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CCS T 47

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ASSOCIATION STANDARD

T/CSAE 77-2018

Test methods for constancy of braking efficiency of regenerative braking system for electric vehicles

电动汽车再生制动系统制动效能 恒定性试验方法

(English Translation)

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Foreword

This standard is based on GB/T 1.1-2009 "Standardization Work Guide Part 1. Standard Structure and Compilation" Read on.

1 Scope

This standard specifies the test method for the braking performance constant of electric vehicle regenerative braking system.

This standard applies to electric vehicles equipped with regenerative braking systems.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the dated version applies to this file. For dated documents, the latest edition (including all amendments) applies to this document.

GB/T 19596 electric vehicle terminology GB/T 18384.1 Electric Vehicle Safety Requirements Part 1. Vehicle Rechargeable Energy Storage System (REESS) GB 21670 Passenger car brake system technical requirements and test methods Evaluation and test method for energy recovery rate of regenerative braking of T/CSAE 44 pure electric passenger car GB 12676 Technical requirements and test methods for brake systems for commercial vehicles and trailers QC/T 1089 Electric vehicle regenerative braking system requirements and test methods

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3 Terms and definitions

The following terms and definitions defined in GB/T 19596-2017 and GB/T 18384.1-2015 apply to this document. For ease of use, Some of the terms and definitions in GB/T 19596-2017 and GB/T 18384.1-2015 are repeated below.

3.1 Regenerative braking system regenerative braking system

When the car is taxiing, slowing down or going downhill, the kinetic energy and potential energy during the driving process are converted or partially converted into vehicle-mounted rechargeable energy storage.

The system's energy is stored in the brake system.

Note: Rewrite GB/T 19596-2017, definition 3.1.2.1.8.

3.2 Rechargeable energy storage system rechargeable energy storage system (REESS)

An energy storage system that can be charged and provides electrical energy, such as batteries and capacitors.

[GB/T 18384.1-2015, definition 3.1]

4.1 Test conditions

The test vehicle, site, running-in, etc. of the passenger car shall be in accordance with the requirements of Test Method 7 of GB 21670-2008. Commercial vehicle the requirements for test vehicles, sites, running-in, etc. shall be in accordance with the requirements of test requirements 5.1 in GB 12676-2014. In the (5 ~ 32) °C environment Perform an outdoor test at temperature.

4.2 Regenerative braking system status requirements

A vehicle regenerative braking system includes a friction braking system and an electric braking system. For passenger cars, the state of their regenerative braking system should Meet the requirements of the friction braking system and the electric regenerative braking system specified in GB 21670-2008 4, 5 and Appendix D.

[T/CSAE 44-2015 5.1.3] for commercial vehicles, the state of the regenerative braking system shall comply with the friction system specified in GB 12676-2014 4, 5 and Appendix H.

Related content of the dynamic system and the electric regenerative braking system.

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4.3.1 Test of the stability of braking performance at different initial braking speeds

4.3.1.1
Adjust the state of charge of the rechargeable energy storage system to the vicinity of the intermediate value.

4.3.1.2
When the vehicle is fully loaded, the selected vehicles are tested in the following three states.

1) The initial braking speed is 80% of the maximum speed and cannot exceed 160km/h;

2) The initial braking speed is 80km/h;

3) The initial braking speed is 32km/h.

4.3.1.3
During the test, first confirm that the average temperature of the service brake on the axle with the highest temperature is between 65 °C and 100 °C. in on a horizontal road surface with good adhesion coefficient, accelerate the vehicle to 5 km/h above the test specified speed, and when the vehicle speed drops to the test specified speed, Depress the brake pedal to fix the brake pedal opening brake until the vehicle stops, recording the vehicle speed and braking distance. Repeat the test at least 5 times.

4.3.1.4
Braking at different initial braking speeds with brake pedal opening fixed at 30%, 50%, 80% respectively Test for potency of efficacy.

4.3.2 Test of the stability of vehicle braking performance under different state of charge in rechargeable energy storage system

4.3.2.1 The selected vehicles are tested in the following three states (QC/T 1089-2017 Appendix A A.3).

1) The vehicle is fully charged or charged at 95% or more;

2) Discharge the vehicle and complete one-third of the constant speed range;

3) Discharge the vehicle and complete two-thirds of the constant speed range.

4.3.2.2 Set the initial braking speed to 80% of the maximum speed, repeating 4.3.1.3 and 4.3.1.4.

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4.4 Calculating the average deceleration coefficient of variation

In the formula.

-- average deceleration coefficient of variation;

- the standard deviation of the average deceleration, in meters per square second (m/s2);

- the average of the average deceleration of the three groups of tests, in meters per square second (m/s2);

- the average value of the average deceleration of the test in group i, in meters per square second (m/s2);

- the average deceleration of the jth test of group i, in meters per square second (m/s2);

-0.8 vehicle speed in kilometers per hour (km/h);

-0.1 speed, in kilometers per hour (km/h);

- the distance traveled from the time to the period, in meters (m);

- The distance traveled from the time of the period to the meter (m).

Among them, the speed and distance should be measured with an instrument with an accuracy of ±1% at the specified test speed. Can also be used in addition to measuring vehicle speed and distance Other methods are measured; in this case, the accuracy should be within ±3%. [GB 21670-2008 5.1.1.2] Appendix A (informative appendix) Test record

Table A.1 Average deceleration coefficient of variation test

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