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Minimum allowable values of energy efficiency and energy efficiency grades for electric vehicle power supply equipment

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Foreword

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

Please note that certain contents of this document may involve patents. The issuing authority of this document shall not be liable for identifying such patents.

This document is proposed and administered by the Standardization Administration of the People's Republic of China (SAMR).

Minimum allowable values of energy efficiency and energy efficiency grades for electric vehicle power supply equipment

1 Scope

This document specifies the energy efficiency classes, minimum allowable values of energy efficiency, and test methods for electric vehicle power supply equipment.

This document applies to off-board conductive power supply equipment with current control and/or voltage control, where the rated voltage on the grid side does not exceed 1000 V (AC), and the rated voltage on the electric vehicle side does not exceed 1000 V (AC) or 1500 V (DC). This includes DC power supply equipment (Mode 4, Connection Mode C) and AC power supply equipment (Mode 3, Connection Mode B or C).

This document is not applicable to the following equipment:

—— Power supply equipment that only provides DC power on the grid side;

—— In-cable control and protection devices (IC-CPD) for Mode 2 charging;

—— Integrated AC-DC power supply equipment;

—— Integrated charging and energy storage equipment that loses charging function when the energy storage function is disabled;

—— Power supply equipment for automatic charging as well as top or bottom contact charging.

Note: The definitions of Mode 2, Mode 3, Mode 4, Connection Mode B and Connection Mode C are given in GB/T 18487.1.

2 Normative References

The contents of the following documents are incorporated as indispensable provisions of this document through normative reference in the text. For dated referenced documents, only the edition corresponding to the specified date applies to this document; for undated referenced documents, the latest edition (including all amendments) applies to this document.

GB/T 8170 Rules for Rounding Off of Numerical Values and Expression and Judgment of Limiting Values

GB/T 18487.1 Conductive Charging System for Electric Vehicles - Part 1: General Requirements

GB/T 29317 Terms for Electric Vehicle Charging and Battery Swapping Facilities

3 Terms and Definitions

The terms and definitions specified in GB/T 18487.1 and GB/T 29317, as well as the following terms and definitions,

shall apply to this document.

3.1 integrated DC power supply equipment

A DC power supply equipment that integrates the power conversion unit, components related to charging terminal functions, and other constituent units into a single cabinet (enclosure) to form a structural whole.

3.2 split type DC power supply equipment

A DC power supply equipment where the power cabinet containing the power conversion unit is structurally separated from the charging terminal, with the two connected by cables.

3.2.1 charging power unit

The part of a split type DC power supply equipment that is used for power conversion and control.

Note: It usually consists of a power conversion unit (charging module), power input, control components, and a heat dissipation system. Some products may also include output switch units, as well as temperature, humidity, and smoke detection components.

3.2.2 charging terminal

A component of an off-board conductive power supply equipment that the charging operator is required to interact with and operate during electric vehicle charging.

Note: It usually consists of a charging cable, vehicle plug, human-machine interface (HMI), and metering components. Some products may also include communication and control components.

3.3 operation mode

The operating state in which the power supply equipment is connected to an electric vehicle and energy transfer is in progress between the two.

3.4 charging efficiency

The ratio of the electric energy at the output port of the power supply equipment to that at the grid-side input port.

3.5 operation power

The difference between the input active power and the output active power of the power supply equipment when it is in operation mode.

3.6 standby mode

The state of the power supply equipment where only basic functions such as background communication and status indicator lights are retained when no vehicle is being charged and no personnel operation is performed.

[Source: NB/T 33002—2018, 3.5, modified]

3.7 standby power

The AC input active power of the power supply equipment when it is in standby mode.

[Source: NB/T 33002—2018, 3.6, modified]

3.8 minimum allowable values of energy efficiency for DC power supply equipment

The minimum allowable value of charging efficiency, and the maximum allowable value of operation power and/or standby power, of a DC power supply equipment under specified test conditions.

3.9 minimum allowable values of energy efficiency for AC power supply equipment

The maximum allowable value of standby power of an AC power supply equipment under specified test conditions.

4 Energy Efficiency Classes

4.1 Integrated DC Power Supply Equipment

The energy efficiency of integrated DC power supply equipment is classified into 3 grades, with Grade 1 representing the highest energy efficiency. The charging efficiency of each energy efficiency grade shall not be lower than the values specified in Table 1, and the standby power shall not be higher than the values specified in Table 1. The charging efficiency and standby power shall be rounded off in accordance with the provisions of GB/T 8170, with one decimal place retained for each value.