

A General Guide to Hazardous Locations and Product Certification for Explosion Protected Equipment



General Information

Class and Division System (Canada, US)	
Class I	Flammable Gases, Vapours or Liquids
Class II	Combustible Dusts
Class III	Ignitable fibers and flyings
Division 1	Where ignitable concentrations can exist all of the time or some of the time under normal operating conditions
Division 2	Where ignitable concentrations are not likely to exist under normal operating conditions

Groups		
Class I	Class II	Class III
A—Acetylene	E—Metal Dust	None Specified
B—Hydrogen	F—Coal Dust	
C—Ethylene	G—Grain Dust	
D—Propane		

Correlation between Divisions and Zones			
Type of Area	Divisions	Zones	Definition
Continuous Hazard	1	0,20	A place in which a potentially flammable atmosphere is continuously present
Intermittent Hazard	1	1,21	A place in which a potentially flammable atmosphere is likely to occur in normal operation
Abnormal Hazard	2	2,22	A place in which a potentially flammable atmosphere is not likely to occur in normal operation but may occur for short periods

Zone System (IECEx, ATEX, Canada, US)		
Zone	Gas	Dust
0	20	
1	21	
2	22	

Both the USA and Canada are progressing towards full adoption of the Zone system of Classification and moving away from the Class and Division System

Temperature Classifications		
Maximum Surface Temperature	Division System	Zone System
450	T1	T1
300	T2	T2
280	T2A	-
260	T2B	-
230	T2C	-
215	T2D	-
200	T3	T3
180	T3A	-
165	T3B	-
160	T3C	-
135	T4	T4
120	T4A	-
100	T5	T5
85	T6	T6

Gas Groups		Dust Groups	
Gas Group	Representative Gas	Dust Group	Type
I	Methane	IIIA	Combustible Flyings
IIA	Propane	IIIB	Non-conductive dust
IIB	Ethylene	IIIC	Conductive dust
IIC	Hydrogen		

Material Grouping Relationship			
Division System		Zone System	
Material	Class/Group	Material	Group
Acetylene	Class I, Group A	Acetylene	IIC
Hydrogen	Class I, Group B	Hydrogen	IIC
Ethylene	Class I, Group C	Ethylene	IIB
Propane	Class I, Group D	Propane	IIA
Metal Dusts	Class II, Group E	Conductive Dusts	IIIC
Coal Dusts	Class II, Group F	Non-conductive dusts	IIIB
Grain Dusts	Class II, Group G		
Fibers/Flyings	Class III	Combustible Flyings	IIIA

Correlation between Zone, EPL and Category		
Zone	EPL	Category
0	Ga	1G
1	Gb	2G
2	Gc	3G
20	Da	1D
21	Db	2D
22	Dc	3D
-	Ma	M1
-	Mb	M2

IECEx/ATEX System



Marking and Methodology Overview ATEX/IECEx (Electrical)					
Protection Methodology	Symbol	IECEx EPL	ATEX Category	Allowed Zone	Standard Ref (ATEX: EN, IECEx: IEC)
General Requirements	-	Ga and Da	1	0	60079-0
		Gb and Db	2	1	
		Gc and Dc	3	2	
Flameproof Enclosure	da	Ga	1	0	60079-1
	db	Gb	2	1	
	dc	Gc	3	2	
Increased Safety	eb	Gb	2	1	60079-7
	ec	Gc	3	2	
Protection by Enclosure	ta	Da	1	0	60079-31
	tb	Db	2	1	
	tc	Dc	3	2	
Intrinsic Safety	ia	Ga and Da	1	0	60079-11 60079-25
	ib	Gb and Db	2	1	
	ic	Gc and Dc	3	2	
Pressurisation	pxb	Gb and Db	2	1	60079-2
	pyb	Gb and Db	2	1	
	pzc	Gc and Dc	3	2	
Encapsulation	ma	Ga and Da	1	0	60079-18
	mb	Gb and Db	2	1	
	mc	Gc and Dc	3	2	
Liquid Immersion	ob	Gb	2	1	60079-6
	oc	Gc	3	2	
Powder Filling	q	Gb	2	1	60079-5
		Gc	3	2	
Enclosed Construction	nC	Gc	3	2	60079-15
Restricted Breathing	nR	Gc	3	2	
Non Sparking	nA	Gc	3	2	
Optical Radiation	op is	Ga and Da	1	0	60079-28
	op pr	Ga and Da	1	0	
	op sh	Ga and Da	1	0	

North American Division System



Marking and Methodology Overview Division System, Class I					
Protection Methodology	Code	Country	Permitted Division	Standard Reference	
General Requirements	-	US	1,2	FM 3600	
		Canada	1,2	CSA C22.2 No 0	
Non-Incendive	NI	US	2	UL 121201/FM 3611	
	NI	Canada	2	CSA C22.2 No 213	
Explosion-Proof	XP	US	1	UL 1203/FM 3615	
	XP	Canada	1	CSA C22.2 No 30	
Intrinsic Safety	IS	US	1	UL 913/FM 3615	
	IS	Canada	1	CSA 60079-11	
Pressurized	Type X	US	1	FM 3620/NFPA 496	
	Type Y	US	1		
	Type Z	US	2		
	Type X	Canada	1		NFPA 496
	Type Y	Canada	1		
	Type Z	Canada	2		

Marking and Methodology Overview Division System, Class II					
Protection Methodology	Code	Country	Permitted Division	Standard Reference	
General Requirements	-	US	1,2	FM 3600	
		Canada	1,2	CSA C22.2 No 0	
Dust Ignition Proof	-	US	1	UL 1203/FM 3616	
		Canada	1	CSA C22.2 No 25	
Dust Protected	-	US	2	UL 121201/FM 3611	
		Canada	2	CSA C22.2 No 213	
Intrinsic Safety	IS	US	1	UL 913/FM 3610	
	IS	Canada	1	CSA 60079-11	
Pressurized	PX	US	1	FM 3620/NFPA 496	
	PY	US	1		
	PZ	US	2		
	PX	Canada	1		NFPA 496
	PY	Canada	1		
	PZ	Canada	2		

Marking and Methodology Overview Division System, Class III				
Protection Methodology	Code	Country	Permitted Division	Standard Reference
General Requirements	-	US	1,2	FM 3600
		Canada	1,2	CSA C22.2 No 0
Fibre & Flying Protection	-	US	1,2	UL 121201
		Canada	1,2	CSA C22.2 No 213
Intrinsic Safety	IS	US	1	UL 913/FM 3610
	IS	Canada	1	CSA 60079-11

INLEX Engineering are your Hazardous Area Experts and can assist with any enquiries to do with Hazardous Area as well as general Electrical and Instrumentation assistance.

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Marking and Methodology Overview ATEX/IECEx (Mechanical)					
Protection Methodology	Symbol	IECEx EPL	ATEX Category	Allowed Zone	Standard Ref (ATEX: EN, IECEx: IEC)
General Requirements	-	Ga and Da	1	0	80079-36
		Gb and Db	2	1	
		Gc and Dc	3	2	
Constructional Safety	h	Ga and Da	1	0,20	80079-37
		Gb and Db	2	1,21	
Control of Ignition Source		Gc and Dc	3	2,22	
Liquid Immersion					