

BS IEC 60096-0-1:2012+A1:2017



BSI Standards Publication

Radio frequency cables

Part 0-1: Guide to the design of detail specifications — Coaxial cables



National foreword

This British Standard is the UK implementation of IEC 60096-0-1:2012+A1:2017.

The UK participation in its preparation was entrusted to Technical Committee EPL/46, Cables, wires and waveguides, radio frequency connectors and accessories for communication and signalling.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Published by BSI Standards Limited 2017

ISBN 978 0 580 96703 0

ICS 33.120.10

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 March 2017.

Amendments/corrigenda issued since publication

Date	Text affected
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CONSOLIDATED VERSION

VERSION CONSOLIDÉE



**Radio frequency cables –
Part 0-1: Guidelines to the design of detail specifications – Coaxial cables**

**Câbles pour fréquences radioélectriques –
Partie 0-1: Lignes directrices pour la conception des spécifications particulières –
Câbles coaxiaux**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 33.120.10

ISBN 978-2-8322-3911-7

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

RADIO FREQUENCY CABLES –

Part 0-1: Guidelines to the design of detail specifications – Coaxial cables

FOREWORD

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This Consolidated version is not an official IEC Standard and has been prepared for user convenience. Only the current versions of the standard and its amendment(s) are to be considered the official documents.

This Consolidated version of IEC 60096-0-1 bears the edition number 3.1. It consists of the third edition (2012-10) [documents 46A/1043/FDIS and 46A/1064/RVD] and its amendment 1 (2017-01) [documents 46A/1317/FDIS and 46A/1321/RVD]. The technical content is identical to the base edition and its amendment.

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International standard IEC 60096-0-1 has been prepared by subcommittee 46A: Coaxial cables, of IEC technical committee 46: Cables, wires, waveguides, R.F. connectors, R.F. and microwave passive components and accessories.

This third edition constitutes a technical revision.

The significant changes with respect to the previous edition are as follows:

- tables of material constants and factors and have been updated, different equations have been updated and corrected;
- a subclause dealing with the calculation of “Current carrying capacity of coaxial cables” has been added as Subclause 7.7.

A list of all the parts in the IEC 60096 series, published under the general title *Radio frequency cables*, can be found on the IEC website.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of the base publication and its amendment will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

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RADIO FREQUENCY CABLES –

Part 0-1: Guidelines to the design of detail specifications – Coaxial cables

1 Scope

This part of IEC 60096 provides guidance for the design of radio frequency coaxial cables with braid, metallic tapes or tubular outer conductors.

2 Normative references

Void.

3 Symbols and numbering

3.1 Register of symbols used

Symbol	Designation	Unit
α	Total attenuation per unit length, 20 °C	dB/100 m
α_T	Total attenuation per unit length, $T \neq 20$ °C	dB/100 m
α_x	Attenuation due to element x, 20 °C	dB/100 m
β_x	Braid angle of element x	° (degree)
γ_x	Density of the material of element x	g/cm ³
δ_x	Loss angle of the material of element x	rad
ε_x	Relative dielectric permittivity of the material of element x	–
χ_x	Conductivity of the material of element x, 20 °C	m/Ωmm ²
σ_x	Thermal resistivity of the material of element x	K·m/W
B_x	Braid coverage concerning element x	–
c_o	Velocity of propagation in free space	m/s
C	Dielectric diameter	mm
C_x	Capacitance of element x, per unit length	pF/m
d_x	Diameter of individual wires of element x	mm
D_x	Outer diameter of element x	mm
D_{xe}	Electrical effective diameter of element x	mm
D_{xm}	Mean diameter of element x	mm
D	Sheath diameter	mm
D_s	Outer conductor diameter	mm
d	Center conductor diameter	mm
E_2	Maximum permissible voltage gradient of dielectric (peak value)	kV/mm
ε	Surface emissivity (sheathed=0,95, bare=0,35)	
f	Frequency	MHz
h_x	Coating thickness concerning element x	mm
I	Current carrying capacity (Amperes)	
k_x, k_{xy}	Calculation factors according to Tables 1 and 2	–
L_x	Braid lay length concerning element x	mm

Symbol	Designation	Unit
$\ln$	Natural logarithm	
m	Total weight of cable per unit length.....	g/m
m_x	Weight of element x	g/m
N_1	Number of stranded wires of inner conductors	–
N_x	Number of wires to each spindle concerning braid x.....	–
n	Number of cables	
n_x	Number of spindles in the braid concerning element x	–
P_{40}	Maximum permissible input power, ambient temperature 40 °C.....	W
P_i	Thermal resistivity of the dielectric material, Typically = 13,0 K·m/W for both foam, disc and air dielectrics	
P_j	Thermal resistivity of the sheath material, Typically = 3,5 K·m/W for polyethylene Typically = 7,0 K·m/W for polyvinylchloride (PVC) sheaths	
P_T	Maximum permissible input power, ambient temperature $T \neq 40$ °C...	W
P_d	Maximum permissible dissipation power per unit length	W/m
q_x	Filling factor of braid concerning element x	–
R_x	DC resistance of conductive element x, per unit length	Ω/m
	and insulation resistance of insulating element x respectively	$\text{M}\Omega \cdot \text{km}$
R_{ic}	Inner conductor resistance	Ω/m at t_a
R_{ictc}	Inner conductor resistance at conductor operating temperature (t_c)	
R_{oc}	Outer conductor resistance	Ω/m at t_a
R_{octc}	Outer conductor resistance at conductor operating temperature (t_c)	
R_{eoc}	Increase in R_{ic} due to effect of outer conductor	
R_{th}	Total thermal resistance of circuit	K.m/W
R_i	Thermal resistance of dielectric	K.m/W
R_j	Thermal resistance of sheath	K.m/W
s_x	Nominal thickness of element x.....	mm
$s_{x\text{min.}}$	Minimal thickness of element x	mm
T_x	Temperature of element x	°C
T_a	Ambient temperature.....	°C
t_c	Conductor operating temperature	°C
t_a	Ambient temperature	°C
t_s	Cable surface temperature	°C
U_t	Test voltage (40 Hz - 60 Hz), rounded r.m.s. value	kV
U_{tc}	Test voltage (40 Hz - 60 Hz), rounded r.m.s. value	kV
U_d	Discharge test voltage, r.m.s. value	kV
U_o	Maximum permissible operating voltage, rounded r.m.s. value	kV
U_{oc}	Maximum permissible operating voltage, calculated r.m.s. value	kV
v_r	Velocity ratio	–
z_o	Characteristic impedance, nominal value	Ω