



NSAI
Standards

Irish Standard
I.S. EN 62496-2-4:2013

Optical circuit boards - Basic test and measurement procedures -- Part 2-4: Optical transmission test for optical circuit boards without input/output fibres (IEC 62496-2-4:2013 (EQV))

I.S. EN 62496-2-4:2013

Incorporating amendments/corrigenda issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation - recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

| | | |
|--|--|---|
| <i>This document replaces:</i> | <i>This document is based on:</i> EN 62496-2-4:2013 | <i>Published:</i> 30 August, 2013 |
| This document was published under the authority of the NSAI and comes into effect on: 5 September, 2013 | | ICS number: 33.180.01 |
| NSAI 1 Swift Square, Northwood, Santry Dublin 9 | T +353 1 807 3800 F +353 1 807 3838 E standards@nsai.ie W NSAI.ie | Sales: T +353 1 857 6730 F +353 1 857 6729 W standards.ie |
| Údarás um Chaighdeáin Náisiúnta na hÉireann | | |

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 62496-2-4

August 2013

ICS 33.180.01

English version

**Optical circuit boards -
Basic test and measurement procedures -
Part 2-4: Optical transmission test for optical circuit boards
without input/output fibres
(IEC 62496-2-4:2013)**

Cartes à circuits optiques -
Procédures fondamentales d'essais et de
mesures -
Partie 2-4: Essai de transmission optique
des cartes à circuits optiques sans fibres
d'entrée/sortie
(CEI 62496-2-4:2013)

Optische Leiterplatten -
Grundlegende Prüf- und Messverfahren -
Teil 2-4: Optische Übertragungsprüfung
für optische Leiterplatten ohne Eingangs-
/Ausgangsfasern
(IEC 62496-2-4:2013)

This European Standard was approved by CENELEC on 2013-07-23. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 86/449/FDIS, future edition 1 of IEC 62496-2-4, prepared by IEC TC 86 "Fibre optics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62496-2-4:2013.

The following dates are fixed:

- latest date by which the document has to be implemented at (dop) 2014-04-23
national level by publication of an identical national
standard or by endorsement
- latest date by which the national standards conflicting with (dow) 2016-07-23
the document have to be withdrawn

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 62496-2-4:2013 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 62496-2-1 | NOTE | Harmonised as EN 62496-2-1. |
| IEC 60793-2 | NOTE | Harmonised as EN 60793-2. |
| IEC 62496 | NOTE | Harmonised in EN 62496 series (not modified). |

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 60068-1 | - | Environmental testing - Part 1: General and guidance | EN 60068-1 | - |

This page is intentionally left BLANK.

CONTENTS

| | |
|---|----|
| FOREWORD | 4 |
| 1 Scope | 6 |
| 2 Normative references | 6 |
| 3 Terms, definitions and abbreviations | 6 |
| 3.1 Terms and definitions | 6 |
| 3.2 Abbreviations | 7 |
| 4 Measurement conditions | 7 |
| 5 Inspection methods | 8 |
| 5.1 Equipment | 8 |
| 5.1.1 Light source system | 9 |
| 5.1.2 Observation system | 10 |
| 5.1.3 Data processing unit | 11 |
| 5.1.4 Unit for holding the sample | 12 |
| 5.2 Measurement procedures of relative optical loss | 12 |
| 5.2.1 Preparation of light source | 12 |
| 5.2.2 Preparation of the optical observation system measuring equipment | 13 |
| 5.2.3 Measuring coordinates of I/O ports | 13 |
| 5.2.4 Capturing of optical images for control sample and samples to be measured | 13 |
| 5.2.5 Image data processing (detection of I/O port range) | 14 |
| 5.2.6 Calculation of relative loss | 14 |
| 5.3 Evaluation of pass or fail | 15 |
| Annex A (informative) Example of an optical transmission test for an OCB without I/O fibres | 16 |
| Annex B (informative) Measurement of input and output ports in offset positions | 19 |
| Bibliography | 21 |
| Figure 1 – Optical transmission test system without I/O fibres for surface I/O type OCB | 8 |
| Figure 2 – Optical transmission test system without I/O fibres for end-face I/O type OCB | 9 |
| Figure 3 – Schematic diagram of measurement of uniformity of illumination area | 10 |
| Figure 4 – Example of obtained uniformity of illumination area | 10 |
| Figure 5 – Example of obtained sensitivity of an image sensor (input uniformity within 1 %) | 11 |
| Figure 6 – Position alignment of light source | 13 |
| Figure 7 – Example of captured image and extracted I/O port range by image binarization | 14 |
| Figure 8 – Calculation of the total detected intensity of extracted I/O port range from detected intensity for each pixel | 15 |
| Figure A.1 – Example of relative optical loss measurement | 17 |
| Figure A.2 – Example of reproducibility of relative optical loss measurement | 18 |
| Figure B.1 – Ray traces for OCBs with mirror having designated mirror angle (left) and not designated one (right) | 19 |
| Figure B.2 – Difference of focus positions between without offset and with offset | 20 |
| Figure B.3 – Optical images at surface of OCB plane (without offset) and offset position (with offset) | 20 |

I.S. EN 62496-2-4:2013

62496-2-4 © IEC:2013

– 3 –

| | |
|---|----|
| Table A.1 – Observation system | 16 |
| Table A.2 – Light source | 16 |
| Table A.3 – Samples to be measured..... | 16 |

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**OPTICAL CIRCUIT BOARDS –
BASIC TEST AND MEASUREMENT PROCEDURES –**
**Part 2-4: Optical transmission test for optical circuit boards
without input/output fibres**
FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62496-2-4 has been prepared by IEC technical committee 86: Fibre optics.

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

| | |
|-------------|------------------|
| FDIS | Report on voting |
| 86/449/FDIS | 86/456/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 of the IEC 62496 series, published under the general title *Optical circuit boards – Basic test and measurement procedures*, 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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

OPTICAL CIRCUIT BOARDS – BASIC TEST AND MEASUREMENT PROCEDURES –

Part 2-4: Optical transmission test for optical circuit boards without input/output fibres

1 Scope

This part of IEC 62496 specifies the test method to decide whether to pass or fail an optical circuit board using direct illumination by a light. The input ports are directly illuminated and the optical intensity from the output ports of the optical circuit board is monitored using an area image sensor. Excess optical losses are calculated from total detected intensities of light from a sample to be measured and from a control sample. This method is used to illuminate uniformly the input port of the optical circuit board (OCB) with a larger area than the core area, obtain the radiance of an area image from the corresponding output port of the OCB using an area image sensor, and evaluate whether to pass or fail using the radiance obtained compared to that of a control sample.

The advantage of this test method is that the alignment procedure between a launch fibre and the OCB is not necessary.

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 60068-1, *Environmental testing – Part 1: General and guidance*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the following terms, definitions and abbreviations apply.

3.1.1

shading

non-uniformity of detected intensity of an image caused by non-uniformity of the sensitivity of elements of an area image sensor and vignetting depending on the optical system

Note 1 to entry: Correction of the non-uniformity of the detection sensitivity of elements of a uniform one is called "shading correction".

3.1.2

gamma value

factor "γ" for a camera expressed by the following equation:

$$(\text{input optical intensity signal}) = A \times (\text{output image signal})^\gamma$$

where A is a proportionality constant

Note 1 to entry: The input optical intensity is linearly proportional to the output image signal when $\gamma = 1$.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- Looking for additional Standards? Visit Intertek Inform Infostore
 - Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation
-