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## Delsystem för fiberoptisk kommunikation – Grundläggande provningsmetoder – Del 1-4: Provningsmetoder för allmänna delsystem – Mätning av cirkulärt flöde

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

Som svensk standard gäller europastandarden EN IEC 61280-1-4:2023. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 61280-1-4:2023.

### Nationellt förord

Europastandarden EN IEC 61280-1-4:2023

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 61280-1-4, Third edition, 2023 - Fibre optic communication subsystem test procedures - Part 1-4: General communication subsystems - Light source encircled flux measurement method**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 61280-1-4, utg 2:2010 med eventuella tillägg, ändringar och rättelser, gäller ej fr o m 2026-02-23.

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ICS 33.180.01

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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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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.

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

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
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2026-02-23

This document supersedes EN 61280-1-4:2010 and all of its amendments and corrigenda (if any).

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Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

### **Endorsement notice**

The text of the International Standard IEC 61280-1-4:2023 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 standard indicated:

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

IEC 60793-1-41 NOTE Approved as EN 60793-1-41

IEC 61745:2017 NOTE Approved as EN 61745:2017 (not modified)

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60793-2-10	-	Optical fibres - Part 2-10: Product specifications - Sectional specification for category A1 multimode fibres	EN IEC 60793-2-10 -	
IEC 60825-1	-	Safety of laser products - Part 1: Equipment classification and requirements	EN 60825-1	-

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



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**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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ICS 33.180.01

ISBN 978-2-8322-6361-7

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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**

## FOREWORD

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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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://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.

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](http://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
- amended.

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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*