



BSI Standards Publication

Fibre optic interconnecting devices and passive components — Performance standard

Part 021-06: Single-mode fibre optic connectors terminated as pigtails and patchcords for category OP+ — Extended outdoor protected environment

National foreword

This British Standard is the UK implementation of EN IEC 61753-021-06:2023. It is identical to IEC 61753-021-06:2023. It supersedes BS EN 61753-021-6:2008, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GEL/86/2, Fibre optic interconnecting devices and passive components.

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
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EUROPEAN STANDARD

EN IEC 61753-021-06

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2023

ICS 33.180.20

Supersedes EN 61753-021-6:2008

English Version

**Fibre optic interconnecting devices and passive components -
Performance standard - Part 021-06: Single-mode fibre optic
connectors terminated as pigtails and patchcords for category
OP+ - Extended outdoor protected environment
(IEC 61753-021-06:2023)**

Dispositifs d'interconnexion et composants passifs
fibroniques - Norme de performance - Partie 021-06:
Connecteurs à fibres optiques unimodales raccordés
comme des fibres amorces ou des cordons de brassage
pour la catégorie OP+ - Environnement extérieur protégé
étendu
(IEC 61753-021-06:2023)

Lichtwellenleiter - Verbindungselemente und passive
Bauteile - Betriebsverhalten - Teil 021-06: Einmoden-
Lichtwellenleiter-Steckverbinder, konfektioniert als
Anschlussfasern und Patchkabel für die Kategorie OP+ -
Freiluft, geschützte Umgebung, erweitert
(IEC 61753-021-06:2023)

This European Standard was approved by CENELEC on 2023-11-10. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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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

European foreword

The text of document 86B/4792/FDIS, future edition 1 of IEC 61753-021-06, prepared by SC 86B "Fibre optic interconnecting devices and passive components" of IEC/TC 86 "Fibre optics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61753-021-06:2023.

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) 2024-08-10
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2024-11-10

This document supersedes EN 61753-021-6:2008 and all of its amendments and corrigenda (if any).

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.

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 61753-021-06:2023 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 standard indicated:

IEC 61300 (series) NOTE Approved as EN 61300 (series)

IEC 61754-4 NOTE Approved as EN IEC 61754-4

IEC 61754-20 NOTE Approved as EN 61754-20

IEC 62005 (series) NOTE Approved as EN IEC 62005 (series)

Annex ZA (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.cencenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60793-2-50	-	Optical fibres - Part 2-50: Product specifications - Sectional specification for class B single-mode fibres	EN IEC 60793-2-50	-
IEC 60794-2-50	-	Optical fibre cables - Part 2-50: Indoor cables - Family specification for simplex and duplex cables for use in terminated cable assemblies	EN IEC 60794-2-50	-
IEC 61300-1	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 1: General and guidance	EN IEC 61300-1	-
IEC 61300-2-1	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-1: Tests - Vibration (sinusoidal)	EN IEC 61300-2-1	-
IEC 61300-2-2	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-2: Tests - Mating durability	EN 61300-2-2	-
IEC 61300-2-4	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-4: Tests - Fibre or cable retention	EN IEC 61300-2-4	-
IEC 61300-2-5	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-5: Tests - Torsion	EN IEC 61300-2-5	-
IEC 61300-2-6	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-6: Tests - Tensile strength of coupling mechanism	EN 61300-2-6	-

EN IEC 61753-021-06:2023 (E)

IEC 61300-2-7	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-7: Tests - Bending moment	EN 61300-2-7	-
IEC 61300-2-12	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-12: Tests - Impact	EN 61300-2-12	-
IEC 61300-2-17	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-17: Tests - Cold	EN 61300-2-17	-
IEC 61300-2-18	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-18: Tests - Dry heat	EN IEC 61300-2-18	-
IEC 61300-2-21	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-21: Tests - Composite temperature/humidity cyclic test	EN 61300-2-21	-
IEC 61300-2-22	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-22: Tests - Change of temperature	EN 61300-2-22	-
IEC 61300-2-26	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-26: Tests - Salt mist	EN IEC 61300-2-26	-
IEC 61300-2-27	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-27: Tests - Dust - Laminar flow	EN 61300-2-27	-
IEC 61300-2-44	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-44: Tests - Flexing of the strain relief of fibre optic devices	EN 61300-2-44	-
IEC 61300-2-50	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-50: Tests - Fibre optic connector proof test with static load - Singlemode and multimode	EN 61300-2-50	-
IEC 61300-3-1	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-1: Examinations and measurements - Visual examination	EN 61300-3-1	-
IEC 61300-3-3	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-3: Examinations and measurements - Active monitoring of changes in attenuation and return loss	EN 61300-3-3	-

IEC 61300-3-4	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-4: Examinations and measurements - Attenuation	EN IEC 61300-3-4	-
IEC 61300-3-6	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-6: Examinations and measurements - Return loss	EN 61300-3-6	-
IEC 61300-3-28	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-28: Examinations and measurements - Transient loss	EN 61300-3-28	-
IEC 61300-3-34	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-34: Examinations and measurements - Attenuation of random mated connectors	EN 61300-3-34	-
IEC 61300-3-45	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-45: Examinations and measurements - Attenuation of random mated multi-fibre connectors	EN IEC 61300-3-45	-
IEC 61753-1	-	Fibre optic interconnecting devices and passive components - Performance standard - Part 1: General and guidance	EN IEC 61753-1	-
IEC 61754	series	Fibre optic interconnecting devices and passive components - Fibre optic connector interfaces	EN 61754	series
IEC 61755	series	Fibre optic interconnecting devices and passive components - Connector optical interfaces for single-mode fibres	EN IEC 61755	series
IEC 61755-2	series	Fibre optic interconnecting devices and passive components - Connector optical interfaces for single-mode fibres - Part 2: Connection parameters of dispersion unshifted physically contacting fibres	EN IEC 61755-2	series
IEC 61755-3	series	Fibre optic interconnecting devices and passive components - Connector optical interfaces for single-mode fibres - Part 3: Connector parameters of dispersion unshifted physically contacting fibres	EN 61755-3	series

CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	8
4 Test.....	9
5 Test report.....	9
6 Reference components.....	9
7 Performance requirements.....	9
7.1 General.....	9
7.2 Dimensions	9
7.3 Sample size and test sequencing.....	10
7.4 Endface geometry.....	10
7.5 Visual examination.....	10
7.6 Performance criteria	10
7.7 Performance details.....	11
Annex A (normative) Sample size	19
Annex B (normative) Visual examination of outer cable sheath movement	20
B.1 Overview.....	20
B.2 Preparation of the sample and initial visual examination	20
B.3 Final visual examination of outer cable sheath movement.....	20
Bibliography.....	22
Figure 1 – Pigtail test sample.....	8
Figure 2 – Patchcord test sample.....	9
Figure B.1 – Example of initial marking of the cable sheath	20
Figure B.2 – Example of final visual examination	21
Table 1 – Pass/Fail criteria	10
Table 2 – Performance test details.....	12
Table A.1 – Sample size	19

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FIBRE OPTIC INTERCONNECTING DEVICES AND
PASSIVE COMPONENTS – PERFORMANCE STANDARD –****Part 021-06: Single-mode fibre optic connectors terminated
as pigtails and patchcords for category OP+ –
Extended outdoor protected environment**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 61753-021-06 has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics. It is an International Standard.

This first edition cancels and replaces the first edition of IEC 61753-021-6 published in 2007. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC 61753-021-6:2007:

- a) updated environmental category (from O to OP+), tests and their severities according to IEC 61753-1:2018;
- b) removed the copyright notice as it is no longer needed;
- c) changed title and scope to remove restrictions on attenuation and return loss grades;
- d) changed the term and definitions of the different types of test samples (pigtail test samples and patchcord test samples) used in the various tests to avoid confusion;
- e) removed the term and definition for small form factor (SFF) connectors as it is no longer used in the document;
- f) updated fibre naming conventions according to IEC 60793-2-50: and added provisions for B-657 fibres;
- g) added all the attenuation and return loss grades defined in IEC 61753-1;
- h) removed the static side load test;
- i) removed the need to perform all tests sequentially to align with other performance standards;
- j) added provisions for rectangular ferrule connectors;
- k) added Annex B for visual examination of the outer cable sheath movement of reinforced cables as an additional requirement for change of temperature, cable retention and flexing of the strain relief tests.

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

Draft	Report on voting
86B/4792/FDIS	86B/4813/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts of the IEC 61753 series, published under the general title *Fibre optic interconnecting devices and passive components – Performance standard*, 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 webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

Performance standards define the requirements for standard optical performance under a set of specified conditions. Each standard contains a series or a set of tests and measurements with clearly stated conditions, severities and pass/fail criteria. The series of tests, commonly referred to as an operating service environment or performance category, is intended to be run on a "one-off" basis to prove the product's ability to satisfy the requirements of a specific application, market sector or user group.

The subsequent parts of this document define those sets of tests which form each operating service environment or performance category, and which have been standardized for international use. A product that has been shown to meet all the requirements of a performance standard may be declared as complying with that performance standard.

Products having the same classification from one manufacturer that satisfy a performance standard will operate within the boundaries set by the performance standard. Intermateability or interchangeability of products from different suppliers (having the same classification and conforming to the same performance standard) can only be guaranteed when these products also meet the interface standards. Only in this condition will an equivalent level of performance be provided when they are used together (for example, in the case of optical connectors).

Conformance to a performance standard is not a guarantee of lifetime assured performance or reliability.

Reliability testing is subjected to a separate test schedule, where the tests and severities selected are truly representative of the requirements of this reliability test programme. Consistency of manufacture should be maintained using a recognized quality assurance programme whilst the reliability of the product should be evaluated using the procedures recommended in the IEC 62005 series.

Tests and measurements should be selected from the IEC 61300 series. Where this is not possible, the required test method should be attached as an annex to the performance standard.

FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – PERFORMANCE STANDARD –

Part 021-06: Single-mode fibre optic connectors terminated as pigtails and patchcords for category OP+ – Extended outdoor protected environment

1 Scope

This part of IEC 61753 defines the minimum initial test and measurement requirements and severities which single-mode fibre optic connectors terminated as a pigtail or a patchcord satisfy in order to be categorised as meeting the IEC standard category OP+ (extended outdoor protected environment), as defined in IEC 61753-1.

If tests were performed on the connectors terminated as pigtails or patchcords for category OP+^{HD} and the product passed, the product will be automatically qualified or categorized as meeting the IEC standard for category OP+. If tests are performed on the connectors terminated as pigtails or patchcords for category OP+, and the product passes, the product will be automatically qualified or categorized as meeting the IEC standard for categories OP and C.

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

IEC 60794-2-50, *Optical fibre cables – Part 2-50: Indoor cables – Family specification for simplex and duplex cables for use in terminated cable assemblies*

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

IEC 61300-2-1, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-1: Tests – Vibration (sinusoidal)*

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

IEC 61300-2-4, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-4: Tests – Fibre or cable retention*

IEC 61300-2-5, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-5: Tests – Torsion*

IEC 61300-2-6, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-6: Tests – Tensile strength of coupling mechanism*