IEC 60794-1-217

Edition 1.0 2024-04

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Optical fibre cables –
Part 1-217: Generic specification – Basic optical cable test procedures – Environmental test methods – Cable shrinkage (fibre protrusion), Method F17

Câbles à fibres optiques –
Partie 1-217: Spécification générique – Procédures fondamentales d'essais des câbles optiques – Méthodes d'essais d'environnement – Rétraction de câble (excroissance de la fibre), méthode F17

IEC 60794-1-217:2024(en-fr)

IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

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

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FOREWORD

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IEC 60794-1-217 has been prepared by subcommittee 86A: Fibres and cables, of IEC technical committee 86: Fibre optics. It is an International Standard.

This document partially 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) added clarification in the objective that the purpose of this test procedure is to measure the permanent fibre protrusion of cables without rigid strength members;
b) replaced the reference to method F1 for the apparatus with a detailed description for the temperature chamber and temperature sensing device as done in IEC 60794-1-211;

c) added a measuring device in the subclause for apparatus;

d) added conditioning before cutting the cable sample as done in IEC 60794-1-211

e) added all required steps in the subclause for temperature cycling as well as the table for the minimum soak time and the figure for the cycle procedure, and removed the reference to IEC 60794-1-22, method F1;

f) improved the figures and added a figure for preparation of the cable sample;

g) added the informative Annex A for the test procedure recommended for cables with rigid strength members.

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

Draft	Report on voting
86A/2358/CDV	86A/2405/RVC

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, or
- revised.

IMPORTANT – The "colour inside" logo on the cover page of this document 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

This document defines the test method F17 to measure the change of fibre protrusion at both cable ends caused by cable shrinkage due to thermal exposure.

The numbering of this test method continues the F-series numbering sequence of IEC 60794-1-22:2017. This document cancels and replaces method F17 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.

All cables have a memory effect in the form of coils, and are elastic depending on the applied force, making repeatable and reproducible measurements from one end to the other end on a longer cable sample (for example 10 m or longer) very difficult or impossible. Therefore, measurement of the fibre or cable element protrusion at both ends is a suitable and simple alternative.

The advantage of this method is that the change in protrusion length can be directly compared with the capability to accommodate this change of protrusion length in the application situation (for example in a fibre distribution box). The limitation of this method is that the absolute changes of the cable elements and sheath lengths cannot be determined.

The test method in this document determines the permanent fibre protrusion of cables without rigid strength members compared to the cable elements and cable sheath due to temperature changes. The reference for the fibre protrusion is in this case the end of the cable sheath.

The determination of the permanent fibre protrusion according to this test method is not applicable if the strongest rigid strength member, often the central strength member, is to serve as a reference. This is the case when the fixing of the rigid strength member is used in a protective housing and the fixing of the rigid strength member is stronger than the fixing of the cable sheath. For such an installation situation, the recommended test procedure is given in Annex A.

IEC TR 62959 describes the test method F17 that can be optionally used as an indicator for cables terminated with hardened connectors, terminated into passive components, fixed into a module, a divider or a protective housing with the fibres terminated with splices.

IEC TR 62959 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 as an indicator and classification by several grades are given.

A test procedure other than method F17 to measure shrinkage effects exists. Method F11 according to IEC 60794-1-211 defines shrinkage testing on a cable sample with a nominal length of 1 m or less by calculation of the change in sheath length measured before and after thermal exposure.

OPTICAL FIBRE CABLES –

Part 1-217: Generic specification – Basic optical cable test procedures – Environmental test methods – Cable shrinkage (fibre protrusion), method F17

1 Scope

This part of the IEC 60794 series defines the test procedure to measure the permanent fibre protrusion compared to the cable elements and cable sheath due to thermal exposure of a cable.

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60794-1-1 and the following apply.

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

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

3.1
shrinkage
irreversible contraction after extrusion of plastic materials caused by heating or over time at ambient temperature

4 Method F17 – Cable shrinkage (fibre protrusion)

4.1 Objective

The purpose of this test procedure is to measure the permanent fibre protrusion of cables without rigid strength members compared to the cable elements and cable sheath due to temperature changes. The reference for the fibre protrusion is in this case the end of the cable sheath.