SLOVENSKI STANDARD
oSIST prEN IEC 60966-3:2022

01-september-2022

Sestavi radiofrekvenčnih in koaksialnih kablov - 3. del: Področna specifikacija za sestave polzvijavih koaksialnih kablov

Radio frequency and coaxial cable assemblies - Part 3: Sectional specification for semi-flexible coaxial cable assemblies

Konfektionierte Koaxial- und Hochfrequenzkabel - Teil 3: Rahmenspezifikation für halbflexible konfektionierte Koaxialkabel

Cordons coaxiaux et cordons pour fréquences radioélectriques - Partie 3: Spécification intermédiaire pour cordons coaxiaux semi-flexibles

Ta slovenski standard je istoveten z: **prEN IEC 60966-3:2022**

ICS:

33.120.10 Koaksialni kabli. Valovodi Coaxial cables. Waveguides

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COMMITTEE DRAFT FOR VOTE (CDV)

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IEC TC 46 : CABLES, WIRES, WAVEGUIDES, RF CONNECTORS, RF AND MICROWAVE PASSIVE COMPONENTS AND ACCESSORIES

SECRETARIAT: United States of America	SECRETARY: Mr David Wilson
OF INTEREST TO THE FOLLOWING COMMITTEES: SC 46A	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☒ QUALITY ASSURANCE ☐ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING
Attention IEC-CENELEC parallel voting The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Radio frequency and coaxial cable assemblies - Part 3: Sectional specification for semi-flexible coaxial cable assemblies

PROPOSED STABILITY DATE: 2028

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

RADIO FREQUENCY AND COAXIAL CABLE ASSEMBLIES - Part 3: Sectional specification for semi-flexible coaxial cable assemblies

1 Scope

This part of IEC 60966 is a sectional specification that relates to semi-flexible coaxial cable assemblies operating in the transverse electromagnetic mode (TEM). It specifies the design and construction, IEC type designation, workmanship, marking and packaging, standard rating and characteristics, electrical, mechanical and environmental requirements of finished semi-flexible cable assemblies, quality assessment, delivery and storage, etc.

This part of IEC 60966 applies to semi-flexible cable assemblies composed of semi-flexible coaxial cables and coaxial connectors. Semi-flexible cable assemblies are widely used in mobile communication systems, microwave test equipment, radar, aerospace and other fields.

NOTE 1： For the purpose of this sectional specification, a cable assembly is always regarded as an integral unit. All specifications apply to the finished assembly and not to individual and non-assembled parts thereof.

NOTE 2： This sectional specification should be supplemented with detail specifications giving additional details as required by the particular application. This application will not necessarily require all tests.

2 Normative references

The following referenced documents are indispensable for the application 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 60966-1:2019, *Radio-frequency and coaxial cable assemblies Part 1: Generic specification - General requirements and test methods*

IEC 61169 *(all parts), Radio-frequency connectors*

IEC 61196-1-126 *Coaxial communication cables Part 1-126: Electrical test methods – Corona extinction voltage*

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

IEC 62321 *Electrotechnical products-Determination of levels of six regulated substance (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers)*

3 Definitions

For the purposes of this document, the definitions given in IEC 60966-1:2019 apply.

4 Design and construction

4.1 Cable design and construction

Cables should conform to IEC 61196-8. Where cable designs deviating from these publications are required, they shall comply with the requirements of the detail specification of the cable.

If required, the manufacturer may use additional protective tubing or cable deviating from IEC 61196-8, in order to comply with the requirements of the detail specification.

The materials used in the cable shall be given as engineering information the relevant detail specification.

According to local regulation, raw material of the cable as well as those of additional protection shall be chosen to comply with regional or national Directives and Regulations such as RoHS and REACH in Europe.

4.2 Connector design and construction

Connectors should conform to IEC 61169. Where connector designs deviating from IEC 61169 are required, the interface should conform to the relevant part of IEC 61169 where available and shall comply with the requirements of the detail specification.

The materials used in the connector shall be given as engineering information the relevant detail specification.

According to local regulation, raw material of the connector as well as those of additional protection shall be chosen to comply with RoHS and other environmental regulation such as REACH in Europe.

4.3 The relative position dimensions of the interface

The relative position dimensions of the interface of end connector(s) of the cable assemblies should comply with the interface of the relevant part of IEC 61169 or the relevant detail specification. The relative position dimensions of the interface of end connector(s) include the dimension of inner conductor relative to dielectric and inner conductor relative to out conductor.

The relative position dimensions of the interface of some typical connectors are shown in Annex A.

4.4 Outline of the cable assembly

The outline shall be in accordance with the detail specification of the cable assembly.

The length, unless otherwise specified in the relevant detail specification, is defined as between the end planes of the connectors. In the case of right-angle connectors, the length applies to the axis of the connectors (see figure 1 and figure2).

Unless specified in the relevant detail specification, the length tolerance shall be ±1 % for cables equal to or longer than 300 mm, and ±3 mm for cables shorter than 300 mm.

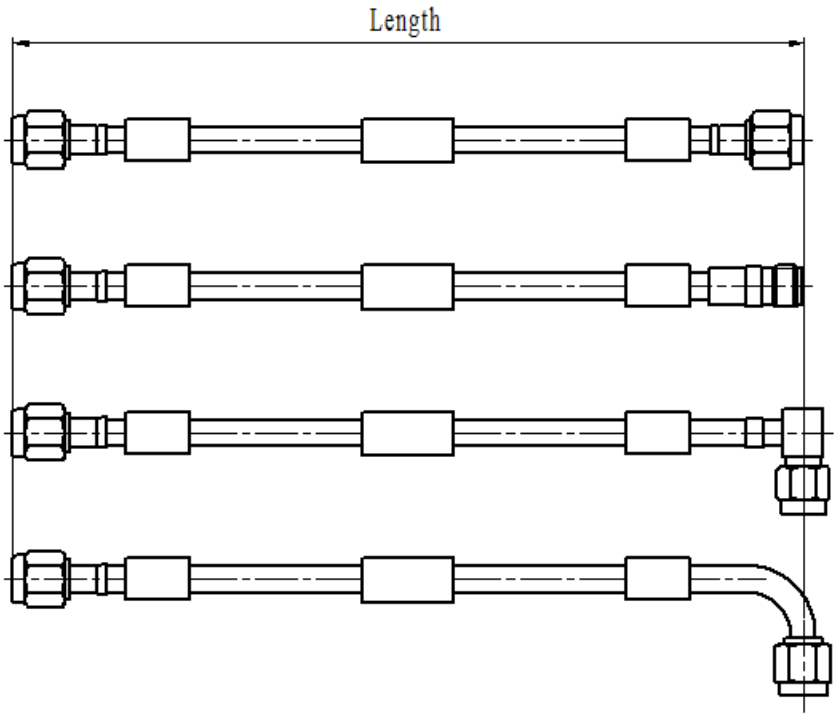


Figure 1 - Length definition of cable assemblies with two connectors

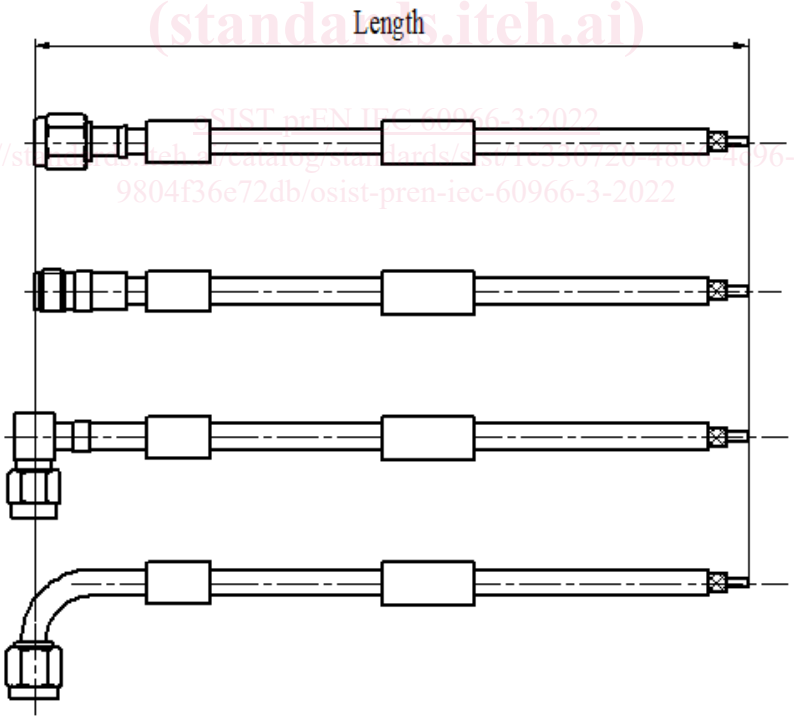


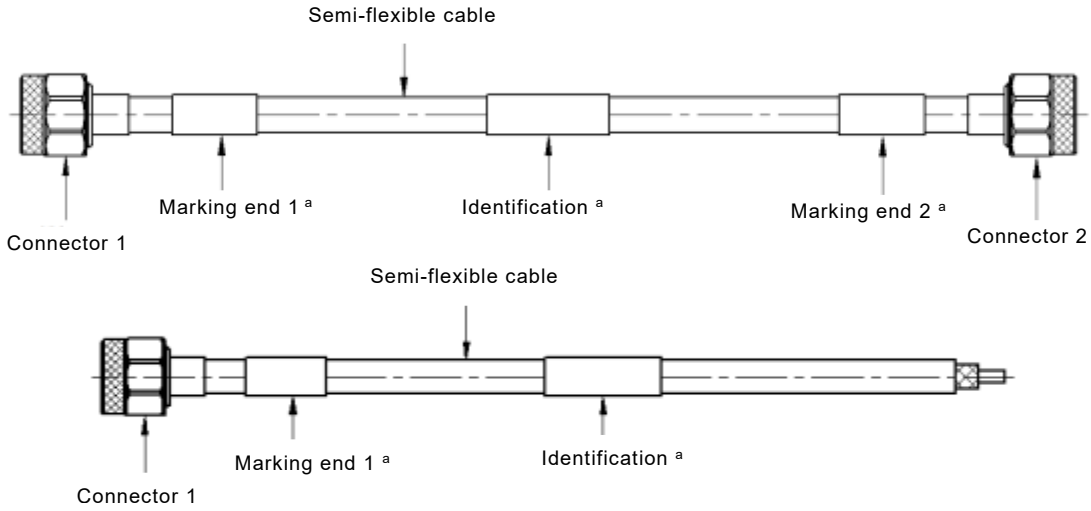
Figure 2 - Length definition of cable assemblies with one connector

5 Workmanship, marking and packaging

Clause 5 of IEC 60966-1:2019 and the following applies:

Cable assemblies made in accordance with this sectional specification comprise a section of cable and two connectors. Occasionally the cable assembly will comprise only a cable and one connector. When specified in the relevant detail specification, the assembly may

additionally include markers for identification of the assembly and interconnecting ends. End caps and other accessories may also be specified (see figure 3).

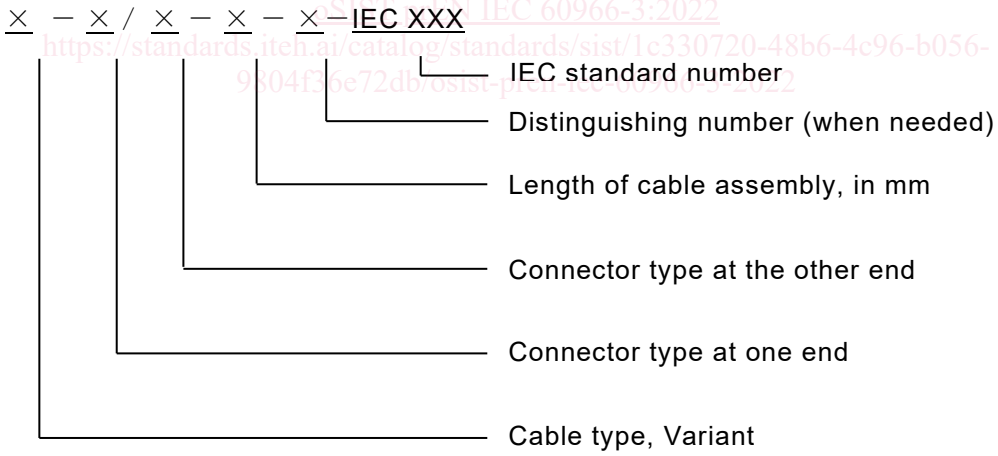


[a] When specified

Figure 3 – The marking example of a cable assembly

6 IEC type designation

IEC type designation of cable assembly consists of the type of cable and connectors, the length of the cable assembly and the IEC standard number, as shown below:



For example 1：50-141-13-SMA/SMA-100-A-IEC60966-3 cable assembly is comprised with 50-141-13 semi-flexible cable, one end is SMA pin connector and the other end is SMA pin connector, the length of the cable assembly is 100mm, its distinguishing number is A. This cable assembly comply with IEC 60966-3.

For example 2：50-141-13-SMA-100-A-IEC60966-3 cable assembly is comprised with 50-141-13 semi-flexible cable, one end is SMA pin connector and the other end empty, the length of the cable assembly is 100mm, its distinguishing number is A. This cable assembly comply with IEC 60966-3.

7 Rating and characteristics

7.1 Nominal characteristic impedance

The nominal characteristic impedance shall be 50Ω, 75Ω or specified in the relevant detail specification.

7.2 Temperature range

The rated temperature range of the cable assemblies with different cables shall be in according to Table 1 or as specified in its detail specification.

Table 1 Rated temperature of cable assemblies with semi-flexible cables with polytetrafluoroethylene dielectric (IEC 61196-8)

Parameter	No sheath °C	PVC Sheath °C	FEP Sheath °C	LSZH Sheath °C
Operational temperature range	-55~125	-40~85	-55~125	-15~70
Storage temperature range	-55~125	-40~85	-55~125	-15~70
Installation temperature range	-10~40	-30~60	-40~60	-10~60

8 Requirements of finished cable assemblies

8.1 General

For finished cable assemblies, the requirements given below shall apply when they are tested in accordance with IEC 60966-1:2019 and the test methods specified herein.

When needed, cable assemblies with one connector shall be terminated with a suitable connector at the cable end to do the test and cut off after the test.

Unless otherwise specified, all measurements shall be carried out under standard atmospheric conditions for testing in accordance with clause 5 of IEC 60068-1:2013.

8.2 Electrical requirements

Electrical requirements are given in Table 2.

Table 2- Electrical requirements

Subclause	Parameter	Test method IEC 60966-1:2019	Requirements/Remarks
8.2.1	Reflection properties	8.1	Value in accordance with the relevant detail specification While the parameter return loss (A_r) is preferred, the reflection factor (r) or the VSWR (voltage standing wave ratio) may be specified where $A_r = -20 \log_{10} \lvert r \rvert$ and $\text{VSWR} = \frac{1 + \lvert r \rvert}{1 - \lvert r \rvert}$

Subclause	Parameter	Test method IEC 60966-1:2019	Requirements/Remarks
8.2.2	Uniformity of impedance	8.2	Rise time of the TDR system according to the detail specification. The characteristic impedance variation shall not exceed ± 5 % of the nominal value or in according to the relevant detail specifications.
8.2.3	Insertion loss	8.3	Value in accordance with the relevant detail specification
8.2.4	Insertion loss stability	8.4	When required, unless otherwise specified in the relevant detail specification, test conditions and requirements are as follows : a) test mandrel radius: dynamic state bending radius in the relevant detail specification of cable b) number of turns: 1 c) portion of the cable assembly on the mandrel is its central portion After bending, the insertion loss shall be in according to the detail specification.
8.2.5	Propagation time	8.5	When required, value in accordance with the detail specification. Typical values are for solid PTFE dielectric of cable: 4,76 ns/m.
8.2.6	Stability of electrical length	8.6	When required, method 1 or method 2 in 8.6.2.1 of IEC 60966-1:2019 shall be used in according to detail specification. Test conditions and requirements in according to the detail specification.
8.2.7	Phase difference	8.7	When required, the phase difference shall not exceed the limits specified in the relevant detail specification. When more than two cable assemblies measured, the reference cable shall be clearly marked.
8.2.8	Phase variation with temperature	8.8	When required, the value is in accordance with the detail specification.
8.2.9	Screening effectiveness	8.9	The value of transfer impedance or shield attenuation in accordance with detail specification. Typical values are as follows: a) transfer impedance: when test frequency is less than 30 MHz, the maximum value is 300 μΩ/m; b) shield attenuation:better than (90-f) dB, f:GHz.
8.2.10	Voltage proof	8.10	Value in accordance with the relevant detail specification There shall be no breakdown, arcing or flashover throughout. Typical values are: – sea-level: 86 kPa to 106 kPa; – 10 km: 25 kPa; – 20 km: 4,4 kPa.
8.2.11	Insulation resistance	8.11	≥1000 MΩ, or in accordance with the relevant detail specification.
8.2.12	Inner and outer conductor continuity	8.12	Test voltage： ≤ 36 V DC. Inner conductor and outer conductor shall be continuous