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Road vehicles — Automotive cables —

Part 1: Vocabulary and design guidelines

Véhicules routiers — Cables automobiles —

Partie 1: Vocabulaire et lignes directrices pour la conception

Reference number
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Foreword

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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 documents 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).

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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*.

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.

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 later be replaced by the ISO 19642 series.

For new automotive cable projects, customers and suppliers are advised to use the ISO 19642 series.

Road vehicles — Automotive cables —

Part 1: Vocabulary and design guidelines

1 Scope

This document defines terms in the field of cables applied in road vehicle general purpose applications, for use in the other parts of the ISO 19642 series.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

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

3.1 Terms related to voltage rating

3.1.1
a.c. voltage
voltage in an alternating current circuit that also periodically reverses because the current has a periodic function of time

Note 1 to entry: Whenever a.c. voltage is specified in the ISO 19642 series, the a.c. r.m.s. value shall be used.

3.1.2
60 V cable
cable (3.3.8) intended for use in road vehicle applications where the nominal system voltage is less than or equal to 30 V a.c. or 60 V d.c.

3.1.3
900 V cable
cable (3.3.8) intended for use in road vehicle applications where the nominal system voltage is less than or equal to 600 V a.c. or 900 V d.c.

3.1.4
1 500 V cable
cable (3.3.8) intended for use in road vehicle applications where the nominal system voltage is less than or equal to 1 000 V a.c. or 1 500 V d.c.

3.2 Terms related to temperatures

3.2.1
temperature class rating
temperature range for safe operation of the *cable* (3.3.8) divided into eight temperature classes as defined in Table 1

Table 1 — Temperature class rating

Class	Is equivalent to Class	Temperature °C
A	T 1	−40 to 85
B	T 2	−40 to 100
C	T 3	−40 to 125
D	T 4	−40 to 150
E	T 5	−40 to 175
F	T 6	−40 to 200
G	T 7	−40 to 225
H	T 8	−40 to 250

3.2.2
room temperature
RT
situation with a temperature of (23 ± 3) °C and a relative humidity (RH) of 45 % to 75 %

3.3 Terms related to cables

3.3.1
Percentage of International Annealed Copper Standard
%IACS
percentage of the volume resistivity of a metal when compared to 100 % of pure annealed copper having a volume resistivity of 0,01724 Ω × mm²/m at 20 °C as defined in IEC 60028

3.3.2
bare conductor
plain conductor
metal *cable* (3.3.8) *conductor* (3.3.12) in which the strand or strands are not coated

3.3.3
bedding layer
non-metallic covering applied (normally extruded) around the assembly of the *cores* (3.3.14) [and *fillers* (3.3.17), if any] of a *multi-conductor cable* (3.3.30) to obtain a more circular outline

3.3.4
braid
covering formed from plain or plated metallic or non-metallic material

3.3.5
braid parameter
parameter of a *braid* (3.3.4) as defined in Table 2 and Table 3

Table 2 — Braid coverage formulae

Outside diameter of the braid	Number of single strands in one direction	Coverage	Optical coverage, braid percentage
$D_G = D_S + 4 \times d$	$m = a \times \frac{n}{2}$	$B = \frac{m \times d}{h \times \cos\alpha}$	$B_O = (2 \times B - B^2) \times 100$

Table 3 — Braid parameters

d	mm	Diameter of the single strand
D_S	mm	Diameter of the *core* (3.3.14) below the braid
D_G	mm	Outside diameter of the braid
a		Number of strands in one carrier
m		Number of single strands in one direction
n		Number of carriers
h	mm	*Lay length* (3.3.28)
α	°	Angle of lay, see Figure 1
B		Coverage, proportion of the covered surface by strands in one direction compared to the whole surface.
B_O	%	Optical coverage. Also called braid percentage. Proportion of the covered surface by strands in both directions compared to the whole surface.

Note 1 to entry: A braid is formed by a number of single strands which are grouped into carriers and applied to the *cable* (3.3.8) surface in two different directions (left and right or S and Z) in a form that each carrier of one direction is alternatively above and below the adjacent carrier of the other direction.

Note 2 to entry: See Figure 1.

Figure 1 — Angle of lay

3.3.6
bunched conductor
conductor (3.3.12) in which individual strands are assembled together in helical formation, all in the same direction and with the same length of lay

3.3.7
bunching loss
f_b
ratio of *conductor* (3.3.12) resistance before and after the bunching process of *stranded conductors* (3.3.40)

Note 1 to entry: The factor, f_b, is derived by the formula:

$$f_b = \frac{m_{mean} \times R_{mean} \times \kappa}{1\,000 \times \rho}$$

where

κ is the conductivity of the used conductor material in Sm/mm^2;

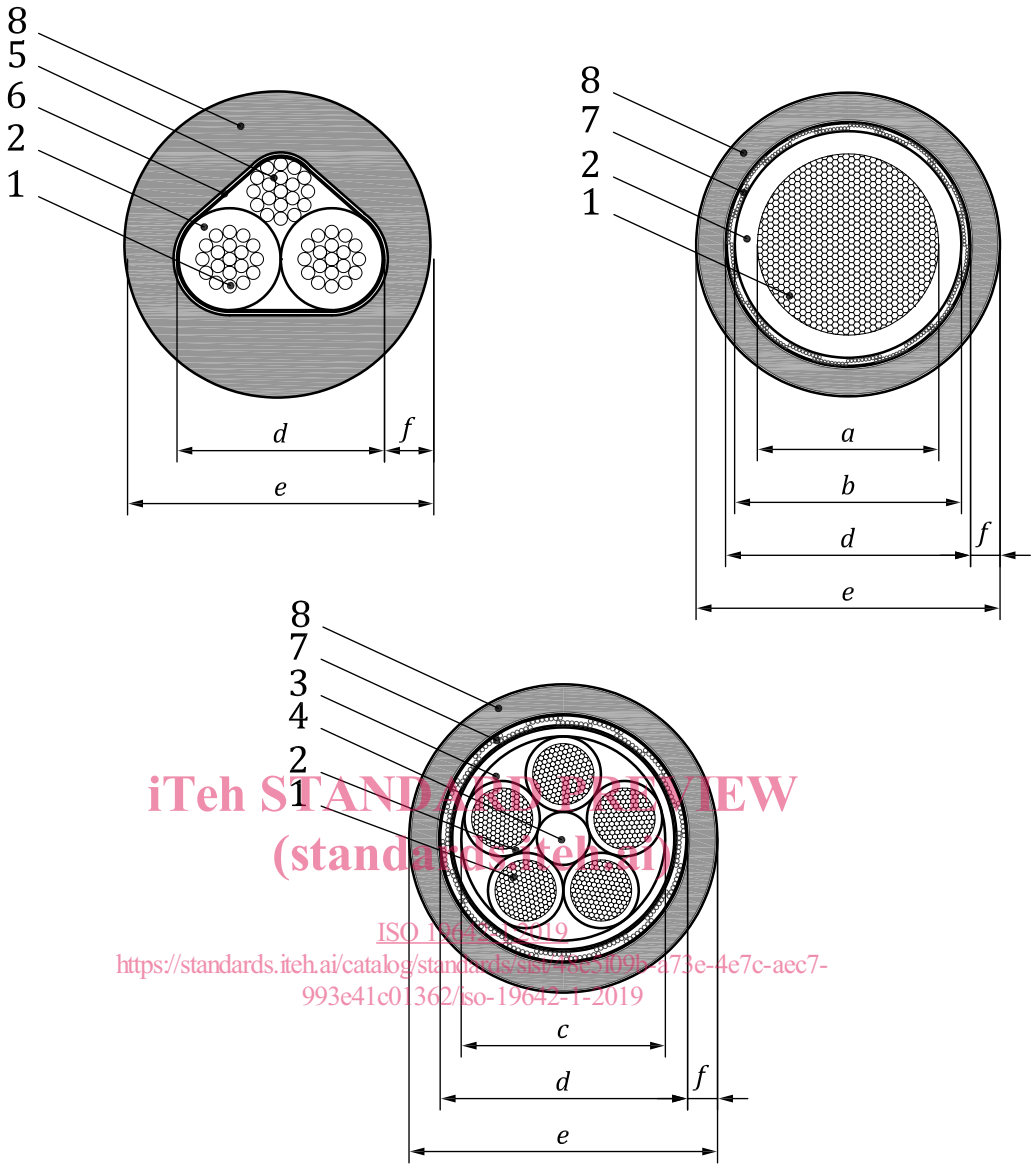
ρ is the density of the conductor material in $kg/dm^3 = kg/l$;

m_{mean} is the mean of measured conductor mass in g/m;

R_{mean} is the mean of measured conductor resistance at 20 °C mΩ/m.

3.3.8
cable
single or multi-core *wire* (3.3.42)

Note 1 to entry: Cable dimension descriptions are shown in Figure 2.



Key

a	*conductor* (3.3.12) diameter	2	*conductor insulation* (3.3.13)
b	*core* (3.3.14) diameter	3	*inner covering* (3.3.22)
c	twisted core diameter	4	*filler* (3.3.17)
d	diameter under *sheath* (3.3.38)	5	drain *wire* (3.3.42)
e	outside cable diameter	6	foil
f	wall thickness sheath	7	*screen* (3.3.36)
1	conductor	8	sheath

Figure 2 — Cable dimension descriptions

3.3.9
cable family
group with multiple *conductor* (3.3.12) sizes having the same conductor strand coating, *insulation* (3.3.25) formulation, and wall thickness type