



**NSAI**  
Standards

Irish Standard  
I.S. EN 60728-6:2011

Cable networks for television signals,  
sound signals and interactive services  
-- Part 6: Optical equipment (IEC 60728  
-6:2011 (EQV))

## I.S. EN 60728-6:2011

*Incorporating amendments/corrigenda issued since publication:*

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S.R. xxx: Standard Recommendation - recommendation based on the consensus of an expert panel and subject to public consultation.

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EUROPEAN STANDARD

**EN 60728-6**

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2011

ICS 33.060.40; 33.160.99

Supersedes EN 60728-6:2003

English version

**Cable networks for television signals, sound signals and interactive services -**

**Part 6: Optical equipment**

(IEC 60728-6:2011)

Réseaux de distribution par câbles pour signaux de télévision, signaux de radiodiffusion sonore et services interactifs -

Partie 6: Matériels optiques  
(CEI 60728-6:2011)

Kabelnetze für Fernsehsignale, Tonsignale und interaktive Dienste -  
Teil 6: Optische Geräte  
(IEC 60728-6:2011)

This European Standard was approved by CENELEC on 2011-05-16. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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**CENELEC**

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

**Management Centre: Avenue Marnix 17, B - 1000 Brussels**

## Foreword

The text of document 100/1654/CDV, future edition 3 of IEC 60728-6, prepared by technical area 5, Cable networks for television signals, sound signals and interactive services, of IEC TC 100, Audio, video and multimedia systems and equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60728-6 on 2011-05-16.

This European Standard supersedes EN 60728-6:2003.

EN 60728-6:2011 includes the following significant technical changes with respect to EN 60728-6:2003.

- The normative references were updated.
- The methods of measurement for optical power and return loss were substituted by references to other standards.
- The method of measurement for polarization dependent loss was deleted.
- A method of measurement for carrier-to-crosstalk ratio (CCR) was added.
- The methods of measurement for CSO and CTB of optical amplifiers were substituted by a method of measurement for microscopic gain tilt of optical amplifiers. This parameter can be used for calculating the second order distortion of optical amplifiers according to the method described in the new Annex B.
- New classes for optical transmitters and receivers have been defined.

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) 2012-02-16
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2014-05-16

Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 60728-6:2011 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60068 series	NOTE	Harmonized in EN 60068 series (not modified).
IEC 60068-2-48	NOTE	Harmonized as EN 60068-2-48.
IEC 60169-2	NOTE	Harmonized as EN 60169-2.
IEC 60728-5	NOTE	Harmonized as EN 60728-5.

IEC 60793-2-50	NOTE	Harmonized as EN 60793-2-50.
IEC 60825-2	NOTE	Harmonized as EN 60825-2.
IEC 61280-2-2	NOTE	Harmonized as EN 61280-2-2.
IEC 61280-4-2	NOTE	Harmonized as EN 61280-4-2.
IEC 61281-1:1999	NOTE	Harmonized as EN 61281-1:1999 (not modified).
IEC 61290-1-1	NOTE	Harmonized as EN 61290-1-1.
IEC 61290-1-2	NOTE	Harmonized as EN 61290-1-2.
IEC 61290-3-1	NOTE	Harmonized as EN 61290-3-1.
IEC 61290-6-1	NOTE	Harmonized as EN 61290-6-1.
IEC 61291-4	NOTE	Harmonized as EN 61291-4.

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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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60068-1 + corr. October	1988 1988	Environmental testing - Part 1: General and guidance	EN 60068-1 <sup>1)</sup>	1994
IEC 60068-2-1	-	Environmental testing - Part 2-1: Tests - Test A: Cold	EN 60068-2-1	-
IEC 60068-2-2	-	Environmental testing - Part 2-2: Tests - Test B: Dry heat	EN 60068-2-2	-
IEC 60068-2-6	2007	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	2008
IEC 60068-2-14	-	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	-
IEC 60068-2-27	-	Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock	EN 60068-2-27	-
IEC 60068-2-30	-	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	EN 60068-2-30	-
IEC 60068-2-31	-	Environmental testing - Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens	EN 60068-2-31	-
IEC 60068-2-40	-	Environmental testing - Part 2-40: Tests. Test Z/AM: Combined cold/low air pressure tests	EN 60068-2-40	-
IEC 60169-24	-	Radio-frequency connectors - Part 24: Radio-frequency coaxial connectors with screw coupling, typically for use in 75 ohm cable distribution systems (Type F)	EN 60169-24	-
IEC 60529	-	Degrees of protection provided by enclosures - (IP Code)	-	-
IEC 60728-1	-	Cable networks for television signals, sound signals and interactive services - Part 1: System performance of forward paths	EN 60728-1	-

<sup>1)</sup> EN 60068-1 includes A1 to IEC 60068-1 + corr. October.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60728-2	-	Cabled distribution systems for television and sound signals - Part 2: Electromagnetic compatibility for equipment	-	-
IEC 60728-3	2010	Cable networks for television signals, sound signals and interactive services - Part 3: Active wideband equipment for cable networks	EN 60728-3	2011
IEC 60728-11	-	Cable networks for television signals, sound signals and interactive services - Part 11: Safety	EN 60728-11	-
IEC 60728-13 + corr. August	2010 2010	Cable networks for television signals, sound signals and interactive services - Part 13: Optical systems for broadcast signal transmissions	EN 60728-13	2010
IEC 60793-2-50	2008	Optical fibres - Part 2-50: Product specifications - Sectional specification for class B single-mode fibres	EN 60793-2-50	2008
IEC 60825-1	-	Safety of laser products - Part 1: Equipment classification and requirements	EN 60825-1	-
IEC 61280-1-1	-	Fibre optic communication subsystem basic test procedures - Part 1-1: Test procedures for general communication subsystems - Transmitter output optical power measurement for single-mode optical fibre cable	EN 61280-1-1	-
IEC 61280-1-3	-	Fibre optic communication subsystem test procedures - Part 1-3: General communication subsystems - Central wavelength and spectral width measurement	EN 61280-1-3	-
IEC/TR 61282-4	-	Fibre optic communication system design guides - Part 4: Accommodation and utilization of non-linear effects	-	-
IEC 61290-1	Series	Optical amplifiers - Test methods - Part 1: Optical power and gain parameters	EN 61290-1	Series
IEC 61290-1-3	-	Optical amplifiers - Test methods - Part 1-3: Power and gain parameters - Optical power meter method	EN 61290-1-3	-
IEC 61290-3-2	2003	Optical amplifiers - Part 3-2: Test methods for noise figure parameters - Electrical spectrum analyzer method	EN 61290-3-2 <sup>2)</sup>	2003
IEC 61290-5	Series	Optical amplifiers - Test methods - Part 5: Reflectance	EN 61290-5	Series
IEC 61290-6	Series	Optical fibre amplifiers - Basic specification - Part 6: Test methods for pump leakage parameters	EN 61290-6	Series

<sup>2)</sup> EN 61290-3-2 is superseded by EN 61290-3-2:2008, which is based on IEC 61290-3-2:2008.

**I.S. EN 60728-6:2011**

EN 60728-6:2011

- 6 -

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61290-11	Series	Optical amplifier - Test methods - Part 11: Polarization mode dispersion parameter	EN 61290-11	Series
IEC 61291-1	-	Optical amplifiers - Part 1: Generic specification	EN 61291-1	-
IEC 61291-5-2	-	Optical amplifiers - Part 5-2: Qualification specifications - Reliability qualification for optical fibre amplifiers	EN 61291-5-2	-
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	-
IEC 61754-4	-	Fibre optic connector interfaces - Part 4: Type SC connector family	EN 61754-4	-
IEC/TR 61931	1998	Fibre optic - Terminology	-	-
IEC 80416	Series	Basic principles for graphical symbols for use on equipment	EN 80416	Series
IEC 60417	database	Graphical symbols for use on equipment	-	-
IEC 60617	database	Graphical symbols for diagrams	-	-



## CONTENTS

FOREWORD.....	6
INTRODUCTION.....	8
1 Scope.....	9
2 Normative references.....	9
3 Terms, definitions, symbols and abbreviations .....	11
3.1 Terms and definitions .....	11
3.2 Symbols .....	18
3.3 Abbreviations.....	19
4 Methods of measurement.....	20
4.1 Measurement requirements .....	20
4.1.1 General .....	20
4.1.2 Input specification.....	20
4.1.3 Measurement conditions .....	20
4.2 Optical power .....	21
4.3 Loss, isolation, directivity and coupling ratio.....	21
4.3.1 General .....	21
4.3.2 Measurement requirements.....	21
4.3.3 Principle of measurement .....	21
4.4 Return loss .....	22
4.5 Saturation output power of an optical amplifier .....	22
4.5.1 Purpose.....	22
4.5.2 Procedure.....	22
4.6 Centroidal wavelength and spectral width under modulation .....	22
4.7 Linewidth and chirping of transmitters with single mode lasers .....	23
4.7.1 Purpose.....	23
4.7.2 Equipment required.....	23
4.7.3 General measurement requirements .....	23
4.7.4 Procedure.....	23
4.7.5 Potential sources of error.....	25
4.8 Optical modulation index.....	25
4.8.1 Purpose.....	25
4.8.2 Equipment required.....	25
4.8.3 Procedure.....	25
4.8.4 Potential sources of error.....	26
4.9 Reference output level of an optical receiver .....	26
4.9.1 Purpose.....	26
4.9.2 Equipment required.....	26
4.9.3 General measurement requirements .....	27
4.9.4 Procedure.....	27
4.9.5 Potential sources of error.....	27
4.10 Slope and flatness .....	28
4.10.1 Purpose.....	28
4.10.2 Equipment required.....	28
4.10.3 Procedure.....	28
4.10.4 Potential sources of error.....	29

4.11	Composite second order distortion (CSO) of optical transmitters .....	29
4.11.1	Purpose .....	29
4.11.2	Equipment required .....	30
4.11.3	Procedure .....	30
4.11.4	Potential sources of error .....	30
4.12	Composite triple beats (CTB) of optical transmitters .....	30
4.12.1	Purpose .....	30
4.12.2	Equipment required .....	31
4.12.3	Procedure .....	31
4.12.4	Potential sources of error .....	31
4.13	Composite crossmodulation of optical transmitters .....	31
4.13.1	Purpose .....	31
4.13.2	Equipment required .....	32
4.13.3	Procedure .....	32
4.13.4	Potential sources of error .....	34
4.14	Receiver intermodulation .....	34
4.14.1	Purpose .....	34
4.14.2	Equipment required .....	34
4.14.3	General measurement requirements .....	35
4.14.4	Procedure .....	35
4.14.5	Potential sources of error .....	36
4.15	Microscopic gain tilt of optical amplifiers .....	36
4.15.1	Purpose .....	36
4.15.2	Equipment required .....	36
4.15.3	Procedure .....	37
4.15.4	Potential sources of error .....	38
4.16	Noise parameters of optical transmitters and optical receivers .....	38
4.16.1	Purpose .....	38
4.16.2	Equipment required .....	38
4.16.3	General measurement requirements .....	39
4.16.4	Procedure .....	40
4.16.5	Relative intensity noise .....	42
4.16.6	Equivalent input noise current density .....	42
4.16.7	Potential sources of error .....	42
4.17	Method for combined measurement of relative intensity noise ( <i>RIN</i> ), optical modulation index and equivalent input noise current .....	43
4.17.1	Purpose .....	43
4.17.2	Equipment required .....	43
4.17.3	General measurement conditions .....	44
4.17.4	Procedure .....	44
4.17.5	Potential sources of error .....	45
4.18	Noise figure of optical amplifiers .....	45
4.19	Influence of fibre .....	45
4.19.1	Purpose .....	45
4.19.2	Equipment required .....	45
4.19.3	Procedure .....	45
4.19.4	Potential sources of error .....	45
4.20	SBS threshold .....	46

4.20.1	Purpose .....	46
4.20.2	Equipment required .....	46
4.20.3	Procedure .....	46
4.20.4	Potential sources of error .....	47
4.21	Carrier-to-crosstalk ratio (CCR) .....	47
4.21.1	Purpose .....	47
4.21.2	Equipment required .....	47
4.21.3	Procedure .....	47
4.21.4	Potential sources of error .....	48
5	Universal performance requirements and recommendations .....	48
5.1	Safety .....	48
5.2	Electromagnetic compatibility (EMC) .....	48
5.3	Environmental .....	48
5.3.1	Requirements .....	48
5.3.2	Storage .....	49
5.3.3	Transportation .....	49
5.3.4	Installation or maintenance .....	49
5.3.5	Operation .....	49
5.4	Marking .....	49
6	Active equipment .....	49
6.1	Optical forward path transmitters .....	49
6.1.1	Classification .....	49
6.1.2	Data publication requirement .....	50
6.1.3	Recommendations .....	50
6.1.4	Performance requirements .....	51
6.2	Optical return path transmitters .....	53
6.2.1	Classification .....	53
6.2.2	Data publication requirement .....	53
6.2.3	Recommendations .....	53
6.2.4	Performance requirements .....	54
6.3	Optical receivers .....	54
6.3.1	Classification .....	54
6.3.2	Data publication requirements .....	54
6.3.3	Recommendations .....	55
6.3.4	Performance requirements .....	55
6.4	Optical amplifiers .....	56
6.4.1	Classification .....	56
6.4.2	Data publication requirements .....	56
6.4.3	Performance requirements .....	56
7	Connectors and splices .....	57
	Annex A (normative) Product specification worksheet for optical amplifiers .....	58
	Annex B (informative) Calculation of second-order distortion caused by microscopic gain tilt of optical amplifiers .....	59
	Bibliography .....	60

Figure 1 – Tilt and microscopic gain tilt of optical amplifiers .....	17
Figure 2 – Measurement of optical loss, directivity and isolation.....	21
Figure 3 – Optical saturation output power.....	22
Figure 4 – Measurement of the chirping and the linewidth of transmitters .....	24
Figure 5 – Measurement of the optical modulation index.....	26
Figure 6 – Measurement of the reference output level of an optical receiver.....	27
Figure 7 – Measurement of the slope and flatness .....	28
Figure 8 – Evaluation of the slope .....	29
Figure 9 – Evaluating the flatness.....	29
Figure 10 – Device under test for measuring CSO of optical transmitters .....	30
Figure 11 – Device under test for measuring CTB of optical transmitters.....	31
Figure 12 – Arrangement for measuring composite crossmodulation of optical transmitters.....	33
Figure 13 – Arrangement of test equipment for measuring receiver intermodulation .....	35
Figure 14 – Arrangement of test equipment for measuring microscopic gain tilt.....	37
Figure 15 – System with internal noise sources .....	38
Figure 16 – PIN diode receiver .....	39
Figure 17 – Optical transmission system under test .....	40
Figure 18 – Arrangement of test equipment for carrier-to-noise measurement.....	40
Figure 19 – Measurement set-up for determination of the noise parameters and the optical modulation index.....	44
Figure 20 – Arrangement for measuring the SBS threshold.....	46
Figure 21 – Arrangement for measuring the CCR .....	47
Figure 22 – Classification of return path transmitters .....	53
Table 1 – Noise correction factors $C_n$ for different noise level differences $D$ .....	41
Table 2 – Classes of optical forward path transmitters .....	50
Table 3 – Data publication requirements for optical forward path transmitters .....	50
Table 4 – Recommendations for optical forward path transmitters.....	51
Table 5 – Requirements for optical forward path transmitters .....	52
Table 6 – Data publication requirements for optical return path transmitters .....	53
Table 7 – Recommendations for optical return path transmitters .....	53
Table 8 – Requirements for optical return path transmitters .....	54
Table 9 – Classification of optical receivers .....	54
Table 10 – Data publication requirements for optical receivers.....	55
Table 11 – Recommendations for optical receivers .....	55
Table 12 – Performance requirements for optical receivers.....	56
Table 13 – Classification of optical amplifiers .....	56
Table 14 – Performance requirements for optical amplifiers.....	57
Table A.1 – Parameters of optical amplifiers.....	58

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**CABLE NETWORKS FOR TELEVISION SIGNALS,  
SOUND SIGNALS AND INTERACTIVE SERVICES –**

**Part 6: Optical equipment**

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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International Standard IEC 60728-6 has been prepared by technical area 5: Cable networks for television signals, sound signals and interactive services, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

This third edition cancels and replaces the second edition published in 2003 of which it constitutes a technical revision.

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

- The normative references were updated.
- The methods of measurement for optical power and return loss were substituted by references to other standards.
- The method of measurement for polarization dependent loss was deleted.

**I.S. EN 60728-6:2011**

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– 7 –

- A method of measurement for carrier-to-crosstalk ratio (CCR) was added.
- The methods of measurement for CSO and CTB of optical amplifiers were substituted by a method of measurement for microscopic gain tilt of optical amplifiers. This parameter can be used for calculating the second order distortion of optical amplifiers according to the method described in the new Annex B.
- New classes for optical transmitters and receivers have been defined.

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

CDV	Report on voting
100/1654/CDV	100/1789/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.

The list of all the parts of the IEC 60728 series, under the general title *Cable networks for television signals, sound signals and interactive services*, 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.

## INTRODUCTION

Standards of the IEC 60728 series deal with cable networks including equipment and associated methods of measurement for headend reception, processing and distribution of television signals, sound signals and their associated data signals and for processing, interfacing and transmitting all kinds of signals for interactive services using all applicable transmission media.

- This covers all kinds of networks that convey modulated RF carriers such as CATV-networks;
- MATV-networks and SMATV-networks;
- individual receiving networks;

and all kinds of equipment, systems and installations installed in such networks.

NOTE CATV encompasses the Hybrid Fibre Coaxial (HFC) networks used nowadays to provide telecommunications services, voice, data and audio and video both broadcast and narrowcast.

The extent of this standardisation work is from the antennas and/or special signal source inputs to the headend or other interface points to the network up to the terminal input.

The standardisation of any user terminals (i.e. tuners, receivers, decoders, multimedia terminals, etc.) as well as of any coaxial, balanced and optical cables and accessories thereof is excluded.

The reception of television signals inside a building requires an outdoor antenna and a distribution network to convey the signal to the TV receivers.

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