

Fibre optic communication subsystem test procedures -
Part 1-4: General communication subsystems - Light
source encircled flux measurement method

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 61280-1-4:2023 sisaldab Euroopa standardi EN IEC 61280-1-4:2023 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 61280-1-4:2023 consists of the English text of the European standard EN IEC 61280-1-4:2023.
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English Version

**Fibre optic communication subsystem test procedures - Part 1-4:
General communication subsystems - Light source encircled flux
measurement method
(IEC 61280-1-4:2023)**

Procédures d'essai des sous-systèmes de
télécommunication fibroniques - Partie 1-4: Sous-systèmes
généraux de télécommunication - Méthode de mesure du
flux inscrit de la source optique
(IEC 61280-1-4:2023)

Lichtwellenleiter-Kommunikationsuntersysteme -
Grundlegende Prüfverfahren - Teil 1-4: Allgemeine
Kommunikationsuntersysteme - Verfahren zur Messung des
begrenzten Lichtstroms einer Strahlungsquelle
(IEC 61280-1-4:2023)

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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 86C/1806/CDV, future edition 3 of IEC 61280-1-4, prepared by SC 86C "Fibre optic systems and active devices" of IEC/TC 86 "Fibre optics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61280-1-4:2023.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2023-08-23
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In the official version, for Bibliography, the following notes have to be added for the standard indicated:

IEC 60793-1-20 NOTE Approved as EN 60793-1-20

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INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Fibre optic communication subsystem test procedures –
Part 1-4: General communication subsystems – Light source encircled flux
measurement method**

**Procédures d'essai des sous-systèmes de télécommunication fibroniques –
Partie 1-4: Sous-systèmes généraux de télécommunication – Méthode de
mesure du flux inscrit de la source optique**



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IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Fibre optic communication subsystem test procedures –
Part 1-4: General communication subsystems – Light source encircled flux
measurement method**

**Procédures d'essai des sous-systèmes de télécommunication fibroniques –
Partie 1-4: Sous-systèmes généraux de télécommunication – Méthode de
mesure du flux inscrit de la source optique**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FIBRE OPTIC COMMUNICATION SUBSYSTEM
TEST PROCEDURES –****Part 1-4: General communication subsystems –
Light source encircled flux measurement method**

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IEC 61280-1-4 has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics. It is an International Standard.

This third edition cancels and replaces the second edition published in 2009. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) improvement of calibration procedure and calibration traceability;
- b) improvement of fibre shaker description and requirements;
- c) addition of pulsed light sources;
- d) removal of a poorly traceable calibration process using a micro positioner.

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

Draft	Report on voting
86C/1806/CDV	86C/1828/RVC

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/publications.

A list of all parts of the IEC 61280 series can be found, under the general title *Fibre optic communication subsystem test procedures*, on the IEC website.

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INTRODUCTION

This part of IEC 61280 specifies how to measure the encircled flux of a multimode light source. Encircled flux is a fraction of the cumulative output power to the total output power as a function of radial distance from the centre of the multimode optical fibre's core.

The basic approach is to collect two-dimensional (2D) nearfield data, using a calibrated camera, and to mathematically convert the 2D data into three normalized functions of radial distance from the fibre's optical centre. The three functions are intensity, incremental flux, and encircled flux. The intensity represents optical power per surface area (in watts per square meter). The incremental flux represents optical power per radius differential (in watts per meter), and the encircled flux represents a fraction of the cumulative output power to the total output power.

These three radial functions are intended to characterize fibre optic laser sources either for use in mathematical models predicting the minimum guaranteed length of a communications link, or to qualify a light source to measure insertion loss in multimode links.

FIBRE OPTIC COMMUNICATION SUBSYSTEM TEST PROCEDURES –

Part 1-4: General communication subsystems – Light source encircled flux measurement method

1 Scope

This part of IEC 61280 establishes the characterization process of the encircled flux measurement method of light sources intended to be used with multimode fibre.

This document sets forth a procedure for the collection of two-dimensional fibre optic nearfield greyscale data and subsequent reduction to one-dimensional data expressed as a set of three sampled parametric functions of radius from the fibre's optical centre.

Estimation of the fibre core diameter is not an objective of this document.

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 60793-2-10, *Optical fibres – Part 2-10: Product specifications – Sectional specification for category A1 multimode fibres*

IEC 60825-1, *Safety of laser products – Part 1: Equipment classification and requirements*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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

calibration light source

light source used to find the optical centre of a multimode fibre

3.2

centroid image

image used to determine the optical centre of the multimode fibre core

3.3

corrected image

image which has had a dark image subtracted from it and whose elements have had uniformity correction applied