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COMMENTED VERSION

INTERNATIONAL STANDARD

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Coaxial communication cables –
Part 4: Sectional specification for radiating cables

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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COAXIAL COMMUNICATION CABLES –

Part 4: Sectional 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.
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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 commented version (CMV) of the official standard IEC 61196-4:2022 edition 4.0 allows the user to identify the changes made to the previous IEC 61196-4:2015 edition 3.0. Furthermore, comments from IEC SC 46A experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

IEC 61196-4 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 fourth edition cancels and replaces the third 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) rewrote "1 Scope" to be consistent with other blank detail specifications of coaxial cables;
b) updated different standards in "Clause 2 Normative references";
c) added the definitions of uniformly radiating type cable, stop frequency band and link loss;
d) added different materials and constructions in 4.2 to 4.5;
e) added "Clause 5 IEC type designation";
f) added a detailed rated temperature range of different materials in "6.2 Rated temperature range";
g) added detailed frequencies in "6.3 Operating frequency range";
h) added "6.4 Stop frequency band" and "6.5 Radiating characteristics";
i) added different detail requirements or typical values in 8.2.4, 8.2.7, 8.2.8, 8.4.3 to 8.4.8;
j) deleted "7.4.4 Ovality of outer conductor";
k) 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";
l) used IEC 61196-1-123 and IEC 61196-1-124 in the electrical requirements to replace Annex A and Annex B respectively and deleted Annex A and Annex B;
m) added "Figure A.1 Example of testing coupling loss around circumferential orientation of radiating cable (Y-Z)" in Annex A.

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

Draft	Report on voting
46A/1583/FDIS	46A/1598/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 part of IEC 61196 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

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COAXIAL COMMUNICATION CABLES –

Part 4: Sectional 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 systems, such as tunnels, railways, highways, subways, elevators and other installations in which conventional antenna transmission is not satisfactory or even impossible.~~

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

This part of IEC 61196 applies to radiating coaxial communication cables, and specifies the terms and definitions, material and construction, IEC type designation, standard rating and characteristics, identification, marking and labelling, requirements of finished cables, quality assessment, delivery and storage, etc. Radiating coaxial communication cables are widely used in wireless communication systems for long, narrow, semi-enclosed and indoor environments, such as high-speed railways, subways, tunnels, and indoor environments.

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 60068-2-61, *Environmental testing – Part 2-61: Test methods: Test Z/ABDM: Climatic sequence*

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 TS 60695-7-50[1], *Fire hazard testing – Part 7-50: Toxicity of fire effluent – Estimation of toxic potency – Apparatus and test method*

IEC TS 60695-7-51[2], *Fire hazard testing – Part 7-51: Toxicity of fire effluent – Estimation of toxic potency – Calculation and interpretation of test results*

IEC 60811-406, *Electric ~~and~~ optical fibre cables – Test methods for non-metallic materials – Part 406: Miscellaneous tests – Resistance to stress cracking of polyethylene and polypropylene compounds*

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1 Withdrawn.

2 Withdrawn.

IEC 60811-502, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 502: Mechanical tests − Shrinkage test for insulations*

IEC 61034-2~~:2005~~, *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 61196-1-100, *Coaxial communication cables – Part 1-100: Electrical test methods – General 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 61196-1-110, *Coaxial communication cables – Part 1-110: Electrical test methods – Test for continuity*

IEC 61196-1-112, *Coaxial communication cables – Part 1-112: Electrical test methods – Test for return loss (uniformity of impedance)*

~~IEC 61196-1-115, *Coaxial communication cables – Part 1-115: Electrical test methods – Test for regularity of impedance (pulse/step function return loss)*~~

IEC 61196-1-123[3], *Coaxial communication cables – Part 1-123: Electrical test methods – Test for attenuation constant of radiating cable*

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

IEC 61196-1-200, *Coaxial communication cables – Part 1-200: Environmental test methods – General requirements*

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3 Under preparation. Stage at the time of publication: IEC/CDV 61196-1-123:2022.

IEC 61196-1-201, ~~*Environmental test methods*~~ *Coaxial communication cables – Part 1-201: Environmental test methods – Test for cold bend performance of cable*

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

IEC 61196-1-300, *Coaxial communication cables – Part 1-300: Mechanical test methods – General requirements*

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:~~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 TR 62222, *Fire performance of communication cables installed in buildings*

IEC 62230~~:2006~~, *Electric cables – Spark-test method*

IEC 61196-4

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Coaxial communication cables – Part 4: Sectional specification for radiating cables

Câbles coaxiaux de communication – Partie 4: Spécification intermédiaire pour câbles rayonnants

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

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[3] Under preparation. Stage at the time of publication: IEC/CDV 61196-1-123:2022.

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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CÂBLES COAXIAUX DE COMMUNICATION –

Partie 4: Spécification intermédiaire pour câbles rayonnants

AVANT-PROPOS

1) La Commission Electrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. À cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
2) Les décisions ou accords officiels de l'IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux de l'IEC intéressés sont représentés dans chaque comité d'études.
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L'IEC 61196-4 a été établie par le sous-comité 46A: Câbles coaxiaux, du comité d'études 46 de l'IEC: Câbles, fils, guides d'ondes, connecteurs, composants passifs pour micro-onde et accessoires. Il s'agit d'une Norme internationale.

Cette quatrième édition annule et remplace la troisième édition parue en 2015. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) réécriture de "1 Domaine d'application" pour assurer la cohérence avec les autres spécifications particulières-cadres des câbles coaxiaux;
b) mise à jour de différentes normes à l'Article "2 Références normatives";

c) ajout des définitions de câble de type uniformément rayonnant, bande de fréquences d'arrêt et perte de liaison;

d) ajout de différents matériaux et de différentes constructions en 4.2 à 4.5;

e) ajout de l'Article "5 Désignation de type IEC";

f) ajout d'une plage de températures assignée détaillée de différents matériaux en "6.2 Plage de températures assignée";

g) ajout de fréquences détaillées en "6.3 Bande de fréquences opérationnelles";

h) ajout de "6.4 Bande de fréquences d'arrêt" et "6.5 Caractéristiques de rayonnement";

i) ajout de différentes exigences détaillées ou de valeurs types en 8.2.4, 8.2.7, 8.2.8, 8.4.3 à 8.4.8;

j) suppression de "7.4.4 Ovalité du conducteur extérieur";

k) ajout de "8.2.11 Perte de liaison", "8.4.9 Adhérence du diélectrique", "8.4.10 Rétraction des enveloppes isolantes", "8.4.11 Force de traction maximale du câble";

l) utilisation de l'IEC 61196-1-123 et de l'IEC 61196-1-124 dans les exigences électriques pour remplacer les Annexes A et B, respectivement, et suppression des Annexes A et B;

m) ajout de la "Figure A.1 Exemple d'essai d'affaiblissement de couplage autour de l'orientation circonférentielle du câble rayonnant (Y-Z)" dans l'Annexe A.

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
46A/1583/FDIS	46A/1598/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/publications.

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Une liste de toutes les parties de la série IEC 61196, publiées sous le titre général *Câbles coaxiaux de communication*, se trouve sur le site web de l'IEC.

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- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

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CÂBLES COAXIAUX DE COMMUNICATION –

Partie 4: Spécification intermédiaire pour câbles rayonnants

1 Domaine d'application

La présente partie de l'IEC 61196 s'applique aux câbles de communication coaxiaux rayonnants et spécifie les termes et définitions, les matériaux et la construction, la désignation de type IEC, les valeurs normalisées et les caractéristiques, l'identification, le marquage et l'étiquetage, les exigences des câbles finis, l'évaluation de la qualité, la livraison et le stockage, etc. Les câbles de communication coaxiaux rayonnants sont largement utilisés dans les systèmes de communication sans fil destinés aux environnements longs, étroits, semi-fermés et intérieurs, tels que les lignes ferroviaires à grande vitesse, les souterrains, les tunnels et les environnements intérieurs.

2 Références normatives

Les documents suivants sont cités dans le texte de sorte qu'ils constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60068-1:2013, *Essais d'environnement – Partie 1: Généralités et lignes directrices*

IEC 60068-2-61, *Essais d'environnement – Partie 2-61: Méthode d'essai: Essai Z/ABDM: Séquence climatique*

IEC 60332-1-2, *Essais des câbles électriques et à fibres optiques soumis au feu – Partie 1-2: Essai de propagation verticale de la flamme sur conducteur ou câble isolé – Procédure pour flamme à prémélange de 1 kW*

IEC 60754-1, *Essai sur les gaz émis lors de la combustion des matériaux prélevés sur câbles – Partie 1: Détermination de la quantité de gaz acide halogéné*

IEC TS 60695-7-50[1], *Essais relatifs aux risques du feu – Partie 7-50: Toxicity of fire effluent – Estimation of toxic potency – Apparatus and test method (disponible en anglais seulement)*

IEC TS 60695-7-51[2], *Essais relatifs aux risques du feu – Partie 7-51: Toxicité de l'effluent du feu – Estimation de la puissance toxique – Calcul et interprétation des résultats d'essai*

IEC 60811-406, *Câbles électriques et à fibres optiques – Méthodes d'essai pour les matériaux non-métalliques – Partie 406: Essais divers - Résistance des mélanges polyéthylène et polypropylène aux craquelures*

IEC 60811-502, *Câbles électriques et à fibres optiques – Méthodes d'essai pour les matériaux non-métalliques – Partie 502: Essais mécaniques − Essai de rétraction des enveloppes isolantes*

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1 Retirée.

2 Retirée.

IEC 61034-2, *Mesure de la densité de fumées dégagées par des câbles brûlant dans des conditions définies – Partie 2: Procédure d'essai et prescriptions*

IEC 61196-1:2005, *Câbles coaxiaux de communication – Partie 1: Spécification générique – Généralités, définitions et exigences*

IEC 61196-1-1, *Câbles coaxiaux de communication – Partie 1-1 Agrément de savoir-faire pour câbles coaxiaux*

IEC 61196-1-100, *Câbles coaxiaux de communication – Partie 1-100: Méthodes d'essais électriques – Exigences générales*

IEC 61196-1-101, *Câbles coaxiaux de communication – Partie 1-101: Méthodes d'essais électriques – Essai de la résistance en courant continu des conducteurs des câbles*

IEC 61196-1-102, *Câbles coaxiaux de communication – Partie 1-102: Méthodes d'essais électriques – Essai pour la résistance d'isolation du diélectrique du câble*

IEC 61196-1-103, *Câbles coaxiaux de communication – Partie 1-103: Méthodes d'essais électriques – Essais sur la capacité du câble*

IEC 61196-1-105, *Câbles coaxiaux de communication – Partie 1-105: Méthodes d'essais électriques – Essai pour la tension d'épreuve du diélectrique du câble*

IEC 61196-1-108, *Câbles coaxiaux de communication – Partie 1-108: Méthodes d'essais électriques –Essai de l'impédance caractéristique, du retard de phase et de groupe, de la longueur électrique et de la vitesse de propagation*

IEC 61196-1-110, *Coaxial communication cables – Part 1-110: Electrical test methods –Test for continuity (disponible en anglais seulement)*

IEC 61196-1-112, *Câbles coaxiaux de communication – Partie 1-112: Méthodes d'essai électrique – Essai de l'affaiblissement de réflexion (uniformité d'impédance)*

IEC 61196-1-123[3], *Coaxial communication cables – Part 1-123: Electrical test methods –Test for attenuation constant of radiating cable (disponible en anglais seulement)*

IEC 61196-1-124, *Coaxial communication cables – Part 1-124: Electrical test methods –Test for coupling loss of radiating cable (disponible en anglais seulement)*

IEC 61196-1-200, *Câbles coaxiaux de communication – Partie 1-200: Méthodes d'essais d'environnement – Exigences générales*

IEC 61196-1-201, *Coaxial communication cables – Part 1-201: Environmental test methods – Test for cold bend performance of cable (disponible en anglais seulement)*

IEC 61196-1-215, *Coaxial communication cables – Part 1-215: Environmental test methods – High temperature cable ageing (disponible en anglais seulement)*

IEC 61196-1-300, *Coaxial communication cables – Part 1-300: Mechanical test methods – General requirements (disponible en anglais seulement)*

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[3] En cours d'élaboration. Stade au moment de la publication: IEC/CDV 61196-1-123:2022.

IEC 61196-1-301, *Câbles coaxiaux de communication – Partie 1-301: Méthodes d'essais mécaniques – Essai d'ovalité*

IEC 61196-1-302, *Câbles coaxiaux de communication – Partie 1-302: Méthodes d'essais mécaniques – Essai d'excentricité*

IEC 61196-1-313, *Coaxial communication cables – Part 1-313: Mechanical test methods – Adhesion of dielectric and sheath (disponible en anglais seulement)*

IEC 61196-1-314:2015, *Coaxial communication cables – Part 1-314: Mechanical test methods –Test for bending (disponible en anglais seulement)*

IEC 61196-1-316, *Câbles coaxiaux de communication – Partie 1-316: Méthodes d'essais mécaniques – Essai de force de traction maximale du câble*

IEC 61196-1-317, *Câbles coaxiaux de communication – Partie 1-317: Méthodes d'essai mécanique – Essai de résistance à l'écrasement des câbles*

IEC TR 62222, *Fire performance of communication cables installed in buildings* (disponible en anglais seulement)

IEC 62230, *Câbles électriques – Méthode d'essai au défilement à sec (Sparker)*