



**SCANDINAVIAN ACADEMY**  
For Training and Development

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# Course: Safe Handling, Operation and Maintenance of Electrical Equipment in Hazardous Areas

| Code   | City                 | Hotel              | Start      | End        | Price  | Language - Hours |
|--------|----------------------|--------------------|------------|------------|--------|------------------|
| MA-643 | Zurich (Switzerland) | Hotel Meeting Room | 2026-12-21 | 2027-01-01 | 9450 € | En - 50          |

## Course Introduction:

Working with electrical equipment in hazardous areas presents unique risks, including potential fires, explosions, and severe equipment damage. Proper handling, operation, and maintenance of electrical systems in such environments are critical to ensuring workplace safety and regulatory compliance.

This 10-day intensive training program provides professionals with in-depth knowledge and practical expertise on international safety standards, classification of hazardous areas, explosion protection techniques, and effective risk management. Participants will gain hands-on experience in inspecting, troubleshooting, and maintaining electrical systems while ensuring compliance with industry standards like IEC 60079, ATEX, and NEC 500/505.

Through theoretical instruction, real-world case studies, and practical exercises, attendees will leave with the skills needed to enhance workplace safety, improve operational efficiency, and prevent accidents in hazardous environments.

## Course Objectives:

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

- Understand the classification of hazardous areas and explosion risks.
- Identify various types of electrical equipment used in hazardous areas.



- Apply international safety standards and regulations (IEC, ATEX, NEC).
- Implement best practices for the installation and maintenance of electrical systems.
- Recognize potential hazards and apply risk mitigation measures.
- Conduct inspections, testing, and certification of explosion-proof electrical equipment.
- Develop and implement a structured maintenance and troubleshooting strategy.
- Enhance operational safety through practical risk assessment techniques.

## **Target Audience:**

- Electrical Engineers & Technicians
- Maintenance and Operations Personnel
- HSE Officers and Safety Professionals
- Project Managers working in hazardous industries
- Instrumentation and Control Engineers
- Anyone responsible for electrical safety in hazardous environments

## **Course Outline**

### **Day 1: Introduction to Hazardous Areas and Explosion Risks**

- Overview of hazardous areas and classification principles
- Sources of ignition and explosion risks
- Explosion limits and flammability characteristics
- Case studies on industrial accidents related to hazardous areas
- Safety regulations and compliance requirements

### **Day 2: Electrical Equipment for Hazardous Areas**

- Types of electrical protection techniques (Ex d, Ex e, Ex i, Ex p, etc.)
- Certification and labeling of explosion-proof equipment
- Selection criteria for electrical and electronic equipment



- Safe design and construction of hazardous area installations
- Hands-on session: Identifying and interpreting Ex markings

### **Day 3: Standards, Regulations, and Compliance**

- International standards overview (IEC 60079, ATEX, NEC 500/505)
- Hazardous area zoning classifications (Zone 0, 1, 2, and 20, 21, 22)
- Equipment protection levels (EPL) and temperature classes
- Legal responsibilities and workplace safety requirements
- Case study: Regulatory compliance in industrial plants

### **Day 4: Safe Operation and Risk Management**

- Safe operation procedures for hazardous area equipment
- Identifying early warning signs of equipment failure
- Risk assessment and hazard control strategies
- Personal protective equipment (PPE) for hazardous areas
- Emergency procedures and incident response planning

### **Day 5: Maintenance, Inspection, and Troubleshooting**

- Routine and preventive maintenance procedures
- Inspection methods for explosion-proof equipment
- Troubleshooting common electrical faults in hazardous areas
- Using specialized tools for hazardous area inspections
- Hands-on workshop: Conducting an Ex inspection

### **Day 6: Earthing, Bonding, and Static Electricity Control**

- Principles of earthing and bonding in hazardous areas
- Importance of static electricity control
- Grounding requirements for electrical installations
- Inspection and testing of earthing systems



- Practical demonstration: Measuring and verifying grounding continuity

## **Day 7: Intrinsically Safe Systems and Control Circuits**

- Introduction to intrinsic safety (Ex i) principles
- Designing and implementing intrinsically safe systems
- Safety barriers and isolation techniques
- Common issues and troubleshooting intrinsically safe circuits
- Hands-on session: Assembling and testing an IS circuit

## **Day 8: Explosion-Proof Enclosures and Junction Boxes**

- Types and classifications of explosion-proof enclosures
- Design, installation, and maintenance best practices
- Common failures and corrective measures
- Guidelines for cable glands and wiring methods
- Practical workshop: Inspecting and assembling Ex enclosures

## **Day 9: Hazardous Area Equipment Testing and Certification**

- Testing methods for hazardous area electrical installations
- Periodic inspection requirements and procedures
- Certification processes for electrical equipment
- Managing documentation and compliance records
- Practical assessment: Conducting an electrical safety audit

## **Day 10: Final Assessment**

- Review of key concepts and best practices
- Developing a structured maintenance and compliance strategy
- Mock inspection and practical competency assessment



The Scandinavian Academy for Training and Development adopts the latest scientific and professional methodologies in training and human resource development, aiming to enhance the efficiency of individuals and organizations. Training programs are delivered through a comprehensive approach that includes:

- Theoretical lectures supported by PowerPoint presentations and visual materials (videos and short films).
- Scientific evaluation of participants before and after the program to measure progress and knowledge acquisition.
- Brainstorming sessions and practical role-playing to simulate real-life scenarios.
- Case studies tailored to align with the training content and participants work nature.
- Assessment tests conducted at the end of the program to evaluate the achievement of training objectives.

Each participant will receive comprehensive training materials, including theoretical content, practical exercises, and supporting resources, provided in both printed and digital formats. Detailed reports, including attendance records, final results, and overall program evaluations, are also provided.

Training materials are prepared professionally by a team of experts and specialists in various fields. At the end of the program, participants are awarded a professional attendance certificate, signed and accredited by the Scandinavian Academy for Training and Development.

### **Program Timings:**

- 9:00 AM to 2:00 PM in Arab cities.
- 10:00 AM to 3:00 PM in European and Asian cities.

### **The program includes:**

- A daily Coffee Break provided during the sessions to ensure participants comfort.