

FIRE & GAS DETECTOR SYSTEMS FOR THE OIL & GAS INDUSTRY

"Ensuring Reliable Detection and Timely Response in Hazardous Environments"

Schedule

Date	Venue	Fees (Face-to-Face)
08 - 12 Jun 2026	London, UK	USD 3495 per delegate

► **Available delivery methods:** Face-to-Face & Online Training

Introduction

In the oil and gas industry, the consequences of fire and gas leaks can be catastrophic. Therefore, reliable detection systems are a critical component of any facility's safety strategy. From upstream installations to refineries and LNG terminals, fire and gas detection technologies must be properly designed, installed, tested, and maintained to ensure fast response and protect lives, assets, and the environment.

This 5-day intensive training provides a practical and technical foundation for understanding fire and gas detection systems used across oil and gas operations. Participants will gain knowledge of system architecture, sensor selection, installation practices, maintenance routines, and performance verification based on international standards like NFPA, ISA, and IEC.

Objectives

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

- Understand the types and functions of fire and gas detectors used in oil and gas facilities
- Design and assess fire and gas detection system layouts
- Apply zoning, coverage analysis, and detector placement techniques
- Troubleshoot, maintain, and test fire and gas systems
- Comply with global standards for installation, calibration, and safety

Why Attend

- Gain practical knowledge of fire and gas detection system components and functions
- Understand safety integrity levels (SIL) and risk-based placement of detectors
- Enhance system reliability and reduce false alarms
- Improve inspection, testing, and maintenance programs for critical systems
- Meet compliance standards required by oil and gas regulators and operators

Target Audience

This program is designed for:

- Safety and instrumentation engineers
- Fire protection and HSE personnel
- Control systems and automation engineers
- Maintenance supervisors and technicians
- Design and project engineers in oil, gas, and petrochemical sectors

Individual Benefits

Key competencies that will be developed include:

- Selection and specification of fire and gas detection equipment
- Technical understanding of detection technologies and coverage strategies
- Troubleshooting and diagnostic skills
- Standard-compliant inspection and testing practices
- Integration of F&G systems with emergency response procedures

Organizational Benefits

Upon completing the training course, participants will demonstrate:

- Improved protection of personnel and assets in hazardous areas
- Reduced risk of fire, explosion, and gas release incidents
- Higher reliability and availability of safety systems
- Stronger alignment with regulatory and industry standards
- Improved maintenance efficiency and response time

Instructional Methodology

The course follows a blended learning approach combining theory with practice:

- Technical Lectures – System components, technology comparison, standards overview
- Case Studies – Fire/gas incidents and lessons learned
- Hands-On Exercises – Detector placement planning and SIL evaluation
- System Walkthroughs – Typical design architectures and configurations
- Inspection Templates – Maintenance forms, test sheets, and audit checklists

Course Outline

Training Hours: 7:30 AM - 3:30 PM Daily Format: 3-4 Learning Modules | Coffee Breaks: 09:30 & 11:15 | Lunch Buffet: 01:00 - 02:00

Day 1: Principles of Fire & Gas Detection in Oil & Gas

- Module 1: Fire & Gas Hazards in Oil & Gas Facilities (07:30 - 09:30) • Process safety context and hazard types
- Case histories and regulatory expectations Module 2: Fundamentals of Detection Technologies (09:45 - 11:15) • Point vs open-path gas detection • Flame, heat, and smoke detectors
- Module 3: System Architecture and Control Interfaces (11:30 - 01:00) • Conventional, addressable, and intelligent systems • Integration with ESD and fire suppression systems
- Module 4: Exercise - Compare Detector Technologies (02:00 - 03:30) • Evaluate performance and suitability by zone

Day 2: Detector Placement and System Design

- Module 5: Coverage Mapping and Zoning (07:30 - 09:30) • Hazardous area classification • Detector spacing and density
- Module 6: Performance-Based Design Approach (09:45 - 11:15) • Fault tolerance and voting logic • Detection coverage analysis using software
- Module 7: Safety Integrity Level (SIL) in F&G Systems (11:30 - 01:00) • Risk reduction targets and SIFs • IEC 61508 / 61511 applications
- Module 8: Workshop - Layout a Detector Map (02:00 - 03:30) • Design layout for a sample process unit

Day 3: Installation, Commissioning, and Testing

- Module 9: Installation Best Practices and Challenges (07:30 - 09:30) • Cabling, mounting, orientation, environmental considerations • Avoiding dead zones and obstruction
- Module 10: Pre-Commissioning and Functional Testing (09:45 - 11:15) • Loop checks, signal testing, and integration • Factory and site acceptance tests (FAT/SAT)
- Module 11: Calibration and Detector Maintenance (11:30 - 01:00) • Calibration gases, intervals, and tools • Logbooks and test protocols
- Module 12: Simulation - Troubleshoot a Detector Fault (02:00 - 03:30) • Alarm testing, false alarms, and failure handling

Day 4: System Reliability, Monitoring, and Response

- Module 13: Common Failures and Alarm Management (07:30 - 09:30) • Alarm flooding, spurious trips, degraded modes • Root cause analysis and system logs
- Module 14: Integration with Safety Systems (09:45 - 11:15) • SCADA, ESD, fire panels, and annunciators • Shutdown sequences and emergency drills
- Module 15: Testing Frequency and Regulatory Compliance (11:30 - 01:00) • NFPA 72, ISA TR84.00.07, company standards • Audit preparation and documentation
- Module 16: Workshop - Prepare a Test and Maintenance Plan (02:00 - 03:30) • Develop a checklist and schedule for your facility

Day 5: Case Studies, Trends, and Final Assessment

- Module 17: Industry Case Studies - Lessons from Real Incidents (07:30 - 09:30) • Review of failures, misplacements, and poor maintenance • What could have been done differently?
- Module 18: Trends in Fire & Gas Technology (09:45 - 11:15) • Wireless detectors, smart analytics, AI integration • Remote monitoring and digital twins
- Module 19: Final Group Exercise - Design a System for a New Facility (11:30 - 01:00) • End-to-end planning for detection and response
- Module 20: Certification Review and Close-Out (02:00 - 03:30) • Course recap, group Q&A, and knowledge assessment

Certification

Participants will receive a Certificate of Completion in Fire & Gas Detector Systems for the Oil & Gas Industry, validating their ability to design, operate, and maintain industry-standard F&G systems for risk-prone environments in line with global best practices.

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