

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

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 61290-10-4:2007 sisaldab Euroopa standardi EN 61290-10-4:2007 ingliskeelset teksti. Käesolev dokument on jõustatud 13.09.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 61290-10-4:2007 consists of the English text of the European standard EN 61290-10-4:2007. This document is endorsed on 13.09.2007 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.
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Käsitlusala: This part of IEC 61290 applies to all commercially available optical amplifiers (OAs) and optically amplified subsystems. It applies to OAs using optically pumped fibres (OFAs based on either rare-earth doped fibres or on the Raman effect), semiconductor optical amplifiers (SOAs) and waveguides (POWA).	Scope: This part of IEC 61290 applies to all commercially available optical amplifiers (OAs) and optically amplified subsystems. It applies to OAs using optically pumped fibres (OFAs based on either rare-earth doped fibres or on the Raman effect), semiconductor optical amplifiers (SOAs) and waveguides (POWA).
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ICS 33.180.30

Võtmesõnad:

**Optical amplifiers -
Test methods -
Part 10-4: Multichannel parameters -
Interpolated source subtraction method
using an optical spectrum analyzer
(IEC 61290-10-4:2007)**

Amplificateurs optiques -
Méthodes d'essais -
Partie 10-4: Paramètres
à canaux multiples -
Méthode par soustraction
de la source interpolée en utilisant
un analyseur de spectre optique
(CEI 61290-10-4:2007)

Prüfverfahren
für Lichtwellenleiter-Verstärker -
Teil 10-4: Mehrkanal-Parameter -
Quellen-Interpolations- und
Subtraktionsverfahren
unter Verwendung eines
optischen Spektralanalysators
(IEC 61290-10-4:2007)

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Comité Européen de Normalisation Electrotechnique
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Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 86C/724/CDV, future edition 1 of IEC 61290-10-4, prepared by SC 86C, Fibre optic systems and active devices, of IEC TC 86, Fibre optics, was submitted to the IEC-CENELEC parallel Unique Acceptance Procedure and was approved by CENELEC as EN 61290-10-4 on 2007-06-01.

This standard is to be used in conjunction with EN 61291-1:2006.

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) 2008-03-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2010-06-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61290-10-4:2007 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 61290-1-1 | NOTE Harmonized as EN 61290-1-1:2006 (not modified). |
| IEC 61290-3 | NOTE Harmonized as EN 61290-3:2000 (not modified). |
-

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 61291-1	2006	Optical amplifiers - Part 1: Generic specification	EN 61291-1	2006
IEC 61291-4	- ¹⁾	Optical amplifiers - Part 4: Multichannel applications - Performance specification template	EN 61291-4	2003 ²⁾

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

INTERNATIONAL
STANDARD

IEC
CEI

NORME
INTERNATIONALE

61290-10-4

First edition
Première édition
2007-05

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Méthode par soustraction de la source interpolée
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International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPTICAL AMPLIFIERS – TEST METHODS –

Part 10-4: Multichannel parameters – Interpolated source subtraction method using an optical spectrum analyzer

FOREWORD

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International Standard IEC 61290-10-4 has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics.

This standard shall be used in conjunction with IEC 61291-1. It was established on the basis of the second (2006) edition of that standard.

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

CDV	Report on voting
86C/724/CDV	86C/742/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.

A list of all parts of 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 publication will remain unchanged until the maintenance result 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.

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 additions to this standard can be expected.

OPTICAL AMPLIFIERS – TEST METHODS –

Part 10-4: Multichannel parameters – Interpolated source subtraction method using an optical spectrum analyzer

1 Scope and object

This part of IEC 61290 applies to all commercially available optical amplifiers (OAs) and optically amplified subsystems. It applies to OAs using optically pumped fibres (OFAs based on either rare-earth doped fibres or on the Raman effect), semiconductor optical amplifiers (SOAs) and waveguides (POWA).

The object of this standard is to establish uniform requirements for accurate and reliable measurements, by means of the interpolated source subtraction method using an optical spectrum analyzer. The following OA parameters, as defined in Clause 3 of IEC 61291-1, are determined:

- channel gain, and
- channel signal-spontaneous noise figure.

This method is called *interpolated source subtraction* (ISS) because the amplified spontaneous emission (ASE) at each channel is obtained by interpolating from measurements at a small wavelength offset around each channel. To minimize the effect of source spontaneous emission, the effect of source noise is subtracted from the measured noise.

The accuracy of the ISS technique degrades at high input power level due to the spontaneous emission from the laser source(s). Annex A provides guidance on the limits of this technique for high input power.

An additional source of inaccuracy is due to interpolation error. Annex A provides guidance on the magnitude of interpolation error for a typical amplifier ASE versus wavelength characteristic.

NOTE 1 All numerical values followed by (±) are suggested values for which the measurement is assured. Other values may be acceptable but should be verified.

NOTE 2 General aspects of noise figure test methods are reported in IEC 61290-3.

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 61291-1:2006, *Optical amplifiers – Part 1: Generic specification*

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