

STN	Bezpečnosť strojových zariadení Elektrosenzitívne ochranné zariadenia Časť 3: Osobitné požiadavky na aktívne optoelektronické ochranné zariadenia citlivé na rozptylové odrazy (AOPDDR)	STN EN IEC 61496-3 33 2205
------------	--	--

Safety of machinery - Electro-sensitive protective equipment - Part 3: Particular requirements for active opto-electronic protective devices responsive to diffuse Reflection (AOPDDR)

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. 05/19

Obsahuje: EN IEC 61496-3:2019, IEC 61496-3:2018

Oznámením tejto normy sa od 11.01.2022 ruší
STN P CLC/TS 61496-3 (33 2205) zo septembra 2008

128687

EUROPEAN STANDARD

EN IEC 61496-3

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2019

ICS 13.110; 31.260

Supersedes CLC/TS 61496-3:2008

English Version

**Safety of machinery - Electro-sensitive protective equipment -
Part 3: Particular requirements for active opto-electronic
protective devices responsive to diffuse Reflection (AOPDDR)
(IEC 61496-3:2018)**

Sécurité des machines - Equipements de protection électro-sensibles - Partie 3: Exigences particulières pour les équipements utilisant des dispositifs protecteurs optoélectroniques actifs sensibles aux réflexions diffuses (AOPDDR)
(IEC 61496-3:2018)

Sicherheit von Maschinen - Berührungslos wirkende Schutzeinrichtungen - Teil 3: Besondere Anforderungen an aktive optoelektronische diffuse Reflexion nutzende Schutzeinrichtungen (AOPDDR)
(IEC 61496-3:2018)

This European Standard was approved by CENELEC on 2019-01-11. 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey 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

EN IEC 61496-3:2019 (E)**European foreword**

The text of document 44/831/FDIS, future edition 3 of IEC 61496-3, prepared by IEC/TC 44 "Safety of machinery - Electrotechnical aspects" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61496-3:2019.

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) 2019-10-11
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-01-11

This document supersedes CLC/TS 61496-3:2008.

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.

Endorsement notice

The text of the International Standard IEC 61496-3:2018 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:

The bibliography of IEC 61496-1:2012 applies, except as follows:

Addition:

IEC 60068-2-64:2008	NOTE	Harmonized as EN 60068-2-64:2008 (not modified)
IEC 60721-3-5:1997	NOTE	Harmonized as EN 60721-3-5:1997 (not modified)
IEC 61508-1:2010	NOTE	Harmonized as EN 61508-1:2010 (not modified)

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.

Clause 2 of IEC 61496-1:2012 applies, except as follows.

Addition:

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60068-2-14	-	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	-
IEC 60068-2-75	-	Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests	EN 60068-2-75	-
IEC TR 60721-4-5	-	Classification of environmental conditions - Part 4-5: Guidance for the correlation and transformation of environmental condition classes of IEC 60721-3 to the environmental tests of IEC 60068 - Ground vehicle installations	-	-
IEC 60825-1	2014	Safety of laser products - Part 1: Equipment classification and requirements	EN 60825-1	2014
-	-		EN 60825-1:2014/ AC:2017-06	
IEC 61496-1	2012	Safety of machinery - Electro-sensitive protective equipment - Part 1: General requirements and tests	EN 61496-1	2013
IEC 62471	-	Photobiological safety of lamps and lamp systems	EN 62471	-
ISO 13855	2010	Safety of machinery - Positioning of safeguards with respect to the approach speeds of parts of the human body	EN ISO 13855	2010
ISO 20471	2013	High-visibility clothing - Test methods and requirements	EN ISO 20471	2013



IEC 61496-3

Edition 3.0 2018-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Safety of machinery – Electro-sensitive protective equipment –
Part 3: Particular requirements for active opto-electronic protective devices
responsive to diffuse reflection (AOPDDR)**

**Sécurité des machines – Équipements de protection électro-sensibles –
Partie 3: Exigences particulières pour les équipements utilisant des dispositifs
protecteurs optoélectroniques actifs sensibles aux réflexions diffuses
(AOPDDR)**



THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2018 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 Central Office
 3, rue de Varembe
 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 corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

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 also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing 21 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

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.

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.

Catalogue IEC - webstore.iec.ch/catalogue

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

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 aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient 21 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

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 61496-3

Edition 3.0 2018-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Safety of machinery – Electro-sensitive protective equipment –
Part 3: Particular requirements for active opto-electronic protective devices
responsive to diffuse reflection (AOPDDR)**

**Sécurité des machines – Équipements de protection électro-sensibles –
Partie 3: Exigences particulières pour les équipements utilisant des dispositifs
protecteurs optoélectroniques actifs sensibles aux réflexions diffuses
(AOPDDR)**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 13.110; 31.260

ISBN 978-2-8322-6091-3

**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.**

CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references	9
3 Terms and definitions	9
4 Functional, design and environmental requirements	11
4.1 Functional requirements.....	11
4.2 Design requirements.....	12
4.3 Environmental requirements	22
5 Testing.....	25
5.1 General.....	25
5.2 Functional tests	26
5.3 Performance testing under fault conditions	36
5.4 Environmental tests	37
6 Marking for identification and for safe use	56
6.1 General.....	56
7 Accompanying documents	57
Annex A (normative) Optional functions of the ESPE	59
Annex B (normative) Catalogue of single faults affecting the electrical equipment of the ESPE, to be applied as specified in 5.3.....	65
Annex AA (informative) Examples of the use of an AOPDDR in different applications	66
AA.1 General.....	66
AA.2 Example of the use of an AOPDDR-2D on machinery.....	66
AA.3 Example of the use of an AOPDDR-2D on an automatic guided vehicle (AGV)	67
AA.4 Positioning of AOPDDR-3D in respect of parts of the human body	69
AA.5 Examples of the use of an AOPDDR	78
AA.6 Detection zone angled to the direction of approach – orthogonal approach	81
AA.7 Example for the calculation of the response time of an AOPDDR-2D.....	83
Annex BB (informative) Relationship between position accuracy and probability of detection.....	84
Bibliography.....	90
Figure 1 – Detection zone of an AOPDDR-2D	16
Figure 2 – Detection zone of an AOPDDR-3D	17
Figure 3 – AOPDDR used as a trip device with orthogonal approach (200 mm minimum detectable object size)	18
Figure 4 – AOPDDR used as a trip device with orthogonal approach (150 mm minimum detectable object size)	19
Figure 5 – Minimum diffuse reflectivity of materials	21
Figure 6 – Test piece intrusion into the detection zone for test.....	27
Figure 7 – Influence on detection capability by incandescent light – Example 1	31
Figure 8 – Influence on detection capability by incandescent light – Example 2	32
Figure 9 – Influence on detection capability by light reflected by the background	33

Figure 10 – Configuration for the endurance test – Example 1	34
Figure 11 – Configuration for the endurance test – Example 2	35
Figure 12 – Interference between two AOPDDR-3D of identical design (opposite arrangement)	47
Figure 13 – Interference between two AOPDDR-3D of identical design (parallel arrangement)	48
Figure 14 – Example of an emitting element of an AOPDDR	50
Figure 15 – Example of a receiver of an AOPDDR	50
Figure 16 – Influence on detection capability by background.....	52
Figure 17 – Multi-path reflection test (top view).....	53
Figure 18 – Multi-path reflection test (side view)	53
Figure A.1 – Reference boundary monitoring – Distribution of measurement values.....	62
Figure A.2 – Use of an AOPDDR with reference boundary monitoring.....	63
Figure A.3 – Use of an AOPDDR as parts of a body trip device.....	63
Figure AA.1 – Example of the use of an AOPDDR-2D on machinery	66
Figure AA.2 – Example of the use of an AOPDDR-2D on an AGV	68
Figure AA.3 – Minimum distance S – Example 1.....	71
Figure AA.4 – Overall minimum distance S_0 without tolerance zone – Example 1	72
Figure AA.5 – Overall minimum distance S_0 including tolerance zone – Example 1	73
Figure AA.6 – Minimum distance S – Example 2.....	74
Figure AA.7 – Overall minimum distance S_0 without tolerance zone – Example 2.....	75
Figure AA.8 – Overall minimum distance S_0 including tolerance zone – Example 2.....	75
Figure AA.9 – Application example for body detection of an AOPDDR-3D.....	77
Figure AA.10 – Limited distance	79
Figure AA.11 – Overlap.....	80
Figure AA.12 – Reference boundary monitoring – Distribution of measurement values	81
Figure AA.13 – AOPDDR-2D detection zone angled to the direction of approach – Orthogonal approach	82
Figure AA.14 – AOPDDR-3D detection zone angled to the direction of approach – Orthogonal approach	82
Figure BB.1 – Relationship between position accuracy and detection zone	84
Figure BB.2 – Relationship between position accuracy, detection zone and the probabilistic part of the tolerance zone – Example 1	85
Figure BB.3 – Relationship between position accuracy, detection zone and the probabilistic part of the tolerance zone – Example 2	86
Figure BB.4 – Relationship between position accuracy, detection zone and tolerance zone – Example 1	87
Figure BB.5 – Relationship between position accuracy, detection zone and tolerance zone – Example 2	88
Figure BB.6 – POD of a single measurement (logarithmic) for a MooM-evaluation with $1 \leq M \leq 50$	89
Figure BB.7 – POD of a single measurement for a MooM-evaluation with $1 \leq M \leq 50$ in relation to σ in the case of a normal distribution.....	89
Table 1 – Minimum tests required for the verification of detection capability requirements (see also 4.2.12.1).....	28

Table 2 – Overview of light interference tests..... 41

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SAFETY OF MACHINERY –
ELECTRO-SENSITIVE PROTECTIVE EQUIPMENT –****Part 3: Particular requirements for active opto-electronic protective
devices responsive to diffuse reflection (AOPDDR)**

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.

International Standard IEC 61496-3 has been prepared by IEC technical committee 44: Safety of machinery – Electrotechnical aspects.

This third edition cancels and replaces the second edition published in 2008. This edition constitutes a technical revision.

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

- a) extension of the scope from AOPDDR-2D to AOPDDR-3D;
- b) extension of the scope from Type 3 ESPE to Type 2 ESPE;
- c) implementation of requirements and test procedures for AOPDDR-3D and Type 2 ESPE;
- d) listing of reference boundary monitoring as an optional function of the ESPE;

- e) implementation of instructions for positioning of AOPDDR-3D in respect of parts of the human body;
- f) revised requirement for combinations of single faults with conditions for no failure to danger, see for example 4.2.2.4, last paragraph.

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

FDIS	Report on voting
44/831/FDIS	44/837/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.

This document is to be used in conjunction with IEC 61496-1:2012.

Where a particular clause or subclause of IEC 61496-1:2012 is not mentioned in this document, that clause or subclause applies as far as is reasonable. Where this document states "addition" or "replacement", the relevant text of IEC 61496-1:2012 is adapted accordingly. Clauses and subclauses which are additional to those of IEC 61496-1:2012 are numbered sequentially, following on the last available number in IEC 61496-1:2012. Where no available number exist, the additional subclauses are numbered starting from 101. Supplementary Annexes are entitled AA and BB.

A list of all parts in the IEC 61496 series, published under the general title *Safety of machinery – Electro-sensitive protective equipment*, 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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication 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

An electro-sensitive protective equipment (ESPE) is applied to machinery presenting a risk of personal injury. It provides protection by causing the machine to revert to a safe condition before a person can be placed in a hazardous situation.

This part of IEC 61496 supplements or modifies the corresponding clauses in IEC 61496-1 to specify particular requirements for the design, construction and testing of electro-sensitive protective equipment (ESPE) for the safeguarding of machinery, employing active opto-electronic protective devices responsive to diffuse reflection (AOPDDR) for the sensing function.

Each type of machine presents its own particular hazards, and it is not the purpose of this document to recommend the manner of application of the ESPE to any particular machine. The application of the ESPE is a matter for agreement between the equipment supplier, the machine user and the enforcing authority. In this context, attention is drawn to the relevant guidance established internationally, for example, IEC 62046 and ISO 12100.

Due to the complexity of the technology, there are many issues that are highly dependent on analysis and expertise in specific test and measurement techniques. In order to provide a high level of confidence, independent review by relevant expertise is recommended.

SAFETY OF MACHINERY – ELECTRO-SENSITIVE PROTECTIVE EQUIPMENT –

Part 3: Particular requirements for active opto-electronic protective devices responsive to diffuse reflection (AOPDDR)

1 Scope

This part of IEC 61496 specifies additional requirements for the design, construction and testing of electro-sensitive protective equipment (ESPE) designed specifically to detect persons or parts of persons as part of a safety-related system, employing active opto-electronic protective devices responsive to diffuse reflection (AOPDDRs) for the sensing function. Special attention is directed to requirements which ensure that an appropriate safety-related performance is achieved. An ESPE can include optional safety-related functions, the requirements for which are given both in Annex A of this document and in Annex A of IEC 61496-1:2012.

This document does not specify the dimensions or configurations of the detection zone and its disposition in relation to hazardous parts for any particular application, nor what constitutes a hazardous state of any machine. It is restricted to the functioning of the ESPE and how it interfaces with the machine.

AOPDDRs are devices that have either

- one or more detection zone(s) specified in two dimensions (AOPDDR-2D), or
- one or more detection zone(s) specified in three dimensions (AOPDDR-3D)

wherein radiation in the near infrared range is emitted by an emitting element(s). When the emitted radiation impinges on an object (for example, a person or part of a person), a portion of the emitted radiation is reflected to a receiving element(s) by diffuse reflection. This reflection is used to determine the position of the object.

Opto-electronic devices that perform only a single one-dimensional spot-like distance measurement, for example, optical proximity switches, are not covered by this document.

This document does not address those aspects required for complex classification or differentiation of the object detected.

This document does not address requirements and tests for outdoor application.

Excluded from this document are AOPDDRs employing radiation with the peak of wavelength outside the range 820 nm to 950 nm, and those employing radiation other than that generated by the AOPDDR itself. For sensing devices that employ radiation of wavelengths outside this range, this document can be used as a guide. This document is relevant for AOPDDRs having a minimum detectable object size in the range from 30 mm to 200 mm.

This document can be relevant to applications other than those for the protection of persons, for example, for the protection of machinery or products from mechanical damage. In those applications, different requirements can be appropriate, for example when the materials that have to be recognized by the sensing function have different properties from those of persons and their clothing.

This document does not deal with electromagnetic compatibility (EMC) emission requirements.

2 Normative references

Clause 2 of IEC 61496-1:2012 applies, except as follows.

Addition:

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC TR 60721-4-5, *Classification of environmental conditions – Part 4-5: Guidance for the correlation and transformation of environmental condition classes of IEC 60721-3 to the environmental tests of IEC 60068 – Ground vehicle installations*

IEC 60825-1:2014, *Safety of laser products – Part 1: Equipment classification and requirements*

IEC 61496-1:2012, *Safety of machinery – Electro-sensitive protective equipment – Part 1: General requirements and tests*

IEC 62471, *Photobiological safety of lamps and lamp systems*

ISO 13855:2010, *Safety of machinery – Positioning of safeguards with respect to the approach speeds of parts of the human body*

ISO 20471:2013, *High-visibility clothing – Test methods and requirements*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN