IEC 60794-1-310

Edition 1.0 2022-04

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Optical fibre cables –
Part 1-310: Generic specification – Basic optical cable test procedures – Cable element test methods – Strippability, method G10**

**Câbles à fibres optiques –
Partie 1-310: Spécification générique – Procédures fondamentales d'essai des câbles optiques – Méthodes d'essai des éléments de câbles – Dénudabilité, méthode G10**

IEC 60794-1-310:2022-04(en-fr)

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OPTICAL FIBRE CABLES –

Part 1-310: Generic specification – Basic optical cable test procedures – Cable element test methods – Strippability, method G10

FOREWORD

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IEC 60794-1-310 has been prepared by subcommittee 86A: Fibres and cables, of IEC technical committee 86: Fibre optics. It is an International Standard.

This document partially cancels and replaces IEC 60794-1-23:2019.

This edition includes the following significant technical change with respect to IEC 60794-1-23:2019: inclusion of semi-tight buffer fibres in method G10C.

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

Draft	Report on voting
86A/2136/CDV	86A2186/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- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

This document contains method G10A, method G10B and method G10C of IEC 60794-1-23:2019, which will be withdrawn. The system for optical fibre test methods have been restructured and renumbered. The optical cable element test methods contained in IEC 60794-1-23:2019 will now be individually numbered in the IEC 60794-1-3xx 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.

OPTICAL FIBRE CABLES –

Part 1-310: Generic specification – Basic optical cable test procedures – Cable element test methods – Strippability, method G10

1 Scope

This part of IEC 60794 describes test procedures to be used in establishing uniform requirements of optical fibre cable elements for the mechanical property – strippability.

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.

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

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

3 Terms and definitions

No terms and definitions are listed in this document.

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

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

4 General requirements

IEC 60794-1-2 is the reference guide to test methods of all types. It shall be considered for general requirements and definitions.

5 Method G10A: Stripping force stability of cabled optical fibres

5.1 Object

This test determines the stability of the stripping force of the coating of cabled optical fibres by measuring the change in fibre strippability after exposure to specified environmental conditions.

NOTE This method is known as method G10A in IEC 60794-1-23:2019.

5.2 Sample

5.2.1 Sample length

The length of the cable or fibre sample shall be sufficient to carry out the specified test.

5.2.2 Sample preparation

The cable from which the fibres shall be extracted is preconditioned, as specified in the relevant detail specification, prior to withdrawal of the fibres.

The test shall be carried out on a fibre/fibres taken from the cable sample which is further divided into two lengths (minimum 2 m). One length is for testing and the other, the reference fibre, shall be used to compare the results.

Sufficient samples shall be provided to allow tests to be carried out on 10 test pieces of fibre, conditioned as specified in the relevant detail specification, and compared with test results for fibres taken from the reference cable length.

After withdrawal, any filling compound adhering to the fibres shall be carefully removed (e.g. by wiping with a soft tissue).

5.3 Apparatus

The apparatus consists of conditioning equipment (if necessary) and a fibre strippability apparatus (according to the strippability test method of IEC 60793-1-32:2018).

5.4 Procedure

The optical fibre strippability shall be measured on the environmentally conditioned samples using the strippability method of IEC 60793-1-32:2018, after the recovery time and reconditioning as given in the relevant detail specification. The same method shall be used to measure the strippability of fibre samples taken from the reference cable length, and the change in stripping force shall be determined from a comparison of the results.

Alternatively, samples shall be taken from cable aged according to method F9 of IEC 60794-1-22:2017, if samples from an aged cable are specified.

5.5 Requirements

The change in stripping force shall meet the requirements specified in the relevant detail specification.

5.6 Details to be specified

The relevant detail specification shall include the following:

a) cable preconditioning;

b) fibre conditioning;

c) recovery time and reconditioning;

d) permissible change in stripping force.

6 Method G10B: Strippability of optical fibre ribbons

6.1 Object

The purpose of this test is to evaluate the strippability of optical fibre ribbons and the effect of stripping on the sample when checked for fibre cleanliness and possible fibre breakage.

NOTE This method is known as method G10B in IEC 60794-1-23:2019.

6.2 Sample

The test sample shall be representative of the type/design of ribbon under evaluation.

Samples may be taken sequentially along a length of ribbon, but sections of the ribbon previously in the grips of the stripping tool shall be excluded.

The length of the sample shall be sufficient to allow the matrix and fibre coatings to be removed over a minimum length of 25 mm with a maximum of ten and a minimum of five strips per sample.

Sample environmental conditioning requirements shall be agreed between customer and supplier.

6.3 Apparatus

6.3.1 General

A ribbon stripping apparatus and conditioning equipment (if necessary).

6.3.2 Stripping tool

The results of the test are strongly dependent upon the design of the stripping tool used, and the following tool design guidelines shall be taken into account.

– The mechanical stripping tool shall provide a heated surface that operates at a temperature in the range +70 °C to +140 °C. The heated surface, once set to the specified temperature, shall maintain that temperature within ±5 °C during the stripping operation. The heated surface(s) shall be located behind the stripping blades and positioned to heat the part of the ribbon in which the coating shall be removed.
  - Heat-up time and dwell time for the tool may be important and the tool manufacturer's recommendations shall be followed.
  - Follow the ribbon manufacturer's recommendations for setting the tool temperature.
– The stripping tool or loading fixture shall maintain a constant pressure sufficient for proper stripping. Ensure that the tool does not begin to open during stripping.
– The size of the gap between the blades shall be known. This dimension and its tolerance shall ensure that the blades cut through the matrix material and fibre coatings without damaging the fibre cladding.
– The condition of the blades can greatly influence the stripping action. The edges of the blades shall be inspected for notches and burrs under normal vision before and after use.
– Replace the blades when they become damaged or blunt or whenever wear is sufficient to affect the results.

6.3.3 Motor and slide (if used)

The motor and slide shall allow repeatable motion with low vibration and fast acceleration. They shall be capable of imparting constant motion, without jerking, to the test ribbon or stripping tool.

If a manual tool is used, the stripping action shall follow these same criteria.

6.4 Positioning and holding equipment

The test sample shall be firmly held in place so that no slippage occurs (a capstan is recommended). The sample ribbon fibres shall be in line (vertically, horizontally and rotationally) with the plane of the stripping motion.

6.5 Alcohol wipe

A non-abrasive cloth or paper material saturated with a suitable alcohol solution shall be used to wipe the fibres after stripping.

6.6 Procedure

Unless otherwise specified, the condition for testing shall be in accordance with controlled ambient conditions. The strip length shall be ≥ 25 mm and the strip velocity shall be as given in the relevant detail specification (between 100 mm/min and 500 mm/min).

Turn on the test apparatus and allow the tool temperature to stabilize.

Ensure that the area around both blades of the stripping tool is free from debris from any previous use and that the blades are clean.

Strip the ribbon following the manufacturer's recommendation on heating dwell time prior to stripping.

After stripping, wipe the stripped fibres with the alcohol wipe and inspect them visually at a magnification of at least 2X.

Assess the cleanliness and integrity of the fibres after stripping as indicated in Table 1.

Table 1 – Condition of stripped samples

Rating	Condition of stripped sample
1	Coating and matrix materials leave no residue after one or two alcohol wipes.
2	Coating and matrix material crumbles or breaks up leaving a heavy residue upon stripping, and multiple alcohol wipes are required to remove residue on the fibres. Fibres are capable of being wiped clean without a second strip.
3	Incomplete strip, some fibre coating remains intact. Multiple strips and alcohol wipes are required to remove all visible residue from the fibres.
4	Failed strip: – one or more fibres break; – fail to strip within the required speed.

Carry out the number of strips as given in the relevant detail specification and calculate the average cleanliness rating for each sample, rounded to the nearest whole number.

6.7 Requirements

The average cleanliness rating shall comply with the values given in the relevant detail specification.

No fibres shall break.