IEC 61196-6-4

Edition 2.0 2020-05
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

Coaxial communication cables –
Part 6-4: Detail specification for 75-7 type CATV drop cables

IEC 61196-6-4:2020-05 RLV(en)

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 It also gives information on projects, replaced and withdrawn publications.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

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary
67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC 61196-6-4

Edition 2.0 2020-05
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

Coaxial communication cables –
Part 6-4: Detail specification for 75-7 type CATV drop cables

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 33.120.10

ISBN 978-2-8322-8429-2

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

COAXIAL COMMUNICATION CABLES –

Part 6-4: Detail specification for 75-7 type CATV drop 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. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 61196-6-4 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.

This second edition cancels and replaces the first edition, published in 2018. This edition constitutes a technical revision.

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

– designation of variants including construction details;
– consistent screening classes;
– bending test only for flexible cables.

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

FDIS	Report on voting
46A/1404/FDIS	46A/1411/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

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

It is to be used in conjunction with IEC 61196-1:2005 and IEC 61196-6:2009.

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 "http://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 publication 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.

COAXIAL COMMUNICATION CABLES –

Part 6-4: Detail specification for 75-7 type CATV drop cables

1 Scope

This part of IEC 61196 applies to coaxial communication cables described in IEC 61196-6. It specifies the requirements for 75-7 type CATV drop cables. These cables are used in CATV distribution systems, surveillance & control systems, satellite television receiving systems and as bidirectional hybrid fibre coaxes (HFC). The operating frequency is from 5 MHz to 3 000 MHz.

This part of IEC 61196 is to be used in conjunction with IEC 61196-1:2005 and IEC 61196-6:2009. It determines the layout and style with respect to the model and type.

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.

NOTE Documents which are needed to achieve the tests according to Clause 4, item [8] or item [9], respectively, are listed in IEC 61196-6.

IEC 60966-4 (all parts), *Radio frequency and coaxial cable assemblies*

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

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

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

IEC 61196-6:2009, *Coaxial communication cables – Part 6: Sectional specification for CATV drop cables*

IEC 62153-4-3, *Metallic communication cable test methods – Part 4-3: Electromagnetic compatibility (EMC) – Surface transfer impedance – Triaxial method*

IEC 62153-4-4, *Metallic communication cable test methods – Part 4-4: Electromagnetic compatibility (EMC) – Test method for measuring of the screening attenuation as up to and above 3 GHz, triaxial method*

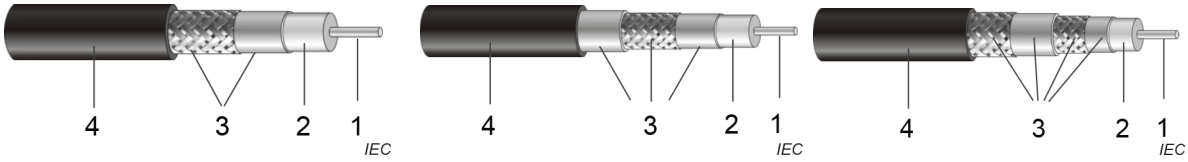
3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

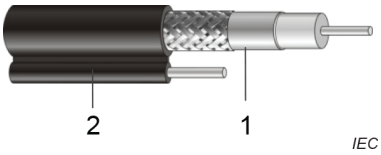
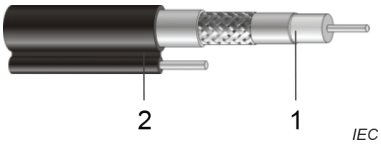
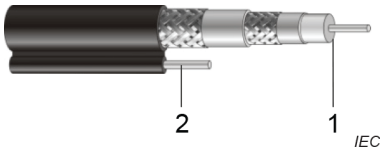
- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

4 Detail specification

<table>
<tr><td colspan="5">COAXIAL COMMUNICATION CABLES –
Part 6-4: Detail specification for 75-7 type CATV drop cables</td></tr>
<tr><td colspan="2">[1] Prepared by:
IEC SC 46A</td><td></td><td colspan="2">[2] Document No.: IEC 61196-6-4
Issue: Edition ~~1.0~~ 2.0
Date:</td></tr>
<tr><td colspan="2">[3] Available from:
IEC</td><td colspan="3">[4] Generic specification: IEC 61196-1
Sectional specification: IEC 61196-6</td></tr>
<tr><td colspan="5">[5] Additional references</td></tr>
<tr><td colspan="5">[6] Cable construction</td></tr>
<tr><td colspan="5">75-7S (~~Dual~~ Standard shield) 75-7T (Tri-shield) 75-7Q (Quad-shield)
 

1: Inner conductor 2: Dielectric 3: Shield 4: Sheath or jacket</td></tr>
<tr><td colspan="2">Variant [a] constructions</td><td>75-7S-Y-Z-A-B</td><td>75-7T-Y-Z-A-B</td><td>75-7Q-Y-Z-A-B</td></tr>
<tr><td rowspan="3">Inner conductor</td><td>Material</td><td colspan="3">BC or CCS</td></tr>
<tr><td>Diameter (mm)</td><td colspan="3">1,63</td></tr>
<tr><td>Tolerance (mm)</td><td colspan="3">± 0,02</td></tr>
<tr><td rowspan="3">Dielectric</td><td>Material</td><td colspan="3">Foamed PE</td></tr>
<tr><td>Diameter (mm)</td><td colspan="3">7,11</td></tr>
<tr><td>Tolerance (mm)</td><td colspan="3">± 0,15</td></tr>
<tr><td rowspan="6">Outer conductor or shield</td><td>Material</td><td>ALT+A
or ALT+TC</td><td>ALT+A+ALT
or ALT+TC+ALT</td><td>ALT+A+ALT+A
or ALT+TC+ALT+TC</td></tr>
<tr><td>Inner shield diameter (mm)</td><td colspan="3">7,32</td></tr>
<tr><td>Tolerance (mm)</td><td colspan="3">± 0,15</td></tr>
<tr><td>Longitudinally overlap (%)</td><td colspan="3">18 to 35</td></tr>
<tr><td>Braid coverage (%)</td><td>≥ 59</td><td>≥ 59</td><td>Inner braid ≥ 59
Outer braid ≥ 32</td></tr>
<tr><td>Maximum outer diameter (mm)</td><td>8,30</td><td>8,45</td><td>9,10</td></tr>
<tr><td rowspan="4">Sheath or jacket</td><td>Material</td><td colspan="3">PVC or PE or LSZH</td></tr>
<tr><td>Minimum thickness (mm)</td><td>0,80</td><td>0,73</td><td>0,51</td></tr>
<tr><td>Diameter (mm)</td><td>10,16</td><td>10,16</td><td>10,34</td></tr>
<tr><td>Tolerance (mm)</td><td colspan="3">± 0,25</td></tr>
</table>

NOTE BC — Bare copper wire CCS — Copper clad steel wire ALT — Aluminium-polymeric laminated tape A — Aluminium alloy wire TC — Tinned copper wire PE — Polyethylene PVC — Polyvinylchloride LSZH — Low smoke zero halogen polyolefin
[a] Variants are shown in Annex A.

Messenger construction (when applicable)				
75-7S-Y-Z-A-B /M [a] (~~Dual~~ Standard shield + Messenger)		**75-7T-Y-Z-A-B /M (Tri-shield + Messenger)**		**75-7Q-Y-Z-A-B /M (Quad-shield + Messenger)**
				
1: Dual shield cable 2: Messenger		1: Tri-shield cable 2: Messenger		1: Quad-shield cable 2: Messenger
Integral messenger	Material	Zinc coated carbon steel wire		
	Diameter (mm)	1,83 ± 0,05	2,11 ± 0 ,05	2,77 ± 0,05
	Tensile strength (kgf)	156,9	193,7	320,2
	~~Minimum~~ Elongation (%)	≤ 3,0		
	Corrosion properties	NS		
NOTE Cable constructions of messenger cable are the same as described above cable.				
[a] Variants are shown in Annex A.				

[7] Engineering information (reference only)	
Operating temperature range	−40 °C to 70 °C (PE sheath) −20 °C to 70 °C (PVC sheath) −15 °C to 70 °C (LSZH sheath)
Operating frequency range	5 MHz to 3 000 MHz
Nominal characteristic impedance	75 Ω
Minimum bending radius	10 × D (D is the nominal cable outer diameter)
Relative propagation velocity	85 % (nominal)
Maximum current carrying capacity (Inner conductor T_c max = 65 °C)	~~13~~ 14 A (T_a = 20 °C); 10 A (T_a = 40 °C) for BC conductor 7 A (T_a = 20 °C); 5 A (T_a = 40 °C) for CCS conductor
Cable identification and marking	See Annex A.

[8] Parameter or characteristic	[9] Subclause of IEC 61196-6:2009	[10] Value	[11] Remarks
Electrical testing of finished cable	7.1		
Low-frequency and DC electrical measurements	7.1.1		
Conductor resistance Inner conductor Outer conductor	7.1.1.1	≤ 8,30 Ω/km (BC conductor) ≤ 40,20 Ω/km (CCS conductor) ≤ 30,20 Ω/km (ALT+A) ≤ 14,50 Ω/km (ALT+TC) ≤ 20,80 Ω/km (ALT+A+ALT) ≤ 12,50 Ω/km (ALT+TC+ALT) ≤ 17,00 Ω/km (ALT+A+ALT+A) ≤ 9,00 Ω/km (ALT+TC+ALT+TC)	At 20 °C
Insulation resistance	7.1.1.2	≥ 10 000 MΩ•km	
Withstand voltage of dielectric	7.1.1.3	1,5 kV AC, 1 min	alternative: 3,75 kV AC, 2 s
Withstand voltage of sheath	7.1.1.4	2,5 kV AC, 1 min	alternative: 6,25 kV AC, 2 s
Current carrying capacity	7.1.1.5		See [7]
Spark test	7.1.1.6	2,5 kV AC 50 Hz, or 3 kV AC 15 kHz, or 3,75 kV DC	
High-frequency electrical and transmission measurements	7.1.2		
Characteristic impedance	7.1.2.1	75 Ω ± 3 Ω	Measured at 200 MHz
Relative propagation velocity	7.1.2.2		See [7]
Return loss (uniformity of impedance)	7.1.2.3	≥ 20 dB (5 MHz to 1 000 MHz) ≥ 18 dB (1 000 MHz to 2 000 MHz) ≥ 16 dB (~~1 000~~ 2 000 MHz to 3 000 MHz)	The measurement inaccuracy $\Delta a_{r,f}$ shall be < 1 dB
Attenuation constant, α	7.1.2.4	Do not exceed the values specified in Annex B.	At 20 °C
Regularity of impedance	7.1.2.5	≥ 40 dB resp. ≤ 1 %	Perform on both ends of the cable Test procedure: IEC 61196-1-115
Transfer impedance after flex	7.1.2.6	a) ~~Dual shield cable~~ ~~no more than~~ Screening class C: ≤ 50 mΩ/m from 5 MHz to 30 MHz b) ~~Tri-shield cable~~ ~~no more than~~ Screening class B: ≤ 15 mΩ/m from 5 MHz to 30 MHz c) ~~Quad-shield cable~~ ~~no more than~~ Screening class A: ≤ 5 mΩ/m from 5 MHz to 30 MHz d) Screening class A+: ≤ 0,9 mΩ/m from 5 MHz to 30 MHz	The flexure test according to IEC 61196-1-314:2015, 8.3.~~3~~2, Procedure 2: a) Radius: 10 × cable diameter b) Tension: 10 N c) Speed: ≤ 1 m/s d) Number of cycles: 3 After flexure test, measure the transfer impedance according to IEC 62153-4-3

[8] Parameter or characteristic	[9] Subclause of IEC 61196-6:2009	[10] Value	[11] Remarks
Screening attenuation after flex	7.1.2.7	a) ~~Dual shield cable:~~ ~~no less than screening class A:~~ ~~≥ 85 dB from 30 MHz to 1 000 MHz~~ ~~≥ 75 dB from 1 000 MHz to 2 000MHz~~ ~~≥ 65 dB from 2 000 MHz to 3 000 MHz~~ Screening class B & C: ≥ 75 dB from 30 MHz to 1 000 MHz ≥ 65 dB from 1 000 MHz to 2 000 MHz ≥ 55 dB from 2 000 MHz to 3 000 MHz b) ~~Tri-shield cable:~~ ~~no less than~~ Screening class A: ≥ 85 dB from 30 MHz to 1 000 MHz ≥ 75 dB from 1 000 MHz to 2 000 MHz ≥ 65 dB from 2 000 MHz to 3 000 MHz c) ~~Quad-shield cable:~~ ~~no less than screening class~~ Screening class A+: ≥ 95 dB from 30 MHz to 1 000 MHz ≥ 85 dB from 1 000 MHz to 2 000 MHz ≥ 75 dB from 2 000 MHz to 3 000 MHz	The flexure test according to IEC 61196-1-314:2015, 8.3.~~3~~2, Procedure 2: a) Radius: 10 × cable diameter b) Tension: 10 N c) Speed: ≤ 1 m/s d) Number of cycles: 3 After flexure test, measure the screening attenuation according to IEC 62153-4-4
Environmental testing of finished cable	7.2		
Cold bend	7.2.1	No physical damages of sheath	a) Test method: Method B b) Mandrel diameter: 20 × cable diameter c) Test temperature: PE sheath: −40 °C ± 2 °C PVC sheath: −20 °C ± 2 °C LSZH sheath: −15 °C ± 2 °C
Water penetration	7.2.2	Not applicable	
Climatic sequence	7.2.3	a) No physical damages of sheath b) Magnitude of change ~~in~~ of attenuation constant ~~is no more than 7 % in Annex B~~ shall be not more than 7 % of cable measured values before the test.	a) Test temperature: PE sheath: T_A = −40 °C, T_B = 70 °C; PVC sheath: T_A = −20 °C, T_B = 70 °C LSZH sheath: T_A = −15 °C , T_B = 70 °C b) t_1: 24 h c) Number of cycles: 3
Damp heat (steady state)	7.2.4	a) No physical damages of sheath b) Insulation resistance is not less than 10 000 MΩ•km c) Magnitude of change in attenuation constant is not more than 7 % in Annex B	