IEC 61196-8-2

Edition 1.0 2012-09

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Coaxial communication cables –
Part 8-2: Detail specification for 50-047 type semi-flexible cables with solid polytetrafluoroethylene (PTFE) insulation

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Câbles coaxiaux de communication –
Partie 8-2: Spécification particulière pour câbles semi-flexibles de type 50-047 à isolation en polytétrafluoroéthylène (PTFE) compact

IEC 61196-8-2:2012

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COAXIAL COMMUNICATION CABLES –

Part 8-2: Detail specification for 50-047 type semi-flexible cables with solid polytetrafluoroethylene (PTFE) insulation

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International Standard IEC 61196-8-2 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/1087/FDIS	46A/1101/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

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COAXIAL COMMUNICATION CABLES –

Part 8-2: Detail specification for 50-047 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 50-047 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.

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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 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 –

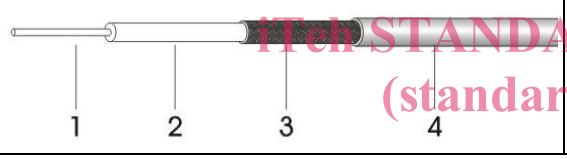
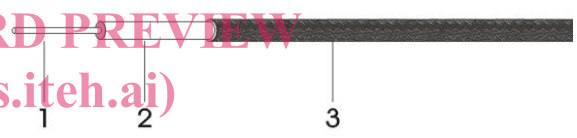
Part 8-2: Detail specification for 50-047 type semi-flexible cables with solid polytetrafluoroethylene (PTFE) insulation

[1]	**Prepared by:** IEC SC 46A		**[2]**	**Document No.** **Issue:** **Date:**	IEC 61196-8-2 first 2012
[3]	**Available from:** IEC	**[4]**	**Generic specification** **Sectional specification**	IEC 61196-1 IEC 61196-8	

[5] Additional references:

IEC 61196-1-115

[6] Cable description:

50-047- XX -IEC 61196-8-2	**50-047- X -IEC 61196-8-2**
	

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Key:

1: Inner conductor (SPC or SPCW)

2: Dielectric (Solid PTFE)

3: Outer conductor (Tin soaked copper wire braid)

4: Sheath (FEP, LSZH or PVC)

[7] Cable construction

Variants Constructions		**50-047-1**	**50-047-2**	**50-047-11**	**50-047-21**	**50-047-12**	**50-047-22**	**50-047-13**	**50-047-23**
Inner conductor	Material	SPC	SPCW	SPC	SPCW	SPC	SPCW	SPC	SPCW
	Diameter (mm)	0,30		0,30		0,30		0,30	
	Tolerance (mm)	±0,01		±0,01		±0,01		±0,01	
Dielectric	Material	PTFE		PTFE		PTFE		PTFE	
	Diameter (mm)	0,94		0,94		0,94		0,94	
	Tolerance (mm)	±0,10		±0,10		±0,10		±0,10	
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)	1,14		1,14		1,14		1,14	
	Tolerance (mm)	±0,10		±0,10		±0,10		±0,10	

Sheath	Material	–	FEP	PVC	LSZH
	Minimum Thickness (mm)	–	0,16	0,24	0,24
	Diameter (mm)	–	1,54	1,74	1,74
	Tolerance (mm)	–	±0,10	±0,10	±0,10

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.

[8] Engineering information (reference only)

Variants **Items**	**50-047-1** **50-047-2**	**50-047-11** **50-047-21**	**50-047-12** **50-047-22**	**50-047-13** **50-047-23**
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	1,0 kV rms	1,0 kV rms	1,0 kV rms	1,0 kV rms
Minimum bending radius (static state)	4 mm	4 mm	4 mm	4 mm
Minimum bending radius (dynamic state)	12 mm	12 mm	12 mm	12 mm
Nominal weight	4,9 kg/km	6,7 kg/km	6,9 kg/km	6,9 kg/km
Power rating	As shown in Annex A			

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[9] **Inspection value, rating or characteristic**	**[10]** **Subclause of IEC 61196-8**	**[11]** **Value**	**[12]** **Remarks**
Electrical characteristics	7.1		
Conductor direct current resistance	7.1.1	≤0,28 Ω/m (SPC) ≤0,686 Ω/m (SPCW)	20 °C
Capacitance	7.1.2	≤105 pF/m	1 000 Hz
Withstand voltage of dielectric	7.1.3	2 kV rms	40 Hz to 60 Hz
Withstand voltage of sheath	7.1.4	1,5 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:8 m
Attenuation	7.1.9	As shown in Annex C	
Intermodulation (IM3)	7.1.10	Not applicable	
Screening attenuation	7.1.11	≥100 dB	At 1 GHz
Insulation resistance	7.1.12	≥15 000 MΩ km	

[9] Inspection value, rating or characteristic	[10] Subclause of IEC 61196-8	[11] Value	[12] Remarks
Environmental characteristics	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:12 mm
Resistance soldering	7.2.2	Displacement ≤0,5 mm	Bending radius:12 mm
Ageing	7.2.3	200 °C ± 5 °C (FEP sheath) 98 °C ± 2 °C (PVC sheath) 90 °C ± 2 °C (LSZH sheath)	
Mechanical characteristics	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	≤7 %	Applies to cables with sheath
Eccentricity of dielectric	7.3.4	≤8,5 %	
Adhesion testing	7.3.5	Inner conductor to dielectric ≥9 N Outer conductor to dielectric ≥9 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: 4 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)
Repeated bending	7.3.7	Impedance: 50 Ω ± 2 Ω No cracks in the outer conductor	a) Angle of displacement: 180° b) Number of cycles: 20 c) Mass of the weight: 0,3 kg d) Bending radius: 12 mm e) Test temperature: 20 °C ± 5 °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 Ω ± 2 Ω No cracks in the outer conductor	Maximum load:15 N Length of the specimen:2 m
Pinhole of the finished cable	7.3.9	≤10 pinholes	Length of the specimen: 1 m

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Annex A
(normative)

Power rating

Power rating can be calculated as shown in the formulas below:

a) For FEP sheath and without sheath: $P = \frac{32}{\sqrt{f}}$

b) For PVC sheath: $P = \frac{17}{\sqrt{f}}$

c) For LSZH sheath: $P = \frac{12}{\sqrt{f}}$

where

P is the power rating at 40 °C, sea level, VSWR = 1,0, in W;

f is the frequency, in GHz.

NOTE VSWR = Voltage standing wave ratio

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Typical values are given in Table A.1.

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Table A.1 – Typical power rating values

Frequency GHz	Power rating W		
	FEP sheath and without sheath	PVC sheath	LSZH sheath
0,5	45	24	17
1	32	17	12
2	23	12	8,5
3	18	9,8	6,9
5	14	7,6	5,4
10	10	5,4	3,8
18	7,5	4,0	2,8