

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

**Coaxial communication cables –  
Part 7: Sectional specification for cables for BCT cabling in accordance with  
ISO/IEC 15018 – Indoor drop cables for systems operating at 5 MHz – 3 000 MHz**

**Câbles coaxiaux de communication –  
Partie 7: Spécification intermédiaire pour câbles destinés au câblage BCT  
(broadcast and communication technology) conformément à l'ISO/CEI 15018 –  
Câbles de raccordement à usage intérieur pour systèmes fonctionnant dans la  
plage 5 MHz – 3 000 MHz**



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## COAXIAL COMMUNICATION CABLES –

**Part 7: Sectional specification for cables  
for BCT cabling in accordance with ISO/IEC 15018 –  
Indoor drop cables for systems operating at 5 MHz – 3 000 MHz**

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International Standard IEC 61196-7 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/1042/FDIS	46A/1063/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.

This standard is intended to be read in conjunction with IEC 61196-1. It is based on the second edition (2005) of that standard.

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 stability 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

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[IEC 61196-7:2011](#)

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## COAXIAL COMMUNICATION CABLES –

### Part 7: Sectional specification for cables for BCT cabling in accordance with ISO/IEC 15018 – Indoor drop cables for systems operating at 5 MHz – 3 000 MHz

#### 1 Scope

This part of IEC 61196 applies to coaxial communications cables. It specifies the requirements for cables for broadcast and communications technologies (BCT) cabling in accordance with ISO/IEC 15018 for use in cabled television distribution networks operating at temperature between  $-40\text{ °C}$  and  $+70\text{ °C}$ <sup>1</sup> and in the frequency range from 5 MHz to 3 000 MHz and is to be read in conjunction with IEC 61196-1.

#### 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 60096-0-1, *Radio Frequency cables – Part 0-1: Guide to the design of detail specifications – Coaxial cables*

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

IEC 61196-1-101, *Coaxial communication cables – Part 1-101: Electrical test methods – Test for conductor d.c. resistance of cable*

IEC 61196-1-102, *Coaxial communication cables – Part 1-102: Electrical test methods – Test for insulation resistance of cable dielectric*

IEC 61196-1-103, *Coaxial communication cables – Part 1-103: Electrical test methods – Test for capacitance of cable*

IEC 61196-1-105, *Coaxial communication cables – Part 1-105: Electrical test methods – Test for withstand voltage of cable dielectric*

IEC 61196-1-106, *Coaxial communication cables – Part 1-106: Electrical test methods – Test for withstand voltage of cable sheath*

IEC 61196-1-108, *Coaxial communication cables – Part 1-108: Electrical test methods – Test for characteristic impedance, phase and group delay, electrical length and propagation velocity*

IEC 61196-1-112, *Coaxial communication cables – Part 1-112: Electrical test methods – Test for return loss (uniformity of impedance)*

IEC 61196-1-113, *Coaxial communication cables – Part 1-113: Electrical test methods – Test for attenuation constant*

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<sup>1</sup> Only valid without current load.

IEC 61196-1-115, *Coaxial communication cables – Part 1-115: Electrical test methods – Test for regularity of impedance (pulse/step function return loss)*

IEC 61196-1-201:2009, *Coaxial communication cables – Part 1-201: Environmental test methods – Test for cold bend performance of cable*

IEC 61196-1-203, *Coaxial communication cables – Part 1-203: Environmental test methods – Test for water penetration of cable*

IEC 61196-1-206, *Coaxial communication cables – Part 1-206: Environmental test methods – Climatic sequence*

IEC 61196-1-304:\_\_\_\_, *Coaxial communication cables – Part 1-304: Mechanical test methods – Impact resistance*<sup>2</sup>

IEC 61196-1-308, *Coaxial communication cables – Part 1-308: Mechanical test methods – Test for tensile strength and elongation for copper-clad metals*

IEC 61196-1-313, *Coaxial communication cables – Part 1-313: Mechanical test methods – Adhesion of dielectric and sheath*

IEC 61196-1-314:2006, *Coaxial communication cables – Part 1-314: Mechanical test methods – Test for bending*

IEC 61196-1-316, *Coaxial communication cables – Part 1-316: Mechanical test methods – Test of maximum pulling force of cable*

IEC 61196-1-317, *Coaxial communication cables – Part 1-317: Mechanical test methods – Test for crush resistance of cable*

IEC 1196-1-324, *Coaxial communication cables – Part 1-324: Mechanical test methods – Test for abrasion resistance of cable*

IEC 62153-1-1, *Metallic communication cables test methods – Part 1-1: Electrical – Measurement of the pulse/step return loss in the frequency domain using the Inverse Discrete Fourier Transformation (IDFT)*

IEC 62153-4-3, *Metallic communication cable test methods – Part 4-3: Electromagnetic compatibility (EMC) – Surface transfer impedance – Triaxial method*

IEC 62153-4-4, *Metallic communication cable test methods – Part 4-4: Electromagnetic compatibility (EMC) – Shielded screening attenuation, test method for measuring of the screening attenuation  $a_s$  up to and above 3 GHz*

IEC 62230, *Electric cables – Spark-test method*

ISO/IEC 15018, *Information technology – Generic cabling for homes*

EN 50289-1-6, *Communication cables – Specifications for test methods – Electrical test methods – Electromagnetic performance*

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<sup>2</sup> To be published



### 3 Terms and definitions

For the purposes of this document, the terms and definitions of IEC 61196-1 apply.

## 4 Requirements for cable construction

### 4.1 General

When designing the cable, consideration should be paid to the maximum admissible current stated in the detail specification. The mechanical and electrical properties of the cable should be maintained across the specified operating temperatures.

This specification covers standard applications, other cables may be designed with respect to the MICE tables respectively to harsh environment depending upon agreement between customer and supplier.

NOTE MICE tables: The so-called MICE tables describe the environmental classifications within the industrial premises, and the parameters for each kind (level) of environment.

### 4.2 Inner conductor

The conductor shall meet the requirements of 4.4.1 of 61196-1:2005, and shall be solid or tube. Individual wires can be plain or metal coated. Dimensions shall be  $\geq 0,6$  mm and  $\leq 1,2$  mm and specified in the detail specification.

Any joint made during the final cable production should not affect the mechanical or electrical performance.

### 4.3 Dielectric

The dielectric shall be in accordance with 4.5 of IEC 61196-1:2005.

The dielectric material(s) shall be in accordance with 4.5 of IEC 61196-1 and shall consist of polyolefin materials (e.g. polyethylene or polypropylene).

The diameter of the dielectric shall be  $\geq 3,0$  mm and  $\leq 6,0$  mm and shall be specified in the detail specification.

### 4.4 Outer conductor or screen

The construction and material of the outer conductor and/or screen shall meet the requirements of 4.6 of IEC 61196-1, b), c), f) or g). Where option b) is used, a double braid layer is required.

For braid constructions or helically wound wires, the braid angle shall be between  $15^\circ$  and  $45^\circ$ . The coverage factor shall be greater than or equal to 65 %, or, when the cable is provided with a metal foil, greater than or equal to 25 %. These values are also valid for cables with two bi-directional layers of helically wound wires.

The diameter over the outer conductor shall be  $\geq 3,5$  mm and  $\leq 6,5$  mm and specified in the detail specification.

### 4.5 Filling compounds

Not applicable.

#### 4.6 Moisture barriers

Not applicable.

#### 4.7 Wrapping layers

Not applicable.

#### 4.8 Sheath

The sheath shall meet the requirements of 4.7 of IEC 61196-1:2005.

The diameter of the outer sheath shall be  $\leq 11,0$  mm and shall be specified in the detail specification.

#### 4.9 Metallic protection

Not applicable.

#### 4.10 Cable integral suspension strand (messenger wire)

Not applicable.

#### 4.11 Oversheath

Not applicable.

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**(standards.iteh.ai)**

#### 4.12 Fauna proofing

Not applicable.

<https://standards.iteh.ai/catalog/standards/sist/d6e69fdb-ac32-4832-bb85-6338a762178b/iec-61196-7-2011>

#### 4.13 Chemical and/or environmental proofing

Not applicable.

#### 4.14 Cable identification

##### 4.14.1 General

Cable identification shall be in accordance with of 6.1 of IEC 61196-1.

##### 4.14.2 Sheath marking

Unless otherwise specified in the detail specification, sheath marking shall be achieved as a non-degradable print containing the following minimum information:

- the number of the relevant IEC specification;
- attenuation value (in dB/100 m at 800 MHz, rounded);
- screening class;
- name of supplier.

EXAMPLE IEC 61196-1, 21, Class A < XXX >

### 4.14.3 Labelling

Unless otherwise specified in the detail specification, drums or coils shall be provided with a label with a non-degradable print containing the following minimum information:

- the number of the relevant IEC specification;
- attenuation value (in dB/100 m at 800 MHz, rounded);
- screening class;
- name of supplier;
- batch part number;
- length of cable.

EXAMPLE IEC 61196-1, 21, Class A < XXX > 03/04 543 m

## 5 Tests for completed cables

### 5.1 General

When tested in accordance with the requirements of IEC 61196-1, the requirements given below shall apply.

### 5.2 Electrical tests

#### 5.2.1 Low-frequency and d.c. electrical measurements

Table 1 – Low-frequency and d.c. electrical measurements

No.	IEC test procedure	Parameter	Requirements/Remarks
5.2.1.1	61196-1-101	Conductor resistance	Applicable, value in accordance with the detail specification
	61196-1-101	Loop resistance	≤ 90 Ω/km
5.2.1.2	61196-1-102	Insulation resistance	≥ 10 <sup>4</sup> MΩ × km
5.2.1.3	61196-1-105	Withstand voltage of dielectric	2 kV d.c. or 1,5 kV a.c. for 1 min, unless otherwise specified in the relevant detail specification
5.2.1.4	61196-1-106	Withstand voltage of sheath	2,5 kV a.c. or 3,75 kV d.c., unless otherwise specified in the relevant detail specification
5.2.1.5	61196-1-103	Mutual capacitance	When required, in accordance with the relevant detail specification
5.2.1.6		Spark test	Test in accordance with IEC 62230, value in accordance with the detail specification
5.2.1.7		Current carrying capacity	May be specified for information purposes only in the detail specification, according to IEC 60096-0-1

5.2.2 High-frequency electrical and transmission measurements

Table 2 – High-frequency electrical and transmission measurements

No.	IEC test procedure	Parameter	Requirements/Remarks
5.2.2.1	61196-1-108	Characteristic impedance	$75 \Omega \pm 3 \Omega$
5.2.2.2	61196-1-108	Velocity of propagation	May be specified in the detail specification as required
5.2.2.3	61196-1-112	Return loss	$RL = 20$ dB min. from 5 MHz to 1 000 MHz $RL = 18$ dB min. from 1 000 MHz to 2 000 MHz $RL = 16$ dB min. from 2 000 MHz to 3 000 MHz
5.2.2.4	61196-1-113	Attenuation constant (maximum attenuation)	The maximum value at any frequency shall not be greater than calculated with the following formula: $a \cdot \sqrt{f} + b \cdot f + c$ , (dB/100 m). In case of copper clad conductor material a term $d \sqrt{f}$ should be added, to better match the curve at low frequencies. $\alpha$ shall be corrected to a temperature of 20 °C The coefficients a, b, c and d (if applicable) shall be given in the relevant detail specification. NOTE – a, b, c, d = least square fit coefficients $f$ is in MHz
5.2.2.5	61196-1-115	Regularity of impedance	Perform on both ends of tested cable Regularity $\geq 40$ dB resp $\leq 1$ % IEC 61196-7:2011 Test procedure: IEC 61196-1-115 (time domain) or IEC 62153-1-1 (transformation from frequency domain into time domain by IDFT). <a href="https://standards.iteh.ai/catalog/standards/iec/61196-7-2011/6338a762178b4e11-5694b7e334832bb85">https://standards.iteh.ai/catalog/standards/iec/61196-7-2011/6338a762178b4e11-5694b7e334832bb85</a>
5.2.2.6	62153-4-3	Transfer impedance	Screening Class A+: $\leq 2,5$ m $\Omega$ /m from 5 MHz to 30 MHz; Screening Class A : $\leq 5$ m $\Omega$ /m from 5 MHz to 30 MHz; Test procedure according to EN 50289-1-6, triaxial method, after completion of the flexure test according to 5.4.8 of this standard.
5.2.2.7	62153-4-4	Screening attenuation	Screening Class A+: $\geq 95$ dB from 30 MHz to 1 000 MHz; $\geq 85$ dB from 1 000 MHz to 2 000 MHz; $\geq 75$ dB from 2 000 MHz to 3 000 MHz. Screening Class A: $\geq 85$ dB from 30 MHz to 1 000 MHz; $\geq 75$ dB from 1 000 MHz to 2 000 MHz; $\geq 65$ dB from 2 000 MHz to 3 000 MHz. Test procedure according to IEC 62153-4-4, triaxial method after completion of the flexure test according to 5.4.8 of this standard.