## Standards and certifications

<table>
<thead>
<tr>
<th>Class/Division System</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class I</strong></td>
<td>Explosive atmosphere Class I: Gas/Vapor</td>
</tr>
<tr>
<td><strong>Class II</strong></td>
<td>Explosive atmosphere Class II: Dust</td>
</tr>
<tr>
<td><strong>Class III</strong></td>
<td>Explosive atmosphere Class III: Flyings</td>
</tr>
</tbody>
</table>

### Temperature Classes

<table>
<thead>
<tr>
<th>Temperature Class</th>
<th>Permissible Surface Temperature of Electrical Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>450°C/842°F</td>
</tr>
<tr>
<td>T2</td>
<td>300°C/572°F</td>
</tr>
<tr>
<td>T2A</td>
<td>280°C/536°F</td>
</tr>
<tr>
<td>T2B</td>
<td>260°C/500°F</td>
</tr>
<tr>
<td>T2C</td>
<td>230°C/446°F</td>
</tr>
<tr>
<td>T2D</td>
<td>215°C/419°F</td>
</tr>
<tr>
<td>T3</td>
<td>200°C/392°F</td>
</tr>
<tr>
<td>T3A</td>
<td>180°C/356°F</td>
</tr>
<tr>
<td>T3B</td>
<td>165°C/329°F</td>
</tr>
<tr>
<td>T3C</td>
<td>160°C/320°F</td>
</tr>
<tr>
<td>T4</td>
<td>135°C/275°F</td>
</tr>
<tr>
<td>T4A</td>
<td>120°C/248°F</td>
</tr>
<tr>
<td>T5</td>
<td>100°C/212°F</td>
</tr>
<tr>
<td>T6</td>
<td>85°C/185°F</td>
</tr>
</tbody>
</table>

### Class/Division System

- **Class I**: Subdivided into Classes I, IIA, IIB, and IIC. Classes I, IIA, IIB, and IIC are further divided into Groups A, B, C, D, E, F, G, and H.
- **Class II**: Subdivided into Classes II, II A, II B, II C, and II D.
- **Class III**: Subdivided into Classes III, III A, III B, IIIC, and IIID.

### Group

- **A**: Acetylene
- **B**: Hydrogen
- **C**: Ethylene
- **D**: Propane
- **E**: Metal dusts
- **F**: Carbonaceous dusts
- **G**: Combustible dusts

### Division

- **Division 1**: 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**: In which ignitable concentrations of hazards are handled, processed or used, but which are normally in closed containers or closed systems from which they can only escape through accidental rupture or breakdown of such containers or systems.

### Temperature Classes

Temperature classes designate the maximum temperature on the surface of the equipment which should not exceed the autoignition temperature of the surrounding atmosphere.

### Marking Label

Example label for a product marked with Class I, Division 1, Group B, C, D, T6 according to NEC 500, and Class I, Zone 1, IIB + H2, T6 according to NEC 505.

### Manufacturer of the Equipment

Safe operating temperature

Issuer of the certificate and certificate (file) number

Marking according to the National Electrical Code (NEC) 500-506 USA & CANADA

**Notes:**

- For dust environments, the class of the hazard (Class II) shall not be mentioned in the marking.
- Gas/dust groups:
  - **IIA**: Propane
  - **IIB**: Ethylene
  - **IIC**: Acetylene + Hydrogen, H2
  - **IIIA**: Combustible flyings
  - **IIIB**: Non-conductive dusts
  - **IIIC**: Conductive dusts

- Gas/dust groups:
  - **T1** - **T6**: Gas: T1-T6, T6: 85°C
  - **Temperature code**: Gas: T1-T6, T6: 85°C
  - **Maximum surface temperature of equipment**: 85°C

- Each Class is subdivided into Division 1 and Division 2.
  - Division defines the likelihood of the hazardous material being present in a flammable concentration. Equipment approved for Division 1 can also be used in Division 2 within the same Class.

- Zone 0 (Gas): 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.
- Zone 1 (Gas): In which ignitable concentrations of hazards are handled, processed or used, but which are normally in closed containers or closed systems from which they can only escape through accidental rupture or breakdown of such containers or systems.
- Zone 2 (Gas): Gas/dust group A:
- Zone 20 (Dust): Gas/dust group IIB:
- Zone 21 (Dust): Gas/dust group II A:
- Zone 22 (Dust): Gas/dust group IIC:
- Zone 20 (Dust): Gas/dust group IIIB:
- Zone 21 (Dust): Gas/dust group IIIC:

- Gas/dust groups:
  - **Temperature code**: Gas: T1-T6, T6: 85°C
  - **Maximum surface temperature of equipment**: 85°C

**Note:**

- For Dust Environments, the Class of the Hazard (Class II) Shall Not Be Mentioned in the Marking.
**Explosion-protected cameras**

**What's in the marking label**

- **II**
- **2**
- **D**
- **Ex**
- **T80°C**
- **Db**
- **IP68**

**Explosive atmosphere**

- **I**: Mines
- **II**: Surface industry

**Equipment category**

- **1**: Zone 0 (or 20)
- **2**: Zone 1 (or 21)
- **3**: Zone 2 (or 22)

**Surrounding atmosphere**

- **G**: Gas
- **D**: Dust

**Explosion protection**

- **t**: By enclosure
- **b**: Zone 21

**Dust group**

- **IIIA**: Combustible flyings
- **IIIB**: Non-conductive dust
- **IIIC**: Conductive dust

**Safe operating temperature**

- **80°C**

**Network cameras**

- Improve health and safety in hazardous areas
- Provide remote monitoring and maintenance

**Certification**

- IECEx certificate and marking
- ATEX certificate and marking
- EAC Ex certificate and marking

**Why explosion-protected devices**

In hazardous areas, flammable material (liquids, gas, vapor, or dust) may be present. An explosion occurs with three components: fuel, oxidizer, and energy. If one or more is removed, no explosion. A flameproof enclosure, certified for hazardous environments, prevents energy from igniting the surrounding environment. Network cameras can improve health and safety in hazardous areas by providing remote monitoring and maintenance.

**Zone system**

Zone system defines the probability that hazardous material will be present in an ignitable concentration in the surrounding atmosphere. Products marked with Zone 1 (21) can also be used in Zone 2 (22).

<table>
<thead>
<tr>
<th>Hours per year of flammable gas-air mixture or dust clouds</th>
<th>Gas</th>
<th>Dust</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 or more hours/year (10%)</td>
<td>T1</td>
<td>T6</td>
</tr>
<tr>
<td>10 &lt; hours/year &lt; 1000 (0.1% - 10%)</td>
<td>T2</td>
<td>T5</td>
</tr>
<tr>
<td>1 &lt; hour/year &lt; 10 (0.01% - 0.1%)</td>
<td>T3</td>
<td>T4</td>
</tr>
</tbody>
</table>

**Marking label**

The marking specifies the type of protection, the group of apparatus, the temperature category, and the equipment protection level. The CE mark is complemented with the ATEX Ex symbol, followed by the Group, Category and, if Group II equipment, whether the marking relates to gases (G) or dust (D).

**Explosion-protected cameras**

- Network cameras are flameproof. They may be used in hazardous areas.
- IP68 rating ensures dust and water resistance.
- IECEx and ATEX certification ensure compliance with safety standards.

**What's in the marking label**

- **II**
- **2**
- **D**
- **Ex**
- **T80°C**
- **Db**
- **IP68**

**Surrounding atmosphere**

- **G**: Gas
- **D**: Dust

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- **t**: By enclosure
- **b**: Zone 21

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