



HSE111

Hazardous Area

Classification and Control of Ignition Sources

Course Introduction:

This course will provide a broad overview of hazardous area classifications and the types of protection techniques involved. When electrical equipment is used in, around, or near an atmosphere that has flammable gases or vapors, flammable liquids, combustible dusts, ignitable fibers or flying, there is always a possibility or risk that a fire or explosion might occur. Those areas where the possibility or risk of fire or explosion might occur due to an explosive atmosphere and/or mixture is often called a hazardous (or classified) location/area.

Course Objectives:

Upon successful completion of this course, the delegates will be able to:

- Provide the skills required to analyze an oil, gas or chemical processing facility and establish the degree and extent of the classified area
- Provide an overview of the various codes and recommended practices developed for classifying facilities
- Provide guidelines on how to properly document your analysis and communicate to third parties who will rely on the information for design, construction and operating activities
- Introduce a number of alternative options for classifying facilities

Who Should Attend?

This course is intended for process safety engineers, mechanical, electrical and technical safety authorities and asset managers.

Course Outline:

Day 1:

Pre Test

Introduction

- Basic Concepts of Hazardous Area Classification
- History
- Electrical Ignition Hazard
- Other ignition hazards
- Types of Hazards and Examples:
 - Deepwater Horizon (Gas)
 - Buncefield (Gas & Vapor)

- Savannah, GA, (Sugar) - Static Electricity & Dust
- The Fire Triangle
- Consequences of Fire, Explosion-Releases
- What is a hazardous area according to NSI, NEC, NFPA
- Dusts, Gases – types and concentrations
- What Causes Fires & Explosions?
- Temperature and Its classification (auto ignition)
- Static Electricity
- Flash/Arc Flash, and Electrical connections
- Responsibility of the Engineer
- Standard of Care US & EU & BSE Standards
- Background History
- The Fire Triangle
- Risk of Ignition Verses Probability of Release

Codes Standards and Recommended Practices

- CEC Section 18; Code for Electrical Installations at Oil and Gas Facilities
- API RP 500, RP 505
- NFPA 497
- IEC 60079-10, ISA 12.24.01
- IP15, IGE/SR/25
- NFPA 325, IEC 60079-20

Day 2:

Definitions

- Class, Zone, Group, Auto Ignition Temperature
- Normal verses Abnormal Operations

Hazardous Materials

- What is a Hazardous Material Definitions and Examples
 - Flammable Gases
 - Flammable Liquids Classification
 - Combustible Liquids Classification
 - Flammability relationships
 - Properties of hazardous mixtures
- A Hazardous Material may not be just the risk of fire or explosion-Toxicities of Chemicals and Hazards

Day 3:

- Testing for Hazardous Areas
 - Equipment
 - Specialty Equipment
- How to Classify a Hazardous Area
 - Classification by example
 - Point Source method
 - Hybrid approach
 - Risk based approach
- The Ventilation Solution
 - Adequate verses inadequate ventilation-How good is your plan?
 - How to measure ventilation?
 - Relationship of Grade of Release and degree of ventilation to zone classification

Day 4:

- Examples and Discussion of Hazardous Area Classification Principles
 - Classification by Example - Gas Station
 - Classification by Example – Drilling Rig
 - Hybrid Method–Upstream Oil and Gas Facility
- Fugitive emission analyses & How to analyze
- Fire/Explosion Hazards from fugitive emissions
- HVAC design concepts and evaluation
- Naturally ventilated enclosed areas
- Use of gas detection & Continuous Monitors
- Use of vapor-tight barriers
- Interface with vendors packages
- Hybrid Method – Refinery
- Documentation Requirements and the report
- Err on the side of safety
- Area Classification Study Contents
- Calculations
- Area Classification Drawing Requirements

Day 5:

- Alternative Methods of Area Classification
- NFPA 497
- API Alternative Method
- RP 505 Alternative Ventilation Criteria

Course Certificate:

International Center for Training & Development (ICTD) will award an internationally recognized certificate(s) for each delegate on completion of training.

Course Methodology:

A variety of methodologies will be used during the course that includes:

- (30%) Based on Case Studies
- (30%) Techniques
- (30%) Role Play
- (10%) Concepts
- Pre-test and Post-test
- Variety of Learning Methods
- Lectures
- Case Studies and Self Questionnaires
- Group Work
- Discussion
- Presentation

Course Fees:

To be advised as per the course location. This rate includes participant's manual, Hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Timings:

Daily Course Timings:

08:00 - 08:20	Morning Coffee / Tea
08:20 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:30	Recess (Prayer Break & Lunch)
13:30 - 15:00	Last Session