

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 61496-3:2008)**

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)
(CEI 61496-3:2008)

Sicherheit von Maschinen -
Berührungslos wirkende
Schutzeinrichtungen -
Teil 3: Besondere Anforderungen an
aktive optoelektronische diffuse Reflektion
nutzende Schutzeinrichtungen (AOPDDR)
(IEC 61496-3:2008)

This Technical Specification was approved by CENELEC on 2008-03-01.

CENELEC members are required to announce the existence of this TS in the same way as for an EN and to make the TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force.

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CENELEC

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

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Foreword

The text of document 44/572/FDIS, future edition 2 of IEC 61496-3, prepared by IEC TC 44, Safety of machinery - Electrotechnical aspects, in collaboration with the Technical Committee CENELEC TC 44X, Safety of machinery: electrotechnical aspects, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as CLC/TS 61496-3 on 2008-03-01.

This Technical Specification supersedes CLC/TS 61496-3:2003.

The most important changes and improvements compared to CLC/TS 61496-3:2003 are:

- extension of the range of detection capability covered by this part of the standard from 50 mm to 100 mm to the range of 30 mm to 200 mm;
- clarification of requirements for the selection of multiple detection zones (Clause A.10);
- more detailed information about the use of an AOPDDR as a whole body trip device by extension of Clause A.12 and a new Clause A.13;
- improved description of the relationship between ranging accuracy and probability of detection (Annex BB).

This Technical Specification is to be used in conjunction with EN 61496-1.

The following date was fixed:

- latest date by which the existence of the CLC/TS
has to be announced at national level (doa) 2008-06-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61496-3:2008 was approved by CENELEC as a Technical Specification without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

ISO 14121-1 NOTE Harmonized as EN ISO 14121-1:2007 (not modified).

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

Addition to Annex ZA of EN 61496-1:

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
-	-	High-visibility warning clothing for professional use - Test methods and requirements	EN 471	2003
IEC 60068-2-14 + A1	1984 1986	Environmental testing - Part 2: Tests - Test N: Change of temperature	EN 60068-2-14	1999
IEC 60068-2-75	1997	Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests	EN 60068-2-75	1997
IEC 60825-1	- ¹⁾	Safety of laser products - Part 1: Equipment classification and requirements	EN 60825-1	2007 ²⁾
IEC 61496-1 (mod)	2004	Safety of machinery - Electro-sensitive protective equipment - Part 1: General requirements and tests	EN 61496-1	2004
IEC/TS 62046	- ¹⁾	Safety of machinery - Application of protective equipment to detect the presence of persons	CLC/TS 62046	2008 ²⁾
ISO 13855	2002	Safety of machinery - Positioning of protective equipment with respect to the approach speeds of parts of the human body	-	-

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

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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 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.

Where a particular clause or subclause of part 1 is not mentioned in this part 3, that clause or subclause applies as far as is reasonable. Where this part states "addition", "modification" or "replacement", the relevant text of part 1 should be adapted accordingly.

Supplementary Annexes are entitled AA, BB, etc.

Each type of machine presents its own particular hazards, and it is not the purpose of this standard to recommend the manner of application of the ESPE to any particular machine. The application of the ESPE should be 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, ISO/TR 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

Replacement:

This part of IEC 61496 specifies additional requirements for the design, construction and testing of non-contact electro-sensitive protective equipment (ESPE) designed specifically to detect 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 may include optional safety-related functions, the requirements for which are given both in Annex A of this part and in Annex A of IEC 61496-1.

This part 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 a detection zone specified in two dimensions wherein radiation in the near infrared range is emitted by a transmitter 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 whereby the presence of the object can be detected.

NOTE 1 Under certain circumstances, limitations of the sensor in relation to its use need to be considered. For example:

- Objects that generate mirror-like (specular) reflections may not be detected if the diffuse reflectance value is less than that specified for the "black" test piece.
- The determination of the minimal reflection factors for the detection of obstacles is based on the clothing of a person. Objects having a reflectivity lower than that considered in this part may not be detected.

Excluded from this part are AOPDDRs employing radiation of wavelength outside the range 820 nm to 946 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 part may be used as a guide. This part is relevant for AOPDDRs having a stated detection capability in the range from 30 mm to 200 mm. AOPDDRs intended for use as trip device using whole-body detection with normal approach to the detection zone and having a stated detection capability not exceeding 200 mm shall meet the requirements of Clause A.12. AOPDDRs intended for a direction of approach normal to the detection zone and having a stated detection capability in the range from 30 mm to 70 mm shall meet the requirements of Clause A.13.

NOTE 2 According to ISO 13855 (EN 999), 6.3 foreseeable angles of approach greater than 30° should be considered normal approach and foreseeable angles of approach less than 30° should be considered parallel approach.

NOTE 3 According to ISO 13855 (EN 999), 6.2 when electro-sensitive protective equipment employing active opto-electronic protective devices is used for direction of approach parallel to the detection zone the device should have a detection capability in the range from 50 mm to 117 mm.

This part may 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 may be necessary, 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 part does not deal with electromagnetic compatibility (EMC) emission requirements.

Opto-electronic devices that perform only one-dimensional spot-like distance measurements, for example, proximity switches, are not covered by this part.

2 Normative references

Addition:

IEC 60068-2-14:1984, *Basic environmental testing procedures – Part 2: Tests – Test N: Change of temperature*

Amendment 1 (1986)

IEC 60068-2-75:1997-08, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60825-1, *Safety of laser products – Part 1: Equipment classification, requirements and user's guide*

IEC 61496-1:2004, *Safety of machinery – Electro-sensitive protective equipment – Part 1: General requirements and tests*

IEC 62046¹, *Safety of machinery – Application of protective equipment to detect the presence of persons*

ISO 13855:2002, *Safety of machinery – Positioning of protective equipment with respect to the approach speeds of parts of the human body*

EN 471:2003-09, *High-visibility warning clothing for professional use – Test methods and requirements*

3 Terms and definitions

Replacement:

3.4

detection zone

zone within which the specified test piece(s) (see 4.2.13) is detected by the AOPDDR with a minimum required probability of detection (see 4.2.12.2)

NOTE A tolerance zone is necessary to achieve the required probability of detection of the specified test piece(s) within the detection zone.

Addition:

¹ To be published.