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Replacing GB/T 5054.4-2008

Road vehicles - Multi-core connecting cables - Part 4: Test methods and requirements for coiled cable assemblies

道路车辆 多芯连接电缆 第 4 部分:螺旋电缆总成的试验方法和要求

(ISO 4141-4:2009, MOD)

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Foreword

This document was 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*.

This document is Part 4 of GB/T 5054 *Road vehicles - Multi-core connecting cables*. GB/T 5054 has been published in the following parts:

-- Part 1: Test methods and requirements for basic performance sheathed cables;

-- Part 2: Test methods and requirements for high performance sheathed cables;

-- Part 3: Construction, dimensions and marking of unscreened sheathed low-voltage cables;

-- Part 4: Test methods and requirements for coiled cable assemblies.

This document replaces GB/T 5054.4-2008 *Road vehicles - Multi-core connecting cables - Part 4: Articulation test method and requirements for coiled cable assemblies*. Compared with GB/T 5054.4-2008, in addition to structural adjustments and editorial changes, the main technical changes are as follows:

-- The content of the chapter "Scope" has been changed (see Chapter 1; see Chapter 1 of the 2008 edition);

-- The pretreatment test requirements have been added (see Chapter 4);

-- The bending test method and requirements have been changed; the bending test arrangement diagram and positions and the conductor breakage monitoring connection diagram have been added (see Chapter 5; see Chapter 4 of the 2008 edition);

-- The method and requirements for torsion test have been added (see Chapter 6);

-- The naming rules for coiled cable assemblies have been added (see Chapter 7).

This document is modified in relation to ISO 4141-4:2009 *Road vehicles - Multi-core connecting cables - Part 4: Test methods and requirements for coiled cable assemblies*.

This document has made the following structural adjustments compared to ISO 4141-4:2009.

-- Chapter 4 corresponds to Chapter 3 of ISO 4141-4:2009;

Road vehicles - Multi-core connecting cables - Part 4: Test methods and requirements for coiled cable assemblies

1 Scope

This document specifies the pretreatment of coiled cable assemblies and the naming rules for coiled cable assemblies, and describes the bending test and torsion test methods.

This document applies to the design, production and inspection of coiled cable assemblies for electrical connections between towing vehicles and trailers with a nominal voltage of 12 V and a nominal voltage of 24 V.

2 Normative references

The provisions of the following documents constitute the essential clauses of this document through normative references in this text. Among them, for any dated reference, only the version corresponding to that date applies to this document; for any undated reference, the latest version (including all amendments) applies to this document.

GB/T 5054.3-2024 Road vehicles - Multi-core connecting cables - Part 3: Construction, dimensions and marking of unscreened sheathed low-voltage cables (ISO 4141-3:2019, IDT)

GB/T 25086 Road vehicles - Connectors for the electrical connection of towing and towed vehicles - 7-pole connector type 12S (supplementary) for vehicles with 12 V nominal supply voltage (GB/T 25086-2010, ISO 3732:2003, MOD)

GB/T 25088 Road vehicles - Connectors for the electrical connection of towing and towed vehicles - 7-pole connector type 24S (supplementary) for vehicles with 24 V nominal supply voltage (GB/T 25088-2010, ISO 3731:2003, MOD)

ISO 1185 Road vehicles - Connectors for the electrical connection of towing and towed vehicles - 7-pole connector type 24 N (normal) for vehicles with 24 V nominal supply voltage

NOTE: GB/T 5053.1-2006 Road vehicles - Connectors for the electrical connection of towing and towed vehicles - 7-pole connector type 24 N (normal) for vehicles with 24 V nominal supply voltage

3 Terms and definitions

There are no terms or definitions that require definition in this document.

4 Preprocessing

When testing coiled cable assemblies that meet the requirements of GB/T 5054.3-2024, appropriate connectors shall be assembled in accordance with any of the requirements of GB/T 25086, GB/T 25088, ISO 1185, ISO 1724, ISO 7638-1, ISO 7638-2, ISO 11446-1, ISO 11446-2, ISO 12098 or ISO 25981, and anti-torsion protection devices shall be installed at the parts that require protection.

Before testing, the coiled cable assembly shall be pre-treated according to the following steps:

a) Place the sample in a low-temperature box at a temperature of (-40±2) °C for 2 hours. After taking it out, stretch the coiled cable assembly to the maximum allowable extension length specified in GB/T 5054.3-2024 within 15 seconds. Then remove the external force and place it at a room temperature of (23±5) °C for 120 seconds.

b) Place the sample in a high-temperature oven at (80±2) °C for 2 hours. After taking it out, stretch the coiled cable assembly to the maximum allowable extension length specified in GB/T 5054.3-2024 within 15 seconds, and then remove the external force;

c) Leave at room temperature for 2 hours.

5 Bending test

5.1 Purpose

Verify the bending resistance of the coiled cable assembly (including plug) and protective device under extreme conditions of vehicle and train turning.

5.2 Test conditions

According to the arrangement of Figure 1a), two plugs are inserted into corresponding sockets, and at least one fixture fixing the socket is rotated horizontally by 90° in both directions around the vertical axis A.

Figure 1 shows the test arrangement and the positions of one cycle of the bending test,

Alternatively, complete steps a)~g) of the test on only the plug and the straight cable segment, as shown in Figure 5.

6.4 Requirements

6.4.1 After at least one cycle, the marking between the cable and the plug shall not be displaced; after 1000 cycles, there shall be no failure in the electrical conductivity.

6.4.2 The cable shall have no cracks at the end position, the anti-torsion protection device (if installed) shall not be displaced, and the marking between the cable and the plug shall not be displaced.

NOTE: A higher number of cycles may be adopted through negotiation between the supplier and the purchaser.

6.4.3 If the sample is not damaged, perform a withstand voltage test. Connect a test circuit of 1000 V (r.m.s, 50 Hz or 60 Hz) AC or 1600 V DC between each conductor and the other conductors connected in series. No breakdown shall occur during the 1-minute test (see Figure 3).

7 Naming rules for coiled cable assemblies

Naming rules for coiled cable assemblies are shown in Appendix A. The main characteristics of the coiled cable assembly should be described in the name.

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