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I.S. EN 60793-1-47:2009

Optical fibres -- Part 1-47: Measurement methods and test procedures - Macrobending loss (IEC 60793-1-47:2009 (EQV))

I.S. EN 60793-1-47:2009

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**Optical fibres -
Part 1-47: Measurement methods and test procedures -
Macrobending loss
(IEC 60793-1-47:2009)**

Fibres optiques -
Partie 1-47: Méthodes de mesure
et procédures d'essai -
Pertes dues aux macrocourbures
(CEI 60793-1-47:2009)

Lichtwellenleiter -
Teil 1-47: Messmethoden
und Prüfverfahren -
Makrobiegeverlust
(IEC 60793-1-47:2009)

This European Standard was approved by CENELEC on 2009-05-01. 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 Central Secretariat or to any CENELEC member.

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CENELEC

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

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 86A/1207/CDV, future edition 3 of IEC 60793-1-47, prepared by SC 86A, Fibres and cables, of IEC TC 86, Fibre optics, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60793-1-47 on 2009-05-01.

This European Standard supersedes EN 60793-1-47:2007.

The main change from EN 60793-1-47:2007 is listed below:

- introduction of the Annex A describing small bend radius phenomena.

This standard is to be read in conjunction with EN 60793-1-1.

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) 2010-02-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2012-05-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60793-1-47:2009 was approved by CENELEC as a European Standard without any modification.

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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60793-1-1	- ¹⁾	Optical fibres - Part 1-1: Measurement methods and test procedures - General and guidance	EN 60793-1-1	2008 ²⁾
IEC 60793-1-40 (mod)	- ¹⁾	Optical fibres - Part 1-40: Measurement methods and test procedures - Attenuation	EN 60793-1-40	2003 ²⁾
IEC 60793-1-46	- ¹⁾	Optical fibres - Part 1-46: Measurement methods and test procedures - Monitoring of changes in optical transmittance	EN 60793-1-46	2002 ²⁾
IEC 61280-4-1	- ¹⁾	Fibre-optic communication subsystem test procedures - Part 4-1: Cable plant and links - Multimode fibre-optic cable plant attenuation measurement	EN 61280-4-1	2004 ²⁾

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

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INTERNATIONAL STANDARD

**Optical fibres –
Part 1-47: Measurement methods and test procedures – Macrobending loss**





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Part 1-47: Measurement methods and test procedures – Macrobending loss**

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CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references.....	6
3 Specimen.....	7
3.1 Specimen length.....	7
3.1.1 Method A – Fibre winding.....	7
3.1.2 Method B – Quarter circle bends.....	7
3.2 Specimen end face.....	7
4 Apparatus.....	7
4.1 Method A – Fibre winding.....	7
4.2 Method B – Quarter circle bends.....	7
5 Procedure.....	8
5.1 Method A – Fibre winding.....	8
5.1.1 General.....	8
5.1.2 Single-mode fibres.....	9
5.1.3 Multimode (A1) fibres.....	10
5.2 Method B – Quarter circle bends.....	10
6 Calculations.....	12
7 Results.....	12
7.1 Information available with each measurement.....	12
7.2 Information available upon request.....	12
8 Specification information.....	13
Annex A (informative) Small bend radius phenomena.....	14
Bibliography.....	16
Figure 1 – Quarter circle guide groove in plate.....	8
Figure 2 – Multiple bends using stacked plates.....	11
Figure A.1 – Loss curves versus curve fits.....	14

INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPTICAL FIBRES –

Part 1-47: Measurement methods and test procedures – Macrobending loss

FOREWORD

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International Standard IEC 60793-1-47 has been prepared by subcommittee 86A: Fibres and cables, of IEC technical committee 86: Fibre optics.

This third edition cancels and replaces the second edition published in 2006. It constitutes a technical revision. The main change is listed below:

- Introduction of the Annex A describing small bend radius phenomena.

This standard is to be read in conjunction with IEC 60793-1-1.

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

CDV	Report on voting
86A/1207/CDV	86A/1240/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 of 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 maintenance result date indicated on the IEC web site 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.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

Publications in the IEC 60793-1 series concern measurement methods and test procedures as they apply to optical fibres.

Within the same series, several different areas are grouped, but all numbers are possibly not used, as follows:

- Parts 1-10 to 1-19: General
- Parts 1-20 to 1-29: Measurement methods and test procedures for dimensions
- Parts 1-30 to 1-39: Measurement methods and test procedures for mechanical characteristics
- Parts 1-40 to 1-49: Measurement methods and test procedures for transmission and optical characteristics
- Parts 1-50 to 1-59: Measurement methods and test procedures for environmental characteristics

OPTICAL FIBRES –

Part 1-47: Measurement methods and test procedures – Macrobending loss

1 Scope

This part of IEC 60793 establishes uniform requirements for measuring the macrobending loss of single-mode fibres (category B) at 1 550 nm or 1 625 nm, category A1 multimode fibres at 850 nm or 1 300 nm, and category A3 and A4 multimode fibres at 650 nm, 850 nm or 1 300 nm, thereby assisting in the inspection of fibres and cables for commercial purposes.

The standard gives two methods for measuring macrobending sensitivity:

- Method A – Fibre winding, pertains to category B single-mode fibres and category A1 multimode fibres.
- Method B – Quarter circle bends, pertains to category A3 and A4 multimode fibres.

For both of these methods, the optical power is measured using either the power monitoring or the cut-back technique.

Methods A and B are expected to produce different results if they are applied to the same fibre. This is because the key difference between the two methods is the deployment, including the bend radius and amount of fibre that is bent. The reason for the difference is that A3 and A4 multimode fibres are expected to be deployed in short lengths with relatively fewer bends compared to single-mode and category A1 multimode fibres.

In the following text, the “curvature radius” is defined as the radius of the suitable circular shaped support (e.g. mandrel or guiding groove on a flat surface) on which the fibre can be bent.

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

IEC 60793-1-40: *Optical fibres – Part 1-40: Measurement methods and test procedures – Attenuation*

IEC 60793-1-46: *Optical fibres – Part 1-46: Measurement methods and test procedures – Monitoring of changes in optical transmittance*

IEC 61280-4-1: *Fibre-optic communication subsystem test procedures – Part 4-1: Cable plant and links – Multimode fibre-optic cable plant attenuation measurement*

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