SVENSK STANDARD SS-EN 60793-1-20

Fastställd	Utgåva	Sida	Ansvarig kommitté
2015-03-11	2	1 (1+46)	SEK TK 86

Optofibrer – Del 1-20: Mätning och provning – Fibergeometri

Optical fibres – Part 1-20: Measurement methods and test procedures – Fibre geometry

Som svensk standard gäller europastandarden EN 60793-1-20:2014. Den svenska standarden innehåller den officiella engelska språkversionen av EN 60793-1-20:2014.

Nationellt förord

Europastandarden EN 60793-1-20:2014

består av:

- **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
- **IEC 60793-1-20, Second edition, 2014 - Optical fibres - Part 1-20: Measurement methods and test procedures - Fibre geometry**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 60793-1-20, utgåva 1, 2003, gäller ej fr o m 2017-11-14.

ICS 33.180.10

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60793-1-20

November 2014

ICS 33.180.10

Supersedes EN 60793-1-20:2002

English Version

Optical fibres - Part 1-20: Measurement methods and test procedures - Fibre geometry (IEC 60793-1-20:2014)

Fibres optiques - Partie 1-20: Méthodes de mesure et procédures d'essai - Géométrie de la fibre (CEI 60793-1-20:2014)

Lichtwellenleiter - Teil 1-20: Messmethoden und Prüfverfahren - Fasergeometrie (IEC 60793-1-20:2014)

This European Standard was approved by CENELEC on 2014-11-14. 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.

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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

Ref. No. EN 60793-1-20:2014 E

SEK Svensk Elstandard

Foreword

The text of document 86A/1562/CDV, future edition 1 of IEC 60793-1-20, prepared by SC 86A "Fibres and cables" of IEC/TC 86 "Fibre optics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60793-1-20:2014.

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) 2015-08-14
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2017-11-14

This document supersedes EN 60793-1-20:2002.

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 60793-1-20:2014 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated :

IEC 60793-1-45	NOTE	Harmonized as EN 60793-1-45.

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 1 When 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.

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 60793-2-20	-	Optical fibres - Part 2-20: Product specifications - Sectional specification for category A2 multimode fibres	EN 60793-2-20	-
IEC 60793-2-30	-	Optical fibres - Part 2-30: Product specifications - Sectional specification for category A3 multimode fibres	EN 60793-2-30	-
IEC 60793-2-40	-	Optical fibres - Part 2-40: Product specifications - Sectional specification for category A4 multimode fibres	EN 60793-2-40	-
IEC 60793-2-50	-	Optical fibres - Part 2-50: Product specifications - Sectional specification for class B single-mode fibres	EN 60793-2-50	-
IEC 60793-2-60	-	Optical fibres - Part 2-60: Product specifications - Sectional specification for category C single-mode intraconnection fibres	EN 60793-2-60	-
IEC 61745	-	End-face image analysis procedure for the calibration of optical fibre geometry test sets	-	-

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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OPTICAL FIBRES –

Part 1-20: Measurement methods and test procedures – Fibre geometry

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.
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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.
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International Standard IEC 60793-1-20 has been prepared by subcommittee SC86A: Fibre and cables, of IEC technical committee TC86: Fibre optics.

This second edition cancels and replaces the first edition, published in 2001, and constitutes a technical revision.

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

- the reference test method for all fibre types is changed to the video grey scale transmitted near field method from the refracted near field method;
- the test lengths for all fibre types are now to be specified in the fibre's detail specification;
- the core illumination wavelength for all multimode fibre types may now to be specified in the fibre's detail specification although defaults are given;

- the core k-factor (decision level) is now to be specified in the detail specification for all multimode fibre types;
- this edition is substantially more specific in describing the measurement; data reduction and transformation is fully described;
- the data reduction methodology for both refracted near-field and transmitted near-field methods are now unified and consistent.

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

CDV	Report on voting
86A/1562/CDV	86A/1623/RVC

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 in the IEC 60793 series, published under the general title *Optical fibres*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website 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.

INTRODUCTION

This standard gives two methods for measuring fibre geometry characteristics:

– Method A: Refracted near-field, described in Annex A;

– Method B: Transmitted near-field, described in Annex B.

Methods A and B apply to the geometry measurement of all class A multimode fibres, class B single-mode fibres and class C single-mode interconnection fibres. The fibre's applicable product specifications, IEC 60793-2-10, IEC 60793-2-20, IEC 60793-2-30, IEC 60793-2-40, IEC 60793-2-50 and IEC 60793-2-60, provide relevant measurement details, including sample lengths and k factors.

The geometric parameters measurable by the methods described in this standard are as follows:

– cladding diameter;

– cladding non-circularity;

– core diameter (class A fibre only);

– core non-circularity (class A fibre only);

– core-cladding concentricity error.

NOTE 1 The core diameter of class B and class C fibres is not specified. The equivalent parameter is mode field diameter, determined by IEC 60793-1-45.

NOTE 2 These methods specify both one-dimensional (1-D) and two-dimensional (2-D) data collection techniques and data analyses. The 1-D methods by themselves cannot detemine non-circularity nor concentricity error. When non-circular bodies are measured with 1-D methods, body diameters suffer additional uncertainties. These limitations may be overcome by scanning and analysing multiple 1-D data sets. Clause 5 provides further information.

Information common to both methods appears in Clauses 2 through 10, and information pertaining to each individual method appears in Annexes A and B, respectively. Annex C describes normative methods used to find the optical boundaries of the core and the cladding, Annex D describes normative procedures to fit ellipses to sets of detected boundaries. Annex E provides an informative fitting procedure of power-law models to graded-index core profiles. Annex F describes an informative methodology relating to the transformation of core diameter measurements determined with methods other than the reference method to approximate reference method values.

OPTICAL FIBRES –

Part 1–20: Measurement methods and test procedures – Fibre geometry

1 Scope

This part of IEC 60793 establishes uniform requirements for measuring the geometrical characteristics of uncoated optical fibres.

The geometry of uncoated optical fibres directly affect splicing, connectorization and cabling and so are fundamental parameters requiring careful specification, quality control, and thus measurement.

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

IEC 60793-2-20, *Optical fibres – Part 2-20: Product specifications – Sectional specification for category A2 multimode fibres*

IEC 60793-2-30, *Optical fibres – Part 2-30: Product specifications – Sectional specification for category A3 multimode fibres*

IEC 60793-2-40, *Optical fibres – Part 2-40: Product specifications – Specification for category A4 multimode fibres*

IEC 60793-2-50, *Optical fibres – Part 2-50: Product specifications – Sectional specification for class B single-mode fibres*

IEC 60793-2-60, *Optical fibres – Part 2-60: Product specifications – Sectional specification for category C single-mode intraconnection fibres*

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