



JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS D 9115 : 2018

(JBPI)

Electric power assisted bicycles

ICS 43.150

Reference number : JIS D 9115 : 2018 (E)

PROTECTED BY COPYRIGHT

 **Documents**
Document Sharing Hub

19 S

D 9115 : 2018

Date of Establishment: 2009-09-24

Date of Revision: 2018-09-20

Date of Public Notice in Official Gazette: 2018-09-20

Investigated by: Japanese Industrial Standards Committee

Standards Board for ISO area

Technical Committee on Consumer Life Products

JIS D 9115:2018, First English edition published in 2019-05

Translated and published by: Japanese Standards Association
Mita MT Building, 3-13-12, Mita, Minato-ku, Tokyo, 108-0073 JAPAN

In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

© JSA 2019

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

Printed in Japan

PROTECTED BY COPYRIGHT

Contents

	Page
Introduction	1
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Construction and parts	4
5 Safety (including performance, construction, size and shape)	4
5.1 General	4
5.2 Brake	4
5.3 Steering	4
5.4 Frame	4
5.5 Front fork	5
5.6 Wheels (including integrated wheels)	5
5.7 Quick-release mechanism	5
5.8 Tyres and tubes	5
5.9 Drive system	5
5.10 Saddles	5
5.11 Protective device	5
5.12 Lighting system and reflectors	5
5.13 Horns	5
5.14 Locks	5
5.15 Stands	5
5.16 Static load strength of rear carriers and frames	5
5.17 Power assisting system	6
5.18 Secondary batteries	6
5.19 Battery charger	7
6 Requirements for product design	7
7 Appearance	7
8 Test method	7
8.1 Lighting duration and luminous intensity of battery lamps	7
8.2 Strength test of power assisting system	7
8.3 Vibration resistance test	8
9 Inspection	8
10 Marking	8
11 Instruction manual	9

Annex A (normative)	Criteria for motors to assist human power	10
Annex B (normative)	Items of criteria for motors and criteria for time responsiveness	11
Annex C (normative)	Requirements for product design	18
Annex D (normative)	Method for measurement and indication of travel distance per charge	22

Foreword

This Japanese Industrial Standard has been revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Bicycle Promotion Institute (JBPI) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS D 9115:2017** is replaced with this Standard.

This **JIS** document is protected by the Copyright Law.

Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, applications for a patent after opening to the public or utility model rights. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying any of such patent rights, applications for a patent after opening to the public or utility model rights.

Electric power assisted bicycles

Introduction

This Japanese Industrial Standard was established in 2009 and has gone through revisions of “product standard” in 2013 and 2017 up to the present.

Today, electric power assisted bicycles vary in function, construction and performance across countries and regions. This Standard has been revised for the purpose of facilitating communication among all stakeholders related to electric power assisted bicycles by standardizing the safety requirements, test methods, design requirements, etc. in order to secure the safety and convenience of “electric power assisted bicycles” in Japan.

No corresponding International Standard has been established at this point.

1 Scope

This Standard specifies electric power assisted bicycles classified in Table 1 of **JIS D 9111**.

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 0920 *Degrees of protection provided by enclosures (IP Code)*

JIS C 8702-1 *Small-sized valve regulated lead-acid batteries—Part 1: General requirements, functional characteristics—Methods of test*

JIS C 8702-3 *Small-sized valve regulated lead-acid batteries—Part 3: Safety recommendations for use in electric appliances*

JIS C 8712 *Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications*

JIS C 9335-1 *Household and similar electrical appliances—Safety—Part 1: General requirements*

JIS C 9335-2-29 *Household and similar electrical appliances—Safety—Part 2-29: Particular requirements for battery chargers*

JIS C 9502 *Lighting equipment for bicycles*

JIS C 60050-161 *International Electrotechnical Vocabulary: Electromagnetic compatibility*

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

JIS D 9301 *Bicycles for general use*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS C 60050-161**, **JIS D 9111** and **JIS D 9301**, and the following apply.

3.1

ordinary bicycles

bicycles without electric motor to assist human power

3.2

power of pedal cranking

crankshaft torque generated by rider's pedaling

3.3

assisted driving power

torque given to drive wheels by electric motor

3.4

power assisting system

system which is composed of drive system including electric motor, control part, pedal effort detecting part and power supply part, and which is intended to generate the assisted driving power

3.5

ratio of power assistance

ratio of assisted driving power to power of pedal cranking

3.6

functions for power assistance

functions of power assisting system to generate assisted driving power controlled to the specified ratio of power assistance

3.7

stop of power assistance

of control conditions for terminating the secondary battery discharge, state in which the battery output current related to power assistance is ceased

3.8

chassis dynamometer

unit to measure driving power from drive torque transmitted to roller shaft and from the number of roller rotations, by setting the drive wheel on the roller

3.9

secondary cell

accumulator equipped as power supply for electric power assisted bicycle

3.10

secondary battery

power supply unit of electric power assisted bicycle assembled with secondary cells

3.11

battery lamp

lighting equipment (head lamp and rear lamp) using secondary battery as power supply

3.12

battery charger

unit built into or attached to electric power assisted bicycle to charge secondary batteries

3.13

pedaling input

method for driving the power assisting system by application of the rider's pedal effort to the electric power assisted bicycle on a chassis dynamometer

3.14

pattern running

running an electric power assisted bicycle on a chassis dynamometer, following a given pattern

3.15

electronic load device

device for measuring the capacity of a secondary battery by discharging the secondary battery under such a condition as constant current, constant voltage or constant power

3.16

substances of concern

substances such as asbestos, hexavalent chromium, polybrominated biphenyl (PBB), polybrominated diphenyl ether (PBDE), cadmium, mercury and lead, use of which for products are restricted

NOTE Relevant regulations include Japanese laws e.g. Industrial Safety and Health Act, Soil Contamination Countermeasures Act, Air Pollution Control Act, Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, as well as international regulations e.g. Restriction of Hazardous Substances (RoHS) Directive adopted by the European Parliament.

3.17

travel distance per charge

distance which an electric power assisted bicycle can continuously travel with functions for power assistance, when the bicycle is driven on a chassis dynamometer with the secondary battery being fully charged by an auxiliary battery charger

3.18

equivalent inertia mass

mass required for simulating the inertia, on the chassis dynamometer, which is generated when a human-loaded electric power assisted bicycle runs on the road

This mass is adjusted by the fly wheel attached to the roller of the chassis dynamometer.

3.19

pattern discharge

discharging a secondary battery according to a specified pattern

3.20

full charge

state of a secondary battery which has been charged by means of a battery charger specified by the manufacturer until the charging stop condition is met

3.21

pattern discharge device

device for measuring the capacity of a secondary battery by discharging the secondary battery according to a specified or loaded current pattern, or a system incorporating an electronic load device

3.22

I_t

numerical value, expressed in ampere (A), which indicates the magnitude of battery discharge current and is expressed by the following formula when the rated capacity of the secondary battery is C_5 Ah:

$$I_t \text{ A} = C_5 \text{ Ah/1h}$$

3.23

discharge capacity of the battery

capacity which has been discharged by a secondary battery in a pattern running or by pattern discharge, expressed in ampere hour (Ah)

3.24

discharge power of the battery

power which has been consumed by a secondary battery in a pattern running or by discharge, expressed in watt hour (Wh)

4 Construction and parts

The power assisting system, secondary battery and battery charger comprising electric power assisted bicycles shall comply with Clause 4 of **JIS D 9301** and **JIS D 9111**.

5 Safety (including performance, construction, size and shape)

5.1 General

As specified in 5.1 of **JIS D 9301**.

5.2 Brake

As specified in 5.2 of **JIS D 9301**.

5.3 Steering

As specified in 5.3 of **JIS D 9301**.

5.4 Frame

As specified in 5.4 of **JIS D 9301**.

5.5 Front fork

As specified in **5.5** of **JIS D 9301**.

5.6 Wheels (including integrated wheels)

As specified in **5.6** of **JIS D 9301**.

5.7 Quick-release mechanism

As specified in **5.7** of **JIS D 9301**.

5.8 Tyres and tubes

As specified in **5.8** of **JIS D 9301**.

5.9 Drive system

As specified in **5.9** of **JIS D 9301**.

5.10 Saddles

As specified in **5.10** of **JIS D 9301**.

5.11 Protective device

As specified in **5.11** of **JIS D 9301**.

5.12 Lighting system and reflectors

5.12.1 General

Lighting system and reflectors shall be as specified in **5.12.2** in addition to **5.12** of **JIS D 9301**.

When battery lamps are used as the lighting device of electric power assisted bicycles, items testable only with a head lamp and a rear lamp are applicable among those specified in **JIS C 9502**.

5.12.2 Battery lamp

Battery lamps shall stay on for at least 15 min, keeping the luminous intensity specified in **6.1.1.1** and/or **6.2.1** of **JIS C 9502**, after the stop of power assistance when tested in accordance with **8.1**.

5.13 Horns

As specified in **5.13** of **JIS D 9301**.

5.14 Locks

As specified in **5.14** of **JIS D 9301**.

5.15 Stands

As specified in **5.15** of **JIS D 9301**.

5.16 Static load strength of rear carriers and frames

As specified in **5.16** of **JIS D 9301**.

5.17 Power assisting system

5.17.1 Strength of power assisting system

In the case where the housing or the like of the drive system of a power assisting system doubles as a component of the frame, any part of the power assisting system shall be free from breakage, noticeable deformation and distortion when tested in accordance with **8.2**.

5.17.2 Assisted driving power

5.17.2.1 Ratio of power assistance

The ratio of power assistance corresponding to a running velocity shall comply with the requirement of **A.2 b)** when the power assisting system is tested in accordance with **B.2.2**.

5.17.2.2 Functions for power assistance

Functions for power assistance shall comply with the requirement of **A.3**. They shall also comply with the following requirements when tested in accordance with **B.3**.

Electric motor shall not generate assisted driving power when the power of pedal cranking becomes zero or when the running velocity reaches the maximum velocity specified in **A.2 c)** or reaches the shut off velocity of functions for power assistance which is set below the maximum velocity above.

5.17.3 Preventive measures against conversion

Power assisting system shall comply with the requirements of **A.2 d)** and **B.2.3**.

5.17.4 Water resistance

When the power assisting system is subjected to the water resistance test for Degree of protection 4 (splash-proof type) specified in **JIS C 0920**, the system shall have no abnormality in the electric circuit or the like and shall satisfy the requirement in **A.3** immediately after the test and after having been left for 12 h or more after the test.

5.17.5 Vibration resistance

When tested in accordance with **8.3**, any part of the power assisting system shall be free from abnormal sound, looseness, breakage, disconnection, deformation or the like. When fitted to a bicycle again, the power assisting system shall comply with the requirement in **A.3**.

5.18 Secondary batteries

Secondary cells used for secondary batteries shall be as follows.

Lead-acid cells shall satisfy the requirements specified in **JIS C 8702-1** and **JIS C 8702-3**, and other cells shall satisfy the requirements specified in **JIS C 8712**.

NOTE The Ministerial Order to Provide Technical Standards for Electrical Appliances and Materials (Order of the Ministry of Economy, Trade and Industry No. 34, dated July 1, 2013) (hereafter referred to as Ministerial Order) applies to the lithium ion batteries subject to the Order for Enforcement of the Electrical Appliances and Materials Safety Act (Cabinet Order No. 324, dated August 14, 1962).

5.19 Battery charger

The battery charger shall be as specified in **JIS C 9335-1** and **JIS C 9335-2-29**.

NOTE The relevant Ministerial Orders apply to battery chargers.

6 Requirements for product design

Requirements for product design shall be as specified in Clause 5 and Annex C.

7 Appearance

As specified in Clause 6 of **JIS D 9301**.

8 Test method

8.1 Lighting duration and luminous intensity of battery lamps

Lighting duration and luminous intensity of battery lamps shall be as follows.

- a) According to the test method specified in **D.2.3.1** or **D.2.4.1**, connect the secondary battery to the electronic load device using the average battery current obtained when the bicycle runs in the standard pattern specified in **D.3 a)**, and discharge the battery until the condition of the stop of power assistance is met, under the conditions and preparation for measurement of the pattern running by the pedaling input as specified in **D.2.2**.
- b) With the battery lamps and the power assisting system being connected to the secondary battery in the stop of power assistance, light the battery lamps for 15 min or more after the stop of power assistance, and measure the battery voltage. The ambient temperature in the test room during the measurement shall be $20\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.
- c) Using the battery voltage measured in **b)**, measure the luminous intensity of the head lamp specified in **6.1.1.1** of **JIS C 9502** or the rear lamp specified in **6.2.1** of **JIS C 9502**.

8.2 Strength test of power assisting system

Install a component of the power assisting system to be tested onto a jig equivalent to the frame as shown in Figure 1 or onto the frame. Then, apply a downward force of 1 400 N to the centre of the pedal shaft 75 000 times alternately on each side, i.e. 150 000 times in total, or 75 000 times on one side first and then 75 000 times on the other side, hence 150 000 times in total.