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

GB/T 26779-2021

Replacing GB/T 26779-2011

Fuel cell electric vehicles - Refuelling receptacle

燃料电池电动汽车加氢口

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Foreword

This Standard was drafted in accordance with the rules given in GB/T 1.1-2009 "Directives for standardization - Part

1. Structure and drafting of standards". This Standard replaces GB/T 26779-2011 "Fuel cell electric vehicles - Refueling receptacle". Compared with GB/T 26779-2011, in addition to structural adjustments and editorial changes, the main technical changes are as follows: - added the ozone aging resistance test (see 5.2.6); - added the salt spray corrosion resistance test (see 5.2.9); - added the temperature cycle resistance test (see 5.2.10); -

added the compatibility test (see 5.2.11); - added the 70MPa receptacle size (see Figure A.3); - added an informative appendix for the antifreeze design of receptacle (see Annex B); - modified the processing requirements of 35MPa receptacle (see Figure A.1, Figure A.2, Figure A.1 of Edition 2011 and Figure A.3 of No.

1 Scope

China's national standard for the hydrogen refuelling receptacle of fuel cell electric vehicles. It specifies the requirements, the test methods and the marking of the receptacle on the vehicle into which the filling nozzle is connected. The receptacle is a small component with an outsized role, because it is the only physical interface between a vehicle and a fuelling infrastructure that has to work everywhere. A car must be fillable at any station of its pressure class, from any supplier, in any country that has adopted the same interface - so the geometry is not a design choice but a fixed contract, and it has to be fixed in a way that makes the wrong connection physically impossible. Receptacles are keyed by pressure class so that a vehicle rated for thirty-five megapascals cannot be filled from a seventy megapascal dispenser, and the profile is dimensioned so that a nozzle either engages fully and seals or does not engage at all. What sits behind the geometry is a pressure component in a hostile position. It is on the outside of a vehicle, exposed to weather, road salt, dirt and impact, and it is connected and disconnected thousands of times over the vehicle's life while holding hydrogen at up to seventy megapascals. Hydrogen leaks through paths that would hold any other gas and embrittles some materials that would otherwise be obvious choices. And the filling itself is fast and the gas heats as it compresses, so the receptacle sees temperature swings on every fill. So the standard specifies the dimensions and the keying, the materials and their compatibility with hydrogen, the pressure and leakage requirements, the durability over the connection cycles, the temperature range, the resistance to impact and corrosion, the protective cap, and the communication interface where the fill is controlled by the vehicle. Issued on 9 March 2021 and in force since 1 October 2021, it replaces GB/T 26779-2011.

This Standard specifies types, marks, requirements and test methods for hydrogen fuel cell electric vehicle refueling receptacle. This Standard is applicable to the hydrogen fuel cell electric vehicle refueling receptacle that uses compressed hydrogen as working medium, the rated filling pressure does not exceed 70MPa, the working temperature is -40°C~85°C.

2 Normative references

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

GB/T 1690-2010, Rubber, vulcanized or thermoplastic - Determination of the effect of liquids

GB/T 10125, Corrosion tests in artificial atmospheres - Salt spray tests

GB/T 24548, Fuel cell electric vehicles - Terminology

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB/T 24548 as well as the followings apply.

3.1 receptacle a component assembly connected to the hydrogenation gun on the vehicle

3.2 nominal working pressure in the standard state, the designed rated filling pressure

4 Model

The receptacle model consists of the following four parts.

5.1 General requirements

5.1.1 The interface type and size shall meet the requirements of Annex A. Designs such as chamfering, protective cover fixing groove, hexagonal shape that are easy to install are allowed. Such design shall not affect the normal engagement of the hydrogenation gun.

5.1.2 In order to solve the freezing problem of hydrogenation gun caused by hydrogen pre-cooling, refer to Annex B for the design of receptacle.

5.1.3 A check valve shall be included in the design of receptacle.

5.2 Performance requirements

5.2.1 Air tightness Carry out the air tightness test according to the method specified in 6.3. First use a leak detector to check. If no bubbles are generated within 1min, it is conforming. If bubbles occur, continue using the leak detector or other methods to measure.

5.2.2 Vibration resistance Carry out the vibration resistance test according to the method specified in 6.4. All connectors shall not be loose. Its air tightness shall meet the requirements of 5.2.1.

5.2.3 Temperature resistance Carry out the temperature resistance test according to the method specified in 6.5. There shall be no air bubbles.

5.2.4 Durability Modified serial number (in Arabic numerals, such as 01, 02); Matched basic size of receptacle and hydrogenation gun (such as 40/18);

5.2.5 Oxygen aging resistance For the seals in contact with hydrogen at the receptacle, carry out the oxygen aging test according to the method specified in 6.7.

5.2.6 Ozone aging resistance For the seals in contact with air at the receptacle, carry out the ozone aging resistance test according to the method specified in 6.8. There shall be no

obvious deformation, deterioration, spots, cracks and so on.

5.2.7 Compatibility For the non-metal parts in contact with hydrogen at the receptacle, carry out the compatibility test according to the method specified in 6.9. Its volume expansion rate shall not be greater than 25%.

5.2.8 Hydrostatic strength The pressure-bearing parts of the receptacle shall be subjected to the hydrostatic strength test according to the method specified in 6.10. There shall be no cracks or permanent deformation.

5.2.9 Salt spray corrosion resistance Test according to the method specified in 6.11. The receptacle shall not show signs of corrosion or peeling off the protective layer. The receptacle shall meet the air tightness requirements specified in 5.2.1.

5.2.11 Compatibility Only the receptacle with a nominal working pressure of 70MPa needs to be tested for compatibility. Carry out the compatibility test according to the method specified in 6.13. After the test, there shall be no abnormal wear and shall meet the requirements for air tightness in 5.2.1.

6 Test methods

6.1 General Unless otherwise specified, the test shall be carried out under the following conditions.

6.2 Appearance and size inspection Use visual inspection for the appearance inspection of receptacle. Size measurement can be added if necessary.

6.3 Air tightness test When the check valve of the receptacle is closed, at the outlet end of receptacle, access with leak detection gas. Respectively test under two pressure states of 0.5MPa and

1.25 times the nominal working pressure.

6.4 Vibration resistance test Reliably fix the test piece on the vibration test bench. From 5Hz~60Hz, each integer frequency point needs to vibrate 8min, 448min in total. The amplitude is shown as Table 2.

6.5 Temperature resistance test The check valve of the receptacle is closed. Fill the outlet end of the receptacle with a leak detection gas whose pressure is the nominal working pressure. Put it in an incubator. The temperature rises from room temperature to 85°C±2°C. Keep the temperature for 8h. Immerse in 85°C water for 1min. Record whether there are bubbles.

6.6 Durability test The durability test is carried out according to the following steps. The total number of cycles is 15000.

6.7 Oxygen aging resistance test The seals in contact with hydrogen at the receptacle shall