INTERNATIONAL STANDARD

IEC 61156-5-1

First edition
2002-05

Multicore and symmetrical pair/quad cables for digital communications –

Part 5-1: Symmetrical pair/quad cables with transmission characteristics up to 600 MHz – Horizontal floor wiring – Blank detail specification

Câbles multiconducteurs à paires symétriques et quartes pour transmissions numériques –

Partie 5-1: Câbles à paires symétriques et quartes avec caractéristiques de transmission allant jusqu'à 600 MHz – Câble capillaire – Spécification particulière cadre

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

MULTICORE AND SYMMETRICAL PAIR/QUAD CABLES FOR DIGITAL COMMUNICATIONS –

Part 5-1: Symmetrical pair/quad cables with transmission characteristics up to 600 MHz – Horizontal floor wiring – Blank detail specification

FOREWORD

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International Standard IEC 61156-5-1 has been prepared by subcommittee 46C: Wires and symmetric cables, of IEC technical committee 46: Cables, wires, waveguides, RF connectors and accessories for communication and signalling.

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

FDIS	Report on voting
46C/505/FDIS	46C/520/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 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 2006. At this date, the publication will be

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- withdrawn;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

MULTICORE AND SYMMETRICAL PAIR/QUAD CABLES FOR DIGITAL COMMUNICATIONS –

Part 5-1: Symmetrical pair/quad cables with transmission characteristics up to 600 MHz – Horizontal floor wiring – Blank detail specification

1 Scope

This blank detail specification describes symmetrical pair/quad cables intended to be used in digital communication systems such as ISDN, local area networks and data communication systems in horizontal floor wiring, using frequencies up to 600 MHz.

This specification should be used in conjunction with IEC 61156-1 and IEC 61156-5. The blank detail specification determines the layout and style for detail specifications describing symmetrical pair/quad cables with transmission characteristics up to 600 MHz for digital communications. Detail specifications, based on the blank detail specification, may be prepared by a national organization, a manufacturer, or a user.

The designation "Category 5e" is used herein to describe an enhanced Category 5 cable (see 1.1 of IEC 61156-5).

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 61156-1, *Multicore and symmetrical pair/quad cables for digital communications – Part 1: Generic specification*

IEC 61156-5, *Multicore and symmetrical pair/quad cables for digital communications – Part 5: Symmetrical pair/quad cables with transmission characteristics up to 600 MHz – Horizontal floor wiring – Sectional specification*

ISO/IEC 11801:2000, *Information technology – Generic cabling for customer premises*

3 Guidance for preparation of detail specifications

It is necessary to keep the transmission characteristics indicated in the relevant sectional specification for the referenced category number, i.e. 5e, 6 or 7.

The detail specification shall be written in accordance with the layout of the blank detail specification, which forms part of this standard.

NOTE 1 When a characteristic does not apply, then NA (for not applicable) should be entered in the appropriate space.

NOTE 2 When a characteristic applies but a specific value is not considered necessary, then NS (for not specified) should be entered in the appropriate space. When NS is used, the appropriate requirement in the sectional specification should apply.

The numbers shown in brackets in this and the following pages correspond to the following items of required information, which should be entered in the spaces provided.

[1] Name and address of the organization that has prepared the document.

[2] IEC document number, issue number and date of issue.

[3] Address of the organization from which the document is available.

[4] Related documents.

[5] Any other reference to the cable, national reference, trade name, etc.

[6] A complete description of the cable which shall include

a) type and number of elements;
b) nominal impedance;
c) screening;
d) application;
e) category;
f) other distinguishing performance characteristics.

Example: 4-pair, unshielded twisted pair cable for use in horizontal floor wiring, having a nominal impedance of 100 Ω, and meeting the transmission requirements of Category 6 and the coupling attenuation requirements of Type III.

[7] Details of the cable material and construction.

[8] Special requirements for bending radius or operating temperatures.

[9] List of cable characteristics. They are separated into electrical, transmission, mechanical and environmental characteristics.

[10] Appropriate subclause references in the generic specification IEC 61156-1.

[11] Appropriate subclause references in the sectional specification IEC 61156-5.

[12] Requirements applicable to this cable. The values entered shall meet as a minimum the requirements of sectional specification IEC 61156-5.

[13] Comments – Relevant remarks.

4 Blank detail specification for symmetrical pair/quad cables with transmission characteristics up to 600 MHz for digital communications in horizontal floor wiring

[1] Prepared by:	[2] Document: Issue: Date:
[3] Available from:	[4] Generic specification: IEC 61156-1 Sectional specification: IEC 61156-5 Blank detail specification: IEC 61156-5-1
[5] Additional references: ISO/IEC 11801	
[6] Cable description: a) Type and number of elements: b) Nominal impedance: c) Screening: d) Application: e) Category: f) Other distinguishing performance characteristics:	

[7] Cable construction:	61156-1 subclause	61156-5 subclause		
	2.2.3	2.2.3	Conductor description:	
	2.2.4	2.2.4	Insulation description: Maximum diameter:	
	2.2.5	2.2.5	Colour code of elements:	
	2.2.6	2.2.6	Number of elements (pair(s)/quad(s)):	
	2.2.7	2.2.7	Screening of the cable element: Tape material Drain wire Braid wire Braid material	
	2.2.8	2.2.8	Cross web, spacer or protective wrapping(s)	
	2.2.9	2.2.9	Screen of the cable core: Tape material Minimum overlap Drain wire Braid wire Braid material	
	– [1]	2.2.10	Ripcord:	
	2.2.10 2.2.11 2.2.12	2.2.10 2.2.11 2.2.12	Sheath Material Nominal thickness Colour Maximum overall Diameter Marking	
	2.2.13	2.2.13	Packaging:	

[1] Not specified in IEC 61156-1.

[8]

Minimum bending radius for static bending: mm

Minimum bending radius for dynamic bending: mm

Temperature range for installation: °C

Operating temperature range: °C

[9] Characteristics	[10] 61156-1 subclause	[11] 61156-5 subclause	[12] Requirements	[13] Comments
Electrical characteristics	**3.2**	**3.2**		
Conductor resistance	3.2.1	3.2.1	≤ .... Ω/km	
Resistance unbalance	3.2.2	3.2.2	≤ .... %	
Dielectric strength				
Conductor/conductor	3.2.3	3.2.3	..... kV	
Conductor/screen	3.2.3	3.2.3	..... kV	
Insulation resistance				
Conductor/conductor	3.2.4	3.2.4	≥ .... MΩ/km	
Conductor/screen	3.2.4	3.2.4	≥ .... MΩ/km	
Mutual capacitance	3.2.5	3.2.5	≤ ... nF/km	
Capacitance unbalance pair to ground	3.2.6	3.2.6	≤ ... pF/km	
Transfer impedance	3.2.7	3.2.7		
1 MHz			≤ ... mΩ/m	
10 MHz			≤ ... mΩ/m	
30 MHz			≤ ... mΩ/m	
100 MHz			≤ ... mΩ/m	
Resistance of the screen	– [1)]	3.2.8	≤ ... Ω/km	

[1)] Not specified in IEC 61156-1.

Transmission characteristics	**3.3**	**3.3**		
Velocity of propagation	3.3.1	3.3.1.1	≥ .... km/s	
Delay	– [1)]	3.3.1.2	≤ ... ns/100 m	
Differential phase delay (skew)	– [1)]	3.3.1.3	≤ ... ns/100 m	
Environmental effects	– [1)]	3.3.1.4	≤ ... ns/100 m	
Attenuation	3.3.2	3.3.2	≤ ... dB/100 m	
Environmental effects	– [1)]	3.3.2.1	≤ ... %/°C	
Unbalance attenuation near-end (TCL)	3.3.3	3.3.3	≥ ... dB	
Unbalance attenuation far-end (EL TCTL)	3.3.3	3.3.3	≥ ... dB	
Near-end cross-talk (power sum)	3.3.4	3.3.4	≥ ... dB	
Near-end cross-talk (pair-to pair)	3.3.4	3.3.4	≥ ... dB	
Far-end cross-talk (power sum)	3.3.5	3.3.5	≥ ... dB	
Far-end cross-talk (power sum)	3.3.5	3.3.5	≥ ... dB	
Input impedance	3.3.6	3.3.6.1	.... Ω	
Function fitted impedance	3.3.6	3.3.6.2	.... Ω	
Mean characteristic impedance	3.3.6	3.3.6.2	.... Ω	
Return loss	3.3.7	3.3.7	≥ ... dB	
Screening attenuation	– [1)]	3.3.8	≥ ... dB	
Coupling attenuation	– [1)]	3.3.9	≥ ... dB	
Crosstalk in bundled cables	– [1)]	3.3.10	≥ ... dB	
Crosstalk in hybrid bundled cables	– [1)]	3.3.10.1	≥ ... dB	

[1)] Not specified in IEC 61156-1.

Mechanical and dimensional characteristics	**3.4**	**3.4**		
Insulation diameter	3.4.1	3.4.1	. . . mm	
Sheath thickness	–	3.4.1	. . . mm	
Cable diameter	–	3.4.1	. . . mm	
Elongation at break of the conductors	3.4.2	3.4.2	≥ … %	
Elongation at break of the insulation	– [1)]	3.4.3	≥ … %	
Elongation at break of the sheath	3.4.4	3.4.4	≥ … %	
Tensile strength of the sheath	3.4.5	3.4.5	≥ … MPa	
Crush test of the cable	3.4.6	3.4.6		
Impact test of the cable	3.4.7	3.4.7		
Bending under tension	– [2)]	3.4.8		
Tensile performance of the cable	3.4.9	3.4.9		

[1)] Not specified in IEC 61156-1.

[2)] Not specified in IEC 61156-1. Instead, a requirement for tensile strength of insulation is specified.

Environmental characteristics	**3.5**	**3.5**		
Shrinkage of insulation	3.5.1	3.5.1	≤ ... %	
Wrapping test of insulation after thermal ageing	3.5.2	3.5.2	NA	
Bending test of insulation at low temperature	3.5.3	3.5.3		
Elongation at break of the sheath after ageing	3.5.4	3.5.4	≥ ... %	Initial value
Tensile strength of the sheath after ageing	3.5.5	3.5.5	≥ ... MPa	Initial value
Sheath pressure test at high temperature	3.5.6	3.5.6	NA	
Cold bend test of cable	3.5.7	3.5.7	NA	
Heat shock test	3.5.8	3.5.8		
Flame propagation of a single cable	3.5.9	3.5.9		
Flame or propagation characteristics of bunched cables	3.5.10	3.5.10		
Acid gas evolution	3.5.11	3.5.11		
Smoke generation	3.5.12	3.5.12		
Toxic gas emission	3.5.13	3.5.13		
Integrated fire test	3.5.14	3.5.14		UC
UC: under consideration				