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TECHNICAL REPORT

colour inside

Electrical accessories – Harmonization of general rules

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CONTENTS

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ELECTRICAL ACCESSORIES – HARMONIZATION OF GENERAL RULES

FOREWORD

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The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a Technical Report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC TR 61916, which is a Technical Report, has been prepared by IEC technical committee 23: Electrical accessories.

This fourth edition cancels and replaces the third edition published in 2014 and constitutes a technical revision. This edition includes the following significant technical changes with respect to the previous edition:

a) clarification of the introduction and the scope;
b) clarification of subclause 6.3;
c) modification of Clause 7;
d) modification of Clause 10;
e) addition of Annex B for temperature selection for GWEPT.

The text of this Technical Report is based on the following documents:

Enquiry draft	Report on voting
23/742/DTR	23/766/RVDTR

Full information on the voting for the approval of this Technical Report can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

In this Technical Report, the following print types are used:

- requirements proper: in roman type;
- *test specifications: in italic type*;
- Explanatory matter: in smaller roman type.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

The purpose of this document is to have harmonized rules on the same subjects in all the standards published by IEC TC 23 and its subcommittees, in order to give coordinated indications to subcommittees when developing their standards.

These recommendations are meant as a guide. Consequently, subcommittees, according to their own particularities, can use whole or part of the document, which is not meant to be compulsory.

In this document, the word “shall” is used only to illustrate how the relevant requirement should be implemented in a product standard and does not itself imply a product requirement within this document.

In publishing these recommendations, IEC TC 23 wishes to spread the information so that other committees of the IEC can use these recommendations, if necessary.

ELECTRICAL ACCESSORIES – HARMONIZATION OF GENERAL RULES

1 Scope

This document, which is a Technical Report, provides guidance on requirements and tests for subjects applicable to electrical accessories that are within the scope of IEC TC 23 and its subcommittees.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
tracking
progressive formation of conductive paths, which are produced on the surface of or within a solid insulating material, due to the combined effects of electric stress and electrolytic contamination

[SOURCE: IEC 60050-212:2010, 212-11-56, modified – The note has been deleted.]

3.2
electric erosion
wearing away of insulating material by the action of electric discharges

[SOURCE: IEC 60050-212:2010, 212-11-55]

3.3
comparative tracking index
CTI
numerical value of the maximum voltage in volts at which a material withstands 50 drops without tracking

Note 1 to entry: The value of each test voltage and the CTI should be divisible by 25.

[SOURCE: IEC 60050-212:2010, 212-11-59, modified – In the definition, the number of drops is specified and the text "and without a persistent flame occurring under specified test conditions" has been removed at the end of the definition. Note 1 to entry has been added.]

3.4
proof tracking index
PTI
numerical value of the proof voltage in volts at which an insulating material withstands 50 drops without tracking

[SOURCE: IEC 60050-212:2010, 212-11-60, modified – In the definition, the number of drops is specified. As a consequence, the words “can withstand in a specified tracking test without tracking failure and without a persistent flame occurring” have been deleted.]

3.5
material selection
process of assessing and choosing candidate materials for parts of components or subassemblies during the design stage of a product

4 General requirements

4.1 General

Before tests, the specimen is stored for at least 24 h in an atmosphere having a temperature between 15 °C and 35 °C and relative humidity between 45 % and 75 %, except for the test of Clause 7 where IEC 60112 applies.

Accessories within the scope of TC 23 standards, and those of its subcommittees, shall be designed and constructed so that, in normal use, their performance is reliable and safe for the user and the surroundings.

Standard conditions for operation in service for electrical accessories complying with the existing standards should be suitable for use at ambient temperatures not normally exceeding 40 °C, and whose average over a period of 24 h does not exceed 35 °C, with a lower limit of the ambient air temperature of −5 °C.

4.2 Standard conditions for operation in service

4.2.1 Ambient temperature

4.2.1.1 General

Unless covered by a temperature classification, accessories within the scope of TC 23 standards, and those of its subcommittees, should be at least capable of operating under the following standard conditions.

4.2.1.2 Ambient air temperature range in normal use

Electrical accessories complying with the existing standards are suitable for normal use at ambient temperatures not normally exceeding 40 °C, but their average over a period of 24 h does not exceed 35 °C, with a lower limit of the ambient air temperature of −5 °C.

NOTE This temperature range corresponds to AA4 of IEC 60364-5-51:2005, Table 51A. Part of the temperature range of IEC 60721-3-3, class 3K5, with the high air temperature restricted to 40 °C.

Accessories intended to be used in ambient air temperatures outside the above mentioned conditions permanently or during a long period shall be covered by special requirements or tests, if necessary, to be decided by each product committee.

4.2.1.3 Ambient air temperature range in cold climate

In areas where electrical accessories are to be used in cold or arctic climate, any tests may need to be performed in a suitable cold ambient temperature.

Product committees have the responsibility to evaluate if the accessories intended to be used in ambient air temperatures in cold climate permanently or during a long period shall be tested in a temperature corresponding to the climate area, for example AA3 or AA2 of IEC 60364-5-51:2005, Table 51A.

4.2.2 Altitude

Unless otherwise specified, the accessories are intended to be installed at an altitude not higher than 2 000 m.

4.2.3 Maximum relative humidity at 40 °C

Unless otherwise specified, the maximum relative humidity at the temperature of 40 °C is 50 %.

Higher relative humidity values are admitted at lower temperature (for example 90 % at 20 °C).

4.2.4 External magnetic field

Unless otherwise specified, the external magnetic field is considered not exceeding five times the Earth's magnetic field in any direction.

NOTE When an equipment is installed in proximity to a strong magnetic field, supplementary requirements can be necessary.

4.2.5 Accessory orientation

Unless otherwise specified, the mounting coordinates of the accessories with respect to the horizontal or vertical are as stated by the manufacturer, with a tolerance of 2° in any direction.

4.3 Ambient air temperature range for testing

Unless otherwise specified, the tests are carried out at an ambient temperature of (20 ± 5) °C.

5 Resistance to heat

5.1 General

This guidance is applicable to the relevant clause(s) of TC 23 standards, and those of its subcommittees, covering requirements and tests to determine the resistance to heat of accessories.

These recommendations are in accordance with IEC 60669-1.

The text includes two subclauses.

- Requirements (5.2).
- Tests (5.3).

For editing purposes, the order and the numbers may be altered if necessary.

5.2 Requirements

Accessories including enclosures, if any, shall be sufficiently resistant to heat.

Compliance is checked by the tests of 5.3.

5.3 Tests

5.3.1 Verification of resistance to heat:

a) *for surface mounting boxes, separable covers, separable cover plates and separable frames, by the test of 5.3.4;*

b) *for accessories, with the exception of the parts, if any, covered by a), by the tests of 5.3.2, 5.3.3 and, with the exception of the accessories made from natural or synthetic rubber or a mixture of both, by the test of 5.3.4.*

5.3.2 The specimens are kept for 1 h in a heating cabinet at a temperature of 100 °C ± 2 °C.

During the test, they shall not undergo any change impairing their further use, and sealing compound, if any, shall not flow to such an extent that live parts are exposed.

After the test and after the specimens have been allowed to cool down to approximately room temperature, there shall be no access to live parts which are normally not accessible when the specimens are mounted as in normal use, even if probe B of IEC 61032 is applied with a force not exceeding 5 N.

After the test, markings shall still be legible.

Discoloration, blisters or slight displacement of the sealing compound is disregarded provided that safety is not impaired within the meaning of the relevant standard.

5.3.3 *Parts of insulating material necessary to retain current-carrying parts and parts of the earthing circuit in position are subjected to a ball-pressure test according to IEC 60695-10-2:2014, except that the insulating parts necessary to retain the earthing terminals in a box shall be tested instead to the test as specified in 5.3.4.*

A current-carrying part or a part of the earthing circuit retained by a mechanical means is considered to be retained in position. The use of grease or the like is not considered to be mechanical means.

In case of doubt, to determine whether an insulating material is necessary to retain current-carrying parts and parts of the earthing circuit in position, the specimen is examined without conductors while held in all positions with the insulating material in question removed.

Before the test is started, the ball and the support on which the specimen shall be placed, are brought to the temperature specified. The part under test shall be placed on a 3 mm thick steel plate in direct contact with it, so as to be supported to withstand the test force.

When it is not possible to carry out the test on the specimens, the test shall be carried out on a piece at least 2 mm thick which is cut out of the specimen. If this is not possible, up to and including four layers, each cut out of the same specimen, may be used, in which case the total thickness of the layers should be not less than 2,5 mm.

The test load and the supporting means shall be placed within the heating cabinet for a sufficient time to ensure that they have attained the stabilized testing temperature before the test commences.

The test is made in a heating cabinet at a temperature of 125 °C ± 2 °C.

After 60^{+2}_{0} *min, the ball is removed from the specimen which is then cooled and treated according to Clause 7 of IEC 60695-10-2:2014.*