

# DIN EN 1127-1:2019-10 (E)

## Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology

---

<b>Contents</b>	<b>Page</b>
European foreword.....	4
Introduction .....	5
1 Scope.....	6
2 Normative references.....	7
3 Terms and definitions .....	7
4 Risk assessment.....	8
4.1 General.....	8
4.2 Identification of explosion hazards .....	8
4.2.1 General.....	8
4.2.2 Flammability properties.....	9
4.2.3 Explosion behaviour .....	9
4.2.4 Likelihood of occurrence of a hazardous explosive atmosphere .....	9
4.3 Identification of ignition hazards.....	10
4.3.1 General.....	10
4.3.2 Ignition properties .....	11
4.3.3 Likelihood of occurrence of effective ignition sources.....	11
4.4 Estimation of the possible effects of an explosion .....	11
5 Possible ignition sources.....	12
5.1 Hot surfaces.....	12
5.2 Flames and hot gases (including hot particles).....	13
5.3 Mechanically generated impact, friction and abrasion .....	13
5.4 Electrical equipment and components.....	14
5.5 Stray electric currents, cathodic corrosion protection .....	14
5.6 Static electricity .....	14
5.7 Lightning .....	15
5.8 Radio frequency (RF) electromagnetic waves from $10^4$ Hz to $3 \times 10^{11}$ Hz .....	15
5.9 Electromagnetic waves from $3 \times 10^{11}$ Hz to $3 \times 10^{15}$ Hz .....	15
5.10 Ionizing radiation.....	16
5.11 Ultrasonic waves .....	16
5.12 Adiabatic compression and shock waves.....	16
5.13 Exothermic reactions, including self-ignition of dusts .....	17
6 Risk reduction .....	17
6.1 Fundamental principles .....	17
6.2 Avoidance or reduction of the amount of hazardous explosive atmospheres.....	18
6.2.1 Process parameters.....	18
6.2.2 Design and construction of equipment, protective systems and components .....	19
6.3 Hazardous areas .....	21
6.4 Requirements for the design and construction of equipment, protective systems and components for avoidance of effective ignition sources.....	21
6.4.1 General.....	21
6.4.2 Hot surfaces.....	22
6.4.3 Flames and hot gases .....	24

6.4.4	Mechanically generated impact, friction and grinding.....	24
6.4.5	Electrical equipment and components.....	25
6.4.6	Stray electric currents and cathodic corrosion protection.....	25
6.4.7	Static electricity.....	26
6.4.8	Lightning.....	26
6.4.9	Radio frequency (RF) electromagnetic waves from $10^4$ Hz to $3 \times 10^{11}$ Hz.....	27
6.4.10	Electromagnetic waves from $3 \times 10^{11}$ Hz to $3 \times 10^{15}$ Hz.....	28
6.4.11	Ionizing radiation.....	28
6.4.12	Ultrasonic waves.....	29
6.4.13	Adiabatic compression and shock waves.....	30
6.4.14	Exothermic reactions, including self-ignition of dusts.....	31
6.5	Requirements for the design and construction of equipment, protective systems and components to reduce the explosion effects.....	31
6.6	Provisions for emergency measures.....	32
6.7	Principles of measuring and control systems for explosion prevention and protection.....	32
7	Information for use.....	33
7.1	General.....	33
7.2	Information for commissioning, maintenance and repair to prevent explosion.....	34
7.3	Qualifications and training.....	34
Annex A (informative) Information for the use of tools in potentially explosive atmospheres.....		35
Annex B (informative) Tightness of equipment.....		36
B.1	General.....	36
B.2	Normal tightness.....	36
B.3	Enhanced tightness.....	37
Annex C (normative) Verification procedure for the threshold limit of ultrasound in liquids.....		38
Annex D (informative) Significant technical changes between this document and the previous edition of this document.....		40
Annex ZA (informative) Relationship between this European Standard and the essential requirements of EU Directive 2014/34/EU aimed to be covered.....		42
Annex ZB (informative) Relationship between This document and the essential requirements of Directive 2006/42/EC aimed to be covered.....		43
Bibliography.....		44