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Electrical relays - Tests and measurements - Part 41: Tests and measurement procedures - Insulation coordination

FOREWORD

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IEC 63522-41 has been prepared by IEC technical committee 94: Electrical relays. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
94/1181/FDIS	94/1199/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts of IEC 61810 series, published under the general title *Electrical relays - Tests and measurements,* can be found on the IEC website.

This International Standard is to be used in conjunction with IEC 63522-0.

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

– reconfirmed,
– withdrawn, or
– revised.

1 Scope

This part of IEC 63522 provides guidelines for the insulation coordination of electromechanical elementary, solid state, time, forcibility guided and reed relays as well reed contacts and hybrid switching solutions. This document can also be used for similar devices when specified in a detail specification.

Either the test, measurement of creepages, clearances, solid insulation and insulation systems or combinations or all of them are carried out in conjunction with other parts of the IEC 63522 series.

The basis of the insulation coordination is given in the IEC 60664 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.

IEC 60060-1:2025, *High-voltage test techniques - Part 1: General terminology and test requirements*

IEC 60079-15:2017, *Explosive atmospheres - Part 15: Equipment protection by type of protection "n"*

IEC 60270, *High-voltage test techniques - Charge-based measurement of partial discharges*

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage supply systems - Part 1: Principles, requirements and tests*

IEC 60664-3:2016, *Insulation coordination for equipment within low-voltage systems - Part 3: Use of coating, potting or moulding for protection against pollution*

IEC 60664-5:2007, *Insulation coordination for equipment within low-voltage systems - Part 5: Comprehensive method for determining clearances and creepage distances equal to or less than 2 mm*[1]

IEC TS 62993:2017, *Guidance for determination of clearances, creepage distances and requirements for solid insulation for equipment with a rated voltage above 1 000 V AC and 1 500 V DC, and up to 2 000 V AC and 3 000 V DC*

IEC 63522-0, *Electrical relays - Tests and measurements - Part 0: General and guidance*[2]

IEC 63522-4:2025, *Electrical relays - Tests and measurements - Part 4: Dielectric strength test*

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1 This publication was withdrawn.

2 Under preparation. Stage at the time of publication: IEC CDV 63522-0:2025.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 63522-0 and the following apply.

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

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

3.1 Terms and definitions related to insulation

3.1.1
functional insulation
insulation between conductive parts, necessary for the proper functioning of the relay

Note 1 to entry: A typical functional insulation is the coil wire insulation.

[SOURCE: IEC 60050-195:2021,195-02-41, modified – Replacement of "equipment" with "relay" and addition of a Note 1 to entry.]

3.1.2
basic insulation
insulation of hazardous-live-parts which provides basic protection against electric shock

Note 1 to entry: Basic insulation does not necessarily include insulation used exclusively for functional purposes.

[SOURCE: IEC 60664-1:2020, 3.1.30, modified – Addition of "against electric shock" and Note 1 to entry has been reworded.]

3.1.3
supplementary insulation
independent insulation applied in addition to basic insulation, in order to provide protection against electric shock in the event of a failure of basic insulation

[SOURCE: IEC 60050-195:2021, 195-06-07, modified – Replacement of ", that provides fault protection" with "in order to provide protection against electric shock in the event of a failure of basic insulation".]

3.1.4
double insulation
insulation comprising both basic insulation and supplementary insulation

[SOURCE: IEC 60050-195:2021, 195-06-08]

3.1.5
reinforced insulation
insulation of hazardous-live-parts which provides a degree of protection against electric shock equivalent to double insulation

[SOURCE: IEC 60050-195:2021, 195-06-09, modified – Addition of "of hazardous-live-parts" in the definition, and deletion of Note 1 to entry.]

3.1.6
conductive part
part which is capable of conducting electric current, although it may not necessarily be used for this purpose

[SOURCE: IEC 60050-195:2021, 195-01-06, modified – Addition of "although it may not necessarily be used for this purpose".]

3.1.7
live part
conductor or conductive part intended to be energized in normal operation, including a neutral conductor, but by convention not a PEN conductor

Note 1 to entry: A PEN conductor combines the functions of both a protective earthing conductor and a neutral conductor.

[SOURCE: IEC 60050-195:2021, 195-02-19, modified – Addition of "conductor" and deletion of "and mid-point conductor" and "PEM conductor and PEL conductor" in the definition. Addition of a Note 1 to entry.]

3.1.8
clearance
shortest distance in air between two conductive parts, or between a conductive part and the accessible surface of a relay

Note 1 to entry: An example for an accessible surface is the actuating member of a relay used for manual operation.

[SOURCE: IEC 60664-1:2020, 3.1.4, modified – Addition of "or between a conductive part and the accessible surface of a relay", and addition of a Note 1 to entry.]

3.1.9
solid insulation

solid insulating material interposed between two conductive parts

[SOURCE: IEC 60664-1:2020, 3.1.6, modified — Replacement of "or a combination of solid insulating materials, placed between two conductive parts or between a conductive part and a body part" with " interposed between two conductive parts".]

3.1.10
thin layer
solid, homogenic insulating material with specified dielectric strength

Note 1 to entry: Typical examples for thin layers are insulation tapes and similar.

3.1.11
creepage distance
shortest distance along the surface of the insulating material between two conductive parts

[SOURCE: IEC 60664-1:2020, 3.1.5, modified – Deletion of "solid" in the definition.]

3.1.12
tracking
progressive degradation of a solid insulating material by local discharges to form conducting or partially conducting paths

Note 1 to entry: Tracking usually occurs due to surface contamination.

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