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Road vehicles — Automotive cables —

Part 2: Test methods

Véhicules routiers — Câbles automobiles —

Partie 2: Méthodes d'essai

Reference number
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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Contents

Page

Foreword ..... **v**
Introduction ..... **vi**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **3**
4 Specifications **3**
4.1 General test conditions 3
4.1.1 General information on dimensional tests 3
4.2 Safety concerns 4
4.3 Ovens 4
5 Test methods for single core cables **4**
5.1 General 4
5.2 Dimensional tests 4
5.2.1 Cable outside diameter 4
5.2.2 Insulation thickness 5
5.2.3 Conductor diameter 5
5.2.4 Cross-sectional area (CSA) 5
5.2.5 In-process cable outside diameter 6
5.3 Electrical tests 7
5.3.1 Conductor resistance 7
5.3.2 Determination of temperature coefficients 8
5.3.3 Withstand voltage 10
5.3.4 Withstand voltage after environmental testing 11
5.3.5 Insulation faults 11
5.3.6 Insulation volume resistivity 12
5.4 Mechanical tests 12
5.4.1 Strip force 12
5.4.2 Abrasion 13
5.4.3 Breaking force of the finished cable 16
5.4.4 Cyclic bending 17
5.4.5 Flexibility 18
5.5 Environmental tests 20
5.5.1 Test specimen preparation and winding tests 20
5.5.2 Long term heat ageing, 3 000 h at temperature class rating 22
5.5.3 Short term heat ageing, 240 h at temperature class rating +25 °C 22
5.5.4 Thermal overload, 6 h at temperature class rating +50 °C 23
5.5.5 Pressure test at high temperature 23
5.5.6 Shrinkage by heat 25
5.5.7 Low temperature winding 25
5.5.8 Cold impact 25
5.5.9 Temperature and humidity cycling 27
5.5.10 Resistance to hot water 29
5.5.11 Resistance to liquid chemicals 30
5.5.12 Durability of cable marking 32
5.5.13 Stress cracking resistance 32
5.5.14 Resistance to ozone 33
5.5.15 Resistance to flame propagation 34
6 Test methods for sheathed and/or multi-conductor cables **35**
6.1 General 35
6.2 Dimensional tests 36
6.2.1 Cable outside diameter 36
6.2.2 Ovality of sheath 36

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6.2.3 Thickness of sheath ... 36
6.2.4 In-process cable outside diameter ... 36
6.2.5 Lay length ... 37
6.3 Electrical tests ... 38
6.3.1 Electrical continuity ... 38
6.3.2 Withstand voltage at final inspection ... 38
6.3.3 Screening effectiveness ... 38
6.3.4 Sheath fault on screened cables ... 41
6.3.5 General information on electrical test setups of unscreened balanced cables ... 42
6.3.6 General information on low frequency electrical tests ... 46
6.3.7 Resistance unbalance ... 46
6.3.8 Capacitance ... 47
6.3.9 Inductance ... 48
6.3.10 General information on high radio frequency (RF) electrical tests ... 48
6.3.11 Velocity of propagation ... 51
6.3.12 Characteristic impedance in frequency domain (CIF) ... 55
6.3.13 Characteristic impedance in time domain (CIT) ... 56
6.3.14 Insertion loss, (IL) ... 58
6.3.15 Return loss, (RL) ... 58
6.3.16 Unbalance attenuations ... 58
6.3.17 Near-end crosstalk, NEXT ... 59
6.3.18 Far-end crosstalk, FEXT ... 59
6.3.19 PS alien near-end crosstalk, PS-ANEXT – exogenous crosstalk ... 59
6.3.20 PS attenuation to alien far-end crosstalk ratio, PS-AACR-F - exogenous crosstalk ... 59
6.4 Mechanical tests ... 60
6.4.1 Strip force of sheath ... 60
6.4.2 Cyclic bending ... 60
6.4.3 Flexibility ... 60
6.4.4 Cyclic bending test for RF cables ... 61
6.4.5 Dynamic bending tests for RF cables ... 63
6.4.6 Test for assessment of minimum bending radius ... 67
6.4.7 Strip force of screen ... 68
6.4.8 Abrasion test of sheath ... 70
6.5 Environmental tests ... 70
6.5.1 Test specimen preparation and winding tests ... 70
6.5.2 Long-term heat ageing, 3 000 h at temperature class rating ... 72
6.5.3 Short term heat ageing, 240 h at temperature class rating +25 °C ... 73
6.5.4 Thermal overload, 6 h at temperature class rating +50 °C ... 73
6.5.5 Pressure test at high temperature ... 73
6.5.6 Shrinkage by heat of sheath ... 73
6.5.7 Low temperature winding ... 74
6.5.8 Cold impact ... 74
6.5.9 Temperature and humidity cycling ... 74
6.5.10 Resistance to liquid chemicals ... 75
6.5.11 Durability of sheath marking ... 75
6.5.12 Resistance to ozone ... 76
6.5.13 Artificial weathering ... 76
6.5.14 Resistance to flame propagation ... 76
Annex A (informative) **Examples of materials and sources suppliers** ... **78**
Annex B (informative) **Flexibility test apparatus** ... **80**
Annex C (normative) **Flame test apparatus** ... **84**
Annex D (informative) **Concentricity, A-Factor, $F_{x,A}$** ... **86**
Bibliography ... **88**

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 32, *Electrical and electronic components and general system aspects*.

This second edition cancels and replaces the first edition (ISO 19642-2:2019), which has been technically revised.

The main changes are as follows:

— new parts have been added to the ISO 19642 series (ISO 19642-11 and ISO 19642-12);

— both new International Standards refer to this document for definition of test procedures. Some new test procedures are needed for the new standards of the ISO 19642 series and have been added accordingly;

— some new test procedures for screened RF cables have been added for a new standard of the ISO 19642 series.

A list of all parts in the ISO 19642 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

This document was prepared following a joint resolution to improve the general structure of the ISO Automotive Electric Cable standards. This new structure adds more clarity and, by defining a new standard family, opens up the standard for future amendments.

Many other standards currently refer to ISO 6722-1, ISO 6722-2 and ISO 14572. These standards will stay valid at least until the next scheduled systematic review and will be replaced later on by the ISO 19642 series.

For new automotive cable projects customers and suppliers are advised on using the ISO 19642 series.

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Road vehicles — Automotive cables —

Part 2: Test methods

WARNING — The use of this document can involve hazardous materials, operations and equipment. This document does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this document to establish appropriate safety practices and determine the applicability of regulatory limitations prior to use.

1 Scope

This document defines test methods for electrical cables in road vehicles, which are used in other parts of the ISO 19642 series.

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 edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1817[1)], *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

ISO 4141-1, *Road vehicles — Multi-core connecting cables — Part 1: Test methods and requirements for basic performance sheathed cables*

ISO 4892-2, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps*

ISO 4926, *Road vehicles — Hydraulic braking systems — Non-petroleum-based reference fluid*

ISO 6931-1, *Stainless steels for springs — Part 1: Wire*

ISO 19642-1, *Road vehicles — Automotive cables — Part 1 — Vocabulary and design guidelines*

ISO 19642-3, *Road vehicles — Automotive cables — Part 3: Dimensions and requirements for 30 V a.c. or 60 V d.c. single core copper conductor cables*

ISO 19642-4, *Road vehicles — Automotive cables — Part 4: Dimensions and requirements for 30 V a.c. and 60 V d.c. single core aluminium conductor cables*

ISO 19642-5, *Road vehicles — Automotive cables — Part 5: Dimensions and requirements for 600 V a.c. or 900 V d.c. and 1 000 V a.c. or 1 500 V d.c. single core copper conductor cables*

ISO 19642-6, *Road vehicles — Automotive cables — Part 6: Dimensions and requirements for 600 V a.c. or 900 V d.c. and 1 000 V a.c. or 1 500 V d.c. single core aluminium conductor cables*

SAE RM-66-06, *Motor Vehicle Brake Fluid — High Boiling Compatibility/Reference Fluid*

IEC 60216-4-1, *Electrical insulating materials — Thermal endurance properties — Part 4-1: Ageing ovens — Single-chamber ovens*

IEC 60216-4-2, *Electrical insulating materials — Thermal endurance properties — Part 4-2: Ageing ovens — Precision ovens for use up to 300 °C*

1) Eight edition under preparation. Stage at the time of publication: ISO/DIS 1817:2023.

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IEC 60811-201, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 201: General tests — Measurement of insulation thickness*

IEC 60811-202, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 202: General tests — Measurement of thickness of non-metallic sheath*

IEC 60811-401, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 401: Miscellaneous tests - Thermal ageing methods - Ageing in an air oven*

IEC 60811-403, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 403: Miscellaneous tests — Ozone resistance test on cross-linked compounds*

IEC 60811-501, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 501: Mechanical tests — Tests for determining the mechanical properties of insulating and sheathing compounds*

IEC 60811-508:2012, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 508: Mechanical tests — Mechanical tests - Pressure test at high temperature for insulation and sheaths*

IEC 61156-1, *Multicore and symmetrical pair/quad cables for digital communications - Part 1 — Generic specification*

IEC TR 61156-1-2:2009+AMD1:2014, *CSV Consolidated version, Multicore and symmetrical pair/quad cables for digital communications — Part 1-2: Electrical transmission characteristics and test methods of — Symmetrical pair/quad cables*

IEC 61196-1, *Coaxial communication cables — Part 1: Generic specification — General, definitions and requirements*

IEC 61196-1-100, *Coaxial communication cables — Part 1-100: Electrical test methods — General requirements*

IEC 61196-1-103, *Coaxial communication cables — Part 1-103: Electrical test methods — Test for capacitance of cable*

IEC 61196-1-108, *Coaxial communication cables — Part 1-108: Electrical test methods — Test for characteristic impedance, phase and group delay, electrical length and propagation velocity*

IEC 61196-1-112, *Coaxial communication cables — Part 1-112: Electrical test methods — Test for return loss (uniformity of impedance)*

IEC 61196-1-113, *Coaxial communication cables — Part 1-113: Electrical test methods — Test for attenuation constant*

IEC 61196-1-114, *Coaxial communication cables — Part 1-114: Electrical test methods — Test for inductance*

IEC 61196-1-116, *Coaxial communication cables — Part 1-116: Electrical test methods — Test for impedance with time domain reflectometry (TDR)*

IEC 62153-4-3, *Metallic communication cable test methods — Part 4-3: Electromagnetic compatibility (EMC) - Surface transfer impedance — Triaxial method*

IEC 62153-4-4, *Metallic communication cable test methods — Part 4-4: Electromagnetic compatibility (EMC) —Test method for measuring of the screening attenuation as up to and above 3 GHz, triaxial method*

IEC 62153-4-5, *Metallic communication cables test methods — Part 4-5: Electromagnetic compatibility (EMC) — Coupling or screening attenuation — Absorbing clamp method*

IEC 62153-4-9, *Metallic communication cables test methods — Part 4-9: Electromagnetic compatibility (EMC) — Coupling attenuation of screened balanced cables, triaxial method*

EN 50289-1-1, *Communication cables— Specifications for test methods— Electrical test methods — General requirements*

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EN 50289-1-5, *Communication cables— Specifications for test methods— Electrical test methods — Capacitance*

EN 50289-1-12, *Communication cables— Specifications for test methods— Electrical test methods — Inductance*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 19642-1 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Specifications

4.1 General test conditions

Unless specified otherwise, the device under test (DUT) shall be preconditioned continuously for at least 16 h at a room temperature (RT) (see ISO 19642-1). Unless specified otherwise, all tests other than "in process" shall be conducted in these conditions.

Where no tolerance is specified, all values shall be considered to be approximate.

When AC tests are performed, they shall be at 50 Hz or 60 Hz. Applications at higher frequencies may require additional testing.

Use the temperature tolerances shown in Table 1 unless specified in the individual tests.

Table 1 — Test temperature tolerance

Test temperature (T) °C	**Temperature tolerance** °C
$T \leq 100$	±2
$100 < T \leq 200$	±3
$T > 200$	±4

Unintentional direct contact between different metals shall not occur with any of the test methods, in order to avoid electrochemical effects on the test results.

All tests shall be performed on the same manufactured batch of cable. If, for any reason, a different batch of cable is used for any of the tests, it should be noted accordingly on the test report and test summary.

Unless otherwise specified, each test is to be performed on at least three test specimens.

If suppliers and customers agree upon modifications or changes to the methods and requirements, it is required that all the changes and modifications be clearly documented.

4.1.1 General information on dimensional tests

Measure with a device accurate to at least 0,01 mm.

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