



ISO/IEC 11801

Edition 2.0 2010-04

INTERNATIONAL STANDARD

AMENDMENT 2

Information technology – Generic cabling for customer premises



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Information technology – Generic cabling for customer premises

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FOREWORD

Amendment 2 to International Standard ISO/IEC 11801 was prepared by subcommittee 25: Interconnection of information technology, of ISO/IEC joint technical committee 1: Information technology.

This International Standard has been approved by vote of the member bodies, and the voting results may be obtained from the address given on the second title page.

INTRODUCTION

Add, at the end of the existing introductions the following text:

INTRODUCTION to Amendment 2

Amendment 2 of ISO/IEC 11801:2002 provides balanced cabling models, requirements and normative references for Category 6_A and Category 7_A components, requirements for Class E_A and Class F_A links, together with amendments to the requirements for optical fibre cabling.

Global change:

Replace, throughout ISO/IEC 11801:2002 and Amendment 1:2008 “optical fibre channel” by “optical fibre cabling channel”.

2 Normative references

Replace the entire existing Clause 2 of both ISO/IEC 11801:2002, as well Amendment 1:2008, by the following:

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.

The provisions of the referenced specifications other than ISO/IEC, IEC, ISO and ITU documents, as identified in this clause, are valid within the context of this International Standard. The reference to such a specification within this International Standard does not give it any further status within ISO or IEC. In particular, it does not give the referenced specification the status of an International Standard.

IEC 60352 (all parts), *Solderless connections*

IEC 60352-3, *Solderless connections – Part 3: Solderless accessible insulation displacement connections – General requirements, test methods and practical guidance*

IEC 60352-4, *Solderless connections – Part 4: Solderless non-accessible insulation displacement connections – General requirements, test methods and practical guidance*

IEC 60352-5, *Solderless connections – Part 5: Press-in connections – General requirements, test methods and practical guidance*

IEC 60352-6, *Solderless connections – Part 6: Insulation piercing connections – General requirements, test methods and practical guidance*

IEC 60352-7, *Solderless connections – Part 7: Spring clamp connections – General requirements, test methods and practical guidance*

IEC 60352-8, *Solderless connections – Part 8: Compression mount connections – General requirements, test methods and practical guidance*¹

IEC 60364-1, *Low-voltage electrical installations – Part 1: Fundamental principles, assessment of general characteristics, definitions*

IEC 60512-2-1, *Connectors for electronic equipment – Tests and measurements – Part 2-1: Electrical continuity and contact resistance tests – Test 2a: Contact resistance – Millivolt level method*

IEC 60512-3-1, *Connectors for electronic equipment – Tests and measurements – Part 3-1: Insulation tests – Test 3a: Insulation resistance*

IEC 60512-4-1, *Connectors for electronic equipment – Tests and measurements – Part 4-1: Voltage stress tests – Test 4a: Voltage proof*

IEC 60512-5-2, *Connectors for electronic equipment – Tests and measurements – Part 5-2: Current-carrying capacity tests – Test 5b: Current-temperature derating*

IEC 60512-25-1, *Connectors for electronic equipment – Tests and measurements – Part 25-1: Test 25a – Crosstalk ratio*

IEC 60512-25-2:2002, *Connectors for electronic equipment – Tests and measurements – Part 25-2: Test 25b – Attenuation (insertion loss)*

IEC 60512-25-4:2001, *Connectors for electronic equipment – Tests and measurements – Part 25-4: Test 25d – Propagation delay*

IEC 60512-25-5, *Connectors for electronic equipment – Tests and measurements – Part 25-5: Test 25e – Return loss*

IEC 60512-25-9:2008, *Connectors for electronic equipment – Tests and measurements – Part 25-9: Signal integrity tests – Test 25i: Alien crosstalk*

IEC 60512-26-100, *Connectors for electronic equipment – Tests and measurements – Part 26-100: Measurement setup, test and reference arrangements and measurements for connectors according to IEC 60603-7 – Tests 26a to 26g*

IEC 60603-7, *Connectors for electronic equipment – Part 7: Detail specification for 8-way, unshielded, free and fixed connectors*

IEC 60603-7-1, *Connectors for electronic equipment – Part 7-1: Detail specification for 8-way, shielded free and fixed connectors*

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 MHz²*

¹ To be published.

² Second edition to be published.

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*³

IEC 60603-7-4:–, *Connectors for electronic equipment – Part 7-4: Detail specification for 8-way, unshielded, free and fixed connectors, for data transmissions with frequencies up to 250 MHz*⁴

IEC 60603-7-5:–, *Connectors for electronic equipment – Part 7-5: Detail specification for 8-way, shielded, free and fixed connectors, for data transmissions with frequencies up to 250 MHz*⁵

IEC 60603-7-7:–, *Connectors for electronic equipment – Part 7-7: Detail specification for 8-way, shielded, free and fixed connectors, for data transmission with frequencies up to 600 MHz*⁶

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 60603-7-71:–, *Connectors for electronic equipment – Part 7-71: Detail specification for 8-way, shielded, free and fixed connectors, for data transmission with frequencies up to 1 000 MHz*⁷

IEC 60793-1-40, *Optical fibres – Part 1-40: Measurement methods and test procedures – Attenuation*

IEC 60793-1-44, *Optical fibres – Part 1-44: Measurement methods and test procedures – Cut-off wavelength*

IEC 60793-1-49, *Optical fibres – Part 1-49: Measurement methods and test procedures – Differential mode delay*

IEC 60793-2:2007, *Optical fibres – Part 2: Product specifications – General*

IEC 60793-2-10, *Optical fibres – Part 2-10: Product specifications – Sectional specification for category A1 multimode fibres*

IEC 60793-2-50, *Optical fibres – Part 2-50: Product specifications – Sectional specification for class B single-mode fibres*

IEC 60794 (all parts), *Optical fibre cables*

IEC 60794-2, *Optical fibre cables – Part 2: Indoor cables – Sectional specification*

³ Second edition to be published.

⁴ Second edition to be published.

⁵ Second edition to be published.

⁶ Third edition to be published.

⁷ To be published.

IEC 60825 (all parts), *Safety of laser products*

IEC 60874-19-1:2007, *Fibre optic interconnecting devices and passive components Connectors for optical fibres and cables – Part 19-1: Fibre optic patch cord connector type SC-PC (floating duplex) standard terminated on multimode fibre type A1a, A1b – Detail specification*

IEC 60874-19-2:1999, *Connectors for optical fibres and cables – Part 19-2: Fibre optic adaptor (duplex) type SC for single-mode fibre connectors – Detail specification*

IEC 60874-19-3:2007, *Fibre optic interconnecting devices and passive components – Connectors for optical fibres and cables – Part 19-3 Fibre optic adaptor (duplex) type SC for multimode fibre connectors – Detail specification*

IEC 61073-1, *Fibre optic interconnecting devices and passive components – Mechanical splices and fusion splice protectors for optical fibres and cables – Part 1: Generic specification*

IEC 61076-3-104, *Connectors for electronic equipment – Part 3-104: Detail specification for 8-way, shielded free and fixed connectors for data transmissions with frequencies up to 1 000 MHz*

IEC 61076-3-110, *Connectors for electronic equipment – Part 3-110: Detail specification for shielded, free and fixed connectors for data transmission with frequencies up to 1 000 MHz*

IEC 61156 (all parts), *Multicore and symmetrical pair/quad cables for digital communications*

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

Amendment 1 (2009)

IEC 61156-2:, *Multicore and symmetrical pair/quad cables for digital communications – Part 2: Symmetrical pair/quad cables with transmission characteristics up to 100 MHz – Horizontal floor cable – Sectional specification*

IEC 61156-3:2008, *Multicore and symmetrical pair/quad cables for digital communications – Part 3: Work area wiring – Sectional specification*

IEC 61156-4:2009, *Multicore and symmetrical pair/quad cables for digital communications – Part 4: Riser cables – Sectional specification*

IEC 61156-5:2009, *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, *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*⁸

IEC 61300-1, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 1: General and guidance*

IEC 61300-2-2:1995, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-2: Tests – Mating durability*

⁸ Refers to the third edition which is currently in preparation

IEC 61300-3-6:1997, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-6: Examinations and measurements – Return loss*
 Amendment 1:1998
 Amendment 2:1999

IEC 61300-3-34:2001, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-34: Examinations and measurements – Attenuation of random mated connectors*

IEC 61754-20:2002, *Fibre optic connector interfaces – Part 20: Type LC connector family*

IEC 61935-1, *Specification for the testing of balanced communication cabling in accordance with ISO/IEC 11801 – Part 1: Installed cabling*

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

IEC 62153-4-12, *Metallic communication cable test methods – Part 4-12: Electromagnetic compatibility (EMC) – Coupling attenuation or screened attenuation of connecting hardware – Absorbing clamp method*

ISO/IEC TR 14763-2:2000, *Information technology – Implementation and operation of customer premises cabling – Part 2: Planning and installation*

ISO/IEC 14763-3, *Information technology – Implementation and operation of customer premises cabling – Part 3: Testing of optical fibre cabling*

ISO/IEC 15018, *Information technology – Generic cabling for homes*

ISO/IEC 18010, *Information technology – Pathways and spaces for customer premises cabling*

ISO/IEC TR 24750:2007, *Information technology – Assessment and mitigation of installed balanced cabling channels in order to support 10GBASE-T*

ITU-T Recommendation O.9: *Measuring arrangements to assess the degree of unbalance about earth*

3.1 Terms and definitions

Add the following new terms and definitions:

3.1.84

cabled optical fibre category

system of defining requirements for the cabled optical fibre performance within optical fibre cabling channels and links

NOTE Also referred to as performance codes in some standards.⁹

3.1.85

equipment interface

location where a connection between equipment and the cabling system occurs

⁹ Standards developed by IEC subcommittee 86C use this definition in support of JTC 1/SC25 standards.

3.1.86**test interface**

location where a connection between test equipment and the cabling to be tested occurs

3.1.74

Replace, in ISO/IEC 11801:2002, the existing definition 3.1.56 for the term “small form factor connector” (renumbered as 3.1.74 by Amendment 1:2008) by the following:

3.1.74**small form factor connector**

optical fibre connector designed to accommodate two or more optical fibres with at least the same mounting density as achievable within the IEC 60603-7 series

3.2 Abbreviations

Add the following new abbreviations:

EI Equipment interface

TI Test interface

4 Conformance¹⁰

Replace, in Amendment 1:2008, point 2) of item b) by the following:

- 2) attachment of appropriate components to a permanent link or CP link design meeting the prescribed performance class of Clause 6 and Annex A. Channel performance shall be ensured where a channel is created by adding more than one cord to either end of a link meeting the requirements of Annex A;

Delete, in Amendment 1:2008, the following text and referenced footnote:

Until amendment 2⁴ of ISO/IEC 11801:2002 has been published:

- conformance for Classes D, E and F with regards to TCL, ELTCTL and coupling attenuation can only be achieved by option 1) above;
- conformance for Classes E_A and F_A can only be achieved by option 1) above.

Add, after bullet h), the following text:

Test methods to assess conformance with the channel and link requirements of Clause 6 and Annex A respectively are specified in IEC 61935-1 for balanced cabling and ISO/IEC 14763-3 for optical fibre cabling. The treatment of measured results that fail to meet the requirements of Clause 6 and Annex A respectively, or lie within the relevant measurement accuracy, shall be clearly documented within a quality plan as described in ISO/IEC 14763-2.

Installation and administration of cabling in accordance with this International Standard shall be undertaken in accordance with ISO/IEC 14763-2.

This International Standard does not specify which tests and sampling levels should be adopted. The test parameters to be measured and the sampling levels to be applied for a particular installation shall be defined in the installation specification and quality plans for that installation prepared in accordance with ISO/IEC 14763-2.

¹⁰ The entire Clause 4 of ISO/IEC 11801:2002, has been replaced by Amendment 1:2008.

Replace the last paragraph by the following:

For balanced cables, 2 pairs per TO may be used as an alternative to 4 pairs. However, this may require pair reassignment and will not support some applications (see Annex F). Care should be taken that the initial pair assignment, and all subsequent changes, are recorded (see ISO/IEC 14763-2 for details of administration requirements. Until ISO/IEC 14763-2 (first edition) is published, relevant information can be found in ISO/IEC TR 14763-2). Pair reassignment by means of inserts is allowed.

5.7.6 Consolidation point

Replace, in ISO/IEC 11801:2002, the existing text of bullet point d) by “void”.

6.2 Layout

Delete, in Amendment 1:2008, the NOTE which reads:

NOTE Component performance requirements for Category 6_A and Category 7_A will be available in Amendment 2 to ISO/IEC 11801:2002.

Delete, in ISO/IEC 11801:2002, the entire fourth paragraph beginning with “Most Class F channels...”.

Replace, in ISO/IEC 11801:2002, the existing paragraph prior to Figure 11, as well as Figure 11 by the following:

Figure 11 shows an example of terminal equipment in the work area connected to transmission equipment using two different media channels which are cascaded. In fact, there is an optical fibre cabling channel (see Clause 8) connected via an active component in the FD to a balanced cabling channel. There are four channel interfaces; one at each end of the balanced channel and one at each end of the optical fibre cabling channel.

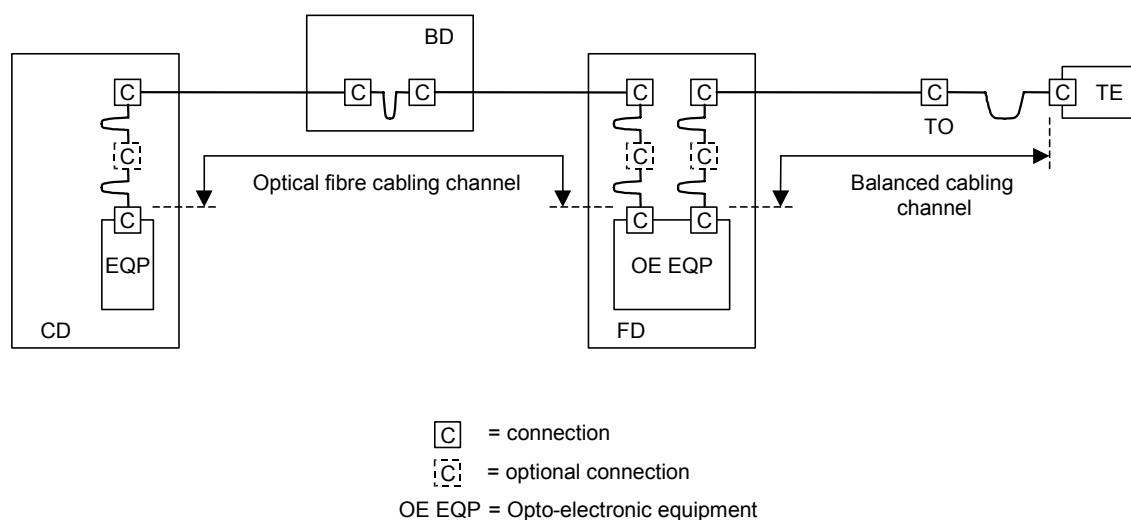


Figure 11 – Example of a system showing the location of cabling interfaces and extent of associated channels

Delete, in Amendment 1:2008, the NOTE which reads:

NOTE Permanent link and CP link requirements for Class E_A and Class F_A will be available in amendment 2 to ISO/IEC 11801:2002.

Delete, in ISO/IEC 11801:2002, the entire last paragraph beginning with “Most Class F channels...”.

6.3 Classification of balanced cabling

Replace, in ISO/IEC 11801:2002, the second sentence of the second paragraph by the following:

Similarly, Class B, C, D, E, E_A, F and F_A channels provide the transmission performance to support Class B, C, D, E, E_A, F and F_A applications respectively.

6.4.2 Return loss

Replace, in ISO/IEC 11801:2002, the existing first paragraph by the following:

The return loss requirements are applicable to Classes C, D, E, E_A, F and F_A only.

6.4.3 Insertion loss/attenuation

Replace, in ISO/IEC 11801:2002, the last paragraph before Table 4 by the following:

When required, the insertion loss shall be measured according to IEC 61935-1.

6.4.5.1 General

Replace, in Amendment 1:2008, the entire text of this subclause by the following:

ACR-N and PS ACR-N requirements are applicable to Classes D, E, E_A, F and F_A only.

Except for the name, the definition and equations for ACR-N and PS ACR-N are identical to those used for ACR and PS ACR, respectively, in prior editions of this standard.

6.4.6.1 General

Replace, in Amendment 1:2008, the first paragraph by the following:

ACR-F and PS ACR-F requirements are applicable to Classes D, E, E_A, F and F_A only.

6.4.9 Current carrying capacity

Replace, in ISO/IEC 11801:2002, the existing subclause by the following:

The minimum current carrying capacity for channels of Classes D, E, E_A, F and F_A shall be 0,175 A d.c. per conductor for all temperatures at which the cabling will be used. This shall be achieved by an appropriate design.

For information on current carrying capacity in respect to applications using remote power supplied over balanced cabling, see ISO/IEC TR 29125.

6.4.13 Delay skew

Replace, in ISO/IEC 11801:2002, the existing second paragraph by the following:

When required, the delay skew shall be calculated according to IEC 61935-1.

6.4.15.5 PS AFEXT for Class E_A channels

Replace, in Amendment 1:2008, the existing third paragraph by the following:

The measured pair-to-pair *AFEXT* values of a wire pair *k* in a disturbed channel from the disturbing channel *l* are normalized by the difference of the insertion losses of disturbing and disturbed channels.

7.1 General

Replace, in ISO/IEC 11801:2002, the existing text by the following:

This clause describes implementations of generic balanced cabling that utilise components and assemblies referenced in Clauses 9, 10 and 13. These reference implementations meet the requirements of Clause 5, and when installed in accordance with ISO/IEC 14763-2 (until ISO/IEC 14763-2 is published, relevant information can be found in ISO/IEC TR 14763-2), comply with the channel performance requirements of Clause 6.

7.2.1 General

Replace, in ISO/IEC 11801:2002, the first paragraph by the following:

Balanced components referenced in Clauses 9 and 10 are defined in terms of impedance and category. In the reference implementations of this clause, the components used in each cabling channel shall have the same nominal impedance in accordance with 9.2.

7.2.2.1 Component choice

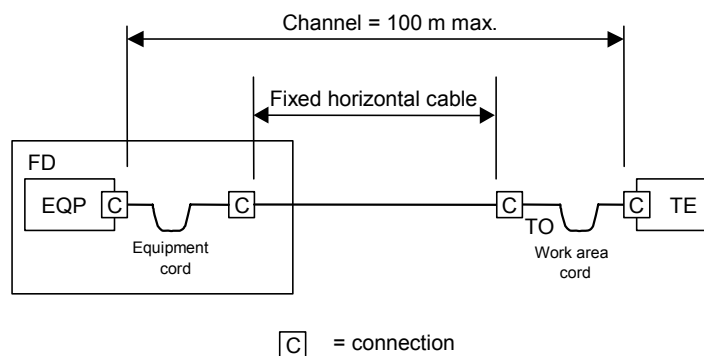
Replace, in Amendment 1 to ISO/IEC 11801:2008, the existing bullet points for Category 6_A and Category 7_A by the following:

- Category 6_A components provide Class E_A balanced cabling performance;
- Category 7_A components provide Class F_A balanced cabling performance;

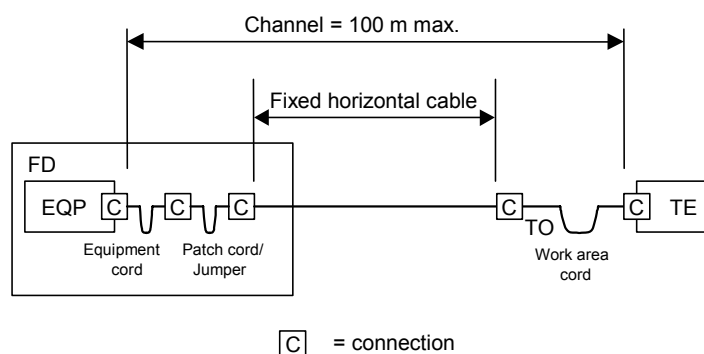
7.2.2.2 Dimensions

Replace, in ISO/IEC 11801:2002, the existing Figure 12 by the following:

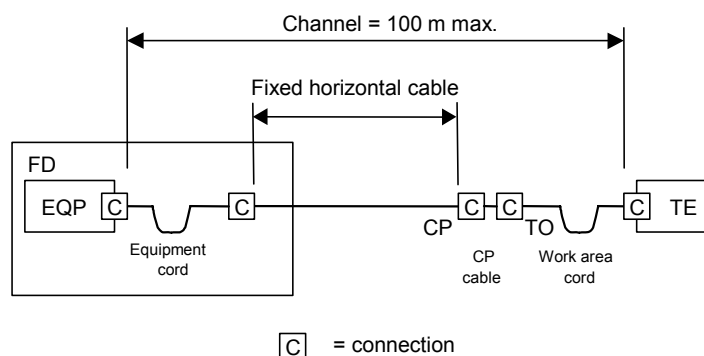
a) Interconnect - TO Model



b) Crossconnect - TO Model



c) Interconnect - CP - TO Model



d) Crossconnect - CP - TO Model

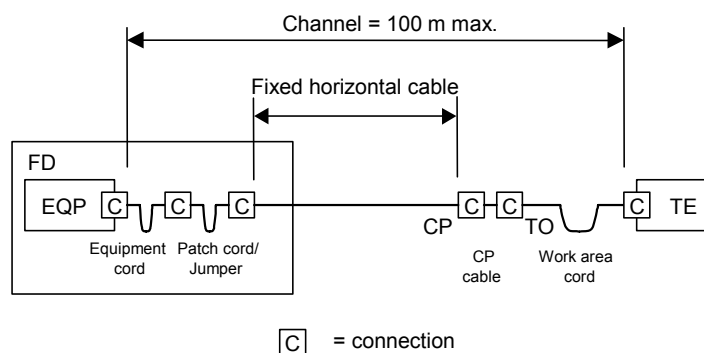


Figure 12 – Horizontal cabling models

7.2.2.2 Dimensions

Replace, in Amendment 1:2008, the existing paragraph before Table 31 by the following:

Table 31 contains the length assumptions of the mathematical model used to validate channel performance using components of Clauses 9, 10 and 13. They do not represent absolute restrictions on the implementation of channels and permanent links, but may be used for guidance in reference implementations.

Table 31¹¹

Replace, in Amendment 1:2008, the table title by the following:

Table 31 – Length assumptions used in the mathematical modelling of balanced horizontal cabling

Add, in Amendment 1:2008, the following text before Table 32:

In addition to the cords, the channels shown in Figure 12c and Figure 12d contain a CP cable. The insertion loss specification for the CP cable may differ from that of both the fixed horizontal cable and the cords. In order to accommodate cables used for work area cords, CP cables, patch cords, jumpers and equipment cords with different insertion loss, the length of the cables used within a channel shall be determined by the equations shown in Table 32.

Replace, in Amendment 1:2008, Table 32 by the following:

(Note that Table 21 in ISO/IEC 11801:2002 has been replaced and renumbered by Amendment 1:2008 as Table 32.)

Table 32 – Horizontal channel length equations

Model	Figure	Implementation equation		
		Class D	Class E and E _A	Class F and F _A
Interconnect - TO	12a	$H = 109 - FX$	$H = 107 - 3^a - FX$	$H = 107 - 2^a - FX$
Cross-connect - TO	12b	$H = 107 - FX$	$H = 106 - 3^a - FX$	$H = 106 - 3^a - FX$
Interconnect - CP - TO	12c	$H = 107 - FX - CY$	$H = 106 - 3^a - FX - CY$	$H = 106 - 3^a - FX - CY$
Cross-connect - CP - TO	12d	$H = 105 - FX - CY$	$H = 105 - 3^a - FX - CY$	$H = 105 - 3^a - FX - CY$
H the maximum length of the fixed horizontal cable (m) F combined length of patch cords/jumpers, equipment and work area cords (m) C the length of the CP cable (m) X the ratio of cord cable insertion loss (dB/m) to fixed horizontal cable insertion loss (dB/m) Y the ratio of CP cable insertion loss (dB/m) to fixed horizontal cable insertion loss (dB/m)				
NOTE For operating temperatures above 20 °C, H should be reduced by 0,2 % per °C for screened cables; 0,4 % per °C (20 °C to 40 °C) and 0,6 % per °C (>40 °C to 60 °C) for unscreened cables.				
^a This length reduction is to provide an allocated margin to accommodate insertion loss deviation.				

Move, in Amendment 1:2008, after Table 32 the following text above the bulleted list:

For the purpose of calculation in Table 32 it is assumed that:

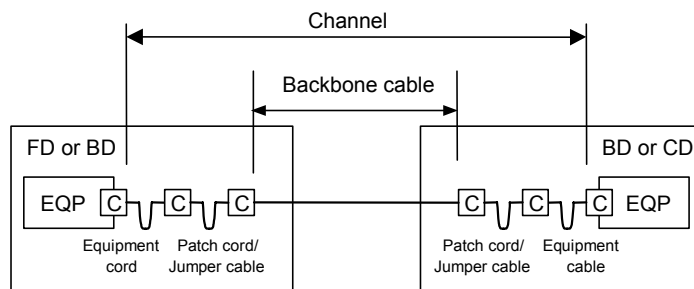
¹¹ Refers to Table 31 as added by Amendment 1 and not Table 31 (renumbered as Table 42 by Amendment 1:2008) in ISO/IEC 11801:2002.

7.2.3.2 Dimensions

Replace, in ISO/IEC 11801:2002, the last sentence of the first paragraph by the following:

This represents the maximum configuration for a Class D, E, E_A, F or F_A backbone channel.

Replace, in ISO/IEC 11801:2002, the existing Figure 13 of by the following:



EQP = equipment; C = connection (mated pair)

Figure 13 – Backbone cabling model

Replace, in ISO/IEC 11801:2002, the introductory sentence of the second paragraph with bullet points by the following:

The following general restrictions apply for Classes D, E, E_A, F and F_A:

Replace, in Amendment 1:2008, Table 33 by the following:

(Note that Table 22 in ISO/IEC 11801:2002 has been replaced and renumbered by Amendment 1:2008 as Table 33.)

Table 33 – Backbone channel length equations

Component Category	Implementation equations ^a							
	Class A	Class B	Class C	Class D	Class E	Class E _A	Class F	Class F _A
5	2 000	$B = 250 - FX$	$B = 170 - FX$	$B = 105 - FX$	–	–	–	–
6	2 000	$B = 260 - FX$	$B = 185 - FX$	$B = 111 - FX$	$B = 105 - 3^b - FX$	–	–	–
6_A	2 000	$B = 260 - FX$	$B = 189 - FX$	$B = 114 - FX$	$B = 108 - 3^b - FX$	$B = 105 - 3^b - FX$	–	–
7	2 000	$B = 260 - FX$	$B = 190 - FX$	$B = 115 - FX$	$B = 109 - 3^b - FX$	$B = 107 - 3^b - FX$	$B = 105 - 3^b - FX$	–
7_A	2 000	$B = 260 - FX$	$B = 192 - FX$	$B = 117 - FX$	$B = 111 - 3^b - FX$	$B = 105 - 3^b - FX$	$B = 105 - 3^b - FX$	$B = 105 - 3^b - FX$
<i>B</i> the maximum length of the backbone cable (m) <i>F</i> combined length of patch cords/jumpers and equipment cords (m) <i>X</i> the ratio of cord cable insertion loss (dB/m) to backbone cable insertion loss (dB/m) NOTE 1 Where channels contain a different number of connections than in the model shown in Figure 13, the fixed cable length is reduced (where more connections exist) or increased (where fewer connections exist) by 2 m per connection for Category 5 cables and 1 m per connection for Category 6, 6_A, 7 and 7_A cables. Additionally, the <i>NEXT</i>, return loss (<i>RL</i>) and <i>ACR-F</i> performance should be verified. NOTE 2 For operating temperatures above 20 °C, <i>B</i> should be reduced by 0,2 % per °C for screened cables; 0,4 % per °C (20 °C to 40 °C) and 0,6 % per °C (>40 °C to 60 °C) for unscreened cables. ^a Applications limited by propagation delay or delay skew may not be supported if channel lengths exceed 100 m. ^b This length reduction is to provide an allocated margin to accommodate insertion loss deviation.								

8.1 General

Replace, in ISO/IEC 11801:2002, the entire text of this subclause by the following:

The selection of an optical fibre cabling channel design for use within a generic cabling system should be made with reference to Annex F. This standard specifies the following classes for optical fibre cabling:

Class OF-300 channels support applications over the cabled optical fibre Categories referenced in Clause 9 to a minimum of 300 m

Class OF-500 channels support applications over the cabled optical fibre Categories referenced in Clause 9 to a minimum of 500 m

Class OF-2 000 channels support applications over the cabled optical fibre Categories referenced in Clause 9 to a minimum of 2 000 m

Optical fibre cabling channels shall be comprised of components that comply with Clauses 9 and 10. These clauses specify physical construction (core/cladding diameter and numerical aperture) and transmission performance. Within the reference implementations of this clause, the cabled optical fibres used in each cabling channel shall be of the same specification.

8.2 Component choice

Replace, in ISO/IEC 11801:2002, the existing first paragraph by the following:

The selection of optical fibre components shall take into account the initial class of applications to be supported, and the required channel lengths, and should take into account any predicted changes to the class of applications to be supported during the expected life of the cabling.

8.3 Channel attenuation

Replace, in ISO/IEC 11801:2002, the existing last sentence of the first paragraph by the following:

The attenuation of channels and permanent links at a specified wavelength shall not exceed the sum of the specified attenuation values for the components at that wavelength (where the attenuation of a length of cabled optical fibre is calculated from its attenuation coefficient multiplied by its length).

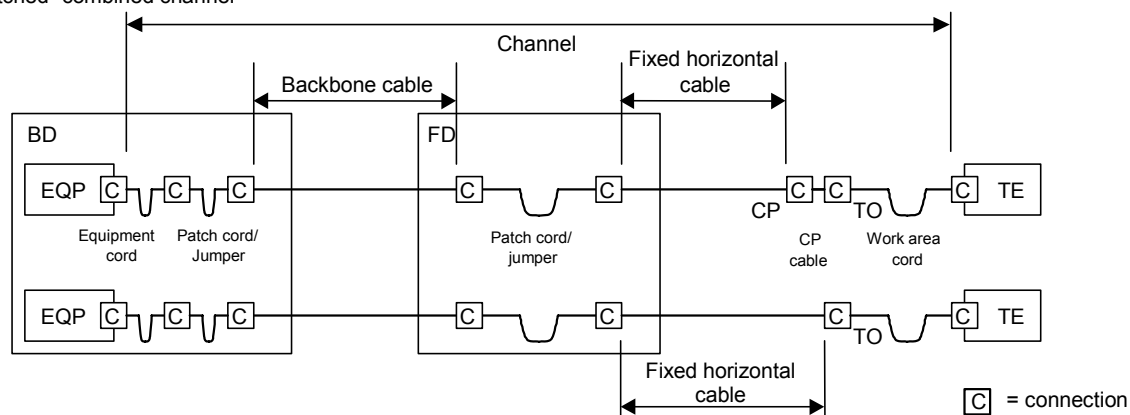
8.4 Channel topology

Replace, in ISO/IEC 11801:2002, the existing first sentence of the second paragraph by the following:

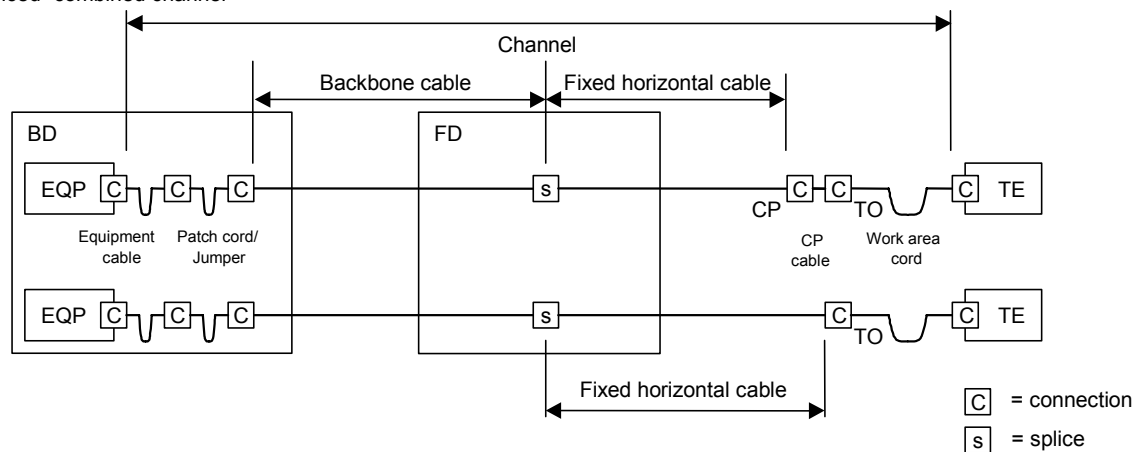
The delivery of cabled optical fibre to the TO would not generally require transmission equipment at the FD (unless the design of optical fibre in the backbone cabling subsystem differs from that in the horizontal cabling subsystem).

Replace, in ISO/IEC 11801:2002, the existing Figure 14 by the following:

a) "Patched" combined channel



b) "Spliced" combined channel



c) "Direct" combined channel

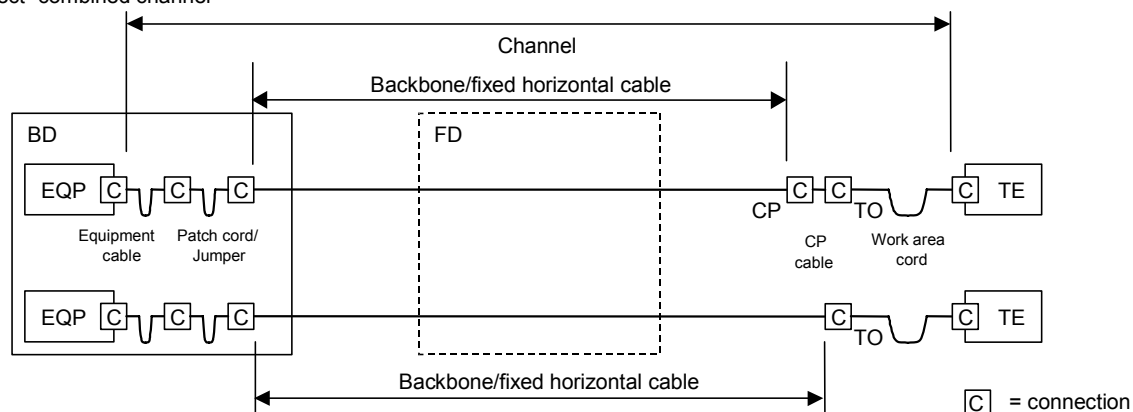


Figure 14 – Combined backbone/horizontal channels

8.5 Propagation delay

Replace, in ISO/IEC 11801:2002, the existing text of this subclause by the following:

For some applications, knowledge of the delay of optical fibre cabling channels is important. This ensures compliance with end-to-end delay requirements of complex networks consisting of multiple cascaded channels. For this reason, it is important to know the lengths of the optical fibre cabling channels. It is possible to calculate propagation delay based on cable performance (see Clause 9).

9.1 General

Replace, in ISO/IEC 11801:2002, the existing first paragraph by the following:

This clause specifies the minimum cable performance requirements for the reference implementations in Clause 7. The requirements in this clause are specified at a temperature of 20 °C. They include:

9.2 Balanced cables

9.2.1 Basic performance requirements

Replace, in ISO/IEC 11801:2002, the existing title of this subclause as follows:

9.2.1 Performance for balanced cables

Replace, in ISO/IEC 11801:2002, Table 24 (renumbered as Table 35 by Amendment 1:2008) by the following new title and Table 35:

Table 35 – Performance for balanced cables

IEC 61156-2, third edition ^a	Sectional specification for multicore and symmetrical pair/quad cables for digital communications – Horizontal wiring
IEC 61156-3, third edition ^a	Sectional specification for multicore and symmetrical pair/quad cables for digital communications – Work area wiring
IEC 61156-4 third edition ^a	Sectional specification for multicore and symmetrical pair/quad cables for digital communications – Riser cables
IEC 61156-5 second edition ^a	Symmetrical pair/quad cables for digital communications with transmission characteristics up to 1 000 MHz – Part 5: Horizontal wiring
IEC 61156-6 third edition ^a	Symmetrical pair/quad cables for digital communications with transmission characteristics up to 1 000 MHz – Part 6: Work area wiring
^a In preparation, see Clause 2.	

9.2.2.3 Mean characteristic impedance

Replace, in ISO/IEC 11801:2002, the title and the text of the entire subclause by the following:

9.2.2.3 Characteristic impedance

Refer to 6.3.10 of IEC 61156-5:2009, measured according to 6.3.10.1.1 of IEC 61156-1:2007, on a standard length of 100 m. The nominal impedance shall be 100 Ω.

Alternative test methodologies that have been shown to correlate with these requirements may also be used.

9.2.2.4 Attenuation

Replace, in ISO/IEC 11801:2002, the first paragraph by the following:

For the attenuation of Category 5 cable the constants specified in 6.3.3.2 of IEC 61156-5:2009 shall be used. They result in a lower attenuation than given in Table 4 of 6.3.3.1 of IEC 61156-5:2009, for example in 21,3 dB/100 m at 100 MHz.

9.2.2.5 ELFEXT and PS ELFEXT

Replace, in ISO/IEC 11801:2002, the title and text of the entire subclause by the following:

9.2.2.5 ACR-F and PS ACR-F

9.2.2.5.1 ACR-F

The *ACR-F* of each pair combination shall meet the requirements derived by the equation in Table 60.

Table 60 – ACR-F for cables

Frequency MHz	Minimum ACR-F ^{a, b} dB				
	Cable category				
	5	6	6 _A	7	7 _A
$1 \leq f \leq 100$	$63,8 - 20 \lg(f)$	–	–	–	–
$1 \leq f \leq 250$	–	$67,8 - 20 \lg(f)$	–	–	–
$1 \leq f \leq 500$	–	–	$67,8 - 20 \lg(f)$	–	–
$1 \leq f \leq 600$	–	–	–	$94,0 - 20 \lg(f)$	–
$1 \leq f \leq 1\,000$	–	–	–	–	$105,3 - 20 \lg(f)$
^a <i>ACR-F</i> at frequencies that correspond to measured <i>FEXT</i> values of greater than 70 dB, are for information only.					
^b <i>ACR-F</i> at frequencies that correspond to calculated values of greater than 75,0 dB shall revert to a minimum requirement of 75,0 dB.					

Table 61 – Informative ACR-F values for cables at key frequencies

Frequency MHz	Minimum ACR-F dB				
	Cable category				
	5	6	6 _A	7	7 _A
1	63,8	67,8	67,8	75,0	75,0
100	23,8	27,8	27,8	54,0	65,3
250	–	19,8	19,8	46,0	57,3
500	–	–	13,8	40,0	51,3
600	–	–	–	38,4	49,7
1 000	–	–	–	–	45,3

9.2.2.5.2 PS ACR-F

The *PS ACR-F* of each pair combination shall meet the requirements derived by the equation in Table 62.

Table 62 – PS ACR-F for cables

Frequency MHz	Minimum PS ACR-F ^{a, b}				
	dB				
	Cable category				
	5	6	6 _A	7	7 _A
$1 \leq f \leq 100$	$60,8 - 20 \lg(f)$	–	–	–	–
$1 \leq f \leq 250$	–	$64,8 - 20 \lg(f)$	–	–	–
$1 \leq f \leq 500$	–	–	$64,8 - 20 \lg(f)$	–	–
$1 \leq f \leq 600$	–	–	–	$91,0 - 20 \lg(f)$	–
$1 \leq f \leq 1\,000$	–	–	–	–	$102,3 - 20 \lg(f)$
^a PS ACR-F at frequencies that correspond to measured PS FEXT values of greater than 67 dB, are for information only.					
^b PS ACR-F at frequencies that correspond to calculated values of greater than 72,0 dB shall revert to a minimum requirement of 72,0 dB.					

Table 63 – Informative PS ACR-F values for cables at key frequencies

Frequency MHz	Minimum PS ACR-F				
	dB				
	Cable category				
	5	6	6 _A	7	7 _A
1	60,8	64,8	64,8	72,0	72,0
100	20,8	24,8	24,8	51,0	62,3
250	–	16,8	16,8	43,0	54,3
500	–	–	10,8	37,0	48,3
600	–	–	–	35,4	46,7
1 000	–	–	–	–	42,3

9.2.2.6 Current carrying capacity

Replace, in ISO/IEC 11801:2002, the entire text of this subclause by the following:

Minimum d.c. current carrying capacity per conductor shall be as indicated in Table 64.

Table 64 – Minimum current carrying capacity

Minimum current A d.c.	Operating temperature t °C
0,300	$t \leq (T_R - 10)$
0,175	$(T_R - 10) < t \leq T_R$
NOTE T_R is the lowest specified operating temperature (maximum) of the cables comprising the cabling subsystem.	

Conformance shall be achieved by design.

Refer to ISO/IEC TR 29125 for additional information on current carrying capacity under different installation conditions.

9.2.2.7 Coupling attenuation

Replace, in ISO/IEC 11801:2002, the entire text of this subclause by the following:

Screened cables shall meet the requirements of Type II as described in IEC 61156-5.

9.2.2.8 Transfer impedance

Replace, in ISO/IEC 11801:2002, the entire text of this subclause by the following:

Screened cables shall meet the grade 2 transfer impedance requirements as described in IEC 61156-5.

Insert, after 9.2.2.8, the following new subclause:

9.2.2.9 Unbalance attenuation, near-end

Unscreened cables shall meet the requirements of level 2 as described in IEC 61156-5.

9.3 Additional crosstalk considerations for cable sharing in balanced cables

9.3.1 General

Replace, in ISO/IEC 11801:2002, the titles of 9.3 and 9.3.1 as follows:

9.3 Additional crosstalk considerations for balanced cables

9.3.1 Cable sharing

Delete the first paragraph of 9.3.1.

9.3.2 Power summation in backbone cables

Replace the last sentence of the first paragraph of by the following:

These cables shall additionally meet the *PS NEXT* requirements for crosstalk in bundled cable, i.e. 3.3.10 of IEC 61156-5:2002¹².

Insert, after subclause 9.3.3, the following new subclause:

9.3.4 Alien crosstalk

Cables used in class E_A and class F_A channels shall meet alien crosstalk requirements for category 6_A and category 7_A cables respectively, as specified in IEC 61156-5 and IEC 61156-6.

¹² IEC 61156-5:2002, *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*

9.4 Optical fibre cables

Replace, in ISO/IEC 11801:2002, the title of this subclause as follows:

9.4 Optical fibre cable (cabled optical fibres)

9.4.1 Optical fibre types

Replace, in ISO/IEC 11801:2002, the title and the entire subclause by the following:

9.4.1 Cabled optical fibre Categories

Six cabled optical fibre Categories are specified to support various classes of applications, four multimode Categories (OM1, OM2, OM3 and OM4) and two single-mode Categories (OS1 and OS2).

Replace, in ISO/IEC 11801:2002, Table 26 (renumbered as Table 37 by Amendment 1:2008) by the following:

Table 37 – Cabled optical fibre attenuation

Cabled optical fibre attenuation (maximum) dB/km							
	OM1, OM2 OM3 and OM4 multimode		OS1 single-mode		OS2 single-mode		
Wavelength	850 nm	1 300 nm	1 310 nm	1 550 nm	1 310 nm	1 383 nm	1 550 nm
Attenuation	3,5	1,5	1,0	1,0	0,4	0,4	0,4

9.4.3 Multimode optical fibre cable

*Replace, in ISO/IEC 11801:2002, the entire text and table of this subclause by the following:
(Note that Table 27 was renumbered as Table 38 by Amendment 1:2008.)*

Requirements of multimode optical fibre cables include compliance to

- a) the cabled optical fibre performance,
- b) the type of fibre,
- c) the physical cable performance.

The cabled optical fibre Category designated as OM1 and OM2 is achieved using a multimode, graded-index optical fibre waveguide with nominal 50/125 µm or 62,5/125 µm core/cladding diameter and numerical aperture complying with A1b or A1a.1 optical fibre, respectively, of IEC 60793-2-10.

The cabled optical fibre Category designated as OM3 and OM4 is achieved using a multimode, graded-index optical fibre waveguide with nominal 50/125 µm core/cladding diameter and numerical aperture complying with A1a.2 and A1a.3 optical fibre respectively of IEC 60793-2-10.

The limits to be met for cabled optical fibre transmission performance are specified in Table 37 and Table 38. Attenuation shall be measured in accordance with IEC 60793-1-40.

The optical fibre cable shall meet mechanical and environmental requirements of the relevant specification of the IEC 60794 series.

Table 38 – Multimode optical fibre modal bandwidth

		Minimum modal bandwidth MHz × km		
		Overfilled launch bandwidth		Effective modal bandwidth
Wavelength		850 nm	1 300 nm	850 nm
Category	Nominal core diameter μm			
OM1	50 or 62,5	200	500	Not specified
OM2	50 or 62,5	500	500	Not specified
OM3	50	1 500	500	2 000
OM4	50	3 500	500	4 700

NOTE Modal bandwidth requirements apply to the optical fibre used to produce the relevant cabled optical fibre category and are assured by the parameters and test methods specified in IEC 60793-2-10. Optical fibres that meet only the overfilled launch modal bandwidth may not support some applications specified in Annex F.

9.4.4 Single-mode optical fibre cables

Replace, in ISO/IEC 11801:2002, the entire text by the following:

Requirements of single-mode optical fibre cables include compliance to

- a) the cabled optical fibre performance,
- b) the type of fibre,
- c) the physical cable performance.

The cabled optical fibre category designated as OS1 is achieved using a single-mode, fibre complying with B1.1, B1.3 or B6_a, respectively, of IEC 60793-2-50.

The cabled optical fibre category designated as OS2 is achieved using a single-mode, fibre complying with B1.1, B1.3 or B6_a, respectively, of IEC 60793-2-50.

NOTE 1 If concatenating different OSx cabled optical fibres manufactured with different optical fibre types, refer to IEC/TR 62000:2010¹³ for additional guidance.

The requirements for cabled optical fibre transmission performance are specified:

- a) for the attenuation in Table 37 when measured in accordance with IEC 60793-1-40;
- b) for the cut-off wavelength being less than 1 260 nm when measured in accordance with IEC 60793-1-44.

The optical fibre cable shall meet mechanical and environmental requirements of the relevant specification of the IEC 60794 series.

NOTE 2 Channels with a specified attenuation at 1 383 nm can only be created using B1.3 or B6_a optical fibres.

NOTE 3 B1.1 optical fibre is not recommended where channels may contain both category OS1 and OS2 cabled optical fibre.

NOTE 4 B6_a optical fibre is recommended when it is expected that the optical fibre or the cable will have to support smaller bend radii than 25 mm.

¹³ The second edition is planned to be published in 2010.

10.1.1 Applicability

Replace, in ISO/IEC 11801:2002, the last sentence of the first paragraph by the following:

The requirements of the detail specifications for free connectors and fixed connectors referenced in this clause shall also be met.

10.1.6 Installation practices

Replace, in ISO/IEC 11801:2002, the existing third paragraph by the following:

The connecting hardware shall be identified according to the requirements of ISO/IEC 14763-2 (until ISO/IEC 14763-2 is published, relevant information can be found in ISO/IEC TR 14763-1). Planning and installation of connecting hardware should be carried out in accordance with ISO/IEC 14763-2 (until ISO/IEC 14763-2 is published, relevant information can be found in ISO/IEC TR 14763-2).

10.2.1 General requirements

Replace, in ISO/IEC 11801:2002, the entire text by the following:

The following requirements apply to all connecting hardware used to provide electrical connections with balanced cables that comply with the requirements of Clause 9. It is desirable that hardware used to directly terminate balanced cable elements be of the insulation piercing connection (IPC) type or the insulation displacement connection (IDC) type. In addition to these requirements, connecting hardware used with screened cabling shall be in full compliance with Clause 11.

The requirements of 10.2.3 and 10.2.4 are based upon the categories of connecting hardware specified in the reference implementations of Clause 7. For channel, permanent link, and CP link design routes to conformance, as specified in Clause 4, other connecting hardware can be used at places other than the TO.

10.2.3 Mechanical characteristics

Replace, in ISO/IEC 11801:2002, Table 28 (renumbered as Table 39 by Amendment 1:2008) by the following:

Table 39 – Mechanical characteristics of connecting hardware for use with balanced cabling

Mechanical characteristics			Requirement	Component or test standard
a)	Physical dimensions (TO only)	Category 5 unscreened	Mating dimensions and gauging	IEC 60603-7-2
		Category 5 screened	Mating dimensions and gauging	IEC 60603-7-3
		Category 6 unscreened	Mating dimensions and gauging	IEC 60603-7-4
		Category 6 screened	Mating dimensions and gauging	IEC 60603-7-5
		Category 6 _A unscreened	Mating dimensions and gauging	IEC 60603-7-41
		Category 6 _A screened	Mating dimensions and gauging	IEC 60603-7-51
		Category 7 screened	Mating dimensions and gauging	IEC 60603-7-7 ^h
	Category 7 _A screened	Mating dimensions and gauging	IEC 60603-7-71 ^{h, i}	
b)	Cable termination compatibility			
	Nominal conductor diameter – mm		0,5 to 0,65 ^a	–
	Cable type	Patching ^d	Stranded or solid conductors	–
		Jumpers	Stranded or solid conductors	–
		Other	Solid conductors	–
	Nominal diameter of insulated conductor mm	Categories 5 and 6	0,7 to 1,4 ^{b, c}	–
		Categories 6 _A , 7, and 7 _A	0,7 to 1,6 ^{b, c}	
	Number of conductors	Telecommunications outlet	8	Visual inspection
		Other	≥2 × n (n = 1, 2, 3, ...)	
	Cable outer diameter mm	Outlet	≤20	–
Free connector (plug)		≤9 ^e		
Means to connect screen ^f		Mechanical and environmental performance	Annex C and Clause 11	
c)	Mechanical operation (durability)			
	Cable termination (cycles)	Non-reusable IDC	1	IEC 60352-3 or IEC 60352-4
		Reusable IDC	≥20	IEC 60352-3 or IEC 60352-4
		Non-reusable IPC	1	IEC 60352-6
	Jumper termination (cycles)		≥200 ^g	IEC 60352-3 or IEC 60352-4
	TO-type interface (cycles)		≥750	IEC 60603-7 (unscreened) or IEC 60603-7-1 (screened)
Other connections		≥200	Annex C	
^a It is not required that connecting hardware be compatible with cables outside of this range. However, when cables with conductor diameters as low as 0,4 mm or as high as 0,8 mm are used, special care shall be taken to ensure compatibility with connecting hardware to which they connect.				
^b Use of the free connector (plug) specified in series IEC 60603-7 is typically limited to cables having insulated conductor diameters in the range of 0,8 mm to 1,0 mm.				
^c It is not required that connecting hardware be compatible with cables outside of this range. However, when cables with insulated conductor diameters as high as 1,6 mm are used, special care shall be taken to ensure compatibility with connecting hardware to which they connect.				
^d Free connectors (plugs) shall be compatible with the solid or stranded cable selected for work area or equipment cords.				
^e Applicable only to individual cable units.				
^f If it is intended to use screened cabling, care should be taken that the connector is designed to terminate the screen. There may be a difference between connectors designed to terminate balanced cables with overall screens only, as opposed to cables having both individually screened elements and an overall screen (see ANNEX E).				
^g This durability requirement is only applicable to connections designed to administer cabling system changes (i.e., at a distributor).				
^h In installations where other factors, such as BCT applications (see ISO/IEC 15018), take preference over the backward compatibility offered with IEC 60603-7-7 and IEC 60603-7-71, the interface specified in IEC 61076-3-104 may be used.				
ⁱ If backwards compatibility is not required, the free connector (plug) specified in IEC 61076-3-110 may be used.				

10.2.4.1 General

Replace, in ISO/IEC 11801:2002, the first paragraph by the following:

Connecting hardware intended for use with balanced cabling shall meet the following performance requirements. Connecting hardware shall be tested with terminations and test

leads that match the nominal characteristic impedance of the types of cable that they are intended to terminate (see 9.2).

10.2.4.2 Telecommunications outlets

Replace, in ISO/IEC 11801:2002, Table 29 (renumbered as Table 40 by Amendment 1:2008) by the following:

Table 40 – Electrical characteristics of TOs intended for use with balanced cabling

Electrical characteristics of the telecommunications outlet		Requirement	Component or test standard
Interface type	Frequency range MHz		
Category 5 unscreened	d.c., 1 to 100	All	IEC 60603-7-2
Category 5 screened	d.c., 1 to 100	All	IEC 60603-7-3
Category 6 unscreened	d.c., 1 to 250	All	IEC 60603-7-4
Category 6 screened	d.c., 1 to 250	All	IEC 60603-7-5
Category 6 _A unscreened	d.c., 1 to 500	All	IEC 60603-7-41
Category 6 _A screened	d.c., 1 to 500	All	IEC 60603-7-51
Category 7 screened	d.c., 1 to 600	All	IEC 60603-7-7 ^a
Category 7 _A screened	d.c., 1 to 1 000	All	IEC 60603-7-71 ^a

^a In installations where other factors, such as BCT applications (see ISO/IEC 15018), take preference over the backward compatibility offered with IEC 60603-7-7, the interface specified in IEC 61076-3-104 may also be used.

10.2.4.3 Connecting hardware for use in distributors and consolidation points

Replace, in ISO/IEC 11801:2002, the first paragraph by the following:

Connecting hardware for use in distributors and consolidation points of a given category shall meet the corresponding performance requirements specified in the following tables irrespective of the mating interface used. All two-piece connections that are not covered by 10.2.4.2 shall comply with the mechanical and environmental performance requirements specified in Annex C for unscreened and screened connectors. All electrical requirements shall be met before and after mechanical and environmental performance testing, as prescribed in Annex C.

*Add, in ISO/IEC 11801:2002, the following new paragraph, after the first paragraph:
(Note that Tables 32 and 33 were renumbered as Tables 43 and 44 by Amendment 1:2008.)*

If the CP link portion of a Class F_A 3 connector permanent link (PL3 in Figure A.1) uses cable in accordance with IEC 61156-5, the connecting hardware at the CP requires NEXT and PSNEXT performance that is 6 dB better than the Category 7_A requirements specified in Table 43 and Table 44.

Replace, in ISO/IEC 11801:2002, Table 30 (renumbered as Table 41 by Amendment 1:2008) by the following:

Table 41 – Return loss for connector

Frequency MHz	Minimum return loss ^a dB					Test standard
	Connector category					
	5	6	6 _A	7	7 _A	
1 ≤ f ≤ 100	60 – 20 lg(f)	–	–	–	–	IEC 60512-25-5
1 ≤ f ≤ 250	–	64 – 20 lg(f)	–	–	–	
1 ≤ f ≤ 500	–	–	68 – 20 lg(f)	–	–	
1 ≤ f ≤ 600	–	–	–	68 – 20 lg(f)	–	
1 ≤ f ≤ 1 000	–	–	–	–	68 – 20 lg(f) ^b	
^a Return loss at frequencies that correspond to calculated values of greater than 30,0 dB shall revert to a minimum requirement of 30,0 dB.						
^b Calculated values below 10,0 dB revert to a 10,0 dB plateau.						

Insert, in ISO/IEC 11801:2002, between Tables 30 and 31 (renumbered as Tables 41 and 42, by Amendment 1:2008) the following new Table 65:

Table 65 – Informative return loss values for connector at key frequencies

Frequency MHz	Minimum return loss dB				
	Connector category				
	5	6	6 _A	7	7 _A
1	30,0	30,0	30,0	30,0	30,0
100	20,0	24,0	28,0	28,0	28,0
250	–	16,0	20,0	20,0	20,0
500	–	–	14,0	14,0	14,0
600	–	–	–	12,4	12,4
1 000	–	–	–	–	10,0

Replace, in ISO/IEC 11801:2002, Table 31 (renumbered as Table 42 by Amendment 1:2008) by the following:

Table 42 – Insertion loss for connector

Frequency MHz	Maximum insertion loss ^a dB					Test standard
	Connector category					
	5	6	6 _A	7	7 _A	
1 ≤ f ≤ 100	0,04√f	–	–	–	–	IEC 60512-25-2
1 ≤ f ≤ 250	–	0,02√f	–	–	–	
1 ≤ f ≤ 500	–	–	0,02√f	–	–	
1 ≤ f ≤ 600	–	–	–	0,02√f	–	
1 ≤ f ≤ 1 000	–	–	–	–	0,02√f	
^a Insertion loss at frequencies that correspond to calculated values of less than 0,1 dB shall revert to a requirement of 0,1 dB maximum.						

Insert, in ISO/IEC 11801:2002, between Tables 31 and 32 (renumbered as Tables 42 and 43 by Amendment 1:2008) the following new Table 66:

Table 66 – Informative insertion loss values for connector at key frequencies

Frequency MHz	Maximum insertion loss dB				
	Connector category				
	5	6	6 _A	7	7 _A
1	0,10	0,10	0,10	0,10	0,10
100	0,40	0,20	0,20	0,20	0,20
250	–	0,32	0,32	0,32	0,32
500	–	–	0,45	0,45	0,45
600	–	–	–	0,49	0,49
1 000	–	–	–	–	0,63

Replace, in ISO/IEC 11801:2002, Table 32 (renumbered as Table 43 by Amendment 1:2008) by the following:

Table 43 – Near end crosstalk (NEXT) for connector

Frequency MHz	Minimum NEXT ^a dB					Test standard
	Connector category					
	5	6	6 _A	7	7 _A	
1 ≤ f ≤ 100	83 – 20 lg(f)	–	–	–	–	IEC 60512-25-1
1 ≤ f ≤ 250	–	94 – 20 lg(f)	94 – 20 lg(f)	–	–	
250 < f ≤ 500	–	–	46,04 – 30 lg(f/250)	–	–	
1 ≤ f ≤ 600	–	–	–	102,4 – 15 lg(f)	116,3 – 20 lg(f)	
600 < f ≤ 1 000	–	–	–	–	60,73 – 40 lg(f /600)	
^a NEXT at frequencies that correspond to calculated values of greater than 75,0 dB shall revert to a minimum requirement of 75,0 dB.						

Insert, in ISO/IEC 11801:2002, between Tables 32 and 33 (renumbered as Tables 43 and 44 by Amendment 1:2008) the following new Table 67:

Table 67 – Informative NEXT values for connector at key frequencies

Frequency MHz	Minimum NEXT dB				
	Connector category				
	5	6	6 _A	7	7 _A
1	75,0	75,0	75,0	75,0	75,0
100	43,0	54,0	54,0	72,4	75,0
250	–	46,0	46,0	66,4	68,3
500	–	–	37,0	61,9	62,3
600	–	–	–	60,7	60,7
1 000	–	–	–	–	51,9

Replace, in ISO/IEC 11801:2002, Table 33 (renumbered as Table 44 by Amendment 1:2008) by the following:

**Table 44 – Power sum near end crosstalk (PS NEXT) for connector
(for information only)**

Frequency MHz	Minimum PS NEXT ^a dB					Test standard
	Connector category					
	5	6	6 _A	7	7 _A	
1 ≤ f ≤ 100	80 – 20 lg(f)	–	–	–	–	IEC 60512-25-1
1 ≤ f ≤ 250	–	90 – 20 lg(f)	90 – 20 lg(f)	–	–	
250 < f ≤ 500	–	–	42,04 – 30 lg(f/250)	–	–	
1 ≤ f ≤ 600	–	–	–	99,4 – 15 lg(f)	113,3 – 20 lg(f)	
600 < f ≤ 1 000	–	–	–	–	57,73 – 40 lg(f/600)	
^a PS NEXT at frequencies that correspond to calculated values of greater than 72,0 dB shall revert to a minimum requirement of 72,0 dB.						

Insert, in ISO/IEC 11801:2002, between Tables 33 and 34 (renumbered as Tables 44 and 45 by Amendment 1:2008) the following new Table 68.

Table 68 – Informative PS NEXT values for connector at key frequencies

Frequency MHz	Minimum PS NEXT dB				
	Connector category				
	5	6	6 _A	7	7 _A
1	72,0	72,0	72,0	72,0	72,0
100	40,0	50,0	50,0	69,4	72,0
250	–	42,0	42,0	63,4	65,3
500	–	–	33,0	58,9	59,3
600	–	–	–	57,7	57,7
1 000	–	–	–	–	48,9