IEC 62496-2-5

Edition 1.0 2022-12

INTERNATIONAL STANDARD

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Optical circuit boards – Basic test and measurement procedures – Part 2-5: Flexibility test for flexible opto-electric circuits

Cartes a circuits optiques – Procédures fondamentales d'essais et de mesures – Partie 2-5: Essai de flexibilité pour les circuits optoélectriques souples



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OPTICAL CIRCUIT BOARDS – BASIC TEST AND MEASUREMENT PROCEDURES –

Part 2-5: Flexibility test for flexible opto-electric circuits

FOREWORD

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IEC 62496-2-5 has been prepared by IEC technical committee 86: Fibre optics. It is an International Standard.

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

Draft	Report on voting
86/605/FDIS	86/609/RVD

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/standardsdev/publications.

A list of all parts in the IEC 62496 series, published under the general title *Optical circuit boards*, 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- withdrawn,
- replaced by a revised edition, or
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OPTICAL CIRCUIT BOARDS – BASIC TEST AND MEASUREMENT PROCEDURES –

Part 2-5: Flexibility test for flexible opto-electric circuits

1 Scope

This part of IEC 62496 defines a test method for folding flexibility inspection of flexible opto-electric circuits with a flexibility tester endurance tester and presents a guideline for a step stress test method for finding the predetermined minimum mechanical folding radii below which the flexible opto-electric circuits can be damaged by intended folding distortion. Here, test samples are used instead of products for the flexibility test of their flexible opto-electric circuits, and the test samples have the same material, layer structure, processing technology and equipment as the products.

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

IEC 60793-2 (all parts), *Optical fibres – Part 2: Product specifications*

IEC 62496-2-1, *Optical circuit boards – Part 2-1: Measurements – Optical attenuation and isolation*

ISO 5626:1993, *Paper – Determination of folding endurance*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62496-1 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1
flexible opto-electric circuit board
flexible circuit board that contains both optic and electric circuits integrated into a flexible sheet

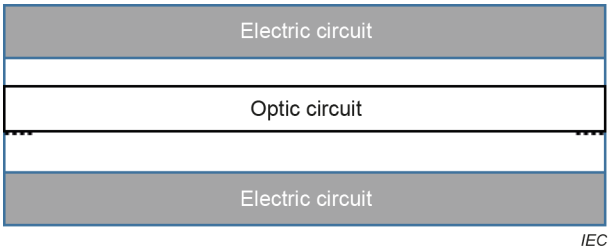


Figure 1 – Schematic diagram of flexible opto-electric circuit board (top view)

Note 1 to entry: Figure 1 shows an example of the top view of a flexible opto-electric circuit board.

Note 2 to entry: There are two types of flexible opto-electric circuit board: optical fibre-types and planer optical waveguide-types.

[SOURCE: ISO 5626:1993, Clause 1]

3.2
flexibility tester
instrument for folding endurance test of flexible sheets with interchangeable folding heads, allowing a range of thickness up to 1,25 mm

Note 1 to entry: In general, it is called the MIT folding endurance tester.

4 Apparatus

4.1 General description

The flexibility test system for flexibility test of the flexible opto-electric circuit board (hereafter FOECB) shall be used for finding of the minimum folding radii of both optic and electric circuits of the FOECB before any functional damage occurs. An existing flexibility folding method has been used for testing the folding flexibility of only electric circuits. However, in this document, it shall be used for testing the folding flexibility of both optic and electric circuits.

Since the test sample for fibre optical type should be connected to the flexibility test system through an optical fibre, real-time monitoring may be possible. Accordingly, the flexibility tester shall be configured with a real-time monitoring system using a laser signal device to accurately know the time of breakage of the optical fibres.

Generally, test samples for planar waveguide optical circuits are difficult to measure through real-time monitoring because it is not easy to connect to a flexibility test device through an optical fibre. Therefore, the test sample should be tested by connecting only electric circuits as in the existing flexibility folding method. The failure time of the test sample should be measured separately using a visual light on the planar waveguide circuits.

But, in case of that the test sample for planar waveguide optical circuits shall use optical fibres with connector to coupling with the optical waveguide, flexibility test of the test samples can be possible with real-time monitoring.

In addition, these tests should be measured in the process of replacing the holding jig.The test sample shall be clamped by the folding jig within the main controller as shown in Figure 2.