

INTERNATIONAL STANDARD

**Coaxial communication cables –
Part 9-1: Blank detail specification for flexible RF coaxial cables**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COAXIAL COMMUNICATION CABLES –

Part 9-1: Blank detail specification for flexible RF coaxial cables

FOREWORD

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IEC 61196-9-1 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 2015. This edition constitutes a technical revision.

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

- a) [8] Engineering information: "Nominal characteristic impedance", "Relative propagation velocity (velocity ratio)", "Capacitance", "Maximum tensile force (when required)", "Average power (when required)" are added.

- b) [9] to [12]: Tables revised, 7.2.17 "Phase difference", 7.2.20 "Corona extinction voltage", 7.3.5 Stress-crack resistance (for FEP sheath)", "7.4.14 Vibration" are added,
- c) [9] to [12]: Different requirements revised or added.

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

Draft	Report on voting
46A/1641/FDIS	46A/1647/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/publications.

This document is to be read in conjunction with IEC 61196-1:2005 and IEC 61196-9:2023.

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- withdrawn,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.

COAXIAL COMMUNICATION CABLES –

Part 9-1: Blank detail specification for flexible RF coaxial cables

1 Scope

This part of IEC 61196 applies to coaxial communication cables described in IEC 61196-9. It specifies the requirements of flexible coaxial communication cables with solid or semi-air-spaced dielectric and wrap or/and braid outer conductor. These cables are widely used in mobile communication systems, microwave test equipment, consumer electronics and other fields.

This document determines the layout and style for detail specifications. Detail specifications (DS) can be prepared by a national organization, a manufacturer or a user by entering the details in the blank detail specification.

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

IEC 61196-1-314:2015, *Coaxial communication cables – Part 1-314: Mechanical test methods – Test for bending*

IEC 61196-9:2023, *Coaxial communication cables – Part 9: Sectional specification for flexible RF coaxial cables*

3 Terms and definitions

No terms and definitions are listed in this document.

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>

4 Guidance for the preparation of detail specifications

The detail specification shall be written in accordance with the layout of the blank detail specification, which forms part of this document.

When a characteristic does not apply, then NA (not applicable) should be entered in the appropriate space.

When a characteristic applies but a specific value is not considered necessary, then NS (not specified) should be entered in the appropriate space.

The numbers shown in brackets in this and the following pages correspond to the following items of required information, which should be entered in the space provided.

- [1] Name and address of the organization that has prepared the document.
- [2] IEC document number and date of issue.
- [3] Address of the organization from which the document is available.
- [4] Related documents.
- [5] Any other references to the cable, national reference, trade name, etc.
- [6] Complete description of the cable.
- [7] Cable construction.
- [8] Engineering information.
- [9] Parameter or characteristic.
- [10] Reference to the relevant subclause of the sectional specification.
- [11] Minimum requirements, the values entered shall meet as a minimum the requirements of the sectional specification.
- [12] Remarks.

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5 Detail specification

Title:	
[1] Prepared by:	[2] Document No.: Issue: Date:
[3] Available from:	[4] Generic specification IEC 61196-1 Sectional specification IEC 61196-9
[5] Additional references:	
[6] Cable description: a) Cable variant b) Material of inner conductor c) Material and construction of dielectric d) Outer conductor e) Material of sheath	
[7] Cable construction a) Inner conductor Material: Diameter (mm) nominal: Tolerance (mm): $\pm \dots$ b) Dielectric Material: Construction: Diameter (mm) nominal: Tolerance (mm): $\pm \dots$ c) Outer conductor Material: Construction: Diameter (mm) nominal: Tolerance (mm): $\pm \dots$ d) Sheath (if any) Material: Minimum thickness(mm): Diameter (mm) nominal: Tolerance (mm): $\pm \dots$	
[8] Engineering information (reference only) a) Operation, storage and installation temperature range: b) Maximum recommended operating frequency, cut-off frequency: c) Nominal characteristic impedance: d) Relative propagation velocity (velocity ratio): e) Maximum continue working voltage: f) Minimum bending radius (static state): g) Minimum bending radius (dynamic state): h) Nominal weight: i) Capacitance: j) Maximum tensile force (when required): k) Average power (when required): l) Peak power (when required):	

[9] Parameter	[10] IEC 61196-9:2023 Subclause	[11] Value	[12] Remarks
Electrical characteristics	7.2		
Continuity	7.2.1	Inner conductor shall be continuous. Outer conductor shall be continuous.	
Conductor direct current resistance	7.2.2	$\leq \dots \Omega/\text{km}$ (Inner conductor) $\leq \dots \Omega/\text{km}$ (Outer conductor)	
Insulation resistance	7.2.3	$\geq 10\ 00\ \text{M}\Omega\cdot\text{km}$	
Withstand voltage of dielectric	7.2.4	$\dots\ \text{kV RMS}$	40 Hz~60 Hz
Withstand voltage of sheath ^a	7.2.5	$\dots\ \text{kV RMS}$	40 Hz~60 Hz
Spark test ^a	7.2.6	$\dots\ \text{kV RMS}$	40 Hz~60 Hz
Capacitance	7.2.7	$\leq \dots\ \text{pF/m}$	
Inductance	7.2.8	$\leq \dots\ \text{mH/m}$	
Characteristic impedance	7.2.9	$(\dots\pm\dots)\ \Omega$	
Relative propagation velocity (velocity ratio) ^b	7.2.10	$\geq \dots\%$ or $\dots\% \pm \dots\%$	
Return loss	7.2.11	$\dots\ \text{MHz to MHz}$ $\geq \dots\ \text{dB}$	Specimen length: $\geq 2\ \text{m}$
Attenuation	7.2.12	$\dots\ \text{MHz} \leq \dots\ \text{dB/m at } 20\ ^\circ\text{C}$	
PIM ^{b c}	7.2.13	Better than $\dots\ \text{dBc}$	This test is only applicable to the cable with characteristic impedance of $50\ \Omega$. Input power: $2\times 20\ \text{W}$ Test frequency: $\dots\ \text{MHz}$
RF power ^b	7.2.14	$\dots\ \text{W}$ Frequency: $\dots\ \text{GHz}$	
Phase stability vs temperature ^c	7.2.15	$\leq \dots\ \text{PPM}$ Frequency: $\dots\ \text{GHz}$ Test temperature:	
Phase stability vs bending ^c	7.2.16	$\pm \dots^\circ$ ($\dots\ \text{GHz to } \dots\ \text{GHz}$) Mandrel diameter: $\dots\ \text{mm}$	
Phase difference ^c	7.2.17	$\pm \dots^\circ$ or $(\dots\pm\dots)^\circ$ Specimen length: $(\dots\pm\dots)\ \text{mm}$ Frequency: $\dots\ \text{GHz}$	
Transfer impedance	7.2.18	$\dots\ \text{MHz to } \dots\ \text{MHz}$ $\leq \dots\ \text{m}\Omega/\text{m}$	
Screening attenuation ^b	7.2.19	$\dots\ \text{MHz to } \dots\ \text{MHz}$ $\geq \dots\ \text{dB}$	0,5 GHz~3 GHz
Corona extinction voltage ^b	7.2.20	$\geq \dots\ \text{kV}$	

[9] Parameter	[10] IEC 61196-9:2023 Subclause	[11] Value	[12] Remarks
Environmental characteristics	7.3		
Cold bend performance	7.3.1	No physical damages of conductors, dielectric and sheaths	Test temperature: ...°C ± ...°C Mandrel diameter: ...mm
Water penetration ^c	7.3.2	The requirement shall be specified in the detailed specification.	
Climatic sequence ^b	7.3.3	Insulation resistance ≥ ... MΩ · km	$T_a = \dots ^\circ\text{C}$ $T_b = \dots ^\circ\text{C}$ $t_1 = \dots \text{h}$
Thermal ageing ^b	7.3.4	Displacement: ≤ ...mm No cracks, flaws or other damage in the cable surface.	Length of sample: ...m Test temperature: ...°C ± ...°C Duration: 168 h
Stress-crack resistance (for FEP sheath)	7.3.5	No cracks, flaws or other damage in the cable surface.	Mandrel diameter: ...mm
Thermal cycling ^b	7.3.6	The requirement shall be specified in the detailed specification.	
UV stability ^b	7.3.7	No cracks shall be seen under visual examination.	
Mechanical characteristics	7.4		
Visual examination	7.4.1	No observable defects	
Dimensional examination	7.4.2	The requirement shall be specified in the detailed specification.	
Ovality of dielectric ^c	7.4.3	≤ ...%	
Ovality of sheath ^c	7.4.4	≤ ...%	
Eccentricity of dielectric ^c	7.4.5	≤ ...%	
Eccentricity of sheath ^c	7.4.6	≤ ...%	
Carbon black content ^c	7.4.7	The requirement shall be specified in the detailed specification.	
Adhesion of dielectric	7.4.8	≥ ...N to ≤ ...N	Test temperature: 20 °C ± 5 °C Specimen length: L=75 mm
Bending	7.4.9	Maximum allowable attenuation increase < ... %	IEC 61196-1-314:2015, Clause 5 Bending radius: ... mm; Number of cycles: ...; Mass of the weight: ... kg. IEC 61196-1-314:2015, Clause 5 a) Diameter of pulleys A and B: ... mm; b) Number of cycles: ...; c) Mass of the weight: ... kg.
Tensile strength of cable (longitudinal pull) ^b	7.4.10	a) The characteristic impedance: (...±...) Ω b) No physical damage in the cable	The maximum tension applied shall be greater than the cable weight of 100 m or be specified in the detail specification.
Crush resistance of cable ^b	7.4.11	Load = The maximum impedance irregularity: ≤1 %	