

STN	Optické káble Časť 1-23: Kmeňová špecifikácia Základné skúšobné postupy pre optické káble Skúšobné metódy pre prvky kábla	STN EN IEC 60794-1-23 35 9223
------------	--	---

Optical fibre cables - Part 1-23: Generic specification - Basic optical cable test procedures - Cable element test methods

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 06/20

Obsahuje: EN IEC 60794-1-23:2019, IEC 60794-1-23:2019

Oznámením tejto normy sa od 13.11.2022 ruší
STN EN 60794-1-23 (35 9223) z mája 2013

130870

EUROPEAN STANDARD

EN IEC 60794-1-23

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2019

ICS 33.180.10

Supersedes EN 60794-1-23:2012 and all of its
amendments and corrigenda (if any)

English Version

**Optical fibre cables - Part 1-23: Generic specification - Basic
optical cable test procedures - Cable element test methods
(IEC 60794-1-23:2019)**

Câbles à fibres optiques - Partie 1-23: Spécification
générique - Procédures fondamentales d'essai des câbles
optiques - Méthodes d'essai des éléments de câble
(IEC 60794-1-23:2019)

Lichtwellenleiterkabel - Teil 1-23: Fachgrundspezifikation -
Grundlegende Prüfverfahren für Lichtwellenleiterkabel -
Prüfverfahren für Kabelemente
(IEC 60794-1-23:2019)

This European Standard was approved by CENELEC on 2019-11-13. 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 CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

EN IEC 60794-1-23:2019 (E)**European foreword**

The text of document 86A/1912/CDV, future edition 2 of IEC 60794-1-23, 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 IEC 60794-1-23:2019.

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) 2020-08-13
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-11-13

This document supersedes EN 60794-1-23:2012 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 60794-1-23:2019 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 60793-1-50:2014	NOTE	Harmonized as EN 60793-1-50:2015 (not modified)
IEC 60793-1-51:2014	NOTE	Harmonized as EN 60793-1-51:2014 (not modified)
IEC 60793-1-52:2014	NOTE	Harmonized as EN 60793-1-52:2014 (not modified)
IEC 60793-1-53:2014	NOTE	Harmonized as EN 60793-1-53:2014 (not modified)
IEC 60794-1-21:2015	NOTE	Harmonized as EN 60794-1-21:2015 (not modified)
IEC 60794-1-22:2017	NOTE	Harmonized as EN IEC 60794-1-22:2018 (not modified)
IEC 60811-403	NOTE	Harmonized as EN 60811-403
IEC 60811-404	NOTE	Harmonized as EN 60811-404
IEC 60811-501	NOTE	Harmonized as EN 60811-501
IEC 60811-505	NOTE	Harmonized as EN 60811-505

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where 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 60793-1-32	2018	Optical fibres - Part 1-32: Measurement methods and test procedures - Coating strippability	EN IEC 60793-1-32	2018
IEC 60793-1-40	-	Optical fibres - Part 1-40: Attenuation measurement methods	EN IEC 60793-1-40	-
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 60794-1-2	-	Optical fibre cables – Part 1-2: Generic specification – Basic optical cable test procedures – General guidance	EN 60794-1-2	-
IEC 60794-1-31	2018	Optical fibre cables – Part 1-31: Generic specification – Optical cable elements – Optical fibre ribbon	EN IEC 60794-1-31	2018
IEC 60811-401	-	Electric and optical fibre cables - Test methods for non-metallic materials - Part 401: Miscellaneous tests - Thermal ageing methods - Ageing in an air oven	EN 60811-401	-



IEC 60794-1-23

Edition 2.0 2019-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Optical fibre cables –
Part 1-23: Generic specification – Basic optical cable test procedures – Cable
element test methods**

**Câbles à fibres optiques –
Partie 1-23: Spécification générique – Procédures fondamentales d’essai des
câbles optiques – Méthodes d’essai des éléments de câble**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2019 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC -

webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.



IEC 60794-1-23

Edition 2.0 2019-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Optical fibre cables –
Part 1-23: Generic specification – Basic optical cable test procedures – Cable
element test methods**

**Câbles à fibres optiques –
Partie 1-23: Spécification générique – Procédures fondamentales d’essai des
câbles optiques – Méthodes d’essai des éléments de câble**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 33.180.10

ISBN 978-2-8322-7407-1

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD	5
1 Scope	7
2 Normative references	7
3 Terms and definitions	7
4 General requirements	8
5 Method G1: Bend test for optical cable elements	8
5.1 Object	8
5.2 Sample	8
5.3 Apparatus	8
5.4 Procedure	8
5.5 Requirements	8
5.6 Details to be specified	8
6 Method G2: Ribbon dimensions and geometry – Visual method	9
6.1 Object	9
6.2 Sample	9
6.3 Apparatus	9
6.4 Procedure	9
6.4.1 General	9
6.4.2 Method 1	9
6.4.3 Method 2	9
6.5 Requirements	9
6.6 Details to be specified	9
6.7 Definitions of ribbon dimensions and geometry	10
6.7.1 General	10
6.7.2 Width and height	10
6.7.3 Basis line	10
6.7.4 Fibre alignment	10
7 Method G3: Ribbon dimensions – Aperture gauge	11
7.1 Object	11
7.2 Sample	11
7.3 Apparatus	11
7.4 Procedure	11
7.5 Requirement	11
7.6 Details to be specified	11
8 Method G4: Ribbon dimensions – Dial gauge (obsoleted method)	12
9 Method G5: Ribbon tear (separability)	12
9.1 Object	12
9.2 Sample	12
9.3 Apparatus	13
9.4 Procedure	13
9.5 Requirements	14
9.6 Details to be specified	14
10 Method G6: Ribbon torsion	14
10.1 Object	14
10.2 Sample	14

10.3	Apparatus	14
10.4	Procedure	15
10.5	Requirements	15
10.6	Details to be specified.....	15
11	Method G7: Tube kinking.....	16
11.1	Object.....	16
11.2	Sample	16
11.3	Apparatus	16
11.4	Procedure	17
11.5	Requirements	17
11.6	Details to be specified.....	17
12	Method G8: Ribbon residual twist test.....	18
12.1	Object.....	18
12.2	Sample	18
12.3	Apparatus	18
12.4	Procedure	18
12.5	Requirements	18
12.6	Details to be specified.....	19
13	Method G9: Bleeding and evaporation	19
13.1	Object.....	19
13.2	Sample	19
13.3	Apparatus	19
13.4	Procedure	20
13.5	Requirements	20
13.6	Details to be specified.....	21
14	Method G10A: Stripping force stability of cabled optical fibres	21
14.1	Object.....	21
14.2	Sample	21
14.2.1	Sample length	21
14.2.2	Sample preparation	21
14.3	Apparatus	21
14.4	Procedure	21
14.5	Requirements	21
14.6	Details to be specified.....	22
15	Method G10B: Strippability of optical fibre ribbons.....	22
15.1	Object.....	22
15.2	Sample	22
15.3	Apparatus	22
15.3.1	General	22
15.3.2	Stripping tool	22
15.3.3	Motor and slide (if used)	23
15.4	Positioning and holding equipment.....	23
15.5	Alcohol wipe	23
15.6	Procedure	23
15.7	Requirements	24
15.8	Details to be specified.....	24
16	Method G10C: Strippability of buffered optical fibres	24
16.1	Object.....	24

16.2	Sample	24
16.3	Apparatus	24
16.4	Procedure	24
16.5	Requirements	25
16.6	Details to be specified.....	25
17	Method G11A: Tensile strength and elongation of buffer tubes and micro tubes at break	25
17.1	Object.....	25
17.2	Sample	25
17.2.1	General	25
17.2.2	Preparation and conditioning of test pieces.....	25
17.2.3	Determination of cross-sectional area	28
17.2.4	Ageing treatment	29
17.3	Apparatus	29
17.4	Procedure	30
17.5	Requirements	31
18	Method G11B: Elongation of buffer tubes and micro tubes at low temperature	31
18.1	Object.....	31
18.2	Sample	31
18.2.1	General	31
18.2.2	Preparation of test pieces	31
18.3	Apparatus	32
18.4	Procedure	32
18.5	Requirements	33
18.6	Details to be specified.....	33
	Bibliography.....	34
	Figure 1 – Cross-sectional drawing illustrating fibre ribbon geometry	10
	Figure 2 – Aperture gauge	11
	Figure 3 – Sample preparation for ribbon separability test.....	13
	Figure 4 – Separability procedure	14
	Figure 5 – Torsion test.....	15
	Figure 6 – Tube kinking test.....	16
	Figure 7 – Bleeding and evaporation test set-up	20
	Figure 8 – Dumb-bell test piece	27
	Figure 9 – Small dumb-bell test piece	28
	Figure 10 – Punch end showing groove	28
	Figure 11 – Test pieces cut by grooved punch	28
	Figure 12 – Machine for preparing test pieces.....	30
	Table 1 – Examples of test apparatus dimensions for tube kinking.....	17
	Table 2 – Condition of stripped samples	23

INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPTICAL FIBRE CABLES

Part 1-23: Generic specification – Basic optical cable test procedures – Cable element test methods

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 60794-1-23 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 2012. It constitutes a technical revision.

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

- a) addition of a new test method G9: Bleeding and evaporation (formerly known as method E15 in IEC 60794-1-21:2015);
- b) addition of a new test method G10A: Stripping force stability of cabled optical fibres (formerly known as method E5A in IEC 60794-1-21:2015);
- c) addition of a new test method G10B: Strippability of optical fibre ribbons (formerly known as method E5B in IEC 60794-1-21:2015);
- d) addition of a new test method G10C: Strippability of buffered optical fibres (formerly known as method E5C in IEC 60794-1-21:2015);

- e) addition of a new test method G11A: Tensile strength and elongation of buffer tubes (included in IEC 60811-501);
- f) addition of a new test method G11B: Elongation of buffer tubes at low temperature (included in IEC 60811-505);
- g) clarification of the sample preparation procedure in method G5: Ribbon tear (separability);

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

CDV	Report on voting
86A/1912/CDV	86A/1945/RVC

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 60794 series, published under the general title *Optical fibre cables*, 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 FIBRE CABLES

Part 1-23: Generic specification – Basic optical cable test procedures – Cable element test methods

1 Scope

This part of IEC 60794 describes test procedures to be used in establishing uniform requirements for the geometrical, material, mechanical, environmental properties of optical fibre cable elements.

This document applies to optical fibre cables for use with telecommunication equipment and devices employing similar techniques, and to cables having a combination of both optical fibres and electrical conductors.

Throughout the document, the wording "optical cable" can also include optical fibre units, microduct fibre units, etc.

NOTE The environmental testing of optical fibre ribbon would be valuable for some applications. Useful information about suitable test methods can be found in the optical fibre standards IEC 60793-1-50, IEC 60793-1-51, IEC 60793-1-52, and IEC 60793-1-53.

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 60794-1-2, *Optical fibre cables – Part 1-2: Generic specification – Basic optical cable test procedures – General guidance*

IEC 60794-1-31:2018, *Optical fibre cables – Part 1-31: Generic specification – Optical cable elements – Optical fibre ribbon*

IEC 60793-1-32:2018, *Optical fibres – Part 1-32: Measurement methods and test procedures – Coating strippability*

IEC 60793-1-40, *Optical fibres – Part 1-40: Attenuation measurement methods*

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

IEC 60811-401, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 401: Miscellaneous tests – Thermal ageing methods – Ageing in an air oven*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN