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BUREAU OF INDIAN STANDARDS

भारतीय मानक ***मसौदा***

साइकिल ब्रेक विशिष्टता

Draft Indian Standard

BICYCLES – BRAKES – SPECIFICATION

ICS 43.150

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

FOREWORD

(*Adoption clause will be added later*)

While preparing this standard, assistance has been drawn from JIS D 9414:2021 Bicycle-Brakes' brought out by Japanese Standards Association.

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 – BRAKES – SPECIFICATION

1 SCOPE

This standard specifies requirements for brakes, brake levers and operating-force transmission for nearly all types of bicycles such as Young children's bicycles, Young adult bicycles, City and Trekking/Roadster/SLR bicycles, Mountain bicycles, Racing bicycles, BMX bicycles and Electrically power assisted bicycles.

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
1367 (Part 3):2017/ ISO 898-1:2013	Technical Supply Conditions for Threaded Steel Fasteners: Part 3 Mechanical Properties of Fasteners made of Carbon Steel and Bolts, Screws and Studs (fifth revision)
1367 (Part 6):2018/ ISO 898-2:2012	Technical Supply Conditions for Threaded Steel Fasteners: Part 6 Mechanical Properties of Fasteners made of Carbon Steel and alloy steel – Nuts with specified property classes - Coarse thread and fine pitch thread (Fourth Revision)
10613: 2023	Cycles - Safety and performance requirements for bicycles (Third revision)
DOC: TED16 (XXXX1)	Bicycle - Handle bars – Specification (Fourth revision of IS 625)
DOC: TED16 (XXXX2)	Bicycle - Hub assembly – Specification (Fourth revision of IS 629)
DOC: TED16 (18837)	BMX bicycles - Safety requirements and test methods
DOC: TED 16 (23113)	Cycles - Safety requirements for bicycles for young children (Second revision)
DOC: TED 16 (23339)	Cycles — Electrically power-assisted cycles (EPAC) Part 1 Pedal-assisted bicycles

3 TERMS AND DEFINITIONS

For the purposes of this standard, the definitions given in IS 10613 and DOC: TED (18837), DOC: TED 16 (23113) and DOC: TED 16 (23339) shall apply.

4 CLASSIFICATIONS

4.1 BRAKE

Various types of bicycles brakes based on braking mechanism are given in Table 1. Any type of brakes can be used for any type of bicycles.

Table 1 Type of Brakes
(Clause 4.1)

Sl No.	Type of brake (1)	Braking mechanism (2)	Figure (Illustrative) (3)
i	Rim brake	Brake on rim	Fig. 1 & 2
ii	Calliper brake (side-pull, center-pull, cantilever, cantilever V type)		Fig. 3, 4, 5, 6 & 7
iii	Band brake	Brake on hub[1)]	Fig. 8
iv	Internal expanding brake		Fig. 9
v	Roller brake		Fig. 10 & 11
vi	Disk brake		Fig. 12
Note [1)] Coaster brake hubs are covered in IS DOC: TED16 (XXXXX2)			

4.2 BRAKE LEVER

Brake levers shall be classified into touring brake lever, drop handlebar brake lever (including extension brake lever), guidonnet brake lever and inverted brake lever (see Fig 13 to 16).

4.3 OPERATING FORCE TRANSMISSIONS

Operating-force transmissions shall be classified into rod system, cable system and hydraulic system, depending on the construction. Brake cable illustration is shown in Fig. 17.

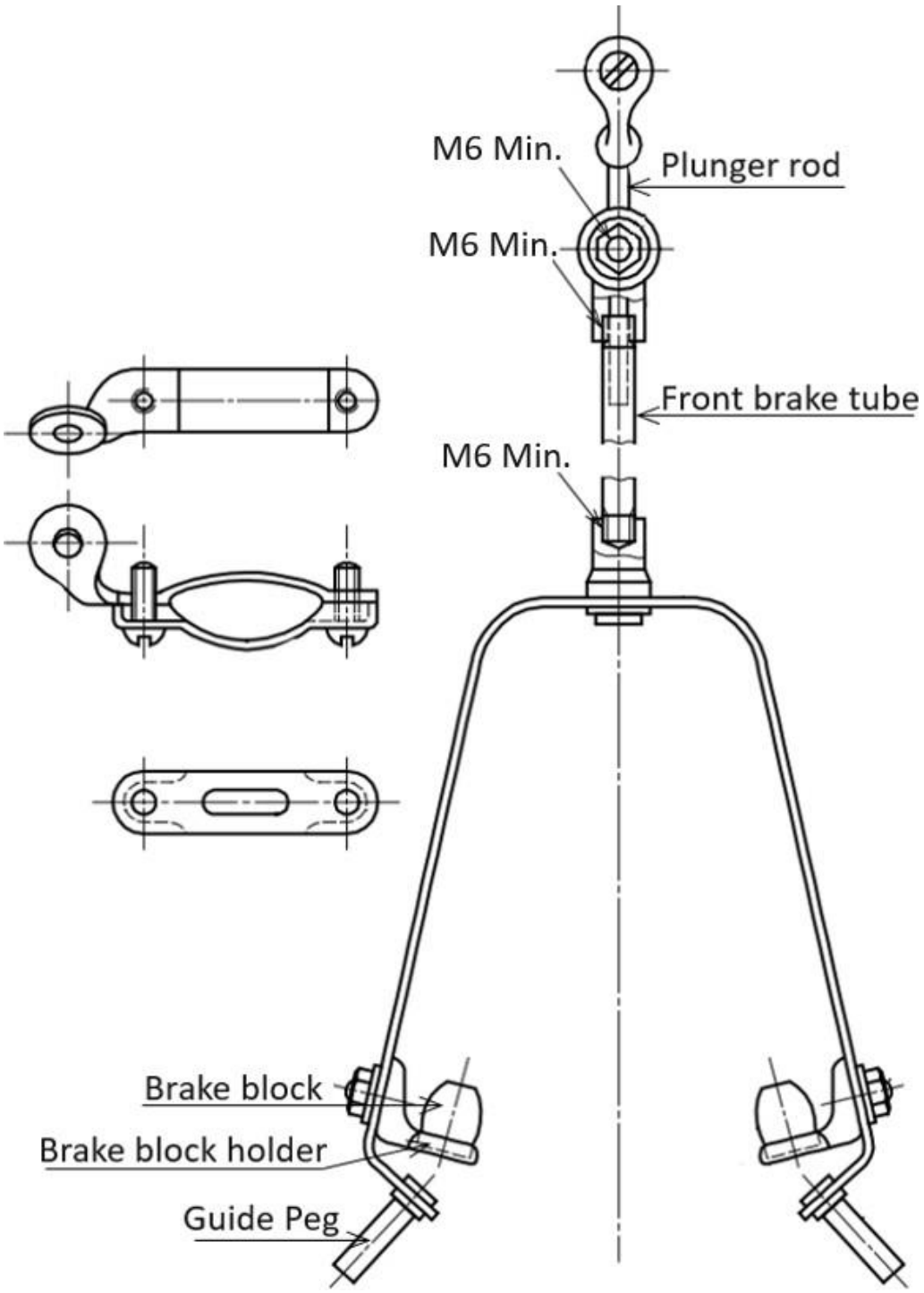


FIG. 1 FRONT RIM BRAKE

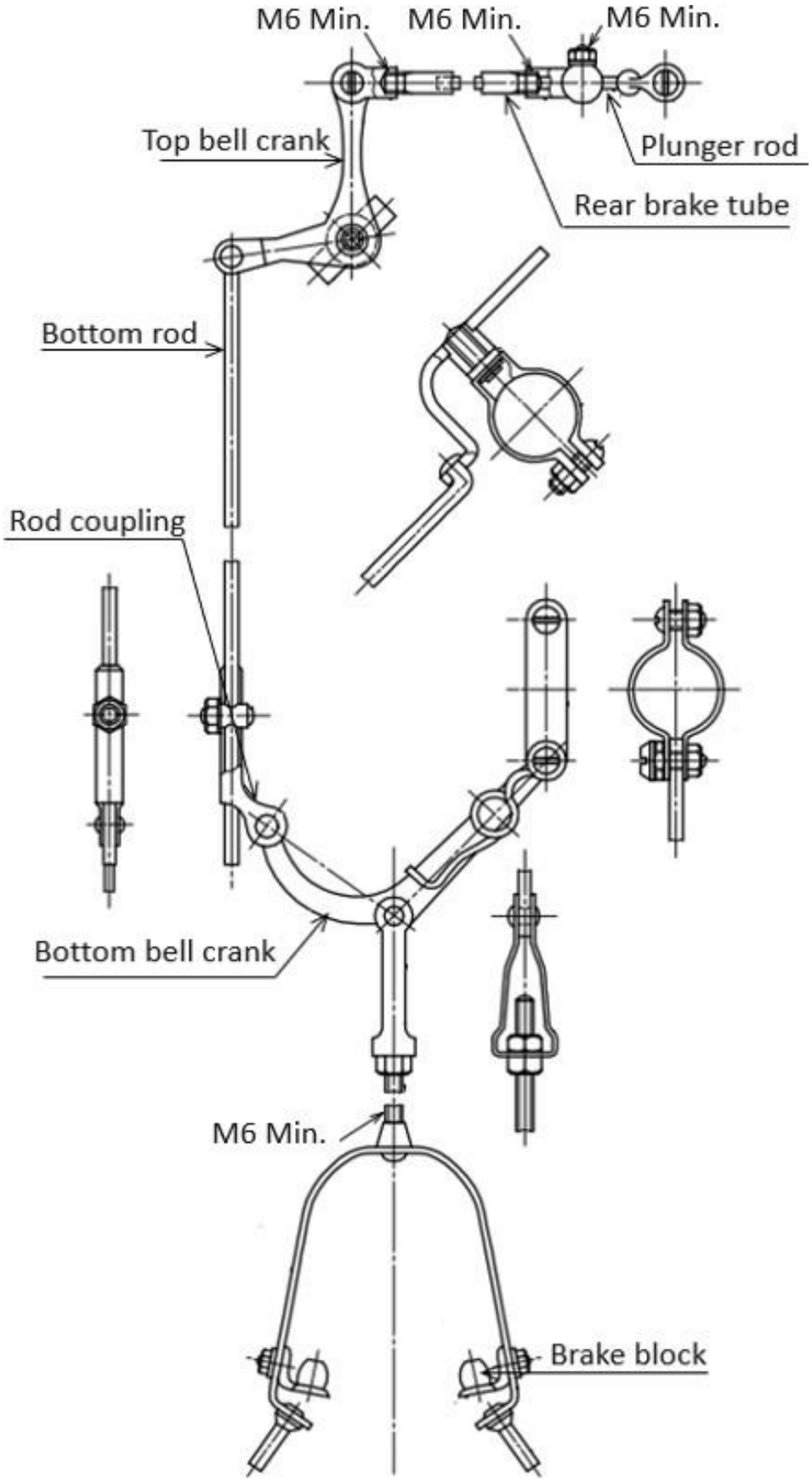


FIG. 2 REAR RIM BRAKE

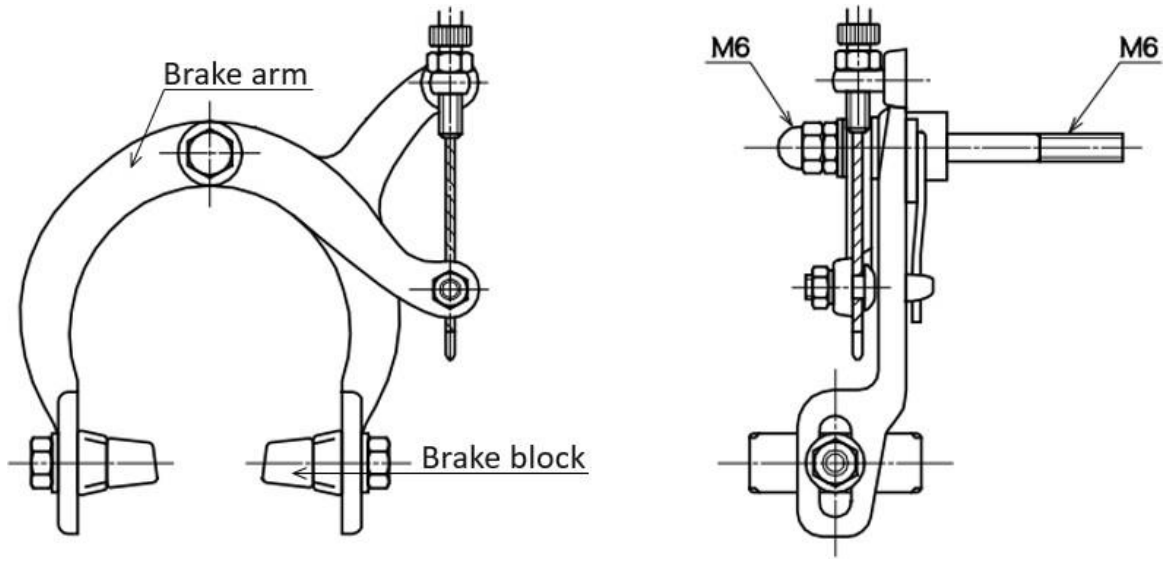


FIG. 3 SIDE-PULL CALLIPER

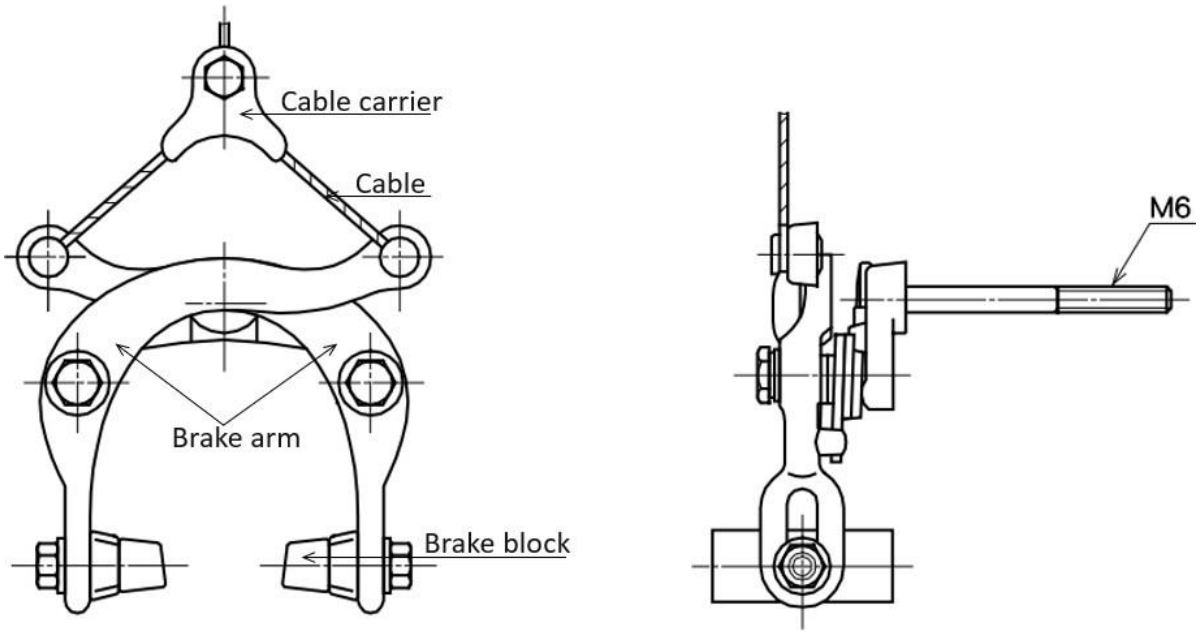


FIG. 3 CENTRE-PULL CALLIPER

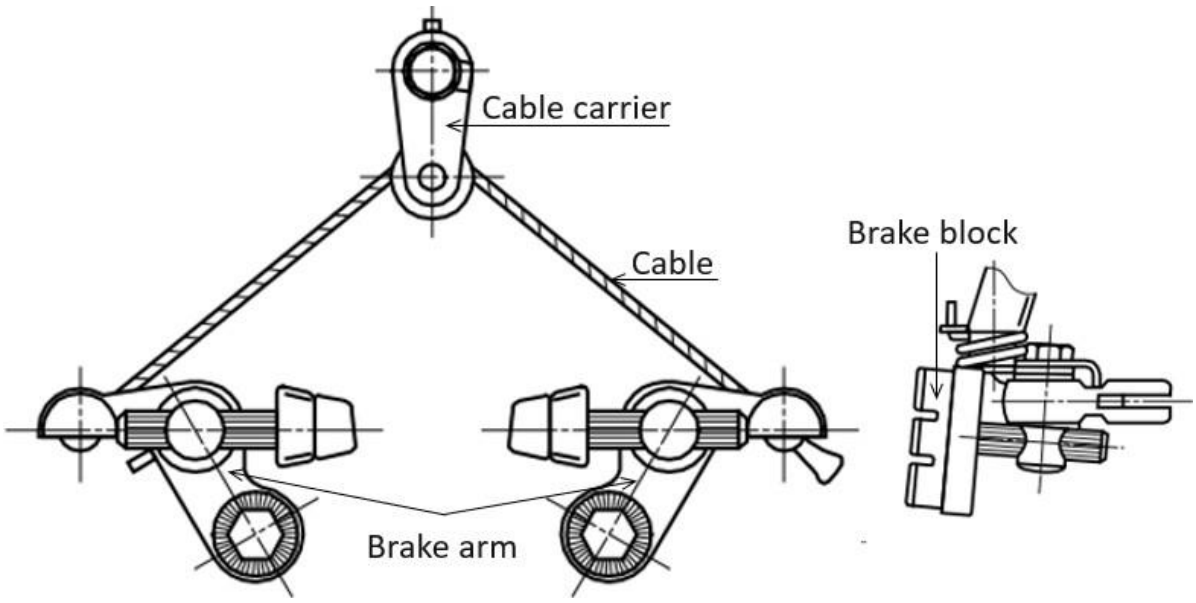


FIG. 4 CANTILEVER CALLIPER BRAKE

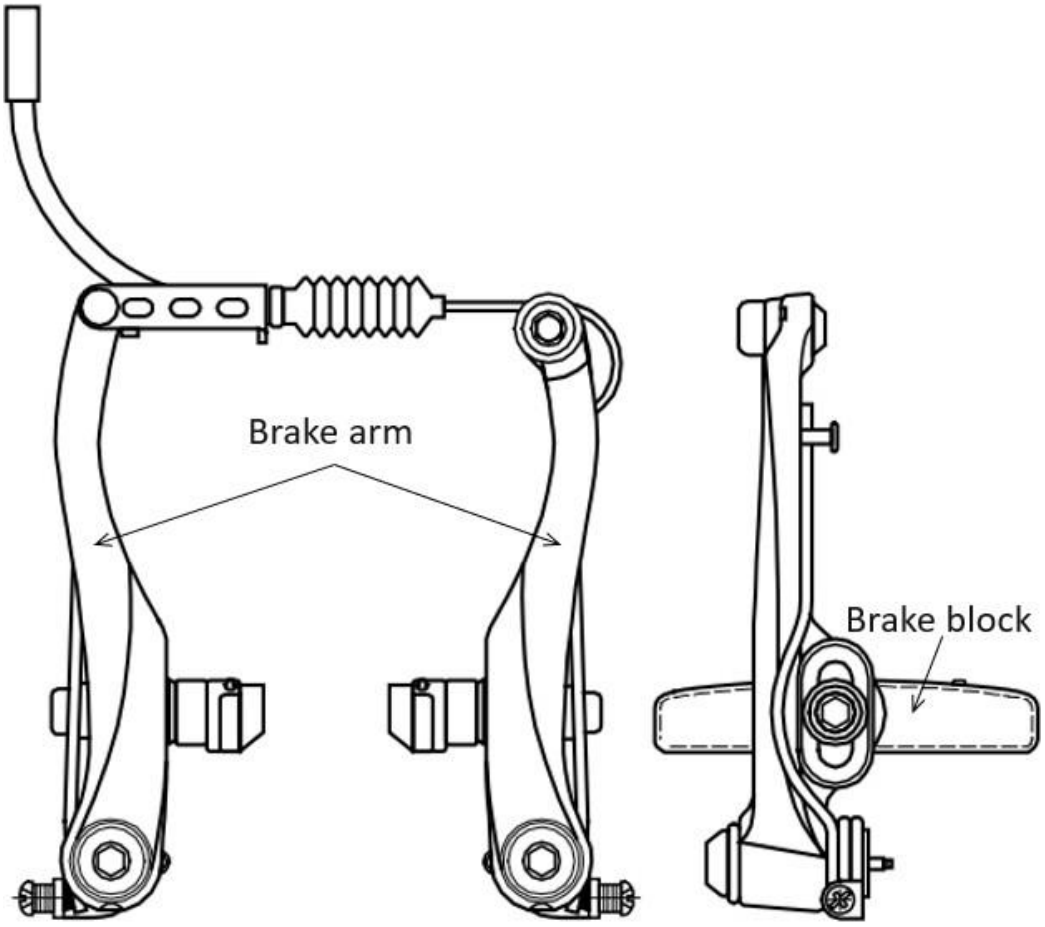


FIG. 5 CANTILEVER V TYPE CALLIPER

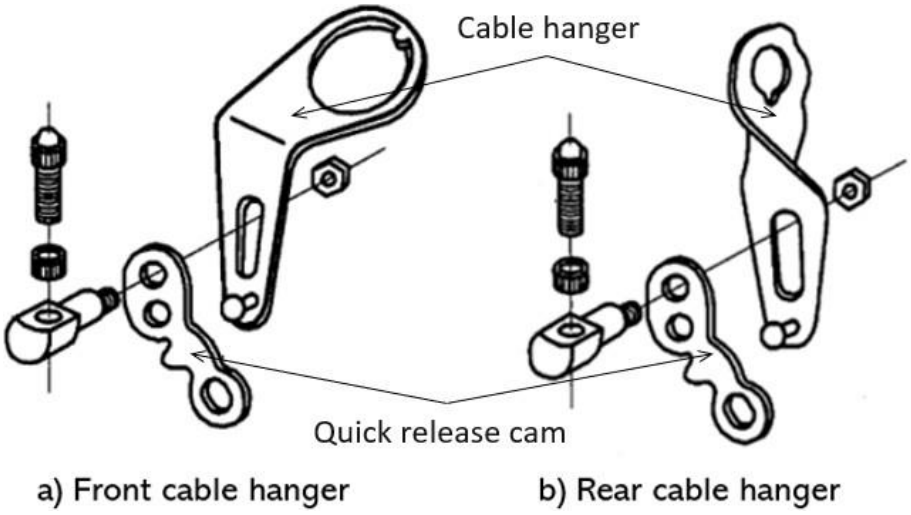
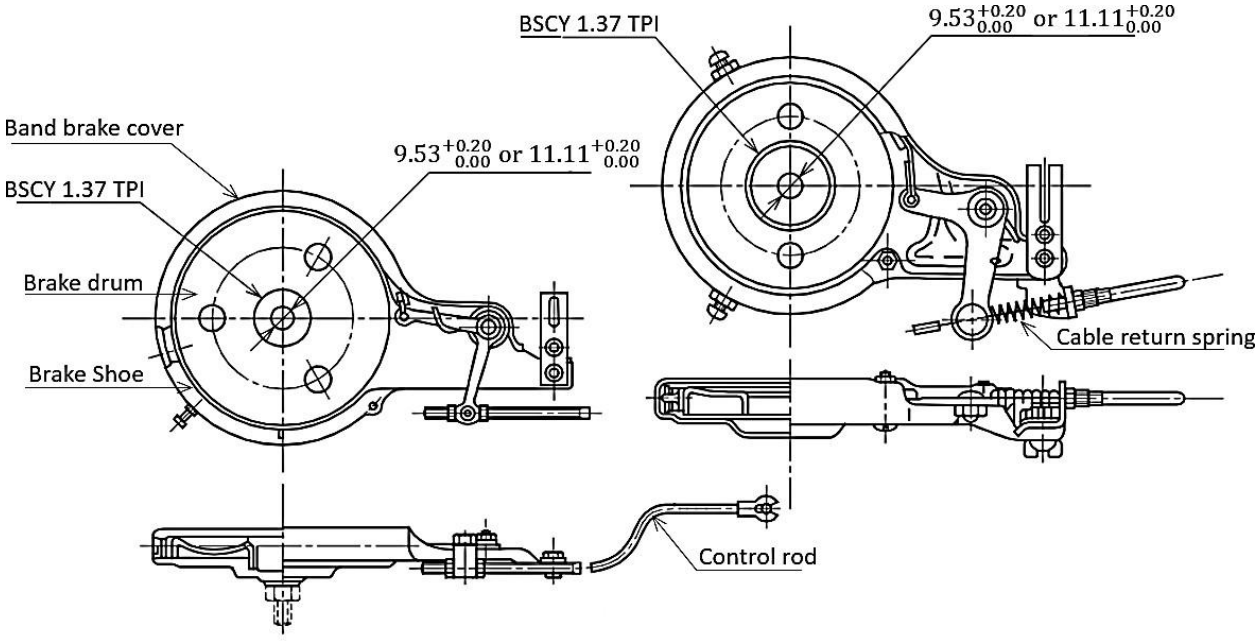


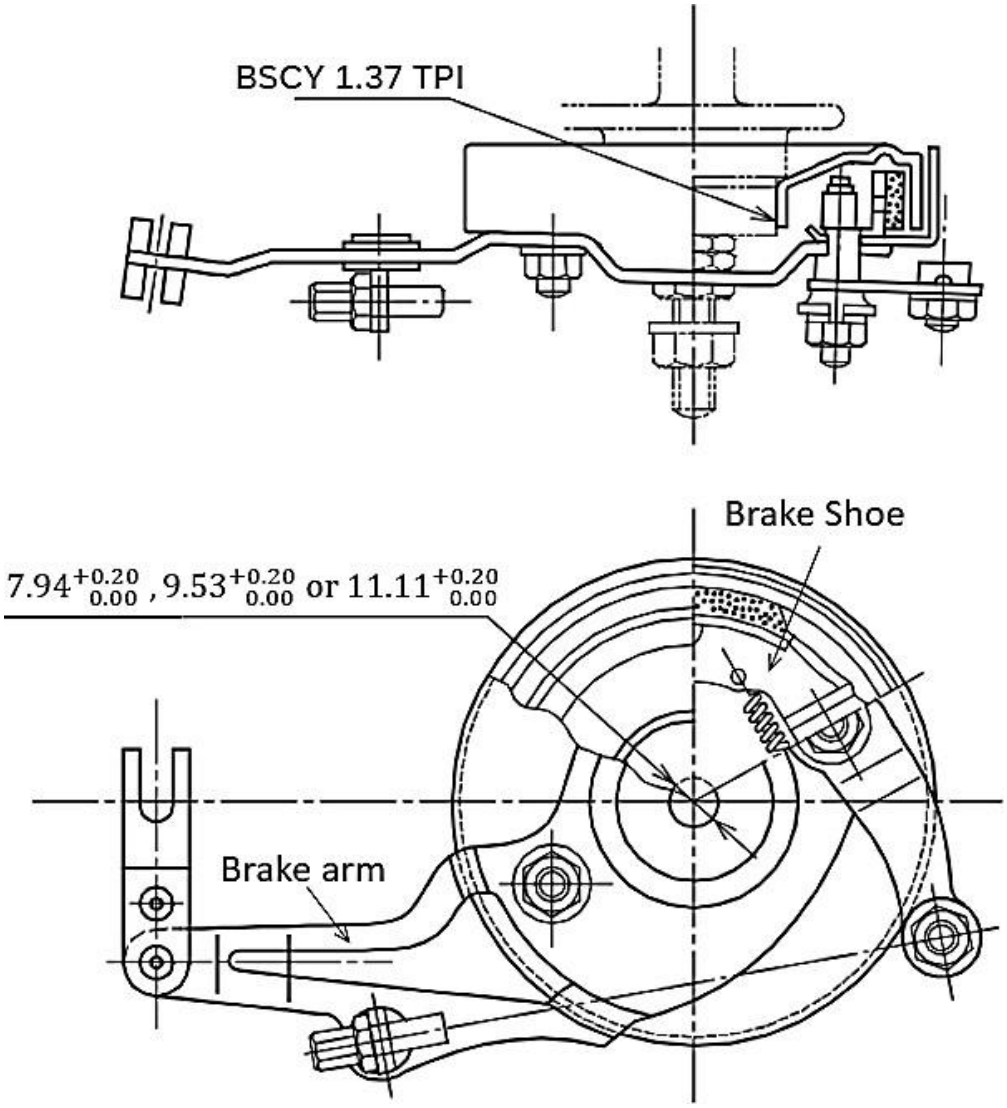
FIG. 6 CABLE HANGER FOR CALLIPER BRAKE



Note - BSCY 1.37 TPI indicates bicycle threads with 1.37 threads per inches

All dimensions in millimetres

FIG. 7 BAND BRAKE



Note - BSCY 1.37 TPI indicates bicycle threads with 1.37 threads per inches

All dimensions in millimetres

FIG. 8 INTERNAL EXPANDING BRAKE

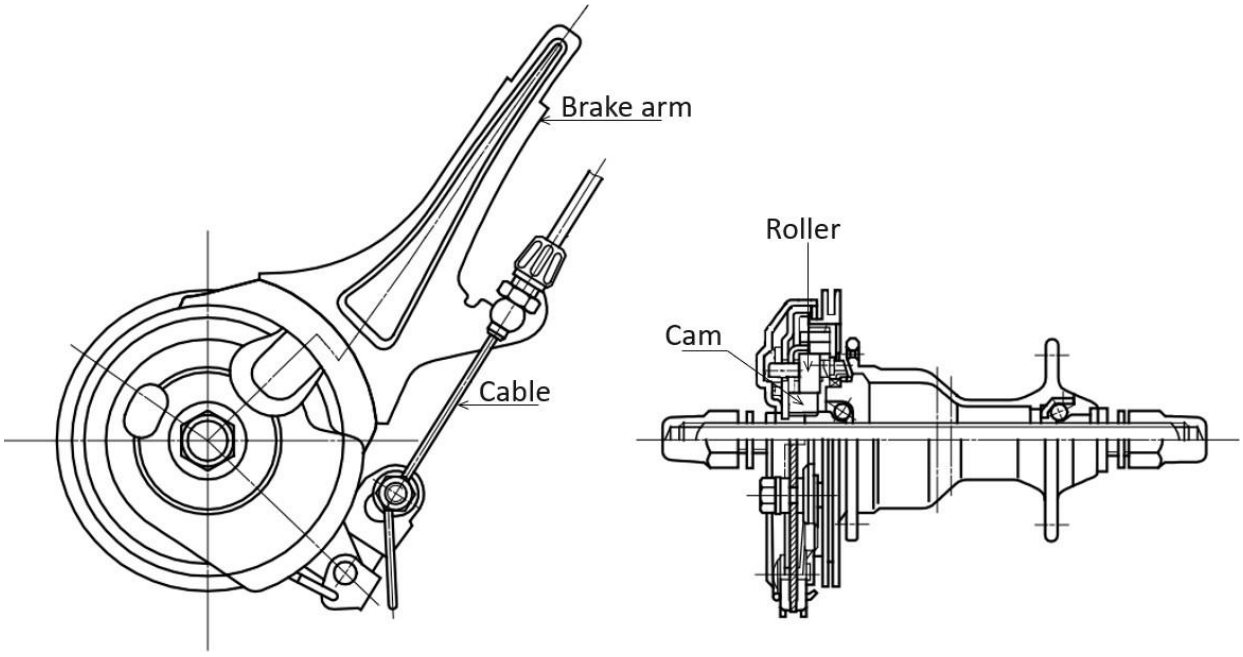


FIG. 9 FRONT ROLLER BRAKE

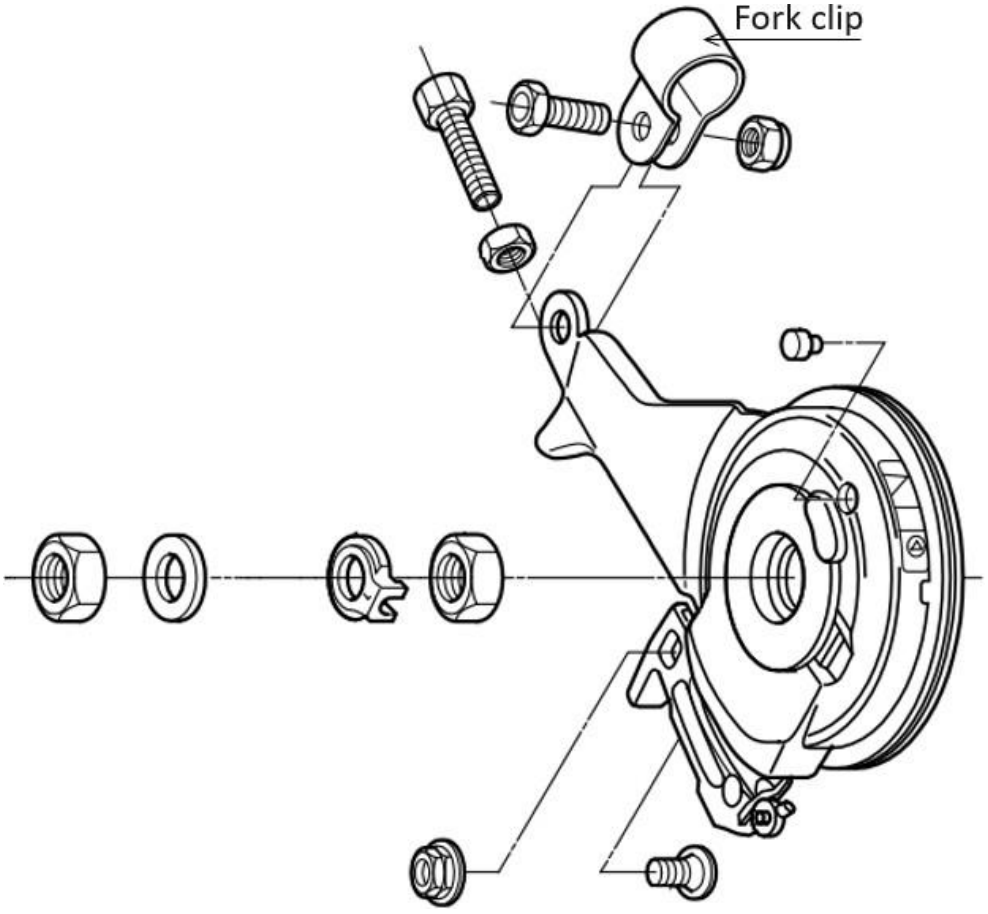
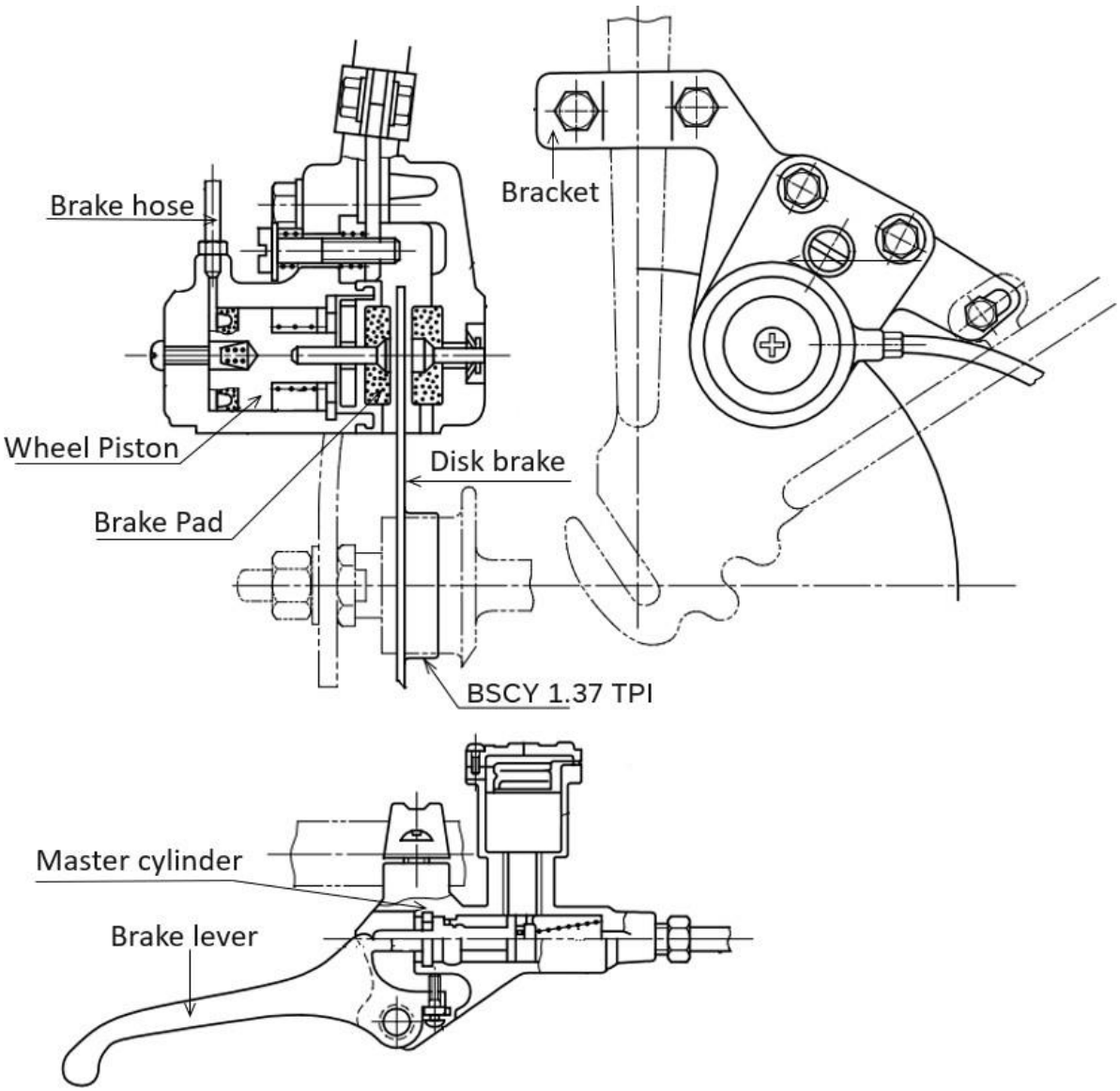


FIG. 10 REAR ROLLER BRAKE



Note - BSCY 1.37 TPI indicates bicycle threads with 1.37 threads per inches

FIG. 11 DISK BRAKE

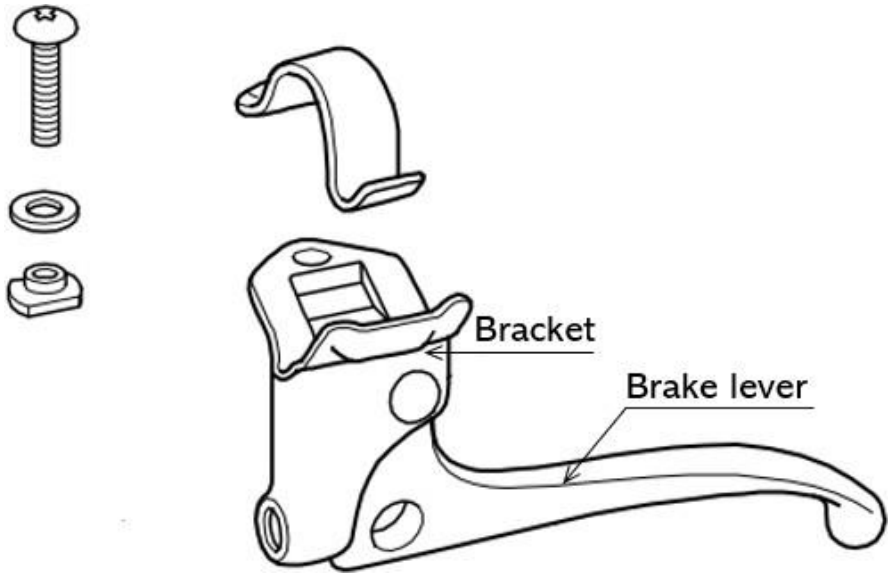


FIG. 12 TOURING BRAKE LEVER

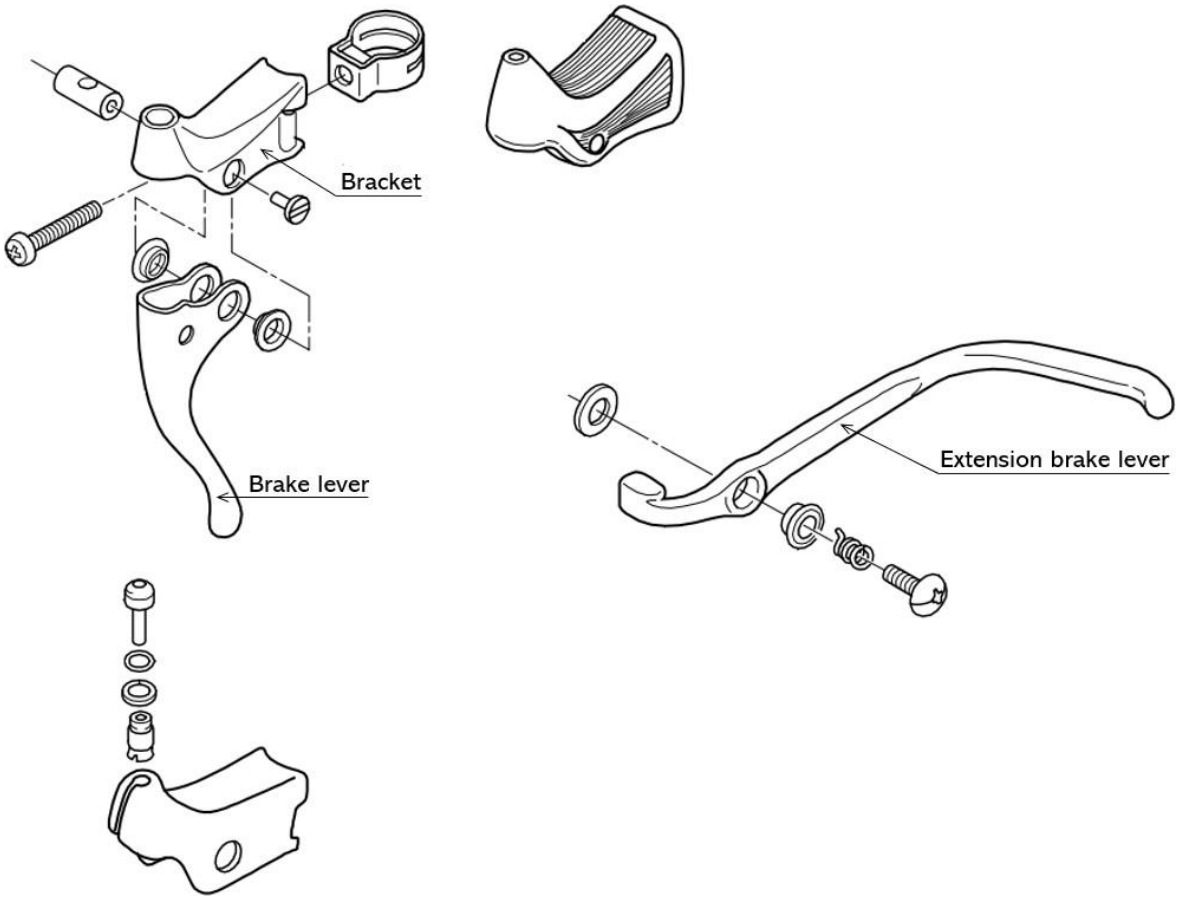


FIG. 13 DROP HANDLEBAR BRAKE LEVER

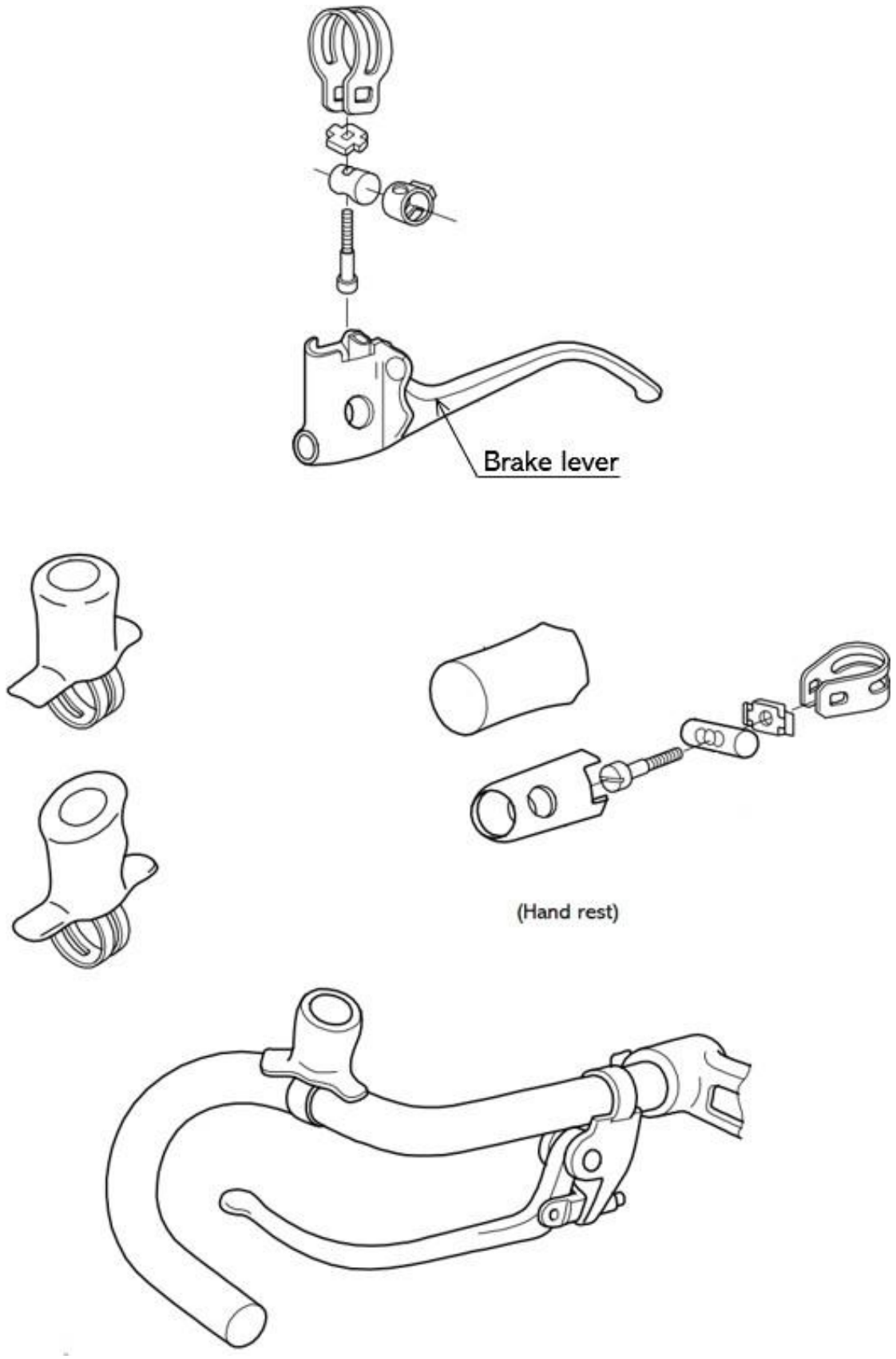


FIG. 14 GUIDONNET BRAKE LEVER

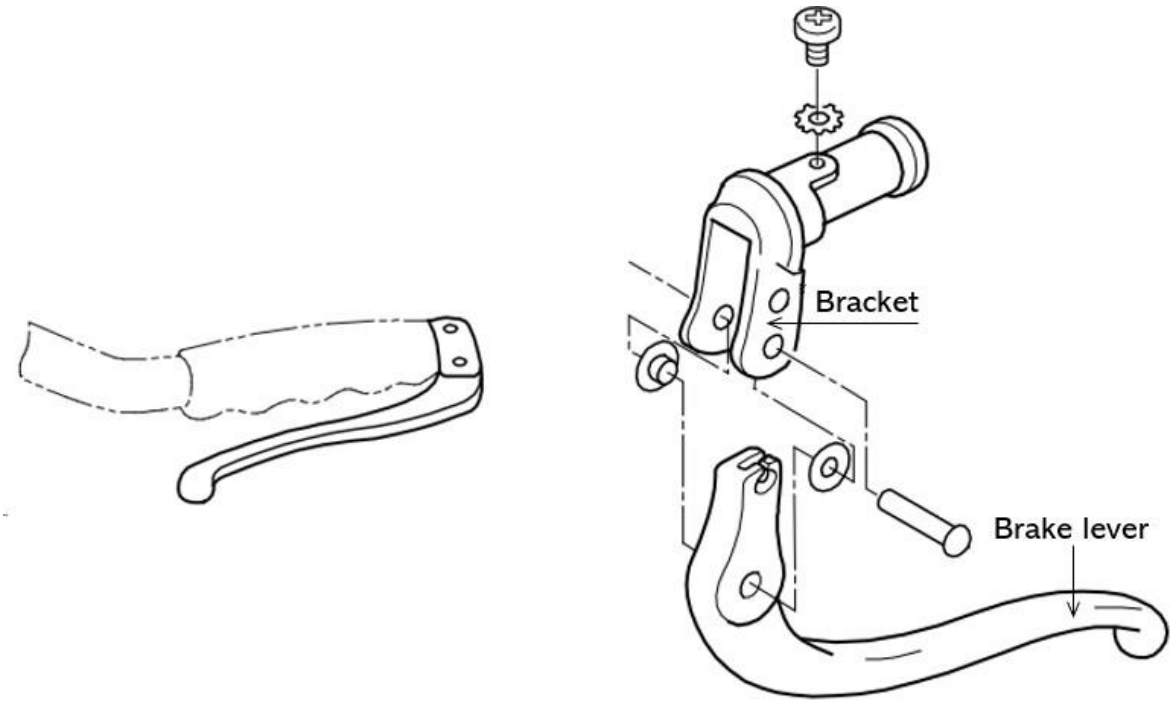
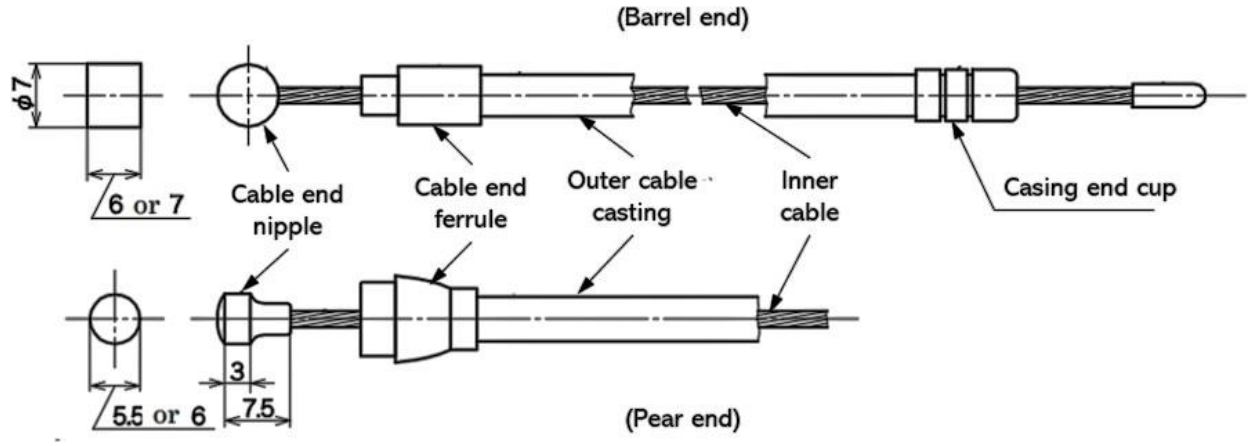


FIG. 15 INVERTED BRAKE LEVER



All dimensions in millimetres

FIG. 16 BRAKE CABLE

5 MATERIAL

The manufacturers may use any suitable materials subject to their conformity with the requirements/ tests specified in this standard unless there is an agreement between manufacturer and supplier to use specific materials. Some illustrative materials for various brake components are given Table 2.

Table 2 Illustrative Material for Brake Components
(*Clause* 5)

Sl No. (1)	Components (2)	Materials (3)
i	Inner wire	Steel

ii	Wire cable	Steel, Nylon, Teflon (PTFE), Rubber, Stainless Steel, Virgin PVC
iii	Nipple	Brass, Aluminium
iv	Brake pads	Leather, Rubber, Cork, Synthetic Resin, Composites
v	Brake pads backing plate	Steel, Stainless steel, Aluminium alloy, Metal composite
vi	Plunger Rod	Steel, Stainless steel
vii	Brake Lever and housing	Steel, Aluminium alloy, Carbon fiber reinforced polymer
viii	Brake Hose	Stainless steel, Aluminium alloy, rubber, Synthetic resin, Steel alloy
ix	Screws	Alloy steel, Aluminium alloy, Titanium alloy
x	Disk Rotor	Stainless steel, Aluminium alloy, Composites, Hybrid Steel alloy and Aluminium alloy
xi	Calliper body (bracket) and master cylinder	Magnesium, Titanium, Composites, Stainless steel, Aluminium alloy, Steel alloy
xii	Piston	Ceramic, Aluminium Alloy, Stainless steel
xiii	Spring	Stainless steel, Steel alloy

6 GENERAL REQUIREMENT

6.1 A Bicycle shall be equipped with at least two independently actuated braking systems. At least one shall operate on the front wheel and one on the rear wheel. The Braking Systems shall operate without binding.

6.2 Ensure that the assembled brake components are firmly joined so that they function correctly upon activation. The brake system should be designed to maintain braking force through adjustments, accommodating wear of brake block/lining, elongation of brake cables, and similar factors. Utilize appropriate friction materials for brake block, lining, and pad. Brake blocks containing asbestos shall not be used. When correctly adjusted, the friction material shall not contact anything other than the intended braking surface. The brake blocks of a bicycle with rod brakes shall not come into contact with the rim of the wheels when the steering angle of the handlebars is set at 60°, nor shall the rods bend, or be twisted after the handlebars are reset to the central position.

6.3 When securing inner cables with the manufacturer's recommended tightening torque, ensure that the securing position firmly holds the cables. Provide screws for attaching brakes to a frame body or front fork with effective locking measures against loosening, such as spring washers, lock washers, lock nuts, nylon nuts, or screw-locking bonds. Hydraulic brakes shall be leak-free.

6.4 Brake lever fittings shall securely tighten the brake lever on handlebars (*see* IS DOC: TED16 (XXXXX1)).

6.5 Heat-resisting structures are essential for brakes designed to brake on hub (*see* IS DOC: TED16 (XXXXX2)), while those designed for a rim should have a heat-resisting structure when using thermoplastic resin materials for components.

6.6 Cable pinch-bolts shall not sever any of the cable strands when assembled to the manufacturer's instructions. In the event of a cable failing, no part of the brake mechanism shall inadvertently inhibit the rotation of the wheel. The cable end shall either be protected with a cap, that shall withstand a removal force of 20 N or be otherwise treated to prevent unravelling.

7 DIMENSIONS

7.1 For young children's bicycles, the brake lever grip dimension shall be as specified in **4.7.2.2.1** of DOC: TED (23113). For 'Young adult bicycles', 'City and Trekking', 'Roadster', 'SLR bicycles',

'Mountain bicycles', and 'Racing bicycles', the brake lever grip dimension shall be as specified in **4.4.2.2** of IS 10613. For BMX bicycles, the brake lever grip dimension shall be as specified in **4.8.2.2.1** of DOC: TED 16 (18837). For EPAC bicycles, the brake lever grip dimension shall be as specified in **4.3.5.2.2.1** of DOC: TED 16 (XXXX1).

7.2 Threaded fasteners such as clip bolts, rod coupling bolt etc. should be in accordance with the requirements specified in IS 1367 (Part 3)/IS 1367 (Part 6) as applicable. Other suitable threaded fasteners may also be used.

8 FINISH

8. 1 The brake components shall be free from rust, scale, sharp tips, significant fins, burrs and oily substances. The components shall be suitably pre-treated and plated or painted.

8.2 The plated surface shall be devoid of any noticeable flaws, exposure, incomplete polishing of the substrate, peeling, or other significant defects. The exposed surface after assembly should be free from uneven plating. Non-plated or painted surfaces shall be free from rust, cracks, noticeable flaws or other significant defects.

9 ACCEPTANCE TESTS

9.1 Brake Lever Grip Dimension Test

For young children's bicycles, the brake lever grip dimension shall pass the test as specified in **4.7.2.2.2** of DOC: TED (23113). For 'Young adult bicycles', 'City and Trekking', 'Roadster', 'SLR bicycles', 'Mountain bicycles', and 'Racing bicycles', the brake lever grip dimension shall pass the test as specified in **4.4.3** of IS 10613. For BMX bicycles, the brake lever grip dimension shall pass the test as specified in **4.8.2.2.2** of DOC: TED 16 (18837). For EPAC bicycles, the brake lever grip dimension shall pass the test as specified in **4.3.5.2.2.2** of DOC: TED 16 (23339).

9.2 Brake-Block and Brake-Pad Assemblies — Security Test

For young children's bicycles, the Brake-Block and Brake-Pad Assemblies shall pass the test as specified in **4.7.4** of DOC: TED (23113). For 'Young adult bicycles', 'City and Trekking', 'Roadster', 'SLR bicycles', 'Mountain bicycles', and 'Racing bicycles', the Brake-Block and Brake-Pad Assemblies shall pass the test as specified in **4.4.6** of IS 10613. For BMX bicycles, the Brake-Block and Brake-Pad Assemblies shall pass the test as specified in **4.8.5** of DOC: TED 16 (18837). For EPAC bicycles, the Brake-Block and Brake-Pad Assemblies shall pass the test as specified in **4.3.5.5** of DOC: TED 16 (23339).

9.3 Hand-Operated Braking-System — Strength Test

For young children's bicycles, the hand-operated braking system shall pass the test as specified in **4.7.7.1** of DOC: TED (23113). For 'Young adult bicycles', 'City and Trekking', 'Roadster', 'SLR bicycles', 'Mountain bicycles', and 'Racing bicycles', the hand-operated braking system shall pass the test as specified in **4.4.8** of IS 10613. For BMX bicycles, the hand-operated braking system shall pass the test as specified in **4.8.6** of DOC: TED 16 (18837). For EPAC bicycles, the hand-operated braking system shall pass the test as specified in **4.3.5.7** of DOC: TED 16 (23339).

9.4 Back-Pedal Braking System — Strength Test

For young children's bicycles, the back-pedal braking system shall pass the test as specified in **4.7.7.3** of DOC: TED (23113). For 'Young adult bicycles', 'City and Trekking', 'Roadster', 'SLR bicycles', 'Mountain bicycles', and 'Racing bicycles', the back-pedal braking system shall pass the test as specified in **4.4.9** of IS 10613. For EPAC bicycles, the back-pedal braking system shall pass the test as specified in **4.3.5.8** of DOC: TED 16 (23339). This test is not applicable for BMX bicycles.

9.5 Braking Performance

For young children's bicycles, the hand-operated braking system shall pass the test as specified in **4.7.8** of DOC: TED (23113). For 'Young adult bicycles', 'City and Trekking', 'Roadster', 'SLR bicycles', 'Mountain bicycles', and 'Racing bicycles', the hand-operated braking system shall pass the test as specified in **4.4.10, 4.4.14 & 4.4.15** of IS 10613. For BMX bicycles, the hand-operated braking system shall pass the test as specified in **4.8.7** of DOC: TED 16 (18837). For EPAC bicycles, the hand-operated braking system shall pass the test as specified in **4.3.5.9** of DOC: TED 16 (23339).

9.5.1 *Brakes – heat- resistance test*

For 'Young adult bicycles', 'City and Trekking', 'Roadster', 'SLR bicycles', 'Mountain bicycles', and 'Racing bicycles', the brake shall pass the test as specified in **4.4.13.8** of IS 10613. For EPAC bicycles, the brake shall pass the test as specified in **4.3.5.10** of DOC:TED 16 (23339). This test is not applicable for BMX bicycles and young children's bicycles.

9.5.2 *Back-pedal brake linearity test*

For young children's bicycles, the back-pedal brake shall pass the test as specified in **4.7.8.3** of DOC: TED (23113). For 'Young adult bicycles', 'City and Trekking', 'Roadster', 'SLR bicycles', 'Mountain bicycles', and 'Racing bicycles', the back-pedal brake shall pass the test as specified in **4.4.11** of IS 10613. For EPAC bicycles, the back-pedal brake shall pass the test as specified in **4.3.5.11** of DOC: TED 16 (23339). This test is not applicable for BMX bicycles.

9.6 Chemical Test

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

Table 3 Chemical Tests
(*Clause* 9.6)

Test/Test conditions/Suitability	**Salt Spray Test**	
	Neutral Salt Spray (NSS)	**Copper-accelerated Acetic acid Salt Spray (CASS)**
(1)	**(2)**	**(3)**
Temperature	35 °C ± 2 °C	50 °C ± 2 °C
Concentration of Salt Solution	5% NaCl	5% NaCl
pH (Solution)	6.5 to 7.2	3.1 to 3.3
Test duration	24* h	6* h
Recovery period	1 h	1 h
Air Pressure	70 to 170 kPa	70 to 170 kPa
Suitability **	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, 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 the test indicated in Table 3 shall apply.

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

10 MARKING

10.1 Each brake 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) Brake Type;

10.2 Markings indicated at Sl No. 1 at least shall be compulsorily marked by punching of sufficient depth or by printing on the brake. All the markings including that given at Sl No. 1, shall be suitably indicated on the packing.

10.3 BIS Certification Marking

Each brake may also be marked with the Standard Mark.

10.3.1 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