# IEC 61196-7

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REDLINE VERSION

# INTERNATIONAL STANDARD

## Coaxial communication cables –
## Part 7: Sectional specification for cables for BCT cabling in accordance with ~~ISO/IEC 15018~~ ISO/IEC 11801-4 – Indoor drop cables for systems operating at 5 MHz – ~~3 000~~ 6 000 MHz

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# COAXIAL COMMUNICATION CABLES –

## Part 7: Sectional specification for cables for BCT cabling in accordance with ~~ISO/IEC 15018~~ ISO/IEC 11801-4 – Indoor drop cables for systems operating at 5 MHz – ~~3 000~~ 6 000 MHz

## FOREWORD

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IEC 61196-7 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.

This second edition cancels and replaces the first edition published in 2011. This edition constitutes a technical revision.

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

a) extension of frequency range up to 6 GHz,

b) revised sheath marking and labelling,

c) a table with typical cable characteristics was added as Annex B.

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

| FDIS | Report on voting |
|---|---|
| 46A/1499/FDIS | 46A/1516/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.

It is to be used in conjunction with IEC 61196-1:2005.

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 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,
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- replaced by a revised edition, or
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# COAXIAL COMMUNICATION CABLES –

## Part 7: Sectional specification for cables for BCT cabling in accordance with ~~ISO/IEC 15018~~ ISO/IEC 11801-4 – Indoor drop cables for systems operating at 5 MHz – ~~3 000~~ 6 000 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~~ ISO/IEC 11801-4 for use in cabled television distribution networks operating at temperature between −40 °C and +70 °C~~[1]~~ and in the frequency range from 5 MHz to ~~3 000~~ 6 000 MHz ~~and is to be read in conjunction with IEC 61196-1~~.

## 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 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)*

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~~[1] Only valid without current load.~~

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

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 61196-1-212, *Coaxial communication cables – Part 1-206: Environmental test methods – UV stability*

IEC 61196-1-304, *Coaxial communication cables – Part 1-304: Mechanical test methods – Impact resistance*[2]

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~~2015, *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 61196-1-324, *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 as up to and above 3 GHz, triaxial method*

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

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

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~~[2] To be published~~

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ISO/IEC 11801-4, *Information technology – Generic cabling for customer premises – Part 4: Single-tenant homes*

ISO/IEC TR 29106:2007, *Information technology – Generic cabling – Introduction to the MICE environmental classification*

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

## 3 Terms and definitions

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

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 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.

A list of different cable types which indicates typical cable properties for informative purposes (for cables with copper inner conductors) is given in Annex B.

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 (see ISO/IEC TR 29106:2007).

### 4.2 Inner conductor

The conductor shall meet the requirements of IEC 61196-1:2005, Subclause 4.4.1, and shall be solid or tube. Individual wires can be plain or metal coated. Dimensions shall be ≥ 0,6 mm and ≤ 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 IEC 61196-1:2005, Subclause 4.5.

The dielectric material(s) shall be in accordance with IEC 61196-1:2005, Subclause 4.5 and shall consist of polyolefin materials, (e.g. polyethylene or polypropylene).

The diameter of the dielectric shall be ~~≥ 3,0 mm and ≤ 6,0 mm~~ ≥ 2,7 mm and ≤ 7,3 mm and shall be specified in the detail specification.

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### 4.4 Outer conductor or screen

The construction and material of the outer conductor and/or screen shall meet the requirements of IEC 61196-1:2005, Subclause 4.6.1 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° and 45°. 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 ~~≥ 3,5 mm and ≤ 6,5 mm~~ ≥ 3,2 mm and ≤ 8,0 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 IEC 61196-1:2005, Subclause 4.7.

The diameter of the outer sheath shall be ≤ 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.

### 4.12 Fauna proofing

Not applicable.

### 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.~~

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IEC 61196-1:2005, Subclause 6.1 applies.

### 4.14.2 Sheath marking

Unless otherwise specified in the detail specification, sheath marking shall be achieved as a non-degradable print containing the 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 >~~

– a number giving the nominal characteristic impedance of the cable in ohms, "75",
– a number that corresponds to the approximate dielectric outer diameter in mm; for example, the nominal dielectric diameter 3,66 mm shall be expressed by "4",
– a letter that corresponds to the different outer conductor construction types,
– a letter that corresponds to the different inner conductor types,
– a letter that corresponds to the different outer conductor construction types,
– letters that correspond to the different outer conductor materials,
– a number that corresponds to the different screening classes,
– the number of the IEC standard (61196-7),
– the name of supplier.
– the length of cable.

EXAMPLE: 75-4T-BC-ALT/BC/ALT-A – <xxx> – IEC 61196-7

More detailed information is given in Annex A.

### 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~~

– a number giving the nominal characteristic impedance of the cable in ohms, "75",
– a number that corresponds to the approximate dielectric outer diameter in mm; for example, the nominal dielectric diameter 3,66 mm shall be expressed by "4",
– a letter that corresponds to the different outer conductor construction types, see A.1.2,
– letters that correspond to the different inner conductor types, see A.1.2,
– letters that correspond to the different outer conductor construction types, see A.1.2,
– letters that correspond to the different outer conductor materials, see A.1.2,
– a designation of the different screening classes, see A.1.2,

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– the name of supplier,
– the number of the IEC standard (61196-7),
– the batch part number.

More detailed information is given in Annex A.

EXAMPLE: 75-4T-BC-ALT/BC/ALT-A – <xxx> – IEC 61196-7 – 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.~~

## 5.1 Electrical tests

### 5.1.1 Low-frequency and DC electrical measurements

Low-frequency and DC electrical measurements are described in Table 1.

**Table 1 – Low-frequency and DC electrical measurements**

| No. | IEC test procedure | Parameter | Requirements/Remarks |
|---|---|---|---|
| 5.1.1.1 | 61196-1-101 | Conductor resistance | Applicable, value in accordance with the detail specification |
| | 61196-1-101 | Loop resistance | ≤ 90 Ω/km |
| 5.1.1.2 | 61196-1-102 | Insulation resistance | ≥ $10^4$ MΩ × km |
| 5.1.1.3 | 61196-1-105 | Withstand voltage of dielectric | 2 kV DC or 1,5 kV AC for 1 min, unless otherwise specified in the relevant detail specification |
| 5.1.1.4 | 61196-1-106 | Withstand voltage of sheath | 2,5 kV AC or 3,75 kV DC, unless otherwise specified in the relevant detail specification |
| 5.1.1.5 | 61196-1-103 | Mutual capacitance | When required, in accordance with the relevant detail specification |
| 5.1.1.6 | 62230 | Spark test | Test in accordance with IEC 62230, value in accordance with the detail specification |
| 5.1.1.7 | 60096-0-1 | Current carrying capacity | May be specified for information purposes only in the detail specification, according to IEC 60096-0-1 |

### 5.1.2 High-frequency electrical and transmission measurements

High-frequency electrical and transmission measurements are described in Table 2.

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