IEC 61935-2-20

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INTERNATIONAL STANDARD

Testing of balanced communication cabling in accordance with ISO/IEC 11801 – Part 2-20: Patch cords and work area cords – Blank detail specification for class D applications

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

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Email: csc@iec.ch
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Fax: +41 22 919 03 00

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CONTENTS

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FOREWORD

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International Standard IEC 61935-2-20 has been prepared by IEC technical committee 46: Cables, wires, waveguides, R.F. connectors, R.F. and microwave passive components and accessories.

This first edition cancels and replaces the ISO/IEC PAS 61935-2-20 published in 2007.It constitutes a technical revision.

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

FDIS	Report on voting
46/270/FDIS	46/278/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 blank detail specification is to be used in conjunction with IEC 61156-1, IEC 61156-6, IEC 60603-7-2 and IEC 60603-7-3.

A list of all parts of the IEC 61935 series can be found, under the general title *Testing of balanced communication cabling in accordance with ISO/IEC 11801*, 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 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- withdrawn;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.

TESTING OF BALANCED COMMUNICATION CABLING IN ACCORDANCE WITH ISO/IEC 11801 –

Part 2-20: Patch cords and work area cords – Blank detail specification for class D applications

1 Scope

This blank detail specification describes work area cord for class D applications, as defined in ISO/IEC 11801 as well as in the ISO/IEC 24702.

This blank detail specification determines the layout and style for detail specifications describing cords with transmission characteristics up to 100 MHz for digital communications. Detail specifications, based on this blank detail specification, may be prepared by a national organization, a manufacturer, or a user.

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

The designation "Category 5e" is used herein to describe an enhanced category 5 cable (see 1 of IEC 61156-6).

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 60603-7-2, *Connectors for electronic equipment – Part 7-2: Detail specification for 8-way, unshielded, free and fixed connectors, for data transmissions with frequencies up to 100 MHz*

IEC 60603-7-3, *Connectors for electronic equipment – Part 7-3: Detail specification for 8-way, shielded, free and fixed connectors, for data transmissions with frequencies up to 100 MHz*

IEC 60794-1-2, *Optical fibre cables – Part 1-2: Generic specification – Basic optical cable test procedures*

IEC 61156-1:2007, *Multicore and symmetrical pair/quad cables for digital communications – Part 1: Generic specification*

IEC 61156-6:2007, *Multicore and symmetrical pair/quad cables for digital communications – Part 6: Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz – Work area wiring – Sectional specification*

IEC 61935-2:2005*, Testing of balanced communication cabling in accordance with ISO/IEC 11801 – Patch cords and work area cords*

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

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

ISO/IEC 24702, *Information technology – Generic cabling – Industrial premises*

EN 50289-1-13, *Electrical test methods – Coupling attenuation or screening attenuation of patch cords / coaxial cable assemblies / pre-connectorised cables*[1]

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 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 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 work area wiring, having a nominal impedance of 100 Ω, and meeting the transmission requirements of category 5e 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 table requirements of ISO/IEC 24702. These recommendations were made to better reflect the cable behaviour.

It should be noted that ingress requirements using particles are not applicable to a cable.

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

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1 The EN 50289-1-13 will be replaced with equivalent IEC publication when available.

Electromagnetic requirements coming from the MICE table of ISO/IEC 24702 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/ 61935-2/ 62012-1/ 60794-1-2 and EN 50289-1-13.

[11] Appropriate subclause references in the sectional specification IEC 61156-6/ 61935-2/ 62012-1 and EN 50289-1-13.

[12] Requirements applicable to this cable. The values shall meet the requirements of sectional specification IEC 61156-6 for category 5e.

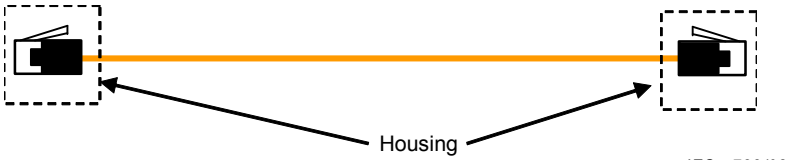
For those limits that are not related to the cable category and for which a choice is proposed, they have to be chosen to meet the related MICE table requirements

[13] Comments – Relevant remarks.

4 Blank detail specification for Work area cord for class D applications

[1] Prepared by:	[2] Document: Issue: Date:
[3] Available from:	[4] Sectional for the testing of cords: IEC 61935-2 Blank detail specification: IEC 61935-2-20
[5] Additional references: ISO/IEC 11801	
[6] Cord description: a) Category b) Nominal impedance c) Connector type d) Cable e) Screening f) Housing g) MICE	

[7] Cable assembly construction:



IEC 61935-2, 4.1	IEC 61156-1	IEC 61156-6		
	5.2.6	5.2.6	Sheath Material Nominal thickness[a]	
	5.2.6	5.2.6	Colour Maximum overall Diameter	
	5.2.7.1	5.2.7	Marking	
	2.2.13	2.2.13	Packaging:	
Visual inspection	IEC 61935-2, 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) [d]

[9] Characteristics	[10] IEC 61156-1 subclause	[11] IEC 61156-6 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			
CS Resistance unbalance	6.2.2	6.2.2	Assumed to be met by design			
Wire Map	IEC 61935-2, 5.2					
Transmission characteristics	**6.3**	**6.3**				
Propagation delay	– [b]	IEC 61935-2, 5.3	Assumed to be met by design			
Differential phase delay (skew)	– [b]	IEC 61935-2, 5.4	Assumed to be met by design			
Insertion loss		IEC 61935-2, 5.5	≤ … dB			
Near-end crosstalk (pair to pair)	6.3.4	IEC 61935-2, 5.7	≥ … dB			
Return loss		IEC 61935-2, 5.6	≥ … dB			
Screening attenuation	EN 50289-1-13[1]	EN 50289-1-13	na	≥40 dB	≥60 dB	
Transfer impedance	6.2.7	6.2.7	na	grade 2	grade 1	
Coupling attenuation	6.2.8	6.2.8	type III	type II	type I	
Mechanical and dimensional characteristics	**6.4**	**6.4**				
Tensile performance of the cord		IEC 61935-2, 6.2	≥ …N			
Flexure		IEC 61935-2, 6.3				
Bending		IEC 61935-2, 6.4	≥ …			
Twisting		IEC 61935-2, 6.5				
Crushing		IEC 61935-2, 6.6	700 N	1 100 N	2 200 N	d e
Dust test		IEC 61935-2, 6.7	2 cycles	10 cycles	20 cycles	
Impact test of the cable	6.4.9	6.4.9	na	10 J	20 J	d
Shock	IEC 62012-1, 3.4.4	IEC 62012-1	na	15 g / 11 ms	50 g / 11 ms	d
Bump	IEC 62012-1, 3.4.3	IEC 62012-1	na	15 g / 11 ms	50 g / 11 ms	d
Vibration	IEC 62012-1, 3.4.2	IEC 62012-1	na	10 – 500 Hz with 10 g	10 - 2 000 Hz with 20 g,	d
Water immersion	IEC 60794-1-2, méthode F10		na	1 m/ 12 h	1 m/ 12 h	j
Damp heat steady state	IEC 62012-1, 3.5.2	IEC 62012-1	na	60/90/ 10	60/90/ 56	d f g

[9] Characteristics	[10] IEC 61156-1 subclause	[11] IEC 61156-6 subclause	[12] Recommended severities/ Requirements			[13] Comments
Solar radiation	IEC 61156-1 6.5.10		na	u.c.	u.c.	
Solvents and contaminating fluids	IEC 62012-1, 3.6.2	IEC 62012-1	na	na	na	[h]
Salt mist and sulphur dioxide tests	IEC 62012-1, 3.6.2	IEC 62012-1	na	na	4 days	[i]
Climatic sequence		IEC 61935-2, 6.9	-10 °C to +60 °C	-25 °C to +70 °C	-40 °C to +70 °C	
Environmental characteristics	**6.5**	**6.5**				
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				

u.c.: under consideration.

[a] It is assumed that a thickness of 0,5 mm is sufficient for spark testing up to 3 Kv, thickness larger than 0,8 mm is assumed to be sufficient for spark testing up to 5 kV.

[b] Not specified in IEC 61156-1.

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

[d] The proposed severities are taken from the environmental description of ISO/CEI 24702, MICE table. Depending upon the actual need of the end user, other severities may be agreed between customer and manufacturer.

[e] The lowest severity is expected to be met by design. Testing is not required.

[f] The temperature to be used for this test shall be chosen according to the highest specified [8] operating temperature

[g] This test is assumed to demonstrate the compliance a cable that meets the humidity requirements of the MICE table of ISO/CEI 24702.

[h] This test is assumed to demonstrate the compliance a cable that meets the liquid pollution requirements of the MICE table of ISO/CEI 24702.

[i] This test is assumed to demonstrate the compliance a cable that meets the gaseous pollution requirements of the MICE table of ISO/CEI 24702.

[j] This test is under consideration.

Bibliography

IEC 61076-3-106, *Connectors for electronic equipment – Product requirements – Part 3-106: Rectangular connectors: Detail specification for protective housings for use with 8-way shielded and unshielded connectors for industrial environments incorporating the IEC 60603-7 series interface*

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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

3, rue de Varembé
PO Box 131
CH-1211 Geneva 20
Switzerland

Tel: + 41 22 919 02 11
Fax: + 41 22 919 03 00
info@iec.ch
www.iec.ch