BS EN 61300-2-1:2009

BSI Standards Publication

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

Part 2-1: Tests — Vibration (sinusoidal)

National foreword

This British Standard is the UK implementation of EN 61300-2-1:2009. It is identical to IEC 61300-2-1:2009, incorporating corrigendum January 2010. It supersedes BS EN 61300-2-1:2003 which is withdrawn.

The start and finish of text introduced or altered by corrigendum is indicated in the text by tags. Text altered by IEC corrigendum January 2010 is indicated in the text by ▌AC1〉 〈AC1▐.

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 subcommittee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

ISBN 978 0 580 54392 0

ICS 33.180.20

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

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 April 2010.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61300-2-1

November 2009

ICS 33.180.20

Supersedes EN 61300-2-1:2003

English version

Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-1: Tests - Vibration (sinusoidal)

(IEC 61300-2-1:2009)

Dispositifs d'interconnexion et composants passifs à fibres optiques - Méthodes fondamentales d'essais et de mesures - Partie 2-1: Essais - Vibrations (sinusoïdales) (CEI 61300-2-1:2009)

Lichtwellenleiter - Verbindungselemente und passive Bauteile - Grundlegende Prüf- und Messverfahren - Teil 2-1: Prüfungen - Schwingung (sinusförmig) (IEC 61300-2-1:2009)

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 86B/2862/FDIS, future edition 3 of IEC 61300-2-1, 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 61300-2-1 on 2009-10-01.

This European Standard supersedes EN 61300-2-1:2003.

Changes from EN 61300-2-1:2003 are to reconsider the severity and the structure of this standard.

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)	2010-07-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2010-10-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61300-2-1:2009 was approved by CENELEC as a European Standard without any modification.

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 60068-2-6	-[1)]	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	2008[2)]
IEC 61300-1	-[1)]	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 1: General and guidance	EN 61300-1	2003[2)]
IEC 61300-3-1	-[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	2005[2)]
IEC 61300-3-3	-[1)]	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	2009[2)]
IEC 61300-3-28	-[1)]	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-28: Examinations and measurements - Transient loss	EN 61300-3-28	2002[2)]

[1)] Undated reference.

[2)] Valid edition at date of issue.

CONTENTS

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

Part 2-1: Tests – Vibration (sinusoidal)

1 Scope

This part of IEC 61300 evaluates the effects of vibration on fibre optic devices at the predominant frequency ranges and magnitudes that may be encountered during field service.

NOTE Most vibrations encountered in service are not of a simple harmonic nature. However, it has been shown that tests based on vibrations of this type are satisfactory to simulating actual service.

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 60068-2-6, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

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 61300-3-28, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-28: Examinations and measurements – Transient loss*

3 General description

This procedure is derived from IEC 60068-2-6, test Fc. The device under test (DUT) is mounted on a vibration generator and vibrated with a sinusoidal motion. The DUT is exposed to vibration in three mutually perpendicular directions, one of which is parallel to the optical axis. The vibration amplitude is specified either in terms of constant displacement or constant acceleration.

4 Apparatus

4.1 General

The apparatus shall be in accordance with IEC 60068-2-6, test Fc and consists of the following elements.

4.2 Vibration generator

A vibration generator capable of generating a sinusoidal excitation and its auxiliary test equipment.

4.3 Mounting fixture

A suitable DUT mounting fixture capable of transmitting the vibration conditions specified shall be used. The mounting fixture shall be designed so that the resonant vibration inherent in the fixture shall not have an effect on the specified frequency range. The amplitude and the acceleration of the applied vibration shall be monitored on the test fixture near the DUT mounting points.

4.4 Measuring equipment

Unless otherwise specified, measuring equipment specified in IEC 61300-3-3 shall be connected to the DUT for monitoring the optical performances during the test; moreover the transient loss measuring equipment specified in IEC 61300-3-28 shall be used to detect fast variation of attenuation.

5 Procedure

5.1 Preparation of DUT

Prepare the DUT according to the manufacturer's instructions or as specified in the relevant specification.

5.2 Pre-conditioning

Pre-condition the DUT for 2 h at the standard test conditions specified in IEC 61300-1, unless otherwise specified in the relevant specification.

5.3 Initial measurement

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

5.4 Conditioning

The DUT shall be mounted rigidly to the fixture in a manner that simulates normal mounting as closely as possible. A minimum of 200 mm of optical fibre/cable shall be unsupported on both ends of the DUT and be attached free of tension to the vibrating surface. Conduct the procedure in accordance with IEC 60068-2-6, test Fc. The DUT shall be vibrated in three mutually perpendicular axes coincident with the principal axes of the device. If the sample has axial symmetry the number of axes to be tested can be reduced to two. The vibration endurance shall be performed by sweeping continuously between minimum and maximum frequency at a specified rate. An example of vibration apparatus test is outlined in Figure 1.

5.5 Monitoring

The attenuation and/or return loss of the DUT shall be monitored during the test using an x-y-plotter, an oscilloscope or/and a digital data acquisition system for recording as described in IEC 61300-3-28, unless otherwise specified in the relevant specification. Any change in optical performance shall be within the limit given in the relevant specification.

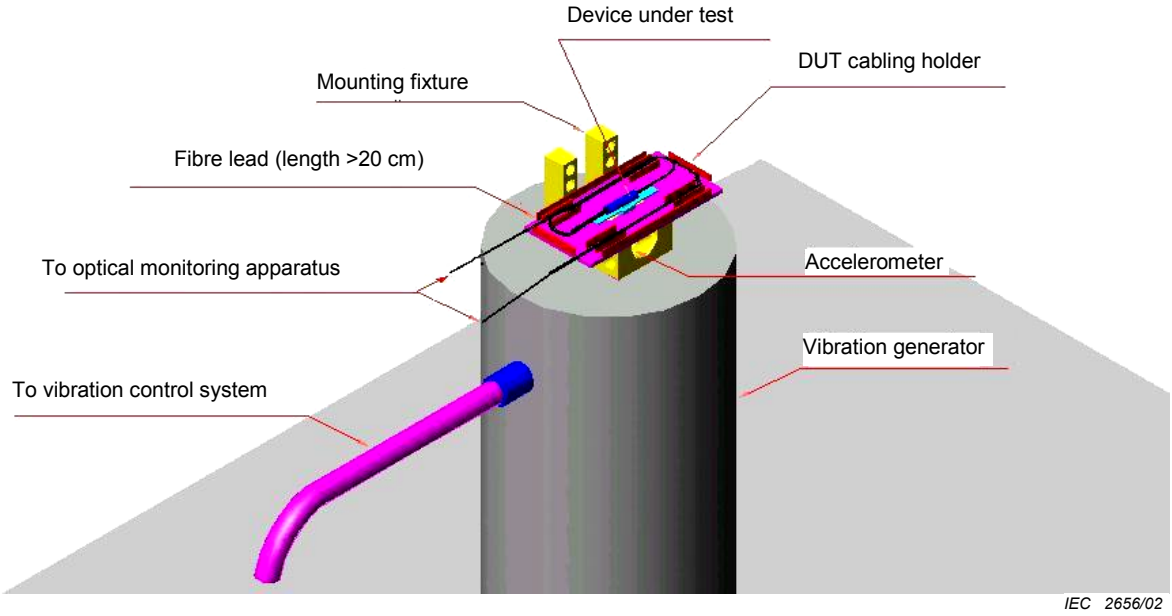

Figure 1 – Example of vibration apparatus

5.6 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.

5.7 Final measurements

On completion of the test, remove all fixtures 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.

Unless otherwise specified, visually examine the DUT in accordance with IEC 61300-3-1. Check for evidence of any degradation in the DUT. 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.

6 Severity

The severity consists of the combination of frequency range, vibration amplitude, sweep rate and either number of sweeps or endurance duration per axis. The severity shall be specified in the relevant specification. Recommended values of the test parameters are given below in Table 1 and 2.

〈AC1〉 Table 1 – Connectors and passive components

Category	Parameter	Value
Categories C, U and E	Frequency range	10 Hz– 55 Hz
	Sweep rate	1 oct/min
	Number of sweeps	15/axis
	Amplitude	0,75 mm
Category O	Frequency range	10 Hz – 55 Hz
	Sweep rate	1 oct/min for passive components 45 Hz/min for connectors
	Duration	2 h/axis
	Amplitude	1,52 mm for passive components 0,75 mm for connectors

Table 2 – Fibre management systems and closures

Category	Parameter	Value
Categories C, A, G and S	Frequency range	5 Hz – 500 Hz
	Sweep rate	1 oct/min
	Number of sweeps	10/axis
	Amplitude	3,5 mm below 9 Hz
	Acceleration	9,8 m/s^2 above 9 Hz 〈AC1〉

7 Details to be specified

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

– frequency range;
– vibration amplitude;
– number of sweeps;
– endurance duration per axis;
– frequency change at constant rate;
– initial examinations and measurements and performance requirements;
– examinations and measurements during test and performance requirements;
– final examinations and measurements and performance requirements;
– deviations from test procedure;
– additional pass/fail criteria.

_____

This page deliberately left blank

British Standards Institution (BSI)

BSI is the independent national body responsible for preparing British Standards and other standards-related publications, information and services.
It presents the UK view on standards in Europe and at the international level.

It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover.

Tel: +44 (0)20 8996 9001 Fax: +44 (0)20 8996 7001

BSI offers Members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Tel: +44 (0)20 8996 7669 Fax: +44 (0)20 8996 7001
Email: plus@bsigroup.com

Buying standards

You may buy PDF and hard copy versions of standards directly using a credit card from the BSI Shop on the website **www.bsigroup.com/shop.** In addition all orders for BSI, international and foreign standards publications can be addressed to BSI Customer Services.

Tel: +44 (0)20 8996 9001 Fax: +44 (0)20 8996 7001
Email: orders@bsigroup.com

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Knowledge Centre.

Tel: +44 (0)20 8996 7004 Fax: +44 (0)20 8996 7005
Email: knowledgecentre@bsigroup.com

Various BSI electronic information services are also available which give details on all its products and services.

Tel: +44 (0)20 8996 7111 Fax: +44 (0)20 8996 7048
Email: info@bsigroup.com

BSI Subscribing Members are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration.

Tel: +44 (0)20 8996 7002 Fax: +44 (0)20 8996 7001
Email: membership@bsigroup.com

Information regarding online access to British Standards via British Standards Online can be found at **www.bsigroup.com/BSOL**

Further information about BSI is available on the BSI website at **www.bsigroup.com/standards**

Copyright

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Tel +44 (0)20 8996 9001
Fax +44 (0)20 8996 7001
www.bsigroup.com/standards

raising standards worldwide™