SLOVENSKI STANDARD

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Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-15: Examinations and measurements - Eccentricity of a convex polished ferrule endface (IEC 61300-3-15:1995)

ICS 33.180.20

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Fibre optic interconnecting devices and passive components Basic test and measurement procedures Part 3-15: Examinations and measurements Eccentricity of a convex polished ferrule endface (IEC 61300-3-15:1995)

Dispositifs d'interconnexion et composants passifs à fibres optiques Méthodes fondamentales d'essais et de mesures Partie 3-15: Examens et mesures Excentricité de la face terminale d'un embout poli convexe (CEI 61300-3-15:1995)

Lichtwellenleiter - Verbindungselemente und passive Bauteile - Gründlegende Prüf- und Meßverfahren Teil 3-15: Untersuchungen und Messungen - Exzentrizität eines konvex polierten Stiftes (IEC 61300-3-15:1995)

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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 the International Standard IEC 61300-3-15:1995, 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 61300-3-15 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- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1998-06-01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 61300-3-15:1995 was approved by CENELEC as a European Standard without any modification.

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Partie 3-15:
Mesures – Excentricité de la face terminale d'un embout poli convexe

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

Part 3-15:
Measurements – Eccentricity of a convex polished ferrule endface

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 3-15: Measurements – Eccentricity of a convex polished ferrule endface

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 1300-3-15 has been prepared by sub-committee 86B: Fibre optic interconnecting devices and passive components, of technical committee 86: Fibre optics.

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

DIS	Report on voting
86B/184/DIS	86B/574/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 components – Basic test and measurement procedures.

Part 1: General and guidance

Part 2: Tests

Part 3: Measurements

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

Part 3-15: Measurements – Eccentricity of a convex polished ferrule endface

1 General

1.1 *Scope and object*

The object of this part of IEC 1300 is to describe measurements of dome eccentricity of a spherically polished ferrule endface. Two procedures are presented: a Newton ring method and an interference method.

1.2 *General description*

Dome eccentricity (X) is defined as the distance between the axis of the ferrule and the line parallel to the axis which passes through the vertex or highest point on the dome formed by spherically polishing the ferrule as shown in figure 1.

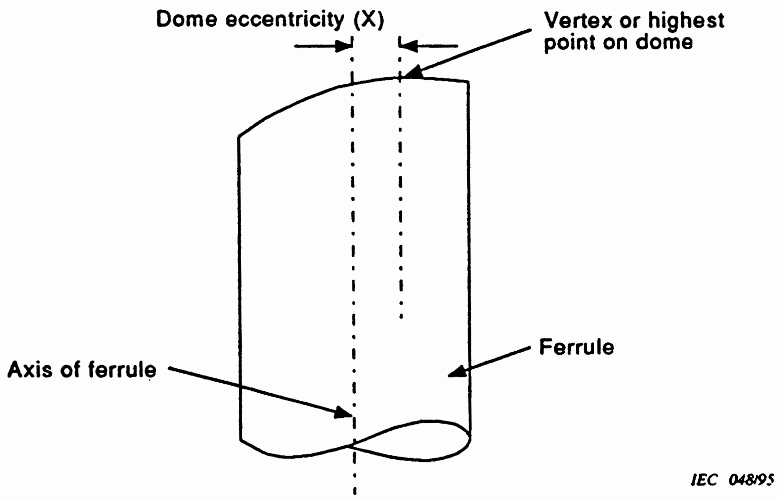

Figure 1 – Definition of dome eccentricity

The eccentricity may be directly determined as the distance between the centre of the fibre or fibre hole and the centre of the Newton ring or interference ring. In this case, the eccentricity measurement will be affected by any misalignment of the measuring system, especially the angular offset between the ferrule axis and the interferometric axis. The alignment of the measuring system shall be strictly checked and adjusted.

In both the Newton ring method and an interference method, errors due to misalignment of the measuring system can be reduced by rotating the ferrule around its axis and observing the maximum displacement of the centre of the Newton or interference rings. The dome eccentricity is one-half of the maximum displacement.

1.2.1 *Method 1 – Newton ring method (contacting method)*

In this method, the polished ferrule is pressed against a flat glass plate which is held perpendicular to the axis of the ferrule, and by using a microscope the Newton ring is observed. The ferrule is rotated around its axis. The displacement of the centre of the Newton ring is observed. The eccentricity is determined as one-half of the maximum displacement.

1.2.2 *Method 2 – Interference ring method (non-contacting method).*

This method uses an interferometer and a microscope with a TV camera.

Interference is created between the reference beam and the beam reflected from the ferrule endface, and the interference ring is observed. The ferrule is rotated around its axis. The displacement of the centre of the interference ring is observed. The eccentricity is determined as one-half of the maximum displacement.

1.3 *Normative reference*

The following normative document contains provisions which, through reference in this text, constitute provisions of this part of IEC 1300. At the time of publication, the edition indicated was valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 1300 are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 2538: 1974, *Limits and fits – Series of angles and slopes on wedges and prisms*

2 Apparatus

2.1 *Method 1 – Newton ring method*

This method 1 requires the following material:

- a ferrule holder with a V-groove or precision sleeve mounted on a micro-manipulator (the ferrule holder shall be capable of holding the ferrule against the glass plate with a specified force. According to ISO 2538, the preferred angle for the V-groove is 108°);
- a flat glass plate perpendicular to the axis of the V-groove or precision sleeve;
- a microscope;
- a light source (white light).

2.2 *Method 2 – Interference ring method*

This method 2 requires the following material:

- a V-groove or precision sleeve mounted on a micro-manipulator (according to ISO 2538, the preferred angle for the V-groove is 108°);
- an interferometer;
- a microscope with TV camera;
- a TV monitor;
- a light source (example: He-Ne laser, monochromatic lamp).

3 Procedure

3.1 *Method 1 – Newton ring method*

a) Place the ferrule in the V-groove or the precision sleeve.

b) Position the ferrule into a visual field of the microscope using the micro-manipulator.

c) Bring the ferrule into perpendicular contact with the glass plate and with the specified pressure at the ferrule/glass interface.

d) Observe the Newton ring and record the position of the centre of the ring (see figure 2).

e) Rotate the ferrule through 180°. Record the second position of the centre of the ring.

f) Record the displacement 2X of the centre of the Newton ring. The dome eccentricity is one-half of the displacement (see figures 3a) and 3b).

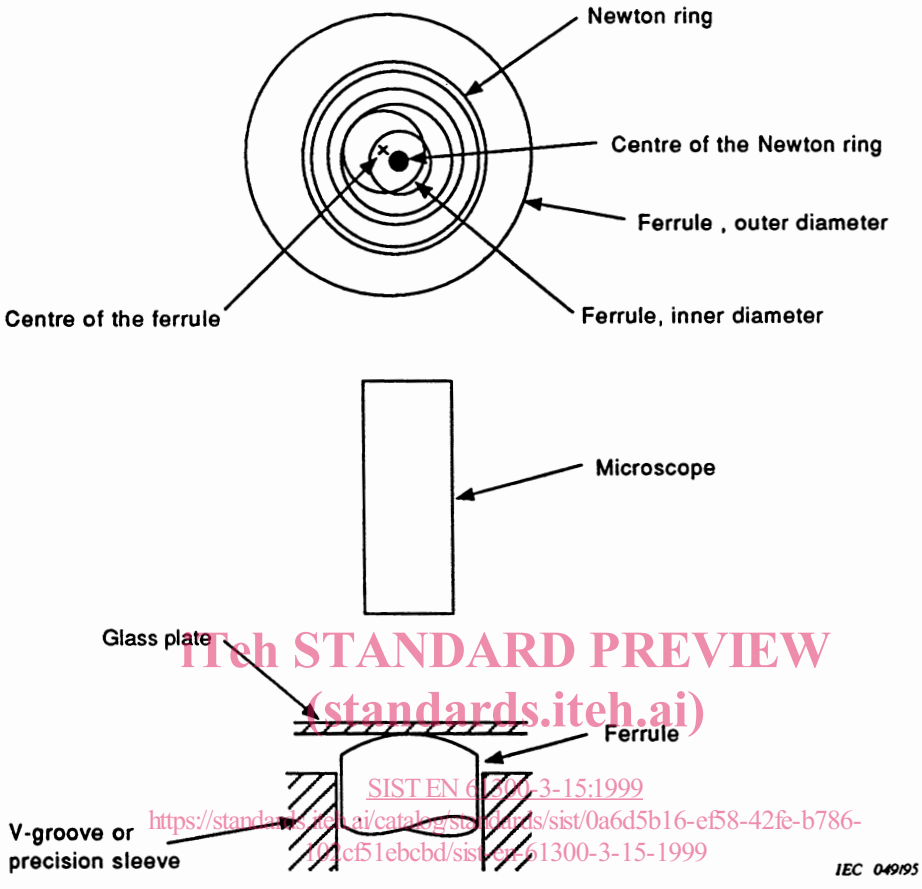

Figure 2 – Example of set-up for eccentricity measurement (method 1)