



SLOVENSKI STANDARD
SIST EN IEC 60794-1-1:2023

01-september-2023

Optični kabli - 1-1. del: Splošna specifikacija - Splošno (IEC 60794-1-1:2023)

Optical fibre cables - Part 1-1: Generic specification - General (IEC 60794-1-1:2023)

Lichtwellenleiterkabel - Teil 1-1: Fachgrundspezifikation - Allgemeines (IEC 60794-1-1:2023)

Câbles à fibres optiques - Partie 1-1: Spécification générique - Généralités (IEC 60794-1-1:2023)

Ta slovenski standard je istoveten z: EN IEC 60794-1-1:2023

ICS:

33.180.10 (Optična) vlakna in kabli Fibres and cables

SIST EN IEC 60794-1-1:2023

en

EUROPEAN STANDARD

EN IEC 60794-1-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2023

ICS 33.180.10

Supersedes EN 60794-1-1:2016

English Version

**Optical fibre cables - Part 1-1: Generic specification - General
(IEC 60794-1-1:2023)**

Câbles à fibres optiques - Partie 1-1: Spécification
générique - Généralités
(IEC 60794-1-1:2023)

Lichtwellenleiterkabel - Teil 1-1: Fachgrundspezifikation -
Allgemeines
(IEC 60794-1-1:2023)

This European Standard was approved by CENELEC on 2023-06-26. 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, Türkiye and the United Kingdom.

<https://standards.iteh.ai/catalog/standards/sist/704f8762-7139-4084-97fa-f610336330e0/sist-en-iec-60794-1-1-2023>



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 60794-1-1:2023 (E)**European foreword**

The text of document 86A/2286/FDIS, future edition 5 of IEC 60794-1-1, 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 60794-1-1:2023.

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) 2024-03-26
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2026-06-26

This document supersedes EN 60794-1-1:2016 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.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

iTeh STANDARD PREVIEW
Endorsement notice
 (standards.itih.ai)

The text of the International Standard IEC 60794-1-1:2023 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 standard indicated:

IEC 60793-2-50	NOTE Approved as EN IEC 60793-2-50
IEC 60794-1-1	NOTE Approved as EN 60794-1-1
IEC 60794-1-2	NOTE Approved as EN IEC 60794-1-2
IEC 60794-1-3	NOTE Approved as EN 60794-1-3
IEC 60794-1-23	NOTE Approved as EN IEC 60794-1-23
IEC 60794-1-24	NOTE Approved as EN 60794-1-24
IEC 60794-1-401	NOTE Approved as EN IEC 60794-1-401
IEC 60794-1-402	NOTE Approved as EN IEC 60794-1-402
IEC 60794-2 (series)	NOTE Approved as EN IEC 60794-2 (series)
IEC 60794-2-10	NOTE Approved as EN IEC 60794-2-10
IEC 60794-2-11	NOTE Approved as EN IEC 60794-2-11
IEC 60794-2-20	NOTE Approved as EN 60794-2-20
IEC 60794-2-21	NOTE Approved as EN IEC 60794-2-21

IEC 60794-2-22	NOTE Approved as EN IEC 60794-2-22
IEC 60794-2-30	NOTE Approved as EN IEC 60794-2-30
IEC 60794-2-31	NOTE Approved as EN IEC 60794-2-31
IEC 60794-2-40	NOTE Approved as EN 60794-2-40
IEC 60794-2-41	NOTE Approved as EN 60794-2-41
IEC 60794-2-42	NOTE Approved as EN 60794-2-42
IEC 60794-2-50	NOTE Approved as EN IEC 60794-2-50
IEC 60794-3 (series)	NOTE Approved as EN IEC 60794-3 (series)
IEC 60794-3-10	NOTE Approved as EN 60794-3-10
IEC 60794-3-11	NOTE Approved as EN 60794-3-11
IEC 60794-3-12	NOTE Approved as EN IEC 60794-3-12
IEC 60794-3-20	NOTE Approved as EN 60794-3-20
IEC 60794-3-21	NOTE Approved as EN 60794-3-21
IEC 60794-3-30	NOTE Approved as EN 60794-3-30
IEC 60794-3-40	NOTE Approved as EN IEC 60794-3-40
IEC 60794-3-70	NOTE Approved as EN IEC 60794-3-70
IEC 60794-4 (series)	NOTE Approved as EN IEC 60794-4 (series)
IEC 60794-4-10	NOTE Approved as EN 60794-4-10
IEC 60794-4-20:2018	NOTE Approved as EN IEC 60794-4-20:2018 (not modified)
IEC 60794-4-30	NOTE Approved as EN IEC 60794-4-30
IEC 60794-5 (series)	NOTE Approved as EN 60794-5 (series)
IEC 60794-5-10	NOTE Approved as EN 60794-5-10
IEC 60794-5-20	NOTE Approved as EN 60794-5-20
IEC 60794-6 (series)	NOTE Approved as EN IEC 60794-6 (series)
IEC 60794-6-10	NOTE Approved as EN IEC 60794-6-10
IEC 60794-6-20	NOTE Approved as EN IEC 60794-6-20
IEC 60794-6-30	NOTE Approved as EN IEC 60794-6-30
IEC 61753-1	NOTE Approved as EN IEC 61753-1
ISO 14001	NOTE Approved as EN ISO 14001
ISO 14064-1	NOTE Approved as EN ISO 14064-1

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.cencenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60189-1	-	Low-frequency cables and wires with PVC insulation and PVC sheath - Part 1: General test and measuring methods	-	-
IEC 60304	-	Standard colours for insulation for low-frequency cables and wires	HD 402 S2	-
IEC 60793-1-21	-	Optical fibres - Part 1-21: Measurement methods and test procedures - Coating geometry	EN 60793-1-21	-
IEC 60793-1-22	-	Optical fibres - Part 1-22: Measurement methods and test procedures - Length measurement	EN 60793-1-22	-
IEC 60793-1-40	-	Optical fibres - Part 1-40: Attenuation measurement methods	EN IEC 60793-1-40	-
IEC 60793-1-44	-	Optical fibres - Part 1-44: Measurement methods and test procedures - Cut-off wavelength	EN 60793-1-44	-
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 60793-1-48	-	Optical fibres - Part 1-48: Measurement methods and test procedures - Polarization mode dispersion	EN 60793-1-48	-
IEC 60793-2	-	Optical fibres - Part 2: Product specifications - General	EN IEC 60793-2	-
IEC 60793-2-10	-	Optical fibres - Part 2-10: Product specifications - Sectional specification for category A1 multimode fibres	EN IEC 60793-2-10	-
IEC 60793-2-40	2021	Optical fibres - Part 2-40: Product specifications - Sectional specification for category A4 multimode fibres	EN IEC 60793-2-40	2021

IEC 60794-1-21	-	Optical fibre cables - Part 1-21: Generic specification - Basic optical cable test procedures - Mechanical tests methods	EN 60794-1-21	-
IEC 60794-1-22	-	Optical fibre cables - Part 1-22: Generic specification - Basic optical cable test procedures - Environmental test methods	EN IEC 60794-1-22	-
IEC 60811-201	-	Electric and optical fibre cables - Test methods for non-metallic materials - Part 201: General tests - Measurement of insulation thickness	EN 60811-201	-
IEC 60811-202	-	Electric and optical fibre cables - Test methods for non-metallic materials - Part 202: General tests - Measurement of thickness of non-metallic sheath	EN 60811-202	-
IEC 60811-203	-	Electric and optical fibre cables - Test methods for non-metallic materials - Part 203: General tests - Measurement of overall dimensions	EN 60811-203	-

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN IEC 60794-1-1:2023](https://standards.iteh.ai/catalog/standards/sist/704f8762-7139-4084-97fa-f610336330e0/sist-en-iec-60794-1-1-2023)

<https://standards.iteh.ai/catalog/standards/sist/704f8762-7139-4084-97fa-f610336330e0/sist-en-iec-60794-1-1-2023>



INTERNATIONAL STANDARD

NORME INTERNATIONALE



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

**Câbles à fibres optiques –
Partie 1-1: Spécification générique – Généralités**

<https://standards.iteh.ai/catalog/standards/sist/704f8762-7139-4084-97fa-f610336330e0/sist-en-iec-60794-1-1-2023>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 33.180.10

ISBN 978-2-8322-6709-7

**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.....	4
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	7
4 Graphical symbols and abbreviated terms	12
5 Optical fibre cables – IEC 60794 structure.....	13
5.1 General.....	13
5.2 IEC 60794-1 series	13
5.3 IEC 60794-2 series	14
5.4 IEC 60794-3 series	14
5.5 IEC 60794-4 series	15
5.6 IEC 60794-5 series	15
5.7 IEC 60794-6 series	15
5.8 IEC 60794-7 series	16
6 Cable materials	16
6.1 Indoor cable materials.....	16
6.2 Outdoor cable materials	16
6.3 Indoor/outdoor cable materials.....	17
6.4 Environmental requirements for cable materials.....	17
7 Cable construction.....	17
7.1 General.....	17
7.2 Colour coding	17
7.2.1 Overview	17
7.2.2 Fibre colour coding	18
7.2.3 Unit colour coding.....	18
7.2.4 Sheath colour coding	18
7.3 Fibre.....	18
7.3.1 General	18
7.3.2 Attenuation coefficient	18
7.3.3 Attenuation uniformity – Attenuation discontinuities	18
7.3.4 Cable cut-off wavelength	18
7.3.5 Polarization mode dispersion (PMD).....	19
7.4 Buffer tubes	19
7.5 Tensile strength elements	19
7.6 Crush protection elements	19
7.7 Water blocking elements	19
7.8 Sheath removal elements.....	19
7.9 Cable sheath	20
8 Measuring and test methods.....	20
8.1 General.....	20
8.2 Measuring methods for transmission and optical characteristics.....	20
8.3 Measuring methods for dimensions	20
8.4 Test methods for mechanical characteristics.....	21
8.5 Test methods for environmental characteristics.....	21
8.6 Test methods for cable element characterization	21
8.7 Measuring and test methods for electrical characteristics.....	21

Annex A (informative) Guidelines for specific optical fibre and cabled fibre performance	23
A.1 General.....	23
A.2 Cabled fibre attenuation requirements.....	23
A.3 Cabled fibre bandwidth requirements	24
A.4 Type testing at 1 625 nm.....	25
Annex B (informative) Guidelines for qualification sampling	26
B.1 General.....	26
B.2 Fibre selection for cable testing	26
B.3 Pass/fail criteria	27
Annex C (informative) Preferred temperatures	28
Bibliography.....	29
Table 1 – IEC 60794 structure	13
Table 2 – IEC 60794-1 series.....	14
Table 3 – IEC 60794-2 series.....	14
Table 4 – IEC 60794-3 series.....	15
Table 5 – IEC 60794-4 series.....	15
Table 6 – IEC 60794-5 series.....	15
Table 7 – IEC 60794-6 series.....	16
Table 8 – Indoor cables materials (examples).....	16
Table 9 – Outdoor cable materials (examples)	17
Table 10 – Measuring methods for transmission and optical characteristics	20
Table 11 – Measuring methods for dimensions	21
Table 12 – Measuring methods for electrical characteristics.....	22
Table A.1 – Maximum single-mode cabled fibre attenuation coefficient (dB/km), as given by ITU-T	23
Table A.2 – Category A1- multimode fibre maximum cable attenuation coefficient (dB/km).....	24
Table A.3 – Single-mode maximum cable attenuation coefficient (dB/km)	24
Table A.4 – Category A1 multimode cabled fibre bandwidth (MHz·km)	25
Table A.5 – Guidance values for 1 625 nm type test acceptance criteria	25
Table B.1 – Recommended minimum number of tested fibres in a cable	26
Table C.1 – Preferred low and high temperature	28

INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPTICAL FIBRE CABLES –

Part 1-1: Generic specification – General

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

This fifth edition cancels and replaces the fourth edition published in 2015. This edition constitutes a technical revision.

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

- a) reorganization of the document to a more logical flow making it easier for the reader;
- b) expansion of the tables to include names and definitions of all documents in the IEC 60794-x series;
- c) expansion of the definitions, graphical symbols, terminology and abbreviations content, with the aim of making this document the default and reference for all others in the IEC 60794-x series;

- d) inclusion of updated, reorganized and expanded optical fibre, attenuation and bandwidth subclauses, with the aim of making this document the default and reference for all others in the IEC 60794-x series.

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

Draft	Report on voting
86A/2286/FDIS	86A/2313/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. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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 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.