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**

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Ex d

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.
T1 = 450 °C
T2 = 300 °C
T3 = 200 °C
T4 = 135 °C
T5 = 100 °C
T6 = 85 °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

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applicable for each product.

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

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<tr>
<th>NEMA Class</th>
<th>Group</th>
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<tr>
<td>7</td>
<td>I Combustible gases and vapours</td>
<td>1 Normal conditions</td>
<td>Maximum surface temperature.</td>
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<tr>
<td>Group B: Hydrogen</td>
<td>Group C: Ether, Ethylene,...</td>
<td>Group D: Butane, Propane,...</td>
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<tr>
<td>9</td>
<td>II Combustible dusts</td>
<td>2 Abnormal conditions</td>
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<td>Group E: Metal dust</td>
<td>Group F: Coal dust</td>
<td>Group G: Flour and other dusts</td>
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<tr>
<td>T1 = 842 °F</td>
<td>T2 = 572 °F</td>
<td>T3 = 392 °F</td>
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<tr>
<td>T4 = 275 °F</td>
<td>T5 = 212 °F</td>
<td>T6 = 185 °F</td>
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Explosion proof actuator **NEMA 7 or NEMA 9**