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**Bicycles for exclusive sports usage**

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## Foreword

This Japanese Industrial Standard has been established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee according to the proposal for establishment of Japanese Industrial Standard submitted by Japan Bicycle Promotion Institute (JBPI)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law.

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# Bicycles for exclusive sports usage

## Introduction

This Japanese Industrial Standard has been prepared based on **ISO 4210-2:2015**, Edition 2, with some modifications of the technical contents to reflect the needs and conditions unique to Japan and to ensure safety of the products.

The vertical lines on both sides and dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JA.

## 1 Scope

This Standard specifies requirements for bicycles for exclusive sports usage (hereafter referred to as bicycles) as defined in **JIS D 9111**.

The bicycles for exclusive sports usage include mountain bicycles and racing bicycles.

**NOTE** The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 4210-2:2015 *Cycles—Safety requirements for bicycles—Part 2: Requirements for city and trekking, young adult, mountain and racing bicycles* (MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standards and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS C 9502 *Lighting equipment for bicycles*

**NOTE** Corresponding International Standard: ISO 6742-1:1987 *Cycles—Lighting and retro-reflective devices—Photometric and physical requirements—Part 1: Lighting equipment* (MOD)

JIS D 9111 *Cycles—Classification, terminology and essential characteristics*

**NOTE** Corresponding International Standard: ISO 4210-1:2014 *Cycles—Safety requirements for bicycles—Part 1: Terms and definitions* (MOD)

JIS D 9313-1 *Cycles—Part 1: General rule for test method and parts test methods*

**NOTE** Corresponding International Standard: ISO 4210-3:2014 *Cycles—Safety requirements for bicycles—Part 3: Common test methods* (MOD)

JIS D 9313-2 *Cycles—Part 2: Braking device test methods*

**NOTE** Corresponding International Standard: ISO 4210-4:2014 *Cycles—Safety requirements for bicycles—Part 4: Braking test methods* (MOD)

JIS D 9313-3 *Cycles—Part 3: Steering device test methods*

NOTE Corresponding International Standard: ISO 4210-5:2014 *Cycles—Safety requirements for bicycles—Part 5: Steering test methods* (MOD)

JIS D 9313-4 *Cycles—Part 4: Body unit test methods*

NOTE Corresponding International Standard: ISO 4210-6:2015 *Cycles—Safety requirements for bicycles—Part 6: Frame and fork test methods* (MOD)

JIS D 9313-5 *Cycles—Part 5: Running device test methods*

NOTE Corresponding International Standard: ISO 4210-7:2014 *Cycles—Safety requirements for bicycles—Part 7: Wheels and rims test methods* (MOD)

JIS D 9313-6 *Cycles—Part 6: Driving device test methods*

NOTE Corresponding International Standard: ISO 4210-8:2014 *Cycles—Safety requirements for bicycles—Part 8: Pedal and drive system test methods* (MOD)

JIS D 9313-7 *Cycles—Part 7: Seating device test methods*

NOTE Corresponding International Standard: ISO 4210-9:2014 *Cycles—Safety requirements for bicycles—Part 9: Saddles and seat-post test methods* (MOD)

JIS D 9417 *Bicycles—Chains*

NOTE Corresponding International Standard: ISO 9633:2001 *Cycle chains—Characteristics and test methods* (MOD)

JIS D 9451 *Bicycles—Bells*

JIS D 9452 *Cycles—Reflex reflectors*

NOTE Corresponding International Standard: ISO 6742-2:2015 *Cycles—Lighting and retro-reflective devices—Part 2: Retro-reflective devices* (MOD)

JIS D 9453 *Bicycles—Luggage carriers and stands*

NOTE Corresponding International Standard: ISO 11243:1994 *Cycles—Luggage carriers for bicycles—Concepts, classification and testing* (MOD)

### 3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS D 9111** apply.

### 4 Requirements

#### 4.1 General

##### 4.1.1 Sharp edges

Exposed edges that could come into contact with the rider's hands, legs, etc., during normal riding or normal handling and normal maintenance shall not be sharp, e.g. deburred, broken, rolled, or processed with comparable techniques.

NOTE See **JIS B 0051**.

#### 4.1.2 Protrusions

This requirement is intended to address the hazards associated with the users of bicycles falling on projections or rigid components (e.g. handlebars, levers) on a bicycle, possibly causing internal injury or skin puncture.

Tubes and rigid components in the form of projections which constitute a puncture hazard to the rider should be protected. The size and shape of the end protection has not been stipulated, but an adequate shape shall be given to avoid puncturing of the body. Screw threads which constitute a puncture hazard shall be limited to a protrusion length of one major diameter of the screw beyond the internally threaded mating part (e.g. nut).

This requirement does not apply to structural or external protrusions provided for functional purposes, those for adjustment such as chain adjusters, or those covered with a cap etc.

NOTE Grips and end caps are covered in 4.3.2.

#### 4.1.3 Cables

For those brake cables, derailleur cables and remote-controlled cables (for lighting systems) where the inner cable is protruding outside the casing, 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 unraveling.

#### 4.1.4 Safety and strength of fasteners

##### 4.1.4.1 Safety of screws

Any screws used to attach suspension mechanisms, generators, brake mechanisms and mudguards to the frame or the front fork shall be provided with suitable locking devices (e.g. spring washers, lock washers, lock nuts, nylon nuts and adhesives). Fitting screws for hub generators are exempt from this requirement. Fasteners used for fitting the hub brake or the disc brake shall satisfy the heat resistance specified in 4.2.9.2.

NOTE For mechanical properties of bolts, see JIS B 1051.

##### 4.1.4.2 Strength of screws

Screws for fastening the handlebar, handlebar stem, bar end, saddle and seat post shall not break when fastened with a torque 120 % of the recommended value of the manufacturer (maximum value if it is a recommended range) [see also 6 k) 5)].

##### 4.1.4.3 Folding bicycle mechanism

If folding bicycle mechanism is provided, it shall be designed so that the bicycle can be locked for use in a simple, stable, safe way, and when folded, no damage shall occur to any cables. No locking mechanism shall contact the wheels or tyres during riding, and it shall be impossible to unintentionally loosen or unlock the folding mechanisms during riding. The quick-release device for folding and detachment of the frame and handlebar stem shall be designed to require at least two actions to unlock the mechanism so that it is impossible to unintentionally release the locking mechanism such as levers.

#### 4.1.5 Crack detection methods

Standardized methods should be used to emphasize the presence of cracks where visible cracks are specified as criteria of failure in tests specified in this Standard.

NOTE For example, suitable dye-penetrant methods are specified in **JIS Z 2343-1** to **JIS Z 2343-4**. In addition, white paint or surface treatment can be used to aid in detection for composite material.

### 4.2 Braking device

#### 4.2.1 Braking system

Bicycles shall be equipped with at least two independently actuated braking systems, one system operating on the front wheel and one on the rear. The braking systems shall operate without binding and shall be capable of meeting the braking performance requirements specified in 4.2.8. Brake-blocks containing asbestos shall not be permitted.

#### 4.2.2 Hand-operated brakes

##### 4.2.2.1 Brake-lever position

The bicycle manufacturer shall state in the manufacturer's instructions which levers operate the front and rear brakes [see also 6 e) 4)]. Generally, the front brake lever shall be positioned on the right side of the handlebar and the rear brake lever, on the left side.

##### 4.2.2.2 Brake-lever grip dimension

The brake lever grip dimension shall be as follows.

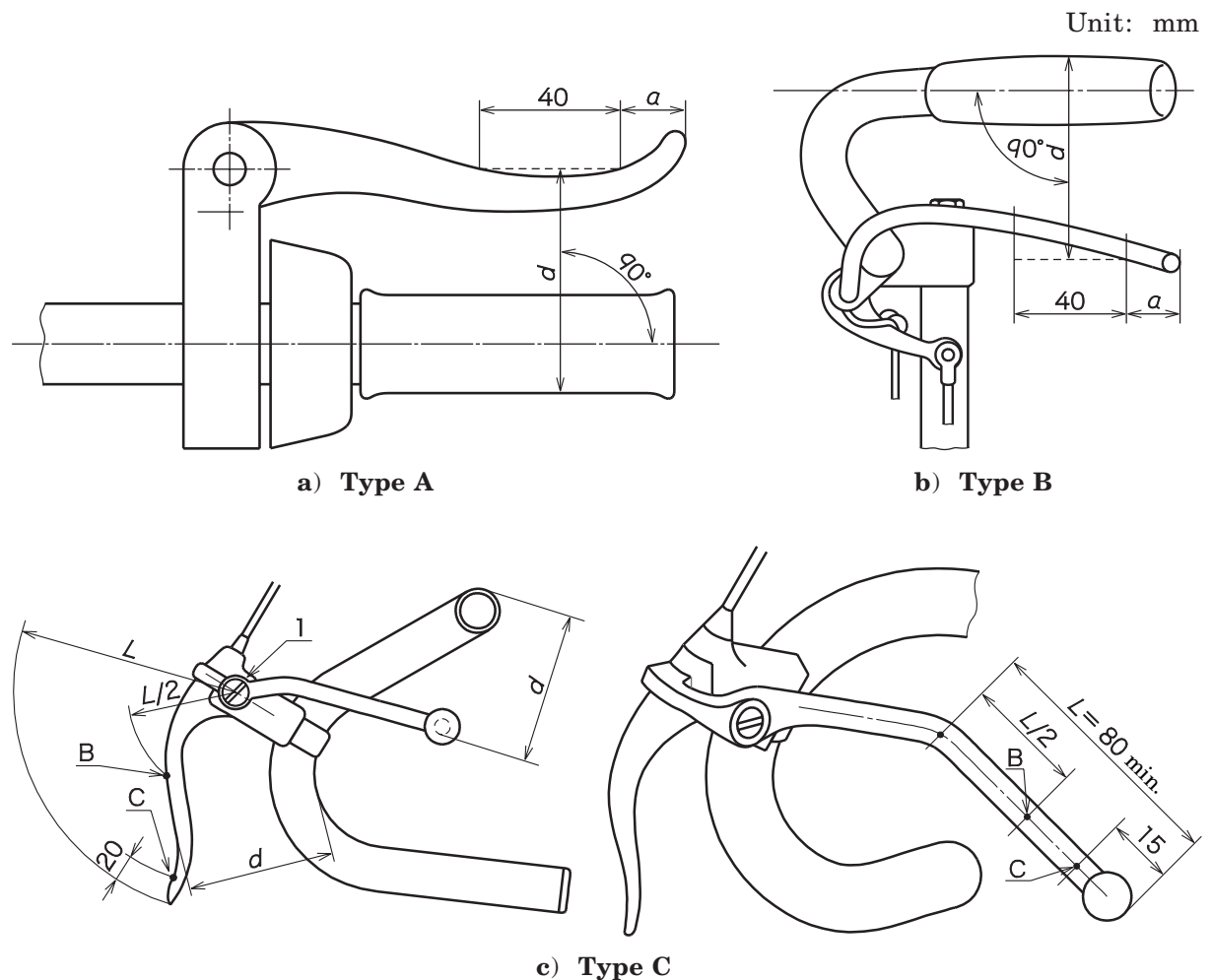
- a) **Type A or Type B brake lever** The dimension,  $d$ , measured in accordance with 4.1.1 of **JIS D 9313-2** between the outer surfaces of the brake lever in the region intended for contact with the rider's fingers and the handlebar or any other covering present shall cover a distance of not less than 40 mm as shown in Figure 1 a) and Figure 1 b) and shall not exceed 90 mm for bicycles on which the minimum intended height of the saddle is 635 mm or more, and 75 mm for bicycles on which the minimum intended height of the saddle is less than 635 mm.

Adjustable brake levers may be adjusted to meet the specified dimension.

NOTE See 6 e) 5) in relation to the minimum intended height of the saddle.

- b) **Type C brake lever** It shall be possible to fit the dimension gauge shown in Figure 3 in **JIS D 9313-2** over the brake lever (or a secondary brake lever) and the handlebar grip or any other covering in at least one position between points B and C indicated in Figure 1 c), without causing any movement of the brake lever towards the handlebar. The dimension  $d$ , when measured in accordance with 4.1.2 of **JIS D 9313-2** shall not exceed 100 mm.

Adjustable brake levers may be adjusted to meet the specified dimension.



- 1 pivot
- a distance between the last part of the lever intended for contact with the rider's fingers and the end of the lever
- B point of  $L/2$
- C point of 20 mm (in case of an extension brake lever, 15 mm) from the end of the lever
- d brake lever grip dimension
- L distance between the centre of the lever pivot and the lever tip end

**Figure 1 Brake-lever grip dimensions**

#### 4.2.3 Attachment of brake assembly and cable requirement

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.

#### 4.2.4 Brake-block and brake-pad assemblies — Security test

The brake block, lining, etc. shall be securely attached to the brake block holder, brake lining shoe and there shall be no failure of the braking system or any component thereof when tested by the rocking test specified in 4.3 of JIS D 9313-2. Further, after completion of the rocking test, the brake system shall meet the requirements in 4.2.6.

#### 4.2.5 Brake adjustment

The brake adjustment shall be as follows.

- a) Each brake shall be capable of adjustment with or without the use of a tool to an efficient operating position until the friction material has worn to the point of requiring replacement as recommended in the manufacturer's instructions.
- b) Also, when correctly adjusted, the brake blocks shall not contact anything other than the intended braking surface.
- c) The brake blocks or brake lining 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.

#### 4.2.6 Hand-operated braking-system — Strength test

When tested by the method described in 4.4 of JIS D 9313-2, there shall be no failure of the braking system or of any component thereof.

#### 4.2.7 Back-pedal brakes

##### 4.2.7.1 General

Back-pedal brakes shall be actuated by the rider's foot pedalling in the opposite direction to the drive force. The brake mechanism shall function at a reversed angle of the chainwheels and cranks not exceeding 60°, and shall be released as soon as the rider's foot starts pedalling in the driving direction.

The measurement shall be taken with the crank held against each position with a pedal force of at least 250 N. The force shall be maintained for 1 min in each position.

##### 4.2.7.2 Requirements

When tested in accordance with 4.5 of JIS D 9313-2, the bicycle with back-pedal brake shall be free from failure of the brake system or any component thereof.

#### 4.2.8 Braking performance

##### 4.2.8.1 General

Two test methods are specified to determine braking performance. One test method is the track test in which braking distance is measured directly with the progressive characteristics of the brakes being self-evident. The alternative test method is a machine/rig base test in which braking force is measured and, from which, braking performance values are calculated. The progressive characteristics of the brake are determined by linearity measurements. A final, simple track test checks for smooth, safe, stopping characteristics. Whichever method is used, there shall be compliance with 4.2.8.2 or 4.2.8.3.

Test bicycle shall be in accordance with 4.6.1 of JIS D 9313-2, secondary brake lever, in accordance with 4.6.2 of JIS D 9313-2.

##### 4.2.8.2 Track test

When tested in accordance with 4.6.3 of JIS D 9313-2, the bicycle shall fulfil the requirements shown in Table 1.

**Table 1 Brake test velocities and braking distance**

| Bicycle type      | Condition | Velocity | Brake in use | Corrected braking distance |
|-------------------|-----------|----------|--------------|----------------------------|
| Mountain bicycles | Dry       | 25 km/h  | Both         | 6 m max.                   |
|                   |           |          | Rear only    | 10 m max.                  |
|                   | Wet       | 16 km/h  | Both         | 5 m max.                   |
|                   |           |          | Rear only    | 10 m max.                  |
| Racing bicycles   | Dry       | 25 km/h  | Both         | 6 m max.                   |
|                   |           |          | Rear only    | 12 m max.                  |
|                   | Wet       | 16 km/h  | Both         | 5 m max.                   |
|                   |           |          | Rear only    | 10 m max.                  |

**4.2.8.3 Machine test**

When tested in accordance with 4.6.5 of **JIS D 9313-2**, the bicycle shall fulfil the requirements shown in Table 2.

**Table 2 Calculated braking performance value**

| Bicycle type      | Condition | Brake in use | Braking performance value $B_p$ |
|-------------------|-----------|--------------|---------------------------------|
| Mountain bicycles | Dry       | Front only   | 425 N min.                      |
|                   |           | Rear only    | 280 N min.                      |
|                   | Wet       | Front only   | 220 N min.                      |
|                   |           | Rear only    | 140 N min.                      |
| Racing bicycles   | Dry       | Front only   | 425 N min.                      |
|                   |           | Rear only    | 260 N min.                      |
|                   | Wet       | Front only   | 220 N min.                      |
|                   |           | Rear only    | 140 N min.                      |

**4.2.8.4 Smooth, safe-stop characteristics**

The bicycle shall show smooth, safe-stop characteristics with regard to the intended use of the bicycle and the ability of the expected user of the bicycle. Either of the following shall apply.

- a) For the track test, smooth, safe-stop characteristics are defined as stopping within the required distances without occurrence of any of the following:
  - 1) excessive juddering;
  - 2) front wheel rocking;
  - 3) bicycle overturning (rear wheel lifting uncontrollably);
  - 4) rider's loss of control;
  - 5) excessive side-skid causing the rider to put his foot to the ground to retain control.

Back pedal brakes shall additionally comply with the linearity requirements of 4.6.4 of **JIS D 9313-2**.

- b) For the machine test, smooth, safe-stop characteristics are defined by compliance with the linearity requirements specified in **4.6.5.3** of **JIS D 9313-2** and freedom from conditions stated in **a) 1) to 5)** when subjected to the simple track test described in **4.6.5.7 h)** of **JIS D 9313-2**.

#### **4.2.8.5 Ratio between wet and dry braking performance**

For mountain bicycles, in order to ensure safety for both wet and dry braking, the ratio of braking performance wet/dry shall be greater than 40 %.

The methods for calculating this ratio are given in **4.6.3.8 c)** of **JIS D 9313-2** for the track test and in **4.6.5.7 g)** of **JIS D 9313-2** for the machine test.

This requirement is not applicable to racing bicycles.

#### **4.2.9 Brakes — Heat-resistance test**

##### **4.2.9.1 General**

This test applies to all disc and hub brakes, but it applies to rim brakes only where they are known or suspected to be manufactured from or include thermoplastic materials.

Each brake on the bicycle shall be tested individually, but where the front and rear brakes are identical, only one brake needs to be tested.

##### **4.2.9.2 Requirements**

Throughout the test described in **4.7.1** of **JIS D 9313-2**, the brake lever shall not touch the handlebar grip, the operating force shall not exceed 180 N, and the braking force shall not deviate outside the range 60 N to 115 N.

Immediately after having been subjected to the test described in **4.7.2** of **JIS D 9313-2**, the brakes shall achieve at least 60 % of the braking performance which was recorded at the highest operating force used during the performance tests in items **1)** and **2)** of **4.6.5.7 c)** of **JIS D 9313-2**.

#### **4.3 Steering device**

##### **4.3.1 Handlebar — Dimensions**

The handlebar shall have an overall width between 350 mm and 1 000 mm for mountain bicycles and 350 mm and 600 mm for racing bicycles unless national regulations dictate otherwise. Adjust the handlebar height to its minimum insertion-depth mark and the saddle to its lowest normal riding position as specified by the manufacturer. Measure the vertical distance from the centre and top of the handlebar grips to a point where the saddle surface is intersected by the seat post axis. This dimension shall not exceed 400 mm (see Figure 2).

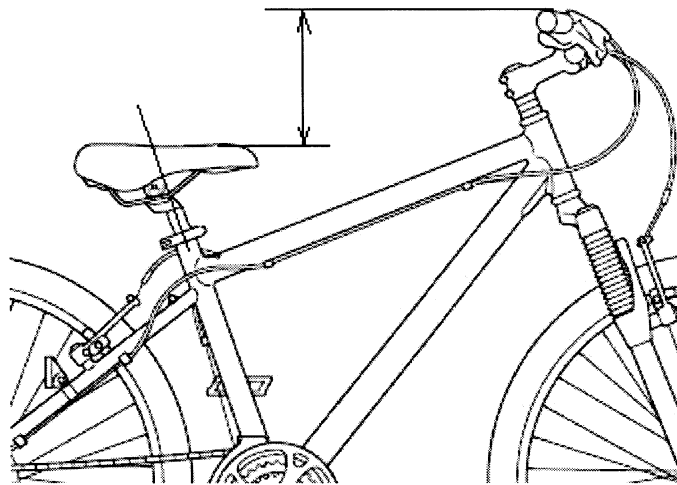


**Figure 2 Vertical distance between the handlebar grips and the seat surface**

#### **4.3.2 Handlebar grips and end caps**

The handlebar grips and end caps, when tested by the method described in 4.1.1 and 4.1.2 of JIS D 9313-3, shall withstand the specified removal forces.

#### **4.3.3 Handlebar stem — Minimum insertion-depth mark or positive stop on seat-post**

The handlebar stem shall be provided with one of the two following alternative means of ensuring a safe insertion depth into the fork steerer.

- a) It shall contain a permanent, transverse mark, of length not less than the external diameter of the stem that clearly indicates the minimum insertion depth of the handlebar stem into the fork steerer. The insertion mark shall be located at a position not less than 2.5 times the external diameter of the handlebar stem from the bottom of the stem, and there shall be at least one stem diameter's length of contiguous, circumferential stem material below the mark.
- b) It shall incorporate a permanent stop to prevent it from being drawn out of the fork steerer such as to leave the insertion less than the amount specified in item a).

#### **4.3.4 Handlebar stem to fork steerer — Clamping requirements**

The distance  $g$  (see Figure 3) between the top of the handlebar stem and the top of the fork steerer to which the handlebar stem is clamped shall not be greater than 5 mm. The dimension  $g$  shall also ensure that the proper adjustment of the steering system can be achieved.

The upper part of the fork steerer to which the handlebar stem is clamped shall not be threaded.

**NOTE** For aluminium and composite fork steerer, the avoidance of any internal device such as anchor nut that could damage the internal surface of the fork steerer is recommended.