

<b>STN</b>	<b>Optické káble</b> <b>Časť 1-211: Kmeňová špecifikácia</b> <b>Základné skúšobné postupy pre optické káble</b> <b>Skúšobné metódy vplyvu prostredia</b> <b>Zmraštenie plášťa, metóda F11</b>	<b>STN</b> <b>EN IEC</b> <b>60794-1-211</b>  35 9223
------------	---	--

Optical fibre cables - Part 1-211: Generic specification - Basic optical cable test procedures - Environmental test methods - Sheath shrinkage, method F11

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. 07/21

Obsahuje: EN IEC 60794-1-211:2021, IEC 60794-1-211:2021

Oznámením tejto normy sa od 25.03.2024 ruší  
STN EN IEC 60794-1-22 (35 9223) z júla 2018

**133156**



EUROPEAN STANDARD

**EN IEC 60794-1-211**

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2021

ICS 33.180.10

Supersedes EN IEC 60794-1-22:2018 and all of its amendments and corrigenda (if any)

English Version

**Optical fibre cables - Part 1-211: Generic specification - Basic optical cable test procedures - Environmental test methods - Sheath shrinkage, method F11  
(IEC 60794-1-211:2021)**

Câbles à fibres optiques - Partie 1-211: Spécification générique - Procédures fondamentales d'essais des câbles optiques - Méthodes d'essais d'environnement - Rétraction de la gaine, méthode F11  
(IEC 60794-1-211:2021)

Lichtwellenleiterkabel - Teil 1-211: Fachgrundspezifikation - Grundlegende Prüfverfahren für Lichtwellenleiterkabel - Umweltprüfverfahren - Mantelschrumpfung, Methode F11  
(IEC 60794-1-211:2021)

This European Standard was approved by CENELEC on 2021-03-25. 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 60794-1-211:2021 (E)****European foreword**

The text of document 86A/2074/FDIS, future edition 1 of IEC 60794-1-211, 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 60794-1-211:2021.

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) 2021-12-25
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2024-03-25

This document supersedes EN IEC 60794-1-22:2018 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 60794-1-211:2021 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 IEC 60794-1-2

IEC 60811-503 NOTE Harmonized as EN 60811-503

## **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](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60794-1-1	-	Optical fibre cables - Part 1-1: Generic specification - General	EN 60794-1-1	-
IEC 60794-1-22	2017	Optical fibre cables - Part 1-22: Generic specification - Basic optical cable test procedures - Environmental test methods	EN IEC 60794-1-22	2018



# IEC 60794-1-211

Edition 1.0 2021-02

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

**Optical fibre cables –  
Part 1-211: Generic specification – Basic optical cable test procedures –  
Environmental test methods – Sheath shrinkage, method F11**

**Câbles à fibres optiques –  
Partie 1-211: Spécification générique – Procédures fondamentales d’essais des  
câbles optiques – Méthodes d’essais d’environnement – Rétraction de la gaine,  
méthode F11**

**THIS PUBLICATION IS COPYRIGHT PROTECTED****Copyright © 2021 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](mailto:info@iec.ch)  
[www.iec.ch](http://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](http://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](http://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](http://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](mailto:sales@iec.ch).

**IEC online collection - [oc.iec.ch](http://oc.iec.ch)**

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

**Electropedia - [www.electropedia.org](http://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 18 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

**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](http://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](http://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](http://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](mailto:sales@iec.ch).

**IEC online collection - [oc.iec.ch](http://oc.iec.ch)**

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

**Electropedia - [www.electropedia.org](http://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.



# IEC 60794-1-211

Edition 1.0 2021-02

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

**Optical fibre cables –**

**Part 1-211: Generic specification – Basic optical cable test procedures –  
Environmental test methods – Sheath shrinkage, method F11**

**Câbles à fibres optiques –**

**Partie 1-211: Spécification générique – Procédures fondamentales d’essais des  
câbles optiques – Méthodes d’essais d’environnement – Rétraction de la gaine,  
méthode F11**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

ICS 33.180.10

ISBN 978-2-8322-9467-3

**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 .....	3
INTRODUCTION .....	5
1 Scope .....	6
2 Normative references .....	6
3 Terms and definitions .....	6
4 Method F11A – Sheath shrinkage (cables to be terminated with connectors) .....	6
4.1 Objective .....	6
4.2 Sample .....	7
4.3 Apparatus .....	7
4.4 Procedure .....	7
4.5 Requirements .....	8
4.6 Details to be specified .....	9
4.7 Details to be reported .....	9
5 Method F11B – Sheath shrinkage (general purpose) .....	9
5.1 Objective .....	9
5.2 Sample .....	9
5.3 Apparatus .....	9
5.4 Procedure .....	9
5.5 Requirements .....	10
5.6 Details to be specified .....	10
5.7 Details to be reported .....	10
Annex A (informative) Comparison between method F11A and method F11B .....	11
Bibliography .....	12
Figure 1 – Cable sample preparation .....	7
Figure 2 – Alternative cable sample preparation (cut ends) .....	8
Table A.1 – Comparison between method F11A and method F11B .....	11

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## OPTICAL FIBRE CABLES –

**Part 1-211: Generic specification –  
Basic optical cable test procedures –  
Environmental test methods – Sheath shrinkage, method F11**

## 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.

IEC 60794-1-211 has been prepared by subcommittee 86A: Fibres and cables, of IEC technical committee 86: Fibre optics. It is an International Standard.

This document cancels and replaces IEC 60794-1-22:2017. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC 60794-1-22:2017:

- a) method F11 (cables intended for patch cords) of IEC 60794-1-22:2017 was renumbered F11A and renamed as "sheath shrinkage (cables to be terminated with connectors)";
- b) a second method F11B is newly included that was adapted from ANSI/TIA-455-86-A;
- c) in method F11A, the thermal exposure from ambient to the specified temperature was replaced by temperature cycling between a low and high temperature according to IEC 60794-1-22, method F1;

- d) in method F11A, the continuing of the test cycles until the shrinkage exhibits a variation less than  $\pm 1$  mm was replaced with a fixed number of cycles specified by the detail specification;
- e) in method F11A, the average was changed to maximum sheath shrinkage that shall not exceed the value specified in the relevant detail specification;
- f) in both methods, the alternative that the sample may be cut to length and the length between the cut sheath ends measured is added.

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

Draft	Report on voting
86A/2074/FDIS	86A/2087/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/standardsdev/publications](http://www.iec.ch/standardsdev/publications).

A list of all parts in the 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.

## INTRODUCTION

This document defines two test methods to measure the shrinkage of the sheath due to thermal exposure of cables intended for termination with connectors and cables for general purpose.

This document cancels and replaces method F11 of IEC 60794-1-22:2017, which will be withdrawn. It includes an editorial revision, based on the new structure and numbering system for optical fibre cable test methods. Additionally, technical changes were implemented. The environmental tests contained in IEC 60794-1-22:2017 will be individually numbered in the IEC 60794-1-2xx series. Each test method is now considered to be an individual document rather than part of a multi-test method compendium. Full cross-reference details are given in IEC 60794-1-2.

This document includes a first method F11 of IEC 60794-1-22:2017 named "sheath shrinkage test for cables intended for patch cords". This method was renumbered as method F11A in this document. There are technical changes in method F11A. The thermal exposure from ambient to the specified temperature was replaced by temperature cycling according to IEC 60794-1-22, method F1. Also, the continuing of the test cycles until the shrinkage exhibits a variation less than  $\pm 1$  mm was replaced by a fixed number of cycles according to the detail specification.

This document includes a second method F11B for sheath shrinkage of cable for general purpose. This test procedure adapts the method in ANSI/TIA-455-86-A.

The numbering of these tests continues the F-series numbering sequence of IEC 60794-1-22:2017.

A test procedure other than method F11A and method F11B to measure the shrinkage exists. Method F17 according to IEC 60794-1-22 defines shrinkage testing on a cable sample with a minimum length of 10 m or longer by measuring the fibre protrusion and, indirectly, the buffered fibre or fibre tube protrusion at both ends.

For electric and optical fibre cables, a shrinkage test for sheaths according to IEC 60811-503 exists that uses a nominal sample length of 500 mm and exposes the sample over a specified temperature and time. Afterwards, the sample is allowed to cool in air to ambient temperature. Five such thermal cycles are carried out.

IEC TR 62959<sup>1</sup> provides information on cable shrinkage characterisation of optical fibre cables that consist of standard glass optical fibres for telecommunication applications. The characterisation is directed to the effects of cable shrinkage or cable element shrinkage on the termination of cables. Recommended test methods for the evaluation of cable shrinkage and classification by several grades are given.

---

<sup>1</sup> Under preparation. Stage at the time of publication: IEC TR/TPUB 62959:2020.

## OPTICAL FIBRE CABLES –

### **Part 1-211: Generic specification – Basic optical cable test procedures – Environmental test methods – Sheath shrinkage, method F11**

#### **1 Scope**

This part of IEC 60794 defines test procedures to measure the shrinkage of the sheath due to thermal exposure of cables.

A first test method, F11A, is included for cables where the fibre or buffered fibre and the sheath of the cable are intended to be fully terminated into a connector at one or both cable ends.

A second test method, F11B, is included in this document for sheath shrinkage testing for general purpose.

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

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

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

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**