

STN	Optické káble Časť 1-22: Kmeňová špecifikácia Základné skúšobné postupy pre optické káble Skúšobné metódy vplyvu prostredia	STN EN IEC 60794-1-22 35 9223
------------	--	---

Optical fibre cables - Part 1-22: Generic specification - Basic optical cable test procedures - Environmental 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. 06/18

Obsahuje: EN IEC 60794-1-22:2018, IEC 60794-1-22:2017

Oznámením tejto normy sa od 09.11.2020 ruší
STN EN 60794-1-22 (35 9223) z decembra 2012

126753

EUROPEAN STANDARD

EN IEC 60794-1-22

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2018

ICS 33.180.10

Supersedes EN 60794-1-22:2012

English Version

Optical fibre cables - Part 1-22: Generic specification - Basic optical cable test procedures - Environmental test methods (IEC 60794-1-22:2017)

Câbles à fibres optiques - Partie 1-22 : Spécification générale - Procédures fondamentales d'essais des câbles optiques - Méthodes d'essai d'environnement (IEC 60794-1-22:2017)

Lichtwellenleiterkabel - Teil 1-22: Fachgrundspezifikation - Grundlegende Prüfverfahren für Lichtwellenleiterkabel - Prüfverfahren zur Umweltprüfung (IEC 60794-1-22:2017)

This European Standard was approved by CENELEC on 2017-11-09. 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, 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 60794-1-22:2018 (E)**European foreword**

The text of document 86A/1813/FDIS, future edition 2 of IEC 60794-1-22, 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 60794-1-22:2018.

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) 2018-08-09
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-11-09

This document supersedes EN 60794-1-22:2012.

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 60794-1-22:2017 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 60794-1-2	NOTE	Harmonized as EN 60794-1-2.
IEC 60794-1-21	NOTE	Harmonized as EN 60794-1-21.
IEC 60794-1-22	NOTE	Harmonized as EN 60794-1-22.
IEC 60794-1-23	NOTE	Harmonized as EN 60794-1-23.
IEC 60794-1-24	NOTE	Harmonized as EN 60794-1-24.

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 60068-2-14	2009	Environmental testing -- Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	2009
IEC 60304	-	Standard colours for insulation for low-frequency cables and wires	HD 402 S2	-
IEC 60544-1	-	Electrical insulating materials - Determination of the effects of ionizing radiation -- Part 1: Radiation interaction and dosimetry	EN 60544-1	-
IEC 60793-1-40	-	Optical fibres -- Part 1-40: Measurement methods and test procedures - Attenuation	EN 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 60793-1-54	-	Optical fibres -- Part 1-54: Measurement methods and test procedures - Gamma irradiation	EN 60793-1-54	-
IEC 60794-1-1	-	Optical fibre cables - Part 1-1: Generic specification - General	EN 60794-1-1	-
IEC 60811-503	-	Electric and optical fibre cables - Test methods for non-metallic materials -- Part 503: Mechanical tests - Shrinkage test for sheaths	EN 60811-503	-
ISO 4892-2	-	Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps	EN ISO 4892-2	-
ISO 4892-3	-	Plastics - Methods of exposure to laboratory light sources - Part 3: Fluorescent UV lamps	EN ISO 4892-3	-



IEC 60794-1-22

Edition 2.0 2017-10

INTERNATIONAL STANDARD



**Optical fibre cables –
Part 1-22: Generic specification – Basic optical cable test procedures –
Environmental test methods**





THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2017 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.

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

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
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 corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub

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 also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions 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

65 000 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.

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: csc@iec.ch.



IEC 60794-1-22

Edition 2.0 2017-10

INTERNATIONAL STANDARD



**Optical fibre cables –
Part 1-22: Generic specification – Basic optical cable test procedures –
Environmental test methods**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 33.180.10

ISBN 978-2-8322-4864-5

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

CONTENTS

FOREWORD	5
INTRODUCTION	7
1 Scope	8
2 Normative references	8
3 Terms and definitions	9
4 Method F1 – Temperature cycling	9
4.1 Object	9
4.2 Sample	9
4.3 Apparatus	10
4.4 Procedure	10
4.4.1 Initial measurement	10
4.4.2 Pre-conditioning	10
4.4.3 Conditioning	10
4.4.4 Recovery	13
4.5 Requirements	13
4.6 Details to be specified	13
4.7 Details to be reported	14
5 Method F5 – Water penetration	14
5.1 Object	14
5.2 Sample	14
5.2.1 Method F5A	14
5.2.2 Method F5B	14
5.2.3 Method F5C (for cables with swellable water blocking material)	15
5.3 Apparatus	15
5.3.1 Test fixtures and set-up	15
5.3.2 Water	15
5.3.3 Orifice (method F5C)	15
5.4 Procedure	15
5.4.1 Method F5A and F5B	15
5.4.2 Method F5C	16
5.5 Requirements	16
5.6 Details to be specified	16
5.7 Details to be reported	16
6 Method F7 – Nuclear radiation	19
6.1 Object	19
6.2 Sample	19
6.3 Apparatus	19
6.4 Procedure	19
6.4.1 Fibres	19
6.4.2 Materials	19
6.5 Requirements	19
6.6 Details to be specified	19
7 Method F8 – Pneumatic resistance	19
7.1 Object	19
7.2 Sample	20

7.3	Apparatus	20
7.4	Procedure	20
7.5	Requirement	20
7.6	Details to be specified.....	20
8	Method F9 – Ageing	21
8.1	Object.....	21
8.2	Sample	21
8.3	Apparatus	21
8.4	Procedure	21
8.5	Requirement	21
8.6	Details to be specified.....	21
9	Method F10 – Underwater cable resistance to hydrostatic pressure.....	22
9.1	Object.....	22
9.2	Sample	22
9.3	Apparatus	22
9.4	Procedure	22
9.5	Requirements	22
9.6	Details to be specified.....	22
10	Method F11 – Sheath shrinkage (cables intended for patch cords)	22
10.1	Object.....	22
10.2	Sample	23
10.3	Apparatus	23
10.4	Procedure	23
10.5	Requirements	24
10.6	Details to be specified.....	24
10.7	Details to be reported	24
11	Method F12 – Temperature cycling of cables to be terminated with connectors	24
11.1	Object.....	24
11.2	Sample	24
11.3	Apparatus	24
11.4	Procedure	25
11.5	Requirements	25
11.6	Details to be specified.....	25
12	Method F13 – Microduct pressure withstand	25
12.1	Object.....	25
12.2	Sample	26
12.3	Apparatus	26
12.4	Procedure	26
12.5	Requirements	26
12.6	Details to be specified.....	26
13	Method F14 – Cable UV resistance test.....	26
13.1	Object.....	26
13.2	Sample	27
13.3	Apparatus	27
13.4	Procedure	27
13.4.1	General	27
13.4.2	Conditioning for outdoor cables (weatherometer test)	27
13.4.3	Conditioning for indoor cables (QUV test).....	28

13.5	Requirements	28
13.6	Details to be specified.....	28
14	Method F15 – Cable external freezing test.....	28
14.1	Object	28
14.2	Sample	28
14.3	Apparatus	28
14.4	Procedure	28
14.5	Requirements	29
14.6	Details to be specified.....	29
15	Method F16 – Compound flow (drip).....	29
15.1	Object.....	29
15.2	Sample	29
15.3	Apparatus	30
15.4	Procedure	30
15.5	Requirements	31
15.6	Details to be specified.....	31
16	Method F17 – Cable shrinkage test (fibre protrusion).....	31
16.1	Object.....	31
16.2	Sample	31
16.3	Apparatus	31
16.4	Conditioning.....	31
16.5	Requirements	33
16.6	Details to be specified.....	33
16.7	Details to be reported	33
17	Method F18 – Mid-span temperature cycling test for exposed buffer tubes	34
17.1	Object.....	34
17.2	Sample	34
17.3	Apparatus	34
17.4	Procedure	34
17.5	Requirements	35
17.6	Details to be specified.....	35
	Annex A (normative) Colour permanence	36
	Bibliography.....	37
	Figure 1 – Initial cycle(s) procedure	12
	Figure 2 – Final cycle procedure	13
	Figure 3 – Test arrangement for method F5A.....	17
	Figure 4 – Test arrangement for method F5B.....	17
	Figure 5 – Test arrangement for method F5C: pre-soaked sample	17
	Figure 6 – Test arrangement for method F5C: pre-soak procedure.....	18
	Figure 7 – Test arrangement for method F5C: orifice	18
	Figure 8 – Test arrangement for method F5C: longer sample	18
	Figure 9 – Preparation of the cable ends.....	32
	Figure 10 – Fibre protrusion measurement.....	33
	Table 1 – Minimum soak time t_1	12

INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPTICAL FIBRE CABLES –**Part 1-22: Generic specification –
Basic optical cable test procedures –
Environmental 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 60794-1-22 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 second edition includes the following significant technical changes with respect to the previous edition:

- a) new test method designation F16 – Compound flow (drip) [E14 in IEC 60794-1-21];
- b) new test method F17 – Cable shrinkage test (fibre protrusion);
- c) new test method F18 – Mid-span temperature cycling test.

NOTE Missing numbers in the test methods sequence are intentional. They can suggest a deleted test method or a test method that was never published.

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

FDIS	Report on voting
86A/1813/FDIS	86A/1827/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 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.

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

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.

INTRODUCTION

IEC 60794-1-2:2003 has been split into five new documents:

- IEC 60794-1-2, *Optical fibre cables – Part 1-2: Generic specification – Basic optical cable test procedures – General guidance*
- IEC 60794-1-21, *Optical fibre cables – Part 1-21: Generic specification – Basic optical cable test procedures – Mechanical tests methods*
- IEC 60794-1-22, *Optical fibre cables – Part 1-22: Generic specification – Basic optical cable test procedures – Environmental tests methods*
- IEC 60794-1-23, *Optical fibre cables – Part 1-23: Generic specification – Basic optical cable test procedures – Cable elements tests methods*
- IEC 60794-1-24, *Optical fibre cables – Part 1-24: Generic specification – Basic optical cable test procedures – Electrical tests methods*

OPTICAL FIBRE CABLES –

Part 1-22: Generic specification – Basic optical cable test procedures – Environmental test methods

1 Scope

This part of IEC 60794 defines test procedures to be used in establishing uniform requirements for the environmental performance of

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

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

See IEC 60794-1-2 for a reference guide to test methods of all types and for general requirements and definitions.

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 60068-2-14:2009, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60304, *Standard colours for insulation for low-frequency cables and wires*

IEC 60544-1, *Electrical insulating materials – Determination of the effects of ionizing radiation – Part 1: Radiation interaction and dosimetry*

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 60793-1-54, *Optical fibres – Part 1-54: Measurement methods and test procedures – Gamma irradiation*

IEC 60794-1-1, *Optical fibre cables – Part 1-1: Generic specification – General*

IEC 60811-503, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 503: Mechanical tests – Shrinkage test for sheaths*

ISO 4892-2, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc lamps*

IEC 60794-1-22:2017 © IEC 2017

– 9 –

ISO 4892-3, *Plastics – Methods of exposure to laboratory light sources – Part 3: Fluorescent UV lamps*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN