

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

**Coaxial communication cables –  
Part 8-4: Detail specification for 50-141 type semi-flexible cables with solid  
polytetrafluoroethylene (PTFE) insulation**

**Câbles coaxiaux de communication –  
Partie 8-4: Spécification particulière pour câbles semi-flexibles de type 50-141 à  
isolation en polytétrafluoroéthylène (PTFE) compact**



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## COAXIAL COMMUNICATION CABLES –

**Part 8-4: Detail specification for 50-141 type semi-flexible cables with solid polytetrafluoroethylene (PTFE) insulation**

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International Standard IEC 61196-8-4 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.

The text of this standard is based on the following documents:

FDIS	Report on voting
46A/1089/FDIS	46A/1103/RVD

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

This International Standard is to be used in conjunction with IEC 61196-1:2005 and IEC 61196-8:2012.

A list of all parts of IEC 61196 series, published under the general title *Coaxial communication 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 this publication 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- withdrawn,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
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## COAXIAL COMMUNICATION CABLES –

### Part 8-4: Detail specification for 50-141 type semi-flexible cables with solid polytetrafluoroethylene (PTFE) insulation

#### 1 Scope

This part of IEC 61196 applies to coaxial communication cables described in IEC 61196-8. It specifies the requirements for 50-141 type semi-flexible radio frequency and coaxial cables with polytetrafluoroethylene (PTFE) dielectric. These cables are for use in microwave and wireless equipment or other signal transmission equipment or units at frequencies from 500 MHz up to 18 GHz.

This part of IEC 61196 is to be used in conjunction with IEC 61196-1:2005 and IEC 61196-8:2012. It determines the layout and style with respect to the model and type.

#### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 3, item [9] or item [10], respectively, are listed in IEC 61196-8.

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IEC 61169-4, *Radio-frequency connectors – Part 4: RF coaxial connectors with inner diameter of outer conductor 16 mm (0,63 in) with screw lock – Characteristic impedance 50  $\Omega$  (type 7-16)*

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 61196-8:2012, *Coaxial communication cables – Part 8: Sectional specification for semi-flexible cables with polytetrafluoroethylene (PTFE) dielectric*

IEC 61196-8-1:2012, *Coaxial communication cables – Part 8-1: Blank detail specification for semi-flexible cables with polytetrafluoroethylene (PTFE) dielectric*

### 3 Detail specification

Numbers in square brackets are explained in IEC 61196-8-1:2012, Clause 3.

Coaxial communication cables –									
Part 8-4:Detail specification for 50-141 type semi-flexible cables with solid polytetrafluoroethylene (PTFE) insulation									
[1]	Prepared by: IEC SC 46A			[2]	Document No. IEC 61196-8-4 Issue: first Date: 2012				
[3]	Available from: IEC			[4]	Generic specification IEC 61196-1 Sectional specification IEC 61196-8				
[5]	Additional references: IEC 61169-4, IEC 61196-1-115								
[6]	Cable description:								
50-141- XX -IEC 61196-8-4					50-141- X -IEC 61196-8-4				
<p>The diagram shows two cross-sections of coaxial cables. The left cable is labeled '50-141- XX -IEC 61196-8-4' and the right is '50-141- X -IEC 61196-8-4'. Both show an inner conductor (1), a dielectric (2), an outer conductor (3), and a sheath (4). The outer conductor of the XX type is shown as a braided structure, while the X type is a solid wire braid. A watermark 'iTech STANDARD PREVIEW (standards.iteh.ai)' is overlaid on the diagram.</p>									
<p>Key:</p> <ul style="list-style-type: none"> <li>1: Inner conductor (SPC or SPCW)</li> <li>2: Dielectric (Solid PTFE)</li> <li>3: Outer conductor (Tin soaked copper wire braid)</li> <li>4: Sheath (FEP, LSZH or PVC)</li> </ul>									
[7]	Cable construction								
Variants Constructions		50-141-1	50-141-2	50-141-11	50-141-21	50-141-12	50-141-22	50-141-13	50-141-23
Inner conductor	Material	SPC	SPCW	SPC	SPCW	SPC	SPCW	SPC	SPCW
	Diameter (mm)	0,93		0,93		0,93		0,93	
	Tolerance (mm)	±0,02	±0,01	±0,02	±0,01	±0,02	±0,01	±0,02	±0,01
Dielectric	Material	PTFE		PTFE		PTFE		PTFE	
	Diameter (mm)	3,00		3,00		3,00		3,00	
	Tolerance (mm)	±0,05		±0,05		±0,05		±0,05	
Outer conductor	Material	tin soaked copper wire braid		tin soaked copper wire braid		tin soaked copper wire braid		tin soaked copper wire braid	
	Diameter (mm)	3,58		3,58		3,58		3,58	
	Tolerance (mm)	±0,10		±0,10		±0,10		±0,10	



<b>Sheath</b>	Material	–	FEP	PVC	LSZH
	Minimum thickness (mm)	–	0,20	0,40	0,40
	Diameter (mm)	–	4,10	4,50	4,50
	Tolerance (mm)	–	±0,10	±0,15	±0,15

**NOTE**

Variants – according to IEC 61196-8, 6.1.2.

SPC – silver plated copper wire.

SPCW – silver plated copper clad steel wire.

PTFE – polytetrafluoroethylene.

FEP – poly fluorinated ethylene propylene.

LSZH – low smoke zero halogen.

PVC – polyvinyl chloride.

<b>[8] Engineering information (reference only)</b>				
Variants Items	50-141-1	50-141-11	50-141-12	50-141-13
	50-141-2	50-141-21	50-141-22	50-141-23
Operating temperature range	–55 °C to 125 °C	–55 °C to 125 °C	–40 °C to 85 °C	–15 °C to 70 °C
Maximum operating frequency	18 GHz	18 GHz	18 GHz	18 GHz
Nominal characteristic impedance	50 Ω	50 Ω	50 Ω	50 Ω
Maximum continue working voltage	1,9 kV rms	1,9 kV rms	1,9 kV rms	1,9 kV rms
Minimum bending radius (static state)	8 mm	8 mm	8 mm	8 mm
Minimum bending radius (dynamic state)	40 mm	40 mm	40 mm	40 mm
Nominal weight	41 kg/km	49,5 kg/km	50 kg/km	49 kg/km
Power rating	As shown in Annex A			

<b>[9]</b> Inspection value, rating or characteristic	<b>[10]</b> Subclause of IEC 61198-8	<b>[11]</b> Value	<b>[12]</b> Remarks
<b>Electrical characteristics</b>	7.1		
Conductor direct current resistance	7.1.1	≤0,027 Ω/m (SPC) ≤0,067 Ω/m (SPCW)	20 °C
Capacitance	7.1.2	≤105 pF/m	1 000 Hz
Withstand voltage of dielectric	7.1.3	5 kV rms	40 Hz to 60 Hz
Withstand voltage of sheath	7.1.4	1,9 kV rms	40 Hz to 60 Hz (applies to cables with sheath)
Mean characteristic impedance	7.1.5	50 Ω ± 2 Ω	200 MHz
Regularity of impedance	7.1.6	Under consideration	
Relative propagation velocity (velocity ratio)	7.1.7	69,5 % to 71 %	200 MHz (if specified)
Return loss	7.1.8	As shown in Annex B	Length of the specimen: 20 m

[9] Inspection value, rating or characteristic	[10] Subclause of IEC 61198-8	[11] Value	[12] Remarks
Attenuation	7.1.9	As shown in Annex C	
Intermodulation (IM3)	7.1.10	≤-115 dBm	Both ends of the specimen should be attached with a type 7-16 connector that complies with IEC 61169-4, the input signal frequency is $f_1 = 936$ MHz, $f_2 = 958$ MHz, at 20 W
Screening attenuation	7.1.11	≥100 dB	At 1 GHz.
Insulation resistance	7.1.12	≥15 000 MΩ·km	
<b>Environmental characteristics</b>	7.2		
Cold bend performance	7.2.1	-55 °C ± 2 °C (FEP sheath) -40 °C ± 2 °C (PVC sheath) -15 °C ± 2 °C (LSZH sheath)	Bending radius: 40 mm
Resistance soldering	7.2.2	Displacement ≤ 1 mm	Bending radius: 40 mm
Ageing	7.2.3	200 °C ± 5 °C (FEP sheath) 98 °C ± 2 °C (PVC sheath) 90 °C ± 2 °C (LSZH sheath)	
<b>Mechanical characteristics</b>	7.3		
Visual examination	7.3.1	Shall be in accordance with 4.2 of IEC 61196-1	
Ovality of dielectric	7.3.2	≤5 %	
Ovality of the sheath	7.3.3	≤10 %	Applies to cables with sheath
Eccentricity of dielectric	7.3.4	≤6,5 %	
Adhesion testing	7.3.5	Inner conductor to dielectric ≥18 N Outer conductor to dielectric ≥18 N	a) Test temperature: 20 °C ± 5 °C b) Specimen length: 300 mm
Bending	7.3.6	Impedance: 50 Ω ± 2 Ω No cracks in the outer conductor	a) Procedure 2 to be used b) Test mandrel diameter: 16 mm c) Number of cycles: 2 d) Number of turns: 1 e) Test temperature: 20 °C ± 5 °C f) After bending, measure the impedance according to IEC 61196-1-115 (procedure B)

[9] Inspection value, rating or characteristic	[10] Subclause of IEC 61198-8	[11] Value	[12] Remarks
Repeated bending	7.3.7	Impedance: $50 \Omega \pm 2 \Omega$ No cracks in the outer conductor	a) Angle of displacement: $180^\circ$ b) Number of cycles: 20 c) Mass of the weight: 0,6 kg d) Bending radius: 40 mm e) Test temperature: $20^\circ\text{C} \pm 5^\circ\text{C}$ f) After bending, measure the impedance according to IEC 61196-1-115 (procedure B)
Tensile strength of cable (longitudinal pull)	7.3.8	Impedance at maximum load: $50 \Omega \pm 2 \Omega$ No cracks in the outer conductor	Maximum load: 130 N Length of the specimen: 2 m
Pinhole of the finished cable	7.3.9	$\leq 10$ pinholes	Length of the specimen: 1 m

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