INTERNATIONAL STANDARD

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Second edition
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Optical fibres –

Part 1-42:
Measurement methods and test procedures –
Chromatic dispersion

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

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International Standard IEC 60793-1-42 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 2001. It constitutes a technical revision. The main changes in this second edition concern the addition of a new Annex E on chromatic dispersion fitting and the applicability to A4 fibres.

This standard is to be read in conjunction with IEC 60793-1.

The text of this standard is based on the following documents:

FDIS	Report on voting
86A/1136/FDIS	86A/1146/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The list of all parts of the IEC 60793 series, under the general title *Optical fibres*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

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

The contents of the corrigendum of June 2007 have been included in this copy.

OPTICAL FIBRES –

Part 1-42: Measurement methods and test procedures – Chromatic dispersion

1 Scope

This part of IEC 60793 establishes uniform requirements for measuring the chromatic dispersion of optical fibre, thereby assisting in the inspection of fibres and cables for commercial purposes.

Chromatic dispersion varies with wavelength. Some methods and implementations measure the group delay as a function of wavelength and the chromatic dispersion and dispersion slope are deduced from the derivatives (with respect to wavelength) of this data. This differentiation is most often done after the data are fitted to a mathematical model. Other implementations can allow direct measurement (of the chromatic dispersion) at each of the required wavelengths.

For some categories of fibre, the chromatic dispersion attributes are specified with the parameters of a specific model. In these cases, the relevant recommendation or standard defines the model appropriate for the definition of the specified parameters. For other fibre categories, the dispersion is specified to be within a given range for one or more specified wavelength intervals. In the latter case, either direct measurements may be made at the wavelength extremes or some fitting model may be used to allow either group delay measurement methods or implementations or storage of a reduced set of parameters that may be used to calculate the interpolated dispersion for particular wavelengths which may not have actual direct measurement values.

Annex E gives a general description of chromatic dispersion fitting and outlines a number of fitting equations suitable for use with any of the measurement methods or fibre categories.

This standard gives four methods for measuring chromatic dispersion:

– method A: phase shift;
– method B: spectral group delay in the time domain;
– method C: differential phase shift;
– method D: interferometry.

Methods A, B, and C apply to the measurement of chromatic dispersion of the following fibres over a specified wavelength range:

– class A1 graded-index multimode fibres;
– category A4f, A4g and A4h multimode fibres;
– class B single-mode fibres (all categories).

Method D applies to the measurement of chromatic dispersion values of single-mode fibres categories B1, B2, B4 and B5 over the 1 000 nm to 1 700 nm wavelength range.

The methods can be applied to laboratory, factory and field measurements of chromatic dispersion, and the wavelength range of the measurements can be tailored as required. Measurements are made at temperature as stated in IEC 60793-1-1, Table 1 – Standard range of atmospheric conditions (Temperature 23 °C ±5 °C).

The methods are suitable for fibre or cable lengths greater than 1 km. They may also be applied to shorter lengths, but accuracy and repeatability may be compromised. Method D is the preferred method for shorter piece fibres (1 m to 10 m).

Information common to all methods is contained in Clauses 1-8, and information pertaining to each individual method appears in Annexes A, B, C, and D, respectively.

2 Normative references

The following referenced documents are indispensable for the application 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 60793-1-1:2002, *Optical fibres – Part 1-1: Measurement methods and test procedures – General and guidance*

IEC 60793-1-41, *Optical Fibres – Part 1-41: Measurement methods and test procedures – Bandwidth*