SVENSK STANDARD SS-EN 61280-1-4

Fastställd	Utgåva	Sida	Ansvarig kommitté
2010-06-21	2	1 (1+34)	SEK TK 86

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 61280-1-4:2010. Den svenska standarden innehåller den officiella engelska språkversionen av EN 61280-1-4:2010.

Nationellt förord

Europastandarden EN 61280-1-4:2010

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC

– **IEC 61280-1-4, Second edition, 2009 - 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, utgåva 1, 2004, gäller ej fr o m 2013-02-01.

ICS 33.180.01

Denna standard är fastställd av SEK Svensk Elstandard,
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Det finns många fördelar med att ha gemensamma tekniska regler för bl a säkerhet, prestanda, dokumentation, utförande och skötsel av elprodukter, elanläggningar och metoder. Genom att utforma sådana standarder blir säkerhetskraven tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

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Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61280-1-4

February 2010

ICS 33.180.01

Supersedes EN 61280-1-4:2003

English version

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

(IEC 61280-1-4:2009)

Procédures d'essai des sous-systèmes de télécommunication à fibres optiques - Partie 1-4: Sous-systèmes généraux de télécommunication - Méthode de mesure du flux inscrit de la source lumineuse (CEI 61280-1-4:2009)

Lichtwellenleiter-Kommunikationsuntersysteme - Grundlegende Prüfverfahren - Teil 1-4: Allgemeine Kommunikationsuntersysteme - Verfahren zur Messung des begrenzten Lichtstroms einer Strahlungsquelle (IEC 61280-1-4:2009)

CENELEC

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

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 61280-1-4:2010 E

SEK Svensk Elstandard

Foreword

The text of document 86C/920/FDIS, future edition 2 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 was approved by CENELEC as EN 61280-1-4 on 2010-02-01.

This European Standard supersedes EN 61280-1-4:2003.

The significant technical changes with respect to EN 61280-1-4:2003 are described in the introduction.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2010-11-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2013-02-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61280-1-4:2009 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 60793-1-20	NOTE	Harmonized as EN 60793-1-20.
IEC 60793-1-41	NOTE	Harmonized as EN 60793-1-41.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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 When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60793-2-10	-	Optical fibres - Part 2-10: Product specifications - Sectional specification for category A1 multimode fibres	EN 60793-2-10	-
IEC 60825-1	-	Safety of laser products - Part 1: Equipment classification and requirements	EN 60825-1	-
IEC 61745	1988	End-face image analysis procedure for the calibration of optical fibre geometry test sets	-	-

CONTENTS

0 Introduction

0.1 General

This part of IEC 61280 is used to measure the encircled flux of a multimode light source. Encircled flux is a measure, as a function of radius, of the fraction of the total power radiating from a multimode optical fibre's core.

The basic approach is to collect 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*. Intensity has dimension optical power per area; incremental flux has dimension power per differential of radius; and encircled flux has dimension total optical power, all three being functions of radius.

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.

0.2 Changes from previous edition

This edition of the standard differs from its predecessor in both scope and content. Many of the content changes improve the measurement precision. Several changes have been made to the computation procedure:

- the integration methodology of the radial functions was simple summation, and is now specified to use trapezoidal integration or other higher-order techniques (see 9.3);
- a baseline subtraction step is specified to improve immunity to DC drifts (see 9.2.2 and 9.2.3);
- the ring width parameter is explicitly specified (see 9.2.1);
- the integration limit is specified (see 9.3).

The geometric calibration of the apparatus microscope now specifies either (depending on the application) the methodology of IEC 61745 or the original technique using the micropositioning stage (see Clause 7). Pixel sensitivity uniformity correction is now optional.

0.3 Assumptions applicable to the characterization of data sources

The 50-μm or 62,5-μm core near-parabolic graded-index multimode fibre used as the "test jumper assembly" is treated as if it possessed perfect circular symmetry about its optical centre, as asymmetries in the launched optical flux distributions will dominate any lopsidedness of the test jumper assembly. It is further assumed that all cladding modes will be stripped by passage through the specified ten metres or more of fibre. The modes of a mode group need not carry equal flux. (In fact, with such short fibres, one thousand metres or less, unequal distribution of flux in the modes of a group is the norm, not the exception.)

0.4 Assumptions applicable to the characterization of measurement sources

Measurement sources are assumed to be sufficiently broadband and incoherent that speckle is not a problem, and to have a sufficiently symmetrical nearfield distribution that the truncated centroid of that nearfield indicates the location of the optical centre of the fibre with sufficient accuracy for the purposes of this standard.

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 is intended to characterize the encircled flux of two types of light sources: transmission light sources, which are usually coherent and substantially under-excite the mode volume of a multimode fibre, and measurement light sources, which are incoherent and excite most of the mode volume of a multimode fibre.

This part of IEC 61280 sets forth a standard 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. This revision of IEC 61280-1-4 continues to fulfil its original purpose, characterization of transmission light sources, which enables the accurate mathematical prediction of minimum guaranteed link length in 1 gigabit per second or greater fibre optic data communication systems. New to this revision is support for improved measurement precision of insertion loss in multimode fibre optic links through the characterization of measurement light sources.

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

2 Normative references

The following referenced documents are indispensable for the application 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*

IEC 61745:1988, *End-face image analysis procedure for the calibration of optical fibre geometry test sets*