SVENSK STANDARD SS-EN 50495

Fastställd	Utgåva	Sida	Ansvarig kommitté
2010-08-23	1	1 (1+37)	SEK TK 31

Säkerhetsanordningar som fordras för säker funktion hos utrustning med avseende på explosionsrisk

Safety devices required for the safe functioning of equipment with respect to explosion risks

Som svensk standard gäller europastandarden EN 50495:2010. Den svenska standarden innehåller den officiella engelska språkversionen av EN 50495:2010.

ICS 13.230; 29.260.30

Denna standard är fastställd av SEK Svensk Elstandard,
som också kan lämna upplysningar om **sakinnehållet** i standarden.
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Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a säkerhet, prestanda, dokumentation, utförande och skötsel av elprodukter, elanläggningar och metoder. Genom att utforma sådana standarder blir säkerhetskraven tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50495

February 2010

ICS 13.230; 29.260.30

English version

Safety devices required for the safe functioning of equipment with respect to explosion risks

Dispositifs de sécurité nécessaires pour le fonctionnement sûr d'un matériel vis-à-vis des risques d'explosion

Sicherheitseinrichtungen für den sicheren Betrieb von Geräten im Hinblick auf Explosionsgefahren

CENELEC

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

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 50495:2010 E

SEK Svensk Elstandard

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 31, Electrical apparatus for potentially explosive atmospheres. The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50495 on 2009-12-01.

This European Standard is to be read in conjunction with the European Standards for the specific types of protection listed in EN 60079 or EN 61241 series of standards.

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

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2010-12-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2012-12-01

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directive 94/9/EC. See Annex ZZ.

Contents

Tables

Introduction

Safety devices, controlling devices and regulating devices which are used for the protection concept of equipment for explosive atmospheres, shall function reliably for the intended purpose. This shall be expressed in terms of some measure of confidence that the devices will be able to maintain a required level of safety at all times. This measure of confidence needs to be in conformity with [1], CENELEC standards of the series EN 60079 and EN 61241 for apparatus for use in explosive atmospheres and relevant control standards.

CENELEC identified the need for research to determine whether existing and proposed standards in the field of safety-related control systems were suitable for this purpose. Research proposals on this topic were invited under the Standardisation, Measurement and Testing (SMT) Programme of the EU-commission and the SAFEC project was selected for funding (contract SMT4-CT98-2255). The project was a 12 month project which began in January 1999. The SAFEC partners were the Health and Safety Laboratory (HSL) of the Health and Safety Executive in the UK (the project coordinator), the Deutsche Montan Technologie (DMT) in Germany, the National Institute for Industrial Environment and Risks (INERIS) in France and the Laboratorio Oficial J.M. Madariaga (LOM) in Spain. The result of this project is summarised in [2] and recommends the application of Safety Integrity Levels as specified in EN 61508-1 for safety devices. A short description of the basic concept is provided in Annex E of this standard.

1 Scope

This European Standard specifies the requirements of electrical safety devices, which are used to avoid potential ignition sources of equipment in explosive atmospheres.

This also includes safety devices, which are operated outside areas with explosive atmospheres, to guarantee the safe function of equipment with respect to explosion hazards.

NOTE 1 This European Standard can also be used to design and assess safety devices for protective systems.

Electrical equipment, which is intended for use in explosive atmospheres, may rely on the correct operation of safety devices which for example maintain certain characteristics of the equipment within acceptable limits. Examples of such safety devices are motor protection devices (to limit temperature rise during stall conditions) and controlling devices for pressurisation protection.

By means of control or monitoring devices, sources of ignition can be avoided. Therefore these devices shall execute the appropriate measures in the appropriate reaction time, for example the initiation of an alarm or an automatic shut down.

NOTE 2 Some potential ignition sources might not be controllable by safety devices, e.g. electrostatic discharges, ignition sparks caused by mechanical impact. Also some protection measures might not be controllable by safety devices, e.g. flameproof enclosures.

Safety devices, whose safety function can not adequately be specified under the existing EN 60079 or EN 61241 series of standards, shall additionally be designed according to the requirements of this standard. Generally for complex safety devices appropriate design requirements are not provided in the existing types of protection (see 3.13 for the definition of a complex device).

NOTE 3 In general the levels of safety required by this standard are considered to be equivalent to those provided by conformity to EN 60079-0 or EN 61241-0. No increase or decrease of safety is intended or required. Similarly neither increase nor decrease of safety with respect to EN 61508 series is intended.

Safety devices can be classified in 2 types:

a) devices, which are included as component in the equipment under control (see 3.8). The combined apparatus is considered as equipment.

EXAMPLES
- thermal switch or thermistor to avoid overheating,
- temperature monitoring devices to control the surface temperature.

b) devices, which are installed separately from the equipment under control and considered as associated apparatus exclusively for a specific type of protection or specific equipment under control. The combined apparatus is considered as a system.

EXAMPLES
- external control devices or safety related parts of a control system for type of protection pressurisation,
- overload protective device for electric motors of type of protection Ex e 'Increased Safety',
- control devices for battery charging equipment (protection against overcharging or deep discharging),
- level detectors for the control of submersible pumps.

Exclusions from this standard:

Safety devices, where the safety function is adequately covered in the existing standards of EN 60079 and EN 61241 series do not need any additional assessment according to this standard.

EXAMPLES Intrinsically safe associated apparatus, fuses, electromechanical overload protection, simple thermal protection devices (e.g. thermal fuses, thermal switches).

The standard does not include devices or systems to prevent the occurrence of explosive atmospheres, e.g. inerting systems, ventilation in workplaces and containers/vessels.

Gas detectors, which are covered under EN 61779 series, EN 50271 or EN 50402 are also excluded from the scope of this standard.

This standard does not deal with protection by control of ignition source ‘b’ for non-electrical equipment as defined in EN 13463-6.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN 13237 *Potentially explosive atmospheres – Terms and definitions for equipment and protective systems intended for use in potentially explosive atmospheres*

EN 13463-6 *Non-electrical equipment for use in potentially explosive atmospheres – Part 6: Protection by control of ignition source ‘b’*

EN 50271 *Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen – Requirements and tests for apparatus using software and/or digital technologies*

EN 50402 + A1 *Electrical apparatus for the detection and measurement of combustible or toxic gases or vapours or of oxygen – Requirements on the functional safety of fixed gas detection systems*

EN 60079 series *Explosive atmospheres* (IEC 60079 series)

EN 60079-0 *Electrical apparatus for explosive gas atmospheres – Part 0: General requirements* (IEC 60079-0, mod.)

EN 60079-10-1 *Explosive atmospheres – Part 10-1: Classification of areas – Explosive gas atmospheres* (IEC 60079-10-1)

EN 60079-30-1 *Explosive atmospheres – Part 30-1: Electrical resistance trace heating – General and testing requirements* (IEC 60079-30-1)

EN 60079-30-2 *Explosive atmospheres – Part 30-2: Electrical resistance trace heating – Application guide for design, installation and maintenance* (IEC 60079-30-2)

EN 60812 *Analysis techniques for system reliability – Procedure for failure mode and effects analysis (FMEA)* (IEC 60812)

EN 61010-1 *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements* (IEC 61010-1)

EN 61025 *Fault tree analysis (FTA)* (IEC 61025)

EN 61165 *Application of Markov techniques* (IEC 61165)

EN 61241 series *Electrical apparatus for use in the presence of combustible dust* (IEC 61241 series)

EN 61241-0 *Electrical apparatus for use in the presence of combustible dust – Part 0: General requirements* (IEC 61241-0, mod.)

EN 61496-1 *Safety of machinery – Electro-sensitive protective equipment – Part 1: General requirements and tests* (IEC 61496-1, mod.)

EN 61508 series *Functional safety of electrical/electronic/programmable electronic safety-related systems* (IEC 61508 series)

EN 61508-1	*Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 1: General requirements* (IEC 61508-1)
EN 61508-2:2001	*Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems* (IEC 61508-2:2000)
EN 61508-3	*Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 3: Software requirements* (IEC 61508-3)
EN 61508-4	*Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 4: Definitions and abbreviations* (IEC 61508-4)
EN 61508-7:2001	*Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 7: Overview of techniques and measures* (IEC 61508-7:2000)
EN 61511 series	*Functional safety – Safety instrumented systems for the process industry sector* (IEC 61511 series)
EN 61511-1:2004	*Functional safety – Safety instrumented systems for the process industry sector – Part 1: Framework, definitions, system, hardware and software requirements* (IEC 61511-1:2003)
EN 61779 series	*Electrical apparatus for the detection and measurement of flammable gases* (IEC 61779 series, mod.)
EN 62061	*Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems* (IEC 62061)
EN ISO 13849-1	*Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design* (ISO 13849-1)
EN ISO 13849-2	*Safety of machinery – Safety-related parts of control systems – Part 2: Validation* (ISO 13849-2)