BSI Standards Publication

Fibre-optic communication subsystem test procedures

Part 4-1: Installed cabling plant — Multimode attenuation measurement

bsi.

National foreword

This British Standard is the UK implementation of EN IEC 61280-4-1:2019+A1:2022. It is identical to IEC 61280-4-1:2019 incorporating corrigendum April 2020, amendment 1:2021, and corrigendum December 2022. It supersedes BS EN IEC 61280-4-1:2019, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by A1 A1.

The UK participation in its preparation was entrusted to Technical Committee GEL/86/3, Fibre optic systems and active devices.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Amendments/corrigenda issued since publication

Date	Text affected
31 May 2020	Implementation of IEC corrigendum April 2020: last paragraph of I.4.1 replaced
31 May 2022	Implementation of IEC amendment 1:2021 with CENELEC endorsement A1:2022
31 May 2023	Implementation of IEC corrigendum December 2022: first paragraph of 6.3 amended

EUROPEAN STANDARD **EN IEC 61280-4-1:2019+A1**

EUROPÄISCHE NORM

December 2022

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Supersedes EN 61280-4-1:2009 and all of its amendments and corrigenda (if any)

English Version

Fibre-optic communication subsystem test procedures - Part 4-1: Installed cabling plant - Multimode attenuation measurement (IEC 61280-4-1:2019)

Procédures d'essai des sous-systèmes de télécommunication fibroniques - Partie 4-1: Installation câblée - Mesure de l'affaiblissement en multimodal (IEC 61280-4-1:2019)

Prüfverfahren für Lichtwellenleiter-Kommunikationsuntersysteme - Teil 4-1: Lichtwellenleiter-Kabelanlagen - Mehrmoden-Dämpfungsmessungen (IEC 61280-4-1:2019)

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN IEC 61280-4-1:2019 E

European foreword

The text of document 86C/1575/FDIS, future edition 3 of IEC 61280-4-1, prepared by SC 86C "Fibre optic systems and active devices" of IEC/TC 86 "Fibre optics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61280-4-1:2019.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2020-03-26
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-06-26

This document supersedes EN 61280-4-1:2009 and all of its amendments and corrigenda (if any)

This edition constitutes a technical revision including the following significant technical changes with respect to the previous edition:

a) changes to Annex F on encircled flux to harmonise with IEC TR 62614-2, but keeping the encircled flux limits defined in Tables F.2 to F.5 unchanged;

b) addition of an equipment cord method in Annex D;

c) inclusion of testing bend insensitive multimode optical fibre;

d) updates to measurement uncertainty;

e) definition of additional cabling configurations;

f) changes to Table 5 on spectral requirements.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 61280-4-1:2019 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60793-1-40	NOTE	Harmonized as EN IEC 60793-1-40
IEC 60793-2	NOTE	Harmonized as EN 60793-2
IEC 60793-2-10	NOTE	Harmonized as EN 60793-2-10
IEC 60793-2-50	NOTE	Harmonized as EN IEC 60793-2-50
IEC 60794-2-21	NOTE	Harmonized as EN IEC 60794-2-21
IEC 61300-3-6	NOTE	Harmonized as EN 61300-3-6
IEC 61300-3-45	NOTE	Harmonized as EN 61300-3-45
IEC 61745	NOTE	Harmonized as EN 61745
IEC 61755-6-2	NOTE	Harmonized as EN IEC 61755-6-2
IEC 62664-1-1	NOTE	Harmonized as EN 62664-1-1
IEC 62614:2010	NOTE	Harmonized as EN 62614:2010 (not modified)

European foreword to amendment A1

The text of document 86C/1720/CDV, future IEC 61280-4-1/AMD1, prepared by SC 86C "Fibre optic systems and active devices" of IEC/TC 86 "Fibre optics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61280-4-1:2019/A1:2022.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022-10-13
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2025-01-13

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Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 61280-4-1:2019/AMD1:2021 was approved by CENELEC as a European Standard without any modification.

(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60825-2	-	Safety of laser products - Part 2: Safety of optical fibre communication systems (OFCS)	EN 60825-2	-
IEC 61280-1-3	-	Fibre optic communication subsystem test procedures - Part 1-3: General communication subsystems - Central wavelength and spectral width measurement	EN 61280-1-3	-
IEC 61280-1-4	-	Fibre optic communication subsystem test procedures - Part 1-4: General communication subsystems - Light source encircled flux measurement method	EN 61280-1-4	-
IEC 61300-3-35	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-35: Examinations and measurements - Visual inspection of fibre optic connectors and fibre-stub transceivers	EN 61300-3-35	-
IEC 61315	-	Calibration of fibre-optic power meters	EN IEC 61315	-
IEC 61746-2	-	Calibration of optical time-domain reflectometers (OTDR) - Part 2: OTDR for multimode fibres	EN 61746-2	-

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FIBRE-OPTIC COMMUNICATION SUBSYSTEM TEST PROCEDURES –

Part 4-1: Installed cabling plant – Multimode attenuation measurement

FOREWORD

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International Standard IEC 61280-4-1 has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics.

This third edition cancels and replaces the second edition, published in 2009. This edition constitutes a technical revision.

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

a) changes to Annex F on encircled flux to harmonise with IEC TR 62614-2, but keeping the encircled flux limits defined in Tables F.2 to F.5 unchanged;
b) addition of an equipment cord method in Annex D;
c) inclusion of testing bend insensitive multimode optical fibre;
d) updates to measurement uncertainty;
e) definition of additional cabling configurations;
f) changes to Table 5 on spectral requirements.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
86C/1575/FDIS	86C/1592/RVD

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

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

A list of all parts in the IEC 61280 series, published under the general title *Fibre optic communication subsystem test procedures*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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.

The contents of the corrigendum of April 2020 have been included in this copy.

FIBRE-OPTIC COMMUNICATION SUBSYSTEM TEST PROCEDURES –

Part 4-1: Installed cabling plant – Multimode attenuation measurement

1 Scope

This part of IEC 61280 is applicable to the measurement of attenuation of installed optical fibre cabling plant using multimode optical fibre. This cabling plant can include multimode optical fibres, connectors, adapters, splices, and other passive devices. The cabling can be installed in a variety of environments including residential, commercial, industrial, and data centre premises, as well as outside plant environments. The test equipment used in this document has one single fibre connector interface or two single fibre connector interfaces.

In this document, the optical fibres that are addressed include sub-categories A1-OMx, where x = 2, 3, 4 and 5 (50/125 µm) and A1-OM1 (62,5/125 µm) multimode optical fibres, as specified in IEC 60793-2-10. The attenuation measurements of the other multimode categories can be made using the approaches of this document, but the source conditions for the other categories have not been defined.

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

IEC 61280-1-3, *Fibre optic communication subsystem test procedures – Part 1-3: General communication subsystems – Central wavelength and spectral width measurement*

IEC 61280-1-4, *Fibre optic communication subsystem test procedures – Part 1-4: General communication subsystems – Light source encircled flux measurement method*

IEC 61300-3-35, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-35: Examinations and measurements – Visual inspection of fibre optic connectors and fibre-stub transceivers*

IEC 61315, *Calibration of fibre-optic power meters*

IEC 61746-2, *Calibration of optical time-domain reflectometers (OTDR) – Part 2: OTDR for multimode fibres*

3 Terms, definitions, graphical symbols and abbreviated terms

For the purposes of this document, the following terms, definitions, graphical symbols and abbreviated terms apply.

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