



Global Professionals Institute for Training  
معهد المحترفون العالميون للتدريب الأهلي

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## Maintain & Test Fire & Gas Detection Devices - Advanced



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## Course Description:

Historically, detection and alarm have been fire protection's first line of defense after an ignition has occurred.

As technology has improved, fires and their by-products have been detected earlier and earlier. More recently, various forms of detection and alarm have become interconnected.

At the same time, the fields of fire protection and security have grown closer together.

"Automatic Fire Detectors," has been expanded to include video-based smoke and flame detection. After describing several types of detectors (heat, smoke, gas, radiant energy, and multisensor), the course discusses detector selection, installation, maintenance, and testing.

"Gas and Vapor Detection Systems and Monitors," addresses the detection of flammable, combustible, or toxic gases and vapors that represent a hazard to the occupants or the facility.

"Carbon Monoxide Detection in Residential Occupancies." The course then outlines carbon monoxide standards and detection technologies and provides a discussion of fire service response to carbon monoxide alarms.



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## Course Objectives:

- ✓ Explain how to access and use the cause-and-effect matrix and other documents & drawings with respect to input device testing.
- ✓ Explain the maintenance & testing procedures for the F & G detection devices (i.e. Smoke, heat, gas and fire, UV, IR).
- ✓ Explain the risks & hazards associated with testing or maintaining F & G detection devices.
- ✓ Explain the permit requirements for working on this equipment/system.
- ✓ Explain the potential consequences of insufficient or inappropriate maintenance of F&G detection devices.
- ✓ Explain the importance of the positioning of Fire & Gas Detection Devices.
- ✓ Demonstrate the steps to inhibit relevant inputs and outputs using key functions on the panel to avoid unnecessary process upsets and shutdowns
- ✓ Demonstrate how to perform checks to ensure the correct visual and audible alarm is annunciated at the appropriate Instrument alarm and shutdown panel in accordance with cause-and-effect matrix.



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- ✓ Coach others on applying and implementing elements of KOC Maintain & Test Fire and Gas Detection Devices Rules and Standards.
- ✓ Record and report deviations, faults & incorrect actions during functional checks for further remedial and corrective actions.
- ✓ Demonstrate how to reinstate the fire and gas detection device correctly after testing.
- ✓ Assess the technical competence of others in implementing KOC Maintain & Test Fire and Gas Detection Devices Rules and Standards and related KOC Maintain & Test Fire and Gas Detection Devices Rules and Standards.

### Who should attend?

- Process Safety Engineer
- Process Engineer
- Instrument/ Automation/ Control Engineer/ Technician
- Maintenance / Instrumentation Technician
- Technical Safety Engineer
- Project Engineer
- Engineering/Operations Management



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## Program Syllabus

### First Day

#### Introduction:

- Overview and Definitions
- Why alarm system
- Regulation & Standards
- Detection System
- The Stages of Combustion
- Why Do We Use Flame and Gas Detectors?
- Fire and Gas Hazards
- Process Risk
- Fixed Fire and Gas Detectors are a Key Component of Fire and Gas Systems
- Flame and Gas Detectors in Fire and Gas Systems
- Fire and Gas System Actions



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## Second Day

### Detection and Alarm:

- Introduction

### Automatic Fire Detectors:

- Introduction

### Heat Detectors

- Operating Principles of Fixed-Temperature Heat Detectors
- Rate Compensation Detectors
- Rate-of-Rise Detectors
- Combination Fixed-Temperature/Rate-of-Rise Detectors
- Electronic Spot-Type Heat Detectors

### Smoke Detectors

- Ionization Smoke Detectors
- Photoelectric Smoke Detectors
- Air Sampling–Type Smoke Detectors
- Video-Based Smoke Detectors



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## Third Day

### Gas-Sensing Fire Detectors

- Semiconductor Principle
- Catalytic Element Principle
- Infrared Absorption Principle

### Multisensor And Multicriteria Detectors

### Radiant Energy–Sensing Fire Detectors

- Flame Detectors
- Spark/Ember Detectors

### VIDEO-BASED FLAME DETECTION

- Operating Principles and Applications
- Combination Video Technologies



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## Fourth Day

### Selection of Detectors

#### Detector Installation

- Detector Placement
- Spacing of Heat Detectors on High Ceilings
- Spacing of Smoke Detectors
- Special Applications

#### Detector Maintenance and Testing

- Summary

### Gas and Vapor Detection Systems and Monitors

- Introduction
- Terminology

#### Sensors

- Semiconductor (MOS) Devices
- Electrochemical Devices
- Flame Cell Devices
- Flame Ionization Devices
- Nondispersive Infrared (NDIR) Sensors



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### Fixed Gas Detection Systems

- Flammable Gas Detection
- Toxic Gas Detection
- Calibration and Maintenance
- Integration with Fire Alarm Systems

### Portable Gas Monitoring Instruments

- Flammable (Combustible) Gas Monitoring Instruments
- Toxic Gas Monitoring Instruments
- Oxygen Concentration Monitoring Instruments
- Calibration of Portable Gas Monitoring Instruments
- **Summary**



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## **Fifth Day**

### **Carbon Monoxide Detection in Residential Occupancies**

- Introduction

### **Physical Properties and Sources of Carbon Monoxide**

- Physical Properties
- Sources

### **Carbon Monoxide Hazards**

- Exposure

### **Development Of Carbon Monoxide Detection Standards**

### **Installation Of Carbon Monoxide Detection Equipment**

- Household Dwelling Units
- Hotel and Congregate Residences
- Other Commercial Occupancies

### **Carbon Monoxide Warning Equipment Alert Signals**

### **Carbon Monoxide Detector Technologies**

- Biometric
- Metal-Oxide Semiconductor
- Electrochemical



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## Response to carbon monoxide alerts

- Occupant Response
- Emergency Service Response
- Summary

## Cause And Effect Chart

## Hard Wire System Typical Configuration

- Conclusion

## Program Methodology

A highly interactive combination of lecture and discussion sessions will be managed to maximize the amount and quality of information, knowledge and experience transfer. The sessions will start by raising the most relevant questions, and motivate everybody finding the right answers. The attendants will also be encouraged to raise more of their own questions and to share developing the right answers using their own analysis and experience. Course material through power point equipped with necessary animation, learning videos, and general discussion to provide participants with full understanding concerning the subject course will be provided.

## Percentage of Delivery Methodologies

50% Presentation

20% Group & Individual Exercises

20% Case Studies

10% Active Movies and Videos



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## العرض المالي

السعر	مكان الانعقاد	تايخ الانعقاد	مدة البرنامج
1200kd	Dubai	26- 30 January 2025	5 days

### تفاصيل التكلفة :

- المحاضرة العلمية ❖
- المادة العلمية ❖
- الشهادات ❖
- بوفيه خفيف ❖



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