



Edition 3.0 2023-01 REDLINE VERSION

TECHNICAL REPORT



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

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 33.180.20

ISBN 978-2-8322-6443-0

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FC	FOREWORD4		
1	Scop	e	6
2	Norm	native references	6
3	Term	is and definitions	6
	3.1	Cleaners	6
	3.2	Optical Fibre optic connector parts	
4	Appli	cation of optical fibre optic connectors	
	4.1	General	
	4.2	Influence of contamination of optical fibre optic connector end-faces	
5		in Guidelines for handling optical fibre optic connectors	
	5.1	General Guidelines for careful handling fibre optic connectors	
	5.2	Storage of optical fibre optic connectors	
	5.3	Connection of optical fibre optic connector plugs to ports on optical network	
	0.0	equipment	9
	5.4	Disconnection of optical fibre optic connector plugs to ports	9
6	Dust	caps	9
7	Clea	ning tools and machines	9
	7.1	General	9
	7.2	Reel type cleaner	10
	7.3	Stick type cleaner	11
	7.4	Pen type cleaner	11
	7.5	Adhesive backed stick type cleaner	12
	7.6	Adhesive pad type cleaner	12
	7.7	Adhesive pen type cleaner	13
	7.8	Gas and vacuum cleaning machine	13
	7.9	Air duster	14
	7.10	Tissue Wipe and solvent – Wet cleaning	14
8		al Fibre optic connectors and their -applicable corresponding cleaning tools nachines	14
9	Proc	edures	15
	9.1	General	15
	9.2	Basic procedure of cleaning	15
	9.3	Procedure to clean exposed plug end-faces with a reel type cleaner	16
	9.4	Procedure for port cleaning using a stick type or a pen type cleaner	16
	9.5	Procedure for port cleaning using an adhesive backed stick type cleaner	18
	9.6	Procedure for plug cleaning using an adhesive pad type cleaner	18
	9.7	Procedure for port cleaning using an adhesive pen type cleaner	
	9.8	Cleaning procedure using a gas and vacuum type cleaning machine	
An	inex A (informative) Precautions for the cleaning process	
	A.1	Material to be cleaned	
	A.1.1	5	
	A.1.2	5	
	A.1.3		
	A.1.4		
	A.2	Additional information	
An	inex B ((informative) General information on contamination	22

IEC TR 62627-01:2023 RLV © IEC 2023 - 3 -

B.1	Impact of contamination	22
B.1.1	General	22
B.1.2	High power levels	22
B.1.3	High data rates	22
B.2	Source of contamination	22
B.2.1	Mishandling	22
B.2.2		
B.2.3	Contamination travels	23
B.2.4	Contamination migration	24
B.3	Problems due to end-face contamination	24
B.3.1	Signal degradation	24
B.3.2	Permanent damage	25
Annex C (informative) Example of inspection equipment	26
Bibliograp	hy	27

Figure 1 – Classification of cleaning tools and machines	10
Figure 2 – Example of a reel type cleaner	11
Figure 3 – Example of stick type cleaners	11
Figure 4 – Example of a pen type cleaner	12
Figure 5 – Example of an adhesive backed stick type cleaner	12
Figure 6 – Example of an adhesive pad type cleaner	13
Figure 7 – Example of an adhesive pen type cleaner	13
Figure 8 – Example of a gas and vacuum cleaning machine	14
Figure 9 – Example of an air duster	14
Figure 10 – Cleaning with a reel type cleaner	16
Figure 11 – Cleaning ports using a stick type cleaner	17
Figure 12 – Cleaning ports using a pen type cleaner	17
Figure 13 – Cleaning ports using an adhesive stick type cleaner	18
Figure 14 – Cleaning with a pad type cleaner	18
Figure 15 – Cleaning with an adhesive pen type cleaner	19
Figure B.1 – Typical examples of contamination	23
Figure B.2 – Results of mating	23
Figure B.3 – Contamination migration	24
Figure B.4 – Signal degradation due to contamination	24
Figure B.5 – Permanent damage due to contamination	25
Figure C.1 – Patch-cord inspection and port inspection	26

Table 1 – Applicable Cleaning tools and machines for typical optical fibre optic	
connector parts1	5

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS –

Part 01: Fibre optic connector cleaning methods

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC TR 62627-01:2016. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

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.

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 document does not address the visual inspection-criteria procedures, 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 document-may be used 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 optical fibre optic 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.





Edition 3.0 2023-01

TECHNICAL REPORT



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

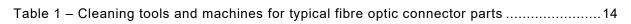


CONTENTS

FC	DREWO	RD	4
1	Scop	e	6
2	Norm	native references	6
3	Term	s and definitions	6
	3.1	Cleaners	6
	3.2	Fibre optic connector parts	7
4	Appli	cation of fibre optic connectors	8
	4.1	General	8
	4.2	Influence of contamination of fibre optic connector end-faces	8
5	Guid	elines for handling fibre optic connectors	8
	5.1	Guidelines for careful handling fibre optic connectors	8
	5.2	Storage of fibre optic connectors	
	5.3	Connection of fibre optic connector plugs to ports on optical network	
		equipment	8
	5.4	Disconnection of fibre optic connector plugs to ports	
6	Dust	caps	9
7	Clear	ning tools and machines	9
	7.1	General	9
	7.2	Reel type cleaner	10
	7.3	Stick type cleaner	11
	7.4	Pen type cleaner	11
	7.5	Adhesive backed stick type cleaner	12
	7.6	Adhesive pad type cleaner	12
	7.7	Adhesive pen type cleaner	13
	7.8	Gas and vacuum cleaning machine	13
	7.9	Air duster	13
	7.10	Wipe and solvent – Wet cleaning	14
8	Fibre	optic connectors and their corresponding cleaning tools and machines	14
9	Proce	edures	15
	9.1	General	15
	9.2	Basic procedure of cleaning	15
	9.3	Procedure to clean exposed plug end-faces with a reel type cleaner	15
	9.4	Procedure for port cleaning using a stick type or a pen type cleaner	16
	9.5	Procedure for port cleaning using an adhesive backed stick type cleaner	17
	9.6	Procedure for plug cleaning using an adhesive pad type cleaner	17
	9.7	Procedure for port cleaning using an adhesive pen type cleaner	18
	9.8	Cleaning procedure using a gas and vacuum type cleaning machine	18
Ar	nnex A (informative) Precautions for the cleaning process	19
	A.1	Material to be cleaned	19
	A.1.1	Plug connector	19
	A.1.2	Plug connector inside adaptors	19
	A.1.3	Adaptor for a cylindrical ferrule plug	19
	A.1.4	Timing of the cleaning	19
	A.2	Additional information	19
Ar	nnex B (informative) General information on contamination	21
	B.1	Impact of contamination	21

B.1.1	General	21
B.1.2		21
B.1.3		21
B.2	Source of contamination	
B.2.1	Mishandling	21
B.2.2	Environmental sources	22
B.2.3	Contamination travels	22
B.2.4	Contamination migration	23
B.3	Problems due to end-face contamination	23
B.3.1	Signal degradation	23
B.3.2		
Annex C (informative) Example of inspection equipment	25
Bibliograp	hy	26
Eiguro 1	Classification of classing tools and machines	10

Figure 1 – Classification of cleaning tools and machines	10
Figure 2 – Example of a reel type cleaner	11
Figure 3 – Example of stick type cleaners	11
Figure 4 – Example of a pen type cleaner	12
Figure 5 – Example of an adhesive backed stick type cleaner	12
Figure 6 – Example of an adhesive pad type cleaner	12
Figure 7 – Example of an adhesive pen type cleaner	13
Figure 8 – Example of a gas and vacuum cleaning machine	13
Figure 9 – Example of an air duster	14
Figure 10 – Cleaning with a reel type cleaner	15
Figure 11 – Cleaning ports using a stick type cleaner	16
Figure 12 – Cleaning ports using a pen type cleaner	16
Figure 13 – Cleaning ports using an adhesive stick type cleaner	17
Figure 14 – Cleaning with a pad type cleaner	18
Figure 15 – Cleaning with an adhesive pen type cleaner	18
Figure B.1 – Typical examples of contamination	22
Figure B.2 – Results of mating	22
Figure B.3 – Contamination migration	23
Figure B.4 – Signal degradation due to contamination	23
Figure B.5 – Permanent damage due to contamination	24
Figure C.1 – Patch-cord inspection and port inspection	25



- 4 -

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS –

Part 01: Fibre optic connector cleaning methods

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject deall with may participate in this preparatory work. International, governmental and non-governmental organizations for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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.

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 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.