IEC 61196-4-1

Edition 2.0 2022-09
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

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

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

Full document details: IEC 61196-4-1 2022 RLV

Documents
Document Sharing Hub

THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2022 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

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 It also gives information on projects, replaced and withdrawn publications.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.

Documents
Document Sharing Hub

Full document details: IEC 61196-4-1 2022 RLV

IEC 61196-4-1

Edition 2.0 2022-09
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 33.120.10

ISBN 978-2-8322-5712-8

Warning! Make sure that you obtained this publication from an authorized distributor.

® Registered trademark of the International Electrotechnical Commission

Documents
Document Sharing Hub

Full document details: IEC 61196-4-1 2022 RLV

CONTENTS

FOREWORD 3
1 Scope 6
2 Normative references 6
3 Terms and definitions 6
4 Guidance for the preparation of detail specifications 6
5 Blank detail specification 7

Documents
Document Sharing Hub

Full document details: IEC 61196-4-1 2022 RLV

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.

This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 61196-4-1:2016. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

AVA Documents
Document Sharing Hub

Full document details: IEC 61196-4-1 2022 RLV

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.

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

Documents
Document Sharing Hub
Full document details: IEC 61196-4-1 2022 RLV

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.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

Documents
Document Sharing Hub

Full document details: IEC 61196-4-1 2022 RLV

COAXIAL COMMUNICATION CABLES –

Part 4-1: Blank detail specification for radiating cables

1 Scope

This part of IEC 61196~~, which is a blank detail specification,~~ 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~~ in which conventional radio transmission is not satisfactory or even impossible~~.

It determines the layout and style for detail specifications. Detail specifications, based on the blank detail specification, ~~may~~ 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:~~2015~~[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.

---

[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.

Documents
Document Sharing Hub

Full document details: IEC 61196-4-1 2022 RLV

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

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

<table>
<tr><td colspan="2">Title</td></tr>
<tr><td>[1] Prepared by:
Date:</td><td>[2] Document No.:
Issue:
~~Date:~~</td></tr>
<tr><td>[3] Available from:</td><td>[4] Generic specification IEC 61196-1
Sectional specification IEC 61196-4</td></tr>
<tr><td>[5] Additional references:
IEC 61196-1-1XX, IEC 61196-1-2XX, IEC 61196-1-3XX</td><td></td></tr>
<tr><td>[6] Cable description:
a) Cable variant
b) Material of inner conductor
c) Material of dielectric
d) Outer conductor
e) Material of sheath (if any)</td><td></td></tr>
<tr><td>[7] Cable construction
a) Inner conductor
Material
~~Diameter (mm) nominal~~
~~Tolerance (mm): ±...~~</td><td></td></tr>
</table>

Documents
Document Sharing Hub
Full document details: IEC 61196-4-1 2022 RLV

Title	
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 ~~Diameter (mm) nominal~~ ~~Tolerance (mm): ±…~~ 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 ~~d) Maximum continue working voltage~~ h) Minimum bending radius (static state) i) Minimum bending radius (dynamic state) j) Nominal weight k) Average and peak power rating	

Documents
Document Sharing Hub
Full document details: IEC 61196-4-1 2022 RLV

[9] Parameter or characteristic	[10] IEC 61196-4:2015 Subclause	[11] Value	[12] Remarks
Electrical characteristics	7.1		
Continuity	7.2.1		
Inner and outer conductor direct current resistance	7.2.2	Inner conductor ≤ … Ω/km @ 20 °C Outer conductor ≤ … Ω/km @ 20 °C	
Capacitance	7.2.3	Frequency: ≤ … pF/m	
Withstand voltage of dielectric	7.2.4	… kV rms or … DC	40 Hz ~ 60 Hz
Withstand voltage of sheath (or spark voltage) [a]	7.2.5	… kV rms	40 Hz ~ 60 Hz
Insulation resistance	7.2.6	≥ … MΩ · km	≥ 5 000 MΩ·km according to IEC 61196-4
Mean characteristic impedance	7.2.7	(…± …) Ω	200 MHz
Return loss	7.2.8	at … MHz ≥ … dB	
Attenuation constant	7.2.9	at … MHz ≤ … dB/100 m @ 20 °C	If necessary, refer to a table or graph at the end of the detail specification
Coupling loss	7.2.10	α_{c50} < … dB @ … MHz α_{c95} < … dB @ …. MHz	If necessary, refer to a table or graph at the end of the detail specification
Environmental characteristics	7.3		
Ageing	7.3.1	Value in accordance with the detail specification	
Cold bend performance	7.3.2	Value in accordance with the detail specification	
Climatic sequence – method 1	7.3.3	Value in accordance with the detail specification	
Environmental stress cracking	7.3.4	Value in accordance with the detail specification	
Mechanical characteristics	7.4		
Visual examination	7.4.1	Pass	
Dimensional examination	7.4.2	Value in accordance with the detail specification	
Ovality of inner conductor	7.4.3	≤ … %	
Ovality of outer conductor	7.4.4	≤ … %	
Ovality of dielectric	7.4.5	≤ … %	
Eccentricity of dielectric	7.4.6	≤ … %	
Eccentricity of sheath	7.4.7	≤ … %	

Documents
Document Sharing Hub
Full document details: IEC 61196-4-1 2022 RLV

[9] Parameter or characteristic	[10] IEC 61196-4:2015 Subclause	[11] Value	[12] Remarks
Cable bending under tension	7.4.8	1) length of the cable: 2) length bent under tension: 3) radius, R, of rollers / cylinders / mandrels: 4) distance, Y: 5) bending angle, φ: 6) moving speed: 7) tensile load:	
Crush resistance of cable	7.4.9	Load:≥ ...N Impedance irregularity: ≤ 1 %	
Fire performance requirement	7.5	In accordance with the requirements of national or regional authorities, when required	
Flame propagation	7.5.1	In accordance with the requirements of national or regional authorities, when required	
Halogen acid gas emission	7.5.2	In accordance with the requirements of national or regional authorities, when required	
Toxic gas emission	7.5.3	In accordance with the requirements of national or regional authorities, when required	
Smoke density	7.5.4	In accordance with the requirements of national or regional authorities, when required	
[a] Mark na, if not applicable.			

Documents
Document Sharing Hub
Full document details: IEC 61196-4-1 2022 RLV