IEC 61300-2-33

Edition 3.0 2012-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

Dispositifs d'interconnexion et composants passifs à fibres optiques – Méthodes fondamentales d'essais et de mesures –
Partie 2-33: Essais – Montage et démontage des épissures mécaniques de fibres optiques, des systèmes de gestion des fibres et des boîtiers

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International Standard IEC 61300-2-33 has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

This third edition cancels and replaces the second edition published in 2006. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition: the inclusion of fibre management system and ancillary passive and active components as well as cable management system for the incoming and outgoing optical cables.

This bilingual version (2013-04) corresponds to the monolingual English version, published in 2012-07.

The text of this standard is based on the following documents:

CDV	Report on voting
86B/3330/CDV	86B/3406/RVC

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

The French version of this standard has not been voted upon.

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

The list of all parts in the IEC 61300 series, published 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 publication will remain unchanged until the stability date indicated on the IEC web site 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- withdrawn,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.

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

Part 2-33: Tests – Assembly and disassembly of fibre optic mechanical splices, fibre management systems and closures

1 Scope

This part of the IEC 61300 series, evaluates the assembly and reassembly of a fibre optic mechanical splice, a fibre management system or a closure for a specified number of times.

The test procedures simulate the following conditions which may be encountered during the component's service lifetime:

– the ability of an optical mechanical splice to be re-installed after disassembly;
– the ability to re-enter fibre management systems and closures, by accessing fibres and optical components and making reconfigurations without disturbing transmission in adjacent fibre circuits;
– verification of the sealing performance after frequent opening and closing of enclosures.

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.

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

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

IEC 61753-1, *Fibre optic interconnecting devices and passive components – Part 1: General and guidance for performance standards*

3 Terms and definitions

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

3.1
closure
all external housings except outdoor cabinets

3.2
fibre management system
system to control fibre routing from the incoming to the outgoing fibres

3.3
re-entry
access to the fibre management system after initial installation

3.4
mechanical splice
a fibre splice accomplished by fixtures or materials, rather than by thermal fusion

Note 1 to entry: Index matching material may be applied between the two fibre ends.

4 General description

Three test procedures are described. Procedure A tests the ability of optical mechanical splices to be re-installed after disassembly. Procedure B tests the ability to re-enter fibre management systems and closures, by accessing fibres and optical components and making reconfigurations without disturbing transmission in adjacent fibre circuits. Procedure C verifies the sealing performance after frequent opening and closing of enclosures.

The mechanical splice, fibre management system or (en)closure shall be assembled and reassembled a specified number of times following the manufacturer's instructions, including any specified cleaning or recovery procedure.

The test shall be done according to requirements referenced in IEC 61753-1. Assembly and disassembly of the mechanical splice, fibre management system or closure shall be carried out at room temperature, unless otherwise specified.

5 Procedure

5.1 Preparation of the specimen

Assembly tools and consumable materials, as specified by the manufacturer, shall be used.

5.2 Test procedures

5.2.1 Procedure A: Re-installation of an optical mechanical splice after disassembly

General description of the steps for Procedure A is defined as follows.

1) Assemble the mechanical splice according to the manufacturer's installation instructions using the specified fibre or cable.
2) Perform any required examination and measurements as specified in the relevant performance standard.
3) Perform the temperature ageing cycle as specified in the relevant performance standard. When not specified, the ageing cycle as defined in Table 1 shall be used. After the ageing cycle allow the specimen to recover at ambient temperature for at least 2 hours.
4) Disassemble the mechanical splice to the specified extent or to the point that all internal fibres and devices can be accessed or removed.
5) Perform any specified cleaning and fibre preparation operations.
6) Re-install the mechanical splice according to the manufacturer's instructions.
7) Perform any required examinations and measurements as specified in the relevant specification.
8) Repeat steps 3 through 7 for the number of cycles specified.

5.2.2 Procedure B: Optical stability during product reconfiguration

General description of the steps for Procedure B is defined as follows.

1) Assemble the (en)closure or fibre management system according to the manufacturer's instructions using the specified fibre or cable. An optical circuit is built as specified in the performance standard.
2) Perform any required examination and measurements as specified in the relevant performance standard. The change in attenuation in the optical circuit shall be measured with the transient loss procedure, IEC 61300-3-28, when performing steps 3, 4 and 5.
3) The handling operations shall be performed as specified in the performance standard (see Annex A for a typical example). The (en)closure shall be disassembled to the specified extent or to the point that the internal fibres and devices can be accessed or removed.
4) Perform the specified reconfiguration operations.
5) Close and secure the fibre management system and reassemble the (en)closure according to the manufacturer's instructions.

5.2.3 Procedure C: Sealing performance after frequent opening and closing of the enclosures

General description of the steps for Procedure C is defined as follows.

1) Assemble the (en)closure according to the manufacturer's installation instructions using the specified fibre or cable.
2) Perform any required examination and check sealing performance as specified in the relevant performance standard.
3) When specified in the performance standard, perform the specified temperature ageing cycle. After the ageing cycle, allow the (en)closure to recover at ambient temperature for at least 4 hours.
4) Disassemble the (en)closure to the specified extent or to the point that all internal fibres and devices can be accessed or removed.
5) Re-install the (en)closure according to the manufacturer's installation instructions.
6) Perform any required examinations and check sealing performance as specified in the relevant specification.
7) Repeat steps 3 through 6 for the number of cycles specified.

5.2.4 Ageing procedure

If specified in the relevant performance standard, the product shall be submitted to an aeging process between assembly and disassembly operations. The major reason for the ageing process is to speed up the creep of the polymeric materials in the alignment area or sealing area after a re-entry is completed.

The purpose of the ageing procedure includes:

– identification of the design failures;
– identification of manufacturing defects;
– impact of product ageing on assembly and disassembly.

Table 1 shows ageing conditions. The ageing conditions are based on the operating environmental conditions given in IEC 61753-1.

Table 1 – Ageing procedure between two cycles of assembly and disassembly of fibre optic mechanical splices and closures

Operating environment	Ageing conditions IEC 61300-2-22
Ageing conditions for Procedure A: Mechanical splices	
Controlled C	-10 °C ± 2 °C to +60 °C ± 2 °C 2 h duration at extremes 1 °C/min rate of change 1 cycle
Uncontrolled U	-40 °C ± 2 °C to +70 °C ± 2 °C 2 h duration at extremes 1 °C/min rate of change 1 cycle
Extreme E	-40 °C ± 2 °C to +85 °C ± 2 °C 2 h duration at extremes 1 °C/min rate of change 1 cycle
Ageing conditions for Procedure C: Closures	
Controlled C	-10 °C ± 2 °C to +60 °C ± 2 °C 4 h duration at extremes 1 °C/min rate of change 1 cycle
Aerial A	-40 °C ± 2 °C to +65 °C ± 2 °C 4 h duration at extremes 1 °C/min rate of change 1 cycle
Ground G	-40 °C ± 2 °C to +65 °C ± 2 °C 4 h duration at extremes 1 °C/min rate of change 1 cycle
Subterranean S	-30 °C ± 2 °C to +60 °C ± 2 °C 4 h duration at extremes 1 °C/min rate of change 1 cycle

After ageing, allow test specimens to recover at ambient temperature for at least 2 h for mechanical splices and 4 h for (en)closures

5.3 Severity

The severity for Procedures A and C is determined by the number of assembly and disassembly cycles as indicated in Table 2.

Table 2 – Number of assembly/disassembly cycles for different operating environments

Operating environment	Number of assembly/ disassembly cycles	Number of ageing cycles between each assembly/disassembly cycle
Procedure A: Mechanical splices		
Controlled C	5	1
Uncontrolled U and O	5	1
Extreme E	5	1
Procedure C: Closures		
Controlled C	10	1
Aerial A	10	1
Ground G	10	1
Subterranean S	10	1
NOTE The ageing procedure between each disassembly/assembly cycle shall be conducted according to Table 2		

6 Details to be specified

The following details, as applicable, shall be specified in the relevant specification:

- test procedure;
- test specimen configuration;
- number of test specimens;
- preconditioning of test specimen;
- number of assembly and disassembly cycles;
- temperature condition for assembly and disassembly;
- ageing process between two assembly/disassembly cycles;
- number of ageing cycles between each assembly/disassembly cycle;
- description of installation and/or intervention operations (see Annex A for example of closure);
- initial examinations and measurements and performance requirements;
- recovery procedure for the mechanical splice, fibre management system or (en)closure;
- final examinations and measurements and performance requirements;
- deviations from the manufacturer's assembly/disassembly instructions;
- additional pass/fail criteria.