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Road Vehicles Jump-Start Cables

道路车辆应急起动电缆

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Foreword

This Standard referred to the German Industry Standard DIN 72553:1994 *Battery Jumper Cable for Road Vehicles with Combustion Engine, Dimension, Requirements, Test*, and Society of Automotive Engineers Standard SAE J 1494:2001 *Battery Charging Cable*.

This Standard was proposed by the Ministry of Industry and Information Technology.

This Standard shall be under the jurisdiction of National Technical Committee for Standardization of Automotive (SAC/TC 114).

Drafting organizations of this Standard: Jiande Wanjia Electric Appliance Cable Co., Ltd., Hangzhou Entry-Exit Inspection and Quarantine Bureau, Zhejiang Academy of Science & Technology for Inspection & Quarantine, Wenzhou Entry-Exit Inspection and Quarantine Bureau, China Automotive Technology & Research Center, Changsha Auto Electric Research Institute, Jiande City Quality and Technical Supervision Bureau, Jiande Hualong Electric Appliance Tool Co., Ltd., Jiande Low-Voltage Contractors Association.

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Road Vehicles Jump-Start Cables

1 Scope

This Standard specifies the terms and definitions, requirements, test methods, inspection rules of road vehicles jump-start cables (hereinafter referred to as start cable).

This Standard is applicable to the start cable with nominal voltage 12V or 24V, the start current no greater than 750A.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

GB/T 191 Packaging – Pictorial Marking for Handling of Goods

GB/T 1220-2007 Stainless Steel Bars

GB/T 3953 Round Copper Wire for Electrical Purposes

GB/T 4909.2-2009 Test Methods for Bare Wires – Part 2: Measurement of Dimensions

GB/T 25085-2010 Road Vehicles – 60V and 600V Single-Core Cables

SJ/T 11223 Copper-Clad Aluminum Wire

3 Terms and Definitions

The following terms and definitions are applicable to this document.

3.1 Rated current

The ability of start cable to transmit current under certain conditions.

3.2 Voltage drop

When the start cable is connected between two battery electrodes and transmits current, the potential difference exists between the two anodes, and two cathodes of two batteries.

4 Requirements

4.1 General requirements

4.1.1 The start cable shall comply with the provisions of this Standard, and shall be manufactured as per the drawing and design document approved by prescribed procedures.

4.1.2 The specification of start cable shall be expressed by the rated current, see Table 1.

Table 1 Specifications and Basic Parameters of Start Cable

Specifications of Start Cable (Rated Current) / A	Start Cable Total Length / mm	Cable Conductor Cross-Sectional Area / mm^2	Voltage Drop / V	Vehicle Engine Cylinder Working Capacity/L	
				Gasoline Engine	Diesel Engine
80	≥2 500	≥3	≤1.6	≤1.0	N/A
100	≥2 500	≥4	≤1.6	≤1.2	N/A
150	≥2 800	≥6	≤1.6	≤1.6	N/A
200	≥2 800	≥10	≤1.6	≤2.0	N/A
220	≥3 000	≥16	≤1.6	≤2.5	≤2.0
350	≥3 500	≥25	≤1.6	≤5.5	≤3.0
480	≥4 000	≥35	≤1.6	≤7.0	≤4.0
750	≥4 500	≥50	≤1.8	≤12.0	≤9.0

4.1.3 The start cable includes common temperature type (-25°C~+70°C), and extra-low temperature type (-40°C~+70°C).

4.1.4 The start cable consists of two cables and accessories; the two ends of each cable shall be connected with a battery clip, one of the cable shall be pasted a unremovable warning label, see Figure 1.

	10mm	20mm	30mm
80	30±6	50±10	70±10
100, 150, 200, 220	35±7	55±11	75±15
350	40±8	60±12	80±16
480, 750	50±10	75±15	95±19

4.4.2 The insulation parts of battery clip shall, at low temperature -25°C (common temperature type) or -40°C (extra-low temperature type) state, be free from surface and structural breakage when falling off from 1.5m high place.

4.4.3 The metal parts of battery clip shall withstand the spray erosion at normal use or storage environment, and the surfaces of them shall be free from rust.

4.5 The bonding strength between cable and battery clip

The bonding place between cable and battery clip shall be free from stripping or damage when being exerted the following tension:

a) For the start cable with rated current no greater than 150A, exert 245N±5N tension;

b) For the start cable with rated current greater than 150A, exert 445N±20N tension.

4.6 Warning label

4.6.1 The warning label shall contain the warning language specified in A.1 of Appendix A.

4.6.2 The picture and text of warning label shall be legible and durable.

4.6.3 After withstanding 22N tension, the warning label shall not be damaged; and its picture and text shall be legible.

4.7 Voltage-drop and temperature-rise of start cable

At 23°C±5°C ambient temperature, the start cable is passed by rated current for 15s, the voltage-drop generated on the start cable shall conform to the provisions of Table 1; during and after the power-on, the temperature-rise on the back of battery clip handle and folder shall not exceed 45K, it shall not damage the mechanical structure and electrical structure of start cable components.

5 Test Method

5.1 Test conditions and specimen requirements

Unless otherwise is specified, all tests shall be performed at the ambient temperature of 23°C±5°C.

Unless otherwise is specified, all specimens shall be taken from the new or non-tested damaged cables.

Unless otherwise is specified, before test, the specimen shall be placed at the ambient temperature of 23°C±5°C, and stand for no less than 1h.

5.2 Start cable polarity test

Check the start cable polarity by visual observation or other suitable methods.

5.3 Cable test

5.3.1 The conductor cross-sectional area test can refer to the provisions of 5.4 in GB/T 4909.2-2009.

5.3.2 The cable outer diameter and cable insulation layer thickness test can refer to the provisions of 5.1.1-5.1.3 and 5.2.1-5.2.3 in GB/T 25085-2010.

5.3.3 The high-temperature pressure test of cable insulation layer can refer to the provisions of 7.1 in GB/T 25085-2010, thereof the oven temperature shall be set at 70°C±2°C.

5.3.4 The low-temperature winding test of cable insulation layer can refer to the provisions of 8.1 in GB/T 25085-2010, thereof freezer temperature shall be set at -25°C±2°C (for common temperature type) or -40°C±2°C (for extra-low temperature type).

5.3.5 The high-temperature-resisting short-term aging test of cable insulation layer can refer to the provisions of 10.2 in GB/T 25085-2010, thereof the oven temperature shall be set at 110°C±2°C, the aging test time is set for 168h.

5.3.6 The gasoline, diesel, and machine oil resisting test of cable insulation layer can refer to the provisions of 11.2 in GB/T 25085-2010.

5.3.7 The self-sustaining combustion test of cable insulation layer can refer to the provisions of Chapter 12 in GB/T 25085-2010.

5.4 Battery clip test

5.4.1 Battery clip extension force and holding force test

Take the battery clip as the specimen, do the following tests in Item a)~d) as shown in Figure 2:

Figure 5 Start Cable Voltage-Drop and Temperature-Rise Test Schematic Diagram

5.7.2 The specimen shall be start cable that has undertaken the bonding strength test specified in 5.5.

5.7.3 Do the test as per the following procedures:

a) Take one cable from the specimen, clamp the two battery clips of such cable onto the central position of the stainless-steel electrode as shown in Figure 5; bond the thermocouple (as shown four temperature-rise testing points in A~D figure) on the handle back center point and clamp jaw back center point of two battery clips, so that measure the temperature-rise of the specimen. When the insulation layer (see Figure 1) of the battery clip adopts non-permanent fixed way, after removing the insulation layer, bond the thermocouple to the battery clip, such insulation layer shall not be taken during the test.

b) Set the energization time to be 15s. Turn on the test power supply, the test current shall be arisen to the rated current within 3s, record the voltage-drop and temperature-rise of the specimen.

c) During the energizing period, when voltage-drop value exceeds the limit value specified in Table 1, and any of the temperature-rise value on four temperature-rise testing points exceed 45K, immediately cut off the power, stop the test. Otherwise, continue the d) test.

d) After energizing for 15s, disconnect the test power supply. Then continue to monitor the temperature-rise value within 120s. When any of the temperature-rise value on four temperature-rise testing points exceed 45K, stop the test. Otherwise, after the above test, cool off the specimen at room temperature for 1h, then continue the e) test.

e) Do the bonding strength test against the specimen as per the method specified in 5.5.

f) Take the other cable from the same specimen, repeat the above a) ~ e) test.

6 Inspection Rules

6.1 Inspection classification

The inspection can be divided into type inspection and exit-factory inspection.

6.2 Type Inspection

6.2.1 The type inspection shall be carried out in any one of the following cases.

specified by the manufacturer in the product technical document, or negotiated by the purchaser or supplier. The exit-factory inspection items shall at least contain all items listed in the column of “exit-factory inspection” in Table 4.

6.3.2 The start cable can leave the factory only when being inspected qualified, and accompanied by the document or mark that proves the product qualification.

7 Package, Transportation and Storage

7.1 Package

7.1.1 Each set of start cable shall have a bag (box). The packaging bag (box) shall be made of plastics or other suitable materials. After use, the start cable can be put into the packaging bag (box) through re-package. A usage manual shall be attached in the packaging bag (box); or print the usage instructions on the packaging bag (box), the usage instructions can refer to the A.2 of Appendix A. The packaging bag (box) shall be labeled with the following contents:

a) Product name, model and specification.

b) Applicable temperature range.

c) Total length of start cable.

d) Main materials of cable conductor.

7.1.2 The outer packaging materials are suitable to take the corrugated box. The appearance of packaging box shall indicate the following contents:

a) Factory name, address, and contact mode.

b) Product name, specification, quantity.

c) Product standard number.

d) Production date.

e) Corresponding moisture-resisting, clamping height marks that conform to the provisions of GB/T 191.

7.1.3 The internal packaging box shall be put the relevant document accompanied by the supplying product.

a) Packing list (refer to multiple packages).

b) Product certificate.

Appendix A

(Normative)

Warning Label and Usage Instructions

A.1 Warning label

The warning label shall contain the following contents:

Instructions for road vehicles emergency-start and charging.

Warning: battery contains acidic ingredients, and may produce the explosive gases.

NOTE: The operator shall wear glasses, gloves, and etc., so as to prevent the injuries of skin or organ. This product is used to connect the battery electrode of power-supply vehicles and power-shortage vehicles, so that transmit the emergency-start power to the power-shortage vehicles. The rated voltage of battery of two to-be-connected vehicles shall be the same, keep two vehicles not contact with each other. See the operation instructions in the usage manual. The following operations are only applicable to the cathode grounding system:

a) Connect one battery clip of the red cable to the anode “+” of the battery of power-shortage vehicle; then connect the other battery clip of such cable to the anode “+” of battery of power-supply vehicle.

b) Connect one battery clip of black cable to the cathode “-” of battery of power-supply vehicle.

c) Connect the other battery clip of black cable to the grounding parts of power-shortage vehicle. Such grounding parts indicate the engine cylinder iron parts or other iron parts firmly connected with engine cylinder, try keep away as far as the battery, never connect to the cathode of battery.

d) Firstly, start the engine of power-supply vehicle, then start the engine of power-shortage vehicle.

e) Remove the start cable in the reverse order of the above.

A.2 Usage instructions

A.2.1 The picture and text of usage instructions shall be legible, and shall include at least all of contents of A.2.2 ~ A.2.5.

A.2.2 Warning: battery contains acidic ingredients, and may produce the explosive gases. When using the start cable, never tilt the battery. The battery shall always keep

The third step: check the connecting state of start cable, ensure there is no contact between the start cable and the operating parts of the engine.

The fourth step: start the engine of power-supply vehicle, so that the engine maintains moderated-speed running. Then start the engine of power-shortage vehicle, every start time shall be no greater than 15s (when for multiple start, the time interval shall be 60s above), after the success of starting engine, maintain for 2min ~ 3min till the engine works normally. Note: before start the engine, all operators shall keep away from the battery of power-supply vehicle, so that prevent the injury from the explosive gases.

The fifty step: remove the start cable in the reverse order of the first and the second steps. Note: when removing, make sure there is no contact between the start cable and the operating parts of the engine.

A.2.5 When the grounding polarity of power-shortage vehicle is anode (i.e. the anode of battery is grounded on the iron part of engine), operate as the following procedures:

The first step: connect one battery clip of black cable to the cathode “-” of battery of power-shortage vehicle; connect the other battery clip of the black cable to the cathode “-” of battery of power-supply vehicle.

The second step: connect one battery clip of red cable to the anode “+” of battery of power-supply vehicle; connect the other battery clip of the red cable to the grounding iron part of power-shortage vehicle. Note: such grounding iron part indicates the engine cylinder iron part or other iron part firmly connected with the engine cylinder; keep away as far as from the battery, direct connection to the cathode of battery is not allowed.

The third step: check the connecting state of start cable, ensure there is no contact between the start cable and the operating parts of the engine.

The fourth step: start the engine of power-supply vehicle, so that the engine maintains moderated-speed running. Then start the engine of power-shortage vehicle, every start time shall be no greater than 15s (when for multiple start, the time interval shall be 60s above), after the success of starting engine, maintain for 2min ~ 3min till the engine works normally. Note: before start the engine, all operators shall keep away from the battery of power-supply vehicle, so that prevent the injury from the explosive gases.

The fifty step: remove the start cable in the reverse order of the first and the second steps. Note: when removing, make sure there is no contact between the start cable and the operating parts of the engine.

END