

INTERNATIONAL STANDARD



**Fibre optic interconnecting devices and passive components – Basic test and measurement procedures –
Part 2-11: Tests – Axial compression**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 2-11: Tests – Axial compression

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.
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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 61300-2-11:2012. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 61300-2-11 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 third edition cancels and replaces the second edition published in 2012. This edition constitutes a technical revision.

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

- a) added Terms and definitions clause;
- b) removed severity table for closures;
- c) added recommended severity for tubes and cables without strength member attachment.

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

| Draft | Report on voting |
|---------------|------------------|
| 86B/4807/FDIS | 86B/4824/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 English.

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 in the 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.

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

Part 2-11: Tests – Axial compression

1 Scope

The purpose of this part of IEC 61300 is to ensure that the captivation or the attachment of the cable to the fibre optic devices or components, for example fibre optic closures, will withstand compressive axial loads likely to be applied during normal service.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 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*

3 Terms, definitions, and abbreviated terms

3.1 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.2 Abbreviated terms

DUT device under test

4 General description

The ~~specimen~~ DUT is rigidly clamped and an axial compressive load is applied to the cable.

5 Apparatus

5.1 General

The test apparatus shall be capable of applying an axial compression load between a clamped ~~specimen~~ device or component and a fixed cable. The apparatus consists of the elements described in 5.2 to 5.5.

5.2 Moveable clamping device

A ~~suitable~~ clamping device which grips a length of fibre optic cable over a distance equivalent to at least three times the cable diameter (see Figure 1, dimension A), and which is capable of providing an axial load without slipping, causing damage to the cable or increasing attenuation.

5.3 Fixed clamping device

A fixed clamping device capable of gripping the ~~specimen~~ device or component without altering any of its mechanical properties.

5.4 Force generator

A force generator may be any device or apparatus capable of smoothly applying the specified force at the specified rate.

5.5 Force gauge

A ~~suitable~~ An instrument for measuring the applied force being exerted between the ~~specimen~~ device or component and the fibre optic cable.

6 Procedure

6.1 Preparation of ~~specimens~~ DUT

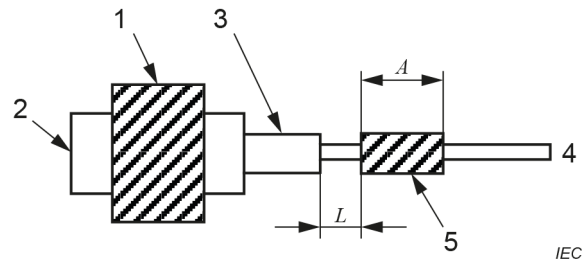
The ~~specimen~~ DUT shall consist of a fully assembled optical device or component, ~~prepared in accordance with the relevant specification~~ where one or more cables are fixed and prepared in accordance with the manufacturer's instructions. ~~Unless otherwise specified,~~ The ~~specimen~~ DUT shall be subjected to the following test procedure in non-operational mode.

6.2 Preconditioning

~~Unless otherwise specified,~~ Precondition each prepared ~~specimen~~ DUT for at least 2 h at the standard ~~test~~ atmospheric conditions specified in IEC 61300-1.

6.3 Mounting of the DUT

Securely fix the device ~~under test~~ or component to the fixed clamping device. See Figure 1 for an example of the test set-up. Clamp the cable at the point of application using a ~~movable~~ clamping device such that the distance, L , between the rear of the strain relief and the front of the ~~cable~~ ~~moveable~~ clamping device is ~~twice the cable diameter~~. ~~The length, L , shall be~~ at maximum twice the cable diameter to prevent cable buckling.



Key

- 1 fixed clamping device
- 2 device ~~under test~~ or component
- 3 strain relief
- 4 fibre optic cable
- 5 movable clamping device
- A cable clamp length (at least three times the cable diameter)
- L length between rear of strain relief and cable clamp (maximum two times the cable diameter)

Figure 1 – Example of test ~~apparatus~~ set-up

6.4 Initial examination

The DUT shall be visually inspected according to IEC 61300-3-1.

6.5 Application of load

Smoothly apply the axial compressive load to the cable, as recommended in Table 1. ~~Unless otherwise specified,~~ Maintain the load for a minimum of 2 min. The position of the point of application shall be such that the load is axially transmitted.

6.6 Recovery

Allow DUT to recover for at least 4 h at standard atmospheric conditions specified in IEC 61300-1.

6.7 ~~Post-test~~ Final examination

Remove the axial compressive load from the ~~specimen~~ DUT and the ~~specimen~~ DUT from the test mounting. ~~Unless otherwise specified,~~ Visually examine the ~~specimen~~ DUT and its component parts in accordance with IEC 61300-3-1. Check for evidence of cracking, loose parts, chipped parts, scratches, permanent deformation, displacement, excessive movements or other damage to cable jacket, seals, strain relief or fibres which might impair its function, and against any other pass/fail criteria specified in the relevant IEC 61753 performance standard or IEC 62005 reliability specification. Careful attention shall be given to degradation of the optical signal, fibre breakage and excessive movement of the cable relative to the ~~specimen~~ DUT.

7 Severity

~~The severity consists of the magnitude of the axial compressive force. The severity shall be specified in the relevant specification. Recommended values of the test parameters are given in Table 1 and Table 2.~~

Table 1 shows the specified test severities in relation to the performance categories. It is recommended to verify the test severities with the relevant IEC 61753 performance standards and IEC 62005 reliability specifications for the normative values.

Table 1 – Recommended severity levels

| Cable diameter mm | Load N |
|----------------------|-----------|
| <3 | 10 |
| 3 to 6 | 20 |
| 6 to 10 | 50 |
| 10 to 20 | 100 |
| >20 | 200 |

| Category | Cable diameter mm | Load N |
|------------|---|-----------|
| C, A, G, S | < 3 | 10 |
| | ≥ 3 to < 6 | 20 |
| | ≥ 6 to < 10 | 50 |
| | ≥ 10 to < 20 | 100 |
| | ≥ 20 | 200 |
| | For tubes and cables without strength member attachment | 10 |

Table 2 – Recommended severity levels for closures

| Target | Load N | Duration min |
|-------------------------|-----------|-----------------|
| Central strength member | 450 | 30 |

8 Details to be specified and reported

The following details, as applicable, shall be specified in the relevant specification and shall be reported in the test report:

- magnitude of the load;
- duration of the axial compression load if other than 2 min;
- cable type, diameter;
- ~~Length L~~
- ~~Rate of load application~~
- ~~Specimen mated or unmated~~
- ~~Specimen optically functioning or non-functioning~~
- type of load application;
- description of DUT;
- pre-conditioning procedure;
- ~~Post conditioning procedure~~
- initial examinations and measurements and performance requirements;
- examinations and measurements during test and performance requirements, if required;
- final examinations and measurements and performance requirements;
- optical measurement method, if necessary;
- deviations from test procedure;

- additional pass/fail criteria.

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