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Test method of durability for motorcycles and mopeds

摩托车和轻便摩托车耐久性试验方法

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Test method of durability for motorcycles and mopeds

1 Scope

This document specifies the test conditions, test items, test methods and test reports of durability tests for motorcycles and mopeds.

This document applies to the durability tests of motorcycles and mopeds (hereinafter referred to as "motorcycles" unless otherwise specified).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB 4569, Limit and measurement method of noise emitted by stationary - Motorcycles and mopeds

GB/T 5359.1, Term for motorcycles and mopeds - Part 1: Types of vehicles

GB/T 5359.2, Term for motorcycles and mopeds - Part 2: Performance of vehicles

GB/T 5373, Measuring method of dimensions and masses parameter for motorcycles and mopeds

GB/T 5378, Methods of road test for motorcycles and mopeds

GB/T 7031, Mechanical vibration - Road surface profiles - Reporting of measured data

GB 7258, Technical specifications for safety of power-driven vehicles operating on roads

GB 14622, Limits and measurement methods for motorcycle pollutant discharge (China stage IV)

GB 15742, Performance requirements and test methods of horn for motor vehicles

GB 15744, The limits and measurement methods of fuel consumption for motorcycles and mopeds

GB 16169, Limit and measurement method of noise emitted by accelerating - Motorcycles and mopeds

GB 18176, Limits and measurement methods for emissions of pollutants from mopeds (CHINA IV)

GB/T 18387, Limits and test method of magnetic and electric field strength from electric vehicles

GB 20073, Performance and measurement method for braking of motorcycles and mopeds

GB 24155, Safety specifications for electric motorcycles and electric mopeds

GB/T 24156, Electric motorcycles and electric mopeds - Power performance - Test methods

GB/T 24157, Test methods of range and indication for the state of charge for electric motorcycles and electric mopeds

GB 34660, Road vehicles - Requirements and test methods of electromagnetic compatibility

JTG B01, Technical standard of highway engineering

3 Terms and definitions

For the purpose of this document, terms and definitions given in GB/T 5359.1 and GB/T 5359.2 apply.

4 Test conditions

4.1 General test conditions

4.1.1 Before testing, the manufacturer shall provide product technical documentation.

4.1.2 The safety and environmental performance of the test vehicle shall comply with the following mandatory standards:

- GB 14622, Limits and measurement methods for motorcycle pollutant discharge (China stage IV);
- GB 18176, Limits and measurement methods for emissions of pollutants from mopeds (CHINA IV);
- GB 16169, Limit and measurement method of noise emitted by accelerating - Motorcycles and mopeds.

4.1.3 Before the performance test, the test vehicle shall be run-in according to the product technical documentation. During the run-in period, the engine and transmission lubricants shall be replaced according to the requirements of the product technical documentation; no parts shall be adjusted or replaced at will; detailed driving inspection records shall be kept. The mechanical moving parts of the electric motorcycles shall be lubricated in accordance with the provisions of the product technical documentation. Before the performance test, the power battery (pack) used in the test vehicle shall be a fully charged battery that has been manufactured within three months (or as specified in the product technical documentation) and has been charged and discharged no more than 50 times.

4.1.4 The loading mass of the test vehicle shall comply with the relevant provisions of GB/T 5378.

4.1.5 The specifications and working pressure of the tires of the test vehicle shall comply with the provisions of the technical documentation accompanying the vehicle, and the pressure error shall not exceed ± 10 kPa.

4.2 Test conditions for termination

If any of the following situations are found during the test, the test shall be terminated:

- a) The steering, braking, transmission, wheel system, etc. cannot ensure driving safety;
- b) The frame or its welds are damaged by cracks, desoldering or other damage that makes it impossible to continue the test;
- c) The assembly to be assessed in the test is severely damaged and needs to be replaced.

4.3 Test road

4.3.1 The driving test road conditions shall be:

- a) Urban highway: urban traffic arterial street that meets the requirements of JTG B01; the road surface roughness shall be Class C or above as specified in GB/T 7031;
- b) Expressway: multi-lane highway that meets the requirements of JTG B01 and is designed for motor vehicles to travel in different directions and lanes, with fully controlled access. It can also be carried out within the test site;
- c) Ordinary highway: in line with the requirements of the national primary and secondary highway, of wide and straight road surface, and good vision;
- d) Mountain highway: average slope greater than 4%, road surface smoothness above Class C as specified in GB/T 7031;

4.3.2 The test road should be selected on a road section with light traffic flow, which is convenient for the vehicle speed to be maximized and conducive to test safety. It can also be conducted in a closed test field.

5 Test items and test methods

5.1 Measurement of main dimensions and mass parameters

The main dimensions and mass shall be in accordance with the provisions of GB/T 5373. The following parameters shall be measured for the test vehicle:

- a) Overall dimensions (length, width, height);
- b) Wheelbase;
- c) Tread;
- d) Front wheel steering angle;
- e) Ground clearance;
- f) Turning circle diameter;
- g) Complete vehicle kerb mass and axle load mass;
- h) Factory-specified maximum total mass and factory-specified maximum axle load.

5.2 Running-in

5.2.1 Before running-in, calibrate the speedometer indication according to the provisions of GB/T 5378.

5.2.2 The test vehicle shall be run-in on a flat road surface as specified in the product technical documentation, with a run-in mileage not exceeding 1 000 km; for mopeds, the run-in mileage of mopeds shall not exceed 250 km. Before testing the electric motorcycle, the equipped power battery (pack) shall be used for running-in, and the running-in mileage shall not exceed 100 km. It can also be run-in to the specified mileage according to the requirements of the company's product technical documentation.

5.2.3 During the running-in period, the tightness and working condition of all parts of the test vehicle shall be checked regularly. Any failures found shall be eliminated promptly and included in the failure statistics.

5.3 Main performance test

5.3.1 Inspection before performance test

After the running-in, maintain according to the product technical documentation, and carry out an inspection drive of no more than 50 km to ensure that the test vehicle is in good mechanical condition.

5.3.2 Initial performance test

5.3.2.1 The initial performance test for motorcycles using internal combustion engines shall include the following items:

- a) Starting performance test, carried out according to GB/T 5378;
- b) Maximum speed test, carried out according to GB/T 5378;
- c) Minimum stable speed test, carried out according to GB/T 5378;
- d) Acceleration performance test, carried out according to GB/T 5378;
- e) Sliding test, carried out according to GB/T 5378;
- f) Climbing performance test, carried out according to GB/T 5378;
- g) Headlamp performance, carried out according to GB 7258;
- h) Horn sound level measurement, carried out according to GB 7258 and GB 15742;
- i) Stationary noise measurement, carried out according to GB 4569;
- j) Acceleration noise measurement, carried out according to GB 16169;
- k) Dual idle pollutant measurement, carried out according to GB 14622 or GB 18176;
- l) Fuel consumption test, carried out according to GB 15744;
- m) Braking performance test, carried out according to GB 20073;
- n) Electromagnetic compatibility test, carried out according to GB 34660.

5.3.2.2 The initial performance test of electric motorcycles shall include the following items:

- a) Maximum driving speed test, carried out according to GB/T 24156;
- b) Minimum stable speed test, carried out according to GB/T 5378;
- c) Acceleration performance test, carried out according to GB/T 24156;
- d) Climbing performance test, carried out according to GB/T 24156;

- b) Speed: While ensuring safety, the vehicle shall be driven at the speed permitted by the product technical documentation and road traffic management regulations, and the speed shall be increased as much as possible.
- c) Braking: Brake to a stop at least twice for every 50 km travelled.
- d) The driving mileage shall include 10% of the driving mileage at night. Driving with lights on during the day is allowed instead.

5.4.3.4.2 Electric motorcycles shall be operated in accordance with the following requirements.

- a) Electric motorcycles must stop and rest for at least 10 minutes every 2 hours of driving.
- b) Speed: While ensuring safety, the vehicle shall be driven at the speed permitted by the product technical documentation and road traffic management regulations, and the speed shall be increased as much as possible.
- c) The electric motorcycle must be braked to a stop at least twice every hour of driving.
- d) The driving mileage shall include 10% of the driving mileage at night. Driving with lights on during the day is allowed instead.
- e) Electric motorcycles must use the same set of power batteries (packs) for durability testing. Each time the remaining battery warning prompt is reached (maximum speed 70%), the vehicle must be charged using the factory-configured charging system, and charging shall be completed at least once a day.
- f) If the enterprise uses the method of replacing the traction battery (pack) instead of charging, it must record this in the corresponding records and indicate in the assessment indicators that the traction battery (pack) and related components are not included.

5.4.3.5 Failure diagnosis and recording

During the driving test, it is allowed to inspect, adjust and maintain the test vehicle in accordance with the provisions of the product technical documentation.

All types of failures and parts replacements shall be included in the failure statistics. The failure classification principles are shown in Appendix B.

5.4.4 Calculation method of durability assessment indicators

5.4.4.1 After the durability test, assess the sample vehicle's mileage to first failure, mean mileage between failures, equivalent failure rate, and comprehensive assessment score.

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