

HAZARDOUS LOCATION & LIGHTING FUNDAMENTALS

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



Class I

Areas where inflammable gases or vapors may be present in sufficient quantities to produce explosive or flammable mixtures.

Class II, Dust

Areas where combustible dust is present.

Class III, Fibers

Areas where ignitable fibers or flyings are present in sufficient quantities to produce ignitable mixtures.

Division 1, Always Present

Areas where the hazardous condition is 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

Groups, Class II

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

IEC publication 60079-10 defines the guidelines for classifying hazardous areas according to zones.

ZONE 0

An area in which an explosive gas-air mixture is continuously present or present for long periods. (comparable to Class I, Div I areas as defined by NEC. Most industrial users attempt 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 I

An area in which an explosive gas-air moisture is likely to occur in normal operations. (Comparable to Class I, Div I applications).

ZONE 2

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. (comparable to Class I, Div 2 locations).

ZONE 20

An area in which an explosive dust atmosphere is continually present.

ZONE 21

An area in which an explosive dust atmosphere is likely to occasionally occur in normal operation.

ZONE 22

An area in which an explosive dust atmosphere is not likely to occur in normal operations, but if it does, only for short periods.

Classification of Hazardous Areas

Hazardous Material	NEC U.S. Standards	IEC Standards	Maximum Operating Temperatures		Temperature (T) Code or Identification Number*
			°C	°F	
Gas or Vapor	Class I, Division 1	Zone 0 & Zone 1	450	840	T1
	Class I, Division 2	Zone 2	300	572	T2
Dust	Class II, Division 1	Zone 20	280	536	T2A
			260	500	T2B
	Class II, Division 2	Zone 21, 22	230	446	T2C
			215	419	T2D
Fibers or Flyings	Class III, Division 1	Zone 20, 21	200	392	T3
			180	356	T3A
			165	329	T3B
	Class III, Division 2	Zone 22	160	320	T3C
			135	275	T4
			120	248	T4A
			100	212	T5
			85	185	T6

* Based on 40° (104°F) ambient

IP Codes: Ingress Protection

1st Number (Solid Objects)

- 0 No Protection
- 1 Objects Greater than 50 mm
- 2 Objects Greater than 12.5mm
- 3 Objects Greater than 2.5mm
- 4 Objects Greater than 1mm
- 5 Dust Protected
- 6 Dust Tight

2nd Number (W)

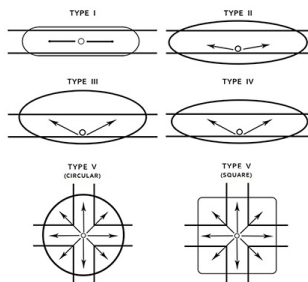
- 0 No Protection
- 1 Vertically Dripping Water
- 2 75° to 90° Dripping Water
- 3 Sprayed Water
- 4 Splashed Water
- 5 Water Jets
- 6 Powerful Water Jets/ Immersion

Beam Descriptions

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

NEMA Type Beam Spread

- 0 10° - 18°
- 1 18° - 29°
- 2 29° - 46°
- 3 46° - 70°
- 4 70° - 100°
- 5 100° - 130°
- 6 130° & up



Enclosures Types

Enclosure Type	Intended Use	Equivalent IP Code
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 laden	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