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Optical amplifiers - Test methods -
Part 1-2: Power and gain parameters - Electrical spectrum analyzer method

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 61290-1-2:2005. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 61290-1-2 has been prepared by subcommittee 86C: Fibre optic systems, sensing and active devices, of IEC technical committee 86: Fibre optics. It is an International Standard.

This third edition cancels and replaces the second edition published in 2005. This edition constitutes a technical revision.

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

a) addition of information on the applicability of this document to the scope;
b) harmonization of the scope with the IEC 61290-1 series;
c) addition of safety recommendations to Clause 4 and Clause 5;
d) correction of an error in Clause 7, item e);
e) replacement of the term "wavelength measurement accuracy" with "wavelength accuracy".

The text of this International Standard is based on the following documents:

Draft	Report on voting
86C/1973/CDV	86C/1991/RVC

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 61290 series, published under the general title *Optical amplifiers - Test methods*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,
– withdrawn, or
– revised.

~~INTRODUCTION~~

~~This International Standard is devoted to the subject of optical amplifiers. The technology of optical amplifiers is still rapidly evolving, hence amendments and new editions to this standard can be expected.~~

~~Each abbreviation introduced in this International Standard is explained in the text at least the first time it appears. However, for an easier understanding of the whole text, a list of all abbreviations used in this International Standard is given in Clause 3.~~

1 Scope

This part of IEC 61290 applies to all commercially available optical amplifiers (OAs) and optically amplified sub-systems. It applies to OAs using optically pumped fibres (OFAs based on either rare-earth doped fibres or on the Raman effect), semiconductors (SOAs), and planar optical waveguides (POWAs). This document does not apply to polarization-maintaining optical amplifiers.

~~NOTE The applicability of the test methods described in the present standard to distributed Raman amplifiers is for further study.~~

This document defines uniform requirements for accurate and reliable measurements, by means of the electrical spectrum analyzer test method, of the following OA parameters, as defined in IEC 61291-1, Clause 3:

a) nominal output signal power;

b) gain;

c) reverse gain;

d) maximum gain;

e) polarization-dependent gain.

~~f) large-signal output stability;~~

~~g) saturation output power;~~

~~h) maximum input signal power;~~

~~i) maximum output signal power;~~

~~j) input power range;~~

~~k) output power range;~~

~~l) maximum total output power.~~

In addition, this test method provides a means for measuring the following parameters:

– maximum gain wavelength;

– gain wavelength band.

~~NOTE All numerical values followed by (‡) are suggested values for which the measurement is assured. Other values may be acceptable, but should be verified.~~

This document specifically covers single-channel amplifiers. For multichannel amplifiers, the IEC 61290-10 series~~[1]~~ applies.

NOTE 1 The applicability of the test methods described in this document to distributed Raman amplifiers is for further study.

NOTE 2 A test method for polarization-maintaining optical amplifiers is for further study.

~~[1] See Bibliography.~~

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60793-1-40, *Optical fibres - Part 1-40: Measurement methods and test procedures - Attenuation*

IEC 61291-1~~:2005~~, *Optical amplifiers - Part 1: Generic specification*~~[2]~~

Bibliography

~~IEC 60793-1-1, *Optical fibres – Part 1-1: Measurement methods and test procedures – General and guidance*~~

IEC 60825-1, *Safety of laser products - Part 1: Equipment classification and requirements* ~~*and user's guide*~~

IEC 60825-2, *Safety of laser products - Part 2: Safety of optical fibre communication systems (OFCS)*

~~IEC 60874-1, *Connectors for optical fibres and cables – Part 1: Generic specification*~~

~~IEC 61931, *Fibre optic – Terminology*~~

IEC 61290 (all parts), *Optical amplifiers - Test methods*

IEC 61290-10 (all parts), *Optical amplifiers - Test methods - Part 10: Multichannel parameters*

~~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*~~