
**Road vehicles — Round, screened and
unscreened 60 V and 600 V multi-core
sheathed cables — Test methods and
requirements for basic and
high-performance cables**

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*Véhicules routiers — Câbles multiconducteurs sous gaine, ronds,
blindés et non blindés, de 60 V et 600 V — Méthodes d'essai et
exigences pour les câbles à performances de base et à hautes
performances*

ISO 14572:2006

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 14572 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

This second edition cancels and replaces the first edition (ISO 14572:2001), which has been technically revised.

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Road vehicles — Round, screened and unscreened 60 V and 600 V multi-core sheathed cables — Test methods and requirements for basic and high-performance cables

1 Scope

This International Standard specifies test methods and requirements for basic and high-performance round, screened and unscreened, multi-core sheathed cables, intended for use in road vehicle applications.

The unscreened, single-core cables must be in accordance with ISO 6722. Other cores may be used but, in these cases, the construction and tests required to ensure functionality of these cores must be agreed between the customer and supplier. See ISO 6722 for temperature classes.

2 Normative references

The following referenced documents are indispensable for the application 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 4892-2:2006, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps*

ISO 6722:2006, *Road vehicles — (60 V and 600 V single-core cables) — Dimensions, test methods and requirements*

IEC 60811-1-1:2001, *Common test methods for insulating and sheathing materials of electric cables and optical cables — Part 1-1: Methods for general application — Measurement of thickness and overall dimensions — Tests for determining the mechanical properties*

IEC 61196-1-100:2005, *Coaxial communication cables — Part 1-100: Electrical test methods — General requirements*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

basic performance cable

cable meeting basic requirements for general automotive applications

3.2

core

assembly comprising a conductor (and screens if any) with its own insulation

3.3

high-performance cable

cable meeting all basic requirements and having enhanced mechanical and/or environmental performance (as defined by the customer)

3.4

screen

conductive material intended to reduce the penetration and/or radiation of a varying electromagnetic field into an assigned region

3.5

unscreened

absence of a screen

4 General

4.1 Rating of cables

4.1.1 Voltage rating

The voltage rating is established by the rating of the cores. 60 V and 600 V cores shall not be mixed in the same multi-core cable.

4.1.2 Temperature-class rating

The temperature-class rating is established by the rating(s) of the cores and sheath. The rating of the cable shall be equal to the lowest rating of the individual cores and sheath.

4.2 600 V cables

Special care shall be taken for cables used for voltages above 600 V d.c. to protect the cables from mechanical stress and to avoid an electric-shock hazard.

The 600 V cable sheath shall be visually identified with a permanent orange colour.

4.3 Tests

The cables shall be submitted to the tests as specified in Table 1.

4.4 General test conditions

According to 4.4 of ISO 6722:2006.

4.5 Ovens

According to 4.5 of ISO 6722:2006.

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4.6 Visual appearance

On visual examination, the sheath shall be smooth, even and free from surface imperfections, such as lumps, voids, particles, or other imperfections.

Table 1 — Tests

Clause, subclause	Test description	Tests in process ^a	Certification		If required ^c	
			initial	periodic ^b	initial	periodic ^c
4	General					
4.6	Visual appearance	—	X	X	—	—
5	Dimensions					
5.2	Outside cable diameter	—	X	X	—	—
5.3	Ovality of sheath	—	—	—	X	X
5.4	Thickness of sheath	—	X	X	—	—
6	Electrical characteristics					
6.1	Continuity	X	X	X	—	—
6.2	Withstand voltage	X	X	X	—	—
6.3	Screening effectiveness	—	—	—	X	X
7	Mechanical characteristics					
7.1	Pressure test at high temperature	—	X	X	—	—
7.2	Adhesion of sheath	—	—	—	X	X
7.3	Cyclic bending	—	—	—	X	—
8	Low temperature characteristics					
8.1	Winding	—	X	X	—	—
8.2	Impact	—	—	—	X	X
9	Resistance to abrasion	—	—	—	X	X
10	Heat ageing					
10.1	Long term ageing, 3 000 h	—	X	—	—	—
10.2	Short term ageing, 240 h	—	X	X	—	—
10.3	Thermal overload	—	—	—	X	X
10.4	Shrinkage by heat of sheath	—	X	X	—	—
11	Resistance to chemicals					
11.1	Fluid compatibility of sheath	—	d	—	d	—
11.2	Durability of sheath marking	—	—	—	X	X
11.3	Resistance to ozone	—	—	—	X	—
11.4	Temperature and humidity cycling	—	—	—	X	—
12	Resistance to flame propagation	—	X	X	—	—
13	Artificial weathering	—	—	—	X	—
X to be applied — not applicable						
^a A test made on all cables during or after manufacture. ^b The frequency of periodic testing shall be established by agreement between the customer and supplier. ^c The usage of "if required" tests shall be established by agreement between the customer and supplier. ^d Some fluids are for "certification" and others are "if required". See 11.1 for details.						

5 Dimensions

5.1 General

Due to the variety of constructions, the requirements for dimensions shall be established by agreement between the customer and supplier (see 5.2.4, 5.3.5 and 5.4.4).

5.2 Outside cable diameter

5.2.1 Test sample

Follow 5.1.1 of ISO 6722:2006.

5.2.2 Apparatus

Follow 5.1.2 of ISO 6722:2006.

5.2.3 Procedure

Follow 5.1.3 of ISO 6722:2006.

5.2.4 Requirement

The outside cable diameter shall be within the limits established by agreement between the customer and supplier.

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5.3 Ovality of sheath

5.3.1 Test usage

The usage of this test shall be established by agreement between the customer and supplier.

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5.3.2 Test sample

Follow 5.1.1 of ISO 6722:2006.

5.3.3 Apparatus

Follow 5.1.2 of ISO 6722:2006.

5.3.4 Procedure

Follow 5.1.3 of ISO 6722:2006. Measure the maximum (d_{\max}) and the minimum (d_{\min}) outside cable diameters. Then calculate the ovality as follows:

$$O = \frac{(d_{\max} - d_{\min})}{0,5 (d_{\max} + d_{\min})} \times 100$$

where

O is the ovality, amount the sheath is “out of round”, in %;

d_{\max} is the maximum outside cable diameter, in mm;

d_{\min} is the minimum outside cable diameter, in mm.

5.3.5 Requirement

Ovality shall be within the limits established by agreement between the customer and supplier.

5.4 Thickness of sheath

5.4.1 Test samples

Follow 5.2.1 of ISO 6722:2006.

5.4.2 Apparatus

Follow 5.2.2 of ISO 6722:2006.

5.4.3 Procedure

Follow 5.2.3 of ISO 6722:2006.

5.4.4 Requirement

The thickness of the sheath shall be within the limits established by agreement between the customer and supplier.

6 Electrical characteristics

6.1 Continuity

6.1.1 Test sample

Remove 100 mm of sheath from each end of a complete cable and 25 mm of insulation from each end of the cores.

6.1.2 Apparatus

Use an appropriate source connected in series with an indicator such as an ohmmeter, light or buzzer.

6.1.3 Procedure

Connect the apparatus to one of the cores. Repeat the procedure until all cores have been tested. If a screen is present, test the continuity using the same procedure for a core. As an alternative, all of the cores shall be tested at once, by connecting them in series. Take care to select a current which shall not damage the individual conductors.

6.1.4 Requirement

The indicator shall show continuity.

6.2 Withstand voltage

6.2.1 Test sample

Remove 100 mm of sheath from one end of the cable and remove 25 mm of insulation from each core. For the test, connect the conductors of all the cores together at one end, except for the core being tested. If a screen is present, it shall be connected in the same manner as a core.

6.2.2 Apparatus

Use a 50 Hz or 60 Hz voltage source capable of applying 2 kV a.c. for a minimum of 3 s.