

INTERNATIONAL STANDARD

Information technology – Generic cabling systems for data centres

(<https://standards.iteh.ai>)
Document Preview

ISO/IEC 24764:2010

<https://standards.iteh.ai/catalog/standards/iec/40616ff9-af0a-48ed-beab-015d0f6bf57c/iso-iec-24764-2010>

Withhold



THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2010 ISO/IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about ISO/IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

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

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub

The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, withdrawn and replaced publications

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Electropedia: www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

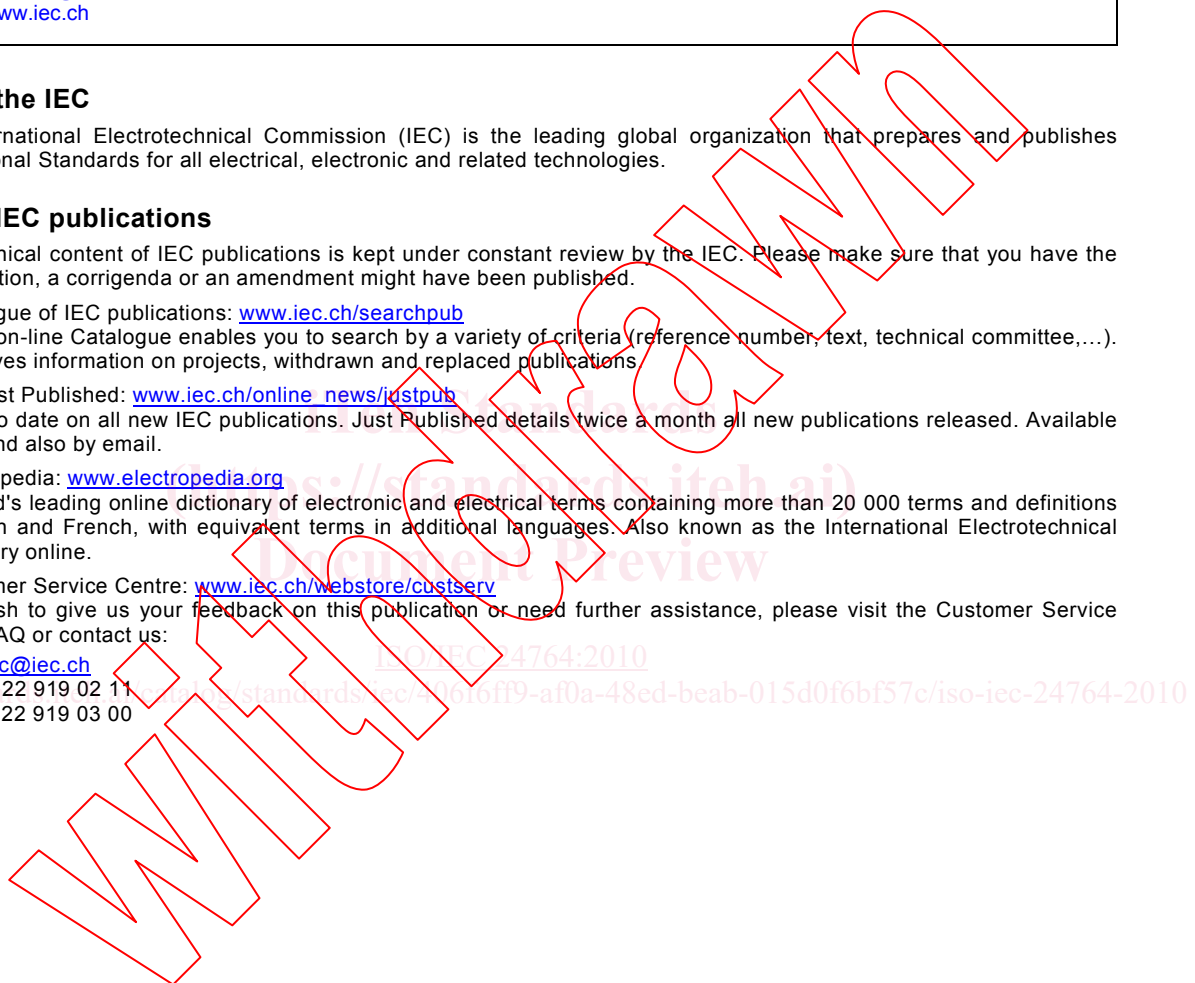
- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch

Tel.: +41 22 919 02 11

Fax: +41 22 919 03 00



<https://standards.iteh.ai/document/preview/ISO/IEC/4764:2010>
<https://standards.iec/406161f9-af0a-48ed-beab-015d0f6bf57c/iso-iec-24764-2010>

INTERNATIONAL STANDARD

Information technology – Generic cabling systems for data centres

(<https://standards.iteh.ai>)

Document Preview

ISO/IEC 24764:2010

<https://standards.iteh.ai/catalog/standards/iec/40616ff9-af0a-48ed-beab-015d0f6bf57c/iso-iec-24764-2010>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE

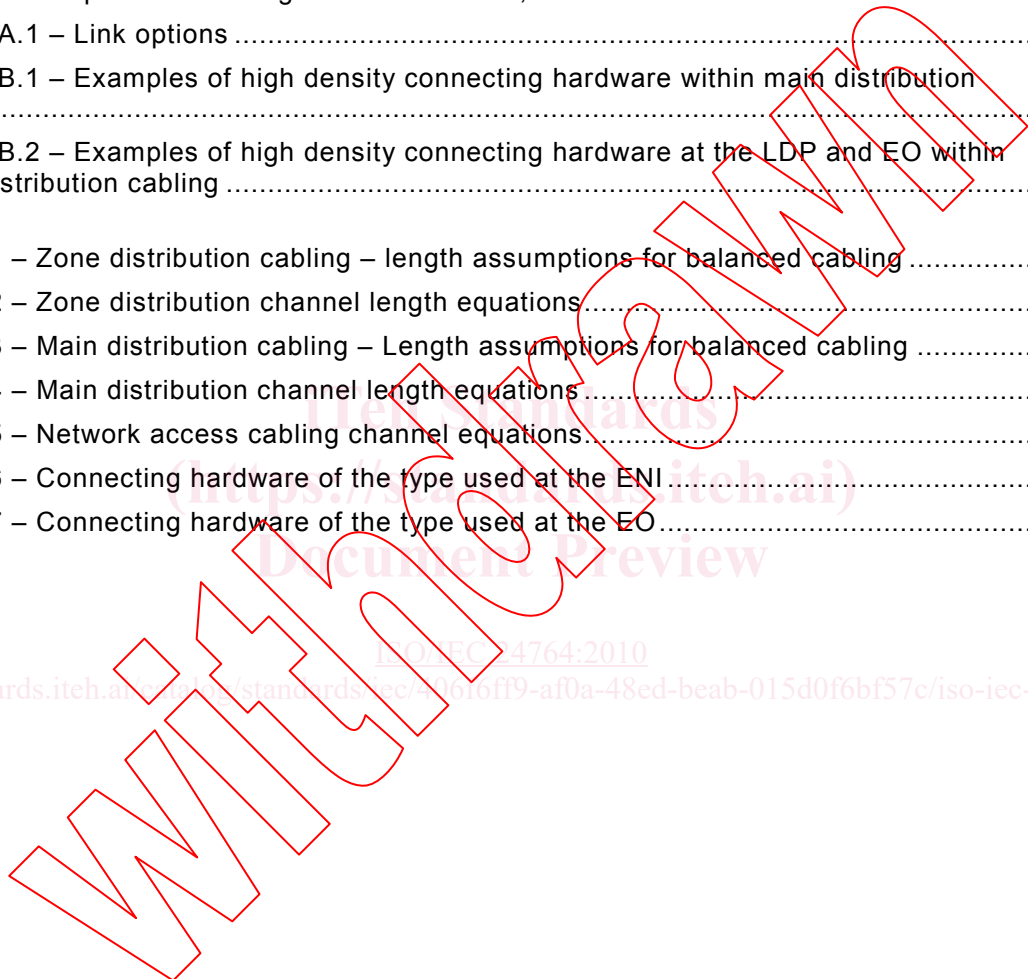
R

CONTENTS

FOREWORD.....	5
INTRODUCTION.....	6
1 Scope.....	8
2 Normative references.....	8
3 Terms and definitions and abbreviations.....	10
3.1 Terms and definitions.....	10
3.2 Abbreviations.....	11
4 Conformance.....	11
5 Structure of the generic cabling system.....	12
5.1 General.....	12
5.2 Functional elements.....	12
5.3 General structure and hierarchy.....	13
5.4 Cabling subsystems.....	14
5.4.1 General.....	14
5.4.2 Network access cabling subsystem.....	14
5.4.3 Main distribution cabling subsystem.....	14
5.4.4 Zone distribution cabling subsystem.....	15
5.4.5 Design objectives.....	15
5.5 Accommodation of functional elements.....	15
5.6 Interfaces.....	16
5.6.1 Equipment interfaces and test interfaces.....	16
5.6.2 Channels and links.....	16
5.7 Dimensioning and configuring.....	18
5.7.1 Distributors.....	18
5.7.2 Redundancy.....	18
5.7.3 External network interface.....	19
5.7.4 Cables.....	20
5.7.5 Equipment cords.....	20
5.7.6 Patch cords and jumpers.....	20
5.7.7 Equipment outlets.....	20
5.7.8 LDP.....	20
5.7.9 Building entrance facilities.....	21
5.8 Earthing and equipotential bonding.....	21
6 Channel performance.....	21
6.1 General.....	21
6.2 Transmission performance.....	22
6.2.1 General.....	22
6.2.2 Balanced cabling.....	22
6.2.3 Optical fibre cabling.....	22
7 Reference implementations.....	22
7.1 General.....	22
7.2 Balanced cabling.....	23
7.2.1 Assumptions.....	23
7.2.2 Zone distribution cabling.....	23
7.2.3 Main distribution cabling.....	26
7.2.4 Network access cabling.....	28

7.3	Optical fibre cabling	30
7.3.1	Assumptions	30
7.3.2	Component choice	30
7.3.3	Optical fibre cabling channel lengths	30
8	Cable requirements	31
8.1	General	31
8.2	Balanced cables	31
8.3	Optical fibre cables	31
9	Connecting hardware requirements	31
9.1	General requirements	31
9.1.1	Overview	31
9.1.2	Applicability	31
9.1.3	Location	31
9.1.4	Design	31
9.1.5	Operating environment	31
9.1.6	Mounting	31
9.1.7	Installation practices	32
9.1.8	Marking and colour coding	32
9.2	Connecting hardware for balanced cabling	32
9.2.1	General requirements	32
9.2.2	Performance marking	32
9.2.3	Mechanical characteristics	32
9.3	Connecting hardware for optical fibre cabling	35
9.3.1	General requirements	35
9.3.2	ENI requirements	35
9.3.3	EO requirements	35
9.3.4	Optical fibre assignments at the EO	35
9.3.5	Other connecting hardware	36
10	Requirements for cords and jumpers	37
10.1	Jumpers	37
10.2	Balanced cords	37
10.3	Optical fibre cords	37
Annex A	(normative) Link performance limits	38
A.1	General	38
A.2	Balanced cabling	39
A.3	Optical fibre cabling	40
Annex B	(informative) Usage of high density connecting hardware within optical fibre cabling	41
B.1	General	41
B.2	Structure of cabling subsystems	41
Bibliography	44
Figure 1	– Relationship between generic cabling standards	7
Figure 2	– Structure of generic cabling within a data centre	13
Figure 3	– Hierarchical structure of generic cabling within a data centre	14
Figure 4	– Example of accommodation of functional elements	15
Figure 5	– Test and equipment interfaces	17

Figure 6 – Connection of functional elements providing redundancy	19
Figure 7 – Examples of external service cabling connections to the ENI	20
Figure 8 – Example of a channel with 4 connections	21
Figure 9 – Example of a system showing the location of cabling interfaces	22
Figure 10 – Zone distribution cabling models	24
Figure 11 – Main distribution cabling models	27
Figure 12 – Network access cabling models.....	29
Figure 13 – Pin grouping and pair assignments at the EO.....	34
Figure 14 – Optical fibre assignments at the EO, front view of fixed connector.....	36
Figure A.1 – Link options	39
Figure B.1 – Examples of high density connecting hardware within main distribution cabling.....	42
Figure B.2 – Examples of high density connecting hardware at the LDP and EO within zone distribution cabling	43
Table 1 – Zone distribution cabling – length assumptions for balanced cabling	25
Table 2 – Zone distribution channel length equations.....	26
Table 3 – Main distribution cabling – Length assumptions for balanced cabling	27
Table 4 – Main distribution channel length equations.....	28
Table 5 – Network access cabling channel equations.....	30
Table 6 – Connecting hardware of the type used at the ENI	32
Table 7 – Connecting hardware of the type used at the EO.....	33



INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INFORMATION TECHNOLOGY –
GENERIC CABLING SYSTEMS FOR DATA CENTRES**

FOREWORD

- 1) ISO (International Organization for Standardization) and IEC (International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards. Their preparation is entrusted to technical committees; any ISO and IEC member body interested in the subject dealt with may participate in this preparatory work. International governmental and non-governmental organizations liaising with ISO and IEC also participate in this preparation.
- 2) In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.
- 3) The formal decisions or agreements of IEC and ISO on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC and ISO member bodies.
- 4) IEC, ISO and ISO/IEC publications have the form of recommendations for international use and are accepted by IEC and ISO member bodies in that sense. While all reasonable efforts are made to ensure that the technical content of IEC, ISO and ISO/IEC publications is accurate, IEC or ISO cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 5) In order to promote international uniformity, IEC and ISO member bodies undertake to apply IEC, ISO and ISO/IEC publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any ISO/IEC publication and the corresponding national or regional publication should be clearly indicated in the latter.
- 6) ISO and IEC provide no marking procedure to indicate their approval and cannot be rendered responsible for any equipment declared to be in conformity with an ISO/IEC Publication.
- 7) All users should ensure that they have the latest edition of this publication.
- 8) No liability shall attach to IEC or ISO or its directors, employees, servants or agents including individual experts and members of their technical committees and IEC or ISO member bodies for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication of, use of, or reliance upon, this ISO/IEC publication or any other IEC, ISO or ISO/IEC publications.
- 9) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 10) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 24764 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

ISO/IEC 24764 is to be read in conjunction with International Standard ISO/IEC 11801:2002, its Amendment 1 (2008) and Amendment 2 (2010).

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.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

INTRODUCTION

Within premises, the importance of the information technology cabling infrastructure is similar to that of other fundamental building utilities such as heating, lighting and mains power. As with other utilities, interruptions to service can have serious impact. Poor quality of service due to lack of design foresight, use of inappropriate components, incorrect installation, poor administration or inadequate support can threaten an organisation's effectiveness.

Cabling within data centres comprises both application-specific and multipurpose networks that are mission-critical. Generic cabling designs in accordance with ISO/IEC 11801 have supported the development of high data rate applications based upon a defined cabling model. This International standard recognizes the benefit of generic cabling to provision multiple services and to connect large quantities of equipment within the limited space of data centre premises, and is to be used in conjunction with ISO/IEC 11801.

This International Standard provides:

- a) data centre users with an application independent generic cabling system capable of supporting a wide range of applications;
- b) data centre users with a flexible cabling scheme such that modifications are both easy and economical;
- c) data centre professionals (for example, data centre architects) with guidance allowing the accommodation of cabling before specific requirements are known; that is, in the initial planning either for construction or refurbishment;
- d) industry and applications standardization bodies with a cabling system which supports current products and provides a basis for future product development.

This International Standard specifies multi-vendor cabling, and is related to:

- the associated standard covering general requirements for generic cabling within premises (ISO/IEC 11801);
- standards for cabling components developed by technical committees of the IEC;
- standards for the quality assurance, installation and administration of information technology cabling (ISO/IEC 14763-2¹) and testing of installed cabling (IEC 61935-1 and ISO/IEC 14763-3);
- applications developed by the technical committees of IEC, subcommittees of ISO/IEC JTC 1 and study groups of ITU-T².

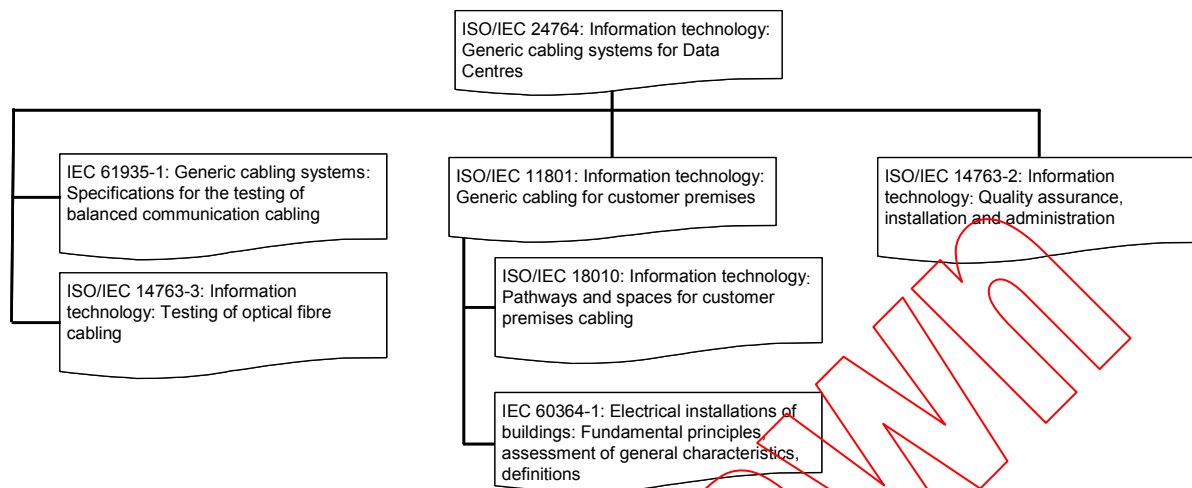
It is anticipated that the generic cabling system meeting the requirements of this International Standard will have a life expectancy of up to ten years.

This International Standard has taken into account requirements specified in application standards listed in Annex F of ISO/IEC 11801:2002 and Amendment 2 (2010). It refers to International Standards for components and test methods whenever appropriate International Standards are available.

¹ Until ISO/IEC 14763-2 is published, relevant information may be found in ISO/IEC 18010.

² International Telecommunication Union – Telecommunications Standardization Sector.

Figure 1 shows the schematic and contextual relationships between the standards produced by ISO/IEC JTC 1/SC 25 for information technology cabling, namely this and other generic cabling design standards (ISO/IEC 11801), cabling installation standards (ISO/IEC 14763-2³), testing of installed cabling (IEC 61935-1 and ISO/IEC 14763-3).



Scheme of the relationship between cabling standards such as ISO/IEC 11801 and other standards relevant for information technology cabling systems.

Figure 1 – Relationship between generic cabling standards

<https://standards.iteh.ai/catalog/standards/iec/406161f9-af0a-48ed-beab-015d0f6bf57c/iso-iec-24764-2010>

³ Until ISO/IEC 14763-2 is published, relevant information may be found in ISO/IEC 18010.

INFORMATION TECHNOLOGY – GENERIC CABLING SYSTEMS FOR DATA CENTRES

1 Scope

This International Standard specifies generic cabling that supports a wide range of communications services for use within a data centre. It covers balanced cabling and optical fibre cabling.

This International Standard is based upon and references the requirements of ISO/IEC 11801.

This International Standard contains additional requirements that are appropriate to data centres in which the maximum distance over which communications services have to be distributed is 2 000 m. The principles of this International Standard may also be applied to data centre installations that do not fall within this range.

In addition to the requirements of ISO/IEC 11801, this International Standard specifies:

- a) a modified structure and configuration for generic cabling within data centres used to support existing and emerging applications;
- b) a reference implementation specific to data centre infrastructures.

Data centres have specific pathway and space requirements that are specified in ISO/IEC 14763-2. Until ISO/IEC 14763-2 is published, relevant information may be found in ISO/IEC 18010 (see Bibliography).

Safety (electrical safety and protection, fire, optical power etc.) and electromagnetic compatibility (EMC) requirements are outside the scope of this International Standard and are covered by other standards and regulations. However, information given in this International Standard and those identified in Figure 1 can be of assistance in meeting these other standards and regulations.

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.

ISO/IEC 11801 2002, Information technology – Generic cabling for customer premises
Amendment 1(2008)
Amendment 2(2010).

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

IEC 60603-7 (all parts), *Connectors for electronic equipment – Part 7: Detail specification for 8-way, unshielded, 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 MHz*⁴

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*⁵

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*⁶

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*⁷

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

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*⁹

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*¹⁰

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*¹¹

IEC 60794-2-11, *Optical fibre cables – Part 2-11: Indoor cables – Detailed specification for simplex and duplex cables for use in premises cabling*

IEC 60874-19-1, *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 61076-3-104, *Connectors for electronic equipment – Product requirements – Part 3-104: Detail specification for 8-way, shielded free and fixed connectors for data transmissions with frequencies up to 1 000 MHz*

4 Second edition in preparation.

5 Second edition in preparation.

6 Second edition in preparation.

7 Second edition in preparation.

8 Third edition in preparation.

9 In preparation.

10 In preparation.

11 In preparation.

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 61754-7, *Fibre optic interconnecting devices and passive components – Fibre optic connector interfaces – Part 7: Type MPO connector family*

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

IEC 61755-3-2, *Fibre optic connector optical interfaces – Part 3-2: Optical interface, 2,5 mm and 1,25 mm diameter cylindrical full zirconia ferrules for 8 degrees angled-PC single mode fibres*

IEC 61935-1, *Specification for the testing of balanced and coaxial information technology cabling – Part 1: Installed balanced cabling as specified in ISO/IEC 11801 and related standards*

3 Terms and definitions and abbreviations

3.1 Terms and definitions

For the purposes of this International Standard the following terms and definitions apply in addition to those of ISO/IEC 11801.

3.1.1

cabled optical fibre Category

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

3.1.2

equipment outlet

fixed connecting device for terminating the zone distribution cabling and providing the interface to the equipment cabling

3.1.3

fixed zone distribution cable

cable connecting the zone distributor to either the equipment outlet or, if present, the local distribution point

3.1.4

local distribution point

connection point in the zone distribution cabling subsystem between a zone distributor and an equipment outlet

3.1.5

local distribution point cable

cable connecting a local distribution point to an equipment outlet

3.1.6

local distribution point link

transmission path between a local distribution point and the interface at the other end of the fixed zone distribution cable including the connecting hardware at each end

3.1.7

main distribution cable

cable connecting the main distributor to the zone distributor