IEC 61196-4-1

Edition 2.0 2022-09

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Coaxial communication cables –
Part 4-1: Blank detail specification for radiating cables

Câbles coaxiaux de communication –
Partie 4-1: Spécification particulière-cadre pour câbles rayonnants

IEC 61196-4-1:2022-09(en-fr)

IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, …). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC
La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC - webstore.iec.ch/advsearchform
La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, …). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished
Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc
Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org
Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

IEC 61196-4-1

Edition 2.0 2022-09

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Coaxial communication cables –
Part 4-1: Blank detail specification for radiating cables

Câbles coaxiaux de communication –
Partie 4-1: Spécification particulière-cadre pour câbles rayonnants

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 33.120.10

ISBN 978-2-8322-5650-3

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

COAXIAL COMMUNICATION CABLES –

Part 4-1: Blank detail specification for radiating 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.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 61196-4-1 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 2016. This edition constitutes a technical revision.

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

a) rewrote "1 Scope" to be consistent with other blank detail specifications of coaxial cables;
b) added detail construction requirements of inner and outer conductor in "[7] Cable construction";
c) added "Storage temperature range", "Installation temperature range" and "Stop frequency band" in "[8] Engineering information (reference only)";
d) added "8.2.11 Link loss", "8.4.9 Adhesion of dielectric", "8.4.10 Shrinkage for insulations", "8.4.11 Maximum pulling force of cable";

e) added different detail requirements or typical values in 8.2.4, 8.2.6 to 8.2.8, 8.3.1 to 8.3.4, 8.4.1, 8.4.3 to 8.4.8;

f) deleted "7.4.4 Ovality of outer conductor".

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

Draft	Report on voting
46A/1584/FDIS	46A/1599/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.

This part of IEC 61196 is to be read in conjunction with IEC 61196-1:2005 and IEC 61196-4:—[1].

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.

[1] Under preparation. Stage at the time of publication: IEC 61196-4/FDIS:2022.

COAXIAL COMMUNICATION CABLES –

Part 4-1: Blank detail specification for radiating cables

1 Scope

This part of IEC 61196 applies to radiating coaxial communication cables. These cables are intended for use in wireless communication system in long, narrow, semi-closed and indoor environment, such as tunnels, railways, highways, subways, elevators and other installations.

It determines the layout and style for detail specifications. Detail specifications, based on the blank detail specification, can be prepared by a national organization, a manufacturer, or a user.

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 61196-1-124[2], *Coaxial communication cables – Part 1-124: Electrical test methods – Test for coupling loss of radiating cable*

IEC 61196-4:[3], *Coaxial communication cables – Part 4 Sectional specification for radiating cables*

3 Terms and definitions

No terms and definitions are listed in this document.

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 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 (for not applicable) is entered in the appropriate space.

_____

2 Under preparation. Stage at the time of publication: IEC/FDIS 61196-1-124:2022.

3 Under preparation. Stage at the time of publication: IEC/FDIS 61196-4:2022.

NOTE 1 When a characteristic applies but a specific value is not considered necessary, then NS (for not specified) is entered.

The numbers shown in square 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 IEC 61196-4

[11] Minimum requirements of the sectional specification IEC 61196-4

[12] Remarks

5 Blank detail specification

Title	
[1] Prepared by: **Date:**	**[2] Document No.:** **Issue:**
[3] Available from:	**[4] Generic specification** IEC 61196-1 **Sectional specification** IEC 61196-4
[5] Additional references: IEC 61196-1-1XX, IEC 61196-1-2XX, IEC 61196-1-3XX	
[6] Cable description: a) Cable variant b) Material of inner conductor c) Material of dielectric d) Outer conductor e) Material of sheath (if any)	

Title	
[7] Cable construction a) Inner conductor Material Construction: For corrugated inner conductor: – Peak diameter and tolerance (mm): – Root diameter and tolerance (mm): – Pitch and tolerance (mm): For smooth inner conductor: – Diameter and thickness and tolerance (mm): For others: – Diameter and tolerance (mm): b) Dielectric Material Diameter (mm) nominal Tolerance (mm): ±… c) Outer conductor Material Construction: For corrugated outer conductor: – Peak diameter and tolerance (mm): – Root diameter and tolerance (mm): – Pitch and tolerance (mm): For smooth tube outer conductor: Diameter and thickness and tolerance (mm): d) Sheath (if any) Material Minimum thickness (mm) Diameter (mm) Tolerance (mm): ± …	
[8] Engineering information (reference only) a) Operating temperature range b) Storage temperature range c) Installation temperature range d) Operating frequency e) Cut-off frequency f) Stop frequency band g) Nominal characteristic impedance h) Minimum bending radius (static state) i) Minimum bending radius (dynamic state) j) Nominal weight k) Average and peak power rating	

[9] Parameter	**[10] IEC 61196-4:–[4] Subclause**	**[11] Value**	**[12] Remarks**
Electrical characteristics	**8.2**		
Continuity	8.2.1	Inner and outer conductors shall be continuous	
Inner and outer conductor direct current resistance	8.2.2	≤ … Ω/km	
Capacitance	8.2.3	Frequency: ≤ … pF/m	
Withstand voltage of dielectric	8.2.4	3/8",1/2": DC 6 kV 7/8",1 1/4": DC 10 kV 1 5/8": DC 15 kV or according to the detail specifications	1 min
Spark-test of sheath	8.2.5	kV RMS	40 Hz to 60 Hz
Insulation resistance	8.2.6	≥10^4 MΩ·km or according to the detail specifications	
Mean characteristic impedance	8.2.7	(50 ± 2) Ω or (75 ± 2) Ω	200 MHz
Return loss	8.2.8	≥ 17,7 dB at 10 MHz to 2 200 MHz ≥ 14,9 dB at 2 200 MHz to 4 000 MHz ≥ 14,0 dB at 4 000 MHz to 6 000 MHz or according to the detail specifications	Minimum length of specimen: 50 m. During the test, the cable should be uncoiled and installed on a test arrangement according to IEC 61196-1-124.
Attenuation constant/insertion loss	8.2.9	For non-uniformly radiating type cable: ≤ … dB/100 m at 20 °C … MHz For uniformly radiating type cable: IL ≤ … dB, L =… m	
Coupling loss (not applicable to uniform radiating type cable)	8.2.10	$L_{c,50}$ ≤ … dB at …. MHz $L_{c,95}$ ≤ … dB at …. MHz	
Link loss [a]	8.2.11	at lowest frequency point… MHz, ≤ … dB at mid-frequency point… MHz, ≤ … dB at highest frequency point … MHz, ≤ … dB	Specimen length: according to design requirements

4 Under preparation. Stage at the time of publication: IEC 61196-4/FDIS:2022.