BS EN 61300-2-5:2011

BSI Standards Publication

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

Part 2-5 : Tests — Torsion

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National foreword

This British Standard is the UK implementation of EN 61300-2-5:2011. It is identical to IEC 61300-2-5:2009. It supersedes BS EN 61300-2-5:2002, which is withdrawn.

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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Compliance with a British Standard cannot confer immunity from legal obligations.

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Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-5: Tests - Torsion

(IEC 61300-2-5:2009)

Dispositifs d'interconnexion et composants passifs à fibres optiques - Procédures fondamentales d'essais et de mesures - Partie 2-5: Essais - Torsion
(CEI 61300-2-5:2009)

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(IEC 61300-2-5:2009)

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European Committee for Electrotechnical Standardization
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Foreword

The text of document 86B/2774/FDIS, future edition 3 of IEC 61300-2-5, 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 was approved by CENELEC as EN 61300-2-5 on 2011-03-18.

This European Standard supersedes EN 61300-2-5:2002.

Specific technical changes from EN 61300-2-5:2002 are as follows:

– the title was changed;

– the procedure was reconsidered;

– the figure of closure test set-up was added;

– the severity of the test was reconsidered according to the component.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

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)	2011-12-18
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2012-03-18

Annex ZA has been added by CENELEC.

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Endorsement notice

The text of the International Standard IEC 61300-2-5:2009 was approved by CENELEC as a European Standard without any modification.

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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.

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 61300-1	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 1: General and guidance	EN 61300-1	-
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	-
IEC 61300-3-6	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-6: Examinations and measurements - Return loss	EN 61300-3-6	-

CONTENTS

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

Part 2-5: Tests – Torsion

1 Scope

The purpose of this part of IEC 61300 is to determine the ability of the cable attachment element of the device under test to withstand torsional loads, while under tension, as might be experienced during installation and normal service. The scope of the test also includes those elements designed for ribbon cables.

2 Normative references

The following referenced documents are indispensable for the application 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 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 61300-3-6, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-6: Examinations and measurements – Return loss*

3 General description

The cable-to-device interface, while under a specified tension, is subjected to a torsional load or twisting action to determine the effects of this action on the physical and optical properties of the device.

4 Apparatus

4.1 General

The test apparatus shall be capable of applying simultaneously both tension and a torsional load or twisting action to the cable-to-device interface. Figures 1 and 2 show the basic parts of a test apparatus for component and closure test set-ups, respectively.

4.2 Mounting fixture

Use a fixture to rigidly mount the device under test and hold it in proper alignment throughout the test. The fixture shall allow the device under test to be connected to an optical source and detector for monitoring attenuation.

4.3 Cable clamp

The cable clamp is the point at which the torsional load is applied. The cable clamp shall be capable of grasping and securing the cable so that it does not turn or slip in the holder when loads are applied. The clamp shall not crush the optical fibres or cause a change in the attenuation. The cable clamp may consist of a mandrel around which several turns of cable are wrapped and secured.

4.4 Weights

Weights or another mechanism for applying a tensile load to the cable clamp are required. Values of recommended loads are given in Table 1.

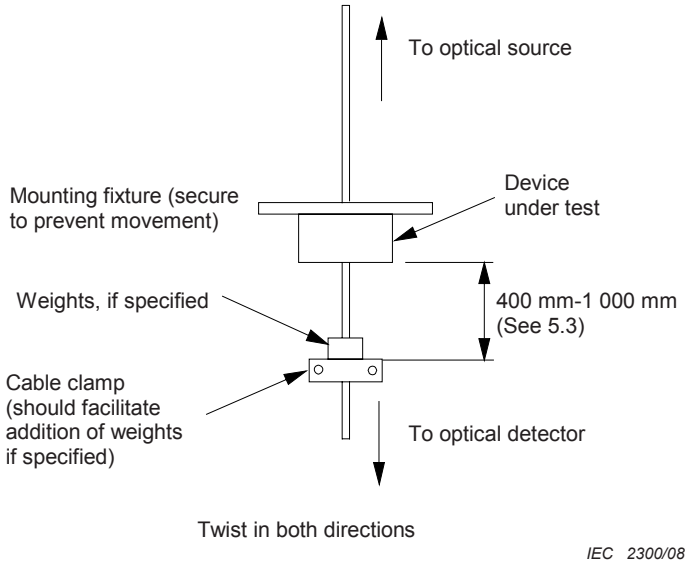

Figure 1 – Component or device test set-up

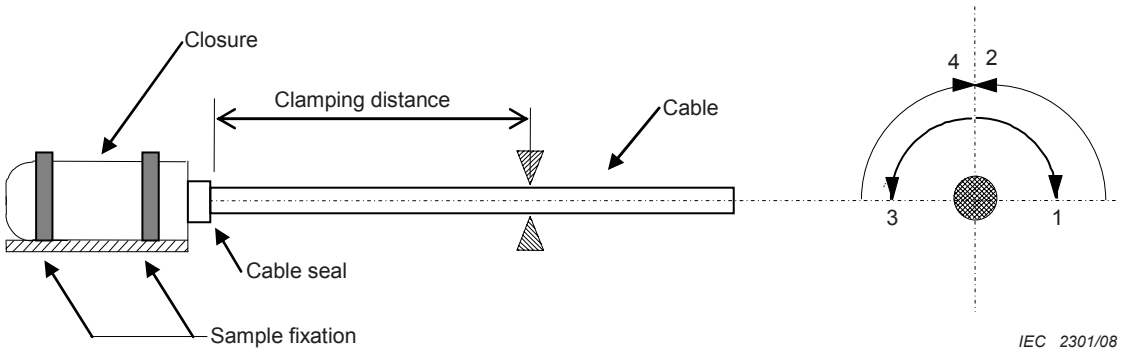

Figure 2 – Closure test set-up

4.5 Optical source and detector

The optical source and detector used to measure changes in attenuation shall comply with that specified in IEC 61300-3-4.

5 Procedure

5.1 Preparation of specimens

Prepare the specimens according to the manufacturer's instructions or as specified in the relevant specification. The device under test shall be terminated onto a sufficient length of fibre cable to facilitate interfacing with the optical source and detector.

5.2 Pre-conditioning

Pre-condition the device under test for 2 h at the standard test conditions specified in IEC 61300-1, unless otherwise specified in the relevant specification. Measure and record the attenuation of the device under test.

5.3 Mount the device under test

The body of the specimen shall be rigidly mounted to a holding plate which is secured in a fixed position (see Figure 1). The clamp to which the load can be applied shall be fastened to the cable in such a manner that the optical fibre or cable is not crushed. The top of the cable clamp shall be 400 mm from the end of the strain relief, if used (see Figure 1). For cable diameters larger than 25 mm, the top of the cable clamp shall be 1 000 mm from the end of the strain relief. If there is no strain relief, the end of the specimen nearest the cable clamp shall be the reference.

5.4 Measure the attenuation

Re-measure the attenuation to ensure that the fixturing and cable clamping have not affected the cable's attenuation.

5.5 Apply cable load

Gradually apply the tensile load, as recommended in Table 1 or as specified in the relevant specification, to the cable clamping fixture, being careful to avoid any sudden jerking or straining of the cable.

5.6 Measure the attenuation

After the load is applied, re-measure the attenuation of the specimen. This value shall be recorded and used as a reference to determine the effects of the twisting motion.

5.7 Twist the cable

Apply a twisting motion to the cable-clamping device, being careful to control the vertical and horizontal motion of the load. One twist cycle shall consist of a twist angle (as indicated in Table 1 or in the relevant specification) in one direction, a return to the original position, a twist angle (as indicatead in Table 1 or in the relevant specification) in the opposite direction and a final return to the original position. Repeat the twist cycle as many times as specified in Table 1, or in the relevant specification.

5.8 Test pressure

For Category S closures, use a test pressure: 40 kPa ± 2 kPa over-pressure at test temperature. For products used in pressurized networks, all testing should be carried out at 98,0 kPa ± 9,8 kPa over-pressure instead of 40 kPa over-pressure.

5.9 Monitoring attenuation

The attenuation of the specimen shall be monitored during the test, as described in IEC 61300-3-3, unless otherwise specified in the relevant specification. Any deviation in the device attenuation from that measured in IEC 61300-3-6 shall be considered attributable to the cable/device interface, fibre-to-fibre interfaces or fibre-to-source/detector interfaces in the device.

NOTE If there are unacceptable changes in attenuation and it is questionable whether the cable itself may be at fault, a control test to determine cable contribution shall be performed in the same manner using a piece of cable and two cable clamps.

5.10 Final measurements and examinations

After completion of the cable twist cycling, remove all fixtures and make a final attenuation measurement to ensure that there is no permanent damage to the device under test. The results of the final measurement shall be within the limit established in the relevant specification.

Remove the device from the mounting fixture and, unless otherwise specified, visually examine the specimens in accordance with IEC 61300-3-1. Check for evidence of any degradation in the specimen. This may include, for example:

– broken, loose or damaged parts or accessories;
– breaking or damage to the cable jacket, seals, strain relief, or fibres;
– displaced, bent, broken or chipped parts;
– scratching of any interface areas.

6 Severity

The severity of the test is dependent upon the tensile load applied, the number of twists per cycle (twist angle) and the number of twist cycles. The severity shall be specified in the relevant specification. Recommended values of the test parameters are given in Table 1.

Table 1 – Severity levels

Component	Recommended load N	Twist angle (1 cycle - °)	Number of cycles
CAT U and CAT E connectors with coated fibre	2,0	180	25
CAT U and CAT E connectors with reinforced cable	15,0	180	25
CAT U and CAT E passive components with coated fibre	2,0	180	10
CAT U and CAT E passive components with reinforced cable	5,0	180	10
CAT O passive components with coated fibre	2,0	180	10
CAT O passive components with reinforced cable	5,0	180	10
CAT O connectors with 250 µm coated fibre	4,9	540	10
CAT O connectors with 900 µm coated fibre	7,4	540	10
CAT O connectors with reinforced cable	13,3	900	10
CAT C, CAT A, CAT G and CAT S closures	50,0	90	5

7 Details to be specified

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

- Tensile load applied to the cable
- Acceptable change in attenuation
- Clamping distance (for closures)
- Twist angle
- Number of cycles
- Sealing performance measurements (for closures)
- Deviations from the test procedure
- Additional pass/fail criteria

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