Hazardous Location Lighting Basics

Classes

Class I: Gases
Areas in which flammable gases or vapors in the air in sufficient quantities to ignite or explode.

Class II: Dust
Areas in which combustible dust may be suspended in the air or accumulates on electrical equipment in quantities sufficient to ignite or explode.

Class III: Fibers
Areas in which basically ignitable fibers or flyings are present. Typically fibers and flyings are not suspended in the air, but can collect around machinery or on lighting fixtures.

Divisions

Division 1: Always Present
Areas in which ignitable concentrations of hazards exist under normal operation conditions and/or where hazard is caused by frequent maintenance or repair work or frequent equipment failure.

Division 2: Not Normally Present
Areas in which ignitable concentrations of hazards are normally in closed containers or closed systems. Hazards may be present due to accidental rupture or breakdown of such containers or systems.

Groups

Class I: Gases
- Group A - Acetylene
- Group B - Hydrogen
- Group C - Ethylene
- Group D - Propane

Class II: Dusts
- Group E - Electrically conductive dust
- Group F - Carbonaceous dust
- Group G - Agricultural and polymer dust

IEC Zone Classifications

Zone 0 - Areas where explosive gas atmosphere is continuously present or present for long periods of time.

Zone 1 - Areas where explosive gas atmosphere is likely to occur in normal operation or can be expected to be present frequently.

Zone 2 - Areas where explosive gas atmosphere is not likely to occur and if it does, it will only be present for a short period of time.

Zone 20 - Areas in which a combustible dust, as a cloud, is present continuously or frequently during normal operations in sufficient quantities to produce an explosive mixture.

Zone 21 - Areas in which a combustible dust, as a cloud, is likely to occur during normal operations in sufficient quantities to produce an explosive mixture.

Zone 22 - Areas in which combustible dust, as a cloud, is not likely to occur, but may occur infrequently and persist for only short periods of time.

IEC publication 60079-10 uses Zones to define the guidelines for classifying hazardous areas.

Comparison

<table>
<thead>
<tr>
<th>Hazardous Material</th>
<th>NEC U.S. Standards</th>
<th>IEC Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas or Vapor</td>
<td>Class I, Division 1</td>
<td>Zone 0, 1</td>
</tr>
<tr>
<td></td>
<td>Class I, Division 2</td>
<td>Zone 2</td>
</tr>
<tr>
<td>Dust</td>
<td>Class II, Division 1</td>
<td>Zone 20</td>
</tr>
<tr>
<td></td>
<td>Class II, Division 2</td>
<td>Zone 22</td>
</tr>
<tr>
<td>Fibers or Flyings</td>
<td>Class III, Division 1</td>
<td>No Equivalent</td>
</tr>
<tr>
<td></td>
<td>Class III, Division 2</td>
<td>No Equivalent</td>
</tr>
</tbody>
</table>

UL Standards

Number | Title
--------|---------------------
8750   | LED safety
1598   | Lighting fixtures approved for ordinary locations
1598A  | Lighting approved for use on marine vessels. Salt water corrosive rated.
924    | Emergency lighting and power equipment
844    | Lighting fixtures for use in hazardous areas

Ingress Protection (IP) Codes

First Number: Solid Objects
- 0 = No protection
- 1 = Objects greater than 50mm
- 2 = Objects greater than 12.5mm
- 3 = Objects greater than 2.5mm
- 4 = Objects greater than 1mm
- 5 = Dust protected
- 6 = Dust proof

Second Number: Liquids
- 0 = No protection
- 1 = Vertically dripping
- 2 = Dripping up to 15°
- 3 = Limited spraying
- 4 = Splashing from all directions
- 5 = Hosing jets from all directions
- 6 = Strong hosing jets from all directions
- 7 = Temporary immersion
- 8 = Continuous immersion
- 9K = Steam-jet cleaning

For complete information, refer to the National Electric Code (NEC)
## ENCLOSURE TYPES

<table>
<thead>
<tr>
<th>Type</th>
<th>Fixture Use</th>
<th>IP Code Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Indoor use, limited amounts of falling dirt</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>Indoor use, limited amounts of falling water and dirt</td>
<td>22</td>
</tr>
<tr>
<td>3</td>
<td>Indoor or outdoor use, rain, sleet, wind blown dust, external formation of ice</td>
<td>55</td>
</tr>
<tr>
<td>3R</td>
<td>Indoor or outdoor use, rain, sleet, external formation of ice</td>
<td>24</td>
</tr>
<tr>
<td>4</td>
<td>Indoor or outdoor use, rain, sleet, wind blown dust and rain, splashing water, hose directed water, external formation of ice</td>
<td>66</td>
</tr>
<tr>
<td>4X</td>
<td>Indoor or outdoor use, rain, sleet, wind blown dust and rain, splashing water, hose directed water, corrosion, external formation of ice</td>
<td>66</td>
</tr>
<tr>
<td>5</td>
<td>Indoor use, settling airborne dust, falling dirt, non-corrosive liquids</td>
<td>52</td>
</tr>
<tr>
<td>6</td>
<td>Indoor or outdoor use, hose directed water, temporary submersion, external formation of ice</td>
<td>67</td>
</tr>
<tr>
<td>6P</td>
<td>Indoor or outdoor use, hose directed water, prolonged submersion, external formation of ice</td>
<td>68</td>
</tr>
<tr>
<td>7</td>
<td>Indoor use, Class I, Groups A, B, C, or D hazardous locations</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Indoor or outdoor use, Class I, Groups A, B, C, or D hazardous locations</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Indoor use, Class II, Groups E, F, or G hazardous locations</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>For use in mining applications</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Indoor use, circulating dust, falling dirt, dripping non-corrosive liquids</td>
<td>54</td>
</tr>
<tr>
<td>12K</td>
<td>Indoor use, circulating dust, falling dirt, dripping non-corrosive liquids, provided with knockouts</td>
<td>54</td>
</tr>
<tr>
<td>13</td>
<td>Indoor use, lint, dust, spraying water, oil and non-corrosive coolant</td>
<td>54</td>
</tr>
</tbody>
</table>

### T-CODES

<table>
<thead>
<tr>
<th>Maximum Operating Temperatures</th>
<th>Temperature Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>°C</td>
<td>°F</td>
</tr>
<tr>
<td>450</td>
<td>842</td>
</tr>
<tr>
<td>300</td>
<td>572</td>
</tr>
<tr>
<td>280</td>
<td>536</td>
</tr>
<tr>
<td>260</td>
<td>500</td>
</tr>
<tr>
<td>230</td>
<td>446</td>
</tr>
<tr>
<td>215</td>
<td>419</td>
</tr>
<tr>
<td>200</td>
<td>392</td>
</tr>
<tr>
<td>180</td>
<td>356</td>
</tr>
<tr>
<td>165</td>
<td>329</td>
</tr>
<tr>
<td>160</td>
<td>320</td>
</tr>
<tr>
<td>135</td>
<td>275</td>
</tr>
<tr>
<td>120</td>
<td>248</td>
</tr>
<tr>
<td>100</td>
<td>212</td>
</tr>
<tr>
<td>85</td>
<td>185</td>
</tr>
</tbody>
</table>

## HAZARDOUS LOCATION LED LIGHTING PRODUCTS - CALL: 1 (833) 4 REDSKY

### Block Series
- **Flood/High Bay**
  - Class I, Division 1, Groups C,D
  - Class I, Division 2, Groups A,B,C,D
  - Class II, Division 2, Groups F,G
  - UL 844
  - UL 1598
  - UL 1598A
  - UL 8750
  - T6 (Class I, Division 1)
  - T4A (Class I, Division 2)
  - T4A (Class II, Division 2)
  - -40°C to 60°C Ambient
  - IP66
  - Available in:
    - 80W - 10,400Lm
    - 100W - 13,000Lm
    - 150W - 19,500Lm

### Round Series
- **Area**
  - Class I, Division 2, Groups A,B,C,D
  - Class II, Division 1, Groups E,F,G
  - Class II, Division 2, Groups F,G
  - Class III
  - UL 844
  - UL 1598
  - UL 1598A
  - UL 8750
  - T4A (Class I, Division 2)
  - T5 (Class II, Division 1)
  - T5 (Class II, Division 2)
  - -40°C to 65°C Ambient
  - IP66
  - Available in:
    - 45W - 6,750Lm
    - 65W - 9,750Lm

### Linear Series
- **Linear**
  - Class I, Division 2, Groups A,B,C,D
  - Class II, Division 1, Groups E,F,G
  - Class II, Division 2, Groups F,G
  - UL 844
  - UL 1598
  - UL 1598A
  - UL 8750
  - T3C (Class I, Division 2)
  - T5 (Class II, Division 1)
  - T5 (Class II, Division 2)
  - -40°C to 55°C Ambient
  - IP66
  - Available in:
    - 40W - 5,480Lm
    - 80W - 9,820Lm

### Linear Tuff Series
- **Linear**
  - Class I, Division 1, Groups C,D
  - Class II, Division 2, Groups A,B,C,D
  - Class III
  - UL 844
  - UL 1598
  - UL 1598A
  - UL 8750
  - T3C (Class I, Division 1)
  - T5 (Class II, Division 2)
  - -40°C to 60°C Ambient
  - IP66
  - Available in:
    - 40W - 4,805Lm
    - 80W - 9,825Lm

---

**Corporate Office:**
410 Main St
Racine, WI, 53403
Phone: 1 (833) 4 REDSKY
info@redskylighting.com
www.redskylighting.com

**Manufacturing Facility:**
5301 21st St.
Racine, WI, 53406
Phone: 1 (844) 4 HAZLOC
www.redskylighting.com