

# INTERNATIONAL STANDARD

**Coaxial communication cables –  
Part 1-201: Environmental test methods – Test for cold bend performance of  
cable**



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INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

PRICE CODE

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**COAXIAL COMMUNICATION CABLES –****Part 1-201: Environmental test methods –  
Test for cold bend performance of cable**

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International Standard IEC 61196-1-201 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.

The text of this standard is based on the following documents:

| FDIS         | Report on voting |
|--------------|------------------|
| 46A/921/FDIS | 46A/928/RVD      |

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

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

A list of all parts of 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 publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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- withdrawn;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

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

## COAXIAL COMMUNICATION CABLES –

### Part 1-201: Environmental test methods – Test for cold bend performance of cable

#### 1 Scope

This part of IEC 61196 applies to CATV and telecommunications cables. It specifies test methods for determining the cold bend performance of coaxial cables for use in cabled distribution telecommunications networks.

#### 2 Normative references

The following referenced documents are indispensable for the application 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 60050-726:1982, *International Electrotechnical Vocabulary – Transmission lines and waveguides*

IEC 60068-2-1:2007, *Environmental testing – Part 2-1: Tests: Test A - Cold*

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 60050-726 and IEC 61196-1 apply.

#### 4 Test for cold bend performance – Method A

##### 4.1 Principle

The purpose of this procedure is to provide instructions to measure the cold bend properties of flexible coaxial cables.

##### 4.2 Test equipment

An environmental chamber having an interior chamber vertical dimension suitable to accommodate the test sample, and capable of maintaining temperatures as required in the relevant cable standard for 24 h.

Test mandrels having a diameter that is ten times the cable diameter ( $10 \times$  cable diameter). For example, cable having an outside diameter of 0,75 cm, the mandrel diameter would be 7,5 cm.

##### 4.3 Test specimen

The cable specimen should be long enough to make 4 complete wraps around the mandrel.

#### 4.4 Test method

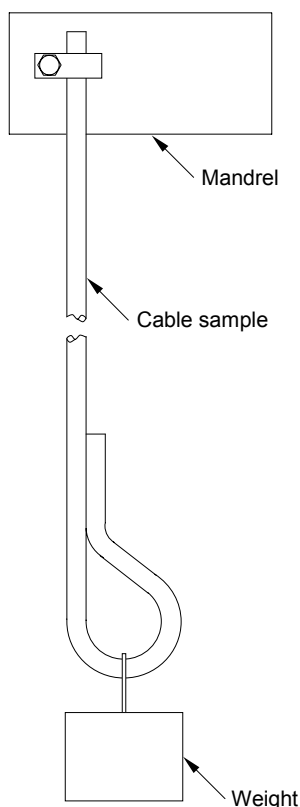
One end of the cable specimen shall be clamped on a mandrel whose diameter is ten (10) times the nominal outside diameter of the cable sample under test. Wrap the cable sample around the mandrel for one full turn and hold in place with a mechanical device. The test specimen shall be cooled in accordance with test Ab of IEC 60068-2-1 and maintained for a period of not less than 2 h at  $-40^{\circ}\text{C}$  for PVC or  $-55^{\circ}\text{C}$  for polyethylene. During the conditioning period, the unwrapped portion of the cable specimen shall be kept reasonably straight. This can be achieved by attaching a small amount of weight (1 kg to 2 kg) at the end of the cable specimen (see Figure 1).

After the conditioning period and while the cable sample is still at the test temperature, the cable specimen shall be wrapped around the mandrel for three (3) full and close turns. The mandrel shall be turned at a uniform rate of  $15 \pm 3$  revolutions per minute during this operation.

After the cable sample has been wrapped around the mandrel, open the environmental chamber door and remove the mandrel and cable sample from the environmental chamber without disturbing the cable sample. Condition the cable sample at room temperature for 1 h maximum. This step should be performed with the cable sample wrapped on the mandrel.

#### 4.5 Inspection

Unwind the cable sample from the mandrel and examine for cracks, flaws or other damage in the jacket material. The area of the cable sample that was clamped to the mandrel should be excluded. Any cracks, flaws or other damage are cause for failure. Additional inspection requirements may be specified in the relevant cable specification.



IEC 120/09

Figure 1 –



#### **4.6 Requirement**

The acceptance criteria for the test shall be stated in the sectional or detailed specification.

### **5 Test for cold bend performance – Method B**

#### **5.1 Principle**

The purpose of this procedure is to provide instructions to measure the cold bend properties of cables with a braided outer conductor as defined in IEC 61196-1, 4.6.1 a), b), d), e), f) and g).

#### **5.2 Preparation of test specimen**

A sample shall be cut from the finished cable and shall have a length of at least 150 times the overall diameter of the cable if it is less than 12,5 mm and 120 times the overall diameter of the cable if it is 12,5 mm or greater. The sample shall be coiled to a diameter of not less than thirty times the overall diameter of the cable.

#### **5.3 Procedure**

The test specimen shall be cooled in accordance with test Ab of IEC 60068-2-1 and maintained at that temperature for a period of not less than 2 h or as indicated in the relevant cable specification.

At the end of this period and while still within the cold chamber, the test specimen shall be wrapped continuously around a mandrel with a diameter as indicated in the relevant cable specification and at a velocity of approximately one turn per 4 s.

For cables having a nominal diameter of less than 12,5 mm, there shall be three touching turns around the mandrel and for cables with diameters of 12,5 mm or greater, there shall be two touching turns.

The test specimen shall be stripped down and examined with normal vision or corrected vision without magnification. Additional inspection requirements may be specified in the relevant cable specification.

#### **5.4 Requirement**

There shall be no signs of physical damage to the conductors, the dielectric, the sheath or the intermediate sheath if applicable.

### **6 Test for cold bend performance – Method C**

#### **6.1 Principle**

The purpose of this procedure is to provide instructions to measure the cold bend properties of coaxial cables with a solid tube outer conductor as defined in 61196-1, 4.6.1 c).

#### **6.2 Test equipment**

An environmental chamber capable of maintaining temperatures as required in the relevant cable standard for 24 h. Test mandrels having a minimum bend radius that is specified in the detailed specification.

#### **6.3 Preparation of test specimen**

The test specimens should be at minimum 1 m long.

## 6.4 Test method

The test specimen shall be cooled in accordance with test Ab of IEC 60068-2-1 and maintained for a period of not less than 2 h at  $-40\text{ }^{\circ}\text{C}$  for PVC or  $-55\text{ }^{\circ}\text{C}$  for polyethylene. During the conditioning period, the cable sample shall be kept reasonably straight. After the conditioning period and while the cable sample is still at the test temperature, place the centre of the test specimen against the mandrel. Bend the test specimen over the mandrel through  $180^{\circ}$  with a steady and constant pressure (see Figure 2). Remove the test specimen from the mandrel after bending. Condition the test specimen at room temperature for 1 h minimum.

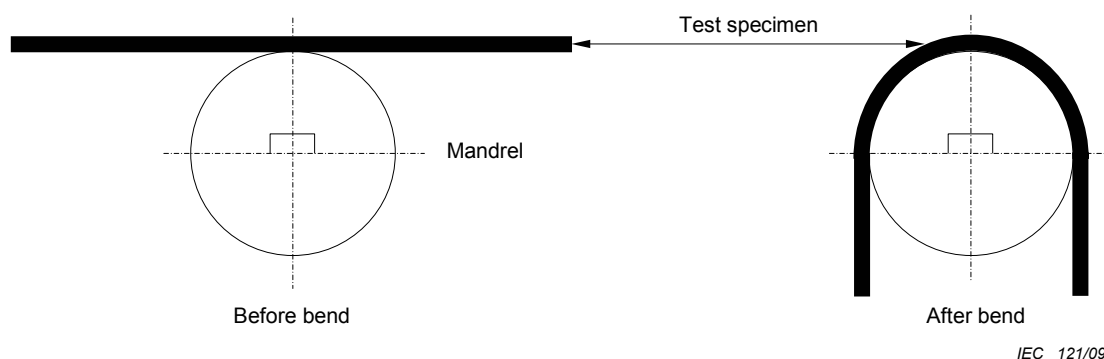


Figure 2 –

## 6.5 Inspection

Examine for cracks, flaws or other damage in the jacket material and outer conductor. Additional inspection requirements may be specified in the relevant cable specification.

## 6.6 Requirement

The acceptance criteria for the test shall be stated in the sectional or detailed specification.



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