Protection for explosive atmosphere

- Electric actuators working in explosive atmosphere require a specific enclosure protection submitted to dedicated certification.
- According to market areas, there exists several types of explosion proof certifications:
  - European ATEX
  - International IECEx
  - US NEMA 7 & 9
  - Customs Union for Belarus, Kazakhstan and Russia
  - INMETRO for Brazil
  - CQST for China...

Focus on ATEX European Directive

The European directive 94/9/CE states the conditions to be met for equipment items used under potentially explosive atmosphere. It classifies the installation areas according to groups and categories:

Ex de

OR

Equipment with electric connection in increased safety "e" (tight terminal box). The remaining parts of the electric equipment are in explosion proof "d" enclosure.

Explosion proof actuator. Ex de

http://www.gpsactuator.com/
Protection by explosion proof enclosure. Connection is achieved inside the enclosure. Enclosure is resistant to internal explosion without flame path.

Explosion proof actuator. **Ex d**

**II B**

**Group I** : Equipment for underground mining.

**Group II** : Equipment for explosive atmosphere other than mining.

**A** : butane, propane,...

**B** : ethylene,...

**C** : hydrogen, acetylene

**T4**

Maximum surface temperature.

- \( T_1 = 450 \, ^\circ\text{C} \)
- \( T_2 = 300 \, ^\circ\text{C} \)
- \( T_3 = 200 \, ^\circ\text{C} \)
- \( T_4 = 135 \, ^\circ\text{C} \)
- \( T_5 = 100 \, ^\circ\text{C} \)
- \( T_6 = 85 \, ^\circ\text{C} \)

Our explosion proof products have been designed for use in GROUP II, Category 2 G (D) areas. These products shall, among other requirements, undergo a CE type examination corresponding to the sections of the CENELEC standards EN 60079, 61241, 13463

BERNARD CONTROLS can offer different levels of protection such as: Ex de, Ex d, IIB, IIC, T4, T5, T6.

Focus on North American standards: NEMA ratings

<table>
<thead>
<tr>
<th>NEMA Class</th>
<th>Group</th>
<th>Division</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 I</td>
<td>Combustible gases and vapours</td>
<td>1</td>
<td>Normal conditions</td>
</tr>
<tr>
<td></td>
<td>Group B: Hydrogen</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group C: Ether, Ethylene,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group D: Butane, Propane,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 II</td>
<td>Combustible dusts</td>
<td>2</td>
<td>Abnormal conditions</td>
</tr>
<tr>
<td></td>
<td>Group E: Metal dust</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group F: Coal dust</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group G: Flour and other dusts</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Explosion proof actuator **NEMA 7 or NEMA 9**