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TECHNICAL REPORT

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Fibre optic interconnecting devices and passive components – Part 01: Fibre optic connector cleaning methods

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS –

Part 01: Fibre optic connector cleaning methods

FOREWORD

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IEC TR 62627-01, which is a Technical Report, has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

This second edition cancels and replaces the first edition published in 2010. This edition constitutes a technical revision.

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

a) restructure of clauses;
b) addition of some terms and definitions;
c) addition of information on cleaning tools and machines;
d) addition of information on dust caps;
e) addition of applicable cleaning tools and machines for optical connectors.

The text of this Technical Report is based on the following documents:

Enquiry draft	Report on voting
86B/3926/DTR	86B/3943A/RVC

Full information on the voting for the approval of this Technical Report 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.

A list of all parts in the IEC 62627 series, published under the general title *Fibre optic interconnecting devices and passive components*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website 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- withdrawn,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 may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication 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.

FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS –

Part 01: Fibre optic connector cleaning methods

1 Scope

This part of IEC 62627, which is a Technical Report, details cleaning methods for fibre optic connectors. It includes typical cleaning tools and machines, and cleaning procedures. Other cleaning methods may exist. The impact of contamination and the reasons for connector visual inspection and cleaning are described in Annex B. This Technical Report does not address the visual inspection criteria, which are covered in IEC 61300-3-35: 2015.

Optical fibre patch cords are handled by the operators and maintenance staff of optical network systems. This Technical Report may be used as a guideline to prepare instruction manuals for those involved in optical system maintenance and operation.

This Technical Report covers fibre optic connector plugs, optical adaptors, optical receptacles (excluding optical transceivers) and dust caps. Guidelines for optical connector end-face cleaning methods for receptacle style optical transceivers are covered in IEC TR 62572-4.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 Cleaners

3.1.1
adhesive backed stick type cleaner
cleaning tool for optical connector end-faces, receptacles and optical connector adaptors using a soft adhesive backing at the end of a stick

3.1.2
air duster
canned air
cleaning tool where compressed air is blown from a nozzle of a can

3.1.3
gas and vacuum type cleaning machine
optical connector end-face cleaning machine in which volatile liquid solvent (gas) is injected and extracted from a nozzle

3.1.4
pen type cleaner
probe type cleaner
cleaning tool for optical connector end-faces, receptacles and optical connector adaptors where a tape cleaning cloth at the top of the tool moves and cleans

3.1.5
reel type cleaner
cassette type cleaner
optical connector plug end-face cleaning tool, in which a cleaning cloth roll is packed in a cassette box, with a small window for cleaning

3.1.6
stick type cleaner
swab type cleaner
optical connector receptacle and optical connector adaptor end-face cleaning tool in which a cleaning cloth is attached to the top of a stick

3.2 Optical connector parts

3.2.1
bulkhead adaptor
component in which two or more plugs may be mated

Note 1 to entry: A bulkhead adaptor has one or more alignment sleeves in which two or more ferrules are aligned.

3.2.2
dust cap
cover or cap which is attached to an optical connector adaptor or an optical receptacle when the optical connector is not connected to protect it from contamination

3.2.3
exposed plug end-face
EPE
fibre optic plug without any fixed optical end-face protection, that may be held in the hand

EXAMPLE *End of a patch cord.*

Note 1 to entry: The ferrule is exposed to the air and is not confined within an alignment sleeve of a bulkhead adaptor or device port. The end-face of the plug is easy to access and may be brought into contact with cleaning material.

3.2.4
port
open fibre optic alignment sleeve which contains a fibre optic plug end-face to which a fibre optic plug may be mated

Note 1 to entry: In the case of a bulkhead adaptor, it is the open side of the adaptor after a fibre optic plug has been inserted into one side. In the case of an optical device, it is the opening into which a user of the device will plug a patch cord. The mating side of a port can only be accessed through the alignment sleeve. Therefore the cleaning material shall be brought to the end-face through the alignment sleeve.

3.2.5
power blocking shuttered adaptor
optical adaptor that has a shutter to block optical power emitted from an optical connector plug

Note 1 to entry: An optical adaptor with shutter should have a structure that, when two optical connector plugs are interfaced and the optical connector plug is removed at the shuttered side, the shutter automatically moves to block emitted optical power. There are two types of optical adaptors with shutter that have already been commercialized: one focuses on blocking the optical power and the other focuses on dust-proofness. Generally, power blocking shuttered adaptors that focus on blocking power often have a metal shutter within the optical adaptor.

4 Application of optical connectors

4.1 General

Optical connectors consist of several parts: connector plugs, receptacles, adaptors, dust caps, etc.

Optical communication network equipment generally has optical adaptors on the front panel or the back-plane to interface with other equipment or transmission lines. An optical patch cord, which has optical connector plugs on both ends of an optical fibre cord, is generally used for optical connection between equipment.

4.2 Influence of contamination of optical connector end-faces

Optical network equipment is located in the central offices, data centres, computer rooms, etc. The environment of these locations is not necessarily clean, and it is possible that dust or condensation is introduced onto the optical connector end-faces which may affect their optical performances (see Annex B).

5 Care in handling optical connectors

5.1 General

Clause 5 describes general care in handling optical connectors.

5.2 Storage of optical connectors

Unused ports on optical network equipment, and unused optical connector plugs on optical patch cords should be covered or capped by clean dust caps. A dust cap should not enter into contact with a fibre end-face when fitted. Optical patch cords are recommended to be stored in clean boxes or bags. Used dust caps should be cleaned before storage. Dust caps should be stored in clean boxes or bags. It is recommended that storage boxes or bags are ESD (electric static discharged) processed.

5.3 Connection of optical connector plugs to ports on optical network equipment

For safety reasons, before connection, optical power should be off. Dust caps should be removed just before the optical connection is made. Before the optical connection, both the optical connector end-faces to be mated should be inspected, and cleaned if necessary unless otherwise recommended by the manufacturer. Annex C shows an example of optical connector end-face visual inspection equipment. The applicable cleaning tools and machines should be appropriate for optical connector plugs and optical adaptors.

After inspection of optical connector end-faces, the clean optical connector plugs should be inserted in ports and mated securely.

5.4 Disconnection of optical connector plugs to ports

Before disconnection, optical power should be off.

Immediately after the disconnection, clean dust caps should be fitted to optical connector plugs and ports.

6 Dust caps

Many shapes and materials of dust caps are available in the market. Appropriate dust caps should be fitted. For optical connector plugs, there are typically two types of dust caps: covering the top of the ferrule, or covering part of the plug housing. Dust caps should have a

structure so that their inner surfaces do not come into contact with the ferrule end-face when dust caps are fitted. Dust caps are recommended to be processed to prevent the creation of a static electric charge. It is recommended that dust caps should be cleaned using an air duster.

7 Cleaning tools and machines

7.1 General

Clause 7 describes cleaning tools machines for optical connectors.

Optical connector cleaning tools or machines should be used.

Optical connector plugs are easier to clean than optical receptacles or optical adaptors. A typical cleaning method for optical connector plugs is to wipe the ferrule end-face with a cloth. As rubbing may produce a static electric charge, which may attract contamination, it is recommended to use an optical connector cleaner with cloth that has been processed so that it will not create a static electric charge. Lint-free cloths are also recommended.

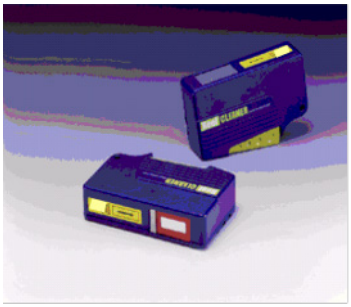
NOTE An ionizer can be useful to neutralize the electrostatic charge which can develop from the cleaning process.

Typical cleaning tools and machines are described in the following clauses. This list is not exhaustive.

7.2 Reel type cleaner

A reel type cleaner is used for cleaning optical connector plug end-faces, but is not suited for cleaning optical receptacles. The cleaning cloth in the reel type cleaner is rolled and packed in a cassette which has a small window into which the plug end-face is inserted for cleaning. Figure 1 shows an example of a reel type cleaner. The cleaning process of connector end-faces with reel type cleaner may result in an electrostatic charge (ESC) effect. Therefore it is recommended that the cleaning cloth has been processed to prevent the creation of a static electric charge. The optical connector plug end-face to be cleaned is pressed into then wiped along the cleaning cloth. The cleaning cloth should be advanced before every cleaning to prevent contamination.

For IEC 61754-7, type MPO connector plugs with guide-pins, dedicated reel type cleaners are available in the market.



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NOTE Reproduced from OPTIPOP TM, Optical Connector Cleaner, NTT Advanced Technology Corporation website http://www.ntt-at.com/product/optipop/

Figure 1 –Example of a reel type cleaner

7.3 Stick type cleaner

A stick type cleaner has cleaning cloth on the top of a stick. It is sometimes called a swab type cleaner. This cleaner is suitable for optical receptacles and optical adaptors. Figure 2 shows an example of stick type cleaners.