SLOVENSKI STANDARD
SIST EN 61300-3-2:1999

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Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-2: Examinations and measurements - Polarization dependence of a single-mode fibre optic device (IEC 61300-3-2:1995)

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Lichtwellenleiter - Verbindungselemente und passive Bauteile - Grundlegende Prüf- und Meßverfahren -- Teil 3-2: Untersuchungen und Messungen - Polarisationsabhängigkeit von Einmoden-Lichtwellenleiter-Bauteilen

Dispositifs d'interconnexion et composants passifs à fibres optiques - Méthodes fondamentales d'essais et de mesures -- Partie 3-2: Examens et mesures - Dépendance de la polarisation d'un dispositif pour fibres optiques monomodes

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English version

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This European Standard was approved by CENELEC on 1997-07-01. 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.

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CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of the International Standard IEC 61300-3-2:1995, prepared by SC 86B, Fibre optic interconnecting devices and passive components, of IEC TC 86, Fibre optics, was submitted to the formal vote and was approved by CENELEC as EN 61300-3-2 on 1997-07-01 without any modification.

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) 1998-06-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1998-06-01

Endorsement notice

The text of the International Standard IEC 61300-3-2:1995 was approved by CENELEC as a European Standard without any modification.

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Fibre optic interconnecting devices and passive components – Basic test and measurement procedures –

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Bureau Central de la Commission Electrotechnique Internationale 3, rue de Varembé Genève, Suisse

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – BASIC TEST AND MEASUREMENT PROCEDURES –

Part 3-2: Examinations and measurements – Polarization dependence of a single-mode fibre optic device

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international cooperation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. 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. The 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 the IEC on technical matters, prepared by technical committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

3) They have the form of recommendations for international use published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.

4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

International Standard IEC 1300-3-2 has been prepared by sub-committee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

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

DIS	Report on voting
86B/522/DIS	86B/595/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.

IEC 1300 consists of the following parts, under the general title: *Fibre optic interconnecting devices and passive specimens – Basic test and measurement procedures:*

- Part 1: General and guidance
- Part 2: Tests
- Part 3: Examinations and measurements

Annex A is for information only.

FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – BASIC TEST AND MEASUREMENT PROCEDURES –

Part 3-2: Examinations and measurements – Polarization dependence of a single-mode fibre optic device

1 General

1.1 *Scope and object*

The object of this part of IEC 1300 is to determine the dependence of single-mode fibre optic devices with regard to changes in polarization. This measurement can be applied to any single-mode interconnecting device and passive component, including connectors, splices, couplers, attenuators, isolators and switches. It is used to measure the total range of attenuation, Δa, due to changes in polarization of the launch state. For branching devices, it can also be used to measure the total range of coupling ratio, ΔCR(i). It cannot be used to measure the polarization dependence of return loss.

1.2 *General description*

Two methods for measuring the polarization dependence are described. Method A will determine the maximum polarization sensitivity over all possible polarization states including linear, circular and elliptical. Method B will determine the maximum polarization sensitivity over all linearly polarized launch states. Method A is preferred, particularly for any device in which the polarization state of light passing through the device is changed. Method B will generally understate the polarization sensitivity of devices which are not dependent on linearly polarized light. Therefore, it is not recommended for measurements where the specimen has not been characterized to be sensitive to purely linearly polarized light.

Two options are allowed for establishing the reference power during the measurement:

1) cutback or substitution fibre;
2) ratio measurement.

Option 1 is the more accurate and should be used to arbitrate disagreements in the options. Option 2 is the more convenient for a typical apparatus using method A.

1.2.1 *Method A*

Light is launched into the input port of the specimen such that linear, circular and elliptical states of polarization with different axes of orientation can be adjusted while the power from the output port is monitored. The input power is also monitored by tapping some of the power through a polarization independent branching device. By adjusting for the maximum and minimum power through the specimen, the polarization sensitivity of the insertion loss can be obtained. For branching devices, it can also be used to measure the total range of coupling ratio.

1.2.2 *Method B*

Linearly polarized light is injected into the launch end of the specimen. The launch lead of the device shall be deployed in a straight line without any external stresses, e.g. bends, twists, kinks, or tension. This is necessary because the state of polarization carried in the fibre is altered by external stresses [1].

The return leads may be deployed with bends as long as they are large enough not to induce bend loss (i.e., bend diameters greater than 90 mm). If the state of polarization is altered by a bend in the output optical path, the polarization dependent loss should not be altered since there are no polarization sensitive specimens in the output optical path.

The linear state of polarization of the launch is typically rotated through a minimum of 180° while the power from the output of the specimen is measured. If the launch power varies as a function of the launched state of linear polarization, this variation may be referenced out. The power from the source may be measured through an equivalent 180° cycle using a cutback length from the input of the specimen or using an equivalent length of fibre similar to the specimen in substitution as long as equivalence to the cutback measurement can be demonstrated.

2 Apparatus

The following apparatus and equipment are required to perform this test.

2.1 *Optical source*

An optical source capable of producing the spectral characteristics defined in the detail specification (both wavelength and spectral width) shall be used. Unless specified in the detail specification, the spectral width shall be less than 10 nm.

The source power shall be capable of meeting the dynamic range requirements of the measurement when combined with the detector sensitivity.

The power, polarization state and wavelength stability of the source shall be sufficient to achieve the desired measurement accuracy over the course of the measurement. An example of such a source is a tungsten bulb combined with a spectrally filtering monochromator. For some applications, a narrow linewidth source such as a single longitudinal mode laser may be used.

NOTE – Multimode lasers may not provide sufficient polarization stability required for this measurement.

2.2 *Excitation unit (E)*

This unit consists of a passive optical system which transmits the optical power to the specimen. Means shall be provided to ensure that the specimen is single-moded at the wavelength of the measurement. A bend in the output pigtail of the specimen may be used to filter any second-order mode power.

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[1] Figures in square brackets refer to the bibliography given in annex A.