PLAHVATUSOHTLIKUD KESKKONNAD. OSA 28: OPTILIST KIIRGUST KASUTAVATE SEADMETE JA EDASTUSSÜSTEEMIDE KAITSE

Explosive atmospheres - Part 28: Protection of equipment and transmission systems using optical radiation

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 60079-28:2015 sisaldab Euroopa standardi EN 60079-28:2015 ingliskeelset teksti.	This Estonian standard EVS-EN 60079-28:2015 consists of the English text of the European standard EN 60079-28:2015.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 18.09.2015.	Date of Availability of the European standard is 18.09.2015.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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EUROPEAN STANDARD

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EN 60079-28

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English Version

Explosive atmospheres - Part 28: Protection of equipment and transmission systems using optical radiation (IEC 60079-28:2015)

Atmosphères explosives - Partie 28: Protection du matériel et des systèmes de transmission utilisant le rayonnement optique
(IEC 60079-28:2015)

Explosionsgefährdete Bereiche - Teil 28: Schutz von Geräten und Übertragungssystemen, die mit optischer Strahlung arbeiten
(IEC 60079-28:2015)

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

The text of document 31/1178/FDIS, future edition 2 of IEC 60079-28, prepared by IEC/TC 31 "Equipment for explosive atmospheres" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60079-28:2015.

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)	2016-04-01
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2018-07-01

This document supersedes EN 60079-28:2007.

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

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive.

For the relationship with EU Directive see informative Annex ZZ, which is an integral part of this document.

Endorsement notice

The text of the International Standard IEC 60079-28:2015 was approved by CENELEC as a European Standard without any modification.

IEC 60079-2	NOTE	Harmonized as EN 60079-2.
IEC 60079-10-1	NOTE	Harmonized as EN 60079-10-1.
IEC 60079-10-2	NOTE	Harmonized as EN 60079-10-2.
IEC 60079-31	NOTE	Harmonized as EN 60079-31.
IEC 61508 (series)	NOTE	Harmonized as EN 61508 (series).
IEC 60825-1	NOTE	Harmonized as EN 60825-1.
IEC 61511 (series)	NOTE	Harmonized as EN 61511 (series).

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When 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 60050	-	International Electrotechnical Vocabulary (IEV)	-	-
IEC 60079-0	-	Explosive atmospheres -- Part 0: Equipment - General requirements	EN 60079-0	-
IEC 60079-1	-	Explosive atmospheres -- Part 1: Equipment protection by flameproof enclosures "d"	EN 60079-1	-
IEC 60079-11	-	Explosive atmospheres -- Part 11: Equipment protection by intrinsic safety "i"	EN 60079-11	-
IEC 60079-15	-	Explosive atmospheres -- Part 15: Equipment protection by type of protection "n"	EN 60079-15	-
IEC 60825-2	-	Safety of laser products -- Part 2: Safety of optical fibre communication systems (OFCS)	EN 60825-2	-

Annex ZZ
(informative)
Coverage of Essential Requirements of EC Directives

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and within its scope the standard covers only the following essential requirements out of those given in Annex II of the EC Directive 2014/34/EU.

- ER 1.0.1 to ER 1.0.4, ER 1.05 (partly)
- ER 1.2.1, ER 1.2.4, ER 1.2.5 (partly), ER 1.2.6, ER 1.2.8, ER 1.2.9
- ER 1.3.1
- ER 1.5.1
- ER 2.0.1
- ER 2.0.2
- ER 2.1.1
- ER 2.1.2
- ER 2.2.1
- ER 2.2.2
- ER 2.3.1
- ER 2.3.2

Compliance with this standard provides one means of conformity with the specified essential requirements of the Directive[s] concerned.

WARNING: Other requirements and other EC Directives may be applicable to the products falling within the scope of this standard.

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INTRODUCTION

Optical equipment in the form of lamps, lasers, LEDs, optical fibers etc. is increasingly used for communications, surveying, sensing and measurement. In material processing, optical radiation of high irradiance is used. Where the installation is inside or close to explosive atmospheres, the radiation from such equipment may pass through these atmospheres. Depending on the characteristics of the radiation it might then be able to ignite a surrounding explosive atmosphere. The presence or absence of an additional absorber, such as particles, significantly influences the ignition.

There are four possible ignition mechanisms:

a) Optical radiation is absorbed by surfaces or particles, causing them to heat up, and under certain circumstances this may allow them to attain a temperature which will ignite a surrounding explosive atmosphere.

b) Thermal ignition of a gas volume, where the optical wavelength matches an absorption band of the gas or vapour.

c) Photochemical ignition due to photo dissociation of oxygen molecules by radiation in the ultraviolet wavelength range.

d) Direct laser induced breakdown of the gas or vapour at the focus of a strong beam, producing plasma and a shock wave both eventually acting as ignition source. These processes can be supported by a solid material close to the breakdown point.

The most likely case of ignition occurring in practice with lowest radiation power of ignition capability is case a). Under some conditions for pulsed radiation case d) also will become relevant. These two cases are addressed in this standard. Although one should be aware of ignition mechanism b) and c) explained above, they are not addressed in this standard due to the very special situation with ultraviolet radiation and with the absorption properties of most gases (see Annex A).

This standard describes precautions and requirements to be taken when using optical radiation transmitting equipment in explosive gas or dust atmospheres. It also outlines a test method, which can be used in special cases to verify that a beam is not ignition capable under selected test conditions, if the optical limit values cannot be guaranteed by assessment or beam strength measurement.

There is equipment outside the scope of this standard because the optical radiation associated with this equipment is considered not to be a risk of ignition for the following reasons:

– due to low radiated power or divergent light, and

– as hot surfaces created due to a too small distance from the radiation source to an absorber which is already considered by general requirements for lighting equipment.

In most cases the optical equipment is associated with electrical equipment and where the electrical equipment is located in a hazardous area then other parts of the IEC 60079 series will also apply. This standard provides guidance for:

a) Ignition hazards associated with optical systems in explosive atmospheres as defined in IEC 60079-10-1 and IEC 60079-10-2, and,

b) Control of ignition hazards from equipment using optical radiation in explosive atmospheres.

This standard is related to the integrated system used to control the ignition hazard from equipment using optical radiation in explosive atmospheres.