# IEC 61935-2-25

Edition 1.0 2015-04

# INTERNATIONAL STANDARD

colour inside

## Generic cabling systems – Specification for the testing of balanced communication cabling in accordance with ISO/IEC 11801 – Part 2-25: Work area with M12 4 poles connectors – Blank detail specification

IEC 61935-2-25:2015-04(en)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

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


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# CONTENTS

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# GENERIC CABLING SYSTEMS – SPECIFICATION FOR THE TESTING OF BALANCED COMMUNICATION CABLING IN ACCORDANCE WITH ISO/IEC 11801 –

## Part 2-25: Work area with M12 4 poles connectors – Blank detail specification

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International Standard IEC 61935-2-25 has been prepared by IEC technical committee 46: Cables, wires, waveguides, R.F. connectors, R.F. and microwave passive components and accessories.

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

| CDV | Report on voting |
|---|---|
| 46/518/CDV | 46/544/RVC |

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 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 publication will remain unchanged until the stability date indicated on the IEC website 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- withdrawn,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.

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# GENERIC CABLING SYSTEMS – SPECIFICATION FOR THE TESTING OF BALANCED COMMUNICATION CABLING IN ACCORDANCE WITH ISO/IEC 11801 –

## Part 2-25: Work area with M12 4 poles connectors – Blank detail specification

## 1 Scope

This part of IEC 61935, which is a blank detail specification, describes work area cord with M12 4 poles d-code connectors, as used in the ISO/IEC 24702 and IEC 61918.

According to the above cabling specifications, although these cords have only two pairs, their transmission performances, when applicable, are at least category 5 compliant for which the requirements are given in ISO/IEC 11801:2002/AMD2:2010, Clause 13.

This specification should be used in conjunction with IEC 61156-1, IEC 61156-6 and IEC 61076-2-101 type D. The 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 the blank detail specification, may be prepared by a national organization, a manufacturer, or a user.

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

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

IEC 61076-2-101, *Connectors for electronic equipment – Product requirements – Part 2-101: Circular connectors – Detail specification for M12 connectors with screw-locking*

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

IEC 61156-6:2010, *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 61918, *Industrial communication networks – Installation of communication networks in industrial premises*

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 environment – Part 1: Generic specification*

ISO/IEC 11801:2002, *Information technology – Generic cabling for customer premises*
ISO/IEC 11801:2002/AMD2:2010

ISO/IEC 24702, *Information technology – Generic cabling – Industrial 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, e.g. 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.

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. 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 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.

EXEMPLE 2-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 5 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 is not applicable to a cable.

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

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/IEC 61935-2.

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

[12] Requirements applicable to this cord. The values shall meet the requirements of the relevant sectional specification IEC 61156-6 for 2 pairs cable up to 100 MHz.

For those limits that are not related to the cord 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 cords for applications up to 100 MHz

| | |
|---|---|
| [1] Prepared by: | [2] Document:<br>Issue:<br>Date: |
| [3] Available from: | [4] Sectional specification for the testing of cords:<br>IEC 61935-2<br>Blank detail specification: IEC 61935-2-25 |
| [5] Additional references: ISO/IEC 11801 | |
| [6] Cord description:<br>a) Specific category of cord, cable and connectors<br>b) Nominal impedance<br>c) Connector type<br>d) Cable<br>e) Conductors material<br>f) Screening<br>g) Housing<br>h) MICE | |
| [7] Cable assembly construction:<br>  <br>IEC | |

| | | | | |
|---|---|---|---|---|
| IEC 61935-2:2010 § 4.1 | IEC 61156-1:2007 | IEC 61156-6:2010 | | |
| | 5.2.6 | | Sheath<br>Material<br>Nominal thickness[a] | |
| | 5.2.6 | | Colour<br>Maximum overall<br>Diameter | |
| | 5.2.7 | | Marking | |
| | 5.2.8 | | Packaging: | |
| Visual inspection | IEC 61935-2:2010 § 5.1 | | | |

[a] Not specified in IEC 61156-1.

[b] 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.

[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) [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 | – [a] | IEC 61935-2: 2010 §5.3 | Assumed to be met by design | | | |
| Differential phase delay (skew) | – [a] | 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 | | | |
| Transfer impedance | 6.2.7 | 6.2.7 | na | Grade 2 | Grade 1 | |
| Coupling attenuation [b] | IEC 61935-2: 2010 §6.8 | 6.2.8 | Type III | Type II | Type I | |

[a] Not specified in IEC 61156-1.

[b] Type Ib per the IEC 61156-6 is also recognized.

| 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 | c d |
| 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 | c |
| Shock | IEC 62012-1:2002 3.4.4 | | na | 15 g / 11 ms | 50 g / 11 ms | c |
| Bump | IEC 62012-1:2002 3.4.3 | | na | 15 g / 11 ms | 50 g / 11 ms | c |
| Vibration | IEC 62012-1:2002 3.4.2 | | na | 10 Hz – 500 Hz with 10 g | 10 Hz – 2 000 Hz with 20 g | c |
| Water immersion | IEC 60794-1-22 F10 | | na | 1 m/12 h | 1 m/12 h | i |
| Damp heat steady state | IEC 62012-1:2002 3.5.2 | | na | 60/90/10 | 60/90/56 | c e f |
| Solar radiation | 6.5.10 | | na | u.c. | u.c. | |
| Solvents and contaminating fluids | IEC 62012-1:2002 3.6.1 | | na | na | a | g |
| Salt mist and sulphur dioxide tests | IEC 62012-1:2002 3.6.2 | | na | na | 4 days | h |
| Climatic sequence | | IEC 61935-2: 2010 §7.9 | –10 °C to +60 °C | –25 °C to +70 °C | –40 °C to +70 °C | |
| | | | | | | |

[a] Not specified in IEC 61156-1.

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

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

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

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

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

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

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

[i] This test is under consideration.

| **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 | | |
| u.c.: under consideration. | | | | |

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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