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Interested committees:

Title: Draft BS EN IEC 61753-022-07 Fibre optic interconnecting devices and passive components – Performance standard. Part 022-07: Hardened fibre optic connectors terminated on multimode fibre for category A – Outdoor aerial environment.

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if the content of this standard

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- ii) affects other national standard(s)
- iii) requires additional national guidance or information

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Information on the co-operating organizations represented on the committees referenced above may be obtained from <https://standardsdevelopment.bsigroup.com/>.

Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

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.	



86B/4447/CD

COMMITTEE DRAFT (CD)

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86B/4277/NP, 86B/4302A/RVN

IEC SC 86B : FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS

SECRETARIAT:

Japan

SECRETARY:

Mr Shigeru Tomita

OF INTEREST TO THE FOLLOWING COMMITTEES:

PROPOSED HORIZONTAL STANDARD:



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

FUNCTIONS CONCERNED:

☐ EMC

☐ ENVIRONMENT

☐ QUALITY ASSURANCE

☐ SAFETY

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Fibre optic interconnecting devices and passive components – Performance standard – Part 022-07: Hardened fibre optic connectors terminated on multimode fibre for category A – Outdoor aerial environment

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS
– PERFORMANCE STANDARD –****Part 022-07: Hardened fibre optic connectors terminated on multimode
fibre for category A – Outdoor aerial environment**

FOREWORD

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International Standard IEC 61753-022-07 has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

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

FDIS	Report on voting
XX/XX/FDIS	XX/XX/RVD

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

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

102 The committee has decided that the contents of this document will remain unchanged until the
103 stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to
104 the specific document. At this date, the document will be

- 105 • reconfirmed,
- 106 • withdrawn,
- 107 • replaced by a revised edition, or
- 108 • amended.

109

110 The National Committees are requested to note that for this document the stability date
111 is 20XX..

112 THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED
113 AT THE PUBLICATION STAGE.

FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – PERFORMANCE STANDARD –

Part 022-07: Hardened fibre optic connectors terminated on multimode fibre for category A – Outdoor aerial environment

1 Scope

This part of IEC 61753 contains the minimum requirements and severities, which a hardened fibre optic connector with single-fibre ferrule or multi-fibre ferrule terminated on multimode fibre must satisfy in order to be categorized as meeting the IEC standard category A – Outdoor aerial environment, as defined in Annex A of IEC 61753-1.

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

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60721-3-2, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 2: Transportation*

IEC 60793-2-10, *Optical fibres – Part 2-10: Product specifications – Sectional specification for category A1 multimode fibres*

IEC 60874-14-1, *Connectors for optical fibres and cables - Part 14-1: Detail specification for fibre optic connector type SC/PC standard terminated to multimode fibre type A1a, A1b*

IEC 60874-19-1, *Fibre optic interconnecting devices and passive components - Connectors for optical fibres and cables - Part 19-1: Fibre optic patch cord connector type SC-PC (floating duplex) standard terminated on multimode fibre type A1a, A1b - Detail specification*

IEC 61300-1, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 1 General and guidance*

IEC 61300-2-1, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-1: Tests – Vibration (sinusoidal)*

IEC 61300-2-2, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-2: Tests – Mating durability*

IEC 61300-2-4, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-4: Tests – Fibre/cable retention*

IEC 61300-2-5, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-5: Tests – Torsion*

IEC 61300-2-9, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-9: Tests – Shock*

IEC 61300-2-12, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-12: Tests – Impact*

IEC 61300-2-21, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-21: Tests – Composite temperature/humidity cyclic test*

IEC 61300-2-22, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-22: Tests – Change of temperature*

IEC 61300-2-26, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-26: Tests – Salt mist*

IEC 61300-2-33, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-33: Tests – Assembly and disassembly of fibre optic mechanical splices, fibre management systems and closures*

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 61300-2-37, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-37: Tests – Cable bending for fibre optic closures*

IEC 61300-2-38, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-38: Tests – Sealing for pressurized fibre optic closures*

IEC 61300-2-50, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-50: Tests – Fibre optic connector proof test with static load – Singlemode and multimode*

IEC 61300-3-1, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-1: Examinations and measurements - Visual examination*

IEC 61300-3-3, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-3: Examinations and measurements – Active monitoring of changes in attenuation and in return loss*

IEC 61300-3-4:2012, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-4: Examinations and measurements – Attenuation*

IEC 61300-3-6, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-6: Examinations and measurements – Return loss*

IEC 61300-3-28, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-28: Examinations and measurements – Transient loss*

IEC 61300-3-34, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-34: Examinations and measurements – Attenuation of random mated connectors*

IEC 61300-3-45, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-45: Examinations and measurements – Attenuation of random mated multi-fibre connectors*

IEC 61754 (all parts), *Fibre optic connector interfaces*

IEC 63267-3 (all parts), *Fibre optic interconnecting devices and passive components - Fibre optic connector optical interfaces - Part 3: End face geometry*

ISO 4892-2, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc lamps*

3 Terms, definitions and abbreviations

For the purposes of this document, the following definitions 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 Terms and definitions

3.1.1

hardened fibre optic connector

water and dust tight connector with three types: plug connector, adapter connector and socket connector, which could be mated as: plug-socket, or plug-adapter-plug

Note 1 to entry: A hardened fibre optic connector is typically used as connection in outside plant.

3.1.2

hardened connector pigtail assembly

a hardened fibre optic plug connector mated with a hardened fibre optic socket connector with unterminated leads, or two hardened fibre optic plug connectors mated with a hardened fibre optic adapter connector with unterminated leads are shown in Figure 1

Note 1 to entry: Each of the unterminated leads should be at least 5 m long so that the splices may be located outside of the environmental test chamber.

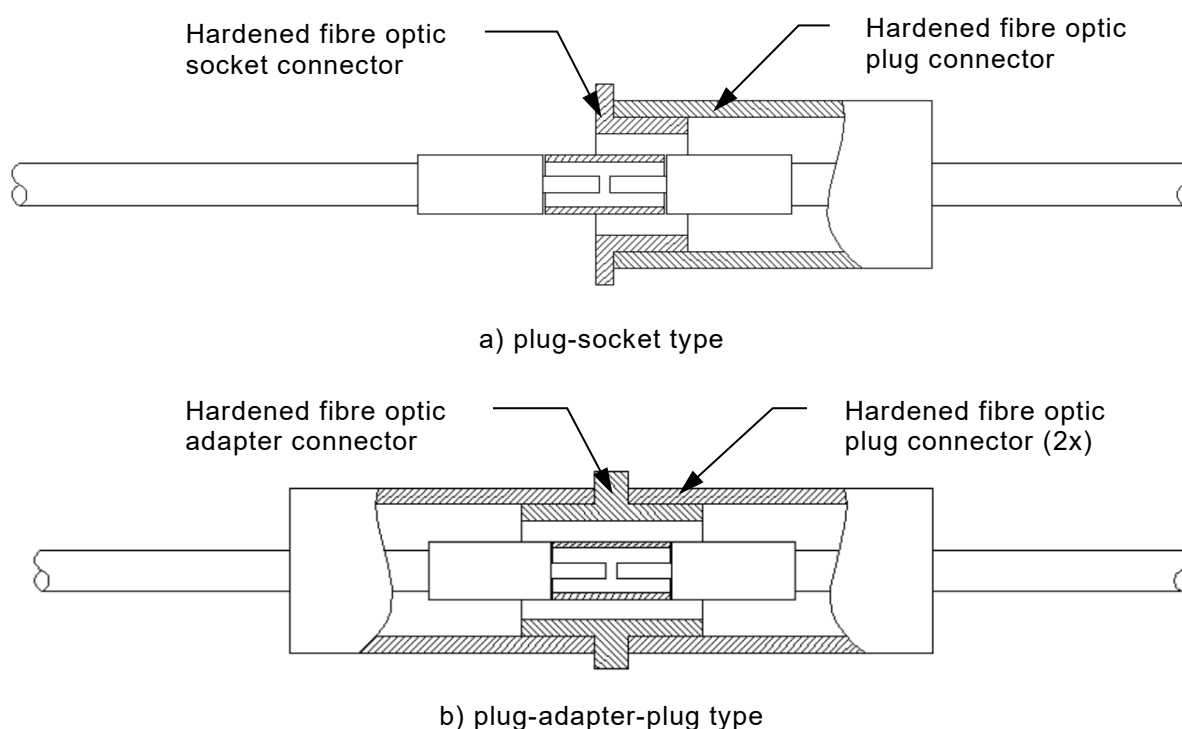


Figure 1 – Hardened connector pigtail assembly

3.2 Abbreviations

HFOC Hardened fibre optic connector

Note 1 to entry: For more convenience reading, plug connector will represent the meaning of hardened fibre optic plug connector, and socket or adapter connector will represent the meaning of hardened fiber optic socket or adapter connector in the following content.

4 General requirements

4.1 Storage, transportation and packaging

The classes of environmental conditions and their severities to which HFOC may be exposed during transportation from one place to another after being made ready for dispatch from the manufacturer are defined in IEC 60721-3-2. Normal transportation time is considered to be 30 days or less.

The product, in its original packaging, shall be suitable for normal public or commercial transportation and storage in weather protected, temperature uncontrolled storage environments.

4.2 Marking and identification

Marking of the product or packaging shall contain the following information:

- a) Identification of manufacturer: mark or logo;
- b) Product designation: manufacturer's part number or model;
- c) One of the following information: lot number, batch number, date of production (at least month and year) or serial number.

Product marking and identification shall survive the storage and transportation.

4.3 Materials

For all applied materials, a Material Safety Data Sheet shall be made available upon request.

The materials of the HFOC shall be compatible with other materials or solvents that can come into contact with it, for example cable filling compounds and degreasing agents.

All materials that can come in contact with personnel shall meet appropriate health and safety regulations.

The effect of UV light on all polymeric materials that are directly exposed to the environment shall not adversely affect the product's performance. The UV test shall be according to ISO 4892-3, lamp type 1A (UVA-340), cycle 1, duration 2160 h. The effect of UV light shall be determined by measuring a suitable property (e.g. tensile strength and elongation at yield) both before and after exposure of the material slabs. The average change in mechanical characteristics of the tested material slabs shall be less than 20%.

Polymeric materials shall not support mould growth causing mechanical degradation of the materials. Mould growth shall be tested according to IEC 60068-2-10. The effect of mould growth shall be determined by measuring a suitable property (e.g. tensile strength and elongation at yield) both before and after exposure of the material slabs. The average change in mechanical characteristics of the tested material slabs shall be less than 20%.

Metallic elements shall be corrosion resistant. Dissimilar metals shall not be used in contact with each other unless they are suitably finished to prevent electrolytic corrosion.

Materials which are not specified, or which are not specifically described, are left to the discretion of the manufacturer.

5 Test

5.1 General

The mechanical and environmental performance of a HFOC is important to the optical transmission access. The purpose of testing is to demonstrate that the HFOC can operate under defined environmental conditions, without failures, and perform according to the requirements.

The performance test procedure of a HFOC shall:

- evaluate the product for 3 basic acceptance criteria: sealing, mechanical integrity and optical transmission requirements;
- simulate the effects of exposure to the environment in which it will be installed;
- simulate installation and intervention conditions.

Optical performance testing is accomplished by subjecting the test specimen to a number of mechanical and environmental conditions and measuring any optical performance deviations at prescribed intervals during and after completion of each test.

5.2 Test specimen preparation

When doing a sealing performance test, testing tools shall be provided with an air pressure test access valve. The length of the optical cables extending from the HFOC shall be long enough to perform the sealing tests. The free ends of the cables shall be sealed. Each applicable cable type with minimum and maximum cable dimensions shall be represented in the test program. When applicable, the plug connector mated with the socket / adapter connector, and the plug connector or the socket / adapter connector mated separately with each sealing cap, shall be tested as described in Annex A.

Optical test samples shall be constructed in such a way that they will cover all allowed functions as specified by the manufacturer.

5.3 Test and measurement methods

All test methods are in accordance with a specific IEC 61300 series.

The connector inside the hardened housing shall be terminated onto multimode fibre as per IEC 60793-2-10, fibre type A1-OM1, A1-OM2, A1-OM3, A1-OM4 or A1-OM5, in either secondary coated or reinforced cable format.

Each test defines the number of samples to be evaluated.

The samples used for each test are intended to be previously unstressed new samples, but may be selected from previously used samples, if so desired.

All optical testing shall be carried out at one central wavelength only, this shall be 850 nm ± 30 nm.

Source characteristics shall be S3 and detector D1, refer to IEC 61300-3-4:2012.

Launch conditions shall be in accordance with IEC 61300-1.

The full set of tests shall be carried out for all fibre types for which compliance to this standard is claimed.

The change in attenuation is defined as the +/- deviation from the original value of the transmitted power at the start of the test, and shall be measured using IEC 61300-3-3. For monitoring intermittent discontinuities during a test, IEC 61300-3-28 shall be used.

5.4 Installation or maintenance

The minimum and maximum temperatures at which a HFOC may be installed or uninstalled (installation or maintenance conditions), are not necessarily equal to the maximum temperature excursion of the environment in which it will reside, once installed. HFOC shall be installable in the temperature range between –5 °C and +45 °C for aerial applications (category A).

Typically, the following operations are carried out during maintenance: