

INTERNATIONAL STANDARD

AMENDMENT 2

Information technology – Generic cabling for customer premises

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ISO/IEC 11801-2002/AMD2:2010

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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.

The contents of the corrigendum of November 2010 have been included in this copy.

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 60603-7-2:2010, *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 60603-7-3:2010, *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 60603-7-4:2010, *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*

IEC 60603-7-5:2010, *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*

IEC 60603-7-41:2010, *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 60603-7-51:2010, *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 61156-2:2010, *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 61156-6:2010, *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*

ISO/IEC 14763-1, *Information technology – Implementation and operation of customer premises cabling – Part 1: Administration*

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.¹

3.1.85

equipment interface

location where a connection between equipment and the cabling system occurs

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:

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

EI	Equipment interface
TI	Test interface

4 Conformance²

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.

5.5 Accommodation of functional elements

Replace, in ISO/IEC 11801:2002, the second sentence of the second paragraph beginning with "Guidance for ..." by the following:

Requirements for the accommodation of distributors are given in ISO/IEC 14763-2 (first edition). Until ISO/IEC 14763-2 is published, relevant information can be found in ISO/IEC TR 14763-2.

Replace, in ISO/IEC 11801:2002, the second sentence of the third paragraph beginning with "Requirements for ..." by the following:

Requirements for pathways and cable management systems are provided in ISO/IEC 14763-2 (first edition). Until ISO/IEC 14763-2 is published, relevant information can be found in ISO/IEC 18010.

5.6.1 Equipment interfaces and test interfaces

Replace, in ISO/IEC 11801:2002, the existing Figure 7 by the following new Figure 7:

² The entire Clause 4 of ISO/IEC 11801:2002, has been replaced by Amendment 1:2008.

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.

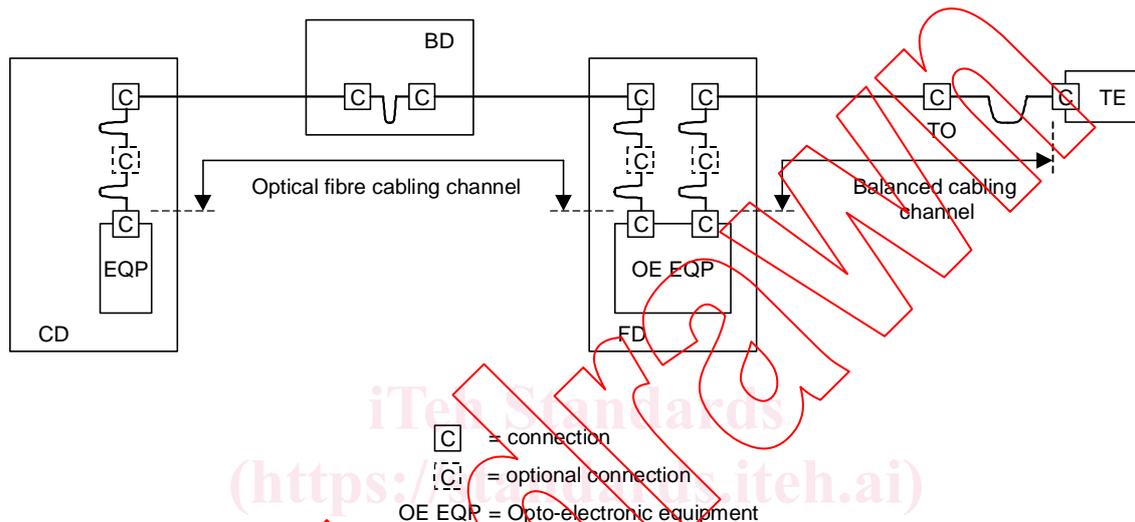


Figure 11 – Example of a system showing the location of cabling interfaces and extent of associated channels

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 in accordance with Table 84. This shall be achieved by an appropriate design.

Table 84 – Current carrying capacity for channel

Minimum current carrying capacity A d.c.	Operating temperature (<i>t</i>) °C
0,300	$t \leq (T_R - 10)$
0,175	$(T_R - 10) < t \leq T_R$
Where T_R is the lowest maximum operating temperature specified for the components comprising the cabling subsystem.	

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.

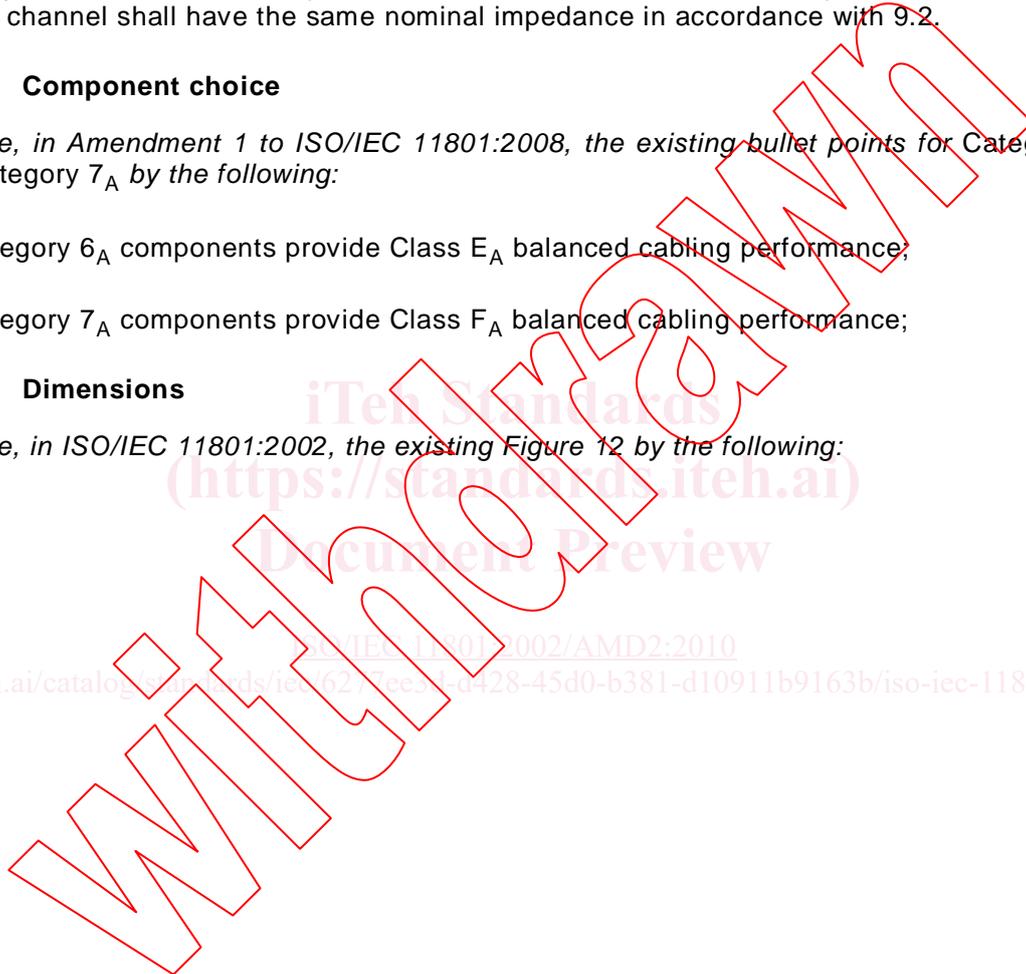
7.2.2.1 Component choice

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:

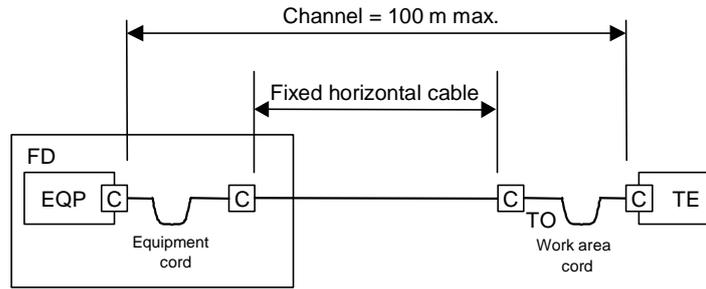


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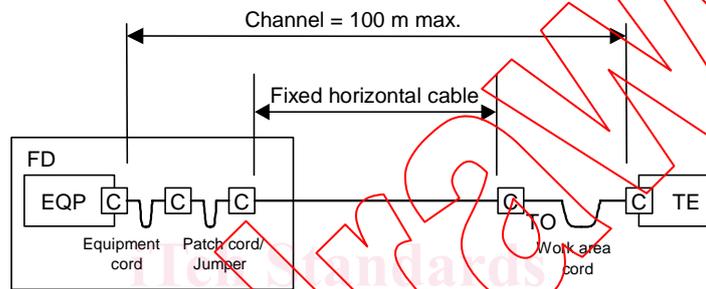
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a) Interconnect - TO Model



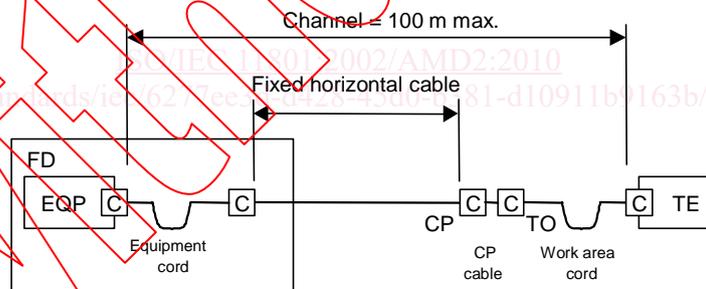
C = connection

b) Crossconnect - TO Model



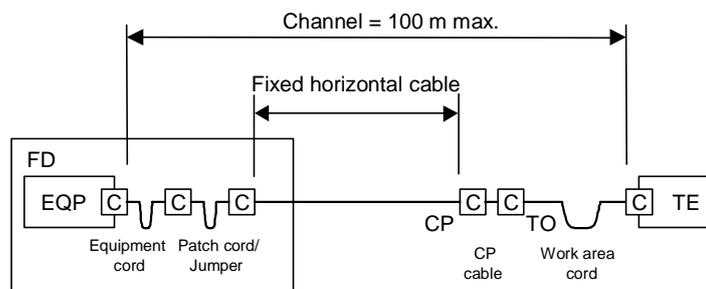
C = connection

c) Interconnect - CP - TO Model



C = connection

d) Crossconnect - CP - TO Model



C = connection

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 31³

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	$H = 108 - FX$	$H = 107 - 3^a - FX$	$H = 107 - 2^a - FX$
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	$H = 105 - FX - CY$	$H = 105 - 3^a - FX - CY$	$H = 105 - 3^a - FX - CY$
<p><i>H</i> the maximum length of the fixed horizontal cable (m) <i>F</i> combined length of patch cords/jumpers, equipment and work area cords (m) <i>C</i> the length of the CP cable (m) <i>X</i> the ratio of cord cable insertion loss (dB/m) to fixed horizontal cable insertion loss (dB/m) <i>Y</i> the ratio of CP cable insertion loss (dB/m) to fixed horizontal cable insertion loss (dB/m)</p>				
<p>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.</p>				
<p>^a This length reduction is to provide an allocated margin to accommodate insertion loss deviation.</p>				

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:

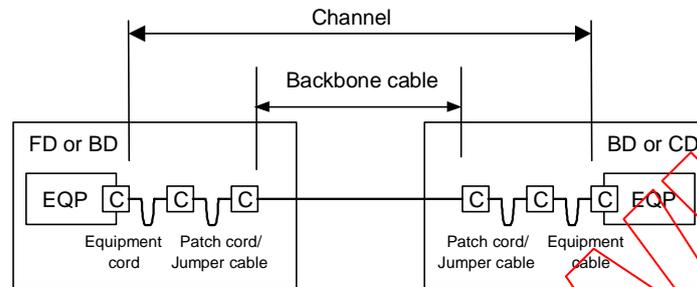
³ Refers to Table 31 as added by Amendment 1 and not Table 31 (renumbered as Table 42 by Amendment 1:2008) in ISO/IEC 11801:2002.

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.)

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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	$B = 260 - FX$	$B = 192 - FX$	$B = 117 - FX$	$B = 111 - 3^b - FX$	$B = 110 - 3^b - FX$	$B = 105 - 3^b - FX$	$B = 110 - 3^b - FX$
<p><i>B</i> the maximum length of the backbone cable (m)</p> <p><i>F</i> combined length of patch cords/jumpers and equipment cords (m)</p> <p><i>X</i> the ratio of cord cable insertion loss (dB/m) to backbone cable insertion loss (dB/m)</p> <p>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 NEXT, return loss (RL) and ACR-F performance should be verified.</p> <p>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.</p> <p>^a Applications limited by propagation delay or delay skew may not be supported if channel lengths exceed 100 m.</p> <p>^b This length reduction is to provide an allocated margin to accommodate insertion loss deviation.</p>								

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.