IEC 60793-1-32

Edition 3.0 2018-11

REDLINE VERSION

colour inside

Optical fibres –
Part 1-32: Measurement methods and test procedures – Coating strippability

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 33.180.10

ISBN 978-2-8322-6309-9

Warning! Make sure that you obtained this publication from an authorized distributor.

® Registered trademark of the International Electrotechnical Commission

CONTENTS

FOREWORD 3
1 Scope 5
2 Normative references 5
3 Terms and definitions 5
4 Apparatus 6
4.1 Tensile equipment 6
4.2 Load cell 6
4.3 Transducer amplifier 6
4.4 Stripping tool 7
4.5 Fibre guide 7
5 Specimen preparation 7
5.1 Representative sample 7
5.2 Strip length 7
6 Procedure 8
6.1 ~~Introduction~~ General 8
6.2 Stripping rate 8
6.3 Preconditioning 8
6.4 Calibrating the transducer amplifier 8
6.5 Loading the test specimen 9
6.6 Stripping the coating 9
7 Calculations 9
7.1 Calculation for the value of a specimen 9
7.1.1 General 9
7.1.2 Approach 1 – Average strip force 9
7.1.3 Approach 2 – Peak strip force 9
7.2 Calculation of the reported value ~~for a specimen~~ 9
8 Documentation 9
8.1 ~~The following~~ Information ~~should~~ to be presented 9
8.2 ~~The following~~ Information ~~should~~ to be available for each test 10
9 Specification information 10
Bibliography 11

Figure 1 – Example of test arrangement 6
Figure 2 – Length of fibre to be stripped 8

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

OPTICAL FIBRES –

Part 1-32: Measurement methods and test procedures – Coating strippability

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.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
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.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

DISCLAIMER
This Redline version is not an official Standard and is intended to provide the user with an indication of what changes have been made to the previous version. Only the IEC International Standard provided in this package is to be considered the official Standard.

This Redline version provides you with a quick and easy way to compare all the changes between this standard and its 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 60793-1-32 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 2010. This edition constitutes a technical revision.

This edition includes the following significant technical change with respect to the previous edition: expansion of the range of coating dimensions applicable to the procedure detailed in this document to accommodate optical fibres with a 200 µm coating dimension.

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

FDIS	Report on voting
86A/1890/FDIS	86A/1899/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

- 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.

OPTICAL FIBRES –

Part 1-32: Measurement methods and test procedures – Coating strippability

1 Scope

This part of IEC 60793 is intended primarily for testing either fibres as produced by a fibre manufacturer or subsequently overcoated (tight buffered) using various polymers. The test can be performed either on fibres as produced, or after exposure to various environments.

This test applies to A1, A2, A3, B and C fibres with a nominal glass dimension of 125 µm.

The object of this document is to establish uniform requirements for the mechanical characteristic – coating strippability. This test quantifies the force required to mechanically remove the protective coating from optical fibres along their longitudinal axis.

This test is not intended as a means to maximize fibre strength after the coating is removed nor is it intended to specify the best conditions for field stripping of optical fibres.

This test is designed for optical fibres having polymeric coatings with nominal outer diameters in the range of 200 µm to 900 µm. ~~Application of this method to fibres with outer coating diameters outside the range of 230 µm to 930 µm is not recommended.~~

~~Warning – Fibres can fracture while being stripped and pierce skin and eyes. Use of protective eyewear is recommended.~~

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 (all parts), *Optical fibres – Measurement methods and test procedures*~~

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

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

IEC 60793-1-32

Edition 3.0 2018-11

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Optical fibres –
Part 1-32: Measurement methods and test procedures – Coating strippability

Fibres optiques –
Partie 1-32: Méthodes de mesure et procédures d'essai – Dénudabilité du revêtement



IEC 60793-1-32:2018-11(en-fr)

CONTENTS

FOREWORD 3
1 Scope 5
2 Normative references 5
3 Terms and definitions 5
4 Apparatus 5
4.1 Tensile equipment 5
4.2 Load cell 6
4.3 Transducer amplifier 6
4.4 Stripping tool 6
4.5 Fibre guide 7
5 Specimen preparation 7
5.1 Representative sample 7
5.2 Strip length 7
6 Procedure 8
6.1 General 8
6.2 Stripping rate 8
6.3 Preconditioning 8
6.4 Calibrating the transducer amplifier 8
6.5 Loading the test specimen 8
6.6 Stripping the coating 9
7 Calculations 9
7.1 Calculation for the value of a specimen 9
7.1.1 General 9
7.1.2 Approach 1 – Average strip force 9
7.1.3 Approach 2 – Peak strip force 9
7.2 Calculation of the reported value 9
8 Documentation 9
8.1 Information to be presented 9
8.2 Information to be available for each test 10
9 Specification information 10
Bibliography 11

Figure 1 – Example of test arrangement 6
Figure 2 – Length of fibre to be stripped 8

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

OPTICAL FIBRES –

Part 1-32: Measurement methods and test procedures – Coating strippability

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.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
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.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60793-1-32 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 2010. This edition constitutes a technical revision.

This edition includes the following significant technical change with respect to the previous edition: expansion of the range of coating dimensions applicable to the procedure detailed in this document to accommodate optical fibres with a 200 µm coating dimension.

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

FDIS	Report on voting
86A/1890/FDIS	86A/1899/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

- 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.

OPTICAL FIBRES –

Part 1-32: Measurement methods and test procedures – Coating strippability

1 Scope

This part of IEC 60793 is intended primarily for testing either fibres as produced by a fibre manufacturer or subsequently overcoated (tight buffered) using various polymers. The test can be performed either on fibres as produced, or after exposure to various environments.

This test applies to A1, A2, A3, B and C fibres with a nominal glass dimension of 125 µm.

The object of this document is to establish uniform requirements for the mechanical characteristic – coating strippability. This test quantifies the force required to mechanically remove the protective coating from optical fibres along their longitudinal axis.

This test is not intended as a means to maximize fibre strength after the coating is removed nor is it intended to specify the best conditions for field stripping of optical fibres.

This test is designed for optical fibres having polymeric coatings with nominal outer diameters in the range of 200 µm to 900 µm.

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*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

SOMMAIRE

AVANT-PROPOS 13
1 Domaine d'application 15
2 Références normatives 15
3 Termes et définitions 15
4 Appareillage 16
4.1 Matériel d'essai de traction 16
4.2 Cellule dynamométrique 16
4.3 Capteur et amplificateur 16
4.4 Outil de dénudage 17
4.5 Guide-fibre 17
5 Préparation des spécimens 17
5.1 Echantillon représentatif 17
5.2 Longueur à dénuder 18
6 Mode opératoire 18
6.1 Généralités 18
6.2 Vitesse de dénudage 18
6.3 Préconditionnement 19
6.4 Etalonnage du capteur et de l'amplificateur 19
6.5 Application de la charge sur le spécimen d'essai 19
6.6 Enlèvement du revêtement 19
7 Calculs 19
7.1 Calcul pour la valeur d'un spécimen 19
7.1.1 Généralités 19
7.1.2 Approche 1 – Force de dénudage moyenne 19
7.1.3 Approche 2 – Force de dénudage crête 20
7.2 Calcul de la valeur consignée 20
8 Documentation 20
8.1 Informations à fournir 20
8.2 Informations devant être disponibles pour chaque essai 20
9 Informations à mentionner dans la spécification 20
Bibliographie 21

Figure 1 – Exemple d'équipement d'essai 16
Figure 2 – Longueur de fibre à dénuder 18

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

_____

FIBRES OPTIQUES –

Partie 1-32: Méthodes de mesure et procédures d'essai – Dénudabilité du revêtement

AVANT-PROPOS

1) La Commission Électrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. À cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
2) Les décisions ou accords officiels de l'IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux de l'IEC intéressés sont représentés dans chaque comité d'études.
3) Les Publications de l'IEC se présentent sous la forme de recommandations internationales et sont agréées comme telles par les Comités nationaux de l'IEC. Tous les efforts raisonnables sont entrepris afin que l'IEC s'assure de l'exactitude du contenu technique de ses publications; l'IEC ne peut pas être tenue responsable de l'éventuelle mauvaise utilisation ou interprétation qui en est faite par un quelconque utilisateur final.
4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l'IEC s'engagent, dans toute la mesure possible, à appliquer de façon transparente les Publications de l'IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l'IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
5) L'IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l'IEC. L'IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets et de ne pas avoir signalé leur existence.

La Norme internationale IEC 60793-1-32 a été établie par le sous-comité 86A: Fibres et câbles, du comité d'études 86 de l'IEC: Fibres optiques.

Cette troisième édition annule et remplace la deuxième édition parue en 2010. Cette édition constitue une révision technique.

Cette édition inclut la modification technique majeure suivante par rapport à l'édition précédente: élargissement de la plage des dimensions de revêtement applicables au mode opératoire présenté dans le présent document pour correspondre aux fibres optiques disposant d'une dimension de revêtement de 200 µm.

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

FDIS	Rapport de vote
86A/1890/FDIS	86A/1899/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.

Ce document a été rédigé 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.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "http://webstore.iec.ch" dans les données relatives au document recherché. À cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

IMPORTANT – Le logo "*colour inside*" qui se trouve sur la page de couverture de cette publication indique qu'elle contient des couleurs qui sont considérées comme utiles à une bonne compréhension de son contenu. Les utilisateurs devraient, par conséquent, imprimer cette publication en utilisant une imprimante couleur.

FIBRES OPTIQUES –

Partie 1-32: Méthodes de mesure et procédures d'essai – Dénudabilité du revêtement

1 Domaine d'application

La présente partie de l'IEC 60793 est destinée principalement aux essais des fibres, dès leur production par un fabricant de fibres, ou après revêtement ultérieur (revêtement protecteur serré) au moyen de divers polymères. L'essai peut être effectué sur des fibres issues de production, ou bien après exposition à divers environnements.

Le présent essai s'applique aux fibres de types A1, A2, A3, B et C avec une dimension de verre nominale de 125 µm.

L'objet du présent document est d'établir des exigences uniformes pour la caractéristique mécanique: dénudabilité du revêtement. Le présent essai permet de quantifier la force exigée pour retirer mécaniquement le revêtement de protection des fibres optiques le long de leur axe longitudinal.

Cet essai n'est pas destiné à augmenter au maximum la résistance de la fibre après retrait du revêtement de protection, ni à spécifier les meilleures conditions pour le dénudage sur site de fibres optiques.

Cet essai est conçu pour les fibres optiques ayant des revêtements polymères avec des diamètres extérieurs nominaux se situant dans la plage comprise entre 200 µm et 900 µm.

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)

3 Termes et définitions

Aucun terme n'est défini dans le présent document.

L'ISO et l'IEC tiennent à jour des bases de données terminologiques destinées à être utilisées en normalisation, consultables aux adresses suivantes:

- IEC Electropedia: disponible à l'adresse http://www.electropedia.org/
- ISO Online browsing platform: disponible à l'adresse http://www.iso.org/obp