

Optical amplifiers - Part 1: Generic specification

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NATIONAL FOREWORD

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English version

**Optical amplifiers -
Part 1: Generic specification
(IEC 61291-1:2012)**

Amplificateurs optiques -
Partie 1: Spécification générique
(CEI 61291-1:2012)

Lichtwellenleiter-Verstärker -
Teil 1: Fachgrundspezifikation
(IEC 61291-1:2012)

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

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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 86C/1013/CDV, future edition 3 of IEC 61291-1, prepared by SC 86C "Fibre optic systems and active devices", of IEC/TC 86 "Fibre optics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61291-1:2012.

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) 2013-02-10
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2015-05-09

This document supersedes EN 61291-1:2006.

EN 61291-1:2012 includes the following significant technical changes with respect to EN 61291-1:2006:

The definitions related to transient behaviour have been extensively updated with terms from the EN 61290-4 series and the definition for gain ripple has been added.

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

Endorsement notice

The text of the International Standard IEC 61291-1:2012 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 60793-2	NOTE	Harmonised as EN 60793-2.
IEC 60825-1	NOTE	Harmonised as EN 60825-1.
IEC 60825-2	NOTE	Harmonised as EN 60825-2.
IEC 60874-1	NOTE	Harmonised as EN 60874-1.

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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61290	Series	Optical amplifiers - Test methods	EN 61290	Series
IEC 61290-1-1	-	Optical amplifiers - Test methods - Part 1-1: Power and gain parameters - Optical spectrum analyzer method	EN 61290-1-1	-
IEC 61290-1-2	-	Optical amplifiers - Test methods - Part 1-2: Power and gain parameters – Electrical spectrum analyzer method	EN 61290-1-2	-
IEC 61290-1-3	-	Optical amplifiers – Test methods - Part 1-3: Power and gain parameters - Optical power meter method	EN 61290-1-3	-
IEC 61290-3-1	-	Optical amplifiers - Test methods - Part 3-1: Noise figure parameters - Optical spectrum analyzer method	EN 61290-3-1	-
IEC 61290-3-2	-	Optical amplifiers - Test methods - Part 3-2: Noise figure parameters - Electrical spectrum analyzer method	EN 61290-3-2	-
IEC 61290-4-1	-	Optical amplifiers - Test methods - Part 4-1: Gain transient parameters - two- wavelength method	EN 61290-4-1	-
IEC 61290-4-2	-	Optical amplifiers - Test methods - Part 4-2: Gain transient parameters - Broadband source method	EN 61290-4-2	-
IEC 61290-5-1	-	Optical amplifiers - Test methods - Part 5-1: Reflectance parameters - Optical spectrum analyzer method	EN 61290-5-1	-
IEC 61290-5-2	-	Optical amplifiers - Test methods - Part 5-2: Reflectance parameters - Electrical spectrum analyser method	EN 61290-5-2	-
IEC 61290-5-3	-	Optical fibre amplifiers - Basic specification - Part 5-3: Test methods for reflectance parameters - Reflectance tolerance using an electrical spectrum analyser	EN 61290-5-3	-
IEC 61290-6-1	-	Optical fibre amplifiers - Basic specification - Part 6-1: Test methods for pump leakage parameters - Optical demultiplexer	EN 61290-6-1	-
IEC 61290-7-1	-	Optical amplifiers - Test methods - Part 7-1: Out-of-band insertion losses - Filtered optical power meter method	EN 61290-7-1	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61290-10-1	-	Optical amplifiers - Test methods - Part 10-1: Multichannel parameters - Pulse method using an optical switch and optical spectrum analyser	EN 61290-10-1	-
IEC 61290-10-2	-	Optical amplifiers - Test methods - Part 10-2: Multichannel parameters - Pulse method using a gated optical spectrum analyzer	EN 61290-10-2	-
IEC 61290-10-3	-	Optical amplifiers - Test methods - Part 10-3: Multichannel parameters - Probe methods	EN 61290-10-3	-
IEC 61290-10-4	-	Optical amplifiers - Test methods - Part 10-4: Multichannel parameters - Interpolated source subtraction method using an optical spectrum analyzer	EN 61290-10-4	-
IEC 61290-11-1	-	Optical amplifier - Test methods - Part 11-1: Polarization mode dispersion parameter - Jones matrix eigenanalysis (JME)	EN 61290-11-1	-
IEC 61290-11-2	-	Optical amplifiers - Test methods - Part 11-2: Polarization mode dispersion parameter - Poincaré sphere analysis method	EN 61290-11-2	-
IEC 61291-2	-	Optical amplifiers - Part 2: Digital applications - Performance specification template	EN 61291-2	-
IEC 61291-4	-	Optical amplifiers - Part 4: Multichannel applications - Performance specification template	EN 61291-4	-
IEC 61291-5-2	-	Optical amplifiers - Part 5-2: Qualification specifications - Reliability qualification for optical fibre amplifiers	EN 61291-5-2	-
IEC/TR 61292-3	-	Optical amplifiers - Part 3: Classification, characteristics and applications	-	-
IEC Guide 107	-	Electromagnetic compatibility - Guide to the drafting of electromagnetic compatibility publications	-	-

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OPTICAL AMPLIFIERS –

Part 1: Generic Specification

1 Scope and object

This part of IEC 61291 applies to all commercially available optical amplifiers (OAs) and optically amplified assemblies. It applies to OAs using optically pumped fibres (OFAs based either on rare-earth doped fibres or on the Raman effect), semiconductors (SOAs), and waveguides (POWAs). The object of this standard is:

- to establish uniform requirements for transmission, operation, reliability and environmental properties of OAs;
- to provide assistance to the purchaser in the selection of consistently high-quality OA products for his particular applications.

Parameters specified for OAs are those characterizing the transmission, operation, reliability and environmental properties of the OA seen as a “black box” from a general point of view. In the sectional and detail specifications a subset of these parameters will be specified according to the type and application of the particular OA device or assembly.

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 61290 (all parts), *Optical amplifiers – Test methods*

IEC 61290-1-1, *Optical amplifiers – Test methods – Part 1-1: Power and gain parameters – Optical spectrum analyzer method*

IEC 61290-1-2, *Optical amplifiers – Test methods – Part 1-2: Power and gain parameters – Electrical spectrum analyzer method*

IEC 61290-1-3, *Optical amplifiers – Test methods – Part 1-3: Power and gain parameters – Optical power meter method*

IEC 61290-3-1, *Optical amplifiers – Test methods – Part 3-1: Noise figure parameters – Optical spectrum analyzer method*

IEC 61290-3-2, *Optical amplifiers – Test methods – Part 3-2: Noise figure parameters – Electrical spectrum analyzer method*

IEC 61290-4-1, *Optical amplifiers – Test methods – Part 4-1: Gain transient parameters – Two wavelength method*

IEC 61290-4-2, *Optical amplifiers – Test methods – Part 4-2: Gain transient parameters – Broadband source method*

IEC 61290-5-1, *Optical amplifiers – Test methods – Part 5-1: Reflectance parameters – Optical spectrum analyzer method*

IEC 61290-5-2, *Optical amplifiers – Test methods – Part 5-2: Reflectance parameters – Electrical spectrum analyzer method*

IEC 61290-5-3, *Optical fibre amplifiers – Basic specification– Part 5-3: Test methods for reflectance parameters – Reflectance tolerance using an electrical spectrum analyzer*

IEC 61290-6-1, *Optical fibre amplifiers – Basic specification – Part 6-1: Test methods for pump leakage parameters – Optical demultiplexer*

IEC 61290-7-1, *Optical amplifiers – Test methods – Part 7-1: Out-of-band insertion losses – Filtered optical power meter method*

IEC 61290-10-1, *Optical amplifiers – Test methods – Part 10-1: Multichannel parameters – Pulse method using an optical switch and optical spectrum analyzer*

IEC 61290-10-2, *Optical amplifiers – Test methods – Part 10-2: Multichannel parameters – Pulse method using a gated optical spectrum analyzer*

IEC 61290-10-3, *Optical amplifiers – Test methods – Part 10-3: Multichannel parameters – Probe methods*

IEC 61290-10-4, *Optical amplifiers – Test methods – Part 10-4: Multichannel parameters – Interpolated source subtraction method using an optical spectrum analyzer*

IEC 61290-11-1, *Optical amplifiers – Test methods – Part 11-1: Polarization mode dispersion parameter – Jones matrix eigenanalysis (JME)*

IEC 61290-11-2, *Optical amplifiers – Test methods – Part 11-2: Polarization mode dispersion parameter – Poincaré sphere analysis method*

IEC 61291-2, *Optical amplifiers – Part 2: Digital applications – Performance specification template*

IEC 61291-4, *Optical amplifiers – Part 4: Multichannel applications – Performance specification template*

IEC 61291-5-2, *Optical amplifiers – Part 5-2: Qualification specifications – Reliability qualification for optical fibre amplifiers*

IEC/TR 61292-3, *Optical amplifiers – Part 3: Classification, characteristics and applications*

IEC Guide 107, *Electromagnetic compatibility – Guide to the drafting of electromagnetic compatibility publications*

3 Terms, definitions and abbreviations

3.1 Overview

The definitions listed in this clause refer to the meaning of the terms used in the specifications of OAs. Only those parameters listed in the appropriate specification template, as in IEC 61291-2 and IEC 61291-4, are intended to be specified.

NOTE 1 The numbered terms in this clause are indexed and cross-referenced in Annex A.

The list of parameter definitions of OAs, given in this clause, is divided into two parts: the first part, in 3.1.2, lists those parameters relevant for OA devices, namely power, pre-, line- and