

# INTERNATIONAL STANDARD

**Multicore and symmetrical pair/quad cables for digital communications –  
Part 3-1: Work area wiring – Blank detail specification**



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Part 3-1: Work area wiring – Blank detail specification**

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MULTICORE AND SYMMETRICAL PAIR/QUAD CABLES  
FOR DIGITAL COMMUNICATIONS –****Part 3-1: Work area wiring –  
Blank detail specification**

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International Standard IEC 61156-3-1 has been prepared by subcommittee 46C: Wires and symmetric cables, of IEC technical committee 46: Cables, wires, waveguides, r.f. connectors, r.f. and microwave passive components and accessories.

This standard is to be read in conjunction with IEC 61156-1: 2002 and IEC 61156-3: 2008.

This third edition cancels and replaces the second edition published in 2003. This edition constitutes a technical revision. The significant global technical change is the alignment with IEC 61156-3: 2008.

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

FDIS	Report on voting
46C/883/FDIS	46C/891/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.

A list of all parts of the IEC 61156 series, published under the general title *Multicore and symmetrical pair/quad cables for digital communications*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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- withdrawn;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
- amended.

A bilingual version of this publication may be issued at a later date.

## MULTICORE AND SYMMETRICAL PAIR/QUAD CABLES FOR DIGITAL COMMUNICATIONS –

### Part 3-1: Work area wiring – Blank detail specification

#### 1 Scope

The application of this blank detail specification relates to multicore and symmetrical pair(s)/quad(s) cables for digital communications in work area wiring.

This blank detail specification determines the layout and style for detail specifications describing multicore and symmetrical pair(s)/quad(s) cables for digital communication in work area wiring. Detail specifications based on the blank detail specification may be prepared by a national standards organization, a manufacturer or a user.

#### 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 61156-1:2002<sup>1</sup>, *Multicore and symmetrical pair/quad cables for digital communications – Part 1: Generic specification*

IEC 61156-3, *Multicore and symmetrical pair/quad cables for digital communications – Part 3: Work area wiring – Sectional specification*

#### 3 Guidance for preparation of detail specifications

It is necessary to keep the transmission characteristics indicated in the relevant sectional specification for the category number (3 or 5) and the characteristic impedance.

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

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

When a characteristic applies but a specific value is not considered necessary, then NS (for Not Specified) should be entered in the appropriate space.

The numbers shown in brackets on 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.

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<sup>1</sup> A more recent version of this standard exists (2007), but as not all of the tests cited herein are addressed by the newer edition, it has been decided that the 2002 edition is to be used.

- [4] Related documents.
- [5] Any other references 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:* Detail specification for 4-pairs cable without common screen for digital communications in work area wiring category 3.

- [7] Details of the cable materials and construction.
- [8] Special requirements for bending radius or operation temperatures.
- [9] List of cable characteristics. They are separated into electrical, transmission, mechanical and environmental characteristics.
- [10] Appropriate subclause references in both the generic specification IEC 61156-1:2002 and sectional specification IEC 61156-3.
- [11] Requirements applicable for this cable. The values entered shall at a minimum meet the requirements of the sectional specification IEC 61156-3.
- [12] Relevant remarks.



#### 4 Blank detail specification for multicore and symmetrical pair(s)/quad(s) cables for digital communication in horizontal floor wiring

[1] Prepared by:		[2] Document:	
		Issue:	
		Date:	
[3] Available from:	[4] Generic specification: IEC 61156-1: 2002 Sectional specification: IEC 61156-3: 2008 Detail specification: IEC 61156-3-1: 2009		
[5] Additional references:			
[6] Cable description:			
[7] Cable materials and construction	IEC 61156-3: 2008 subclause		comments
	2.2.2	Cable construction	
	2.2.3	Conductor description	
	2.2.4	Insulation description: Nominal thickness Maximum diameter	
	2.2.5	Colour code of elements	
	2.2.6	Number of elements	
	2.2.7	Screening of the element	
	2.2.8	Cable make-up: Number of units Screen of the units Tape material Minimum overlap Protective wrapping(s) of the cable core	

	2.2.9	Screen of the cable core: Tape material Minimum overlap Drain wire Braid wire Braid material Filling factor	
	2.2.10	Sheath: Material Nominal thickness Maximum overall diameter Marking Rip cord	
	2.2.11	Colour of the sheath	
	2.2.12	Identification	
	2.2.13	Packaging of finished cable	
<p>[8]</p> <p>Minimum bending radius for static bending:      mm</p> <p>Minimum bending radius for dynamic bending:      mm</p> <p>Temperature range (installation/operation):      °C</p>			

[9] Characteristics	[10] Subclause	[11] Requirements	[12] Comments
<b>Electrical characteristics</b>	<b>3.2</b>		
Conductor resistance	3.2.1	$\leq \dots \Omega/\text{km}$	
Resistance unbalance	3.2.2	$\leq \dots \%$	
Dielectric strength conductor/conductor conductor/screen screen/screen	3.2.3	$\dots \text{ kV}$ $\dots \text{ kV}$ $\dots \text{ kV}$	
Insulation resistance conductor/conductor conductor/screen	3.2.4	$\geq \dots \text{ M}\Omega \cdot \text{km}$ $\geq \dots \text{ M}\Omega \cdot \text{km}$	
Mutual capacitance	3.2.5	$\leq \dots \text{ pF/m}$	
Capacitance unbalance pair/screen	3.2.6	$\leq 1\,700 \text{ pF}/500\text{m}$ $\leq \dots \text{ pF}/500 \text{ m}$	
Transfer impedance at 1 MHz 10 MHz 100 MHz	3.2.7	$\leq \dots \text{ m}\Omega/\text{m}$ $\leq \dots \text{ m}\Omega/\text{m}$ $\leq \dots \text{ m}\Omega/\text{m}$	
<b>Transmission characteristics</b>	<b>3.3</b>		
Velocity of propagation (phase velocity)	3.3.1	$\geq \dots \text{ km/s}$	
Phase delay	3.3.1.1		
Differential phase delay	3.3.1.2		
Environmental effects	3.3.1.2.2		
Attenuation at 1 MHz 4 MHz 10 MHz 16 MHz 20 MHz 31,25 MHz 62,5 MHz 100 MHz	3.3.2	$\leq \dots \text{ dB}/100 \text{ m}$ $\leq \dots \text{ dB}/100 \text{ m}$ $\leq \dots \text{ dB}/100 \text{ m}$ $\leq \dots \text{ dB}/100 \text{ m}$ $\leq \dots \text{ dB}/100 \text{ m}$ $\leq \dots \text{ dB}/100 \text{ m}$ $\leq \dots \text{ dB}/100 \text{ m}$ $\leq \dots \text{ dB}/100 \text{ m}$	
Unbalance attenuation near-end (TCL)	3.3.3	$\dots \text{ dB}$	

[9] Characteristics	[10] Subclause	[11] Requirements	[12] Comments
Unbalance attenuation far-end (EL-TCTL)	3.3.3	...dB	
Near-end crosstalk at 1 MHz 4 MHz 10 MHz 16 MHz 20 MHz 31,25 MHz 62,5 MHz 100 MHz	3.3.4	$\geq$ .... dB $\geq$ .... dB $\geq$ .... dB $\geq$ .... dB $\geq$ .... dB $\geq$ .... dB $\geq$ .... dB $\geq$ .... dB	
Characteristic impedance Input impedance 1 MHz / .... MHz Function fitted impedance / mean characteristic impedance	3.3.5 3.3.5.2 3.3.5.3	... $\Omega$ ... $\Omega \pm 15 \Omega$ ... $\Omega$	
Structural return loss (SRL)	3.3.6	<... dB	
<b>Mechanical characteristics</b>	<b>3.4</b>		
Dimensional requirements Insulation diameter Sheath thickness Cable diameter	3.4.1	... mm	
Elongation at break of the conductors	3.4.2	$\geq$ .... %	
Elongation at break of the insulation	3.4.3	$\geq$ .... %	
Elongation at break of the sheath	3.4.4	$\geq$ .... %	
Tensile strength of the sheath	3.4.5	$\geq$ .... MPa	
Crush test of the cable	3.4.6		
Impact test of the cable	3.4.7		
Repeated bending of the cable	3.4.8		
Tensile performance of the cable	3.4.9	.... N	

[9] Characteristics	[10] Subclause	[11] Requirements	[12] Comments
<b>Environmental characteristics</b>	<b>3.5</b>		
Shrinkage of insulation	3.5.1	$\leq \dots \%$	
Bending test of insulation at low temperature	3.5.3		
Elongation at break of the sheath after ageing	3.5.4	$\geq \dots \%$	Initial value
Tensile strength of the sheath after ageing	3.5.5	$\geq \dots \%$	Initial value
Sheath pressure test at high temperature	3.5.6		
Cold bend test of the cable	3.5.7		
Heat shock test	3.5.8		
Flame propagation characteristics of a single cable	3.5.9		
Flame propagation characteristics of bunched cables	3.5.10		
Acid gas evolution	3.5.11		
Smoke generation	3.5.12		
Toxic gas emission	3.5.13		
Combined flame and smoke test for cables in environmental air handling space	3.5.14		





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