SLOVENSKI STANDARD
SIST EN 61753-2-1:2002

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Fibre optic interconnecting devices and passive components - Part 2-1: Fibre optic connectors terminated on single-mode fibre for category U - Uncontrolled environment (IEC 61735-2-1:2000)

Fibre optic interconnecting devices and passive components performance standard -- Part 2-1: Fibre optic connectors terminated on single-mode fibre for category U - Uncontrolled environment

Lichtwellenleiter - Verbindungselemente und passive Bauteile - Betriebsverhalten -- Teil 2-1: Einmoden-Lichtwellenleiter-Steckverbinder für die Kategorie U - Unkontrollierte Umgebung

Norme de qualité de fonctionnement des dispositifs d'interconnexion et composants passifs à fibres optiques -- Partie 2-1: Connecteurs à fibres optiques raccordés à une fibre monomode pour la catégorie U - Environnement non contrôlé

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Fibre optic interconnecting devices and passive components performance standard
Part 2-1: Fibre optic connectors terminated on single-mode fibre for category U - Uncontrolled environment
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Norme de qualité de fonctionnement des dispositifs d'interconnexion et composants passifs à fibres optiques
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(CEI 61753-2-1:2000)

Lichtwellenleiter-Verbindungselemente und passive Bauteile - Betriebsverhalten
Teil 2-1: Einmoden-Lichtwellenleiter-Steckverbinder für die Kategorie U - Unkontrollierte Umgebung
(IEC 61753-2-1:2000)

This European Standard was approved by CENELEC on 2000-08-01. 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

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 Central Secretariat has the same status as the official versions.

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

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Foreword

The text of document 86B/1314/FDIS, future edition 1 of IEC 61753-2-1, 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 was approved by CENELEC as EN 61753-2-1 on 2000-08-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2001-05-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2003-08-01

Annexes designated "normative" are part of the body of the standard.
In this standard, annexes A, B and ZA are normative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61753-2-1:2000 was approved by CENELEC as a European Standard without any modification.

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FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS PERFORMANCE STANDARD –

Part 2-1: Fibre optic connectors terminated on single-mode fibre for category U – Uncontrolled environment

1 Scope

This part of IEC 61753 contains the minimum requirements and severities which a single-mode connector/cable assembly must satisfy in order to be considered as meeting category U (uncontrolled environment) of IEC 61753-1, as defined in annex A of IEC 61753-1.

This standard contains optional grades of optical performance for the attenuation random mate and return loss tests.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61753. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 61753 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60793-1-1, *Optical fibres – Part 1: Generic specification – Section 1: General*

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/cable retention*

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

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*

IEC 61300-2-7, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-7: Tests – Bending moment*

IEC 61300-2-12, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-12: Tests – Impact*

IEC 61300-2-17, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-17: Tests – Cold*

IEC 61300-2-18, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-18: Tests – Dry heat – High temperature endurance*

IEC 61300-2-19, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-19: Tests – Damp heat (steady state)*

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*

IEC 61300-2-22, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-22: Tests – Change of temperature*

IEC 61300-2-27, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-27: Tests – Dust – Laminar flow*

IEC 61300-2-42, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-42: Tests – Static side load for connectors*

IEC 61300-3-4, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-4: Examination and measurements – Attenuation*

IEC 61300-3-6, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-6: Examinations and measurements – Return loss*

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*

3 Definitions

For the purpose of this part of IEC 61753, the following definitions apply.

3.1
loss variation

attenuation from the value measured before the commencement of the test

3.2
sample

connector set, defined as the complete set of connector components required to provide demountable coupling between one or more pairs of optical fibres

4 Tests

All test methods are in accordance with a specific IEC 61300 part.

The samples shall be terminated onto single-mode fibre as per IEC 60793-1-1, category B.1.1, in either secondary coated or reinforced cable format.

Each test defines the number of samples to be evaluated.

The connector pairs used for each test are intended to be previously unstressed new samples, but may be selected from previously used samples, if so desired.

All optical testing shall be carried out at 1 550 nm ± 30 nm, unless otherwise specified.

Change in attenuation is, for the purpose of the test, defined as peak to peak variation.

5 Test report

Fully documented test reports and supporting evidence shall be prepared and made available for inspection as evidence that the tests have been carried out and complied with.

6 Reference components

Where the test methods used within this standard require the use of reference components, they shall have characteristics as defined in annex B.

7 Performance requirements

7.1 Dimensions

Dimensions shall comply with either the appropriate IEC interface standard or with those given in appropriate manufacturers' drawings, where the IEC interface standard does not exist or cannot be used.

7.2 Sample size, sequencing and groupings

The length of cable (or fibre) on each side of the connector set should be 1,5 m minimum.

The sample sizes, sequencing and grouping to be used for the tests shall be as defined in annex A. Samples may either be new product or sourced from a previous test.

7.3 Performance details

No.	Test	Requirements	Details
1	Attenuation (reference)	≤0,50 dB 1 330 nm ± 30 nm and 1 550 nm ± 30 nm	IEC 61300-3-4 Insertion Method B Launch mode conditions: Only the fundamental mode shall propagate at the connector interface and at the detector Source stability ±0,05 dB over the measuring period or at least 1 h Source characteristics: S4 for 1 310 nm S5 for 1 550 nm Power meter: D2 Reference component: As per annex B Specimen shall be optically functioning Preconditioning procedure: Clean the mechanical and optical alignment parts of the specimen according to the manufacturer's instructions.
2a	Return loss (branching device method)	Class S ≥26 dB Class T ≥35 dB Class R ≥40 dB 1 330 nm ± 30 nm and 1 550 nm ± 30 nm	IEC 61300-3-6 Method 1 Launch fibre length: L ≥2 m Source stability: ±0,20 dB over the measuring period or at least 1 h Source spectral width: To be decided Detector sensitivity: To be decided Detector linearity: To be decided Reference components: As per annex B Specimen shall be optically functioning Preconditioning procedure: Clean the mechanical and optical alignment parts of the specimen according to the manufacturer's instructions.
2b	Return loss (OTDR method)	Class U ≥50 dB Class V ≥60 dB (mated and unmated)	IEC 61300-3-6 Method 2 Launch fibre length: L1 ≥500 m, L2 ≥6 m, L3 ≥6 m Spectral width: To be decided Pulse duration: To be decided Specimen shall be optically functioning Preconditioning procedure: Clean the mechanical and optical alignment parts of the specimen according to the manufacturer's instructions.

3	Attenuation (random mate)	Grade P Mean ≤0,35 dB Max 1,00 dB for ≥97 % of mating combinations Grade Q Mean ≤0,30 dB Max. 0,60 dB for ≥99 % of mating combinations	IEC 61300-3-34 Launch mode conditions: Only the fundamental mode shall propagate at the connector interface and at the detector Source characteristics: S5 for 1 550 nm Power meter D2 Attenuation measurements shall be made using randomly selected specimens Specimen shall be optically functioning Preconditioning procedure: Clean the mechanical and optical alignment parts of the specimen according to the manufacturer's instructions.
4	Vibration (sinusoidal)	Allowable change in attenuation: ≤0,20 dB 1 550 nm ± 30 nm Attenuation shall be measured before, during and after the test Return loss shall be measured before, during and after the test and shall satisfy the requirements for the specified class The change in attenuation measurement shall be made against randomly selected plugs The initial attenuation shall satisfy the requirements for the specified class	IEC 61300-2-1 Frequency range: 10 Hz to 55 Hz Endurance duration per axis: 0,5 h Number of axes: Three, orthogonal Number of sweeps: 15 Vibration amplitude: 0,75 mm Sampling interval: Optical measurement shall be at a maximum period of 2 ms Method of mounting: An adaptor shall be mounted rigidly to the mounting fixture Specimen shall be optically functioning Preconditioning procedure: Clean the mechanical and optical alignment parts of the specimen according to the manufacturer's instructions.
5	Bending moment	Allowable change in attenuation: ≤0,20 dB at 1 550 nm ± 30 nm The connector may be cleaned after the test, before measurement Attenuation shall be measured before, during and after the test Return loss shall be measured before, during and after the test and shall satisfy the requirements for the specified class The change in attenuation measurement shall be made against randomly selected plugs. The initial attenuation shall satisfy the requirements for the specified class	IEC 61300-2-7 Load: 10 N smoothly applied Point of application: 25 mm from centre line of load defined by the optical interface Sampling rate: Losses shall be measured at least once after the load has reached its maximum level and been maintained for a minimum period of 30 s Specimen shall be optically functioning Preconditioning procedure: Clean the mechanical and optical alignment parts of the specimen according to the manufacturer's instructions Recovery procedure: The connector may be cleaned after the test before final measurement.

6	Fibre/cable retention	Allowable change in attenuation: ≤0,20 dB at 1 550 nm ± 30 nm Attenuation shall be measured before, during and after the test Return loss shall be measured before, during and after the test and shall satisfy the requirements for the specified class The change in attenuation measurement shall be made against randomly selected plugs The initial attenuation shall satisfy the requirements for the specified class	IEC 61300-2-4 Magnitude and rate of application of the tensile load: 100 N ± 5 N at a speed of 5 N/s for reinforced cables 5 N ± 0,5 N at a speed of 0,5 N/s for coated fibres Point of application of tensile load: 0,3 m from the endface of the connector Duration of the test (maintaining the load): 120 s at 100 N for reinforced cable 60 s at 5 N for coated fibres Sampling rate: Losses shall be measured at least once after the load has reached its maximum level and been maintained for a minimum period of 30 s Method of mounting: The connector shall be rigidly mounted such that the load is applied to the fibre/cable retention mechanism and not to the connector coupling mechanism. Specimen shall be optically functioning Preconditioning procedure: Clean the mechanical and optical alignment parts of the specimen according to the manufacturer's instructions.
7	Torsion	Allowable change in attenuation: ≤0,20 dB at 1 550 nm ± 30 nm Attenuation shall be measured before, during and after the test Return loss shall be measured before, during and after the test and shall satisfy the requirements for the specified class The change in attenuation measurement shall be made against randomly selected plugs The initial attenuation shall satisfy the requirements for the specified class	IEC 61300-2-5 Magnitude and rate of application of the tensile load: 15 N at a speed of 1 N/s for reinforced cable 2 N at a speed of 0,1 N/s for coated fibre Point of application of tensile load: 0,2 m from the endface of the connector Duration of the test: 25 cycles ± 180° Sampling rate: Losses shall be measured at least once after the load has reached maximum level Specimen shall be optically functioning Preconditioning procedure: Clean the mechanical and optical alignment parts of the specimen according to the manufacturer's instructions Recovery procedure: Clean the mechanical and optical alignment parts of the specimen according to the manufacturer's instructions before final measurement.