BSI Standards Publication

Explosive atmospheres

Part 32-1: Electrostatic hazards, guidance

bsi.

National foreword

This Published Document is the UK implementation of CLC/TR 60079-32-1:2018. It is identical to IEC TS 60079-32-1:2013, incorporating amendment 1:2017. It supersedes PD CLC/TR 60079-32-1:2015, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment A1 is indicated by [A1] [A1].

The UK participation in its preparation was entrusted to Technical Committee EXL/31/-/1, Electrostatic spray guns.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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TECHNICAL REPORT

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English Version

Explosive atmospheres - Part 32-1: Electrostatic hazards, guidance (IEC/TS 60079-32-1:2013, IEC/TS 60079-32-1:2013/A1:2017)

Atmosphères explosives - Partie 32-1: Risques électrostatiques - Guide (IEC/TS 60079-32-1:2013, IEC/TS 60079-32-1:2013/A1:2017)

Explosionsgefährdete Bereiche - Teil 32-1: Elektrostatische Gefährdungen, Leitfaden (IEC/TS 60079-32-1:2013, IEC/TS 60079-32-1:2013/A1:2017)

This Technical Report was approved by CENELEC on 2018-10-22.

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

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European foreword

This document (CLC/TR 60079-32-1:2018) consists of the text of IEC/TS 60079-32-1:2013 and IEC/TS 60079-32-1:2013/A1:2017 prepared by IEC/TC 31 "Equipment for explosive atmospheres".

This document supersedes CLC/TR 60079-32-1:2015.

The technical specification IEC/TS 60079-32-1 is written as a general guidance document for products in general and process properties necessary to avoid ignition hazards arising from static electricity in a hazardous area.

The IEC standard IEC 60079-0 specifies the general requirements, including the requirements to avoid electrostatic charging, for construction, testing and marking of Ex equipment and Ex Components intended for use in explosive atmospheres.

In some cases, the requirements given in IEC 60079-0 are different from the information given in IEC/TS 60079-32-1.

It was decided to have all information also given complete in the guidance document and therefore the new Clause 14 was added to the IEC/TS 60079-32-1 summarizing the requirements given in IEC 60079-0 for Ex equipment and Ex-Components as additional information.

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 texts of the International Technical Specifications IEC/TS 60079-32-1:2013 and IEC/TS 60079-32-1:2013/A1:2017 were approved by CENELEC as a Technical Report without any modification.

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

IEC 60243-1	NOTE Harmonized as EN 60243-1.
IEC 60243-2	NOTE Harmonized as EN 60243-2.
IEC 60247	NOTE Harmonized as EN 60247.
IEC 61340-2-1	NOTE Harmonized as EN 61340-2-1.
IEC 61340-4-5	NOTE Harmonized as EN 61340-4-5.
IEC 61340-4-7	NOTE Harmonized as EN 61340-4-7.
ISO 8028	NOTE Harmonized as EN ISO 8028.
ISO 8330	NOTE Harmonized as EN ISO 8330.
ISO 13688	NOTE Harmonized as EN ISO 13688.
ISO 20344	NOTE Harmonized as EN ISO 20344.
ISO 20345	NOTE Harmonized as EN ISO 20345.

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 When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60079-0	2011	Explosive atmospheres - Part 0: Equipment - General requirements	EN 60079-0	2012
IEC 60079-10-1	-	Explosive atmospheres - Part 10-1: Classification of areas - Explosive gas atmospheres	EN 60079-10-1	-
IEC 60079-10-2	-	Explosive atmospheres - Part 10-2: Classification of areas - Combustible dust atmospheres	EN 60079-10-2	-
IEC 60079-14	-	Explosive atmospheres - Part 14: Electrical installations design selection and erection	EN 60079-14	-
IEC 60079-20-1	-	Explosive atmospheres - Part 20-1: Material characteristics for gas and vapour classification - Test methods and data	EN 60079-20-1	-
IEC 60079-32-2	2015	Explosive atmospheres - Part 32-1: Electrostatics hazards - Tests	EN 60079-32-2	2015
IEC 60093	-	Methods of test for volume resistivity and surface resistivity of solid electrical insulating materials	HD 429 S1	-
IEC 60167	-	Methods of test for the determination of the insulation resistance of solid insulating materials	HD 568 S1	-
IEC 61340-2-3	-	Electrostatics - Part 2-3: Methods of test for determining the resistance and resistivity of solid planar materials used to avoid electrostatic charge accumulation	EN 61340-2-3	-
IEC 61340-4-1	-	Electrostatics - Part 4-1: Standard test methods for specific applications - Electrical resistance of floor coverings and installed floors	EN 61340-4-1	-
IEC 61340-4-3	-	Electrostatics - Part 4-3: Standard test methods for specific applications - Footwear	EN 61340-4-3	-
IEC 61340-4-4	2012	Electrostatics - Part 4-4: Standard test methods for specific applications - Electrostatic classification of flexible intermediate bulk containers (FIBC)	EN 61340-4-4	2012

Publication	Year	Title	EN/HD	Year
ISO 284	-	Conveyor belts - Electrical conductivity - Specification and test method	EN ISO 284	-
ISO 6297	-	Petroleum products - Aviation and distillate fuels - Determination of electrical conductivity	-	-
ISO 8031	-	Rubber and plastics hoses and hose assemblies - Determination of electrical resistance and conductivity	EN ISO 8031	-
ISO 9563	-	Belt drives - Electrical conductivity of antistatic endless synchronous belts - Characteristics and test method	-	-
ISO 12100-1	-	Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology	EN ISO 12100-1	-
ISO 16392	-	Tyres - Electrical resistance - Test method for measuring electrical resistance of tyres on a test rig	-	-
ISO 21178	-	Light conveyor belts - Determination of electrical resistances	EN ISO 21178	-
ISO 21179	-	Light conveyor belts - Determination of the electrostatic field generated by a running light conveyor belt	EN ISO 21179	-
ISO 21183-1	-	Light conveyor belts - Part 1: Principal characteristics and applications	EN ISO 21183-1	-
ASTM D257	-	Standard Test Methods for DC Resistance or Conductance of Insulating Materials	-	-
ASTM D2624-07a	-	Standard Test Methods for Electrical Conductivity of Aviation and Distillate Fuels	-	-
ASTM D4308-95	-	Standard Test Method for Electrical Conductivity of Liquid Hydrocarbons by Precision Meter	-	-
ASTM E582-88	-	Standard test method for minimum ignition energy and quenching distance in gaseous mixtures	-	-
ASTM E2019-03	-	Standard test method for minimum ignition energy of a dust cloud in air	-	-
ASTM F150		Standard Test Method for Electrical Resistance of Conductive and Static Dissipative Resilient Flooring	-	-
ASTM F1971	-	Standard Test Method for Electrical Resistance of Tires Under Load On the Test Bench	-	-
BS 5958-1	-	Code of practice for control of undesirable static electricity - Part 1: General considerations	-	-
BS 5958-2	-	Code of practice for control of undesirable static electricity - Part 2: Recommendations for particular industrial situations	-	-
BS 7506-2	-	Methods for measurements in electrostatics -- Part 2 Test methods		-

Publication	Year	Title	EN/HD	Year
DIN 51412-1	-	Testing of petroleum products; determination of the electrical conductivity - Part 1: laboratory method	-	-
DIN 51412-2	-	Testing of petroleum products; determination of the electrical conductivity - Part 2: field method	-	-
-	-	Resilient floor coverings - Determination of the electrical resistance	EN 1081	-
-	-	Protective clothing - Electrostatic properties - Part 3: Test methods for measurement of charge decay	EN 1149-3	-
-	-	Protective clothing - Electrostatic properties - Part 5: Material performance and design requirements	EN 1149-5	-
-	-	Rubber and plastic hoses and hose assemblies for measured fuel dispensing systems - Specification	EN 1360	-
-	-	Rubber hoses and hose assemblies for aviation fuel handling - Specification	EN 1361	-
-	-	Non-electrical equipment for use in potentially explosive atmospheres - Part 1: Basic method and requirements	EN 13463-1	-
-	-	Thermoplastic and flexible metal pipework for underground installation at petrol filling stations	EN 14125	-
-	-	Conveyor belts for use in underground installations - Electrical and flammability safety requirements	EN 14973	-
ISGOTT	2006	International Safety Guide for Oil Tankers and Terminals (ISGOTT), fifth edition, International Chamber of shipping, 2006	-	-
JNIOSH TR 42		Recommendations for Requirements for Avoiding Electrostatic Hazards in Industry	-	-
NFPA 77	-	Recommended practice on static electricity	-	-
SAE J1645	-	Surface vehicle recommended practice - Fuel systems and Components - Electrostatic Charge Mitigation	-	-

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPLOSIVE ATMOSPHERES –

Part 32-1: Electrostatic hazards, guidance

FOREWORD

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The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a technical specification when

- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC/TS 60079-32-1, which is a technical specification, has been prepared by IEC Technical Committee 31: Equipment for explosive atmospheres, and IEC Technical Committee 101: Electrostatics.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
31/1033/DTS	31/1076/RVC

Full information on the voting for the approval of this technical specification 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.

A list of all parts of the IEC 60079 series, under the general title *Explosive atmospheres,* 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

transformed into an International standard,

reconfirmed,

withdrawn,

replaced by a revised edition, or

amended.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

This IEC Technical Specification is based on CENELEC TR 50404:2003, *Code of practice for the avoidance of hazards due to static electricity* and a number of other documents:

- from the UK: BS 5958, Parts 1 & 2:1991, *Control of undesirable static electricity*,
- from Germany: TRBS 2153:2009, *Preventing risks of ignition due to electrostatic charges,*
- from Shell International Petroleum: *Static electricity – Technical and safety aspects,*
- from the US: NFPA 77, *Recommended Practice on Static Electricity (2007),*
- from Japan: JNIOSH TR42, *Recommendations for Requirements for Avoiding Electrostatic Hazards in Industry (2007),*
- from ASTM, EUROPIA, IEC, International chamber of shipping, ISO etc.

It gives the best available accepted state of the art guidance for the avoidance of hazards due to static electricity.

This document is mainly written for designers and users of processes and equipment, manufacturers and test houses. It can also be used by suppliers of equipment (e.g. machines) and flooring or apparel when no product family or dedicated product standard exists or where the existing standard does not deal with electrostatic hazards.

A second part, IEC 60079-32-2, *Electrostatic Hazards, Tests,* is under development.

EXPLOSIVE ATMOSPHERES –

Part 32-1: Electrostatic hazards, guidance

1 Scope

This part of IEC 60079 gives guidance about the equipment, product and process properties necessary to avoid ignition and electrostatic shock hazards arising from static electricity as well as the operational requirements needed to ensure safe use of the equipment, product or process. It can be used in a risk assessment of electrostatic hazards or for the preparation of product family or dedicated product standards for electrical or non-electrical machines or equipment.

The hazards associated with static electricity in industrial processes and environments that most commonly give problems are considered. These processes include the handling of solids, liquids, powders, gases, sprays and explosives. In each case, the source and nature of the electrostatic hazard are identified and specific recommendations are given for dealing with them.

The purpose of this document is to provide standard recommendations for the control of static electricity, such as earthing of conductors, reduction of charging and restriction of chargeable areas of insulators. In some cases static electricity plays an integral part of a process, e.g. electrostatic coating, but often it is an unwelcome side effect and it is with the latter that this guidance is concerned. If the standard recommendations given in this document are fulfilled it can be expected that the risk of hazardous electrostatic discharges in an explosive atmosphere is at an acceptably low level.

If the requirements of this document cannot be fulfilled, alternative approaches can be applied under the condition that at least the same level of safety is achieved.

Basic information about the generation of undesirable static electricity in solids, liquids, gases, explosives, and also on people, together with descriptions of how the charges generated cause ignitions or electrostatic shocks, is given in the annexes and in IEC/TR 61340-1.

This Technical Specification is not applicable to the hazards of static electricity relating to lightning or to damage to electronic components.

This Technical Specification is not intended to supersede standards that cover specific products and industrial situations.

2 Normative references

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.

〚A1〛 IEC 60079-0:2011 〈A1〉, *Explosive atmospheres – Part 0: Equipment – General requirements*

IEC 60079-10-1, *Explosive atmospheres – Part 10-1: Classification of areas – Explosive gas atmospheres*