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Optical fibres –
Part 1-40: ~~Measurement methods and test procedures~~ – Attenuation
measurement methods

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPTICAL FIBRES –

**Part 1-40: ~~Measurement methods and test procedures~~ –
Attenuation measurement methods**

FOREWORD

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 60793-1-40 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. This edition constitutes a technical revision.

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

- a) Improvement of the description of measurement details for B6 fibre;
- b) Improvement of the calibration requirements for A4 fibre;
- c) Introduction of Annex E describing examples of short cable test results on A1 multimode fibres.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
86A/1909/FDIS	86A/1927/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document 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 document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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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, 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 1-40: ~~Measurement methods and test procedures –~~ Attenuation measurement methods

1 Scope

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

Four methods are described for measuring attenuation, one being that for modelling spectral attenuation:

- method A: cut-back;
- method B: insertion loss;
- method C: backscattering;
- method D: modelling spectral attenuation.

Methods A to C apply to the measurement of attenuation for all categories of the following fibres:

- class A multimode fibres;
- class B single-mode fibres.

Method C, backscattering, also covers the location, losses and characterization of point discontinuities.

~~To date, method D has been demonstrated only on class B fibres.~~

Method D is applicable only to class B fibres.

Information common to all ~~three measurements, and to the modelling method~~ four methods appears in Clauses 1 to ~~8~~ 11, and information pertaining to each individual method appears in Annexes A, B, C, and D, respectively.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60793-1-22, *Optical fibres – Part 1-22: Measurement methods and test procedures – Length measurement*

IEC 60793-1-43, *Optical fibres – Part 1-43: Measurement methods and test procedures – Numerical aperture measurement*

IEC 61746-1, *Calibration of optical time-domain reflectometers (OTDR) – Part 1: OTDR for single mode fibres*

IEC 61746-2, *Calibration of optical time-domain reflectometers (OTDR) – Part 2: OTDR for multimode fibres*

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Optical fibres –
Part 1-40: Attenuation measurement methods**

**Fibres optiques –
Partie 1-40: Méthodes de mesurage de l'affaiblissement**

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FIBRES OPTIQUES –

Partie 1-40: Méthodes de mesurage de l'affaiblissement

AVANT-PROPOS

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La Norme internationale IEC 60793-1-40 a été établie par le sous-comité 86A: Fibres et câbles, du comité d'études 86 de l'IEC: Fibres optiques.

Cette deuxième édition annule et remplace la première édition parue en 2001 dont elle constitue une révision technique.

La présente édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) Amélioration de la description des détails de mesurage pour les fibres B6;
- b) Amélioration des exigences d'étalonnage pour les fibres A4;
- c) Ajout de l'Annexe E qui décrit des exemples de résultats d'essai sur des câbles courts pour des fibres multimodales A1.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
86A/1909/FDIS	86A/1927/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Cette publication a été rédigée selon les Directives ISO/IEC, Partie 2.

Une liste de toutes les parties de la série IEC 60793, publiées sous le titre général *Fibres optiques*, peut être consultée sur le site web de l'IEC.

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- reconduite,
- supprimée,
- remplacée par une édition révisée, ou
- amendée.

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FIBRES OPTIQUES –

Partie 1-40: Méthodes de mesurage de l'affaiblissement

1 Domaine d'application

La présente partie de l'IEC 60793 établit des exigences uniformes pour mesurer l'affaiblissement d'une fibre optique, contribuant ainsi au contrôle des fibres et des câbles dans les relations commerciales.

Quatre méthodes sont décrites pour mesurer l'affaiblissement, parmi lesquelles une méthode pour modéliser l'affaiblissement spectral:

- méthode A: fibre coupée;
- méthode B: pertes d'insertion;
- méthode C: rétrodiffusion;
- méthode D: modélisation de l'affaiblissement spectral.

Les méthodes A à C s'appliquent au mesurage de l'affaiblissement pour toutes les catégories de fibres suivantes:

- fibres multimodales de classe A;
- fibres unimodales de classe B.

La méthode C, rétrodiffusion, s'applique aussi à la localisation, aux pertes et à la caractérisation des discontinuités ponctuelles.

La méthode D s'applique uniquement aux fibres de classe B.

Les informations communes à ces quatre méthodes sont présentées dans les Articles 1 à 11, et les informations propres à chaque méthode individuelle, sont présentées dans les Annexes A, B, C et D, respectivement.

2 Références normatives

Les documents suivants cités dans le texte constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60793-1-1, *Optical fibres – Part 1-1: Measurement methods and test procedures – General and guidance* (disponible en anglais seulement)

IEC 60793-1-22, *Fibres optiques – Partie 1-22: Méthodes de mesure et procédures d'essai – Mesure de la longueur*

IEC 60793-1-43, *Optical fibres – Part 1-43: Measurement methods and test procedures – Numerical aperture measurement* (disponible en anglais seulement)

IEC 61746-1, *Etalonnage des réflectomètres optiques dans le domaine temporel (OTDR) – Partie 1: OTDR pour fibres unimodales*

IEC 61746-2, *Etalonnage des réflectomètres optiques dans le domaine temporel (OTDR) –
Partie 2: OTDR pour fibres multimodales*