IEC TR 62627-01

Edition 3.0 2023-01

TECHNICAL REPORT

colour inside

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

IEC TR 62627-01:2023-01(en)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 33.180.20

ISBN 978-2-8322-6362-4

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

This third edition cancels and replaces the second edition published in 2016. This edition constitutes a technical revision.

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

a) addition of cleaning tools for adhesive pad type and adhesive pen type in terms and definitions (Clause 3), in information (7.5 and 7.6), in fibre optic connectors and their applicable cleaning tools (Table 1 and Clause 8) and procedures (9.5, 9.6 and 9.7);
b) addition of classification of cleaning tools and machines (Figure 1).

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

Draft	Report on voting
86B/4625/DTR	86B/4647/RVDTR

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 Technical Report 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 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 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- withdrawn,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.

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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 exist. The impact of contamination and the reasons for connector visual inspection and cleaning are described in Annex B. This document does not address the visual inspection procedures, which are covered in IEC 61300-3-35.

Optical fibre patch cords are handled by the operators and maintenance staff of optical network systems. This document is useful as a guideline to prepare instruction manuals for those involved in optical system maintenance and operation.

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

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and 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 Cleaners

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

3.1.2
adhesive pad type cleaner
cleaning tool for end-faces of fibre optic connector plugs using a pad style with soft adhesive surface

3.1.3
adhesive pen type cleaner
cleaning tool for end-faces of fibre optic connector plugs, fibre optic connector receptacles and fibre optic connector adaptors using a pen style with a soft adhesive tape at the top of the tool

3.1.4
air duster
canned air
cleaning tool where compressed air is blown from a nozzle of a can

3.1.5
gas and vacuum type cleaning machine
fibre optic connector end-face cleaning machine in which volatile liquid solvent (gas) is injected and extracted from a nozzle

3.1.6
pen type cleaner
probe type cleaner
cleaning tool for fibre optic connector end-faces, receptacles and fibre optic connector adaptors where a tape cleaning cloth at the top of the tool moves and cleans

3.1.7
reel type cleaner
cassette type cleaner
fibre optic connector plug end-face cleaning tool, in which a cleaning cloth roll is packed in a cassette box, with a small window for cleaning

3.1.8
stick type cleaner
swab type cleaner
fibre optic connector receptacle and fibre optic connector adaptor end-face cleaning tool in which a cleaning cloth is attached to the top of a stick

3.2 Fibre optic connector parts

3.2.1
bulkhead adaptor
adaptor mounted in a panel

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 a fibre optic connector plug, a fibre optic connector adaptor or an optical receptacle when the fibre optic 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 can 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 can 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 can 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 is 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 a fibre optic connector plug

Note 1 to entry: An optical adaptor with shutter is a structure that, when two fibre optic connector plugs are interfaced and the fibre optic 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.

Note 2 to entry: Refer IEC TR 62627-08.

4 Application of fibre optic connectors

4.1 General

Fibre optic 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 fibre optic connector plugs on both ends of an optical fibre cord, is generally used for optical connection between equipment.

4.2 Influence of contamination of fibre optic 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 fibre optic connector end-faces, which can affect their optical performances (see Annex B).

5 Guidelines for handling fibre optic connectors

5.1 Guidelines for careful handling fibre optic connectors

Clause 5 describes guidelines for handling fibre optic connectors.

5.2 Storage of fibre optic connectors

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

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

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

Clean fibre optic connector plugs are inserted in ports and mated securely.

5.4 Disconnection of fibre optic connector plugs to ports

Before disconnection, optical power is off.

Immediately after the disconnection, clean dust caps are fitted to fibre optic connector plugs and ports.

6 Dust caps

Many shapes and materials of dust caps are available in the market. Appropriate dust caps are fitted. For fibre optic connector plugs, there are typically two types of dust caps: covering the top of the ferrule, or covering part of the plug housing. It is advisable dust caps 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 processed to prevent the creation of a static electric charge. Dust caps are cleaned using an air duster.

7 Cleaning tools and machines

7.1 General

Clause 7 describes cleaning tools and machines for fibre optic connectors.

Cleaning tools and machines are classified as shown in Figure 1.

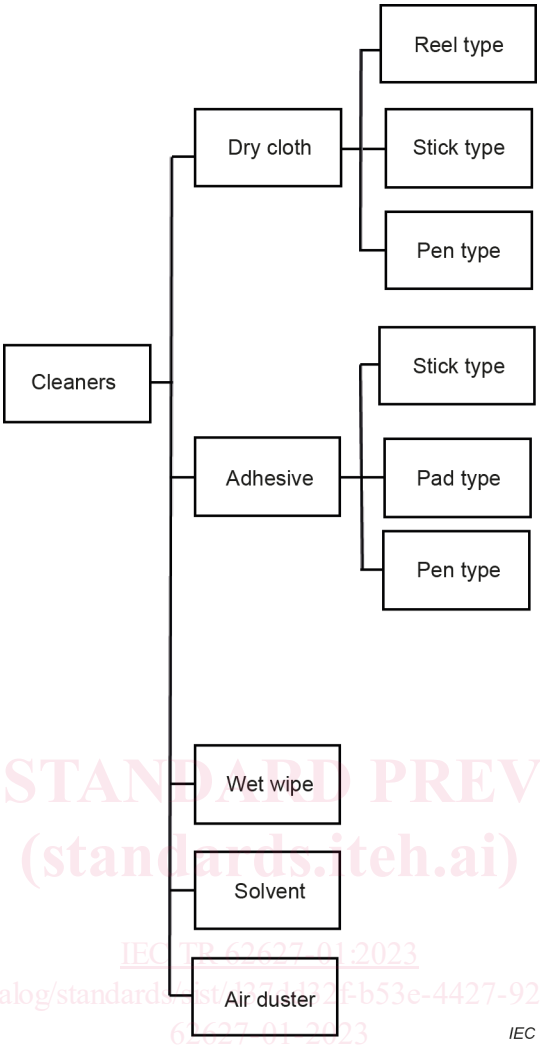

Figure 1 – Classification of cleaning tools and machines

Fibre optic connector cleaning tools or machines should be used.

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

Other than a cloth type, adhesive cleaning tools are available. Adhesive cleaning tools do not produce a static electric charge.

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 7.2 to 7.10. This list is not exhaustive.

7.2 Reel type cleaner

A reel type cleaner is used for cleaning fibre optic 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 2 shows an example of a reel type cleaner. The cleaning process of connector end-faces with reel type cleaner can result in an electrostatic charge (ESC) effect. Therefore, the cleaning cloth is processed to prevent the creation of a static electric charge. The fibre optic connector