

# INTERNATIONAL STANDARD

REDLINE VERSION

Guidance for the interpretation of OTDR backscattering traces for single-mode fibres

(<https://standards.iteh.ai>)  
Document Preview

[IEC TR 62316:2026](https://standards.iteh.ai/catalog/standards/iec/1d4b41b8-34ee-477e-bff5-d5f7b65537e7/iec-tr-62316-2026)

<https://standards.iteh.ai/catalog/standards/iec/1d4b41b8-34ee-477e-bff5-d5f7b65537e7/iec-tr-62316-2026>



**THIS PUBLICATION IS COPYRIGHT PROTECTED**  
**Copyright © 2026 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 It also gives information on projects, replaced and withdrawn publications.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, graphical symbols and the glossary. 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 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

<https://standards.iteh.ai/>

<https://standards.iteh.ai/catalog/standards/iec/1d4b41b8-34ee-477e-bff5-d5f7b65537e7/iec-tr-62316-2026>

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

## CONTENTS

FOREWORD .....	3
INTRODUCTION .....	5
1 Scope .....	6
2 Normative references .....	6
3 Terms, definitions and abbreviated terms .....	6
3.1 Terms and definitions .....	6
3.2 Abbreviated terms .....	6
4 Backscattering phenomenon .....	6
4.1 Rayleigh scattering .....	6
4.2 Fresnel reflections and dead zone fibres .....	7
5 Measurement of the backscattered power (OTDR) .....	7
5.1 General .....	7
5.2 Representation of the backscattered power .....	8
5.3 Noise and perturbations .....	8
6 Interpretation of a backscattering trace .....	9
6.1 General .....	9
6.2 Launch cord .....	9
6.3 Tail cord .....	10
6.4 Unidirectional trace .....	10
6.4.1 General .....	10
6.4.2 Slope as the attenuation coefficient of a fibre .....	10
6.4.3 Impurity and discontinuity .....	11
6.4.4 Pulse width .....	11
6.4.5 Polarization effects .....	12
6.5 Bi-directional trace .....	12
6.5.1 General .....	12
6.5.2 Attenuation uniformity .....	14
6.5.3 MFD uniformity .....	16
6.6 Splice loss evaluation .....	17
6.6.1 General .....	17
6.6.2 Event measurement methods .....	17
6.6.3 Apparent losers and gainers .....	18
6.6.4 Example of apparent splice loss evaluation for uni-directional OTDR measurements .....	22
7 Uncertainties, deviation and resolution .....	26
7.1 General .....	26
7.2 Attenuation coefficient measurements .....	26
7.3 Fault locations .....	26
Bibliography .....	29
Figure 1 – Unidirectional OTDR trace showing splice and/or macrobend loss .....	9
Figure 2 – Idealized unidirectional OTDR traces corresponding to a non-reflective splice between two fibres .....	17
Figure 3 – OTDR traces for similar or different fibre types with either different MFD and/or different backscatter properties, or both .....	19

Figure 4 – Loss in unidirectional OTDR measurements as function of the MFD difference between two spliced fibres ..... 20

Figure 5 – Theoretical power through splice loss due to MFD difference (with  $\omega_1 \Omega_1 = 9 \mu\text{m}$ ) ..... 21

Figure 6 – Apparent cumulative unidirectional backscattering mismatch distribution for six splice combinations of **B1.3B-652** and **B6B-657** reported in Table 1 ..... 25

Figure 7 – Schematic drawing of a fibre with two consecutive defects 1 and 2 ..... 27

Table 1 – Summary for six fibre splice combinations of **B1.3B-652** and **B6B-657** based on popular 1 310 nm MFD fibre distributions ..... 23

**iTeh Standards**  
**(<https://standards.iteh.ai>)**  
**Document Preview**

[IEC TR 62316:2026](#)

<https://standards.iteh.ai/catalog/standards/iec/1d4b41b8-34ee-477e-bff5-d5f7b65537e7/iec-tr-62316-2026>

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**Guidance for the interpretation of OTDR backscattering traces for single-mode fibres**

## 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 TR 62316:2017. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC TR 62316 has been prepared by subcommittee 86A: Fibres and cables, of IEC technical committee 86: Fibre optics. It is a Technical Report.

This fourth edition cancels and replaces the third edition published in 2017. This edition constitutes a technical revision.

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

- a) update of the fibre types;
- b) addition of information as regards attenuation uniformity.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
86A/2621/DTR	86A/2643/RVDTR

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

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](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).

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.

<https://standards.iteh.ai/>

<https://standards.iteh.ai/catalog/standards/iec/1d4b41b8-34ee-477e-bff5-d5f7b65537e7/iec-tr-62316-2026>

## INTRODUCTION

This document is a guide for the interpretation of OTDR backscattering traces for single mode fibres. It does not provide any normative reference, but adequate measurement and test procedures for attenuation (see IEC 60793-1-40 [1]<sup>1</sup> and IEC 61280-4-2 [2]), connector inspection (see IEC 61300-3-35 [3]), as well as for calibration of single mode fibre OTDRs (see IEC 61746-1 [4]) that are applied to ensure the validity of such measurements.

# iTeh Standards (<https://standards.iteh.ai>) Document Preview

[IEC TR 62316:2026](https://standards.iteh.ai/catalog/standards/iec/1d4b41b8-34ee-477e-bff5-d5f7b65537e7/iec-tr-62316-2026)

<https://standards.iteh.ai/catalog/standards/iec/1d4b41b8-34ee-477e-bff5-d5f7b65537e7/iec-tr-62316-2026>

---

<sup>1</sup> Numbers in square brackets refer to the Bibliography