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Standards

Irish Standard
I.S. EN 60793-1-43:2015

Optical fibres - Part 1-43: Measurement methods and test procedures - Numerical aperture measurement

I.S. EN 60793-1-43:2015

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**Optical fibres - Part 1-43: Measurement methods and test
procedures - Numerical aperture measurement
(IEC 60793-1-43:2015)**

Fibres optiques - Partie 1-43 : Méthodes de mesure et
procédures d'essai - Mesure de l'ouverture numérique
(IEC 60793-1-43:2015)

Lichtwellenleiter - Teil 1-43: Messmethoden und
Prüfverfahren - Numerische Apertur
(IEC 60793-1-43:2015)

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Foreword

The text of document 86A/1566/CDV, future edition 2 of IEC 60793-1-43, 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 60793-1-43:2015.

The following dates are fixed:

- latest date by which the document has to be (dop) 2016-02-01
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- latest date by which the national (dow) 2018-05-01
standards conflicting with the
document have to be withdrawn

This document supersedes EN 60793-1-43:2002.

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Annex ZA (normative)

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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

| <u>Publication</u> | <u>Year</u> | <u>Title</u> | <u>EN/HD</u> | <u>Year</u> |
|--------------------|-------------|--|---------------|-------------|
| IEC 60793-1-1 | - | Optical fibres - Part 1-1: Measurement methods and test procedures - General and guidance | EN 60793-1-1 | - |
| IEC 60793-1-21 | - | Optical fibres - Part 1-21: Measurement methods and test procedures - Coating geometry | EN 60793-1-21 | - |
| IEC 60793-1-22 | - | Optical fibres - Part 1-22: Measurement methods and test procedures - Length measurement | EN 60793-1-22 | - |
| 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 | - |

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IEC 60793-1-43

Edition 2.0 2015-03

INTERNATIONAL STANDARD



**Optical fibres –
Part 1–43: Measurement methods and test procedures– Numerical aperture
measurement**



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IEC 60793-1-43

Edition 2.0 2015-03

INTERNATIONAL STANDARD



**Optical fibres –
Part 1–43: Measurement methods and test procedures– Numerical aperture
measurement**

INTERNATIONAL
ELECTROTECHNICAL
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPTICAL FIBRES –

Part 1–43: Measurement methods and test procedures– Numerical aperture measurement

FOREWORD

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International Standard IEC 60793-1-43 has been prepared by subcommittee 86A: Fibres and cables, of IEC technical committee 86: 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:

- expansion of the scope to include A1, A2, A3 and A4 multimode fibre categories;
- addition of measurement parameters of sample length and threshold values, product specific to the variables that are now found in the product specifications;
- a new Annex B entitled "Product specific default values for NA measurement";
- addition of a new Technique 4 for measuring NA of A4d fibres;

- a new Annex A entitled "Mapping NA measurement to alternative lengths" that gives a mapping function to correlate shorter sample length measurements to the length suggested in the reference test method Na_{ff} .

This International Standard is to be used in conjunction with IEC 60793-1-1, IEC 60793-1-21 and IEC 60793-1-22.

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

| CDV | Report on voting |
|--------------|------------------|
| 86A/1566/CDV | 86A/1622/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

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- replaced by a revised edition, or
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OPTICAL FIBRES –

Part 1–43: Measurement methods and test procedures– Numerical aperture measurement

1 Scope

This part of IEC 60793 establishes uniform requirements for measuring the numerical aperture of optical fibre, thereby assisting in the inspection of fibres and cables for commercial purposes.

The numerical aperture (NA) of categories A1, A2, A3 and A4 multimode fibre is an important parameter that describes a fibre's light-gathering ability. It is used to predict launching efficiency, joint loss at splices, and micro/macrobending performance.

The numerical aperture is defined by measuring the far-field pattern (NA_{ff}). In some cases the theoretical numerical aperture (NA_{th}) is used in the literature, which can be determined from measuring the difference in refractive indexes between the core and cladding. Ideally these two methods should produce the same value.

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 60793-1-1, *Optical fibres – Part 1-1: Measurement methods and test procedures – General and guidance*

IEC 60793-1-21, *Optical fibres – Part 1-21: Measurement methods and test procedures – Coating geometry*

IEC 60793-1-22, *Optical fibres – Part 1-22: Measurement methods and test procedures – Length measurement*

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

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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 – Sectional specification for category A4 multimode fibres*

3 Overview of method

This test procedure describes a method for measuring the angular radiant intensity (far-field) distribution from an optical fibre. The numerical aperture of multimode optical fibre can be

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