ICS 33.180.01 SLOVENSKÁ TECHNICKÁ NORMA December 2022

STN	**Skúšobné postupy na optické vláknové komunikačné podsystémy Časť 4-3: Inštalované pasívne optické siete Meranie tlmenia a optických strát odrazom**	**STN EN IEC 61280-4-3 35 9270**

Fibre optic communication subsystem test procedures - Part 4-3: Installed passive optical networks - Attenuation and optical return loss measurements

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 11/22

Obsahuje: EN IEC 61280-4-3:2022, IEC 61280-4-3:2022

obsahuje farebné strany

135870

Úrad pre normalizáciu, metrológiu a skúšobníctvo Slovenskej republiky, 2022
Slovenská technická norma a technická normalizačná informácia je chránená zákonom č. 60/2018 Z. z. o technickej normalizácii.

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 61280-4-3

September 2022

ICS 33.180.01

English Version

Fibre optic communication subsystem test procedures - Part 4-3: Installed passive optical networks - Attenuation and optical return loss measurements (IEC 61280-4-3:2022)

Procédures d'essai des sous-systèmes de télécommunications fibroniques - Partie 4-3: Installations de réseau optique passif - Mesures de l'affaiblissement et de l'affaiblissement de réflexion optique (IEC 61280-4-3:2022)

Prüfverfahren für Lichtwellenleiter-Kommunikationsuntersysteme - Teil 4-3: Installierte passive optische Netze - Messung von Dämpfung und optischer Rückflussdämpfung (IEC 61280-4-3:2022)

This European Standard was approved by CENELEC on 2022-09-02. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

© 2022 CENELEC All rights of exploitation in any form and by any means reserved worldwide for CENELEC Members.

Ref. No. EN IEC 61280-4-3:2022 E

European foreword

The text of document 86C/1749A/CDV, future edition 1 of IEC 61280-4-3, prepared by SC 86C "Fibre optic systems and active devices" of IEC/TC 86 "Fibre optics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61280-4-3:2022.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2023-06-02
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2025-09-02

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 61280-4-3:2022 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60875-1:2015 NOTE Harmonized as EN 60875-1:2015 (not modified)

IEC 61280-1-1 NOTE Harmonized as EN 61280-1-1

IEC 61746-2 NOTE Harmonized as EN 61746-2

IEC 61755-3-1[1] NOTE Harmonized as EN 61755-3-1[2]

IEC 61755-3-2[3] NOTE Harmonized as EN 61755-3-2[4]

IEC 62074-1:2014 NOTE Harmonized as EN 62074-1:2014 (not modified)

[1] Under preparation. Stage at the time of publication: IEC 61755-3-1/CD:2022.

[2] Under preparation. Stage at the time of publication: prEN IEC 61755-3-1:2020.

[3] Under preparation. Stage at the time of publication: IEC 61755-3-2/CD:2022.

[4] Under preparation. Stage at the time of publication: prEN IEC 61755-3-2:2020.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60793-2-50	-	Optical fibres - Part 2-50: Product specifications - Sectional specification for class B single-mode fibres	EN IEC 60793-2-50	-
IEC 61280-1-3	-	Fibre optic communication subsystem test procedures - Part 1-3: General communication subsystems - Measurement of central wavelength, spectral width and additional spectral characteristics	EN IEC 61280-1-3	-
IEC 61280-4-2	-	Fibre-optic communication subsystem test procedures - Part 4-2: Installed cable plant - Single-mode attenuation and optical return loss measurement	EN 61280-4-2	-
IEC/TR 61282-14	2019	Fibre optic communication system design guidelines - Part 14: Determination of the uncertainties of attenuation measurements in fibre plants	-	-
IEC 61300-3-35	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-35: Examinations and measurements - Visual inspection of fibre optic connectors and fibre-stub transceivers	EN 61300-3-35	-
IEC 61315	-	Calibration of fibre-optic power meters	EN IEC 61315	-
IEC 61746-1	2009	Calibration of optical time-domain reflectometers (OTDR) - Part 1: OTDR for single mode fibres	EN 61746-1	2011
			+ AC	2014
IEC 61753-031-2	-	Fibre optic interconnecting devices and passive components - Performance standard - Part 031-2: Non-connectorized single-mode 1 × N and 2 × N non-wavelength-selective branching devices for Category C - Controlled environment	EN 61753-031-2	-

EN IEC 61280-4-3:2022 (E)

IEC 61753-031-3	-	Fibre optic interconnecting devices and passive components - Performance standard - Part 031-3: Non-connectorized single-mode 1×N and 2×N non-wavelength-selective branching devices for Category U - Uncontrolled environment	EN 61753-031-3	-
IEC 61753-031-6	-	Fibre optic interconnecting devices and passive components - Performance standard - Part 031-6: Non-connectorized single-mode 1×N and 2×N non-wavelength-selective branching devices for Category O - Uncontrolled environment	EN 61753-031-6	-
IEC 61753-1	-	Fibre optic interconnecting devices and passive components - Performance standard - Part 1: General and guidance	EN IEC 61753-1	-
IEC/TR 62627-01	-	Fibre optic interconnecting devices and passive components - Part 01: Fibre optic connector cleaning methods	-	-

IEC 61280-4-3

Edition 1.0 2022-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Fibre optic communication subsystem test procedures – Part 4-3: Installed passive optical networks – Attenuation and optical return loss measurements

Procédures d'essai des sous-systèmes de télécommunications fibroniques – Partie 4-3: Installations de réseau optique passif – Mesures de l'affaiblissement et de l'affaiblissement de réflexion optique

IEC 61280-4-3:2022-07(en-fr)

THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2022 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 l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

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

Tel.: +41 22 919 02 11
info@iec.ch
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
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
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
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - 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
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.

A propos de l'IEC
La Commission Electrotechnique Internationale (IEC) 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 IEC
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC - webstore.iec.ch/advsearchform
La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, …). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished
Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc
Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org
Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

IEC 61280-4-3

Edition 1.0 2022-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Fibre optic communication subsystem test procedures – Part 4-3: Installed passive optical networks – Attenuation and optical return loss measurements

Procédures d'essai des sous-systèmes de télécommunications fibroniques – Partie 4-3: Installations de réseau optique passif – Mesures de l'affaiblissement et de l'affaiblissement de réflexion optique

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 33.180.01 ISBN 978-2-8322-4801-0

Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

® Registered trademark of the International Electrotechnical Commission
Marque déposée de la Commission Electrotechnique Internationale

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

FIBRE OPTIC COMMUNICATION SUBSYSTEM TEST PROCEDURES –

Part 4-3: Installed passive optical networks – Attenuation and optical return loss measurements

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) 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.

IEC 61280-4-3 has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics. It is an International Standard.

This publication contains an attached file titled "Supplemental Data" in the form of an Excel spread sheet. This file is intended to be used as a complement and does not form an integral part of the standard.

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

Draft	Report on voting
86C/1749A/CDV	86C/1787/RVC

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 parts in the IEC 61280 series, published under the general title *Fibre optic communication subsystem test 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,
- replaced by a revised edition, or
- amended.

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.

INTRODUCTION

IEC has developed a large set of standards for measurement of fibre optic cable plants. These standards are applicable to passive optical networks (PONs) if specifics of these networks are known and understood. This document provides dedicated procedures for attenuation measurements in PONs as well as additional information.

For the purpose of this document, a PON is a point-to-multipoint network that includes optical line terminals (OLTs), optical network terminals (ONTs), and an optical fibre infrastructure that is entirely passive and is represented by a single-rooted point-to-multipoint tree of optical fibres with splitters, combiners, filters, and other passive components.

PONs are commonly used in fibre-to-the-home (FTTH) and fibre-to-the-building (FTTB) optical access networks (OAN). In addition, the measurement principles described in this document may also apply to PONs used in other applications, like passive optical local area networks (PO-LANs).

FIBRE OPTIC COMMUNICATION SUBSYSTEM TEST PROCEDURES –

Part 4-3: Installed passive optical networks – Attenuation and optical return loss measurements

1 Scope

This part of IEC 61280 describes the measurement of attenuation, optical return loss and optical power in installed passive optical networks (PONs) using single-mode fibre**.**

This document specifies two methods for measuring the attenuation before activation of the PON:

- method A: one-cord method using a light source and a power meter (LSPM);
- method B: optical time-domain reflectometer (OTDR) method in upstream direction only, with reduction of uncertainties due to the variation of backscatter coefficient.

In addition, method C, which is described in informative Annex C, provides an estimate of the attenuation after partial activation of the PON by using a U band filtered optical time-domain reflectometer (FOTDR) in an upstream direction.

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 60793-2-50, *Optical fibres – Part 2-50: Product specifications – Sectional specification for class B single-mode fibres*

IEC 61280-1-3, *Fibre-optic communication subsystem test procedures – Part 1-3: General communication subsystems – Measurement of central wavelength, spectral width and additional spectral characteristics*

IEC 61280-4-2, *Fibre-optic communication subsystem test procedures – Part 4-2: Installed cable plant – Single-mode attenuation and optical return loss measurement*

IEC TR 61282-14:2019, *Fibre optic communication system design guidelines – Part 14: Determination of the uncertainties of attenuation measurements in fibre plants*

IEC 61300-3-35, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-35: Examinations and measurements – Visual inspection of fibre optic connectors and fibre-stub transceivers*

IEC 61315, *Calibration of fibre-optic power meters*

IEC 61746-1:2009, *Calibration of optical time-domain reflectometers (OTDR) – Part 1: OTDR for single-mode fibres*

IEC 61753-031-2, *Fibre optic interconnecting devices and passive components – Performance standard – Part 031-2: Non-connectorized single-mode 1 × N and 2 × N non-wavelength-selective branching devices for Category C − Controlled environment*

IEC 61753-031-3, *Fibre optic interconnecting devices and passive components – Performance standard – Part 031-3: Non-connectorized single-mode 1 × N and 2 × N non-wavelength-selective branching devices for Category U − Uncontrolled environment*

IEC 61753-031-6, *Fibre optic interconnecting devices and passive components − Performance standard − Part 031-6: Non-connectorized single-mode 1 × N and 2 × N non-wavelength-selective branching devices for Category O − Uncontrolled environment*

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

IEC TR 62627-01, *Fibre optic interconnecting devices and passive components – Part 01: Fibre optic connector cleaning methods*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN