BS EN 61300-2-7:2013

BSI Standards Publication

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

Part 2-7: Tests — Bending moment

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The UK participation in its preparation was entrusted by Technical Committee GEL/86, Fibre optics, to Subcommittee GEL/86/2, Fibre optic interconnecting devices and passive components.

A list of organizations represented on this committee can be obtained on request to its secretary.

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(IEC 61300-2-7:2013)

Dispositifs d'interconnexion et composants passifs à fibres optiques - Procédures fondamentales d'essais et de mesures - Partie 2-7: Essais - Moment de flexion (CEI 61300-2-7:2013)

Lichtwellenleiter - Verbindungselemente und passive Bauteile - Grundlegende Prüf- und Messverfahren - Teil 2-7: Prüfungen - Biegemoment (IEC 61300-2-7:2013)

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Foreword

The text of document 86B/3579A/FDIS, future edition 2 of IEC 61300-2-7, prepared by SC 86B, “Fibre optic interconnecting devices and passive components”, of IEC TC 86, “Fibre optics” was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61300-2-7:2013.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2014-03-12
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2014-06-12

This document supersedes EN 61300-2-7:1997.

EN 61300-2-7:2013 includes the following significant technical changes with respect to EN 61300-2-7:1997:

a) a complete reconsideration of the entire document, including additional normative references;

b) clarification of the device under test (DUT);

c) clarification of the relationship between severities, performance categories and the DUT.

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 61300-3-1	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-1: Examinations and measurements - Visual examination	EN 61300-3-1	-
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	EN 61300-3-3	-
IEC 61300-3-4	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-4: Examinations and measurements - Attenuation	EN 61300-3-4	-

CONTENTS

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

Part 2-7: Tests – Bending moment

1 Scope

This part of IEC 61300 details a procedure for determining the suitability of a fibre optic device to withstand the environmental condition of a bending moment which may occur in actual use, storage and/or transport. The test is primarily intended to permit the observation of effects of a bending moment. The bending moment may result in effects that would destroy functional utility, cause loss of physical strength, and cause changes in other important mechanical properties. Degradation of optical properties may also occur. The specimen may be a component, a connector set, a splice or other device combination intended for fibre optic usage.

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 61300-3-1, *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 tests 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 tests and measurement procedures – Part 3-4: Examinations and measurements – Attenuation*

3 General description

The specimen is placed in an apparatus and subjected to a bending moment which is maintained at a given temperature for a specified duration, as specified in the relevant specification. The bending moment is smoothly applied to the specimen so as to bend its longitudinal axis.

4 Apparatus

4.1 Design for a 1 piece or 3 piece DUT

This design is suitable for specimens which consist of one part, like splices.

The apparatus consists of the following elements:

a) two steel rods placed at an appropriate distance in from the extreme ends of the DUT;

b) a steel finger with a defined endface radius which is placed in the middle of the supported DUT;

c) a force generator capable of smoothly applying the specified force at the specified rate to the steel finger;

d) an optional clamping device to fix the DUT;

e) additional measuring equipment.

If the specimen has to operate during the test, then additional equipment and operating conditions shall be specified in the relevant specification.

An example of an apparatus is shown in Figure 1.

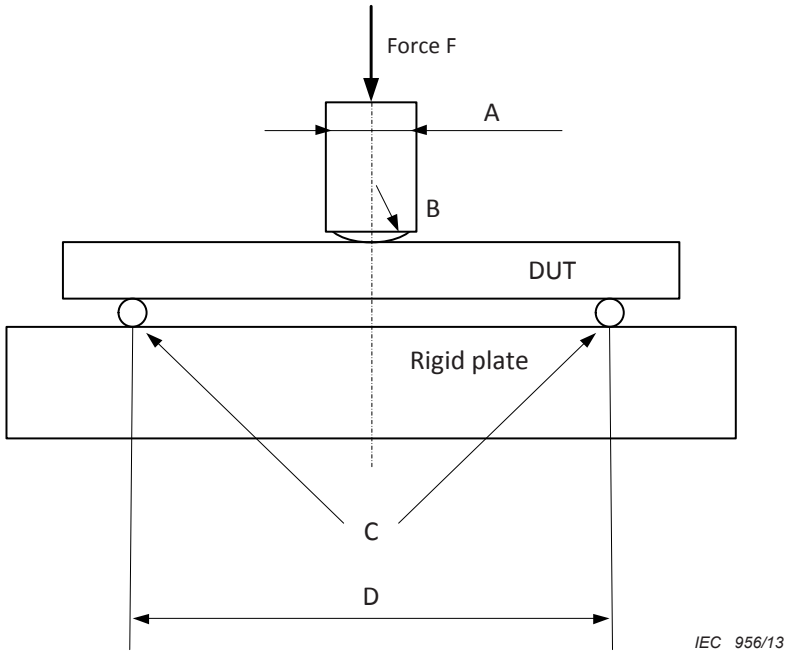

Figure 1 – Test apparatus to apply a bending moment to a 1 piece or 3 piece DUT

4.2 Design for a 2 piece DUT

This design is suitable for specimens which consist of two parts, like connector sets. The two parts are joined together.

The apparatus consists of the following elements:

a) a clamping device on which the DUT, Part 1 is placed;

b) a steel finger with a defined endface radius which is placed at the end of the DUT, Part 2;

c) a force generator capable of smoothly applying the specified force at the specified rate to the steel finger;

d) additional measuring equipment.

If the specimen has to operate during the test, then additional equipment and operating conditions shall be specified in the relevant specification.

An example of an apparatus is shown in Figure 2.

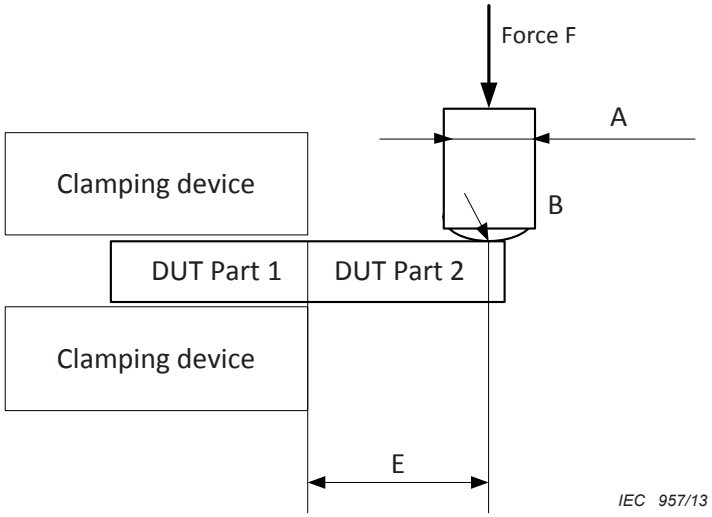

Figure 2 – Test apparatus to apply a bending moment to a 2 piece DUT

4.3 Optical measurements

Where active monitoring is specified, measuring equipment specified in IEC 61300-3-3 shall be connected to the specimen for monitoring optical performance during the test. The optical source and detector used to measure changes in attenuation shall comply with those specified in IEC 61300-3-4.

5 Procedure

5.1 Preconditioning

Maintain the specimen under standard atmospheric condition (room temperature condition) for a minimum of 2 h.

Clean the specimen according to the manufacturer's instructions.

5.2 Initial examinations and measurements

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

5.3 Conditioning for a 1 piece or 3 piece DUT

a) Apply the DUT on the steel rods and securely clamp them, if necessary.

b) Smoothly apply a force to the steel finger at the middle of the DUT and at the values specified in the relevant specification.

c) Maintain the force for 10 s minimum.

d) If required in the relevant specification, optical measurements (i.e. attenuation, return loss) shall be performed and the results shall be collected.

e) Where optical measurements are required during the test, measurements shall be made in accordance with IEC 61300-3-3. The relevant specification shall define the measurements and period(s) during testing after which they shall be carried out. The measurements shall not cause any change to the test conditions.

5.4 Conditioning for a 2 piece DUT

a) Properly join the two parts of the DUT together, according to the manufacturer's instruction.

b) Securely clamp DUT, Part 1.

c) Smoothly apply a force to DUT, Part 2 at the specified point of application and at the values specified in the relevant specification.

d) Maintain the force for 10 s minimum.

e) If required in the relevant specification, optical measurements (i.e. attenuation, return loss) shall be performed and the results shall be collected.

f) Where optical measurements are required during the test, measurements shall be made in accordance with IEC 61300-3-3. The relevant specification shall define the measurements and period(s) during testing after which they shall be carried out. The measurements shall not cause any change to the test conditions.

5.5 Recovery

Allow the specimen to remain under standard atmospheric conditions for a period of 10 min.

5.6 Final examinations and measurements

On completion of the test, remove all fixtures. Clean the mechanical and optical alignment parts of the specimen according to the manufacturer's instructions. Take final measurements as required by the relevant specification. If specified, visually examine the specimen in accordance with IEC 61300-3-1 and take any measurements specified to ensure that there is no permanent damage.

6 Severity

The severities for both methods are determined as indicated in Table 1.

Table 1 – Relationship between severities, performance categories and DUT

DUT	Operating environment	Force F N	Remark
1 piece or 3 piece DUT: Mechanical splices and closures	Controlled C	–	
	Uncontrolled U and O	2 10	For mechanical splices For closures
	Extreme E	–	
	Aerial A	–	
	Ground G	–	
	Subterranean S	–	
2 piece DUT: Connectors	Controlled C	–	
	Uncontrolled U and O	10	
	Extreme E	–	

The severity shall be given in the relevant specification. The severities according to Table 2 or Table 3 may be used for the procedure.

Table 2 – Severities for an 1 piece or 3 piece DUT

Force F N	**Diameter A** mm	**Radius B** mm	**Diameter C** mm	**Distance D** mm	**Remark**
2	10	30	5	The point of application shall be at the ends of the rigid part of the DUT minus 2 mm	For mechanical splices
10	10	30	5	The point of application shall be at the ends of the rigid part of the DUT minus 2 mm	For closures

Table 3 – Severities for an 2 piece DUT

Force F N	**Diameter A** mm	**Radius B** mm	**Distance E** mm
10	10	30	The point of application shall be at the end of the rigid part of the DUT part two minus 2 mm

7 Details to be specified

The following details, as applicable, shall be specified in the relevant specification:

a) Force F
b) Diameter A
c) Diameter B
d) Diameter C
e) Distance D (if applicable)
f) Distance E (if applicable)
g) Direction of the force relative to the specimen
h) Applied load speed or feed speed up to the force F
i) Duration of exposure
j) Specific mounting structures
k) Specimen optically functioning
l) Initial examinations and measurements and performance requirements
m) Examinations and measurements during test and performance requirements
n) Final examinations and measurements and performance requirements
o) Deviations from test procedure
p) Additional pass/fail criteria

Annex A
(informative)

Example for a bending moment test method for splices

An example for a test set-up is shown in Figure A.1.

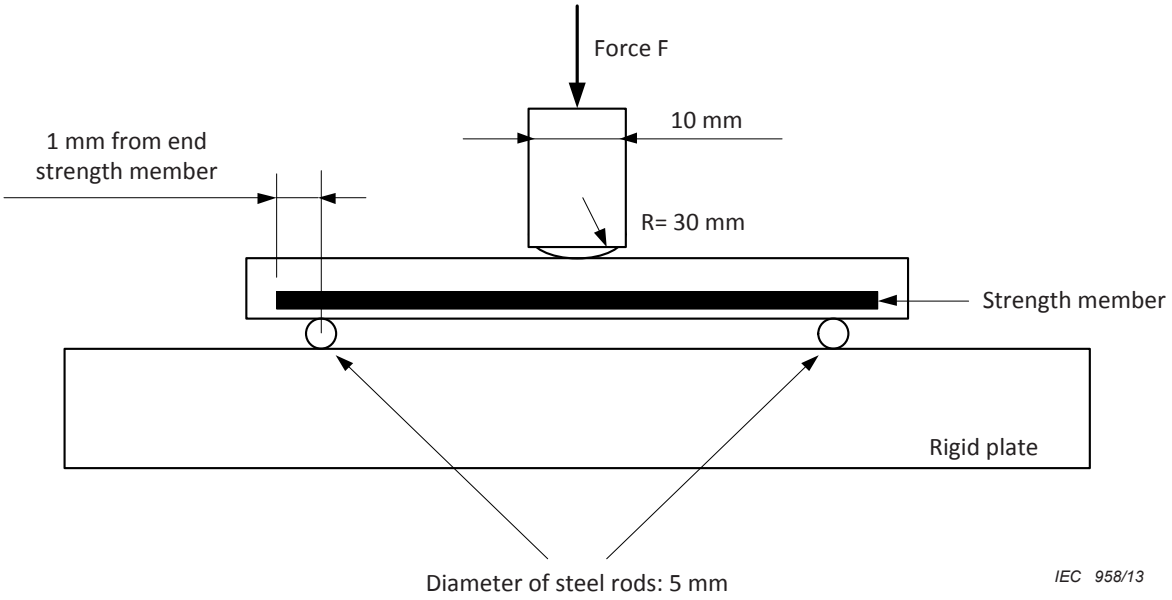

Figure A.1 – Example for a bending moment test set-up for splices

The splice protector will be supported on 5 mm steel rods at both extremes of the strength member. The steel rods are placed 1 mm from the ends of the strength member to avoid unwanted deformation and stress inside the splice protector. A 10 mm wide steel finger or beam with an endface radius of 30 mm is placed in the middle of the supported splice protector. A load of 10 N is applied on the finger or beam for 10 s and then removed.

The change in attenuation shall be measured before and after the test.

For the foldover or clam shell fibre protector types, the outer body of the splice protector is considered to be the strength member. The load shall be applied in the direction that corresponds with the insertion force as applied in real life when the splice protector is inserted in the splice holder. A support on both sides (e.g. a slot) is allowed to avoid “capsizing” of the splice protector when the load is applied.

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