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

GB/T 43191-2023

**On-site testing instruments of AC charging spot for electric
vehicles**

电动汽车交流充电桩现场检测仪

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Foreword

This document was issued on 7 September 2023 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 1 April 2024.

It is a GB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

1 Scope

GB/T 43191-2023 specifies the instruments used to test AC charging points for electric vehicles in the field. A charge point is a metering device sold to the public: it bills by the kilowatt hour, so it falls under legal metrology, and it must be verified where it stands rather than in a laboratory - outdoors, on a live supply, by a technician with a portable instrument. That instrument must therefore be accurate enough to judge the meter, safe on an unknown installation, and able to emulate the vehicle's control pilot signalling well enough to make the charger operate. The standard sets the technical requirements - working environment, mechanical, electrical, electromagnetic compatibility, measurement performance and interfaces - and the corresponding test methods, followed by the inspection rules and the marking, packaging, transport and storage provisions. It took effect on 1 April 2024.

This document defines the terms and definitions of on-site testing instruments of AC charging spot for electric vehicles, stipulates the technical requirements for mechanical properties, electrical properties, electromagnetic compatibility, measurement performance, interfaces, etc., describes the corresponding test methods, inspection rules, and specifies aspects such as marking, packaging, transportation and storage.

This document applies to the design, manufacturing, procurement and acceptance of on-site testing instruments of AC charging spot for electric vehicles.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document.

GB/T 2423.1-2008, Environmental testing for electric and electronic products - Part 2: Test methods - Tests A: Cold

GB/T 2423.2-2008, Environmental testing for electric and electronic products - Part

2: Test methods - Tests B: Dry heat

GB/T 2423.4-2008, Environmental testing for electric and electronic products - Part

2: Test method - Test Db: Damp heat, cyclic (12h+12h cycle)

GB/T 2423.5-2019, Environmental testing - Part 2: Test methods - Test Ea and guidance: Shock

GB/T 2423.43-2008, Environmental testing for electric and electronic products - Part 2: Test methods - Mounting of specimens for vibration impact and similar dynamic tests

GB/T 2423.56-2018, Environmental testing - Part 2: Test methods - Test Fh: Vibration, broadband random and guidance

GB/T 4208-2017, Degrees of protection provided by enclosure (IP code)

The enclosure of the testing instrument shall comply with the requirements for IP5X in GB/T 4208-2017.

4.2.5 Earthing terminal

The testing instrument shall be provided with a protective earth terminal with an obvious earthing mark, and a reliable electrical connection with the accessible metal enclosure of the testing instrument. The resistance between the earthing terminal and each connecting point shall not be greater than 0.1 ohm. The electric conductor of the earthing terminal shall be made of copper and shall be anti-corrosion treated on the surface. The thread diameter of the earthing terminal shall be no less than 6 mm.

4.2.6 Protection against mechanical hazards

4.2.6.1 Sharp edges

The enclosure of the testing instrument shall comply with the provisions of 7.2 in GB/T 17215.231-2021.

4.2.6.2 Transportation protection

The enclosure of the testing instrument shall comply with the provisions of 7.3 in GB/T 17215.231-2021.

4.3 Electrical performance

4.3.1 Power supply

The testing instrument shall at least meet the requirements of 4.5 when working under the following AC power supply conditions:

- a) Rated voltage: single-phase 220 V, allowable deviation: -20% ~ +15%;
- b) Frequency: 50 Hz, allowable deviation +/-1 Hz;
- c) Waveform: sine, waveform distortion factor <=5%.

For the testing instrument using built-in battery power, a fully charged built-in battery shall be able to operate continuously for at least 4 hours.

4.3.2 Power consumption

When the auxiliary device of the testing instrument is not working, the power consumption of the entire testing instrument shall not exceed 50 W.

4.3.3 Insulation resistance

When applying a DC voltage that complies with the requirements in Table 1 between the non-electrically connected live circuits of the testing instrument and between each

4.6.4 Load communication interface

For testing instruments with load communication interfaces, the manufacturing unit shall provide the communication protocol between the testing instrument and the load.

The communication protocol should be made by referring to Appendix B.

4.6.5 Auxiliary interface

The testing instrument should have charging connection confirmation (CC), control pilot (CP) signal lead-out interface and AC power supply (L1, L2, L3, N) lead-out interfaces. The corresponding signal ports between the lead-out interfaces and the charging interface shall be reliably electrically connected, and the AC power outlet interface shall be protected against accidental collision.

4.6.6 Corrosion and rust resistance

The corrosion and rust resistance of the testing instrument interface shall comply with the provisions of Chapter 28 of GB/T 11918.1-2014.