

INTERNATIONAL STANDARD



**Coaxial communication cables –
Part 9: Sectional specification for flexible RF coaxial cables**

INTERNATIONAL STANDARD PREVIEW
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IEC 61196-9:2023

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COAXIAL COMMUNICATION CABLES –

Part 9: Sectional specification for flexible RF coaxial cables

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 61196-9 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 2014. This edition constitutes a technical revision.

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

- a) Title: "RF flexible cables" is changed to "flexible RF coaxial cables",
- b) Clause 2: different standards are added,
- c) Subclauses 4.2 to 4.5: materials and construction details are added,

- d) Subclause 5.1: nominal characteristic impedance is added,
- e) Subclause 5.2: rated temperature range is added,
- f) Subclause 5.4: power rating is added,
- g) Subclause 5.4: bending radius is added,
- h) Clause 6: cable identification is revised,
- i) Clause 7: completely revised, different requirements or typical values are added,
- j) Annex A: Stress-crack resistance is added,
- k) Annex B: Vibrations is added.

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

Draft	Report on voting
46A1620/CDV	46A/1634/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.

This document is to be read in conjunction with IEC 61196-1:2005.

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,
- replaced by a revised edition, or
- amended.

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COAXIAL COMMUNICATION CABLES –

Part 9: Sectional specification for flexible RF coaxial cables

1 Scope

This part of IEC 61196 specifies the materials and cable construction for RF flexible coaxial communication cables with solid or with semi-air-spaced dielectric, IEC type designation, identification, marking and labelling, standard rating and characteristics, requirements of finished cables, quality assessment, delivery and storage, etc.

This document applies to RF flexible coaxial communication cables for use in mobile communication systems, microwave test equipment and other fields. It is read in conjunction with IEC 61196-1:2005.

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 60068-1:2013, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-20:2021, *Environmental testing – Part 2-20: Tests – Test Ta and Tb: Test methods for solderability and resistance to soldering heat of devices with leads*

IEC 60332-1-2, *Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-mixed flame*

IEC 60754-1, *Test on gases evolved during combustion of materials from cables – Part 1: Determination of the halogen acid gas content*

IEC 60811-607, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 607: Physical tests – Test for the assessment of carbon black dispersion in polyethylene and polypropylene*

IEC 60966-1:2019, *Radio frequency and coaxial cable assemblies – Part 1: Generic specification – General requirements and test methods*

IEC 61034-2, *Measurement of smoke density of cables burning under defined conditions – Part 2: Test procedure and requirements*

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

IEC 61196-1-1, *Coaxial communication cables – Part 1-1: Capability approval for coaxial cables*

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 61196-1-110, *Coaxial communication cables – Part 1-110: Electrical test methods – Test for continuity*

IEC 61196-1-111, *Coaxial communication cables – Part 1-111: Electrical test methods – Stability of phase test methods*

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*

IEC 61196-1-114, *Coaxial communication cables – Part 1-114: Electrical test methods – Test for inductance*

IEC 61196-1-116, *Coaxial communication cables – Part 1-116: Electrical test methods – Test for impedance with time domain reflectometry (TDR)*

IEC 61196-1-119, *Coaxial communication cables – Part 1-119: Electrical test methods – RF average power rating*

IEC 61196-1-126, *Coaxial communication cables – Part 1-126: Electrical test methods – Corona extinction voltage*

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 61196-1-209, *Coaxial communication cables – Part 1-209: Environmental test methods – Thermal cycling*

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

IEC 61196-1-215, *Coaxial communication cables – Part 1-215: Environmental test methods – High temperature cable ageing*

IEC 61196-1-301, *Coaxial communication cables – Part 1-301: Mechanical test methods – Test for ovality*

IEC 61196-1-302, *Coaxial communication cables – Part 1-302: Mechanical test methods – Test for eccentricity*

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

IEC 61196-1-314, *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 62037-4, *Passive RF and microwave devices, intermodulation level measurement – Part 4: Measurement of passive intermodulation in coaxial cables*

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

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

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

3 Terms and definitions

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

3.1

flexible coaxial communication cable

coaxial cable which can repeat flexure in service

Note 1 to entry: The typical construction for this type of cable is a single inner conductor which can be solid or stranded covered by dielectric core material, which is surrounded by a braided outer conductor(s), with a protective sheath.

4 Materials and cable construction

4.1 Cable construction

The cable construction shall be in accordance with 4.2 to 4.5 and the requirements stated in the relevant detail specification.

4.2 Inner conductor

The inner conductor shall be a solid or strand copper wire or solid or strand copper clad steel wire according to IEC 61196-1:2005, 4.4.1 to 4.4.4 or any other appropriate material as stated in the relevant detail specification. The conductor can be coated or uncoated. If it is silver plated, the minimum thickness of the silver coating shall be 1 µm.

The nominal diameter shall be stated in the relevant detail specification.

Diameter tolerance for the completed inner conductor shall be as specified in the relevant detail specification.

The inner conductor shall be smooth and continuous.

4.3 Dielectric

The construction of the dielectric shall be one of the materials listed below or a combination of the following:

- a) solid dielectric (such as: solid polyolefin, solid polytetrafluoroethylene (PTFE), solid fluorinated ethylene propylene (FEP), solid perfluoroalkoxyalkane (PFA), etc.);
- b) semi-air-spaced dielectric (such as: foamed polyolefin, foamed FEP, foamed PFA, low density PTFE, etc.);
- c) any other appropriate materials and types as specified in the relevant detail specification.

The nominal diameter and thickness shall be stated in the relevant detail specification.

The tolerance of the dielectric diameter shall be stated in the relevant detail specification.

4.4 Outer conductor or screen

The construction of the outer conductor or screen should be a wrap or/and braid. It consists of one or more of the following layer(s):

- a) metal foil layer or metallized film layer (when applicable): metal foil layer or metallized film layer is optional, which can be copper foil, copper plastic composite tape or any other films as stated in the relevant detail specification. These layers can be applied longitudinally or helically over the dielectric of coaxial cable, with a sufficient overlap as specified in the relevant detail specification;
- b) braid: a braid of plain or coated wire or tape. Joints in the braiding wires or tapes shall be soldered, twisted, or woven in, and there shall be no joint in the complete braid. The braid shall be applied evenly. The braid angle and the filling factor or coverage factor shall be specified in the relevant detail specification.

The construction, material, maximum diameter of the outer conductor or screen shall be specified in the relevant detail specification.

4.5 Sheath

IEC 61196-1:2005, Subclause 4.7 applies with the following amendments and additions.