Hazardous Location & Lighting Fundamentals

For Complete Information, refer to the National Electric Code (NEC)

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Classes

Class I, Gases
Areas where inflammable gases or vapors may be present in sufficient quantities to produce explosive or flammable mixture.

Class II, Dust
Areas where combustible dust are present.

Class III, Fibers
Areas where ignitable fibers or flyings are present in sufficient quantities to produce ignitable mixtures.

Divisions

Division 1, Always Present
Areas where the hazardous condition normally present either continuously or periodically.

Division 2, Not Normally Present
Areas where the hazardous condition is present due to accidental rupture, breakage or unusual faulty operation of a closed container or system.

Groups

Class I
Group A - Acetylene
Group B - Hydrogen
Group C - Ether
Group D - Gasoline

Class II
Group E - Metal Dust
Group F - Coal Dust
Group G - Grain Dust

Classification of Hazardous Areas

IEC publication 60079-10 defines the guidelines for classifying hazardous areas. Instead of using Classes and Divisions, the term Zones is used as defined below.

Zone 0 - Zone 0 is an area in which an explosive gas-air mixture is continuously present or present for long periods. (This is comparable to Class I, Division 1 areas as defined by the National Electric Code). Generally, most industrial users try to keep all electrical equipment out of Zone 0 areas. The only equipment approved for use in Zone 0 applications is intrinsically safe equipment.

Zone 1 - Zone 1 is defined as an area in which an explosive gas-air moisture is likely to occur in normal operations. Zone 1 is also comparable to Class I, Division 1 applications.

Zone 2 - Defined as an area in which an explosive gas-air mixture is not likely to occur and if it does, it is only for a short period of time. (This is comparable to Class I, Division 2 location area as defined by the NEC.)

Zone 20 - A place in which an explosive dust atmosphere is continually present.

Zone 21 - A place in which an explosive dust atmosphere is likely to occur in normal operation occasionally.

Zone 22 - A place in which an explosive dust atmosphere is not likely to occur in normal operation, but if it does only occurs for short periods.

Note: Class III locations (fibers and flyings) are covered in Zone 20, 21+22 areas.

Classification Comparison

Hazardous Material	NEC U.S. Standards	IEC Standards
Gas or Vapor	Class I, Division 1	Zone 0 & Zone 1
	Class I, Division 2	Zone 2
Dust	Class II, Division 1	Zone 20
	Class II, Division 2	Zone 21, 22
Fibers or Flyings	Class III, Division 1	Zone 20, 21
	Class III, Division 2	Zone 22

Temperature Markings

Maximum Operating Temp.		Temp. (T) Code or Identification Number*
°C	°F	
450	840	T1
300	572	T2
280	536	T2A
260	500	T2B
230	446	T2C
215	419	T2D
200	392	T3
180	356	T3A
165	329	T3B
160	320	T3C
135	275	T4
120	248	T4A
100	212	T5
85	185	T6
*Based on °40 (104°F) ambient		

LED Lighting Products

Linear

CHL MHL MHLS XML XP MHD2 MHDS MHDA MAR2

Flood

LHFL SHLF LHFLJ

High-/Mid-bay

SAFJ Hi-Lumen HLHB Hi-Lumen LHFL SHLF LHFLJ

Area

HZALJ SAFR SAFJ XHBF SXPJ

Globe & Guard

AVPH BVPH

Exit & Emergency

XPEL XPEH XPS

Enclosure Types

Enclosure Type	Intended Use	Equivalent IP Code Rating
1	Indoor use, limited amounts of falling dirt	10
3	Indoor or outdoor use, rain, sleet, wind blown dust, external formation of ice	54
3R	Indoor or outdoor use, rain, sleet, external formation of ice	14
3S	Indoor or outdoor use, rain, sleet, wind blown dust, external mechanisms operable when ice laded	54
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
5	Indoor use, settling airborne dust, falling dirt, noncorrosive liquids	52
6	Indoor or outdoor use, hose directed water, temporary submersion, external formation of ice	67
6P	Indoor or outdoor use, hose directed water, prolonged submersion, external formation of ice	67
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	52
12K	Indoor use, circulating dust, falling dirt, dripping noncorrosive liquids, provided with knockouts	52
13	Indoor use, lint, dust, spraying of water, oil and noncorrosive coolant	54

Ingress Protection (IP) Codes

	First Number (Solid Objects)		Second Number (Water)
0	No Protection	0	No Protection
1	Objects Greater than 50mm	1	Vertically Dripping Water
2	Objects Greater than 12.5mm	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	Temporary Immersion in Water
–	–	8	Continuous Immersion in Water
–	–	9	High Pressure and Temperature Water Jets

UL Standards

Number	Title
781	Portable electrical lighting units for use in hazardous (classified) locations
844	Electrical lighting fixtures for use in hazardous (classified) locations
924	Emergency lighting and power equipment
1598*	Luminaires
1598A**	Marine Supplement
8750	Safety of LED Equipment

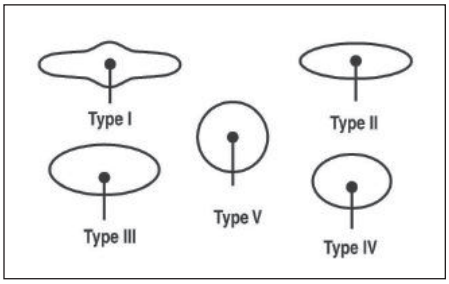
* Replaces 1570, 1571 & 1572
** Replaces 595

NEMA & ANSI/IES Floodlight Beam Descriptions

Asymmetrical beam floodlights may be designated by a combination of horizontal and vertical beam spreads in that order; a floodlight with a horizontal beam spread of 75 degrees (Type 5) and a vertical beam of 35 degrees (Type 3) would be designated as Type 5x3 floodlight.

Beam Spread Degrees	NEMA Type
10 up to 18	1
18 up to 29	2
29 up to 46	3
46 up to 70	4
70 up to 100	5
100 up to 130	6
130 and up	7

ANSI/IES Lateral Light Distributions



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FOR TECHNICAL INFORMATION AND ASSISTANCE CALL (713) 943-0340

availinfra.com/rig-a-lite

8500 Hansen Road,
Houston, TX 77075
(713) 943-0340