp edges

FIG. 15 HUB AXLE DIMENSIONS

Table 6 Sizes of Hub Axle Threads
(*Clause* 4.5)

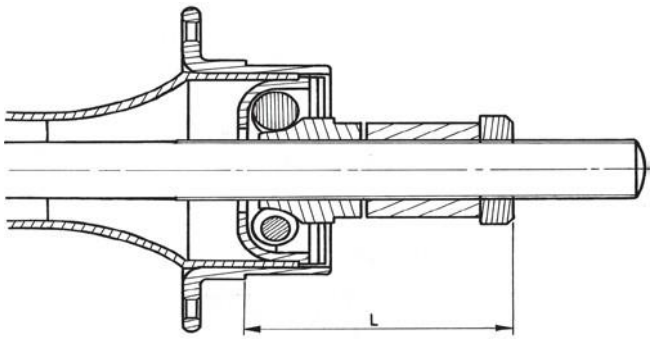
All dimensions in millimetres.

Sl No. (1)	**Ø 'D'** (2)	**Popular BSCY**			**Alternate Metric as per IS 4218 (Part 3)**
		Thread Size 'Y' (3)	Major Diameter (4)	Minor Diameter (5)	Thread Size 'Y' (6)
i)	7.25	5/16 BS CY × 26 TPI	7.863/7.758	6.798/6.693	M 8 × 1P
ii)	8.8	3/8 BS CY × 26 TPI	9.450/9.345	8.460/8.280	M 10 × 1.25P

Note -- Axle size specified in the table are most common sizes used across bicycles categories. Bicycles can be equipped with different sizes of axles based on the application or as per the agreement between manufacturer and purchaser

4.6 Freewheel

The dimension between freewheel stopping face and right-hand side lock nut over cone for multi speed rear hub assemblies shall be as per Fig. 16. This is not applicable for the rear hubs with Cassette free wheel mounting option.



No. of Speeds	*'L'* mm
7/8/9	38-39
6	36-37
5	33.5-37

FIG. 16 FREEWHEEL LOCATION DIMENSION

5 MATERIALS

5.1 The suggested materials forvarious components mayconform to the following Indian Standards:

Component	***Conforming to***
Hub flange	IS 513 (Part 1), IS 1079 or any other suitable material
Hub barrel	IS 2039 or any other suitable material
Hub axle	IS 2062 or any other suitable material
Integral hub, barrel and flange	IS 734 Aluminum alloy of Designation 65032 (Condition WP)
Ball race (Hub cup)	IS 513(Part1), IS 1079, IS 2062 or any other suitable material
Hub cones, lock nuts for cones Axle nuts	IS 2062 or any other suitable material
Steel balls	IS 15184, Steel Balls for Bicycles -
Spring	IS 4454 (Part 1) Patented and Cold Drawn Steel Wires for Mechanical Springs

5.1.1 Besides the above, hub parts can be made of any suitable materials including that of aluminum alloy, carbon fibre reinforced polymer, titanium alloy, magnesium alloy etc.

5.2 Hub Cups and Cones shall be case hardened. Hardness and case depth shall confirm to the values given in table 7. Harness can be measured in different scales but the conversion values shall match the values given in table 7.

Table 7 Case Hardness Values-Hub Parts

(*Clause* 5.2)

Sl.No	**Part Name**	**Rockwell**	**Case Depth**

		hardness HRA	(mm)
(1)	(2)	(3)	(4)
1	Hub Cup	86-90	0.2-0.5
2	Cone	86-90	0.2-0.5

6 MANUFACTURE

6.1 The spoke holes on the right and left flanges shall be located as alternatively deviated each half thepitch (*see* Fig. 17). The spoke holes shall be alternatively chamfered on both sides of each flange for easy fitting of spoke. Spoke holes in hubs made from non-ferrous materials need not be chamfered.

6.2 The hub assemblies shall be properly lubricated. The manufacture of hubs shall be such as to prevent access of foreign matter inside the hubs.

6.3 For the hubs of which any parts are integrated by joining or press fit, each connection shall withstand a torque of not less than 100 kg-cm (10 Nm) for front hubs and 350 kg-cm (35 Nm) for rear hubs. This condition does not apply to hub cups fitted in hub flanges.

6.4 Threads on the flange of Rear Hubs shall have suitable under-cut to provide tool relief during threading operation.

6.5 Hub assemblies may be equipped with sealed bearings.

6.6 Hub assemblies may be equipped with quick release levers.

6.7 Rear Hub assemblies may be equipped with back pedal brake (Coaster brake) system.

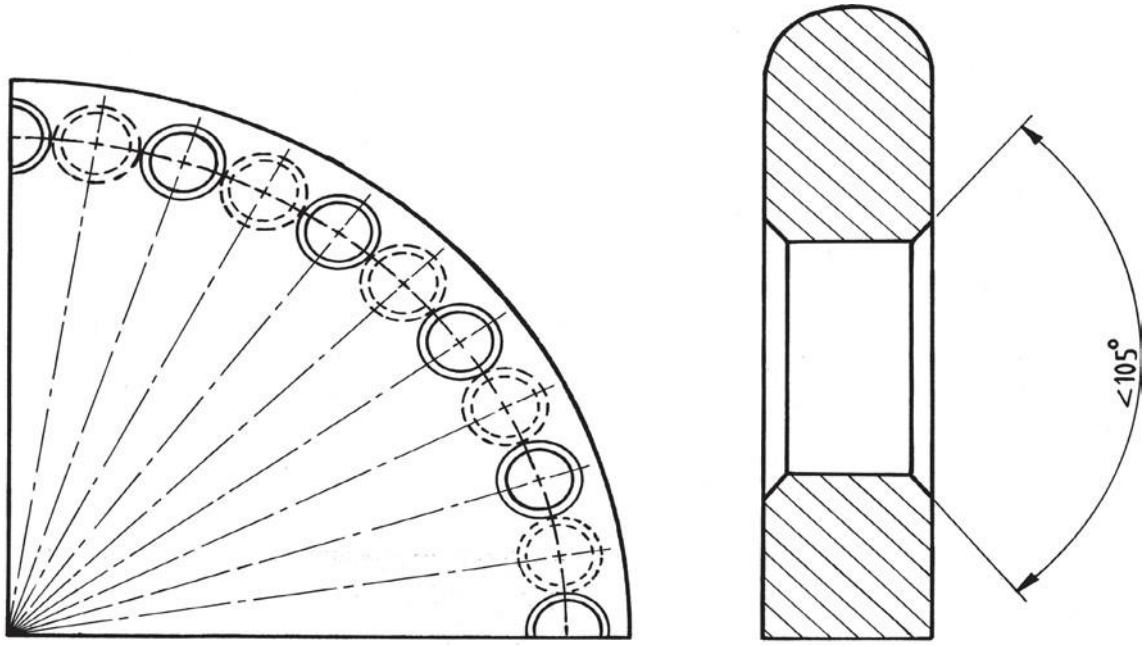


FIG. 17 HUB FLANGE SIDE VIEW

7 FINISH

7.1 Finish Requirements

7.1.1 The hub axle shall have a smooth finish and shall be auto blackened or zinc plated.

7.1.2 The inside of ball races (hub cup) shall be finished smooth to ensure free running of balls.

7.1.3 The hub cones shall be smooth self-finished or chemically coloured or zinc plated.

7.1.4 The lock nuts for cones shall be auto blackened or chemically coloured or zinc plated.

7.1.5 The hub axle nut shall be nickel-chrome plated or zinc plated or shall be chemically coloured.

7.1.6 The hub body comprising of hub barrel, hub flanges and hub cups shall be nickel and chromium plated. The minimum thickness of coating shall be 10 µm in case of nickel and 0.3 µm in case of chromium. Alternately these components may be powder coated or ED Coated or treated with any other suitable finish basis as per the agreement between manufacturer and Purchaser.

NOTE — In view of the shape of the component a non-uniform thickness of plating can be expected. In order to ensure that the thickness of plating at any place is not less than specified, higher plating thickness should have to be aimed at.

7.1.7 Hub body and parts may also have different coatings based on the application or agreement between manufacturer and Purchaser.

7.2 Chemical Test of Finish

Painted, powder coated or plated mudguards shall be tested according to one of the applicable tests as described in Table 8. After the test, in case of painted surface, the paint shall not soften, peel off or show any change in colour. In case of powder coating or plating, it shall not have any adhesion loss, blisters or flaking on an area more than 3 mm on either side from Cross-cut.

Table 8 Chemical Tests
(*Clause* 7.2)

Test/Test conditions/Suitability	**Dip Coating Test**	**Salt Spray Test**	
		Neutral Salt Spray (NSS)	**Copper-accelerate d Acetic acid Salt Spray (CASS)**
(1)	(2)	(3)	(4)
Temperature	Black enamel paint 80°C other enamel paints 60°C	35 °C ± 2 °C	50 °C ± 2 °C
Concentration of Salt Solution	5% NaCl	5% NaCl	5% NaCl
pH (Solution)	6.5 to 7.2	6.5 to 7.2	3.1 to 3.3
Test duration	1 h	96* h	168* h
Recovery period	Nil	1 h	1 h
Air Pressure	Atmospheric Pressure	70 to 170 kPa	70 to 170 kPa
Suitability **	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.

* Subject to agreement between customer and manufacturer, duration of salt spray test both for NSS and CASS can be 96, 168, 240, 480, 720 or 1000 h. Wherever there is no such agreement the duration of test indicated in the Table 8, shall apply.

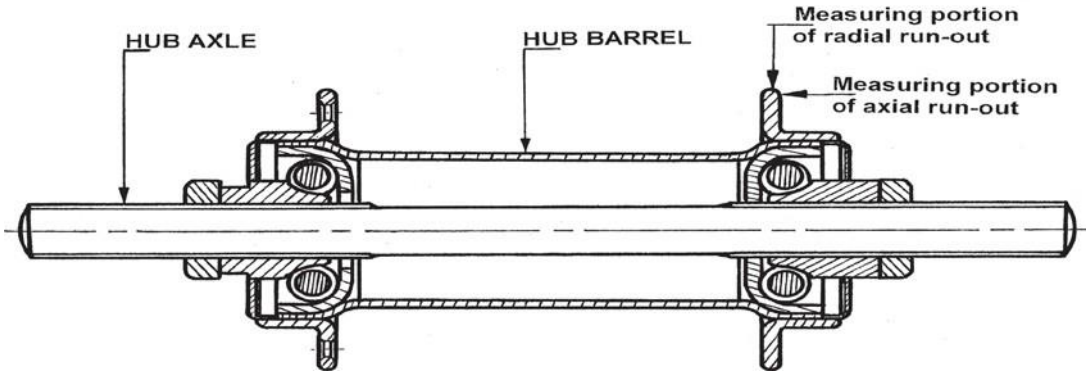
** In-case of suitability of more than one test, only one test as per manufacturer and supplier agreement shall be done.

8 PERFORMANCE

8.1 The rotation of hubs shall be smooth, and there shall be no visible plays between the hub axle and the hub body.

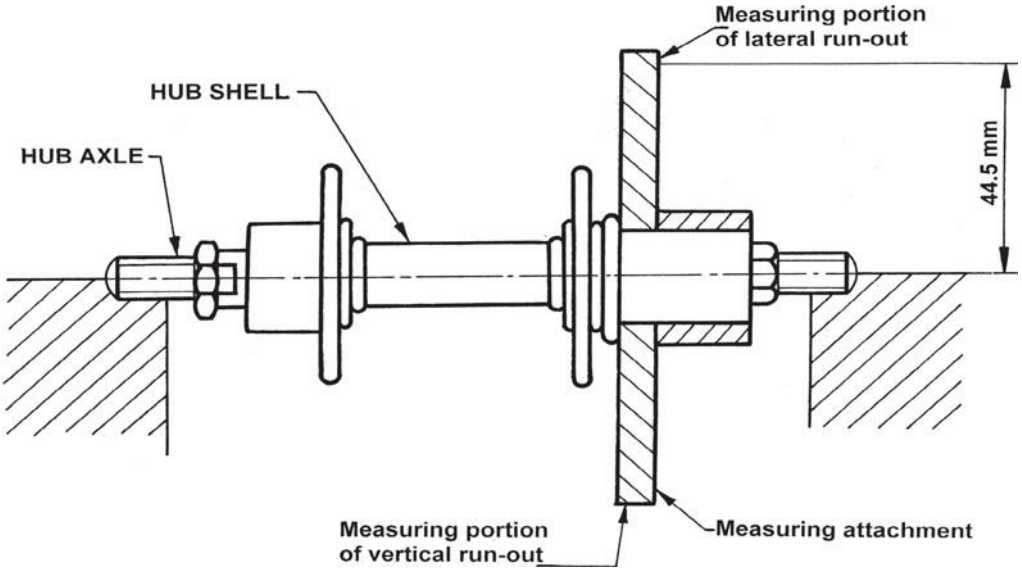
8.2 For front hubs, the radial run-out at the flange periphery and axial run-out at a position between the flange periphery and the spoke hole, measured while fixing the hub axle and the hub shell is rotated as shown in Fig. 18 shall not exceed 0.4 mm and 0.5 mm, maximu m respectively at the measuring portions.

8.3 For rear hubs, the radial run-out at the flange periphery and axial run-out at a position between the flange periphery and the spoke hole, measured while fixing the hub axle and the hub shell is rotated as shown in Fig. 19, shall not exceed 0.4 mm and 0.5 mm respectively at the measuring portions, respectively. For a coaster brake hub, measurement shall be carried out by rotating the measuring attachment in the driving direction while fixing the hub axle.



All dimensions in millimetres.

FIG. 18 AXIAL AND RADIAL RUN-OUT MEASUREMENT OF FRONT HUBS



All dimensions in millimetres.

FIG. 19 AXIAL AND RADIAL RUN-OUT MEASUREMENT OF REAR HUBS

8.4 Coaxial difference betweentheoutercircumference axis and the thread hole axis of hub cone, measured as shown in Fig. 20, shall not exceed 0.3 mm

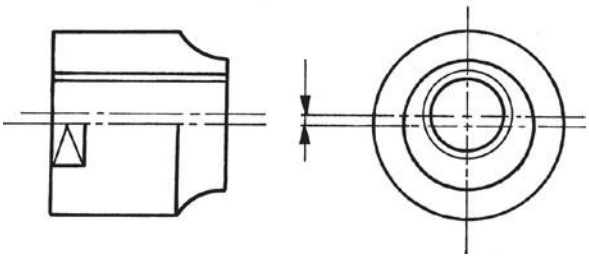


FIG. 20 COAXIAL DIFFERENCE BETWEEN THE OUTER CIRCUMFERENCE AXIS AND THE THREAD HOLE AXIS OF HUB CONE

8.5 For rear hubs, when the rear axle is fixed, and the hub body, loaded with a mass of 120 kg is rotated for 40 000 revolutions at a rate of 250 cycles/min, there shall be no flaking, visible wearing, or other harmful defects on the ball races or other parts contacting surfaces.

8.6 If hubs are equipped with quick release device or back pedal brake system, testing shall be carried out as per Table 9, based on the bicycle category.

Table 9 Hub System Testing
(*Clause* 8.6)

Sl.No	Bicycle Category	Device/System	Test Standard	Test Clause
(1)	(2)	(3)	(4)	(5)
1	Young Children	Quick Release	DOC: TED 16(23113)	Not Applicable
		Back Pedal		4.7.7.3
2	City &Trekking/Roadster/SLR Bicycles, Young Adult Bicycles, Mountain Bicycles and Racing Bicycles	Quick Release	IS 10613	4.8.4.5
		Back Pedal	IS 10613	4.7.7.3
3	BMX Bicycles	Quick Release	----	Not Applicable
		Back Pedal	----	Not Applicable

9 MARKING

9.1 Each hub assembly shall be marked visibly, legibly and indelibly with the following minimum particulars:

1) Manufacturers name, initials or trade-mark;
2) Batch/Lot number
3) Date of manufacture;
4) Name of the country of origin.
5) Type of hub;
6) Use, Front wheel/Rear wheel hub;
7) Number of spoke holes;
8) Spoke hole diameter.

9.2 The markings listed at Sl No. 1 to 3 shall be visibly and permanently marked by punching of sufficient depth for easy reading, by printing or by affixing labels as may be considered appropriate; on the hub assembly. All the above marking including those on hub assembly shall be suitably indicated on the packing.

9.3 BIS Certification Marking

Each hub assembly may also be marked with the Standard Mark.

9.3.1 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.

ANNEX A
(*Foreword*)

COMMITTEE COMPOSITION

BICYCLES SECTIONAL COMMITTEE, TED 16

Will be added later