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INTERNATIONAL STANDARD

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Coaxial communication cables – Part 1-105: Electrical test methods – Test for withstand voltage of cable dielectric

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FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

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IEC 61196-1-105 has been prepared by subcommittee 46A: Coaxial cables, of IEC technical committee 46: Cables, wires, waveguides, R.F. connectors, R.F. and microwave passive components and accessories. It is an International Standard.

This second edition cancels and replaces the first edition published in 2005. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) The scope provides indication on the specific area concerned.
b) The test equipment is updated.
c) The rate of increase of the test voltage has been changed.
d) The leakage current has been taken into consideration in the test report and requirements.
e) The test procedures for the cables with special structure are specified in Annex A.

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

Draft	Report on voting
46A/1659/CDV	46A/1676/RVC

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 in the IEC 61196 series, published under the general title *Coaxial communication cables*, can be found on the IEC website.

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.

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COAXIAL COMMUNICATION CABLES –

Part 1-105: Electrical test methods – Test for withstand voltage of cable dielectric

1 Scope

This part of IEC 61196 applies to coaxial communication cables. It specifies test methods for determining the withstand voltage of the dielectric of coaxial cables. It is intended to detect the flaws in the dielectric of finished coaxial cables.

The test procedures for the cables with special structure are specified in Annex A.

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 61196-1~~:2005~~, *Coaxial communication cables – Part 1: Generic specification – General, definitions and requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61196-1 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

4 Test for withstand voltage of dielectric

4.1 Principle

The purpose of the test is to determine the withstand voltage of the dielectric under AC or DC conditions.

4.2 Test equipment

~~• An a.c. or d.c. power supply~~

~~• a kilovoltmeter~~

The test can be carried out by one of the two following test equipment:

– a test set up including an AC or DC power supply, a kilovoltmeter and a milliammeter;

– a Hipot tester capable of performing the withstand voltage test and monitoring leakage current of the cable under test.

The frequency of the AC voltage shall be between 40 Hz and 60 Hz and the waveform shall be sinusoidal.

4.3 Preparation of the test specimen

The test shall be carried out on a finished length of cable after the test of continuity. The conductors of both cable ends shall be stripped of a sufficient length to avoid breakdown or partial discharge. The insulation at ~~these points~~ the ends shall be properly cleaned.

4.4 Test procedure

~~The dielectric between the outer conductor and between the inner conductor or conductors of the cable shall be subjected to an a.c. or d.c. voltage for 1 min. The value of the voltage shall comply with that indicated in the relevant sectional or detail specification. The rate of increase of the test voltage shall not exceed 2 kV/s.~~

The test procedure is as follows:

a) The well prepared inner conductor and outer conductor shall be connected with the high voltage end and the earth, respectively.

a) An AC or DC voltage should be applied between the inner and outer conductors of the cable. The test voltage shall be slowly raised to the target voltage as uniformly as possible at a rate of approximately 1/10 of the target voltage per second, but not exceed 1 kV/s.

b) Unless otherwise specified in the relevant cable specification, the duration of the cable under withstand voltage test shall be 1 min.

c) The observations from the test to indicate the test result, as well as the spark, disruptive-discharge and the value of the leakage current shall be recorded.

5 Test report

The test report shall give the following test conditions:

– temperature, in °C;
– sample length, in m;
– value of applied voltage, in kV RMS for AC voltages or kV for DC voltages;
– frequency, in the case of AC voltage in Hz;
– duration of test, in min;
– value of leakage current of cable under test, in mA;
– indication whether the sample passed or failed the test;
– configuration of the test.

6 Requirements

There shall be no breakdown of the dielectric when tested at the voltage given in relevant sectional or detail specification.

The value of the leakage current of the cable under test shall not exceed the value given in the relevant sectional or detail specification when required.

Annex A
(normative)

Test procedures for the cables with special structure

A.1 Armoured cables and cables with intermediate sheaths

A.1.1 Armoured cables

The test shall be carried out between the inner conductor and outer conductor. If a dielectric strength test for the bedding of armoured cables is required, the test shall be carried out as for a screened cable unless otherwise specified. All inner elements shall be connected together. The armour shall be earthed during the test.

A.1.2 Cables with intermediate sheaths

The test shall be carried out between the inner conductor and outer conductor, and outer conductor and intermediate screen. The outer conductor shall be earthed during the test. If multi-intermediate screens are present, the test shall be performed between the intermediate screens as specified in the relevant specification. Either of the intermediate screens shall be earthed during the test.

A.2 Balanced cables

A.2.1 Multicore and symmetrical cables

The test shall be carried out as follows:

a) Core-core test: The conductor against conductor; either of the conductors shall be earthed during the test.

b) Core-screen test (if applicable): The conductor against screen; the screen shall be earthed during the test.

c) Screen-screen test (if applicable): The screen against screen; either of the screens shall be earthed during the test.

A.2.2 Twinax cables

The test shall be carried out as follows:

a) Core-core test: The conductor against conductor; either of the conductors shall be earthed during the test.

b) Core-screen test: The conductor connected together against all screens; the screens shall be earthed during the test.

c) Screen-screen test (if applicable): All individual screens connected together against the overall screen; either of the screens shall be earthed during the test.

A.3 Multi-conductor or hybrid cables

The test shall be carried out as follows:

a) Core-core test: Each conductor against all the other conductors; all other conductors connected together and earthed during the test.

b) Core-screen test: All conductors connected together against the screen; the screen shall be earthed during the test.

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