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Edition 2.0 2019-12

INTERNATIONAL STANDARD

colour inside

Information technology – Implementation and operation of customer premises cabling –
Part 2: Planning and installation



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

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

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INFORMATION TECHNOLOGY – IMPLEMENTATION AND OPERATION OF CUSTOMER PREMISES CABLING –

Part 2: Planning and installation

FOREWORD

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International Standard ISO/IEC 14763-2 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

This second edition cancels and replaces the first edition published in 2012 and Amendment 1:2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- the inclusion of planning and installation practices to support remote powering over the telecommunications cabling infrastructure;
- the inclusion of planning and installation practices outside buildings.

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

FDIS	Report on voting
JTC1-SC25/2909/FDIS	JTC1-SC25/2931/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

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

A list of all parts of the ISO/IEC 14763 series, published under the general title *Information technology – Implementation and operation of customer premises cabling*, can be found on the IEC and ISO websites.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

The use of generic information technology (IT) cabling, termed telecommunications cabling throughout this document (in accordance with the ISO/IEC 11801 series), for an increased number of non-IT services is reflected in the predominant use of the term telecommunications in this document.

The importance of services delivered by telecommunications cabling infrastructure is similar to that of utilities such as heating, lighting and electricity supplies. As with those utilities, interruptions to service can have a serious impact. Poor quality of service due to lack of planning, use of inappropriate components, incorrect installation, poor administration or inadequate support can threaten an organization’s effectiveness.

There are four phases in the successful implementation of telecommunications cabling:

a) design;

b) specification – the detailed requirement for the cabling, including the planning of its accommodation and associated building services addressing safety and specific environments (e.g. electromagnetic), together with the quality assurance requirements to be applied;

c) installation – in accordance with the requirements of the specification;

d) operation – the management of connectivity and the maintenance of transmission performance during the life of the cabling.

This document supports the specification, implementation and operation of generic telecommunications cabling designed in accordance with the standards and associated documents developed by ISO/IEC JTC 1/SC 25 and addresses the following topics:

- specification depending on the application, environment, building infrastructure and facilities;
- quality assurance;
- installation planning (including pathways and spaces) depending on the application, environment, building infrastructure and facilities, etc.;
- installation practice (including pathways and spaces);
- documentation and administration;
- testing;
- inspection;
- operation;
- maintenance and maintainability (based on any impact from planning and installation);
- repair and repairability (based on any impact from planning and installation).

It does not cover those aspects of installation associated with the transmission of signals in free space between transmitters, receivers or their associated antenna systems (e.g. wireless, radio, microwave or satellite).

The following normative annexes support specific aspects of planning and installation:

- Annex A: Optical fibre polarity;
- Annex B: Common infrastructures within multi-tenant premises.

The requirements and recommendations of Clauses 5 to 14 are premises-independent. The following normative annexes include requirements for generic cabling in accordance with specific International Standards:

- Annex C: Cabling in accordance with ISO/IEC 11801-2;

- Annex D: Cabling in accordance with ISO/IEC 11801-3;
- Annex E: Cabling in accordance with ISO/IEC 11801-4;
- Annex F: Cabling in accordance with ISO/IEC 11801-5;
- Annex G: Cabling in accordance with ISO/IEC 11801-6.

Annex H provides information on environmental classes for spaces containing telecommunications equipment.

Annex I provides additional information regarding remote powering.

This document sets out the responsibilities of telecommunications cabling installers and premises owners, and is intended to be referenced in relevant contracts. The owners can delegate selected responsibilities to designers, specifiers, operators and maintainers of installed telecommunications cabling.

This document is also relevant to

- architects, building designers and builders,
- main contractors,
- designers, suppliers, installers, inspectors (auditors), building managers, maintainers and owners of telecommunications cabling,
- access providers and service providers,
- end users.

This document is one of a number of documents prepared in support of International Standards and Technical Reports for cabling design produced by ISO/IEC JTC 1/SC 25. Figure 1 shows the inter-relationship between these International Standards and Technical Reports.

Users of this document should be familiar with the applicable cabling design standard.

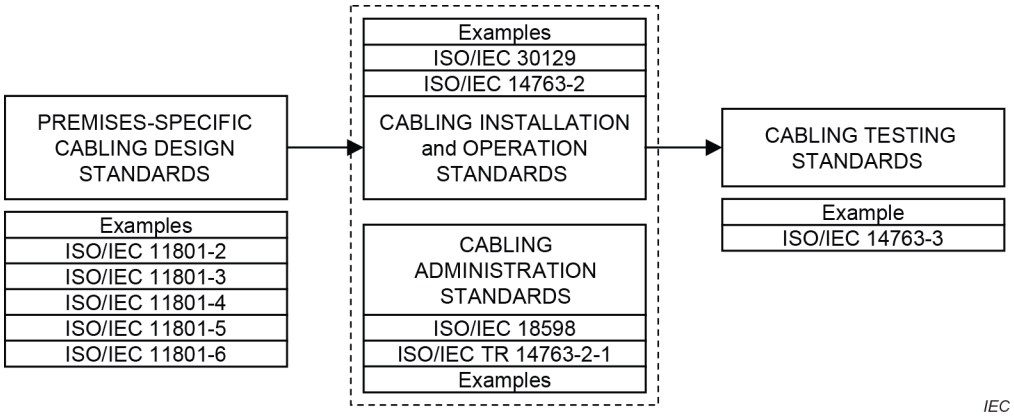


Figure 1 – Schematic relationship between ISO/IEC 14763-2 and other relevant International Standards and Technical Reports

NOTE Telecommunications infrastructure affects raw material consumption. The infrastructure design and installation methods also influence product life and sustainability of electronic equipment life cycling. These aspects of telecommunications infrastructure impact our environment. Since building life cycles are typically planned for decades, technological electronic equipment upgrades are necessary. The telecommunications infrastructure design and installation process magnifies the need for sustainable infrastructures with respect to building life, electronic equipment life cycling and considerations of effects on environmental waste. Telecommunications designers are encouraged to research local building practices for a sustainable environment and conservation of fossil fuels as part of the design process.

INFORMATION TECHNOLOGY – IMPLEMENTATION AND OPERATION OF CUSTOMER PREMISES CABLING –

Part 2: Planning and installation

1 Scope

This part of ISO/IEC 14763 specifies requirements for the planning, installation and operation of telecommunications cabling and cabling infrastructures including cabling, pathways, spaces and telecommunications bonds (other than that specified in ISO/IEC 30129) in support of generic cabling standards and associated documents.

The following aspects are addressed:

a) specification of the installation;
b) quality assurance;
c) installation planning;
d) installation practice;
e) documentation;
f) administration;
g) testing;
h) inspection;
i) operation;
j) maintenance;
k) repair.

The requirements and recommendations of Clauses 5 to 14 are premises-independent. Annexes C through G contain premises-specific amendments of and additions to these requirements and recommendations.

In addition, this document describes the methodology for the assessment of spaces, pathways, pathway systems and cabling (either installed or planned) in support of remote powering objectives.

This document excludes specific requirements applicable to other cabling systems (e.g. power supply cabling); however, it takes account of the effects other cabling systems may have on the installation of telecommunications cabling (and vice versa) and gives general advice.

This document excludes those aspects of installation associated with the transmission of signals in free space between transmitters, receivers or their associated antenna systems (e.g. wireless, radio, microwave or satellite).

This document is applicable to certain hazardous environments but does not exclude additional requirements which are applicable in particular circumstances (e.g. electricity supply and electrified railways).

Safety and electromagnetic compatibility (EMC) requirements are outside the scope of this document and are covered by other standards and regulations. However, information given in this document can be of assistance in meeting these standards and regulations.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60364-5-52, *Low-voltage electrical installations – Part 5-52: Selection and erection of electrical equipment – Wiring systems*

IEC 60825-2, *Safety of laser products – Part 2: Safety of optical fibre communication systems (OFCS)*

IEC 61084 (all parts), *Cable trunking systems and cable ducting systems for electrical installations*

IEC 61386 (all parts), *Conduit systems for cable management*

IEC 61537, *Cable management – Cable tray systems and cable ladder systems*

IEC 61784-5 (all parts), *Industrial communication networks – Profiles*

IEC 61918:2018, *Industrial communication networks – Installation of communication networks in industrial premises*

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*

IEC 61969-1, *Mechanical structures for electronic equipment – Outdoor enclosures – Part 1: Design guidelines*

IEC 61969-2, *Mechanical structures for electronic equipment – Outdoor enclosures – Part 2: Coordination dimensions*

IEC 62305-4, *Protection against lightning – Electrical and electronic systems within structures*

IEC 62368-1, *Audio/video, information and communication technology equipment – Part 1: Safety requirements*

IEC 62368-3, *Audio/video, information and communication technology equipment – Part 3: Safety aspects for DC power transfer through communication cables and ports*

IEC 62949, *Particular safety requirements for equipment to be connected to information and communication technology networks*

ISO/IEC 11801-1:2017, *Information technology – Generic cabling for customer premises – Part 1: General requirements*

ISO/IEC 11801-2, *Information technology – Generic cabling for customer premises – Part 2: Office premises*

ISO/IEC 11801-3, *Information technology – Generic cabling for customer premises – Part 3: Industrial premises*

ISO/IEC 11801-4, *Information technology – Generic cabling for customer premises – Part 4: Single-tenant homes*

ISO/IEC 11801-5, *Information technology – Generic cabling for customer premises – Part 5: Data centres*

ISO/IEC 11801-6, *Information technology – Generic cabling for customer premises – Part 6: Distributed building services*

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

ISO/IEC 18598, *Information technology – Automated infrastructure management (AIM) systems – Requirements, data exchange and applications*

ISO/IEC 20000-1, *Information technology – Service management – Part 1: Service management system requirements*

ISO/IEC 30129, *Information technology – Telecommunications bonding networks for buildings and other structures*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 11801-1, ISO/IEC 11801-2, ISO/IEC 11801-3, ISO/IEC 11801-4, ISO/IEC 11801-5, ISO/IEC 11801-6, ISO/IEC 30129 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1.1
acceptance testing
<of installed cabling> contractual test to confirm that the installed cabling satisfies specific aspects of its specification

3.1.2
access provider space
location of access provider transmission and support equipment

3.1.3
anchor wire
tensioned cable designed to add support to structures

3.1.4
automated infrastructure management system
AIM system
integrated hardware and software system that automatically detects the insertion or removal of cords, documents the cabling infrastructure including connected equipment enabling management of the infrastructure and data exchange with other systems

[SOURCE: ISO/IEC 18598:2016, 3.1.3]

3.1.5
cable bundle
multiple cables maintained in close proximity, generally by fasteners (e.g. cable ties)

3.1.6
cabinet
enclosed construction intended for housing closures and other telecommunications components and equipment

3.1.7
cable management system
system used for the support and/or containment, retention, and protection of all types of cables, information and communication lines, electrical power distribution conductors and their associated accessories

Note 1 to entry: Includes ducts and tubes housing, or intended to house, blown telecommunications cables and/or cable elements.

3.1.8
cabling component
product associated with the cabling installation including cables, connecting hardware, closures, cabinets, frames, racks and pathway systems together with components used to provide bonds to earthing systems

3.1.9
catenary wire
dedicated wire used in aerial applications to which telecommunications cables are attached

3.1.10
closure
fixture or fitting of either open or closed construction intended to contain connecting hardware

3.1.11
closed pathway system
cable management system which does not allow installation of cables by laying without tensile load

3.1.12
electrostatic discharge
transfer of electric charge between bodies of different electric potential in proximity or through direct contact

[SOURCE: IEC 60050-161:2014,161-01-22]

3.1.13
entrance room
space within, or at the boundary of, a building housing the demarcation point where facilities owned by external access and/or service providers interface with the premises cabling

Note 1 to entry: For generic cabling in accordance with ISO/IEC 11801-5, the demarcation point is the external network interface (ENI) and the data centre cabling at that point is the network access cabling.

3.1.14
extraneous-conductive-part
conductive part not forming part of the electrical installation and liable to introduce an electric potential, generally the electric potential of a local earth

[SOURCE: IEC 60050-826:2004, 826-12-11; IEC 60050-195:1998, 195-06-11]

3.1.15
frame
open construction, typically self-supporting and floor-mounted, intended for housing closures and other telecommunications equipment

3.1.16
hand hole
point of access to a pathway that is too small for a person to enter to perform work but that allows the routing of cables during the cable installation process such that bending and pulling requirements are met

Note 1 to entry: An example of a hand hole within a building is called a draw-box.

3.1.17
high-voltage
voltage over 1 000 V RMS or 1 500 V DC

3.1.18
home entrance
space at the boundary of a home that can house the interface(s) between the home networks and external networks provided to the home and that demarcate the administration and maintenance of the two networks

3.1.19
hot zone
area around a high-voltage installation (e.g. substation, transformer, pylon) whose earth potential rise in normal operation or when an earth fault occurs is over the limits given in ITU-T K.68 for typical fault situations

3.1.20
identifier
unique item of information to distinguish a specific component of the cabling installation

3.1.21
installer
person installing cabling components

Note 1 to entry: No design functions are assumed.

3.1.22
junction box
space within a home that enables cables to be routed between pathway systems

3.1.23
label
means of clearly marking a specific component of the telecommunications infrastructure with its identifier and (optionally) other information

3.1.24
maintenance hole
<telecommunications> vault or chamber located in the ground or earth as part of an underground conduit system and used to facilitate placing, connectorization, and maintenance of cables as well as the placing of associated equipment, in which it is expected that a person will enter to perform work

3.1.25
metallic telecommunications cable
cable utilizing metallic conductors for signal transmission

3.1.26
metallic telecommunications cabling
cabling utilizing metallic conductors for signal transmission

3.1.27
minimum bend radius
<installation> minimum radius, as defined by the cable manufacturer, supplier or relevant product standard, to which a cable or cable element is allowed to be subjected during installation

3.1.28
minimum bend radius
<operating static> minimum radius, as defined by the cable manufacturer, supplier or relevant product standard, to which a cable or cable element is allowed to be subjected following installation and when fixed in its final operating position

3.1.29
minimum bend radius
<operating dynamic> minimum radius, as defined by the cable manufacturer, supplier or relevant product standard, to which a cable or cable element is allowed to be subjected under conditions where the cable or cable element is subject to movement during operation

3.1.30
multi-tenant building
building which is designed to accommodate more than one tenant, each of whom has their own tenant entrance facility but who share building entrance facilities (BEF) and associated distribution spaces

3.1.31
non-deformed power supply
power supply that excludes the effects of non-linear loads which generate harmonic currents (e.g. fluorescent lamps, switch mode power supply devices)

3.1.32
open pathway system
pathway system which allows installation of cables by laying without tensile load

3.1.33
openable pathway system
cable management system which restricts access to installed cables but which can be opened to allow installation of cables by laying without tensile load

3.1.34
pathway
<cable route, cable way> defined route for cables between termination points

3.1.35
pathway system
cable management system or other area or volume defined by markings or fittings used to protect and/or support the cabling in order that its desired performance is maintained

3.1.36
power supply cable
cable whose primary purpose is the supply of electrical power

3.1.37
power supply cabling
cabling whose primary purpose is the supply of electrical power

3.1.38
premises owner
owner of the premises within which cabling is to be installed and who can delegate the responsibilities specified in this document to appointed representatives

Note 1 to entry: Appointed representatives can include designers, specifiers, operators and maintainers of the resulting cabling infrastructures.

3.1.39
primary distribution space
space within a home that houses the home distributor (primary home distributor) of ISO/IEC 11801-4 and associated equipment

3.1.40
protective earth conductor
conductor provided for the purposes of safety, for example protection against electric shock

[SOURCE: IEC 60050-826:2004, 826-13-22; IEC 60050-195:1998, 195-02-09]

3.1.41
rack
open construction, typically wall-mounted, for housing closures and other telecommunications equipment

3.1.42
rack unit
44,45 mm of vertical mounting space in an IEC 60297 series standard cabinet or rack

Note 1 to entry: 44,45 mm = 1,75 in.

3.1.43
record
collection of information about, or related to, a specific element of the telecommunications infrastructure

3.1.44
referenced cabling design document
relevant International Standard or Technical Report for cabling design

Note 1 to entry: Refer to ISO/IEC JTC 1/SC 25 and Figure 1 for a list of relevant standards.

3.1.45
remote powering
supply of power to application-specific equipment via balanced cabling

3.1.46
secondary distribution space
space within a home that houses a secondary home distributor of ISO/IEC 11801-4

3.1.47
segregation
physical separation and/or isolation for the purposes of safety, protection of damage to equipment or the prevention of electromagnetic noise from power supply cabling interfering with circuits operating on telecommunications cabling

3.1.48
service loop
excess length of cable or cable element(s)

3.1.49
service provider
operator of any service that furnishes telecommunications content (transmissions) delivered over access provider facilities

Note 1 to entry: The access provider and the service provider can be a single entity.

3.1.50
service provider space
location of service provider transmission and support equipment

3.1.51
space
specified volume (e.g. room, maintenance hole or part thereof) housing closures and/or other telecommunications equipment

3.1.52
surge protective device
device intended to protect the electrical apparatus from high transient overvoltages and to limit the duration and frequently the amplitude of the follow-on current

3.1.53
telecommunications equipment
active or passive equipment necessary to deliver a specific application

EXAMPLES hubs, switches, routers, adapters

3.1.54
termination point
connection, free connector or fixed connector (as appropriate) fitted to an installed cable and housed within a closure

3.1.55
tenant entrance facility
facility that provides all necessary mechanical and electrical services for the entry of telecommunications cables into a tenant's space and which may allow for transition from external to internal cable

3.1.56
work order
collection of information which documents the changes requested and the operations to be carried out on the telecommunications infrastructure

3.2 Abbreviated terms

For the purposes of this document, the abbreviated terms given in ISO/IEC 11801-1, ISO/IEC 11801-2, ISO/IEC 11801-3, ISO/IEC 11801-4, ISO/IEC 11801-5, ISO/IEC 11801-6, ISO/IEC 30129 and the following apply.

AIM automated infrastructure management

CATV community antenna television

CAD computer aided design

CER common equipment room

CSA cross-sectional area

CTR common telecommunications room

EMI electromagnetic interference

EMS energy management systems

ENI external network interface
HV high-voltage
HVAC heating, ventilation and air conditioning
LV low-voltage
IS installation specification
MPO multi-fibre push-on
NVP nominal velocity of propagation
QP quality plan
SPD surge protective device
U rack unit

3.3 Conventions

Annexes B to G adopt a non-sequential clause numbering structure in order to clarify and directly reference the clauses in the main body that are affected by the text of each annex.

4 Conformance

For planning and installation of cabling and cabling infrastructures to conform to this document,

a) the requirements of the applicable generic cabling design standards shall be applied,
b) the specification of the installation shall meet the requirements of Clause 5,
c) the quality planning of the installation shall meet the requirements of Clause 6,
d) the planning of the installation shall meet the requirements of Clause 7,
e) the installation practices shall meet the requirements of Clause 8,
f) the documentation and administration of the installation shall meet the requirements of Clause 9,
g) the testing and inspection of the installation shall meet the requirements of Clauses 10 and 11, respectively,
h) the operation of the installation shall meet the requirements of Clause 12,
i) the maintenance and repair shall meet the requirements of Clauses 13 and 14, respectively,
j) the additional requirements of the applicable premises-specific annex shall be met,
k) telecommunications bonding networks shall conform to ISO/IEC 30129,
l) where a lightning protection system is required, it shall conform to the "integrated lightning protection system" according to IEC 62305-4,
m) other lightning protection systems, including the "isolated lightning protection system" according to IEC 62305-3, are allowed provided that specific restrictions are applied both to the implementation of the telecommunications cabling as agreed between the planners of the lightning protection system and the telecommunications cabling,
n) local regulations shall be met.

5 Specification of installations

5.1 General

Clause 5 in conjunction with Clause 6 describes the key aspects of installation quality assurance as shown in Figure 2.