

Introduction

Hazardous areas are found in a variety of industries including oil & gas processing, chemical manufacturing, shipping terminals, oil rigs, fertilizer industries and other process plants, sugar and grain handling facilities, coal and mining industries. The electrical/electronic instrumentation and controls used in these areas has to be of a special type to prevent ignition. This course covers hazardous areas, their classification, methods of protection of instruments & related equipment such as explosionproof, intrinsic safety, pressurization, increased safety and others. It also covers Fieldbus applications in hazardous areas, Certification and Labeling (including ATEX) and Maintenance/Inspections of hazardous area instruments.



We would like to express our good impression about this course. It is one of the most comprehensive, information rich and fun at the same time regarding Hazardous area classification and its equipment installation practice- Instrumentation Dept, Gulf of Suez Petroleum Company (GUPCO), Egypt

Extensive animations, graphics and actual photos of facilities, real life examples and design related calculations, easy to understand pictures and diagrams make this a wonderful learning experience.

Join the hundreds of engineers and technical staff from all over the world, from a diverse range of industries like Oil & Gas, Shipping, Power Plants, Chemical manufacturing companies, engineering design & contracting companies, automation companies, government agencies, and many other organizations, who have downloaded the course (or accessed it online) and discover for yourself how hazardous area instruments work, use the knowledge so gained to design or upgrade a much better & safer plant or facility.

There is a Self Assessment Test included as well as an option to take on Online test. Successful completion of the online test entitles learners to get a **CERTIFICATE OF COMPETENCY too!**

Though the course covers all aspects of Hazardous Area Instrumentation in detail, we understand the needs of some clients who need to train their employees using their own examples or in house standards & practices. This is easily possible by using our Customization service. Call or mail your request.

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The course consists of **six modules** listed below and they covers all aspects of hazardous areas, as given below

Module 1 : Basic Concepts

- Introduction to hazardous areas
- History Related to Mines
- Flammable Materials
- Fire Triangle
- Explosive Limits (Concept of LEL & UEL)
- Hazardous Atmosphere
- Effects of Temperature and Pressure
- Ignition Energy
- Flashpoint
- Auto Ignition Temperature
- Dust Hazards
- Explosion Pentagon

Module 2 : Classification

- Why do we classify Hazardous Areas
- More about Classification
- Different Types of Standards
- Standards Bodies (IEC)
- Standards Bodies (NFPA)
- Area Classification for Gases (IEC) Zone 0, Zone 1, Zone 2
- Area Classification for Gases (IEC)-Example
- Area Classification for Dust atmospheres (IEC) Zone 20, Zone 21, Zone 22
- Area Classification for Dust atmospheres (IEC)-Example
- Material Classification (IEC)
- Material Classification (IEC)-Examples
- MESH
- Minimum Ignition Current (MIC)
- Minimum Ignition Current Curve
- MIC Ratio
- Temperature Classification (IEC)
- Temperature Classification (IEC)-Example
- Classification of Hazardous Locations (North American system) Division 1, Division 2
- Classification of Hazardous Locations (North American system) -2
- Material Classification for Gases & Vapors (North American system)
- Classification of Gas Groups (North American System)
- Comparison between IEC and North American System
- Article 505 of the National Electrical Code
- Area Classification of Dusts (North American)
- Area Classification of Dusts (North American)-2
- Dust Groups (North American)
- Fibers and Flyings (North American)
- Temperature Classification (North American)

- Step by step area classification of gases and vapors
- Step by step area classification of gases and vapors
- Pitfalls in the classification process
- Area Classification for dusts
- Example of Area Classification-1
- Example of Area Classification-2
- Example of Area Classification-3
- Introduction to ATEX
- ATEX Directives
- ATEX Directive 94/9/EC
- ATEX Equipment and Categories
- ATEX Suitability Table
- ATEX Directive 1999/92/EC
- ATEX Directive 1999/92/EC (contd)

Module 3: Methods of Protection

- Overview of protection methods
- Explosion proof method (IEC Code Ex-d)
- Explosion proof Fundamentals-1
- Explosion proof Fundamentals -2
- Explosion proof working-1
- Explosion proof working-2
- Pressure developed in enclosures-1
- Pressure developed in enclosures-2
- Pressure Piling
- Explosion proof MESG
- Standards and practices for explosionproofing
- Explosion proof seals
- Explosion proof IEC-1
- Explosion proof IEC -2
- Dust Ignition Proof
- Explosion proof Advantages
- Explosion proof Disadvantages
- Intrinsic Safety (IEC Code Ex-i)
- Intrinsic Safety Basics
- Intrinsic Safety Resistive circuits
- Intrinsic Safety- Inductive circuits
- Intrinsic Safety- Capacitive circuits
- Minimum Ignition Current
- Resistive circuit curves
- Curves for Gas Group IIC
- Capacitive circuit curves
- Inductive Circuit curves
- Intrinsic Safety- Simple Apparatus
- Intrinsic Safety apparatus
- Intrinsic Safety Barriers - Diodes
- Intrinsic Safety Barriers- Zener Diodes
- Ordinary Diode curves
- Zener Diode Curves
- Functioning of a safety barrier-1

Working as an Electrical and Instrumentation Technician at a busy refinery I often have to undertake maintenance and install new process control components in a wide variety of locations. Not being fully aware of the the current regulations and requirements imposed on hazardous areas I took it upon myself to further my education in this field, I purchased the Hazardous Area Instrumentation e-learning course by Abhisam. I found this product to be very informative and easy to understand. It is a very useful tool to have on hand when determining zones, temperature classifications, Gas groups and equipment selection for use in different areas. The price of the product compared with others is fantastic and I personally recommend that any technician working in this field should own a copy.

*M.Dempsey
Western Australia*

- Functioning of a safety barrier-2
- Safety Description of barriers
- Zener Barrier example
- Zener Barrier earthing
- Isolators
- Isolator details
- Infallible components
- Entity Concept
- Cable Parameters & L/R ratio
- Ex-ia, Ex-ib, Ex-ic
- Intrinsic Safety parameters
- Matching of IS parameters
- Designing an Intrinsically Safe loop -example
- Intrinsic Safety design example (contd)
- Intrinsic Safety Advantages/Disadvantages
- Pressurization & Purging
- Types of Pressurization
- Pressurization- Type X,Y,Z
- Pressurization-IEC Norms Ex-px,py,pz
- Pressurization-advantages & disadvantages
- Increased Safety Introduction
- Increased Safety-Construction
- Creepage & clearances
- Overloads
- Increased Safety-Advantages & disadvantages
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- Non arcing equipment
- Ex-nA and Ex-nL differences
- Nonincendive-Advantages & disadvantages
- Encapsulation
- Powder filling & oil immersion
- IEC Equipment Protection Level (EPL)
- IEC Protection Methods Summary
- Weather Protection
- Weather Protection-NEMA codes for indoor nonhazardous locations
- Weather protection- NEMA codes for outdoor nonhazardous locations
- NEMA Hazardous locations
- Ingress Protection codes (IP codes)
- IP Codes chart
- Comparison NEMA and IP

Module 4 : Fieldbus Application

- Fieldbus in Hazardous Areas
- Fieldbus using traditional Explosion proof methods
- Fieldbus using Intrinsic Safety-1
- Fieldbus using Intrinsic Safety-2
- Fieldbus using Intrinsic Safety-3
- Fieldbus using Intrinsic Safety-4
- Fieldbus using Intrinsic Safety-5
- Fieldbus using Intrinsic Safety-6
- Fieldbus using Intrinsic Safety-7
- Fieldbus Entity Calculation example

- FISCO
- FISCO Toplogy
- FISCO Conditions
- FISCO Advantages
- FNICO
- FNICO with repeaters
- FNICO and Ex-ic
- Field barriers and High Energy Trunks

Module 5 : Certification

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- Certification Bodies
- Marking & Labeling-1
- Marking & Labeling-2
- ATEX Marking
- Marking and Labeling-example 1
- Testing
- Hexagon Ex and CE marks
- Marking and Labeling-example 2
- The IEC Ex system

Module 6 : Inspections and Maintenance

- Introduction and General Guidelines
- Inspections
- Explosion proof equipment-1
- Explosion proof equipment-2
- Explosion proof equipment-3
- Explosion proof equipment-4
- Explosion proof equipment-5
- Intrinsically Safe equipment-1
- Intrinsically Safe equipment-2
- Intrinsically Safe equipment-3
- Intrinsically Safe equipment-4
- Dust Ignitionproof equipment
- Purged and Pressurized equipment

Self Assessment Test

Online Test (On passing you get a Certificate of Competency)



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