

INTERNATIONAL
STANDARD

IEC
CEI

NORME
INTERNATIONALE

61300-2-51

First edition
Première édition
2007-06

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

Part 2-51:

Tests –

**Fibre optic connector test for
transmission with applied tensile load –
Singlemode and multimode**

[IEC 61300-2-51:2007](https://standards.iteh.ai/catalog/standards/sist/0c2f664e-0799-4263-bb73-492f35482982/iec-61300-2-51-2007)

<https://standards.iteh.ai/catalog/standards/sist/0c2f664e-0799-4263-bb73-492f35482982/iec-61300-2-51-2007>

**Dispositifs d'interconnexion et
composants passifs à fibres optiques –
Méthodes fondamentales d'essais et de mesures –**

Partie 2-51:

Essais –

**Essai des connecteurs à fibres
optiques en transmission lorsqu'une
charge de traction est appliquée –
Unimodal et multimodal**



Reference number
Numéro de référence
IEC/CEI 61300-2-51:2007



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2007 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.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de la CEI ou du Comité national de la CEI du pays du demandeur.

Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: 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 corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub

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 It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch
Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00

A propos de la CEI

La Commission Electrotechnique Internationale (CEI) est la première organisation mondiale qui élabore et publie des normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications CEI

Le contenu technique des publications de la CEI est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

- Catalogue des publications de la CEI: www.iec.ch/searchpub/cur_fut-f.htm

Le Catalogue en-ligne de la CEI vous permet d'effectuer des recherches en utilisant différents critères (numéro de référence, texte, comité d'études,...). Il donne aussi des informations sur les projets et les publications retirées ou remplacées.

- Just Published CEI: www.iec.ch/online_news/justpub

Restez informé sur les nouvelles publications de la CEI. Just Published détaille deux fois par mois les nouvelles publications parues. Disponible en-ligne et aussi par email.

- Service Clients: www.iec.ch/webstore/custserv/custserv_entry-f.htm

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions, visitez le FAQ du Service clients ou contactez-nous:

Email: csc@iec.ch
Tél.: +41 22 919 02 11
Fax: +41 22 919 03 00

INTERNATIONAL
STANDARD

IEC
CEI

NORME
INTERNATIONALE

61300-2-51

First edition
Première édition
2007-06

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

Part 2-51:

Tests –

**Fibre optic connector test for
transmission with applied tensile load –
Singlemode and multimode**

<https://standards.iteh.ai/catalog/standards/sist/0c2f664e-0799-4263-bb73-492f35482982/iec-61300-2-51-2007>

**Dispositifs d'interconnexion et
composants passifs à fibres optiques –
Méthodes fondamentales d'essais et de mesures –**

Partie 2-51:

Essais –

**Essai des connecteurs à fibres
optiques en transmission lorsqu'une
charge de traction est appliquée –
Unimodal et multimodal**



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE
CODE PRIX

H

*For price, see current catalogue
Pour prix, voir catalogue en vigueur*

CONTENTS

FOREWORD.....	3
1 Scope.....	5
2 Normative references.....	5
3 General description.....	5
4 Apparatus.....	5
5 Procedure.....	7
5.1 General.....	7
5.2 Preparation of specimen.....	7
5.3 Preconditioning.....	7
5.4 Initial measurements.....	7
5.5 Test method.....	7
5.6 Recovery.....	8
5.7 Final measurements.....	8
6 Details to be specified.....	8
Figure 1 – Test apparatus for transmission with applied tensile load.....	6
Figure 2 – Application of the load in the case of duplex cordage.....	6
Table 1 – Preferred tensile loads and angles for transmission with applied load.....	7

iteh STANDARD PREVIEW
(standards.iteh.ai)
<https://standards.iteh.ai/catalog/standards/sist/0c2f664e-0799-4263-bb73-492f35482982/iec-61300-2-51-2007>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

**Part 2-51: Tests – Fibre optic connector test for transmission
with applied tensile load – Singlemode and multimode**

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 provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 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.

International Standard IEC 61300-2-51 has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics

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

FDIS	Report on voting
86B/2510/FDIS	86B/2544/RVD

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

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

A list of all parts of 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 maintenance result 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.

The contents of the corrigendum of January 2015 have been included in this copy.

NOTICE

This document contains material that is Copyright © 2006, Telcordia Technologies, Inc. ("Telcordia"). All rights reserved.

The reader is advised that this IEC document and Telcordia source(s) may differ, and the context and use of said material in this IEC document may differ from that of Telcordia. TELCORDIA MAKES NO REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, WITH RESPECT TO THE SUFFICIENCY, ACCURACY, OR UTILITY OF ANY INFORMATION OR OPINION CONTAINED HEREIN. ANY USE OF OR RELIANCE UPON SAID INFORMATION OR OPINION IS AT THE RISK OF THE USER. TELCORDIA SHALL NOT BE LIABLE FOR ANY DAMAGE OR INJURY INCURRED BY ANY PERSON ARISING OUT OF THE SUFFICIENCY, ACCURACY, OR UTILITY OF ANY INFORMATION OR OPINION CONTAINED HEREIN.

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

Part 2-51: Tests – Fibre optic connector test for transmission with applied tensile load – Singlemode and multimode

1 Scope

This part of IEC 61300 describes a test to quantitatively assess the capability of fibre optic connector terminated fibre assemblies to withstand static tensile loads without uncoupling of the connector, physical damage to the assembly or degradation of optical performance. This test is intended to apply to fibre assemblies using any of the following: Media type 1: reinforced jacketed cordage of any diameter, Media type 2: cable with 900 µm buffer coating that may or may not be reinforced or Media type 3: connectors terminating fibre with 250 µm coating.

2 Normative references

The following referenced documents are indispensable for the application 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*

<https://standards.iteh.ai/catalog/standards/sist/0c2f664e-0799-4263-bb73-492f35482982/iec-61300-2-51-2007>

IEC 61300-3-1, *Fiber 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, *Fiber optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-6: Examinations and measurements – Return Loss*

3 General description

Static loads are applied in this test to the fibre or cable of the terminated assembly while the mated connector assembly is held fixed by the adapter. The loads are applied in increments parallel to and at angles to the connector axis and held for a fixed time. The sample is measured for attenuation and return loss before application of the loads, during the application of the load at each combination of load and angle and at the end of the test after the sequence of load and angle combinations have been applied.

4 Apparatus

The apparatus for this test is shown in Figure 1.

Fibre/cable tension is applied with weights through a capstan. The patchcord is flexed at the point of entrance to the connector plug by rotating the test arm. The position of the connector assembly along the test arm should be adjusted so that, when the arm is at 90°, the centerline

along which the fibre/cable hangs, passes through the test point. The fixture is to be designed to allow the capstan to be rotated about the axis of the section of fibre/cable under tension.

The bracket on which the adapter is mounted is to have provision for mounting the adapter at one of the three specified angles from 0° to ±135° to the axis of the connector.

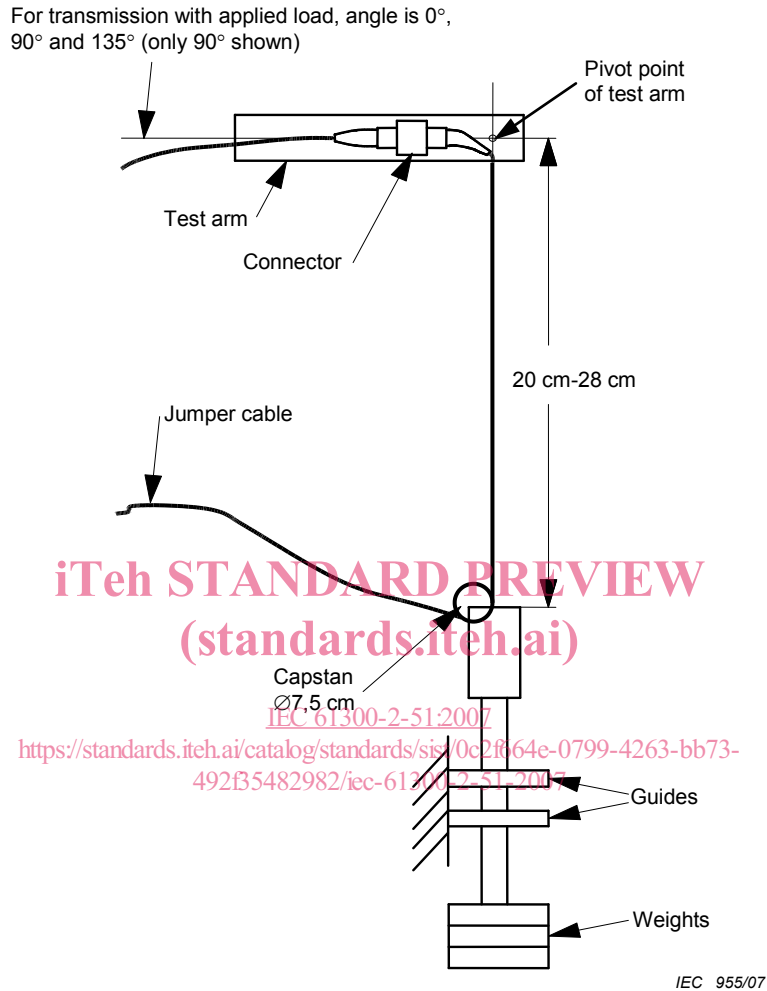


Figure 1 – Test apparatus for transmission with applied tensile load

In the case of duplex cordage, the loads shall not be doubled and the cordage shall be bent in the minor axis direction as shown in Figure 2.

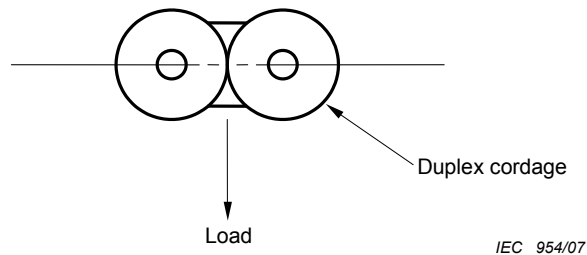


Figure 2 – Application of the load in the case of duplex cordage

5 Procedure

5.1 General

The following procedure shall be used in this test. The combinations of loads and angles to be applied at a rate of 5 N/s are those designated in the relevant specification. If these are not specified, the preferred loads and angles given in Table 1 may be used. For small form factor connectors the preferred loads at the 90° and 135° tests are 2/3 those specified in Table 1.

All optical measurements are made at singlemode 1 310 nm and 1 550 nm wavelengths and multimode 850 nm and 1 300 nm wavelengths. Optional: singlemode at 1 625 nm, or as specified for the appropriate technology (for example, multimode at 650 nm).

5.2 Preparation of specimen

Prepare and clean specimen in accordance with the manufacturer's instructions.

5.3 Preconditioning

Pre-condition the specimen for 2 h at the standard test conditions as defined in IEC 61300-1, unless otherwise specified in the relevant specification.

5.4 Initial measurements

Complete initial examinations and measurements on the specimen as required by the relevant specification.

5.5 Test method

5.5.1 Measure attenuation and return loss as described in IEC 61300-3-4 and IEC 61300-3-6 respectively.

5.5.2 Mount the sample in the apparatus shown in Figure 1.

5.5.3 Apply the combination of loads and angles as specified in the relevant specification beginning with 0° progressing from lowest to highest load for the appropriate media type, then repeat in order for the other angles. At each combination of load and angle, after equilibrium is reached, measure attenuation and return loss during the test, record whether or not the connector uncouples, record whether or not damage occurs to the assembly, and, if so, record a description of the damage in accordance with IEC 61300-3-1. Preferred loads and angles are given in Table 1.

Table 1 – Preferred tensile loads and angles for transmission with applied load

Media Type 1, reinforced cordage			
Load	0°	90°	135°
2,4 N	X	X	X
6,9 N	X	X	
14,7 N	X	X	
19,6 N	X	X	
Media Type 2, 900 µm buffered coated fibre			
Load	0°	90°	135°
2,4 N	X	X	X
6,9 N	X	X	
Media Type 3, fibre with 250 µm coating			

Load	0°	90°	135°
2,4 N	X	X	
4,8 N	X	X	
X = Preferred loads for the angles			

NOTE For 90° and 135° tests, the small form factor connector preferred load is 2/3 the value shown in Table 1.

5.6 Recovery

The device under test shall recover for 20 s after the sequence of load and angle combinations have been applied before the final optical measurements are made.

5.7 Final measurements

On completion of the test, remove all fixtures and make final measurements, as defined by the relevant specification, to ensure that there is no permanent damage to the specimen. The results of the final measurement shall be within the limit established in the relevant specification.

6 Details to be specified

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

- initial examinations and measurements and performance requirements;
- examinations, measurements and performance requirements during test;
- final examinations, measurements and performance requirements after the fibre assembly is removed from the apparatus; [IEC 61300-2-51:2007](https://standards.iteh.ai/catalog/standards/sist/0c28564e-0799-4263-bb73-492f35482982/iec-61300-2-51-2007)
- loads and angles applied at other than 0° if different from the preferred values; <https://standards.iteh.ai/catalog/standards/sist/0c28564e-0799-4263-bb73-492f35482982/iec-61300-2-51-2007>
- singlemode wavelengths 1 310 nm and 1 550 nm, optional 1 625 nm or as specified;
- multimode wavelength 850 nm and 1 300 nm, or as specified;
- deviation from test procedures.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[IEC 61300-2-51:2007](https://standards.iteh.ai/catalog/standards/sist/0c2f664e-0799-4263-bb73-492f35482982/iec-61300-2-51-2007)

<https://standards.iteh.ai/catalog/standards/sist/0c2f664e-0799-4263-bb73-492f35482982/iec-61300-2-51-2007>