ATEX
ATmosphere EXplosive

DIRECTIVE 94/9/CE (ATEX= ATMOSPHERE EXPLOSIVE) OF THE EUROPEAN PARLIAMENT AND COUNCIL (MARCH 23, 1994): IMPACT ON LIGHTING FIXTURES

Application: can be installed outdoors or indoors, in industrial areas, cantilever roofs, environments at risk of fire, and in any other premise compatibly with the fumes and atmospheric or chemical agents which affect the use of plastic materials: check compatibility with corrosive agents.

Application of relevant regulation:

Directive 94/9/CE (ATEX) was enforced and made compulsory on 30 June 2003. Back in January 1998 the CEI 64-2 regulation was replaced for the classification of hazardous areas and for the construction of electrical equipment suitable for potentially explosive atmospheres containing GAS (C1 and C3 environments).

The directive applies to electrical and non-electrical products used in explosive atmospheres.
The following are excluded from this directive:

- medical equipment used in medical environments;
- protection equipment and systems, when the risk of explosion is exclusively due to the presence of explosive substances;
- equipment suitable for domestic use, not suitable for commercial areas where the atmosphere is rarely explosive and can only become so in case of a gas leak;
- individual safety devices, as per directive 89/689/CEE;
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- sea-going ships and mobile offshore units;
- means of transport (vehicles and related trailers); however, vehicles used in potentially explosive areas are not excluded;
- weapons, ammunition and war material.

Equipment suitable for AD/FT systems became obsolete in July 2003. Therefore, this identification will be deleted from new classification and construction regulations for explosion-prone environments.

The new classification of explosion-prone areas identifies hazardous environments where the atmosphere contains gas substances (vapours or mists) with ZONE 0, ZONE 1, ZONE 2. Hazardous environments containing explosive substances and combustible powders are referred to as ZONE 20, ZONE 21, ZONE 22.

ZONA 0 = an area where the atmosphere is constantly filled with explosive gas over long periods of time.

ZONE 1 = an area where lighting fixtures can operate in an explosive gas-filled atmosphere.

ZONE 2 = an area where an explosive gas-filled atmosphere is not allowed when a lighting fixture is operating normaly. An explosion-prone atmosphere is a rare occurrence and only lasts for a very short period of time.

ZONE 20 = an area where the atmosphere is filled with combustible powders either permanently or over long periods of time, or frequently.

ZONE 21 = an area where the atmosphere occasionally contains combustible powders when the lighting fixture is operating normally.

ZONE 22 = an area where the atmosphere is unlikely to be filled with combustible powders when the lighting fixture is operating normally. An explosion-prone atmosphere is a rare occurrence and only lasts for a very short period of time.

A notified Organization should be in charge of prototype certification and product control, which are compulsory requirements for ZONE 0, 1, 20 and 21 as regards electrical equipment. In-house manufacturing checks and the creation of a technical file confirming product compliance (attachment II of 94/9/Ce) are required for ZONE 2 and 22, and should be guaranteed for the entire production line (attachment VIII of 94/9/Ce).

Zone 2 and 22 represent the largest areas as regards hazardous environments.

“Former AD/FT” products can be installed in hazardous areas 2 and 22, provided basic safety requirements are complied with. Electrical systems used in zone 2 should be designed using the “n” protection system, according to regulation EC 60079-15, while the electrical systems developed for zone 22 should be designed according to regulations EN 60079-31

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Equipment level protection (EPL)

ZONE	EPL
0	“Ga”
1	“Ga” o “Gb”
2	“Ga”, “Gb” o “Gc”
20	“Da”
21	“Da” o “Db”
22	“Da”, “Db” o “Dc”

Hazardous places according to Legislative Decree 233/03

Business	Places
chemical and petrochemical industry	gas-fuelled heating plants with P>35Kw
pharmaceutics industry	garages, repair shops, body shops
metal processing	fuel distribution
food industry (storage and processing of cereals, flour and sugar)	bread baking ovens
processing of wood	places where painting processes occur
fabric and spinning industry	distilleries, production of alcoholic beverages

ELECTRICAL SYSTEMS FOR AREAS CONTAINING EXPLOSIVE GAS:	
Ex =	Electrical system built and tested for utilization in an atmosphere filled with explosive gasses.
nA =	The electrical system does not produce sparks when operating normally.
II =	Electrical system suitable for areas with a potentially explosive atmosphere, different from mines, with firedamp.
Gc =	Enhanced protection level
T4 =	Maximum internal or external surface temperature; classification according to regulation cei en 60079-0 table 2
IP66 =	Housing entirely protected against dust and the water jets

ELECTRICAL SYSTEMS FOR AREAS CONTAINING EXPLOSIVE POWDERS:	
Ex =	Electrical system built and tested for utilization in an atmosphere containing powders.
IIIC	Electrical equipment for premises with potentially explosive atmospheres due to the presence of combustible dust, other than mines with the presence of firedamp
Dc	Enhanced protection level
tc	Protection against explosive atmospheres due to the presence of dust where the electrical equipment is equipped with an enclosure
22 =	Permitted hazardous area.
IP6X =	Housing entirely protected against dust
T 135°C =	Maximum temperature in a dust-free environment

SELECTION OF ELECTRICAL SYSTEMS IN RELATION TO HAZARDOUS AREAS

HAZARDOUS AREA	CLASSIFICATION	EPL	PROTECTIONS PERMITTED
ATMOSPHERE CONTAINING GAS	**0**	**Ga**	“ia” Intrinsic safety “ma” Encapsulation Two independent EPLs “Gb”
	1	**Gb**	“d” Explosion proof “e” Increased safety “ib” Intrinsic safety “m” “mb” Encapsulation “o” Oil immersion “p, px, py” Pressurisation “q” Powder filling Field bus intrinsically safe concept (FISCO) Optical radiation safety
	2	**Gc**	“ic” Intrinsic safety “mc” Encapsulation “n, nA” Non sparking “nR” Restricted breathing “nL” Energy limitation “nC” Sparking device and components “pz” Pressurisation Field bus non-incendive concept Optical radiation safety
ATMOSPHERE CONTAINING GAS	**20**	**Da**	“Da” “Id” Intrinsic safety “md” Encapsulation “tD” Protection by enclosure
	21	**Db**	“iD” Intrinsic safety “mD” Encapsulation “tD” Protection by enclosure “pD” Pressurisation
	22	**Dc**	“iD” Intrinsic safety “mD” Encapsulation “tD” Protection by enclosure “pD” Pressurisation

RELEVANT REGULATIONS

Directive 94/9/CE entrusts conformed European regulations with the task of setting out basic technical requirements to guarantee safety in explosion-prone areas, replacing contrasting national and European regulations belonging to the same sector.

IEC 60079-0	Electrical systems for potentially explosive atmospheres GENERAL REGULATIONS
IEC 60079-15	Electrical systems for potentially explosive atmospheres. PROTECTION METHOD “n”
IEC 60079-10-1	Explosive atmospheres Classification of hazardous locations. Explosive atmospheres due to the presence of gas
IEC 60079-14	Explosive atmospheres Design, selection and installation of electrical equipment
IEC 60079-10-2	Explosive atmospheres Classification of hazardous locations. Explosive atmospheres due to the presence of dust
IEC 60079-31	Explosive atmospheres Fixtures with protection by “t” enclosure for use in the presence of combustible dust
IEC 60079-28	Explosive atmospheres Protection of equipment and transmission systems using optical radiation