

HAZARDOUS AREAS - ATEX AND IECEX

Guide to classification

HAZARDOUS AREAS CLASSIFICATION

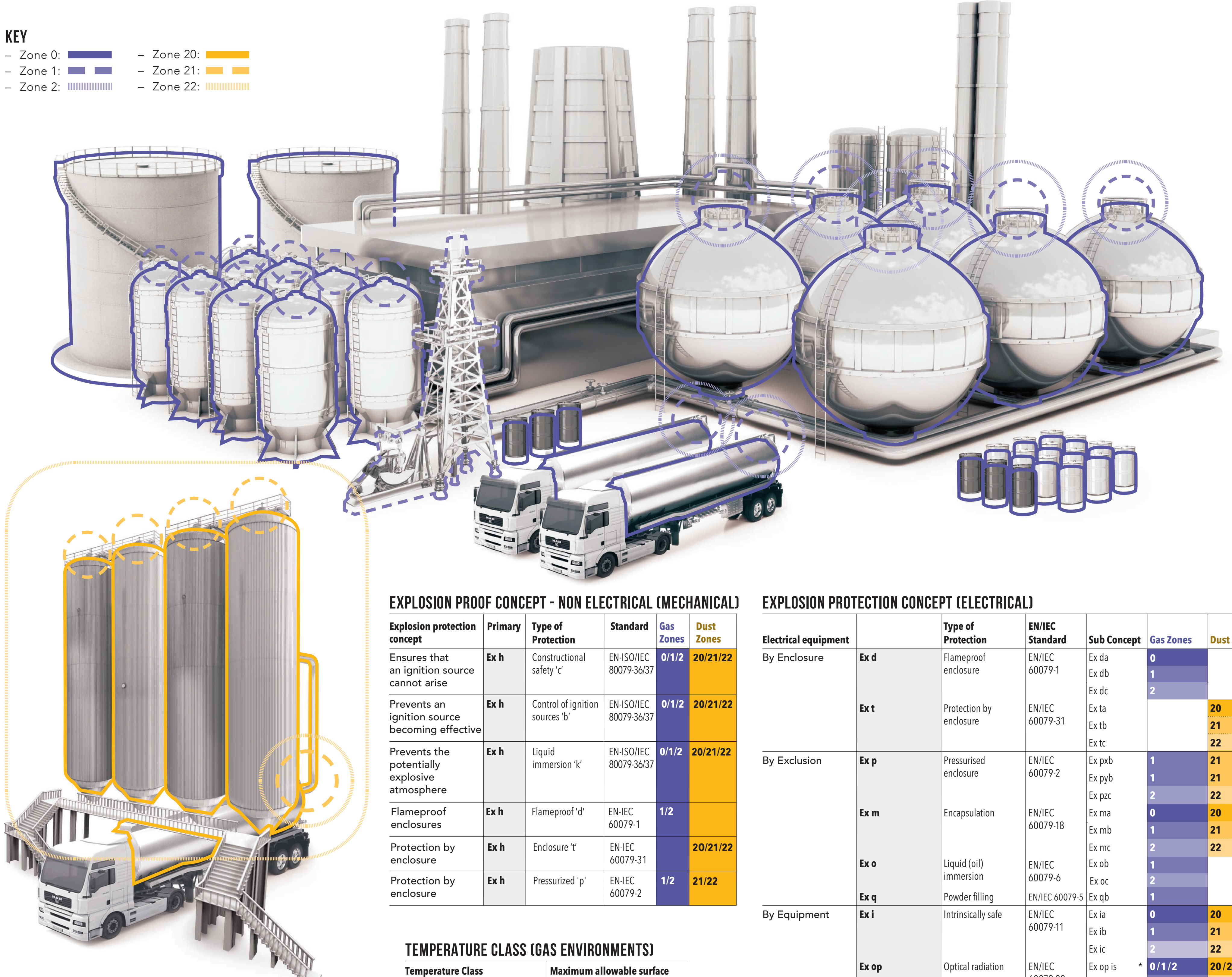
Hazardous Areas Classification		Description	ATEX		EPL	Equipment Usage
			Group	Category		
Mining	Energised	Persistent risk of methane gas and/or combustible dust	I	M1	Ma	
	De-energised		I	M2	Mb	
Gas Environments	Zone 0	Persistent and continuous presence of gas for frequent or long periods	II	1G	Ga	ATEX Equipment Category 1G, Equipment Protection Level Ga
	Zone 1	Likely occurrence of gas presence in normal operation	II	2G	Gb	ATEX Equipment Category 2G or higher, Equipment Protection Level Gb or higher
	Zone 2	Unlikely occurrence of gas presence in normal operation, short term persistence if any	II	3G	Gc	ATEX Equipment Category 3G, Equipment Protection Level Gc or higher
Dust Environments	Zone 20	Persistent and continuous presence of dust for frequent or long periods	II	1D	Da	ATEX Equipment Category 1D, Equipment Protection Level Da
	Zone 21	Likely occurrence of dust presence in normal operation	II	2D	Db	ATEX Equipment Category 2D or higher, Equipment Protection Level Db or higher
	Zone 22	Unlikely occurrence of dust presence in normal operation, short term persistence if any	II	3D	Dc	ATEX Equipment Category 3D or higher, Equipment Protection Level Dc or higher

GROUPS (GAS AND DUST)

Group	Typical		Examples
Mining	I		Methane
Gases	IIA	Propane	
		Ammonia, Methane Gasoline, Butane	
	IIB	Ethylene	
		Town gas Acrylonitril	
IIB+H2	Hydrogen		
	Carbon disulphide		
Dust	IIIC	Hydrogen Acetylene	
		Paper fibres	
	IIIA	Combustible flyings	
Flour (wheat) dust, sugar			
IIIB	Non-conductive dust		
	Metal dust (aluminium), iron		

KEY

- Zone 0:
- Zone 1:
- Zone 2:
- Zone 20:
- Zone 21:
- Zone 22:



EXPLOSION PROOF CONCEPT - NON ELECTRICAL (MECHANICAL)

Explosion protection concept	Primary	Type of Protection	Standard	Gas Zones	Dust Zones
Ensures that an ignition source cannot arise	Ex h	Constructional safety 'c'	EN-ISO/IEC 80079-36/37	0/1/2	20/21/22
Prevents an ignition source becoming effective	Ex h	Control of ignition sources 'b'	EN-ISO/IEC 80079-36/37	0/1/2	20/21/22
Prevents the potentially explosive atmosphere	Ex h	Liquid immersion 'k'	EN-ISO/IEC 80079-36/37	0/1/2	20/21/22
Flameproof enclosures	Ex h	Flameproof 'd'	EN-IEC 60079-1	1/2	
Protection by enclosure	Ex h	Enclosure 't'	EN-IEC 60079-31		20/21/22
Protection by enclosure	Ex h	Pressurized 'p'	EN-IEC 60079-2	1/2	21/22

EXPLOSION PROTECTION CONCEPT (ELECTRICAL)

Electrical equipment	Type of Protection	EN/IEC Standard	Sub Concept	Gas Zones	Dust Zones	
By Enclosure	Ex d	Flameproof enclosure	EN/IEC 60079-1	Ex da	0	
			Ex db	1		
			Ex dc	2		
	Ex t	Protection by enclosure	EN/IEC 60079-31	Ex ta		20
				Ex tb		21
				Ex tc		22
By Exclusion	Ex p	Pressurised enclosure	EN/IEC 60079-2	Ex pxb	1	
			Ex pyb	1		
			Ex pzc	2		
	Ex m	Encapsulation	EN/IEC 60079-18	Ex ma	0	20
				Ex mb	1	21
				Ex mc	2	22
Ex o	Liquid (oil) immersion	EN/IEC 60079-6	Ex ob	1		
			Ex oc	2		
			Ex qb	1		
By Equipment	Ex i	Intrinsically safe	EN/IEC 60079-11	Ex ia	0	
			Ex ib	1		
			Ex ic	2		
Ex op	Optical radiation	EN/IEC 60079-28	Ex op is	*	0/1/2	
			Ex op pr	**	1/2	
			Ex op sh	***	1/2	
Ex e	Increased safety	EN/IEC 60079-7	Ex eb	1		
			Ex ec	2		
			Ex nR	2		
Ex n	Restricted breathing enclosures	EN/IEC 60079-15	Ex nC	2		
			Sealed devices, hermetically sealed devices, non-incendive components	2		

TEMPERATURE CLASS (GAS ENVIRONMENTS)

Temperature Class	Maximum allowable surface temperature of equipment
T1	450°C
T2	300°C
T3	200°C
T4	135°C
T5	100°C
T6	85°C

* The temperature classification is based on the maximum allowable surface temperature of the equipment.
Dust: Indication of the maximum allowable surface temperature in °C

* Inherently safe optical radiation, ** Protection optical radiation, *** Optical radiation interlock

ADDITIONAL CONDITIONS (SEE CERTIFICATE)

Condition	Marking
Equipment applicable without restriction	-
Special application conditions	X
Ex device with part-certificate for assembly	U

