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Coaxial communication cables – Part 1-326: Mechanical test methods – Hanger test

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COAXIAL COMMUNICATION CABLES –

Part 1-326: Mechanical test methods – Hanger test

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IEC 61196-1-326 has been prepared by subcommittee 46A: Coaxial cables, of IEC technical committee 46: Cables, wires, waveguides, RF connectors, RF and microwave passive components and accessories. It is an International Standard.

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

Draft	Report on voting
46A/1589/FDIS	46A/1602/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/standardsdev/publications.

A list of all the 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- withdrawn,
- replaced by a revised edition, or
- amended.

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COAXIAL COMMUNICATION CABLES –

Part 1-326: Mechanical test methods – Hanger test

1 Scope

This part of IEC 61196 describes the test methods to evaluate the suitability of hangers to support a cable on an antenna tower, or on other constructions. This document also provides generic criteria to evaluate performance.

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 60068-2-11, *Environmental testing – Part 2-11: Tests − Test Ka: Salt mist*

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests − Test N: Change of temperature*

3 Terms and definitions

No terms and definitions are listed in this document.

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

4 Test methods

4.1 General

This document includes different test methods to evaluate the suitability of hangers to support one or more cables. While recommended, it is not intended that all tests be carried out in all cases. The tests to be applied can be specified in the relevant specification or agreed between customer and supplier. The hanger specification shall provide the following:

a) cable information by cable type or diameter if rigid,

b) weight to be supported in slippage test if not cable specific.

4.2 Slippage test

4.2.1 Samples

a) six hangers,

b) cable length: 2 m with a tolerance of ±1 % (alternate 0,7 m with a tolerance of ±1 % depending on thermal chamber size constraints),

c) three cables.

4.2.2 Test method

4.2.2.1 Initial measurements

Prior to the test, the following measurements shall be made unless otherwise specified.

a) accessory and cable information,

b) cable dimensions (critical),

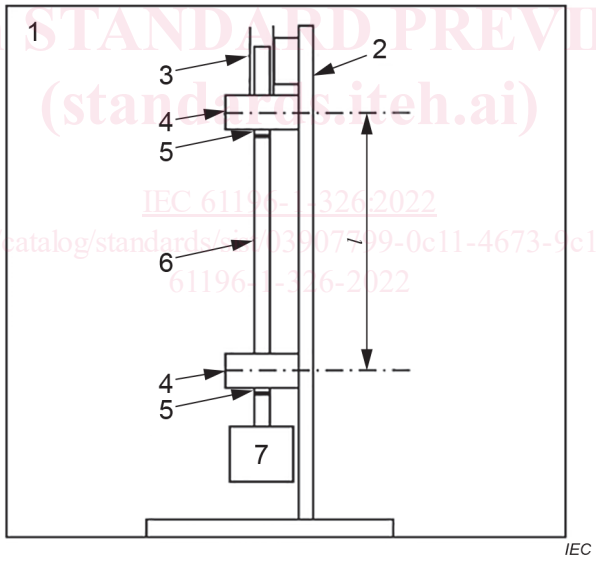
c) accessory dimensions (critical).

Prior to conducting the test, initial measurements shall be performed by reference against specifications.

Visually inspect the cable to make sure it is free of kinks, bends, dents, and/or other visible defects.

4.2.2.2 Procedure

Attach the cable and hangers (2 hangers per cable run spaced 3 feet (e.g. 1 m) apart) to associated hardware (tower mock-up) per manufacturer's instructions. When using the alternate DUT length, due to the thermal chamber size limitations, the space between hangers shall be 0,4 m. See Figure 1.



Key

1 thermal chamber
2 fixture
3 rigid tube over cable (one option)
4 hanger
5 mark
6 cable sample
7 weight attached to cable sample
l spacing between hangers

Figure 1 – Example of a test setup for slippage test method with one cable sample

The cables at the top of the support shall be as straight as possible. Possible ways to accomplish this are described below.

a) The cable assembly is maintained to within 15,2 mm of the top of the hanger, or

b) A rigid tube is placed over the top of the cable and secured to the hanger fixture.

Place the completed assembly into the thermal chamber, attaching the specific weight. If not otherwise specified, as follows:

1) Weight to attach (Kg) = Cable weight/per meter (kg/m) × 2 (m); if using the alternate DUT length (0,7 m), weight to attach (Kg) = Cable weight/per meter (kg/m) × 3,3 (m).
2) Weight may be rounded up to the nearest whole kilogram.

Mark the location on the bottom of each hanger using a paint pen, or other indelible type marker.

Thermal cycle method shall conform to the procedure in IEC 60068-2-14, Method Nb, with dwells as defined in item a) and transition rate at 2 °C/minute. The dwell temperatures are the minimum and maximum specified operating temperatures of the cable.

a) The dwell times should be established by the temperature method shown in Table 1 or, if unknown, the dwell time should be as shown in Table 2.

Table 1 – Dwell times by temperature method

Weight of specimen kg	**Dwell time** h
1,5	1
> 1,5 to ≤ 7,5	1,5
>7,5 to ≤ 14	2
> 14 to ≤ 75	3
> 75 to ≤ 140	4
> 140	8

Table 2 – Dwell times by unknown temperature

Weight of specimen/ test fixtures kg	**Dwell time** h	**Min dwell time** h
>7,5 to ≤ 75	1/2 hour after dwell temperature reached on surface of DUT	1,5
>75	1 hour after dwell temperature reached on surface of DUT	3

b) The number of cycles should be 25.

Start the test.

At 12 cycles and at the conclusion of the test, the following points of the assembly shall be evaluated.

a) Cable slippage: measure and record the location of each hanger relative to the previously marked location.
b) Cable dimensions (critical): measure and record if measurable cable slippage has occurred.

4.2.3 Requirements

The cable slippage shall not exceed the cable diameter and there should be no damage to the device under test.

4.2.4 Report

The report shall contain:

a) whether the amount of slippage was acceptable,
b) general information:
   1) part number of the hanger and cable tested,
   2) date code,
   3) thermal cycle profile and number of cycles,
   4) weight suspended from the cable,
   5) calibration dates of any instrument used.
c) results:
   1) initial results
      i) cable dimensions,
      ii) accessory dimensions,
      iii) photos of setup,
   2) post results
      i) amount of slippage,
      ii) cable dimensional performance changes,
      iii) photos of setup.

4.3 Hanger compression test

4.3.1 General

The hanger specification should provide the following:

a) the tightening force required for test,
b) cable to use for test,
c) hanger mounting instructions.

4.3.2 Samples

a) three hangers,
b) three cable assemblies.

4.3.3 Test method

4.3.3.1 General

a) The tests are done at ambient temperature.
b) For RL and IL measurements, the DUT shall be continuously connected when placing the hanger onto the assembly.
c) In coaxial cables where PIM is measured, the PIM will need to be measured prior to the RL and IL and after the RL and IL tests.

4.3.3.2 Procedure

The initial measurement shall be made and the equipment for IL/RL shall remain connected.

The hanger shall be placed on the cable at any convenient location and tightened to the specified requirements as applicable. The tightening torque shall be measured.

The measurements shall be made after 1 minute of installation of the hanger on the cable.