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INTERNATIONAL STANDARD

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Specification for the testing of balanced and coaxial information technology cabling – Part 2-22: Category 6A cords as specified in ISO/IEC 11801-1 – Blank detail specification

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FOREWORD

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International Standard IEC 61935-2-22 has been prepared by IEC technical committee 46: Cables, wires, waveguides, RF connectors, RF and microwave passive components and accessories.

The text of this International Standard is based on the following documents:

Draft	Report on voting
46/519/CDV	46/541A/RVC

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 61935 series, published under the general title *Generic cabling systems – Specification for the testing of balanced communication cabling* in accordance with ISO/IEC 11801, can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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- withdrawn,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

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SPECIFICATION FOR THE TESTING OF BALANCED AND COAXIAL INFORMATION TECHNOLOGY CABLING –

Part 2-22: Category 6_A cords as specified in ISO/IEC 11801-1 – Blank detail specification

1 Scope

This part of IEC 61935 is a blank detail specification describing cords which are compliant with category 6 cabling requirements, as specified in the ISO/IEC 11801-1.

ISO/IEC 11801 and ISO/IEC 11801 series definitions and specifications referenced by this blank detail specification are currently covered by ISO/IEC 11801-1.

This document is intended to be used in conjunction with IEC 61935-2, IEC 61156-1, IEC 61156-6, IEC 60603-7-41 and IEC 60603-7-51. The blank detail specification determines the layout and style for detail specifications describing cords with transmission characteristics up to 500 MHz for digital communications. Detail specifications, based on the blank detail specification, can be prepared by a national organization, a manufacturer, or a user.

Test configuration applicable to cords is detailed in the IEC 61935-2.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO/IEC 11801-1, *Information technology – Generic cabling for customer premises – Part 1: General requirements*

IEC 60603-7-41, *Connectors for electronic equipment – Part 7-41: Detail specification for 8-way, unshielded, free and fixed connectors, for data transmissions with frequencies up to 500 MHz*

IEC 60603-7-51, *Connectors for electronic equipment – Part 7-51: Detail specification for 8-way, shielded, free and fixed connectors, for data transmissions with frequencies up to 500 MHz*

IEC 60794-1-22, *Optical fibre cables – Part 1-22: Generic specification – Basic optical cable test procedures – Environmental tests methods*

ISO/IEC 61156-1:2007, *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 1 000 MHz – Horizontal floor wiring – Sectional specification*

IEC 61156-6:2010[1], *Multicore and symmetrical pair/quad cables for digital communications – Part 6: Symmetrical pair/quad cables with transmission characteristics up to 1000 MHz – Work area wiring – Sectional specification*
IEC 61156-6:2010/AMD1:2012

IEC 61935-2:2010, *Specification for the testing of balanced and coaxial information technology cabling – Part 2: Cords as specified in ISO/IEC 11801 and related standards*

IEC 62012-1:2002, *Multicore and symmetrical pair/quad cables for digital communications to be used in harsh environments – Part 1: Generic specification*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

4 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. 6_A 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 document.

NOTE 1 When a characteristic does not apply, then na (for not applicable) can 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) can be entered in the appropriate space. When ns is used, the appropriate requirement in the sectional specification applies.

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 cord which shall include

a) type and number of elements;

b) nominal impedance;

c) screening;

d) application;

e) specific category of cord, cable and connectors;

f) other distinguishing performance characteristics.

[1] A 2020 edition of this document exists but the listed edition applies.

EXEMPLE 4-pair, shielded twisted pair cable for use in work area wiring, having a nominal impedance of 100 Ω, and meeting the transmission requirements of Category 6_A 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.

The recommended environmental severities are derived from the MICE environmental classification of ISO/IEC 11801-1. These recommendations were made to better reflect the cable behaviour.

Ingress test requirements using particles are applicable to cable assemblies; while tests using particles are not applicable to the cable, tests using particles are applicable to the connectors.

The temperature requirements are addressed in [8]. Rapid change of temperature is irrelevant for cables.

Electromagnetic requirements coming from the MICE (Mechanical, Ingress, Climatic, Electromagnetic) environmental characterizations of ISO/IEC 11801-1 have been dealt with by using the requirements that are given for transfer impedance, screening attenuation and coupling attenuation. ESD requirements are considered non-applicable.

[10] Appropriate subclause references in the generic specification IEC 61156-1/IEC 61935-2.

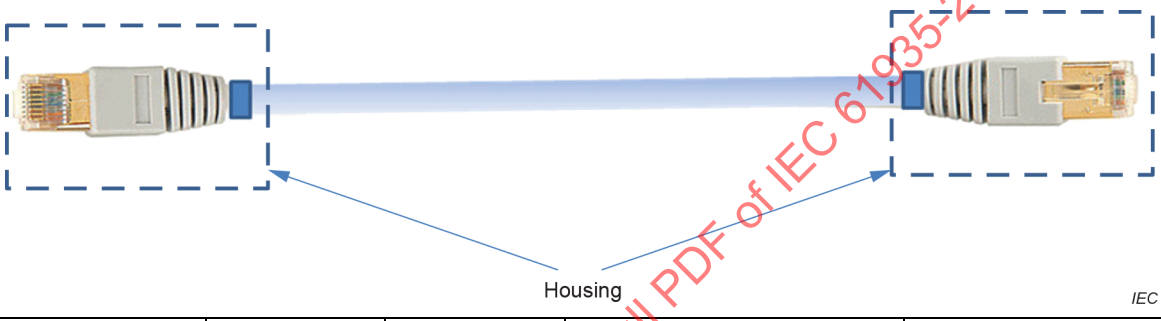
[11] Appropriate subclause references in the sectional specification IEC 61156-6/ IEC 61935-2.

[12] Requirements applicable to this cable. The values shall meet the requirements of sectional specification IEC 61156-6 for category 6_A.

For those limits that are not related to the cable category and for which a choice is proposed, they shall be chosen to meet the related MICE environmental classification of ISO/IEC 11801-1.

[13] Comments – Relevant remarks.

5 Blank detail specification for cords and work area cords category 6_A

[1] Prepared by:			[2] Document: Issue: Date:	
[3] Available from:			[4] Sectional specification for the testing of cords: IEC 61935-2 Blank detail specification: IEC 61935-2-22	
[5] Additional references: ISO/IEC 11801				
[6] Cord description: a) Specific category of cord, cable and connectors b) Nominal impedance c) Connector type d) Cable e) Conductors material f) Screening g) Housing h) MICE				
[7] Cable assembly construction:  				
IEC 61935-2:2010, 4.1	IEC 61156-1:2007	IEC 61156-6:2010		
	5.2.6	5.2.6	Sheath	
			Material Nominal thickness[a]	
	5.2.6	5.2.6	Colour Maximum overall Diameter	
	5.2.7	5.2.7	Marking	
	5.2.8		Packaging:	
IEC 60603-7-41 IEC 60603-7-51				
Visual inspection	IEC 61935-2:2010, 5.1			
[8] Minimum bending radius for static bending: mm Minimum bending radius for dynamic bending: mm Temperature range for installation °C Operating temperature range under static conditions: –10 °C to +60 °C (C1), –25 °C to +70 °C (C2), –40 °C to +70 °C (C3) [b,c]				

[9] Characteristics	[10] IEC 61156-1:2007 Subclause	[11] IEC 61156-6:2010 Subclause	[12] Recommended severities/ Requirements			[13] Comments
Electrical characteristics	6.2	6.2				
DC loop resistance	6.2.1	6.2.1	Assumed to be met by design			
Resistance unbalance	6.2.2	6.2.2	Assumed to be met by design			
Wire map	IEC 61935-2:2010, 5.2					
Transmission characteristics						
Propagation delay	– [d]	IEC 61935-2:2010, 5.3	Assumed to be met by design			
Differential phase delay (skew)	– [d]	IEC 61935-2:2010, 5.4	Assumed to be met by design			
Insertion loss		IEC 61935-2:2010, 5.5	≤ … dB			
Near-end crosstalk (pair to pair)	6.3.5	IEC 61935-2:2010, 5.7	≥ … dB			
Return loss		IEC 61935-2:2010, 5.6	≥ … dB			
TCL		6.3.4	Under consideration			
PS exogenous near end crosstalk		6.3.7	≥ … dB			
PS exogenous far end crosstalk		6.3.8	≥ … dB			
Transfer impedance	6.2.7	6.2.7	na	Grade 2	Grade 1	
Coupling attenuation[e]	IEC 61935-2:2010, 7.8	6.2.8	Type III	Type II	Type I	

[9] Characteristics	[10] IEC 61156-1:2007 Subclause	[11] IEC 61156-6:2010 Subclause	[12] Recommended severities/ Requirements			[13] Comments
Mechanical and dimensional characteristics						
Tensile performance of the cord		IEC 61935-2:2010, 7.2	≥ …N			
Flexure		IEC 61935-2:2010, 7.3				
Bending		IEC 61935-2:2010, 7.4	≥ …			
Twisting		IEC 61935-2:2010, 7.5				
Crushing		IEC 61935-2:2010, 7.6	700 N	1 100 N	2 200 N	b f
Dust test		IEC 61935-2:2010, 7.7	2 cycles	10 cycles	20 cycles	
Impact test of the cable	6.4.9	6.4.9	na	10 J	20 J	b
Shock	IEC 62012-1:2002,3.4.4		na	15 g/ 11 ms	50 g/ 11 ms	b
Bump	IEC 62012-1:2002,3.4.3		na	15 g/ 11 ms	50 g/ 11 ms	b
Vibration	IEC 62012-1:2002,3.4.2		na	10 Hz – 500 Hz with 10 g	10 Hz – 2 000 Hz with 20 g	b
Water immersion	IEC 60794-1-22 F10		na	1 m/12 h	1 m/12 h	k
Damp heat steady state	IEC 62012-1:2002,3.5.2		na	60/90/10	60/90/56	b g h
Solar radiation	IEC 61156-1:2007 6.5.10		na	u.c.	u.c.	
Solvents and contaminating fluids	IEC 62012-1:2002,3.6.1		na	na	a	i
Salt mist and sulphur dioxide tests	IEC 62012-1:2002,3.6.2		na	na	4 days	j
Climatic sequence		IEC 61935-2:2010, 7.9	–10 °C to +60 °C	–25 °C to +70 °C	–40 °C to +70 °C	
Environmental characteristics						
Cold bend test of cable	6.5.7	6.5.7				
Heat shock test	6.5.8	6.5.8				
Flame propagation of a single cable	6.5.16	6.5.16				
a: applicable na: not applicable u.c: under consideration.						