



DPC: 24 / 30494467 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

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Interested committees:

Title: BS EN IEC 61757 Fibre optic sensors - Generic specification

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Introduction

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



86C/1932/CD

COMMITTEE DRAFT (CD)

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86C/1907/CD, 86C/1917A/CC

IEC SC 86C : FIBRE OPTIC SYSTEMS AND ACTIVE DEVICES

SECRETARIAT:

United States of America

SECRETARY:

Mr Fred Heismann

OF INTEREST TO THE FOLLOWING COMMITTEES:

TC 17,TC 18,TC 20,TC 38,TC 45,TC 65,TC 85

PROPOSED HORIZONTAL STANDARD:



Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.

FUNCTIONS CONCERNED:

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TITLE:

Fibre optic sensors - Generic specification

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FIBRE OPTIC SENSORS –
GENERIC SPECIFICATION****FOREWORD**

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IEC 61757 has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics. It is an International Standard.

This second edition cancels and replaces the first edition published in 2018. This edition constitutes a technical revision.

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

- a) updates of and additions to the terms and definitions;
- b) updates of the normative references and bibliography;
- c) extensive revisions of Annex A.

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

Draft	Report on voting
86C/XX/FDIS	86C/XX/RVD

199
200 Full information on the voting for its approval can be found in the report on voting indicated in
201 the above table.

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

203 This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in
204 accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available
205 at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are
206 described in greater detail at www.iec.ch/publications.

207 A list of all parts in the IEC 61757 series, published under the general title *Fibre optic sensors*,
208 can be found on the IEC website.

209 The committee has decided that the contents of this document will remain unchanged until the
210 stability date indicated on the IEC website under webstore.iec.ch in the data related to the
211 specific document. At this date, the document will be

- 212 • reconfirmed,
- 213 • withdrawn,
- 214 • replaced by a revised edition, or
- 215 • amended.

INTRODUCTION

A fibre optic sensor comprises an optical or optically powered sensing element in which incident light is modified by the measurand in such a way that the output light of the sensing element carries quantifiable information on the measurand. The sensing element can be the fibre itself or an optically powered element inserted along the optical path. In a fibre optic sensor, one or more parameters of the guided optical waves are directly or indirectly modified by the measurand somewhere in the optical sensing element, in contrast to a fibre optic data link where the optical information signal is merely transmitted from the transmitter to the receiver.

This document provides generic specifications on optical fibres, components, and sub-assemblies that pertain specifically to fibre optic sensing applications. It is intended to be used as a common working and discussion tool by the vendors of components and subassemblies that are integrated in fibre optic sensors, as well as by designers, manufacturers, and users of fibre optic sensors, independent of specific applications or installations. The individual parts of the IEC 61757 series are numbered as IEC 61757-*M-T*, where *M* denotes the measurand and *T* the technology of the fibre optic sensor.

To better illustrate this classification scheme, Annex A gives examples of various fibre optic sensors. The examples are provided for illustration only and are not intended to be limitative, nor do they constitute a recommendation or endorsement of a particular transduction principle.

FIBRE OPTIC SENSORS – GENERIC SPECIFICATION

1 Scope

This document defines, classifies, and provides a framework of generic tests or measurement methods for characterizing and specifying fibre optic sensors, including their specific components and subassemblies. The requirements of this document apply to all related fibre optic sensor standards that are part of the IEC 61757 series. Other parts of the IEC 61757 series contain requirements that are specific to sensors that measure particular quantities, and to a particular style or variant of such a fibre optic sensor.

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 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60068-1, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-1, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-5, *Environmental testing – Part 2-5: Tests – Test S: Simulated solar radiation at ground level and guidance for solar radiation testing and weathering*

IEC 60068-2-6, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-10, *Environmental testing – Part 2-10: Tests – Test J and guidance: Mould growth*

IEC 60068-2-11, *Environmental testing – Part 2-11: Tests – Test Ka: Salt mist*

IEC 60068-2-13, *Environmental testing – Part 2-13: Tests – Test M: Low air pressure*

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-27, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC 60068-2-30, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60068-2-42, *Environmental testing – Part 2-42: Tests – Test Kc: Sulphur dioxide test for contacts and connections*

IEC 60068-2-43, *Environmental testing – Part 2-43: Tests – Test Kd: Hydrogen sulphide test for contacts and connections*

- 272 IEC 60068-2-78, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*
- 273 IEC 60079-28, *Explosive atmospheres – Part 28: Protection of equipment and transmission*
274 *systems using optical radiation*
- 275 IEC 60529, *Degrees of protection provided by enclosures (IP Code)*
- 276 IEC 60793-1-20, *Optical fibres – Part 1-20: Measurement methods and test procedures – Fibre*
277 *geometry*
- 278 IEC 60793-1-21, *Optical fibres – Part 1-21: Measurement methods and test procedures –*
279 *Coating geometry*
- 280 IEC 60793-1-31, *Optical fibres – Part 1-31: Measurement methods and test procedures –*
281 *Tensile strength*
- 282 IEC 60793-1-32, *Optical fibres – Part 1-32: Measurement methods and test procedures –*
283 *Coating strippability*
- 284 IEC 60793-1-47, *Optical fibres – Part 1-47: Measurement methods and test procedures –*
285 *Macrobending loss*
- 286 IEC 60793-1-54, *Optical fibres – Part 1-54: Measurement methods and test procedures –*
287 *Gamma irradiation*
- 288 IEC 60794-1-21, *Optical fibre cables – Part 1-21: Generic specification – Basic optical cable*
289 *test procedures – Mechanical tests methods*
- 290 IEC 60825-1, *Safety of laser products – Part 1: Equipment classification and requirements*
- 291 IEC 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement*
292 *techniques – Electrostatic discharge immunity test*
- 293 IEC 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement*
294 *techniques – Radiated, radio-frequency, electromagnetic field immunity test*
- 295 IEC 61000-4-4, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement*
296 *techniques – Electrical fast transient/burst immunity test*
- 297 IEC 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement*
298 *techniques – Surge immunity test*
- 299 IEC 61300 (all parts), *Fibre optic interconnecting devices and passive components – Basic test*
300 *and measurement procedures*
- 301 IEC 61300-2-1, *Fibre optic interconnecting devices and passive components – Basic test and*
302 *measurement procedures – Part 2-1: Tests – Vibration (sinusoidal)*
- 303 IEC 61300-2-9, *Fibre optic interconnecting devices and passive components – Basic test and*
304 *measurement procedures – Part 2-9: Tests – Shock*
- 305 IEC 61300-2-18, *Fibre optic interconnecting devices and passive components – Basic test and*
306 *measurement procedures – Part 2-18: Tests – Dry heat*
- 307 IEC 61300-2-22, *Fibre optic interconnecting devices and passive components – Basic test and*
308 *measurement procedures – Part 2-22: Tests – Change of temperature*

IEC 61300-2-34, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-34: Tests – Resistance to solvents and contaminating fluids of interconnecting components and closures*

IEC 61300-2-46, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-46: Tests – Damp heat, cyclic*

IEC 61300-3-35, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-35: Examinations and measurements – Visual inspection of fibre optic connectors and fibre-stub transceivers*

IEC 61753 (all parts), *Fibre optic interconnecting devices and passive components – Performance standard*

IEC TR 61931, *Fibre optic – Terminology*

IEC TR 62222, *Fire performance of communication cables installed in buildings*

IEC TR 62283, *Optical fibres – Guidance for nuclear radiation tests*

IEC TR 62627-01, *Fibre optic interconnecting devices and passive components – Part 01: Fibre optic connector cleaning methods*

ISO/IEC Guide 99, *International vocabulary of metrology – Basic and general concepts and associated terms (VIM)*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in IEC TR 61931, ISO/IEC Guide 99 (VIM), and the following apply.

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>

3.1 Fibre optic sensor principles

3.1.1 fibre optic sensor

part of a measuring instrument, or measuring chain, which is directly affected by the measurand, and which generates a change in the optical characteristics of an optical fibre related to the value of the measurand

Note 1 to entry: The optical fibre itself can act as the sensing element, or the fibre optic sensor can include an optical or optically powered sensing element and one or more of the following (see Figure 1, Figure 2, and Figure 3):

- optical fibre lead;
- optical fibre termination;
- optical signal conditioning.

[SOURCE: IEC 311-05-01, modified – “signal” has been replaced by “change in the optical characteristics of an optical fibre” and Note 1 to entry has been added.]