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Compatibility of On-board Battery Swap System for Battery Electric Passenger Vehicles - Part 2: Battery Swap Cooling Interface

纯电动乘用车车载换电系统互换性

第 2 部分：换电冷却接口

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Foreword

This document was drafted in accordance with the rules provided in GB/T 1.1-2020 *Directives for Standardization - Part 1: Rules for the Structure and Drafting of Standardizing Documents*.

This document is Part 2 of QC/T 1204 *Compatibility of On-board Battery Swap System for Battery Electric Passenger Vehicles*. QC/T 1204 has issued the following parts:

---Part 1: Battery Swap Electrical Interface;

---Part 2: Battery Swap Cooling Interface;

---Part 3: Battery Swap Mechanism;

---Part 4: Battery Swap Pack;

---Part 5: Communication between Electric Vehicle and Battery Pack.

Please be noted that certain content of this document may involve patents. The institution issuing this document does not undertake the responsibility of identifying these patents.

This document was proposed by and shall be under the jurisdiction of National Technical Committee 114 on Auto of Standardization Administration of China (SAC/TC 114).

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Compatibility of On-board Battery Swap System for Battery Electric Passenger Vehicles - Part 2: Battery Swap Cooling Interface

1 Scope

This document specifies the interchangeability requirements and test methods for the cooling interface of on-board battery swap system for battery electric passenger vehicles.

This document is applicable to the cooling interface of on-board battery swap system for battery electric passenger vehicles.

2 Normative References

The content of the following documents constitutes indispensable clauses of this document through normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 19596 Terminology of Electric Vehicles

GB/T 30038 Road Vehicles - Degrees of Electrical Equipment Protection (IP-Code)

GB/T 32879-2016 General Requirements for Swapping Battery Pack Connector of Electric Vehicle

GB 38031-2020 Electric Vehicles Traction Battery Safety Requirements

3 Terms and Definitions

The terms and definitions defined in GB/T 19596, and the following are applicable to this document.

3.1 cooling connector assembly

An interface connecting the liquid cooling system of the complete vehicle and the liquid cooling system of the battery swap pack.

NOTE: it has the function of automatically cutting off the coolant when disconnected and automatically turning on the coolant when connected, including pack connector and vehicle connector.

5.2 Accuracy of Test Instruments

The accuracy of the measurement instruments shall not be lower than the following requirements:

a) Temperature measurement device: ± 1 °C;

b) Time measurement device: ± 1% FS (above 1 min), ± 5% FS (below 1 min);

c) Flow measurement device: ± 0.2 L/min;

d) Pressure measurement device: ± 0.1% FS;

e) Mass measurement device: ± 0.1% FS.

5.3 Floating Capability Test

Install the cooling interface component on a special tooling that can adjust its displacement, and respectively measure the maximum floating amount and maximum correction angle in the *X*, *Y* and *Z* directions.

5.4 Air Tightness Test

Respectively carry out air tightness test on the cooling interface assembly, and pack-end and vehicle-end parts, and choose one of the following three modes for testing:

a) Wet inspection: on the wet sealing performance test bench, pass 205 kPa compressed air to the liquid cooling system immersed in water, and observe the bubbles in the water for 120 s;

b) Dry inspection: on the dry sealing performance test bench, pass 205 kPa compressed air into the liquid cooling system, inflate for 120 s, maintain pressure for 120 s, and the test duration is 60 s;

c) Helium inspection: put the liquid cooling system into the helium inspection box, pass 205 kPa helium gas (concentration: 80%) into the liquid cooling system, maintain pressure for 30 s, and the test duration is 60 s.

5.5 Plug-in and plug-out Force Test

In accordance with the requirements of 6.4 in GB/T 32879-2016, install the cooling interface component of the battery pack for battery swap on an equipment that can measure pulling force and pushing force. At a speed of 10 mm/s, perform plug-in and plug-out. After 30 cycles of plug-in and plug-out, record the measured values of the plug-in and plug-out force.

5.6 Pressure Drop Test

5.6.1 After combining the cooling interface, connect the inlet and outlet to the flow pressure drop machine, and the coolant temperature is 25 °C.

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