SLOVENSKI STANDARD
oSIST prEN IEC 61300-3-3:2024

01-junij-2024

Povezovalne naprave in pasivne komponente optičnih vlaken - Postopki osnovnega preskušanja in merjenja - 3-3. del: Preiskovanje in meritve - Aktivno nadzorovanje sprememb pri zmanjševanju in povračilu izgube

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

Lichtwellenleiter - Verbindungselemente und passive Bauteile - Grundlegende Prüf- und Messverfahren - Teil 3-3: Untersuchungen und Messungen - Aufzeichnung der Änderung von Dämpfung und Rückflussdämpfung

Dispositifs d'interconnexion et composants passifs à fibres optiques - Méthodes fondamentales d'essais et de mesures - Partie 3-3: Examens et mesures - Contrôle actif des variations de l'affaiblissement et de l'affaiblissement de réflexion

Ta slovenski standard je istoveten z: **prEN IEC 61300-3-3:2024**

ICS:

33.180.20	Povezovalne naprave za optična vlakna	Fibre optic interconnecting devices

oSIST prEN IEC 61300-3-3:2024 **en**

86B/4885/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 61300-3-3 ED4**	
DATE OF CIRCULATION: **2024-04-19**	CLOSING DATE FOR VOTING: **2024-06-14**
SUPERSEDES DOCUMENTS: **86B/4759/CDV, 86B/4810A/RVC**	

IEC SC 86B : FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS

SECRETARIAT: Japan	SECRETARY: Mr Shigeru Tomita
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

Attention IEC-CENELEC parallel voting

The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.

The CENELEC members are invited to vote through the CENELEC online voting system.

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Recipients of this document are invited to submit, with their comments, notification of any relevant “In Some Countries” clauses to be included should this proposal proceed. Recipients are reminded that the CDV stage is the final stage for submitting ISC clauses. (SEE AC/22/2007 OR NEW GUIDANCE DOC).

TITLE:

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

PROPOSED STABILITY DATE: 2029

NOTE FROM TC/SC OFFICERS:

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

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

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.

2) The formal decisions or agreements of IEC 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 National Committees.

3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.

4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.

5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.

6) All users should ensure that they have the latest edition of this publication.

7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees 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, use of, or reliance upon, this IEC Publication or any other IEC Publications.

8) 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.

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 61300-3-3 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 fourth edition cancels and replaces the third edition published in 2009. This edition constitutes a minor revision.

The changes with respect to the previous edition include harmonization with IEC 61300-3-4 and 61300-3-6 by revision of the requirements for the:

a) light source,

b) launching condition,

c) detector,

d) temporary joint,

e) as well as revision of normative references.

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

Draft	Report on voting
86B/XX/FDIS	86B/XX/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.

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 IEC 61300 series, published under the general title *Fibre optic interconnecting devices and passive components – Basic test and measurement 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 webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

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

1 Scope

This part of IEC 61300 describes the procedure to monitor changes in either attenuation or return loss, or both, of a component, an interconnecting device, a fibre management system, or a protective housing, when subjected to an environmental or mechanical test. Such a procedure is commonly referred to as active monitoring. The procedure to monitor temporary changes (generally faster) during disruptive events is given in IEC 61300-3-28.

The procedure can be applied to measurements on single samples or to simultaneous measurements on multiple samples, both at single wavelengths and multiple wavelengths, by using either branching devices or switches, or both, as appropriate.

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.

IEC 60050-731, *International Electrotechnical Vocabulary (IEV) – Part 731: Optical fibre communication*

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

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

IEC 61300-3-1, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-1: Examinations and measurements – Visual examination*

IEC 61300-3-2, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-2: Examinations and measurements – Polarization dependent loss in a single-mode fibre optic device*

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 61300-3-28, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-28: Examinations and measurements – Transient loss*

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 61280-1-3, *Fibre optic communication subsystem test procedures – Part 1-3: General communication subsystems – Measurement of central wavelength, spectral width and additional spectral characteristics*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions are given in IEC 60050-731 and IEC 61300-1.

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.

3.2 Abbreviations

BD branching device
DUT device under test
LED light emitting diode
OTDR optical time domain reflectometer
PDL polarization dependent loss
TJ temporary joint
WDM wavelength-division multiplexing

4 General description

4.1 Measurement method

The procedure describes active monitoring measurement methods. Method 1 describes the situation where a single sample is subject to mechanical or environmental stress testing. Methods 2 and 3 describe methods for monitoring changes in the optical performance of multiple samples. Methods 4 and 5 measure changes in the optical performance of samples using an optical time domain reflectometer (OTDR). Methods 4 and 5 may be used only when the OTDR averaging time is much less than the variation time of the test conditions. Where there is any form of uncertainty over the measurement method used, method 1 shall be the reference method.

All methods are capable of being configured to monitor changes in attenuation and return loss at the same time. The required optical test parameters shall be defined in the relevant IEC 61753-series performance standard or IEC 62005-series reliability document.

Where a group of samples is being monitored over a period of time, say several days or weeks, it is usual to employ some form of automated data acquisition. Since the changes in optical performance can be very small, it is important to ensure high measurement stability over time.

4.2 Precautions

The following requirements shall be met.

a) Precautions shall be taken to ensure that cladding modes do not affect the measurement as advised in IEC 61300-1.

b) Precautions shall be taken to prevent movement in the position of the fibres between the sample(s) and the test apparatus, to avoid changes in optical performance caused by bending losses.

c) The stability performance of the test equipment shall be ≤ 0,05 dB or 10 % of the attenuation to be measured, whichever is the lower value. The stability shall be maintained over the measurement time. The required measurement resolution for attenuation shall be 0,01 dB for both multimode and single-mode fiber.

d) To achieve consistent results, all samples shall be cleaned and inspected prior to measurement, in accordance with the manufacturer's instructions. Visual examination shall be undertaken in accordance with IEC 61300-3-1 and IEC 61300-3-35.

e) The power in the fibre shall be at a level that does not generate non-linear scattering effects (typically < 3 mW).

f) It is common to be monitoring changes in optical performance that are small in comparison with the polarization dependence of the device under test (DUT) and of parts of the test apparatus such as branching devices, switches, and detectors. Since polarization along the fibres often changes over time, either an unpolarized or polarization scrambled source can be used to measure the polarization averaged attenuation, or the methods of IEC 61300-3-2 should be used to measure polarization dependent loss (PDL) and attenuation together.

g) When measuring wavelength dependent components such as wavelength-division multiplexing (WDM) devices, it is necessary to use a light source that does not emit light at extraneous wavelengths at levels that can affect the measurement uncertainty.

h) Reflected powers from the test apparatus shall be at a level that does not affect the measurement uncertainty.

i) When using switches or branching devices for multimode measurements, ensure that the launch conditions to the DUT satisfy 5.1.2 and that these devices do not introduce unacceptable measurement uncertainty due to modal detection non-uniformity,

5 Apparatus

5.1 Methods 1, 2 and 3

5.1.1 General

The apparatus used for methods 1, 2 and 3 of this procedure is shown in Figure 1, Figure 2 and Figure 3. The apparatus consists of elements listed in 5.1.2 to 5.1.11.

5.1.2 Launch conditions (E) and source (S)

The launch conditions for light sources shall be in accordance with IEC 61300-1 and shall be measured at the output of the launch reference connector. For multimode fibre sources, a mode-conditioning device can be required to satisfy these conditions, as illustrated with device E in Figure 1 and the launch reference connector where the launch conditions are verified is at the temporary joint into the DUT.

The source unit consists of an optical emitter, the associated drive electronics and fibre pigtail (if any). Preferred source conditions are given in Table 1. The stability of the single-mode fibre source at 23 °C shall be ± 0,01 dB over the duration of the measurement. The stability of the multimode fibre source at 23 °C shall be ± 0,05 dB over the duration of the measurement. The source output power shall be ≥ 20 dB above the minimum measurable power level.

There are several methods of performing measurements at multiple wavelengths. One method, illustrated in Figure 3, shows independent light sources joined by optical Switch 3.