폭발성 대기 및 국제 안전규격 분류

TABLE 1: GAS TYPES BY CLASS/DIVISION/GROUP AND ZONE/GROUP		
Gas	**Class/Division/Group**	**Zone**
Acetylene	A	II C
Hydrogen	B	
Ethylene	C	II B
Propane	D	II A

TABLE 2: RECONCILING CLASS/DIVISION/GROUP AND ZONE		
Hazardous Material	**Class/Division**	**Zone**
Gases/Vapors	Class 1 Division 1	Zone 0/Zone1
	Class 1 Division 2	Zone 2
Dusts	Class 2 Division 1	Zone 0/Zone1
	Class 2 Division 2	Zone 2
Fibers/Flyings	Class 3 Division 1	No Equivalent
	Class 3 Division 2	

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TABLE 3: RECONCILING IEC/ATEX AND NEC MAXIMUM SURFACE TEMPERATURE REQUIREMENTS				
IEC/ATEX		NEC		
Temperature Class	Maximum Surface Temperature °C	Temperature Class	Maximum Surface Temperature	
			°C	°F
T1	450	T1	450	842
T2	300	T2	300	573
		T2A	280	536
		T2B	260	500
		T2C	230	446
		T2D	215	419
T3	200	T3	200	392
		T3A	180	356
		T3B	165	329
		T3C	160	320
T4	135	T4	135	275
		T4A	120	248
T5	100	T5	100	212
T6	85	T6	85	185

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TABLE 4: TYPES OF EQUIPMENT PROTECTION			
Type of Protection	**Ex Code**	**Zone Suitability**	**Definition**
General Requirements	Ex	0, 1, 2	General requirements for the type and testing of electrical equipment intended for an Ex area.
Increased Safety	EX eb	1, 2	Protection for electrical equipment that does not produce arcs or sparks in normal service and under specified abnormal conditions, and for which additional measures are applied to increase protect against excessive temperatures and the occurrence of arcs and sparks.
	EX ec	2	
Non-Arcing (Sparking)	Ex nA	2	Protection for electrical equipment that in normal operation is not capable of igniting a surrounding explosive gas atmosphere, and for which a fault capable of causing ignition is not likely to occur.
Protected Facilities and Components (Containment)	Ex nC	2	Prevents sparks by containing the device using a non-ignitable, hermetic seal or encapsulant compound designed for this purpose.
Restricted Breathing	Ex nR	2	Reduces the possibility of ingress of a surrounding explosive atmosphere to a low level so the concentration of flammable gas inside the enclosure does not exceed the lower explosive limit of the gas while it's present in the external atmosphere.
Flameproof (Explosion-Proof)	Ex d	1, 2	The enclosure will withstand, without damage or causing ignition, an internal explosion of a flammable mixture that has penetrated into the interior, through joints or structural openings in the enclosure, from an external explosive gas atmosphere containing one or more of the gases or vapors against which it is designed to afford protection.

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TABLE 4: TYPES OF EQUIPMENT PROTECTION CONTINUED			
Type of Protection	**Ex Code**	**Zone Suitability**	**Definition**
Powder Filling	Ex q	1, 2	Electrical parts capable of igniting an explosive atmosphere are fixed in position and completely surrounded by glass or quartz powder filling material to prevent the ignition of an external explosive atmosphere.
Intrinsic Safety	Ex i	0, 1, 2	Protection method whereby any spark or thermal effect is insufficient to ignite a mixture of flammable or combustible material in air under prescribed test conditions.
	Ex ia	0, 1, 2	
	Ex ib	1, 2	
	Ex ic	2	
Pressurized Enclosure	Ex px	1, 2	Guards against the ingress of an explosive external atmosphere into an enclosure by filling the enclosure with a protective gas therein at a pressure above that of the external atmosphere.
	Ex py	1, 2	
	Ex pz	2	
Encapsulation	Ex ma	0, 1, 2	Electrical parts that could ignite an explosive atmosphere by sparking or heating are enclosed in a compound in such a way as to preclude ignition.
	Ex mb	1, 2	
	Ex mc	2	
Oil Immersion	Ex o	1, 2	Electrical equipment is immersed in a protective liquid in such a way that an explosive atmosphere above the liquid or outside the enclosure cannot be ignited.

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TABLE 5: INTRINSIC SAFETY EQUIPMENT PROTECTION LEVEL					
IEC				ATEX	
Group	**EPL**	**Protection Level**	**Zone**	**Equipment Group**	**Equipment Category**
I (Mines)	Ma	Very High	No zone class in Mines	I (Mines)	M1
	Mb	High			M2
II (Gas)	Ga	Very High	0	II (Surface)	1G
	Gb	High	1		2G
	Gc	Enhanced	2		3G
III (Dust)	Da	Very High	20		1D
	Db	High	21		2D
	Dc	Enhanced	22		3D