Hazardous Area Classification and Explosion Safety Training Course



16 - 20 Nov 2026

Geneva

5900 € (Per Person)

Ref: #ERE5687_95051

Course Introduction / Overview:

This course provides a comprehensive and in-depth understanding of the principles and practices for managing explosion risks in hazardous areas. In industries where flammable gases, vapors, mists, or combustible dusts are present, a single ignition source can lead to catastrophic events, making robust safety protocols non-negotiable. This program, offered by BIG BEN Training Center, moves beyond simple compliance to instill a deep-seated competency in hazardous area classification and the correct application of explosion protection techniques. Drawing upon foundational principles outlined in key industry texts like the "Guidelines for Engineering Design for Process Safety" by the Center for Chemical Process Safety (CCPS), the curriculum systematically deconstructs complex standards such as the ATEX Directives and the IECEx Scheme. Participants will learn not just the 'what' but the 'why' behind zoning, equipment selection, and protection concepts. The course is meticulously designed to equip professionals with the skills to perform accurate explosion risk assessments, interpret complex Ex markings, and develop effective safety management systems, thereby safeguarding personnel, protecting assets, and ensuring operational continuity in high-risk environments. This training is essential for building a resilient safety culture and achieving operational excellence.

Target Audience / This training course is suitable for:

- Electrical and Instrumentation Engineers.
- Process Safety Professionals.
- Maintenance Supervisors and Technicians.
- Plant and Operations Managers.
- Health, Safety, and Environment (HSE) Advisors.
- Project and Design Engineers.
- Engineering Consultants.
- Regulatory Compliance Officers.
- Installation and Inspection Personnel.

Target Sectors and Industries:

- Oil and Gas (Upstream, Midstream, and Downstream).
- Petrochemical and Chemical Manufacturing.
- Pharmaceutical and Biotechnology Industries.
- Power Generation and Utilities.
- Mining and Mineral Processing.
- Food and Agriculture Processing (e.g., grain silos, sugar refineries).
- Wastewater Treatment Facilities.
- Aerospace and Defense Manufacturing.
- Governmental regulatory bodies and inspection agencies.

Target Organizations Departments:

- Engineering and Design.
- Maintenance and Reliability.
- Operations and Production.
- Health, Safety, and Environment (HSE).
- Project Management.
- Quality Assurance and Control.
- Technical Safety and Loss Prevention.
- Compliance and Regulatory Affairs.

Course Offerings:

By the end of this course, the participants will have able to:

- Conduct systematic hazardous area classification for both gas and dust atmospheres according to international standards.
- Interpret the detailed information contained within ATEX and IECEx equipment markings.
- Select appropriate explosion-protected (Ex) equipment based on zone classification, gas/dust group, and temperature class.
- Differentiate between various explosion protection concepts such as intrinsic safety (Ex i) and flameproof (Ex d).
- Identify and assess both electrical and non-electrical ignition sources in the workplace.
- Contribute effectively to the creation and maintenance of an Explosion Protection Document (EPD).
- Develop procedures for the safe installation, inspection, and maintenance of Ex equipment.
- Understand the legal framework and responsibilities associated with the ATEX Directives.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to be highly interactive and participant-centered, ensuring that complex technical concepts are understood and retained. We believe that adult learning is most effective when it combines theoretical knowledge with practical application. Therefore, this course moves beyond traditional lectures to include a dynamic mix of learning techniques. Sessions will feature detailed presentations, real-world case studies of major industrial incidents, and group workshops where participants will practice conducting hazardous area classification exercises on sample process diagrams. Interactive discussions are encouraged to facilitate peer-to-peer learning and problem-solving. The training will also involve hands-on analysis of Ex equipment markings and design specifications. Our expert instructors utilize a blend of visual aids, practical examples, and question-and-answer sessions to cater to different learning styles. This immersive approach ensures that participants leave not only with a comprehensive understanding of the standards but also with the confidence to apply their new skills directly to their operational environment, enhancing safety and compliance.

Course Agenda (Course Units):

Unit One Fundamentals of Explosion Safety

- Introduction to explosion phenomena.
- The fire triangle and the explosion pentagon.
- Properties of flammable materials (LFL, UFL, AIT, Flashpoint).
- Overview of key legislation and standards (ATEX, DSEAR, IECEx, NFPA).
- Legal responsibilities and the role of competent persons.
- Consequences of explosions and the importance of risk management.
- Introduction to the Explosion Protection Document (EPD).

Unit Two Hazardous Area Classification Principles and Practice

- The concept of hazardous area classification.
- Understanding sources of release and their grades.
- Classification for gas and vapor atmospheres (Zones 0, 1, 2).
- Classification for combustible dust atmospheres (Zones 20, 21, 22).
- The role of ventilation in determining the extent of zones.
- Practical examples and workshop on creating area classification drawings.
- Documentation and record-keeping for area classification.

Unit Three Electrical Explosion Protection Concepts

- Principles of protection for electrical equipment.
- Flameproof enclosures (Ex d).
- Intrinsic Safety (Ex i) and associated apparatus.
- Increased Safety (Ex e).
- Pressurization and Purging (Ex p).
- Other protection methods (Ex n, Ex m, Ex o, Ex q).
- Understanding hybrid protection methods.

Unit Four Equipment Selection and Non-Electrical Protection

- Decoding equipment markings (ATEX and IECEx).
- Understanding Equipment Protection Levels (EPLs).
- Gas groups (IIA, IIB, IIC) and dust groups (IIIA, IIIB, IIIC).
- Temperature classification (T-Class).
- Selection criteria for equipment in classified zones.
- Identifying and controlling non-electrical ignition sources (static, friction, hot surfaces).
- ATEX requirements for mechanical equipment.

Unit Five Installation, Inspection, Maintenance, and Management

- General requirements for installation of Ex equipment.
- Cabling, glanding, and termination techniques for Ex systems.
- Types of inspection (visual, close, and detailed) per IEC 60079-17.
- Maintenance strategies for different types of Ex equipment.
- Developing an effective inspection and maintenance program.
- Managing competency for personnel working in hazardous areas.
- Reviewing and updating the Explosion Protection Document (EPD).

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

Beyond compliance with directives like ATEX, how can an organization cultivate a proactive safety culture that intrinsically mitigates explosion risks at the design stage rather than relying solely on protective equipment?

What unique qualities does this course offer compared to other courses?

This course distinguishes itself by adopting a holistic and pragmatic approach that transcends mere recitation of standards and regulations. While many programs focus on the theoretical aspects of compliance, this training emphasizes the practical application and underlying engineering principles, ensuring participants understand the 'why' behind every safety measure. We delve into the nuanced relationship between process conditions, area classification, and the selection of appropriate protection concepts, a connection often overlooked. The curriculum is enriched with detailed case studies of real-world incidents, providing powerful context on the severe consequences of failure and the critical importance of diligence. Rather than just defining terms like 'intrinsic safety' or 'flameproof', we explore the design philosophies and limitations of each method, empowering participants to make informed, risk-based decisions. The course structure is designed to build competency progressively, from fundamental physics to complex management systems, ensuring a robust and lasting understanding that can be immediately applied to enhance workplace safety and operational integrity.