



NSAI
Standards

Irish Standard
I.S. EN 60793-1-54:2013

Optical fibres -- Part 1-54:
Measurement methods and test
procedures - Gamma irradiation (IEC
60793-1-54:2012 (EQV))

I.S. EN 60793-1-54:2013

Incorporating amendments/corrigenda issued since publication:

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I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

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EUROPEAN STANDARD

EN 60793-1-54

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 2013

ICS 33.180.10

Supersedes EN 60793-1-54:2003

English version

**Optical fibres -
Part 1-54: Measurement methods and test procedures -
Gamma irradiation
(IEC 60793-1-54:2012)**

Fibres optiques -
Partie 1-54: Méthodes de mesure
et procédures d'essai -
Irradiation gamma
(CEI 60793-1-54:2012)

Lichtwellenleiter -
Teil 1-54: Messmethoden
und Prüfverfahren -
Radioaktive Strahlung
(IEC 60793-1-54:2012)

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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.

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CENELEC

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

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Foreword

The text of document 86A/1413/CDV, future edition 2 of IEC 60793-1-54, 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 60793-1-54:2013.

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) 2013-08-29
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2015-11-29

This document supersedes EN 60793-1-54:2003.

EN 60793-1-54:2013 includes the following significant technical changes with respect to EN 60793-1-54:2003:

- launching conditions and optical sources have been reviewed and are better defined.

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 60793-1-54:2012 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 60793-2-10	NOTE	Harmonised as EN 60793-2-10.
IEC 60793-2-20	NOTE	Harmonised as EN 60793-2-20.
IEC 60793-2-50	NOTE	Harmonised as EN 60793-2-50.

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 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 60793-1-40	-	Optical fibres - Part 1-40: Measurement methods and test procedures - Attenuation	EN 60793-1-40	-
IEC 60793-1-44	-	Optical fibres - Part 1-44: Measurement methods and test procedures - Cut-off wavelength	EN 60793-1-44	-
IEC 60793-1-46	-	Optical fibres - Part 1-46: Measurement methods and test procedures - Monitoring of changes in optical transmittance	EN 60793-1-46	-
IEC 61280-4-1	-	Fibre optic communication subsystem test procedures - Part 4-1: Installed cable plant - Multimode attenuation measurement	EN 61280-4-1	-

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPTICAL FIBRES –

**Part 1-54: Measurement methods and test procedures –
Gamma irradiation**

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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International Standard IEC 60793-1-54 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 2003. It constitutes a technical revision.

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

- launching conditions and optical sources have been reviewed and are better defined.

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

CDV	Report on voting
86A/1413/CDV	86A/1433/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 the IEC 60793 series can be found, under the general title *Optical Fibres*, 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 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.

OPTICAL FIBRES –

Part 1-54: Measurement methods and test procedures – Gamma irradiation

1 Scope

This part of IEC 60793 outlines a method for measuring the steady state response of optical fibres and optical cables exposed to gamma radiation. It can be employed to determine the level of radiation induced attenuation produced in Class B single-mode or Class A, category A1 and A2 multimode optical fibres, in either cabled or uncabled form, due to exposure to gamma radiation.

The attenuation of cabled and uncabled optical fibres generally increases when exposed to gamma radiation. This is primarily due to the trapping of radiolytic electrons and holes at defect sites in the glass (i.e. the formation of “colour centres”). This test procedure focuses on two regimes of interest: the low dose rate regime suitable for estimating the effect of environmental background radiation, and the high dose rate regime suitable for estimating the effect of adverse nuclear environments. The testing of the effects of environmental background radiation is achieved with an attenuation measurement approach similar to IEC 60793-1-40 Method A, cut-back. The effects of adverse nuclear environments are tested by monitoring the power before, during and after exposure of the test sample to gamma radiation. The depopulation of colour centres by light (photo bleaching) or by heat causes recovery (lessening of radiation induced attenuation). Recovery may occur over a wide range of time which depends on the irradiation time and annealing temperature. This complicates the characterization of radiation induced attenuation since the attenuation depends on many variables including the temperature of the test environment, the configuration of the sample, the total dose and the dose rate applied to the sample and the light level used to measure it.

This test is not a material test for the non-optical material components of a fibre optic cable. If degradation of cable materials exposed to irradiation is to be studied, other test methods will be required.

This test method is written to contain a clear, concise listing of instructions. The background knowledge that is necessary to perform correct, relevant and expressive irradiation tests as well as to limit measurement uncertainty is presented separately in IEC/TR 62283.

Attention is drawn to the fact that strict regulations and suitable protective facilities are to be adopted in the laboratory for this test. Carefully selected trained personnel shall be used to perform this test. It can be extremely hazardous to test personnel if it is improperly performed or without qualified conditions.

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 60793-1-40, *Optical Fibres – Part 1-40: Measurement methods and test procedures – Attenuation*

IEC 60793-1-44, *Optical fibres – Part 1-44: Measurement methods and test procedures – Cut-off wavelength*

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