

Hazardous Location & Lighting Fundamentals

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



Classes	Divisions	Groups
<p>Class I, Gases Areas where inflammable gases or vapors may be present in sufficient quantities to produce explosive or flammable mixture.</p> <p>Class II, Dust Areas where combustible dust are present.</p> <p>Class III, Fibers Areas where ignitable fibers or flyings are present in sufficient quantities to produce ignitable mixtures.</p>	<p>Division 1, Always Present Areas where the hazardous condition normally present either continuously or periodically.</p> <p>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.</p>	<p>Class I Group A - Acetylene Group B - Hydrogen Group C - Ether Group D - Gasoline</p> <p>Class II Group E - Metal Dust Group F - Coal Dust Group G - Grain Dust</p>

Classification of Hazardous Areas	Classification Comparison	Temperature Markings																																																																	
<p>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.</p> <p>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.</p> <p>Zone 1 - Zone 1 is defined as an area in which an explosive gas-air mixture is likely to occur in normal operations. Zone 1 is also comparable to Class I, Division 1 applications.</p> <p>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.)</p> <p>Zone 20 - A place in which an explosive dust atmosphere is continually present.</p> <p>Zone 21 - A place in which an explosive dust atmosphere is likely to occur in normal operation occasionally.</p> <p>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.</p> <p>Note: Class III locations (fibers and flyings) are covered in Zone 20, 21+22 areas.</p>	<table border="1"> <thead> <tr> <th>Hazardous Material</th> <th>NEC U.S. Standards</th> <th>IEC Standards</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Gas or Vapor</td> <td>Class I, Division 1</td> <td>Zone 0 & Zone 1</td> </tr> <tr> <td>Class I, Division 2</td> <td>Zone 2</td> </tr> <tr> <td rowspan="2">Dust</td> <td>Class II, Division 1</td> <td>Zone 20</td> </tr> <tr> <td>Class II, Division 2</td> <td>Zone 21, 22</td> </tr> <tr> <td rowspan="2">Fibers or Flyings</td> <td>Class III, Division 1</td> <td>Zone 20, 21</td> </tr> <tr> <td>Class III, Division 2</td> <td>Zone 22</td> </tr> </tbody> </table>	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	<table border="1"> <thead> <tr> <th colspan="2">Maximum Operating Temp.</th> <th rowspan="2">Temp. (T) Code or Identification Number*</th> </tr> <tr> <th>°C</th> <th>°F</th> </tr> </thead> <tbody> <tr> <td>450</td> <td>840</td> <td>T1</td> </tr> <tr> <td>300</td> <td>572</td> <td>T2</td> </tr> <tr> <td>280</td> <td>536</td> <td>T2A</td> </tr> <tr> <td>260</td> <td>500</td> <td>T2B</td> </tr> <tr> <td>230</td> <td>446</td> <td>T2C</td> </tr> <tr> <td>215</td> <td>419</td> <td>T2D</td> </tr> <tr> <td>200</td> <td>392</td> <td>T3</td> </tr> <tr> <td>180</td> <td>356</td> <td>T3A</td> </tr> <tr> <td>165</td> <td>329</td> <td>T3B</td> </tr> <tr> <td>160</td> <td>320</td> <td>T3C</td> </tr> <tr> <td>135</td> <td>275</td> <td>T4</td> </tr> <tr> <td>120</td> <td>248</td> <td>T4A</td> </tr> <tr> <td>100</td> <td>212</td> <td>T5</td> </tr> <tr> <td>85</td> <td>185</td> <td>T6</td> </tr> </tbody> </table> <p>*Based on 40 (104°F) ambient</p>	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
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LED Lighting Products

<p>Linear</p> <p>CHL MHL MHLS XML XP MHD2 MHDS MHDA MAR2</p>								
<p>Flood</p> <p>LHFL SHLF LHFLJ</p>			<p>High-/Mid-bay</p> <p>SAFJ Hi-Lumen HLHB Hi-Lumen LHFL SHLF LHFLJ</p>					
<p>Area</p> <p>HZALJ SAFR SAFJ XHBF SXPJ</p>					<p>Globe & Guard</p> <p>AVPH BVPH</p>		<p>Exit & Emergency</p> <p>XPEL XPEH XPS</p>	

Enclosure Types			UL Standards	
Enclosure Type	Intended Use	Equivalent IP Code Rating	Number	Title
1	Indoor use, limited amounts of falling dirt	10	781	Portable electrical lighting units for use in hazardous (classified) locations
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	844	Electrical lighting fixtures for use in hazardous (classified) locations
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	924	Emergency lighting and power equipment
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	1598*	Luminaires
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	1598A**	Marine Supplement
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		8750	Safety of LED Equipment
9	Indoor use, Class II, Division 1, Groups E, F and G hazardous locations, air-break equipment			
10	Mining applications		* Replaces 1570, 1571 & 1572 ** Replaces 595	
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

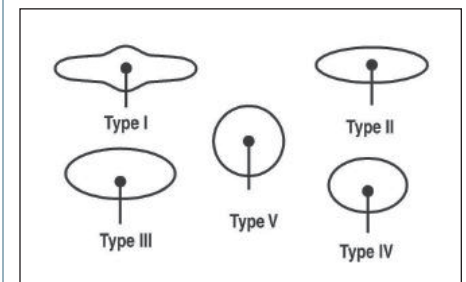
*A "K" suffix in an IP Code denotes Close-Range High Pressure and Temperature Washdowns

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



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

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