

INTERNATIONAL STANDARD

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

**Amplificateurs optiques – Méthodes d'essai –
Partie 4-1: Paramètres de gain transitoire – Méthode à deux longueurs d'onde**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**OPTICAL AMPLIFIERS –
TEST METHODS –**
**Part 4-1: Gain transient parameters –
Two-wavelength method**

FOREWORD

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International Standard IEC 61290-4-1 has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre Optics.

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

CDV	Report on voting
86C/956/CDV	86C/1011/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.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

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

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- withdrawn,
- replaced by a revised edition, or
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Withdrawn

INTRODUCTION

This part of IEC 61290-4 is devoted to the subject of Optical Amplifiers (OAs). The technology of optical amplifiers is quite new and still emerging; hence amendments and new editions to this standard can be expected.

Each abbreviation introduced in this 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 standard is given in 3.3.

Background information on the transient phenomenon in erbium-doped fibre amplifiers and the consequences on fibre optic systems is provided in Annex A and on slow rate effects in Annex B.

Withdrawn

OPTICAL AMPLIFIERS – TEST METHODS –

Part 4-1: Gain transient parameters – Two-wavelength method

1 Scope and object

This part of IEC 61290-4 applies to erbium-doped fibre amplifiers (EDFAs) and optically amplified elementary sub-systems. It applies to OAs using active fibres (optical fibre amplifiers, OFAs), containing rare-earth dopants. These amplifiers are commercially available and widely deployed in service provider networks.

The object of this part of IEC 61290-4 is to provide the general background for EDFA transients and related parameters, and to describe a standard test method for accurate and reliable measurement of the following transient parameters:

- Channel addition/removal transient gain overshoot and transient net gain overshoot
- Channel addition/removal transient gain undershoot and transient net gain undershoot
- Channel addition/removal gain offset
- Channel addition/removal transient gain response time constant (settling time)

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, *Optical amplifiers – Part 1. Generic specification*

NOTE A list of informative references is given in the Bibliography.

3 Terms, definitions and abbreviations

3.1 General

When the input power to an OFA operating in saturation changes sharply, the gain of the amplifier will typically exhibit a transient response before settling back into the required gain. This response is dictated both by the optical characteristics of the active fibre within the OFA as well as the performance of the automatic gain control (AGC) mechanism.

Since a change in input power typically occurs when part of the DWDM channels within the specified transmission band are dropped or added, definitions are provided that describe a dynamic event leading to transient response. Rise and fall time definitions are shown in Figure 1.