

SLOVENSKI STANDARD

SIST EN 61300-3-14:1999

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Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-14: Examinations and measurements - Accuracy and repeatability of the attenuation settings of a variable attenuator (IEC 61300-3-14:1995)

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ICS 33.180.20

Referenčna številka
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English version

**Fibre optic interconnecting devices and passive components
Basic test and measurement procedures
Part 3-14: Examinations and measurements - Accuracy and repeatability of
the attenuation settings of a variable attenuator
(IEC 61300-3-14:1995)**

Dispositifs d'interconnexion et
composants passifs à fibres optiques
Méthodes fondamentales d'essais et
de mesures
Partie 3-14: Examens et mesures
Précision et répétabilité des positions
d'affaiblissement d'un atténuateur
variable
(CEI 61300-3-14:1995)

Lichtwellenleiter - Verbindungselemente
und passive Bauteile - Grundlegende
Prüf- und Meßverfahren
Teil 3-14: Untersuchungen und
Messungen - Genauigkeit und
Reproduzierbarkeit der Einstellung
eines variablen Dämpfungsgliedes
(IEC 61300-3-14:1995)

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.

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

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

Foreword

The text of the International Standard IEC 61300-3-14:1995, 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 61300-3-14 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 61300-3-14:1995 was approved by CENELEC as a European Standard without any modification.

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NORME
INTERNATIONALE
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CEI
IEC
1300-3-14

Première édition
First edition
1995-05

**Dispositifs d'interconnexion et composants
passifs à fibres optiques –
Méthodes fondamentales d'essais
et de mesures –**

**Partie 3-14:
Examens et mesures –
Précision et répétabilité des positions
d'affaiblissement d'un atténuateur variable**

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

**Part 3-14:
Examinations and measurements –
Accuracy and repeatability of the attenuation
settings of a variable attenuator**

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International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

**Part 3-14: Examinations and measurements –
Accuracy and repeatability of the attenuation settings
of a variable attenuator**

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 1300-3-14 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/527/DIS | 86B/599/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.

[SIST EN 61300-3-14:1999](#)

IEC 1300 consists of the following parts, under the general title *Fibre optic interconnecting devices and passive components – 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 3-14: Examinations and measurements – Accuracy and repeatability of the attenuation settings of a variable attenuator

1 General

1.1 Scope and object

The object of this part of IEC 1300 is to measure the accuracy and repeatability of the attenuation value settings of a variable attenuator.

1.2 General description

A variable attenuator is adjusted sequentially through a series of attenuation settings prescribed in the detail specification. The attenuation value is measured at each setting. This sequence of measurements is repeated a number of times as prescribed in the detail specification. The accuracy of the attenuator at each setting is then given by the difference between the mean of the measured values and the nominal value. The repeatability at each setting is given by plus or minus three times the standard deviation of the measurements. This is illustrated in the following figures. Figure 1a shows an attenuator which is calibrated to read the actual or measured attenuation. Figure 1b shows an attenuator which is calibrated relative to a zero-point attenuation setting. When the attenuator is adjusted to read zero, the actual or measured attenuation will be some value greater than zero.

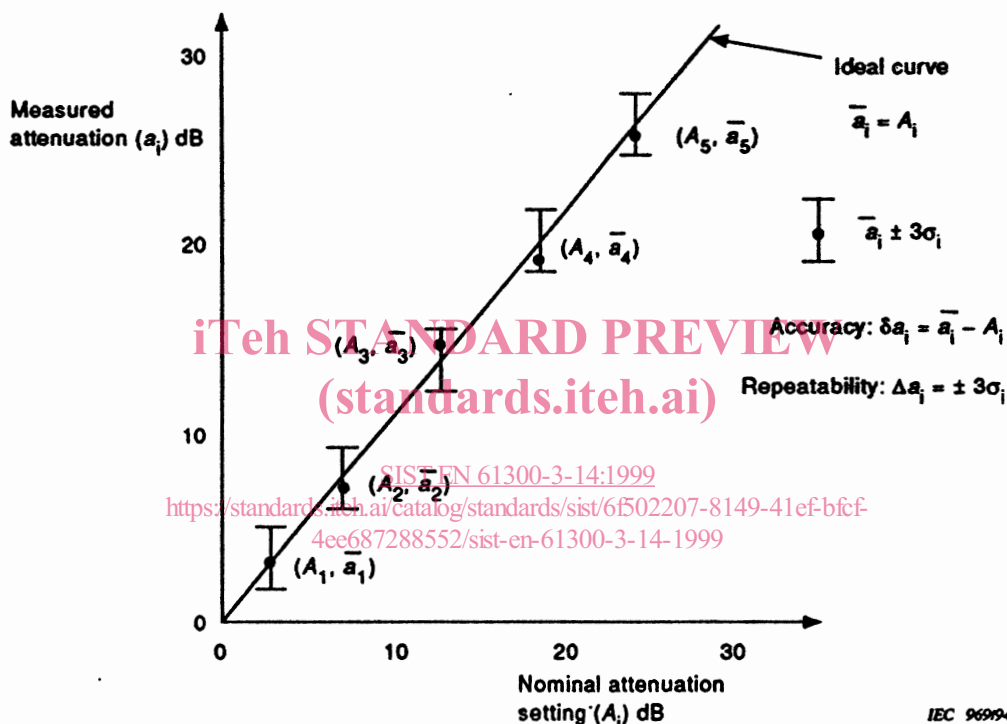


Figure 1a – Measured versus nominal attenuation
(absolute calibration of attenuation)

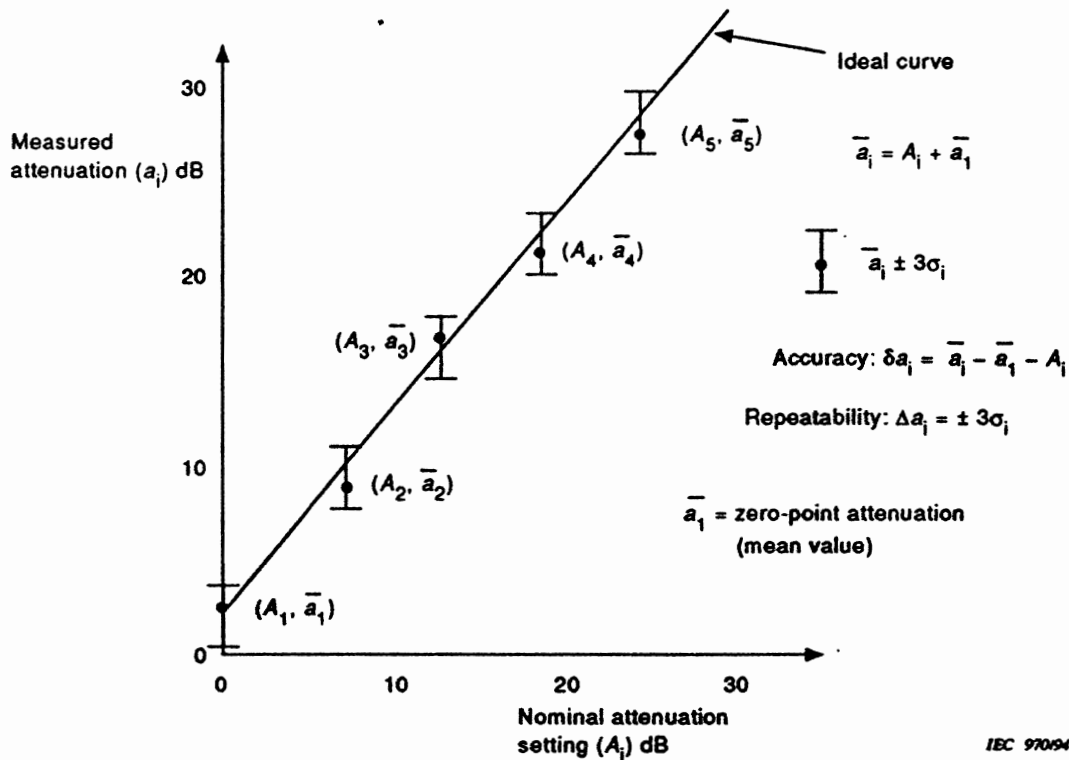


Figure 1b – Measured versus nominal attenuation
(calibration relative to zero-point setting)

2 Apparatus

The apparatus shall consist of the following elements.

2.1 Optical source (S)

The source shall be sufficiently stable over the time required to perform the measurements. The performance of a variable attenuator will be influenced by the spectral characteristics of the source, and therefore the optical wavelength and bandwidth requirements shall be specified in the detail specification. The coherence and polarization characteristics may also influence performance and shall be specified, if applicable.

2.2 Excitation unit (E)

This is a special launch fibre or imaging system designed to achieve the specified launch conditions.

2.3 Optical detector (D)

Any detector non-linearity contributes directly to measurement error. Therefore, it is important that the detector and associated amplification circuits exhibit sufficiently good linearity over all measurement ranges. The amplifier usually contributes the most to non-linearity, particularly when the trans-impedance is changed as the ranges are switched. Precaution should be taken to ensure that the power density at the detector is always at least 10 dB below the saturation level of the detector.

2.4 Temporary joint (TJ)

The insertion loss of the temporary joint shall be sufficiently stable over the time required to perform the measurements. A fusion splice is recommended.

2.5 Reference fibre (RF)

A reference fibre or two reference connector pigtails (R_A and R_B), as specified in the detail specification.

3 Procedure

3.1 The specimen shall be preconditioned as specified in the detail specification.

3.2 Assemble the measurement set-up as shown in figure 2a for unconnectorized attenuators with attached pigtails, or figure 2b for attenuators with attached connectors or connector pigtails. Measure and record power level P_0 .

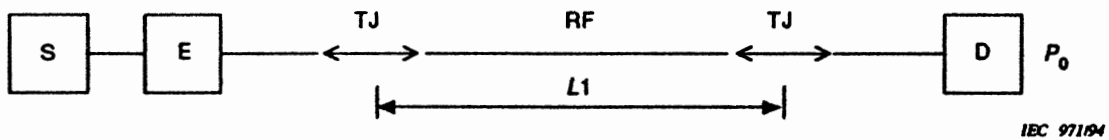


Figure 2a

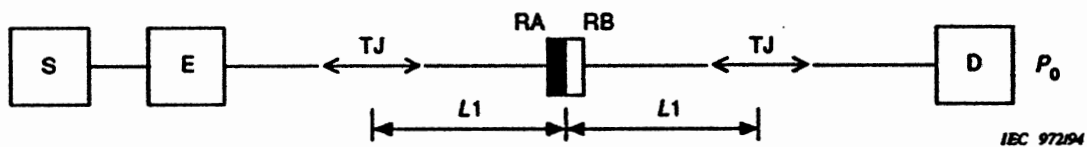


Figure 2b

3.3 Insert the device to be measured (DUT) into the measurement set-up as shown in figure 3a, 3b or 3c as applicable.

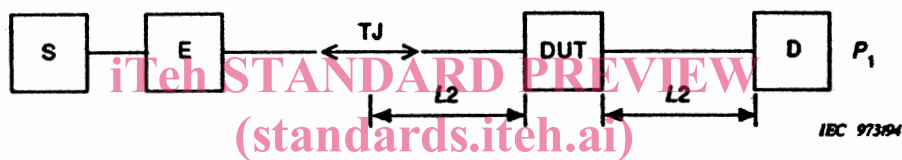


Figure 3a

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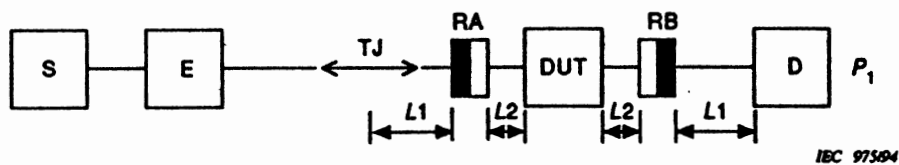


Figure 3b