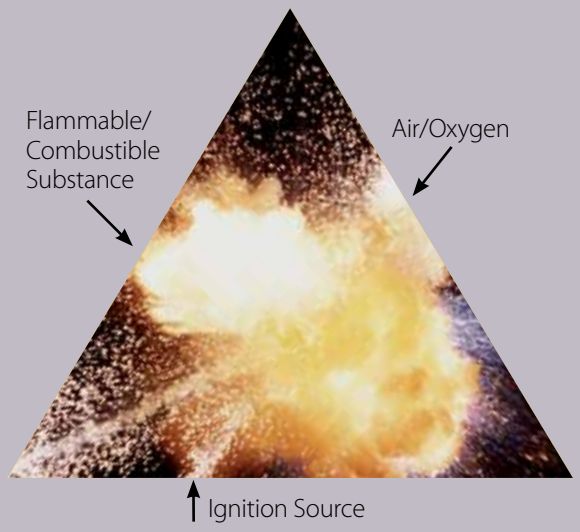
ATEX REFERENCE GUIDE

PROTECTING YOUR ADVANTAGE

Hoffman®

FIRE TRIANGLE



All three elements of the fire triangle must be present for ignition to occur.

This Hoffman ATEX Reference Guide explains European hazardous location protection methods and markings.

PROTECTION CONCEPTS

Protection Concepts	Symbol	How it Works	Category
Increased Safety	Ex e	No arcs, sparks or hot surfaces	2 & 3
Non-sparking	Ex nA		3
Flameproof	Ex d	Contain the explosion and quench flame	2 & 3
Enclosed Break*	Ex nC		3
Quartz/Sand Filled	Ex q		2 & 3
Intrinsic Safety	Ex ia	Limit energy of sparks; limit the temperature	1, 2 & 3
	Ex ib		2 & 3
Energy Limitation	Ex ic		3
	Ex nL		3
Pressurized	Ex px	Keep the flammable gas away from any hot surfaces and ignition capable equipment	1, 2 & 3
	Ex py		2 & 3
	Ex pz		3
Encapsulation	Ex ma		1, 2 & 3
	Ex mb		2 & 3
Oil Immersion	Ex o		2 & 3
Restricted Breathing	Ex nR		3
Special	Ex s	Any proven method	1, 2 & 3

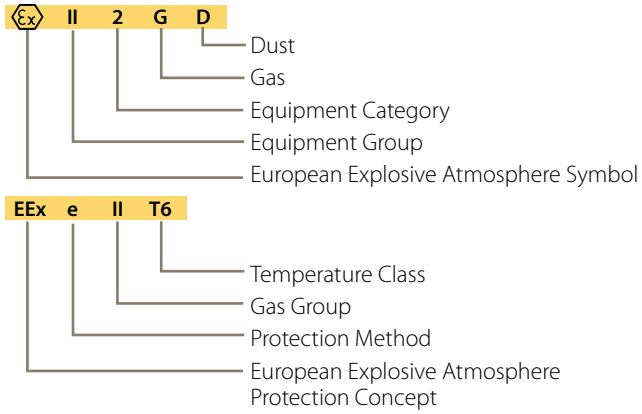
PROTECTION METHODS

Protection Methods		IEC
Intrinsic Safety	ia	60079-11
Intrinsic Safety	ib	60079-11
Intrinsic Safety	ic	60079-11
Flameproof	d	60079-1
Pressurization	p	60079-2
Increased Safety	e	60079-7
Encapsulation	m	60079-18
Oil Immersion	o	60079-6
Powder Filling	q	60079-5
Non-sparking	n	60079-15
General Requirement		60079-0
Inspection & Maintenance		60079-17

TEMPERATURE CLASSES

Max. Surface Temperature	Fahrenheit	T-Class
450° C	(842°F)	T1
300° C	(572°F)	T2
200° C	(392°F)	T3
135° C	(275°F)	T4
100° C	(212°F)	T5
85° C	(185°F)	T6*

Atex Marking Directive (94/9/EC)



CE

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ATEX

MODULES [ATEX (94/9/EC)]

[ANNEX I (1)] CLASSIFICATION OF EQUIPMENT GROUPS INTO CATEGORIES

Equipment shall be classified into the following categories				
Equipment Group	Equipment Category	Atmosphere	Protection Level	Required Protection Performance & Operation
I (Mines)	M1	Methane & Dust	Very High	Two faults, remain energized and functioning
I (Mines)	M2	Methane & Dust	High	Severe normal operation, De-energize in exp. atm.
II (Above Ground)	1	Gas, Vapor, Mist, Dust	Very High	Two faults
II (Above Ground)	2	Gas, Vapor, Mist, Dust	High	One faults
II (Above Ground)	3	Gas, Vapor, Mist, Dust	Low	Normal operation

GAS GROUPS

Typical Material	
Methane	I
Propane	IIA
Ethylene	IIB
Hydrogen	IIC
Acetylene	IIC
All Gases	II

Highlighted items represent protection provided by Hoffman ZONEX™ Enclosures, certified to meet ATEX Directive 94/9/EC and IEC Ex, Exe IIC, Gb/Ex tb IIIC Db IP66

**Applies to component populated Hoffman ZONEX™ Enclosures only.*

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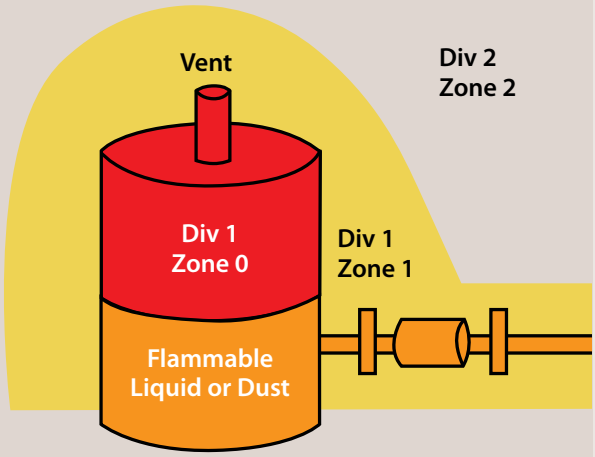
Zones and Divisions



COMPARING DIVISIONS, ZONES & CATEGORIES

Frequency of Occurrence	CEC, NEC Editions Division System	Zone System Class I, CEC, NEC	Category System ATEX
Continuous		Zone 0, 20	Category 1
Intermittent	Class I, Division 1	Zone 1, 21	Category 2
Periodically	Class II, Division 1		
Abnormal	Class I, Division 2	Zone 2, 22	Category 3
Condition	Class II, Division 2		

INGRESS PROTECTION (IP) CODES

First Number[1]		Second Number[1]	
0	No Protection	0	No Protection
1	Objects Greater than 50mm	1	Vertically Dripping Water
2	Objects Greater than 12 mm	2	75° to 90° F Dripping Water
3	Objects Greater than 2.5 mm	3	Sprayed Water
4	Objects Greater than 1 mm	4	Splashed Water
5	Dust Protected	5	Water Jets
6	Dust Tight	6	Powerful Water Jets
		7	Effects of Immersion
		8	Indefinite Immersion

ENCLOSURE TYPES

Enclosure Type[2,3]	Intended Use
1	Indoor use, limited amounts of falling dirt
2	Indoor use, limited amounts of falling water and dirt
3	Outdoor use, rain, sleet, wind blown dust, external formation of ice
3R	Outdoor use, rain, sleet, external formation of ice
3S	Outdoor use, rain, sleet, wind blown dust, external mechanisms operable when ice laden
4	Indoor or outdoor use, wind blown dust and rain, splashing water, hose directed water, external formation of ice
4X	Indoor or outdoor use, wind blown dust and rain, splashing water, hose directed water, corrosion, external formation of ice
5	Indoor use, settling airborne dust, falling dirt, non-corrosive liquids
6	Indoor or outdoor use, hose directed water, temporary submersion, external formation of ice
6P	Indoor or outdoor use, hose directed water, prolonged submersion, external formation of ice
7	Indoor use, Class I, Division 1, Groups A, B, C, and D hazardous locations, air-break equipment
8	Indoor use, Class I, Division 1, Groups A, B, C, and D hazardous locations, oil-immersed equipment
9	Indoor use, Class II, Division 1 Groups E, F, and G hazardous locations, air-break equipment
10	Mining applications
12	Indoor use, circulating dust, falling dirt, dripping noncorrosive liquids
12K	Indoor use, circulating dust, falling dirt, dripping noncorrosive liquids, provided with knockouts
13	Indoor use, lint, dust, spraying of water, oil, and noncorrosive coolant

Note:

[1] Numbers can be replaced by 'X' when the characteristic number is not required

[2] Enclosure Types for US only

[3] Enclosure Type can be converted to IP code rating; however, IP classified enclosures cannot be converted to Enclosure Type

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