

## Hazardous Area and Explosive Atmosphere Course

<b>Duration</b>	16 hours
<b>Target group</b>	Industrial area and maritime workers who deal directly or indirectly in activities in hazardous area.
<b>Prerequisites</b>	<ul style="list-style-type: none"><li>- RG and CPF;</li><li>- Passport (Expatriate);</li><li>- Have more than eighteen (18) years old;</li><li>- Have completed high school;</li><li>- Certificate of good physical and mental health conditions (ASO).</li></ul>
<b>Objective</b>	To qualify the industrial area worker and maritime worker who deals directly or indirectly in activities in hazardous area.
<b>Contents</b>	<ul style="list-style-type: none"><li>• Introduction – Concepts;</li><li>• Hazardous Area;</li><li>• A Non-Hazardous Area;</li><li>• Reasons for classification of areas;</li><li>• Classification of hazardous areas in accordance with NBR IEC 60079;</li><li>• Safety in hazardous areas;</li><li>• Signaling in hazardous areas;</li><li>• Safety procedures;</li><li>• Explosive Atmosphere;</li><li>• Combustion;</li><li>• Fire Tetrahedron;</li><li>• Oxidizer;</li><li>• Fuel;</li><li>• Combustible substances;</li><li>• Ignition;</li><li>• Sources of ignition;</li><li>• Radiant Energies;</li><li>• Chain reaction;</li><li>• Propagation;</li><li>• Rate of spread;</li><li>• Deflagration, Explosion and Detonation;</li><li>• Flash point, combustion point and ignition point;</li><li>• Process equipment: Tanks, pressure vessels, reactors, Boilers and Silos;</li><li>• Risk management;</li><li>• Danger;</li><li>• Risk;</li><li>• Types of risks;</li><li>• Preventive Measures;</li><li>• Risk analysis;</li><li>• Preventive actions with flammable liquids;</li><li>• How to manage risks of explosions;</li><li>• Illustrations of some explosions;</li><li>• Standardization and legislation;</li><li>• Penalties;</li><li>• Responsibilities;</li><li>• Tables of standards;</li><li>• Classification of areas and its characteristics;</li><li>• Procedure for classifying areas;</li></ul>

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- Flammability limits;
  - Air density;
  - Relative density of gas and steam;
  - Volatility;
  - Minimum Ignition energy;
  - Characteristics of dusts and fibers;
  - Maximum surface temperature;
  - Temperature classes;
  - Maximum temperature for dusts and fibers;
  - Group of Explosiveness;
  - Zones 0, 1, 2 and 20, 21, 22;
  - Demarcation of areas;
  - Ventilation;
  - Electrical Equipment;
  - Containment;
  - Segregation;
  - Dilution;
  - Limitation;
  - Suppression;
  - Types of protective equipment;
  - Intrinsic Safety;
  - Explosion-proof;
  - Don't Ignitable;
  - No Sparking;
  - Restricted Breathing;
  - Limited Power;
  - Protected Contacts;
  - Pressurization;
  - Increased Security;
  - Immersion in oil;
  - Immersion in sand;
  - Encapsulated;
  - Wrapper protection;
  - Special;
  - Tables of types of protection according to the zones;
  - Conventional electrical equipment specification;
  - Ex equipment specification;
  - Protection level-EPL;
  - Protection level tables according to EPL;
  - Degrees of protection IP;
  - Additional Letter;
  - Supplementary Letter;
  - IK Degree of protection;
  - Ex equipment certification;
  - Inspection of hazardous areas;
  - Ex equipment repairs.

Technical Reference: ABNT NBR IEC 60079-10-1, NR-20, NBR 15662, NR-10, NR-33, Portaria INMETRO 179/2010, ABNT NBR IEC 60079-17, ABNT NBR IEC 60079-19, ABNT NBR IEC 60079-0, ABNT NBR IEC 60079-14, ABNT NBR IEC 62262, ABNT NBR IEC 60529.

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**Exam**

Multiple choice exam with minimum passing grade of 60%.

Validity: N/A