

# INTERNATIONAL STANDARD

**Fibre optic interconnecting devices and passive components – Basic test and measurement procedures –  
Part 2-44: Tests – Flexing of the strain relief of fibre optic devices**





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Part 2-44: Tests – Flexing of the strain relief of fibre optic devices**

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FIBRE OPTIC INTERCONNECTING  
DEVICES AND PASSIVE COMPONENTS –  
BASIC TEST AND MEASUREMENT PROCEDURES –****Part 2-44: Tests –  
Flexing of the strain relief of fibre optic devices**

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International Standard IEC 61300-2-44 has been prepared by subcommittee SC86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

This third edition cancels and replaces the second edition published in 2008 and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) revision of Figure 1;
- b) change of fibre length from the flex point to the weight.

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

CDV	Report on voting
86B/3499/CDV	86B/3600/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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 publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

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

## **Part 2-44: Tests – Flexing of the strain relief of fibre optic devices**

### **1 Scope**

This part of IEC 61300 specifies a test to determine the influence of flexing under tensile load of the strain relief of fibre optic devices. The intention is to simulate the number of flexing cycles which would typically be experienced during service life. This test is applied to both single fibre cable and multiple fibre cable.

### **2 Normative references**

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

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 61300-3-3, *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*

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

IEC 61753-1, *Fibre optic interconnecting devices and passive components performance standard – Part 1: General and guidance for performance standards*

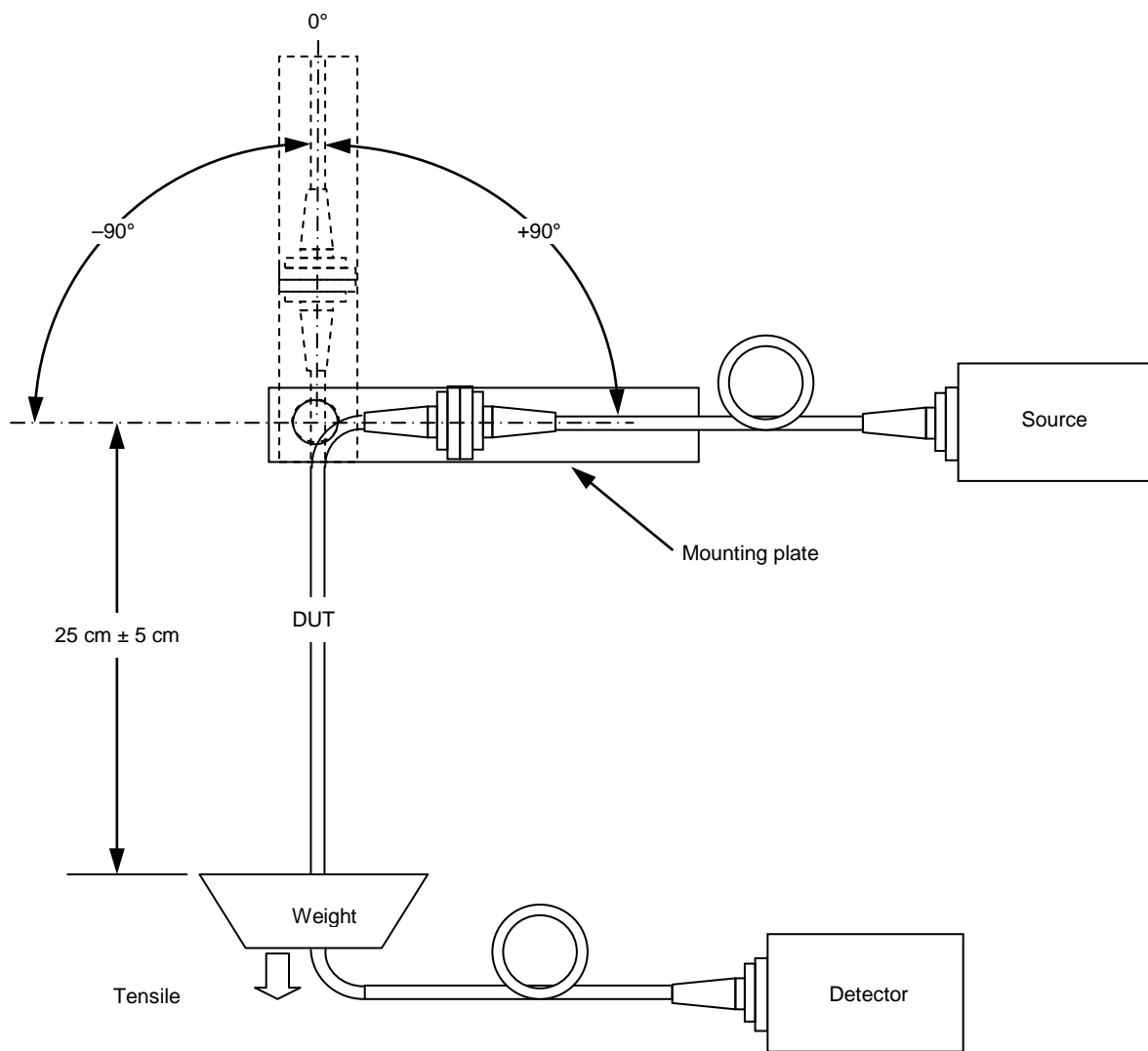
### **3 General description**

The device under test (DUT) is rotated  $\pm 90^\circ$  in the plane of the cable about an axis perpendicular to the axis of the attached cable and in the case of ribbon cable, parallel to the width of the ribbon. This causes flexing of the strain relief and cable close to the DUT. During the flexing, a tensile force, but no torque, is applied.

### **4 Apparatus**

#### **4.1 General**

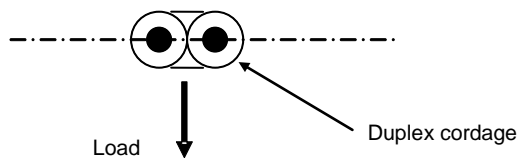
The apparatus for testing and the flexing patterns involved are presented in Figure 1.



IEC 1603/13

**Figure 1 – Apparatus for testing**

In the case of duplex cordage or ribbon, the loads shall not be doubled and the cable shall be bent in the minor axis direction as shown in Figure 2.



IEC 1276/04

**Figure 2 – Application of the load in the case of duplex cordage**

The equipment used is that indicated in 4.2 to 4.5.

#### **4.2 Optical source (S)**

The recommended source shall be in accordance with IEC 61300-3-3 and IEC 61300-3-4 as appropriate.



### 4.3 Detector (D)

The recommended detector shall be in accordance with IEC 61300-3-3 and IEC 61300-3-4 as appropriate.

### 4.4 Mounting fixture

The mounting fixture rigidly holds the fibre optic DUT in correct alignment during the test. If the device is a fibre optic connector, an adaptor or a receptacle may be used as a mounting fixture. The fixture shall not distort the DUT. The fixture shall allow the DUT to be connected to monitoring equipment.

### 4.5 Flex test machine or jig

A machine or jig that can rotate the DUT  $\pm 90^\circ$  from a straight position while applying a load to the fibre or cable.

## 5 Procedure

### 5.1 Preparation of specimens

Prepare and clean the specimen in accordance with the manufacturer's instructions.

Visually check that the attachment of the cable to the fibre optic device is not damaged in accordance with IEC 61300-3-1.

Fibre length from the flex point to the weight:  $25 \text{ cm} \pm 5 \text{ cm}$ .

Fibre length is measured from the point of flexing to the point of application of the load.

### 5.2 Preconditioning

Pre-condition the specimen and all equipment for 2 h at the standard test conditions as defined in IEC 61300-1, unless otherwise specified in the relevant specification.

### 5.3 Initial measurements

Complete initial examinations and measurements on the specimen as required by the relevant specification.

### 5.4 Conditioning

Install the DUT on the apparatus.

Measure the attenuation of the DUT with the flexing arm in a vertical position in accordance with IEC 61300-3-4.

Apply the specified tensile load and apply the specified number of flexes. Use gentle rotational movements, not exceeding 20 cycles/min. The dwell at each extreme shall be not greater than 5 s.

Measure the change in attenuation during test in accordance with IEC 61300-3-3.

Stop the flexing with the flexing arm in vertical position. Remove the tensile force.

## 5.5 Recovery

Allow the DUT to remain under standard test conditions for 2 h, as defined in IEC 61300-1, unless otherwise specified in the relevant specification. Clean the DUT in accordance with the manufacturer's instructions.

## 5.6 Final measurements

Remove the DUT from the apparatus and make final measurements, as defined by the relevant specification, to ensure that there is no permanent damage to the DUT. The results of the final measurement shall be within the limit established in the relevant specification.

Visually check that the attachment of the cable to the fibre optic DUT is not damaged in accordance with IEC 61300-3-1.

## 6 Severity

Severity is specified by the magnitude of tensile force and the number of cycles  $+90^\circ$  to  $-90^\circ$ .

Recommended values of the test parameters are given in Table 1.

**Table 1 – Severities**

Category <sup>a</sup>	Component type	Tensile force N	Number of cycles
C	Connectors – Reinforced cable	2	100
C	Passive components – Reinforced cable	2	30
U and E	Connectors – Reinforced cable	5	100
U and E	Passive components – Reinforced cable	5	30
O	Passive components – Reinforced jacketed cables	5	30
	Primary and secondary coated fibre	2	30
O	Connectors – Reinforced jacketed cables	8,9	100 <sup>b</sup>
	SFF connectors	5,9	100 <sup>b</sup>
<sup>a</sup> Category can be found in IEC 61753-1. <sup>b</sup> Applied at 25 cm $\pm$ 5 cm from cable entrance to plug.			

## 7 Details to be specified

The relevant specification shall specify the following details:

- magnitude of tensile force;
  - number of flexes;
  - applicable optical fibre cable (type, length, etc.);
  - initial examination and measurements and performance requirements;
  - permitted change of attenuation during test;
  - final examination and measurements and performance requirements;
  - pass/fail decision criterion;
  - deviations from test procedure.
-





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