

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Fibre optic active components and devices – Reliability standards –
Part 3: Laser modules used for telecommunication**

**Composants et dispositifs actifs en fibres optiques – Normes de fiabilité –
Partie 3: Modules laser utilisés pour les télécommunications**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FIBRE OPTIC ACTIVE COMPONENTS AND DEVICES –
RELIABILITY STANDARDS –****Part 3: Laser modules used for telecommunication**

FOREWORD

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International Standard IEC 62572-3 has been prepared by subcommittee 86C: Fibre optic systems and active devices of IEC technical committee 86: Fibre optics.

This second edition cancels and replaces the first edition published in 2011. This second edition constitutes a technical revision in which multiple errors in references have been corrected.

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

FDIS	Report on voting
86C/1234/FDIS	86C/1259/RVD

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 in the IEC 62572 series, published under the general title *Fibre optic active components and devices – Reliability standards*, 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- withdrawn,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.

INTRODUCTION

The laser modules covered by this International Standard are purchased by system suppliers (SS) to be inserted in equipment, which in turn are supplied/sold to a system operator (SO) or a network operator (see definitions in Clause 3).

For the system operator to act as an informed buyer, he/she should have knowledge of the potential risks posed by the use of critical components..

Optoelectronic component technology is continuing to develop. Consequently, during product development phases, many failure mechanisms in laser modules have been identified. These failure mechanisms, if undetected, could result in very short laser lifetime in system use.

FIBRE OPTIC ACTIVE COMPONENTS AND DEVICES – RELIABILITY STANDARDS –

Part 3: Laser modules used for telecommunication

1 Scope

This part of IEC 62572 deals with reliability assessment of laser modules used for telecommunication.

The aim of this standard is

- to establish a standard method of assessing the reliability of laser modules in order to minimize risks and to promote product development and reliability;
- to establish means by which the distribution of failures with time can be determined. This should enable the determination of equipment failure rates for specified end of life criteria.

In addition, guidance is given in IEC TR 62572-2.

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 60068-2-1, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60747-1, *Semiconductor devices – Part 1: General*

IEC 60749-6, *Semiconductor devices – Mechanical and climatic test methods – Part 6: Storage at high temperature*

IEC 60749-8, *Semiconductor devices – Mechanical and climatic test methods – Part 8: Sealing*

IEC 60749-10, *Semiconductor devices – Mechanical and climatic test methods – Part 10: Mechanical shock*

IEC 60749-11, *Semiconductor devices – Mechanical and climatic test methods – Part 11: Rapid change of temperature – Two-fluid-bath method*

IEC 60749-12, *Semiconductor devices – Mechanical and climatic test methods – Part 12: Vibration, variable frequency*

IEC 60749-25, *Semiconductor devices – Mechanical and climatic test methods – Part 25: Temperature cycling*

IEC 60749-26, *Semiconductor devices – Mechanical and climatic test methods – Part 26: Electrostatic discharge (ESD) sensitivity testing – Human body model (HBM)*

IEC TR 62572-2, *Fibre optic active components and devices – Reliability standards – Part 2: Laser module degradation*

MIL-STD-883, *Test method standard – Microcircuits*

3 Terms, definitions, symbols and abbreviations

3.1 Terms and definitions

For the purposes of this document the following definitions apply.

3.1.1

laser module

packaged assembly containing a laser diode with/without photodiode

Note 1 to entry: The module may also include a cooler and temperature sensor to enable laser temperature to be controlled and monitored. The optical output is normally via an optical fibre pigtail.

3.1.2

submount

substrate upon which a laser diode or photodiode may be mounted for assembly into the laser module

Note 1 to entry: Components on submounts are also subject to qualification testing.

3.1.3

laser module manufacturer

LMM

manufacturer of laser modules who provides devices meeting the requirements of the relevant detail specification (DS) and the customer's reliability requirements

3.1.4

network operator

NO

organization which operates a telecommunications network

3.1.5

system supplier

SS

manufacturer of telecommunications/data transmission equipment containing optoelectronic semiconductor lasers, i.e. laser module customer

3.1.6

system operator

SO

network operator of telecommunications/data transmission equipment containing optoelectronic semiconductor lasers in the transmission path

Note 1 to entry: The system may also be part of other more extensive systems, for example telecommunications, rail, road vehicles, aerospace or weapons.

3.1.7

capability qualifying components

CQC

components selected to represent critical stages of the process and limiting or boundary characteristics of mechanical and electro-optic design

Note 1 to entry: Such components should aid the identification of end product failure mechanisms to enable the determination of activation energies.