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

GB/T 33594-2025

Replacing GB/T 33594-2017

Charging cables for electric vehicles

电动汽车充电用电缆

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1 Scope

This standard specifies the use characteristics, expression methods, technical requirements, marking, test methods and requirements, inspection rules and cable packaging, transportation and storage of charging cables for electric vehicles.

This standard applies to the charging cables (which may include the signal or control core) having a rated voltage AC 450/750 V and below and DC 1.0 kV and below for the conductive charging device of electric vehicles.

2 Normative references

GB/T 1690-2010

GB/T 2423.3-2006

GB/T 2951.11-2008

GB/T 2951.12-2008

GB/T 2951.13-2008

GB/T 2951.14-2008

GB/T 2951.21-2008

3 Terms and definitions

The terms and definitions as defined in GB/T 2900.10 AND the following terms and definitions apply to this document.

3.1 Nominal value

It refers to the specified magnitude which is often used in forms.

Note. In this standard, the magnitude which is usually introduced by the nominal value is verified through measurement under the consideration of the specified tolerance.

3.2 Median value

It refers to the middle value of the several values obtained from test AND arranged in the order of ascending (or descending) if the number of values is odd, OR the average of the middle two values if the number of values is even.

3.3 Rated voltage

It refers to the reference voltage which is used for cable design, use and electrical performance test.

3.4 Routine tests

It refers to the test performed by the manufacturer on all the manufacturing length of the cable to verify that all cables comply with the specified requirements.

3.5 Sample tests

It refers to the test performed by the manufacturer on the finished cable sample OR on some components from the finished cable to the required frequency, to verify that the cables comply with the specified requirements.

3.6 Type tests

It refers to the test performed on one type of cables covered in this standard in accordance with general commercial principles before the cable is supplied, to demonstrate that the cable has good properties that satisfy the intended service conditions.

4.1 Rated voltage

AC. U_0/U is 450/750 V and below. DC. U_0 is 1.0 kV and below.

4.2 Temperature range

Ambient temperature range is $-40\text{ }^{\circ}\text{C} \sim +50\text{ }^{\circ}\text{C}$, AND it shall select appropriate cables during use based on environmental needs.

5.1.1 Product code

EV. electric vehicle AC (can be omitted). for AC charging DC. for DC charging

5.1.2 Conductor structure

(Omitted). the fifth copper conductor R. the 6th copper conductor

5.1.3 Insulation material code

S. Thermoplastic elastomer at continuous working temperature $70\text{ }^{\circ}\text{C}$ (TPE)
 S90. Thermoplastic elastomer at continuous working temperature $90\text{ }^{\circ}\text{C}$ (TPE) E. The ethylene-propylene rubber or similar synthetic rubber at continuous working temperature $90\text{ }^{\circ}\text{C}$ EY. Rigid ethylene-propylene rubber or similar halogen-free synthetic material

5.1.4 Sheath (inner sheath) material code

S. Thermoplastic elastomer at continuous working temperature $70\text{ }^{\circ}\text{C}$ (TPE)

5.2.1 The cable model composition and arrangement sequence are as shown

in Figure 1.

5.2.2 Common cable model and name are as shown in Table 2.

6.1 Conductor

Conductor shall be of the 5th or 6th annealed copper conductor with/without metal plating in GB/T 3956-2008. Signal or control core conductors are allowed to be reinforced with a suitable material. Conductor nominal cross-sectional area is as shown in Table 3.

6.2 Isolation layer

It is allowed for conductor to be wrapped with a layer of suitable material to form an isolation layer.

6.3 Insulation (including main insulation core, grounding core, auxiliary

power core)

6.3.1 Structure

The insulation shall be wrap tightly around the conductor or isolation layer, AND shall be able to be stripped without damaging the insulation, conductor or tin plating, if any.

6.3.2 Materials

Insulation shall use one of the extruded molding insulation material mixtures as listed in Table 1.

6.3.3 Thickness

The nominal thickness of the insulation is as shown in Table 4, AND the thickness of any isolation layer shall not be included in the insulation thickness.

The average value of the insulation thickness measurement shall not be less than the specified nominal thickness, wherein the minimum measurement value shall not be less than 90% of the nominal value ~ 0.1 mm.

6.3.4 Spark test

Insulated core shall be subjected to the working frequency spark test as specified in Table 5 of GB/T 3048.9-2007 as an intermediate inspection.

6.4.1 Structure

It is allowed for one or more signals or control cores.

If there is shielding, the signal or control core may be shielded in two ways.

bare copper or tinned copper wire braided shield; or aluminum-plastic composite tape wrapped shield plus bare copper or tinned copper wire braided composite shield.

6.5.1 Structure

All insulated cores (which may include signals or control cores) shall be twisted together. The signal or control cores may be twisted into a unit that is stranded with the other cores, BUT they shall not be in the center of the cable core.

It is allowed to use fillers when stranding the insulated cores.

6.5.2 Filler material

The material used as the filler shall be suitable for the operating temperature of the cable AND compatible with the insulation and sheathing material of the cable. In the case of