

INTERNATIONAL STANDARD



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



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IEC 61300-2-34

Edition 3.0 2024-05
COMMENTED VERSION

INTERNATIONAL STANDARD



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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 33.180.20

ISBN 978-2-8322-8999-0

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CONTENTS

FOREWORD	3
1 Scope	5
2 Normative references	5
3 Terms and definitions	6
4 General description	6
5 Apparatus	6
5.1 Containers	6
5.2 Fluids	6
5.3 Heat source	7
5.4 Over Temperature controlled equipment	7
6 Procedure	7
6.1 General DUT preparation	7
6.2 Preconditioning	7
6.3 Initial examinations and measurements	7
6.4 Conditioning	7
6.4.1 Procedure A	7
6.4.2 Procedure B	8
6.5 Recovery	8
6.5.1 Procedure A	8
6.5.2 Procedure B	8
6.6 Final examinations and measurements	8
7 Severity	9
7.1 General	9
6.2 Exposure and drying duration	9
6.3 Fuels, lubricants, hydraulic fluids, cleaning agents and moisture repellents and anti freeze agents	9
7.2 Test fluids	11
8 Details to be specified and reported	11
Bibliography	13
List of comments	14
Table 1 Preferred test durations	9
Table 2 Preferred drying durations	9
Table 3 List of test fluids	9
Table 1 – Recommended test severities	9

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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~~

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This commented version (CMV) of the official standard IEC 61300-2-34:2024 edition 3.0 allows the user to identify the changes made to the previous IEC 61300-2-34:2009 edition 2.0. Furthermore, comments from IEC TC SC 86B experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

IEC 61300-2-34 has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics. It is an International Standard.

This third edition cancels and replaces the second edition published in 2009. This edition constitutes a technical revision.

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

- a) revision of the title;
- b) classification of test procedure and applicable fluids, bringing the document in line with IEC 61753-1;
- c) severities of test.

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

Draft	Report on voting
86B/4879/FDIS	86B/4924/RVD

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 International Standard 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 the parts in the IEC 61300 series, under the general title *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures*, 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, or
- revised.

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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~~

1 Scope

The purpose of this part of IEC 61300 is for testing the resistance to solvents and contaminating fluids on fibre optic interconnecting devices, passive components and ~~closures~~ protective housings, and their functionality. ~~The object of this test is to define a standard test method to assess the effects of short term exposure to fluids and lubricants on fibre optic interconnecting components and closure.~~ **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 61300-1, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 1: General and guidance*

IEC 61300-2-38, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-38: Tests – Sealing for fibre optic sealed closures and hardened connectors using air pressure*

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 61300-3-4, *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 61753 (all parts), *Fibre optic interconnecting devices and passive components – Performance standards*

IEC 62005 (all parts), *Fibre optic interconnecting devices and passive components – Reliability*

ISO 1998-1:1998, *Petroleum industry – Terminology – Part 1: Raw materials and products*

EN 590, *Automotive fuels – Diesel – Requirements and test methods*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

4 General description

WARNING – Intended users of this procedure are cautioned that tests of this nature ~~may~~ can involve the use of certain hazardous material, operations and equipment. ~~In particular,~~ Some of the fluids that ~~may~~ can be used are flammable or ~~may~~ can constitute health hazards, or both. Test temperatures ~~should~~ shall be at least 10 °C below the flashpoint of any fluid being used. Open flame heat sources should not be used with any organic solvents. Test personnel ~~should~~ shall consult the relevant material's safety data sheet of each used fluid and wear the recommended personal protection clothing and equipment for handling highly toxic or flammable products when necessary.

This test method covers the effects ~~of contaminating fluids~~ on the properties of fibre optic interconnecting devices, passive components and ~~closures~~ protective housings when coming in contact with fluids in an intentional or unintentional way. Testing is performed to ensure resistance of a device under test (DUT) to liquids to which it could be exposed during storage, installation or operation, and is carried out by ~~immersing specimens in~~ exposing the DUT to a specified fluid or group of fluids for a specified period at a specified temperature. A separate ~~specimen~~ DUT shall be used with each test fluid. Properties are measured prior to and after exposure to the fluid.

This test method contains two procedures, procedure A and procedure B: **2**

- Procedure A
DUT is immersed in a test fluid for 30 s, removed and then exposed to the test temperature for the test duration specified in Table 1.
- Procedure B
DUT is immersed in a test fluid while being exposed for the test duration and to the test temperature specified in Table 1.

The selected procedure shall be based on the relevant IEC 61753 performance standard.

5 Apparatus

5.1 Containers

A container made of a material that will not interact with the testing fluid shall be used for each test fluid. Example materials for the test vessel are boro-silicate glass or stainless steel ~~vessel of suitable volume for each test fluid shall be used~~. Vessels shall be of sufficient size and capacity to permit the ~~specimen~~ DUT to be immersed until it is fully covered in the selected fluid without violating other physical constraints (e.g. minimum cable bend radius).

5.2 Fluids

Fluids used shall be in accordance with the relevant ~~specification for the fluid~~ IEC 61753 performance standard or IEC 62005 reliability document **3**. Table 1 give examples of fluids that may be used for this evaluation; other liquids can be used by specific request. **4**

5.3 Heat source

A suitable heat source capable of achieving and maintaining the specified temperatures within ± 2 °C of the required setting shall be used.

5.4 ~~Oven~~ Temperature controlled equipment

~~A suitable oven to dry the specimen shall be used.~~

If the specified period for liquid exposure is longer than 1 h, or to dry the DUT after exposure, a temperature-controlled oven or an environmental test chamber shall be used in order to keep the test temperature stable. See 6.4 and 6.5.

6 Procedure

6.1 ~~General~~ DUT preparation

The preparation of the ~~specimen~~ DUT shall be in accordance with the relevant ~~specification~~ IEC 61753 performance standard or IEC 62005 reliability document **5**. If cables are fitted, they shall be long enough to exit the test medium. Where no cables are fitted, blanking plugs shall be inserted.

6.2 Preconditioning

Clean the mechanical and optical alignment parts of the ~~specimen~~ DUT according to the manufacturer's instructions.

Unless otherwise stated, maintain the ~~specimen~~ DUT under standard atmospheric condition according to IEC 61300-1 for a minimum of 2 h.

6.3 Initial examinations and measurements

~~If specified,~~ Perform initial examinations according to IEC 61300-3-1 and measurements as required by the relevant ~~specification~~ IEC 61753 performance standard or IEC 62005 reliability document.

For optical properties measurement, the equipment and measurement methods shall be according to IEC 61300-3-4 for attenuation and IEC 61300-3-6 for return loss measurement. The optical performance measurement shall be performed at the wavelength(s) specified in the relevant IEC 61753 performance standard or IEC 62005 reliability document. When sealing performance is requested to be evaluated, for devices such as sealed closures and hardened connectors, the equipment and measurement method shall be according to IEC 61300-2-38 **6**. For free breathing protective housings (that are not able to hold a permanent overpressure or underpressure), the test shall be carried out on material slabs.

6.4 Conditioning

~~For each specified fluid, prepare a vessel with sufficient fluid such that the specimen can be adequately immersed.~~

~~Immerse the specimen for the specified period while maintaining the fluid temperature.~~

~~NOTE In the case of volatile fluids, it may be necessary to add additional amounts of fluid (heated to the test temperature) during the test in order to keep the specimen immersed.~~

6.4.1 Procedure A **7**

For each specified fluid, prepare a vessel with sufficient fluid such that the DUT can be fully immersed. Immerse the DUT for 30 s in the fluid, then remove the DUT from the fluid. For large

DUTs or high viscosity fluids such as jellies, that are not practical to be immersed, brush the test fluid homogeneously over the DUT external area. Drain-off the excess test fluid for 2 mins and immediately after this step, set the DUT inside the temperature-controlled equipment to be exposed to the test temperature and the period specified in Table 1.

DUTs of the same type and material, although exposed to different test fluids, can be placed inside the same temperature-controlled equipment.

6.4.2 Procedure B **8**

For each specified fluid, prepare a vessel with sufficient fluid such that the DUT can be fully immersed.

Immerse the DUT while maintaining the fluid temperature during the period specified in Table 1. This may require putting the vessel with the DUT immersed in temperature-controlled equipment.

In the case of volatile fluids, it is sometimes necessary to add fluid (heated to the test temperature) during the test in order to keep the DUT immersed.

6.5 Recovery

~~At the end of the immersion period, remove the specimen and wipe off surplus fluid.~~

~~Where applicable as defined in the relevant specification, dry components in an oven at an appropriate temperature for a defined period.~~

6.5.1 Procedure A

After the exposure period at the designated test temperature, remove the DUT from the temperature-controlled equipment and maintain it under standard atmospheric conditions according to IEC 61300-1 for a minimum of 1 h.

6.5.2 Procedure B

At the end of the immersion period, remove the DUT and wipe off surplus fluid.

Dry the DUT in a temperature-controlled equipment at the temperature and period as defined in Table 1. Remove the DUT from the temperature-controlled equipment and maintain it under standard atmospheric conditions according to IEC 61300-1.

6.6 Final examinations and measurements

Upon completion of the test, the ~~specimen~~ DUT(s) shall be visually examined in accordance with IEC 61300-3-1 and all necessary observations recorded as specified in the relevant ~~specification~~ IEC 61753 performance standard or IEC 62005 reliability document. ~~Careful attention shall be given to~~ Ensure no swelling and shrinkage of materials, loss of adhesive bonding between bonded surfaces, corrosion of ~~materials~~ metallic parts, softening of materials, cracks in material, degradation of optical characteristics, etc, have occurred.

The functional measurements ~~shall~~ should be ~~accomplished~~ taken at the standard ~~test~~ atmospheric conditions as defined in IEC 61300-1, ~~unless otherwise specified in the relevant specification~~. When optical measurements are required, the equipment and measurement methods shall be according to IEC 61300-3-4 for attenuation and 61300-3-6 for return loss measurement. When sealing performance is evaluated, the equipment and measurement method shall be according to IEC 61300-2-38.

In the case of contamination, the disposal of contaminated water can be subject to local regulations. Follow the recommendations and warnings indicated in IEC 61300-2-38.

7 Severity

7.1 General

The severity consists of ~~the combination~~ a selection of the test fluid, exposure duration and the fluid exposure temperature. ~~The severity shall be specified in the relevant specification.~~

Table 1 shows the specified test severities in relation to the performance categories. It is recommended to verify the test severities with the relevant IEC 61753 performance standards or IEC 62005 reliability documents for the normative values. **9**

Table 1 – Recommended test severities

Category ^{a,b}	Fluid	Test duration	Test temperature ^c	Drying duration ^d
C, C ^{HD} , OP OPHD, OP+, OP+HD, E	Not required			
I I ^{HD}	NaCl $0,3 \times 10^{-6}$	24 h	30 °C	None
	Mineral Oil $0,5 \times 10^{-6}$	24 h	70 °C	None
	Soap $50\,000 \times 10^{-6}$	24 h	30 °C	None
A	HCl at pH 2	5 days	$+23\text{ °C} \pm 5\text{ °C}$	None
	NaOH at pH 12			
	petroleum jelly, ISO 1998-1:1998, (1.60.132)			
	90 % Isopropyl alcohol (IPA)	24 h		
G S	HCl at pH 2	5 days	$+23\text{ °C} \pm 5\text{ °C}$	None
	NaOH at pH 12			
	Cable compound (petroleum jelly), ISO 1998-1:1998, 1.60.132			
	90 % Isopropyl alcohol (IPA)	24 h		
	Automotive diesel oil ISO 1998-1:1998, 1.20.131, and EN 590	1 h		24 h
	10 % Nonyl Phenol Ethoxylate solution (Igepal) ^e	5 days	$50\text{ °C} \pm 2\text{ °C}$	None

^a Categories are defined in IEC 61753-1.

^b When the tests are performed for category I^{HD}, the product will be automatically qualified for category I.

^c For specified test temperature of 23 °C, the standard atmospheric conditions according IEC 61300-1 can be applied.

^d When drying duration is none, sample should be checked immediately at the end of the test.

^e Nonylphenol ethoxylate (Igepal®) is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of this product. An alternative to this fluid is 10 % sorbitan monostearate solution.

~~The following preferred severities are non-mandatory severities which may be specified for this procedure.~~

~~6.2 Exposure and drying duration~~

~~Specimen shall be exposed to the test for the following preferred duration:~~

~~Table 1 — Preferred test durations~~

1 h
24 h
5 days
7 days
1 month

~~After exposure specimen shall be recovered by drying applied according to the temperatures given in the relevant specification and durations mentioned below.~~

~~Table 2 — Preferred drying durations~~

1 h
2 h
24 h

~~The dry out temperature should be at maximum temperature of the service environment.~~

~~6.3 Fuels, lubricants, hydraulic fluids, cleaning agents and moisture repellents and anti-freeze agents~~

~~Table 3 provides a non-exhaustive list of recommended fluids.~~

Table 3 — List of test fluids

Chemical description	Test fluid code ^a	Test temperature °C
A mixture of toluene (aromatic) 30 % and iso-octane (aliphatic) 70 % (V/V)	-	40 ± 2
Wide-cut aviation turbine fuel	F-34 ^b	70 ± 2
Di-octyl sebacate (aircraft turbine engine lubrication oil)	-	150 ± 2
Mineral oil, viscosity approximately 15 cSt at 38 °C	O-135 ^b	70 ± 2
Castor oil 20 %, ethoxyethanol 80 % (V/V) (this represents a normal hydraulic fluid)	-	20 ± 2
Phosphate ester hydraulic fluid (synthetic hydraulic fluid)	H-544 ^b	70 ± 2
Dimethyl silicone fluid (high temperature hydraulic fluid)	S-1720 ^b	150 ± 2
Monopropylene glycol (de-icing fluid)	S-745 ^b	20 ± 2
Lithium soap/synthetic oil grease (low temperature grease)	G-395 ^b	20 ± 2
Acetone	-	15 to 35
White spirit, 0,79—0,81 g/ml	-	15 to 35
Isopropyl alcohol	-	15 to 35
Petroleum jelly, Vaseline	-	15 to 35
HCl(pH2)	-	15-35
NaOH(pH12)	-	15-35
Kerosene	-	15-35
Diesel fuel	EN-590	15-35
10 % Nonyl Phenol Ethoxylate solution	-	50 ± 2
^a —Wherever possible the fluid given is specified in an International Standard or is described by its constituent chemicals. In some cases a NATO identification has been used in preference to a commercial identification. Reference to relevant commercial literature can correlate the NATO number with commercially available fluid(s). ^b —NATO code.		

7.2 Test fluids 10

Table 1 provides a non-exhaustive list of recommended test fluids. The fluids listed are representative of those that can be encountered in storage, installation and specific operational applications. It is not intended that any DUT should be exposed to all of them.

NOTE See WARNING in Clause 4 about personal safety and compliance with regional regulations.

8 Details to be specified and reported

The following details, as applicable, shall be specified in the relevant specification and reported in the test report:

- ~~Test fluid~~
- ~~Specimen optically functioning or non-functioning~~
- ~~Specimen~~ DUT characteristics: mated or unmated (capped or uncapped), functional or non-functional ~~and all spare~~, sealed ports sealed or capped.
- Preconditioning procedure (see Clause 6.2).
- ~~Immersion period~~
- ~~Fluid temperature~~

- Test conditions applied (see Clause 6.4):
 - procedure A or procedure B;
 - immersed or brushed.
- Severity (see Table 1):
 - test fluids;
 - test duration;
 - test temperature;
 - number of samples to be evaluated per test fluid.
- Recovery procedure (see clause 6.5):
 - duration;
 - temperature.
- Initial examinations, measurements and performance requirements (see Clause 6.3).
- Final examinations, measurements, calculations and performance requirements (see Clause 6.5).
- Additional pass/fail criteria.
- Deviations from test procedure.

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IEC 60068-2-74, *Environmental testing – Part 2-74: Tests – Test Xc: Fluid contamination*

~~ISO 1817, Rubber, vulcanized – Determination of the effect of liquids~~

~~EN 590, Automotive fuels – Diesel – Requirements and test methods~~

IEC 61753-1, *Fibre optic interconnecting devices and passive components – Performance standard – Part 1: General and guidance*

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List of comments

- 1 The object of this test method is to verify the effect of contaminating fluids on the device under test as a whole and its functionality as part of a communications network.
 - 2 Due to diversity of DUTs, sizes, handling and test conditions during the evaluation, IEC 61300-2-34 edition 2 defines two test procedures that can be applied, depending on the degree of simulated contamination on the DUT.
 - 3 Fluids to be used have been reviewed and aligned with the general guidance for performance of fibre optic interconnecting devices and passive components.
 - 4 The fluids list includes those considered reflect actual risk of contamination during storage, handling, installation or operation of interconnecting devices. Fluids that correspond to other applications, e.g. avionics, have been removed from this document.
 - 5 The IEC 62005 reference is an adequate guidance when extended period evaluation is requested because of special applications or for new materials or products reliability studies.
 - 6 References to allow for quantitative base measurements and criteria for effects during and after the evaluations are included.
 - 7 Procedure A is convenient to evaluate interconnecting devices with permanent or long-term exposure to contaminating fluid(s).
 - 8 Procedure B is suitable to evaluate the effect of short-term exposure of interconnecting devices to contaminating fluids.
 - 9 In this new edition the severity for the evaluations are concentrated in a general table and evaluation severities aligned to the operation category of the interconnecting device to be evaluated. This minimizes the risk of applying a severity that does not correspond to a specific element application.
 - 10 Although the list of fluids covers the most used fluids in field and in the different stages of handling and operation optical interconnecting devices may go through, there is the possibility that a specific fluid or operation category can be requested for special applications.
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INTERNATIONAL STANDARD

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Fibre optic interconnecting devices and passive components – Basic test and measurement procedures –

Part 2-34: Tests – Resistance to solvents and contaminating fluids

Dispositifs d'interconnexion et composants passifs fibroniques – Procédures fondamentales d'essais et de mesures –

Partie 2-34 : Essais – Résistance aux solvants et aux fluides contaminants

CONTENTS

FOREWORD.....	3
1 Scope.....	5
2 Normative references	5
3 Terms and definitions	6
4 General description	6
5 Apparatus.....	6
5.1 Containers	6
5.2 Fluids.....	6
5.3 Heat source	7
5.4 Temperature controlled equipment.....	7
6 Procedure.....	7
6.1 DUT preparation	7
6.2 Preconditioning.....	7
6.3 Initial examinations and measurements.....	7
6.4 Conditioning.....	7
6.4.1 Procedure A	7
6.4.2 Procedure B	8
6.5 Recovery	8
6.5.1 Procedure A	8
6.5.2 Procedure B	8
6.6 Final examinations and measurements.....	8
7 Severity.....	8
7.1 General.....	8
7.2 Test fluids	9
8 Details to be specified and reported.....	10
Bibliography.....	11
Table 1 – Recommended test severities.....	9

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE
COMPONENTS – BASIC TEST AND MEASUREMENT PROCEDURES –****Part 2-34: Tests – Resistance to solvents and contaminating fluids****FOREWORD**

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IEC 61300-2-34 has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics. It is an International Standard.

This third edition cancels and replaces the second edition published in 2009. This edition constitutes a technical revision.

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

- a) revision of the title;
- b) classification of test procedure and applicable fluids, bringing the document in line with IEC 61753-1;
- c) severities of test.

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

Draft	Report on voting
86B/4879/FDIS	86B/4924/RVD

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 International Standard 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 the parts in the IEC 61300 series, under the general title *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures*, 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, or
- revised.

FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – BASIC TEST AND MEASUREMENT PROCEDURES –

Part 2-34: Tests – Resistance to solvents and contaminating fluids

1 Scope

The purpose of this part of IEC 61300 is for testing the resistance to solvents and contaminating fluids on fibre optic interconnecting devices, passive components and protective housings, and their functionality.

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

IEC 61300-2-38, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-38: Tests – Sealing for fibre optic sealed closures and hardened connectors using air pressure*

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 61300-3-4, *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 61753 (all parts), *Fibre optic interconnecting devices and passive components – Performance standards*

IEC 62005 (all parts), *Fibre optic interconnecting devices and passive components – Reliability*

ISO 1998-1:1998, *Petroleum industry – Terminology – Part 1: Raw materials and products*

EN 590, *Automotive fuels – Diesel – Requirements and test methods*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

4 General description

WARNING – Intended users of this procedure are cautioned that tests of this nature can involve the use of certain hazardous material, operations and equipment. Some of the fluids that can be used are flammable or can constitute health hazards, or both. Test temperatures shall be at least 10 °C below the flashpoint of any fluid being used. Open flame heat sources should not be used with any organic solvents. Test personnel shall consult the relevant material's safety data sheet of each used fluid and wear the recommended personal protection clothing and equipment for handling highly toxic or flammable products when necessary.

This test method covers the effects on the properties of fibre optic interconnecting devices, passive components and protective housings when coming in contact with fluids in an intentional or unintentional way. Testing is performed to ensure resistance of a device under test (DUT) to liquids to which it could be exposed during storage, installation or operation, and is carried out by exposing the DUT to a specified fluid or group of fluids for a specified period at a specified temperature. A separate DUT shall be used with each test fluid. Properties are measured prior to and after exposure to the fluid.

This test method contains two procedures, procedure A and procedure B:

- Procedure A
DUT is immersed in a test fluid for 30 s, removed and then exposed to the test temperature for the test duration specified in Table 1.
- Procedure B
DUT is immersed in a test fluid while being exposed for the test duration and to the test temperature specified in Table 1.

The selected procedure shall be based on the relevant IEC 61753 performance standard.

5 Apparatus

5.1 Containers

A container made of a material that will not interact with the testing fluid shall be used for each test fluid. Example materials for the test vessel are boro-silicate glass or stainless steel. Vessels shall be of sufficient size and capacity to permit the DUT to be immersed until it is fully covered in the selected fluid without violating other physical constraints (e.g. minimum cable bend radius).

5.2 Fluids

Fluids used shall be in accordance with the relevant IEC 61753 performance standard or IEC 62005 reliability document. Table 1 give examples of fluids that may be used for this evaluation; other liquids can be used by specific request.

5.3 Heat source

A suitable heat source capable of achieving and maintaining the specified temperatures within ± 2 °C of the required setting shall be used.

5.4 Temperature controlled equipment

If the specified period for liquid exposure is longer than 1 h, or to dry the DUT after exposure, a temperature-controlled oven or an environmental test chamber shall be used in order to keep the test temperature stable. See 6.4 and 6.5.

6 Procedure

6.1 DUT preparation

The preparation of the DUT shall be in accordance with the relevant IEC 61753 performance standard or IEC 62005 reliability document. If cables are fitted, they shall be long enough to exit the test medium. Where no cables are fitted, blanking plugs shall be inserted.

6.2 Preconditioning

Clean the mechanical and optical alignment parts of the DUT according to the manufacturer's instructions.

Unless otherwise stated, maintain the DUT under standard atmospheric condition according to IEC 61300-1 for a minimum of 2 h.

6.3 Initial examinations and measurements

Perform initial examinations according to IEC 61300-3-1 and measurements as required by the relevant IEC 61753 performance standard or IEC 62005 reliability document.

For optical properties measurement, the equipment and measurement methods shall be according to IEC 61300-3-4 for attenuation and IEC 61300-3-6 for return loss measurement. The optical performance measurement shall be performed at the wavelength(s) specified in the relevant IEC 61753 performance standard or IEC 62005 reliability document. When sealing performance is requested to be evaluated, for devices such as sealed closures and hardened connectors, the equipment and measurement method shall be according to IEC 61300-2-38. For free breathing protective housings (that are not able to hold a permanent overpressure or underpressure), the test shall be carried out on material slabs.

6.4 Conditioning

6.4.1 Procedure A

For each specified fluid, prepare a vessel with sufficient fluid such that the DUT can be fully immersed. Immerse the DUT for 30 s in the fluid, then remove the DUT from the fluid. For large DUTs or high viscosity fluids such as jellies, that are not practical to be immersed, brush the test fluid homogeneously over the DUT external area. Drain-off the excess test fluid for 2 mins and immediately after this step, set the DUT inside the temperature-controlled equipment to be exposed to the test temperature and the period specified in Table 1.

DUTs of the same type and material, although exposed to different test fluids, can be placed inside the same temperature-controlled equipment.

6.4.2 Procedure B

For each specified fluid, prepare a vessel with sufficient fluid such that the DUT can be fully immersed.

Immerse the DUT while maintaining the fluid temperature during the period specified in Table 1. This may require putting the vessel with the DUT immersed in temperature-controlled equipment.

In the case of volatile fluids, it is sometimes necessary to add fluid (heated to the test temperature) during the test in order to keep the DUT immersed.

6.5 Recovery

6.5.1 Procedure A

After the exposure period at the designated test temperature, remove the DUT from the temperature-controlled equipment and maintain it under standard atmospheric conditions according to IEC 61300-1 for a minimum of 1 h.

6.5.2 Procedure B

At the end of the immersion period, remove the DUT and wipe off surplus fluid.

Dry the DUT in a temperature-controlled equipment at the temperature and period as defined in Table 1. Remove the DUT from the temperature-controlled equipment and maintain it under standard atmospheric conditions according to IEC 61300-1.

6.6 Final examinations and measurements

Upon completion of the test, the DUT(s) shall be visually examined in accordance with IEC 61300-3-1 and all necessary observations recorded as specified in the relevant IEC 61753 performance standard or IEC 62005 reliability document. Ensure no swelling and shrinkage of materials, loss of adhesive bonding between bonded surfaces, corrosion of metallic parts, softening of materials, cracks in material, degradation of optical characteristics, etc, have occurred.

The functional measurements should be taken at the standard atmospheric conditions as defined in IEC 61300-1. When optical measurements are required, the equipment and measurement methods shall be according to IEC 61300-3-4 for attenuation and 61300-3-6 for return loss measurement. When sealing performance is evaluated, the equipment and measurement method shall be according to IEC 61300-2-38.

In the case of contamination, the disposal of contaminated water can be subject to local regulations. Follow the recommendations and warnings indicated in IEC 61300-2-38.

7 Severity

7.1 General

The severity consists of a selection of the test fluid, exposure duration and the fluid exposure temperature.

Table 1 shows the specified test severities in relation to the performance categories. It is recommended to verify the test severities with the relevant IEC 61753 performance standards or IEC 62005 reliability documents for the normative values.

Table 1 – Recommended test severities

Category ^{a,b}	Fluid	Test duration	Test temperature ^c	Drying duration ^d
C, C ^{HD} , OP OPHD, OP+, OP+HD, E	Not required			
I I ^{HD}	NaCl $0,3 \times 10^{-6}$	24 h	30 °C	None
	Mineral Oil $0,5 \times 10^{-6}$	24 h	70 °C	None
	Soap $50\,000 \times 10^{-6}$	24 h	30 °C	None
A	HCl at pH 2	5 days	+23 °C ± 5 °C	None
	NaOH at pH 12			
	petroleum jelly, ISO 1998-1:1998, (1.60.132)			
	90 % Isopropyl alcohol (IPA)	24 h		
G S	HCl at pH 2	5 days	+23 °C ± 5 °C	None
	NaOH at pH 12			
	Cable compound (petroleum jelly), ISO 1998-1:1998, 1.60.132			
	90 % Isopropyl alcohol (IPA)	24 h		
	Automotive diesel oil ISO 1998-1:1998, 1.20.131, and EN 590	1 h		24 h
	10 % Nonyl Phenol Ethoxylate solution (Igepal) ^e	5 days	50 °C ± 2 °C	None
^a Categories are defined in IEC 61753-1. ^b When the tests are performed for category I ^{HD} , the product will be automatically qualified for category I. ^c For specified test temperature of 23 °C, the standard atmospheric conditions according IEC 61300-1 can be applied ^d When drying duration is none, sample should be checked immediately at the end of the test. ^e Nonylphenol ethoxylate (Igepal®) is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of this product. An alternative to this fluid is 10 % sorbitan monostearate solution.				

7.2 Test fluids

Table 1 provides a non-exhaustive list of recommended test fluids. The fluids listed are representative of those that can be encountered in storage, installation and specific operational applications. It is not intended that any DUT should be exposed to all of them.

NOTE See WARNING in Clause 4 about personal safety and compliance with regional regulations.

8 Details to be specified and reported

The following details, as applicable, shall be specified in the relevant specification and reported in the test report:

- DUT characteristics: mated or unmated (capped or uncapped), functional or non-functional, sealed ports sealed or capped.
- Preconditioning procedure (see Clause 6.2).
- Test conditions applied (see Clause 6.4):
 - procedure A or procedure B;
 - immersed or brushed.
- Severity (see Table 1):
 - test fluids;
 - test duration;
 - test temperature;
 - number of samples to be evaluated per test fluid.
- Recovery procedure (see clause 6.5):
 - duration;
 - temperature.
- Initial examinations, measurements and performance requirements (see Clause 6.3).
- Final examinations, measurements, calculations and performance requirements (see Clause 6.5).
- Additional pass/fail criteria.
- Deviations from test procedure.

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Bibliography

IEC 60068-2-74, *Environmental testing – Part 2-74: Tests – Test Xc: Fluid contamination*

IEC 61753-1, *Fibre optic interconnecting devices and passive components – Performance standard – Part 1: General and guidance*

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SOMMAIRE

AVANT-PROPOS	13
1 Domaine d'application	15
2 Références normatives	15
3 Termes et définitions	16
4 Description générale.....	16
5 Appareillage	16
5.1 Conteneurs	16
5.2 Fluides.....	17
5.3 Source de chaleur.....	17
5.4 Équipement thermorégulé	17
6 Procédure.....	17
6.1 Préparation du DUT	17
6.2 Préconditionnement	17
6.3 Examens et mesurages initiaux.....	17
6.4 Conditionnement.....	18
6.4.1 Procédure A	18
6.4.2 Procédure B	18
6.5 Rétablissement.....	18
6.5.1 Procédure A	18
6.5.2 Procédure B	18
6.6 Examens et mesurages finaux	18
7 Sévérité.....	19
7.1 Généralités	19
7.2 Fluides d'essai.....	20
8 Informations détaillées à spécifier et à consigner.....	21
Bibliographie.....	22
Tableau 1 – Sévérités d'essai recommandées	20

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

**DISPOSITIFS D'INTERCONNEXION
ET COMPOSANTS PASSIFS FIBRONIQUES –
PROCÉDURES FONDAMENTALES D'ESSAIS ET DE MESURES –****Partie 2-34: Essais – Résistance aux solvants et aux fluides contaminants****AVANT-PROPOS**

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L'IEC 61300-2-34 a été établie par le sous-comité 86B: Dispositifs d'interconnexion et composants passifs à fibres optiques, du comité d'études 86 de l'IEC: Fibres optiques. Il s'agit d'une Norme internationale.

Cette troisième édition annule et remplace la deuxième édition parue en 2009. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) révision du titre;
- b) classification de la procédure d'essai et des fluides applicables, en alignant le document sur l'IEC 61753-1;
- c) sévérités de l'essai.

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
86B/4879/FDIS	86B/4924/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/publications.

Une liste de toutes les parties de la série IEC 61300, publiées sous le titre général *Dispositifs d'interconnexion et composants passifs fibroniques – Procédures fondamentales d'essais et de mesures*, se trouve sur le site web de l'IEC.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous webstore.iec.ch dans les données relatives au document recherché. À cette date, le document sera

- reconduit,
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- révisé.

DISPOSITIFS D'INTERCONNEXION ET COMPOSANTS PASSIFS FIBRONIQUES – PROCÉDURES FONDAMENTALES D'ESSAIS ET DE MESURES –

Partie 2-34: Essais – Résistance aux solvants et aux fluides contaminants

1 Domaine d'application

L'objectif de la présente partie de l'IEC 61300 est relatif aux essais de résistance aux solvants et aux fluides contaminants des dispositifs d'interconnexion, des composants passifs et des boîtiers de protection fibroniques, ainsi que de leur fonctionnalité.

2 Références normatives

Les documents suivants sont cités dans le texte de sorte qu'ils constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 61300-1, *Dispositifs d'interconnexion et composants passifs fibroniques – Procédures fondamentales d'essais et de mesures – Partie 1: Généralités et recommandations*

IEC 61300-2-38, *Dispositifs d'interconnexion et composants passifs fibroniques – Procédures fondamentales d'essais et de mesures – Partie 2-38: Essais – Étanchéité des boîtiers scellés fibroniques et des connecteurs durcis fibroniques au moyen d'air comprimé*

IEC 61300-3-1, *Dispositifs d'interconnexion et composants passifs à fibres optiques – Méthodes fondamentales d'essais et de mesures – Partie 3-1: Examens et mesures – Examen visuel*

IEC 61300-3-4, *Dispositifs d'interconnexion et composants passifs fibroniques – Procédures fondamentales d'essais et de mesures – Partie 3-4: Examens et mesures – Affaiblissement*

IEC 61300-3-6, *Dispositifs d'interconnexion et composants passifs à fibres optiques – Méthodes fondamentales d'essais et de mesures – Partie 3-6: Examens et mesures – Affaiblissement de réflexion*

IEC 61753 (toutes les parties), *Dispositifs d'interconnexion et composants passifs fibroniques – Norme de performance*

IEC 62005 (toutes les parties), *Dispositifs d'interconnexion et composants passifs fibroniques – Fiabilité*

ISO 1998-1:1998, *Industrie pétrolière – Terminologie – Partie 1: Matières premières et produits*

EN 590, *Carburants pour automobiles – Carburants pour moteur diesel (gazole) – Exigences et méthodes d'essai*

3 Termes et définitions

Aucun terme n'est défini dans le présent document.

L'ISO et l'IEC tiennent à jour des bases de données terminologiques destinées à être utilisées en normalisation, consultables aux adresses suivantes:

- IEC Electropedia: disponible à l'adresse <https://www.electropedia.org/>
- ISO Online browsing platform: disponible à l'adresse <https://www.iso.org/obp>

4 Description générale

AVERTISSEMENT – L'attention des utilisateurs éventuels de cette procédure est attirée sur le fait que de tels essais peuvent impliquer l'utilisation de certains matériaux, opérations et équipements dangereux. Certains fluides pouvant être utilisés sont inflammables ou peuvent constituer des risques pour la santé, ou les deux. Les températures d'essai doivent être au moins 10 °C au-dessous du point d'éclair du fluide utilisé, quel qu'il soit. Il convient de ne pas utiliser des sources de chaleur à flamme nue avec un solvant organique, quel qu'il soit. Le personnel d'essai doit consulter les fiches techniques de sécurité des matériaux de chaque fluide utilisé et porter les vêtements et équipements de protection individuelle recommandés pour manipuler des produits hautement toxiques ou inflammables, si nécessaire.

La présente méthode d'essai concerne les effets sur les propriétés des dispositifs d'interconnexion, des composants passifs et des boîtiers de protection fibroniques lorsqu'ils entrent en contact avec des fluides de manière intentionnelle ou non. Les essais ont pour but d'assurer la résistance d'un dispositif en essai (DUT, *Device Under Test*) à des liquides auxquels il peut être exposé pendant le stockage, l'installation ou l'exploitation et ils consistent à exposer le DUT à un fluide spécifié, ou un groupe de fluides, pendant une durée spécifiée, à une température spécifiée. Un DUT différent doit être utilisé pour chaque fluide d'essai. Les propriétés sont mesurées avant et après l'exposition au fluide.

La présente méthode d'essai comprend deux procédures, la procédure A et la procédure B:

- Procédure A
DUT immergé dans un fluide d'essai pendant 30 s, retiré puis exposé à la température d'essai pendant la durée d'essai spécifiée au Tableau 1 ;
- Procédure B
DUT immergé dans un fluide d'essai tout en étant exposé pendant la durée d'essai et à la température d'essai spécifiées au Tableau 1.

La procédure choisie doit être fondée sur la norme de performance IEC 61753 applicable.

5 Appareillage

5.1 Conteneurs

Un conteneur constitué d'un matériau qui n'interagira pas avec le fluide d'essai, doit être utilisé pour chaque fluide d'essai. Des exemples de matériaux pouvant constituer le récipient d'essai sont le verre borosilicate ou l'acier inoxydable. Les récipients doivent être de dimensions et de capacités suffisantes pour permettre au DUT d'être immergé jusqu'à ce qu'il soit entièrement recouvert dans le fluide choisi sans transgresser d'autres contraintes physiques (par exemple le rayon de courbure minimal du câble).