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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Test methods for power performance of fuel cell electric
vehicles**

燃料电池电动汽车动力性能试验方法

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1 Scope

This document describes the test methods for power performance - such as acceleration performance, maximum speed and gradeability - of fuel cell electric vehicles.

This document applies to the power performance tests of M and N fuel cell electric vehicles using compressed hydrogen (hereinafter referred to as "vehicles").

2 Normative references

GB/T 3730.2

GB/T 12428

GB/T 12534

GB/T 12539

GB/T 12545.1-2008

GB/T 15089

GB 18384

3 Terms and definitions

The following terms and definitions, as well as those determined by GB/T 12539, GB/T 15089, GB 18384, GB/T 18385, GB/T 19596, GB/T 19752 and GB/T 24548, are applicable to this document.

3.1 rechargeable electrical energy storage system mode

A driving mode where the energy or power of vehicle is only provided by the rechargeable electrical energy storage system (REESS).

4.1.1 Atmospheric temperature and atmospheric pressure

The atmospheric temperature shall be 0 °C ~ 40 °C; the atmospheric pressure shall be 91 kPa ~ 104 kPa.

4.1.2 Air density

The air density during the test is calculated from Formula (1). Compared with the air density in the standard environment, the variation shall not exceed 7.5%.

4.1.4 Relative humidity

The relative humidity shall be less than 95%, and the test shall not be conducted in rainy or foggy days.

4.2 Test equipment

See Table 1 for the measurement parameters, units and accuracy.

4.3.1 General requirements

When conducting the maximum thirty-minutes speed test, maximum speed test and acceleration performance test, the vehicle shall be loaded according to the requirements in 4.3.2 and 4.3.3; when conducting the 4% and 12% speed uphill test, maximum gradient and hill starting ability test, the vehicle shall be loaded according to the maximum authorized pay mass (including the mass of the tester and instrument), and the load shall be uniformly distributed and firmly fixed.

4.4.1 The shape structure and technical parameters of the vehicle must be maintained

as that when it leaves the factory.

4.4.2 The vehicle under test shall be loaded according to the technical requirements in 4.3.

4.5.1 General conditions

The test shall be conducted on a dry straight or circular track. The pavement shall be hard, flat, clean and good in adhesion coefficient.

4.5.2 Straight conditions

The length of measurement area shall be at least 1 000 m.

The acceleration area shall be long enough so that the vehicle can achieve the maximum speed within 200 m before entering the measurement area. The longitudinal gradient of both the measurement area and the area 200 m after the acceleration area shall not exceed 0.5%. The longitudinal gradient of the acceleration area shall not exceed 4%.

The lateral gradient of the measurement area shall not exceed 3%.

4.5.3 Circular track

The length of the circular track shall be at least 1 000 m. The circular track is not a complete circle, but being connected by a linear part and a part approximate to a ring.

The curvature radius of the curve shall be no less than 200 m.

4.5.5 Test gradient

As shown in Figure 1, the length of the test road ramp shall be no less than 20 m. A transition section shall be arranged in front and at back of the test section. The straight and flat section before the slope shall be no less than 8 m. The ramp pavement shall be flat, solid, dry, uniform in gradient and good in adhesion performance.

5.1 Hydrogenation

Hydrogen shall be added according to the manufacturer's hydrogenation procedures.

5.2 Power regulation of conventional REESS

To ensure the normal operation of fuel cell system in the vehicle and avoid the single operation of REESS during test, perform the power regulation of REESS in the following procedures before test.

5.3 Warm-up

Before carrying out the test, warm up the vehicle system and components that may affect the test result, so as to meet the manufacturer's requirement for stable temperature.

6.1 Arrangement of test items

For the externally rechargeable and non-externally rechargeable vehicles, arrange the test items as follows.

7.1.1 Standard test procedures (two-direction test)

The standard test procedures are as follows.

7.1.2 Test procedures in single direction

The test procedures in single direction are as follows.

7.1.3 Maximum speed test procedures on circular road

The maximum speed test procedures on the circular road are as follows.

7.3.3.1 Data calculation

Calculate the arithmetic mean, standard deviation and variation factor (standard deviation/arithmetic mean) of all effective test data according to Formula (11), Formula (12) and Formula (13).

7.4 Speed uphill test (unnecessary for the fuel cell electric vehicles other than M1, M2 and N1 vehicles)

7.5 Maximum gradient test

The maximum gradient test procedures are as follows.

Appendix A Appendix A

(Normative) Determination method of correction factor on circular road A.1 Determine the fixed correction factor k on circular road based on the maximum allowable speed on a circular road.

A.2 Determine the correction factor based on multiple speed measurements and control the continuous speed difference of two continuous measurements to be less than 30 km/h.

A.3 For each vehicle speed, the following two test methods shall be carried out, while maintaining the same motor speed, according to the requirements of this document.