

# INTERNATIONAL STANDARD



**Fibre optic interconnecting devices and passive components – Basic test and measurement procedures –  
Part 2-6: Tests – Tensile strength of coupling mechanism**

Document Preview

[IEC 61300-2-6:2023](#)

<https://standards.iteh.ai/catalog/standards/iec/29e76b01-53d4-4cd6-b895-fa6bf72bc1c3/iec-61300-2-6-2023>





## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2023 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Secretariat  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

#### IEC publications search - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [sales@iec.ch](mailto:sales@iec.ch).

#### IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

International Standards  
Document Preview

[IEC 61300-2-6:2023](https://standards.iteh.ai/catalog/standards/iec/29e76b01-53d4-4cd6-b895-fa6bf72bc1c3/iec-61300-2-6-2023)

<https://standards.iteh.ai/catalog/standards/iec/29e76b01-53d4-4cd6-b895-fa6bf72bc1c3/iec-61300-2-6-2023>



IEC 61300-2-6

Edition 3.0 2023-11  
REDLINE VERSION

# INTERNATIONAL STANDARD



**Fibre optic interconnecting devices and passive components – Basic test and measurement procedures –  
Part 2-6: Tests – Tensile strength of coupling mechanism**

Document Preview

[IEC 61300-2-6:2023](https://standards.iteh.ai/catalog/standards/iec/29e76b01-53d4-4cd6-b895-fa6bf72bc1c3/iec-61300-2-6-2023)

<https://standards.iteh.ai/catalog/standards/iec/29e76b01-53d4-4cd6-b895-fa6bf72bc1c3/iec-61300-2-6-2023>

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

ICS 33.180.20

ISBN 978-2-8322-7935-9

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

# CONTENTS

FOREWORD.....	3
1 Scope.....	5
2 Normative references .....	5
<del>3 General.....</del>	<del>5</del>
3 Terms and definitions .....	5
4 Apparatus.....	6
4.1 General.....	6
4.2 Force generator .....	7
4.3 Force gauge .....	8
4.4 Clamping device .....	8
<del>4.5 Specimen mount.....</del>	<del>8</del>
<del>4.6 Torque wrench.....</del>	<del>8</del>
4.5 DUT mount .....	8
5 Procedure.....	8
5.1 General.....	8
5.2 Preconditioning .....	8
5.3 Prepare <del>specimens</del> DUT .....	9
5.4 Initial visual examinations and measurements.....	9
5.5 Mount DUT .....	9
5.6 Apply load.....	9
5.7 Recovery .....	9
5.8 Final examination and measurements .....	9
6 Severity .....	10
7 Details to be specified and reported.....	10
Bibliography.....	11
Figure 1 – Example of test apparatus.....	7
Table 1 – Recommended severity values .....	10

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

---

**FIBRE OPTIC INTERCONNECTING  
DEVICES AND PASSIVE COMPONENTS –  
BASIC TEST AND MEASUREMENT PROCEDURES –****Part 2-6: Tests – Tensile strength of coupling mechanism****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 organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization 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.
- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. 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 61300-2-6:2010. 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 61300-2-6 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 2010. This edition constitutes a technical revision.

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

- a) addition of normative references;
- b) modification of the details to be specified;
- c) addition of optical monitoring.

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

Draft	Report on voting
86B/4808/FDIS	86B/4825/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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

A 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 document will remain unchanged until the stability date indicated on the IEC website under [webstore.iec.ch](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

**IMPORTANT – The "colour inside" logo on the cover page of this document 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 – BASIC TEST AND MEASUREMENT PROCEDURES –

## Part 2-6: Tests – Tensile strength of coupling mechanism

### 1 Scope

This part of IEC 61300 describes a test to ensure the coupling mechanism of a connector set or connector and device combination withstands the axial loads likely to be applied during normal service, and that the optical performance remains within the given specifications during this test.

### 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 61300-3-1, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-1: Examinations and measurements – Visual examination*

IEC 61300-3-3, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-3: Examinations and measurements – Active monitoring of change in attenuation and return loss*

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

### ~~3 General~~

~~A tensile load is smoothly applied to a mated connector set or connector and device combination in a direction that will separate the components. The load is normally applied between the connector plug and the adapter or between the connector plug and the device being tested.~~

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61300-1 apply.

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

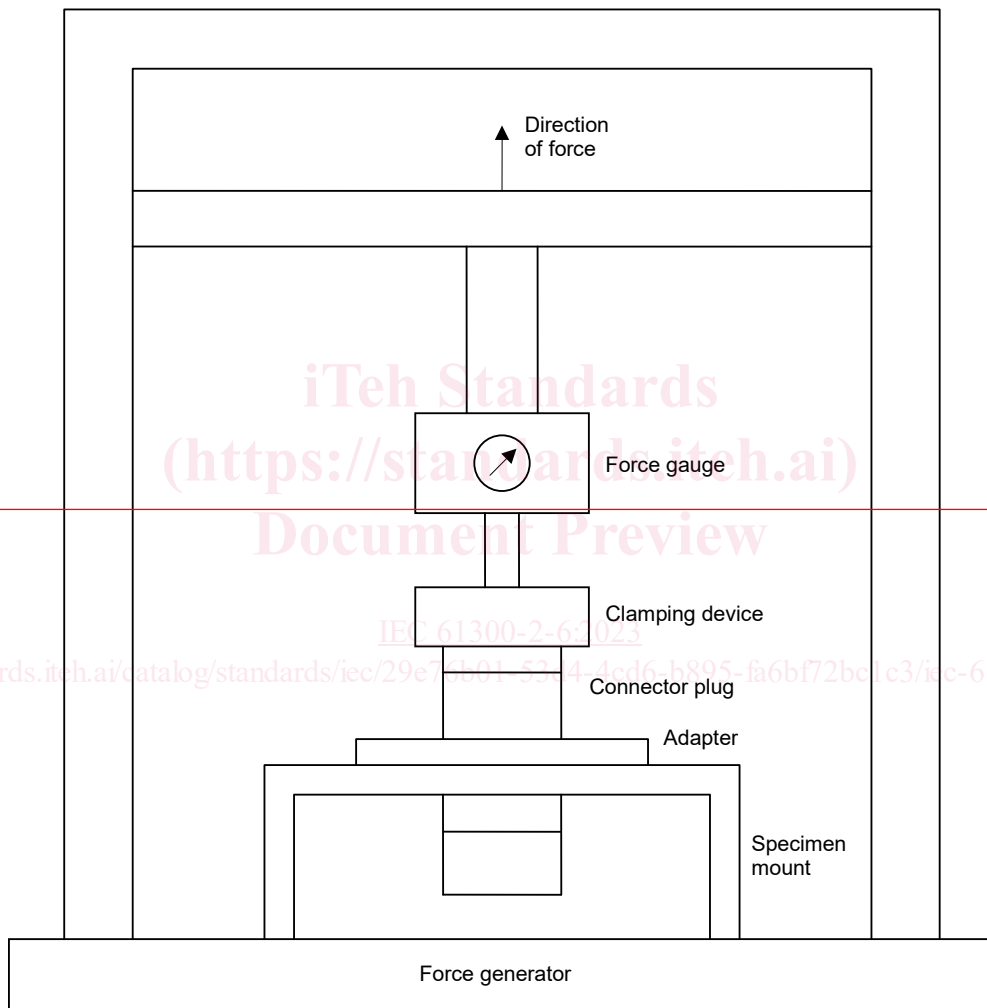
- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

## 4 Apparatus

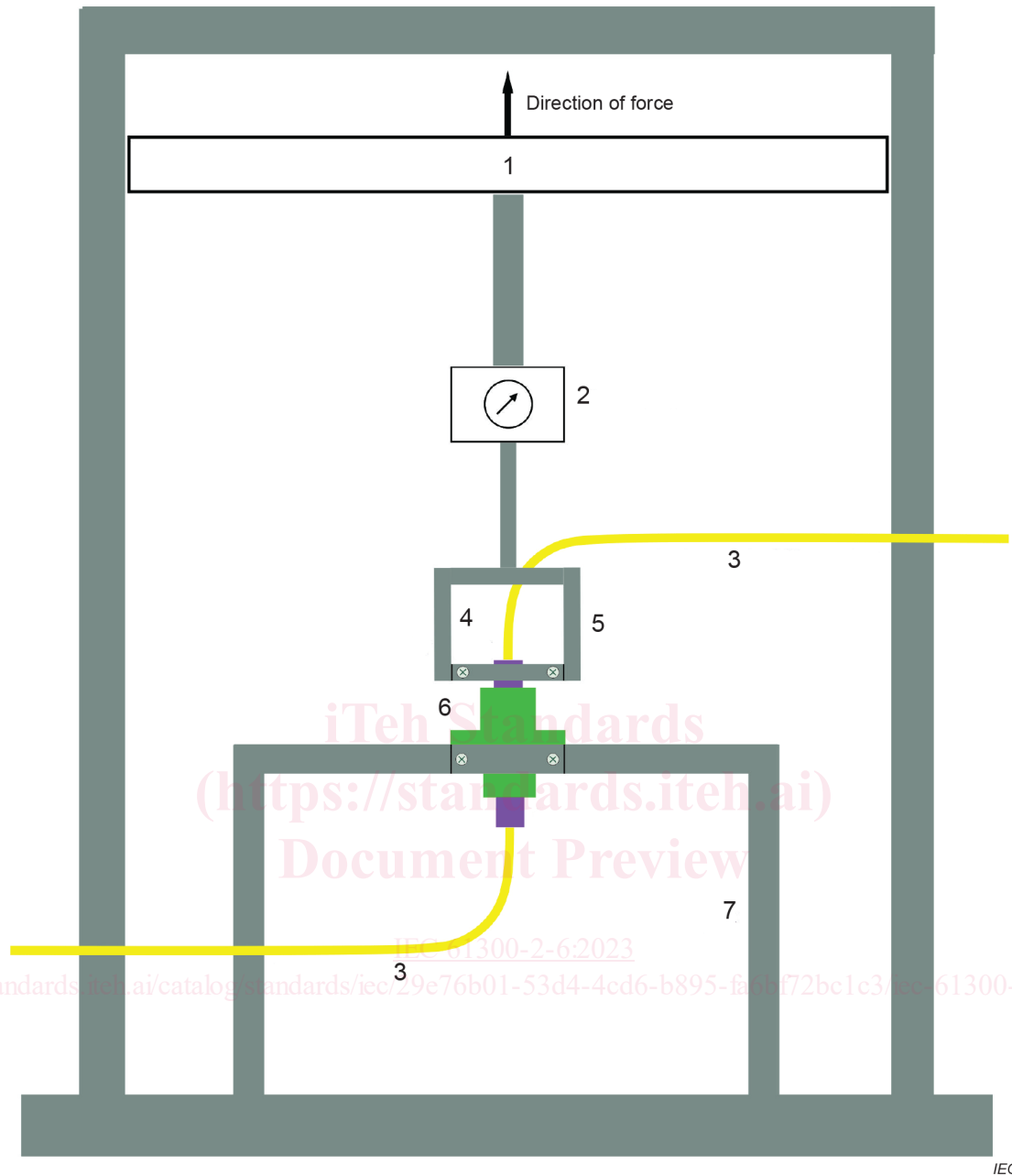
### 4.1 General

The test apparatus shall be capable of applying an axial load ~~between a connector plug or coupling mechanism and an adapter or device~~ in a direction that separates the components. The tensile load is smoothly applied to the device under test (DUT) that consists of a mated connector pair or connector and device combination.

An example of a test apparatus is shown in Figure 1. Some or all the following apparatus components are required.





**Key**

- 1 force generator
- 2 force gauge
- 3 monitoring optical cable
- 4 connector plug
- 5 clamping device
- 6 adaptor or connector receptacles
- 7 DUT mount

**Figure 1 – Example of test apparatus**

#### 4.2 Force generator

The force generator ~~may~~ shall be ~~any device or apparatus~~ capable of smoothly applying the specified force at the specified rate.

### 4.3 Force gauge

A force gauge ~~of specified accuracy~~ shall be used to measure the axial force applied to the DUT.

### 4.4 Clamping device

A suitable clamping device shall be used to ~~couple~~ transmit the force from the force generator to the connector plug or coupling mechanism. ~~Care shall be taken~~ Ensure that, in the design and use of the clamping device ~~to ensure that~~, it does not apply compressive forces which ~~might~~ can influence the mechanical performance of the connector plug or coupling mechanism, and allows mating the connectors for optical monitoring. For connector types with a de-latching mechanism (e.g. SC, MPO) a particular design shall be used in order to clamp the inner part of these connectors as the axial load cannot be applied directly to the outer body which de-latches the connector plug. Alternatively, a mandrel wrap on the cable may be used. However, the mandrel wrap shall be of sufficient diameter to not cause additional attenuation. If a mandrel wrap on the cable is used, the cable shall be reinforced cable. The distance between the rearmost point of the cable fixing component of the DUT and the centre point of the mandrel shall be between 200 mm and 300 mm. If a failure occurs while utilizing the alternate mandrel wrap method, the failure should be investigated to ensure the failure was due to the latching mechanism.

### ~~4.5 Specimen mount~~

~~Mount the specimen according to normal mounting procedures.~~

### ~~4.6 Torque wrench~~

~~A torque wrench may be required to assemble screw type connectors in accordance with the manufacturer's instructions.~~

### 4.5 DUT mount

The mounting feature shall provide rigid fixing of the DUT and give enough clearance for plug connection. The bend radius of the associated monitoring optical fibre cables shall be large enough to avoid compromising the optical results.

## 5 Procedure

### 5.1 General

Mount the DUT according to normal mounting procedures. A tensile load is smoothly applied to a mated connector set or connector and device combination in a direction that will act to separate the components. The load is applied between the connector plug through the clamping device and the adaptor or the device being tested.

Unless otherwise specified, the test shall be performed at the standard atmospheric conditions specified in IEC 61300-1.

### 5.2 Preconditioning

~~Unless otherwise specified, pre-condition each prepared specimen for 2 h at the standard test conditions specified in IEC 61300-1.~~

Precondition all parts of each DUT for minimum 2 h at the standard atmospheric conditions.

### 5.3 Prepare ~~specimens~~ DUT

~~Mate~~ Assemble all parts of the ~~specimens~~ DUT according to the manufacturer's instructions. For screw type couplings, ~~use~~ a torque wrench may be used to ensure that the couplings are tightened to the proper torque value.

### 5.4 Initial visual examinations and measurements

~~Complete initial examinations and measurements on the specimen shall be made as required by the relevant specification. Visual examination shall be done according to IEC 61300-3-1.~~

Visually examine each DUT and its components in accordance with IEC 61300-3-1.

Measure the initial optical performance of each DUT as required by the relevant specification.

### 5.5 Mount DUT

Securely mount one part of the DUT, ~~usually~~ the adaptor with connector ~~adapter, switch, attenuator, etc.~~ plug or the device with connector receptacle to the stationary portion of the test fixture. ~~Fix~~ Mount the other part of the DUT, usually the connector plug or coupling mechanism, to the movable portion of the force generator attached clamping device or the mandrel.

Make sure the monitoring optical fibre cables connected for optical monitoring do not interfere with the test equipment and do not present bending or tension that can influence the results of the active optical monitoring.

Start the monitoring of the optical performance according to IEC 61300-3-3 and make a measurement of the optical performance before applying the load.

### 5.6 Apply load

Smoothly apply the tensile load, as recommended in Table 1 ~~or the specified rate, up to the specified value and specified duration.~~ Meanwhile, take the optical measurements at the interval and wavelengths required by the relevant IEC 61753 performance standard.

After the load is applied for the specified duration, remove the tensile load from the DUT.

### 5.7 Recovery

Allow the DUT to remain under standard atmospheric conditions for at least 1 min, as defined in IEC 61300-1, unless otherwise specified in the relevant IEC 61753 performance standard.

### 5.8 Final examination and measurements

~~Remove the tensile load from the specimen and the specimen from the test mounting. Unless otherwise specified, visually examine the specimen and its component parts in accordance with IEC 61300-3-1. Check for evidence of cracking, permanent deformation or other damage which might impair its function, and against any other pass/fail criteria specified in the relevant specification.~~

After the change of the optical performance according to IEC 61300-3-3 is measured and the tensile load is removed, stop the monitoring of the optical performance.

Remove the DUT from the DUT mount. Measure the final optical performance as required by the relevant IEC 61753 performance standard.

Visually examine each DUT and its component parts in accordance with IEC 61300-3-1. Check for evidence of cracking, permanent deformation or other damage which might impair its