



Motors • Pumps • Controls • Power Transmission

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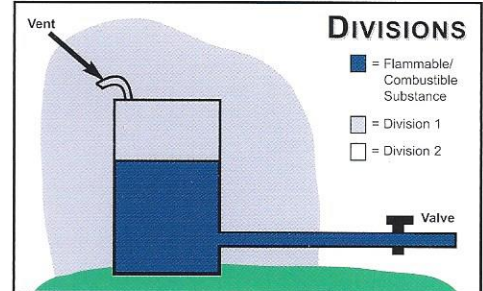
3901 Vincent Road - Linkwood, MD 21835

GUIDE TO POTENTIALLY EXPLOSIVE ATMOSPHERES & HAZARDOUS LOCATIONS

DIVISIONS & ZONES

	Gas / Dust Release	Continuous	Intermittent	Fault Condition	Standard
USA	Gas Class I Dust Class II	Division 1		Division 2	NEC® 500-3 Listed
USA	Gas	Zone 0	Zone 1	Zone 2	NEC® 505-5 Listed
IEC / Canada / EU (Europe)	Gas	Zone 0	Zone 1	Zone 2	IEC 60079-10
IEC / Canada / EU (Europe)	Dust	Zone 20	Zone 21	Zone 22	IEC 6124-3

Note: Equipment category marking for zones listed as **Category 1** for Zone 0 or 20, **Category 2** for Zone 1 or 21, and **Category 3** for Zone 2 or 22.



Division 1: Explosive atmosphere is normally present, continuously or intermittently.

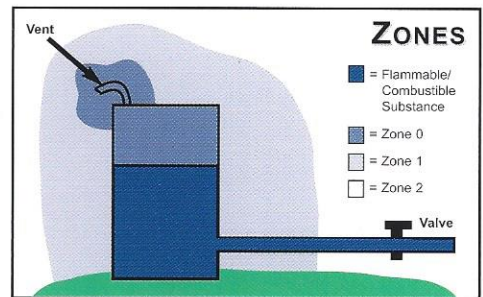
Division 2: Explosive atmosphere is present during failure or abnormal operation only.

GAS GROUP DESIGNATIONS

USA (NEC® 500) Canada (CEC®)	USA (NEC® 505)	IEC Canada (CEC®)	EU (Europe)	Gas, Dust, Fiber
Class I, Group A	Class I, Group IIC	Group IIC	Group IIC	Acetylene
Class I, Group B				Hydrogen
Class I, Group C	Class I, Group IIB	Group IIB	Group IIB	Ethylene
Class I, Group D	Class I, Group IIA	Group IIA	Group IIA	Propane
--	--	Group I*	Group I	Methane
Class II, Group E (Div 1 Only)	--	--	--	Metal Dust
Class II, Group F	--	--	--	Coal Dust
Class II, Group G	--	--	--	Grain
Class III	--	--	--	Fibers

* Not within CEC®

Note: IEC and EU Equipment Groups listed as **Group I** - Mines, and **Group II** - Above Ground.



Zone 0 and Zone 20 - Permanent presence of explosive atmosphere. Only specially designed electric motors can be used here.

Zone 1 and Zone 21 - Incidental presence of explosive atmosphere during normal duty.

Zone 2 and Zone 22 - Presence of explosive atmosphere only by accident, but not during normal duty.

PROTECTION METHODS

Protection Methods	IEC/ EU Code	IEC	EU EN	IEC, Canada (CEC®)	EU (Europe) [ATEX (1999/92/EC)] Category/ Zone	USA Code	USA (NEC® 505)	USA (NEC® 500), Canada (CEC®)	Protection Concept
Intrinsic Safety	Ex ia	60079-11	50020	Zone 0,1,2	Category 1 / Zone 0,1,2	AEx ia	Zone 0,1,2	Class I, Division 1,2	Limit spark energy and temperatures
Intrinsic Safety	Ex ib	60079-11	50020	Zone 1,2	Category 2 / Zone 1,2	AEx ib	Zone 1,2	--	
Flameproof	Ex d	60079 -1	50018	Zone 1	Category 2 / Zone 1	AEx d	Zone 1	--	Contain explosion, prevent flame propagation
Powder Filled	Ex q	60079 -5	50017	Zone 1,2	Category 2 / Zone 1,2	AEx q	Zone 1,2	--	
Explosion-proof	--	--	--	--	--	--	--	Class I, Division 1	
Pressurization	Ex p	60079 -2	50106	Zone 1,2	Category 2 / Zone 1,2	AEx p	Zone 1,2	Class I, Division 1,2	Exclude gas from ignition source
Encapsulation	Ex m	60079-18	50028	Zone 1,2	Category 2 / Zone 1,2	AEx m	Zone 1,2	--	
Oil Immersion	Ex o	60079 -6	50015	Zone 1,2	Category 2 / Zone 1,2	AEx o	Zone 1,2	Class I, Division 2	
Increased Safety	Ex e	60079 -7	50019	Zone 1,2	Category 2 / Zone 1,2	AEx e	Zone 1,2	Class I, Division 2	No arcs, sparks, or hot surfaces
Non-incandive	--	--	--	--	--	--	--	Class I, Division 2	
Non-sparking	Ex n	60079-15	50021	Zone 2	Category 3 / Zone 2	AEx n	Zone 2	Class I, Division 2	

Disclaimer: All information included in this guide is for reference only. Division/ zone, gas groups, protection methods, temperature ratings, ingress protection codes, and types of enclosures are neither determined, defined, specified by, nor the responsibility of the motor manufacturer. Information shown is based on the latest available references as of March 24, 2006.

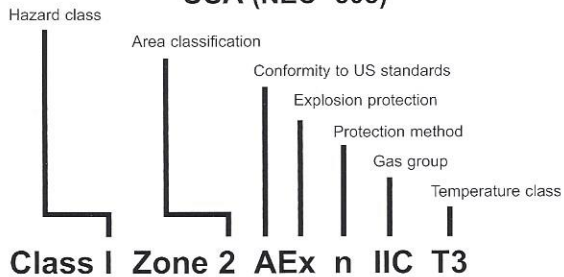
MARKINGS FOR HAZARDOUS AREA EQUIPMENT

NORTH AMERICA

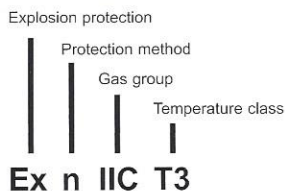
USA (NEC® 500)



USA (NEC® 505)

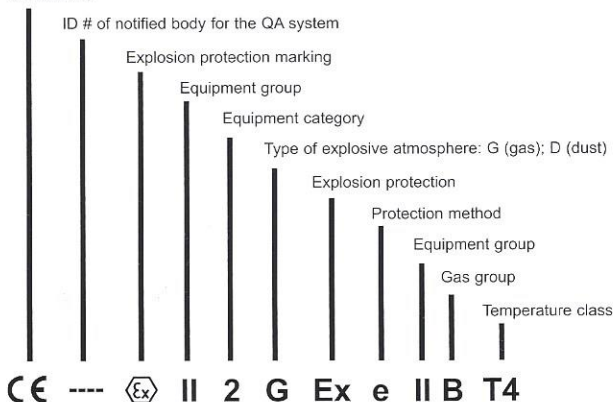


CANADA



EU (EUROPEAN UNION) ATEX DIRECTIVE (94/9/EC)

CE marking



TEMPERATURE RATINGS

Maximum Surface Temperature °C (°F)	USA (NEC® 500)	USA (NEC® 505), IEC, Canada, EU (Europe)
450 (842)	T1	T1
300 (572)	T2	T2
280 (536)	T2A	--
260 (500)	T2B	--
230 (446)	T2C	--
215 (419)	T2D	--
200 (392)	T3	T3
180 (356)	T3A	--
165 (329)	T3B	--
160 (320)	T3C	--
135 (275)	T4	T4
120 (248)	T4A	--
100 (212)	T5	T5
85 (185)	T6	T6

INGRESS PROTECTION (IP) CODES

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

* Numbers can be replaced by 'X' when the characteristic number is not required.

TYPES OF ENCLOSURES

Enclosure Type	Intended Use	Equivalent IP Code Rating ²
1 ¹	Indoor use, limited amounts of falling dirt	23
2	Indoor use, limited amounts of falling water and dirt	30
3	Outdoor use, rain, sleet, wind blown dust, external formation of ice	54
3R	Outdoor use, rain, sleet, external formation of ice	32
4	Indoor or outdoor use, wind blown dust and rain, splashing water, hose directed water, external formation of ice	56
4X	Indoor or outdoor use, wind blown dust and rain, splashing water, hose directed water, corrosion, external formation of ice	56
6	Indoor or outdoor use, hose directed water, temporary submersion, external formation of ice	67
12	Indoor use, circulating dust, falling dirt, dripping non-corrosive liquids	52
13	Indoor use, lint, dust, spraying of water, oil, and non-corrosive coolant	54

¹ Enclosure Types for US only. ² Enclosure Type can be converted to IP code rating; however, IP classified enclosures cannot be converted to Enclosure Type.



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