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# Instrumentation in Hazardous Areas

## INTRODUCTION

- Instrumentation is part and parcel of the modern world. Measurements are taken in many different forms. These could be pressure, temperature, level, flow, et cetera. Furthermore, the signals could either be discrete or analogue in nature. But very many organizations do not always have the benefit of operating in safe areas. Many organizations have to contend with hazardous areas, and instrumentation in these areas cannot be eliminated.
- This training course aims at bridging the all-important areas of using instrumentation, but safely in a hazardous environment.

This training course will highlight:

- Identifying and quantifying hazardous areas
- Selecting appropriate instrumentation and other electrical equipment that can be used in a hazardous area
- Implementing the different explosion protection methodology, and understanding the operation
- Installing, inspecting, and maintaining equipment that has been certified for a hazardous area

## OBJECTIVES

- This training course is aimed specifically at instrumentation, and its use in a hazardous area. The whole idea is to provide a global perspective, with hazardous area as the focal point.

By the end of this training seminar, you will be able to:

- Define hazards, and classify hazardous material
- Understand risk, and eliminate sources of ignition
- Fully understand and implement area classification and types of explosion protection apparatus
- Have a full understanding of instrumentation, and their interaction with various gas groups and temperature classes
- Have a full grasp of the installation and maintenance of an assortment of explosion protection equipment
- Understand inspection of instrumentation in hazardous areas
- Implement documentation of all equipment in a hazardous area



## TRAINING METHODOLOGY

- Participants to this training course will receive a thorough training on the subjects covered by the seminar outline with the Tutor utilizing a variety of proven adult learning teaching and facilitation techniques. Seminar methodology would include theoretical presentation sessions, individual exercises, group exercises, practical demonstrations, and pre and post-course evaluations. Delegates are encouraged to ask questions wherever possible, and group discussion is used as a training tool.

## ORGANISATIONAL IMPACT

- Companies that utilize hazardous areas, would know that safety is of paramount importance. Incorrect installations, as well as lack of knowledge may not only lead to loss of production but may also lead to loss of life. Thus, knowledge shared on this workshop is vital to the organization. Employers will have peace of mind that the employees are comfortable and familiar with:
  - International best practice in explosion prevention
  - The ability to classify hazardous areas correctly
  - The ability to choose equipment that is appropriate to a hazardous area
  - Inspect, review, and maintain existing equipment.

## PERSONAL IMPACT

- Explosion hazards, and how to protect an installation from these
- Understanding zone classification, apparatus grouping and temperature classes
- Carrying out area classification, and defining specifics applicable to these
- Having a full understanding of flammable materials, and how this can influence hazardous areas
- Understanding hazardous area certification labels.

## WHO SHOULD ATTEND?

- This training course is aimed at anybody that would need to know about the use of instrumentation in a hazardous area. This will include individuals responsible for selection, installation, and maintenance. Of course, these individuals could be found at many different levels.

This training course is suitable to a wide range of professionals but will especially benefit:

- Instrumentation and electrical personnel responsible for the installation and maintenance of instrumentation in hazardous areas
- Engineers and management responsible for the purchase of equipment in hazardous areas
- Supervisors and operators that may use information from instrumentation in hazardous areas, and who would be responsible for keeping these areas safe
- Mechanical, electrical and process engineers who are involved in projects that have hazardous areas



- Safety officers, financial supervisors, and procurement personnel

## Course Outline

### Introduction and Basics

- Introduction and history
- Fires and explosions
- Explosive materials
- Critical definitions (such as flashpoint, boiling point, low explosive level, et cetera)
- Area classification
- An in-depth look at sources of hazard, release, zoning, et cetera

### Centrifugal Compressors

- Matching apparatus in hazardous materials to energy and ignition characteristics
- Looking at sources of ignition
- Understanding static electricity and friction, as well as how sparks can be generated in various forms
- Understanding the methods of protection
- Weatherproofing, corrosion, etc

### Cabling, Installation, and Inspection

- Ex i intrinsic safety
- Ex d flame proofing
- Cabling, screening and earthing
- Ex e increased safety
- Creepage and clearance
- Equipment inspection

### Cabling, Installation and Inspection

- Ex p pressurized apparatus
- Ex n protection
- Ex m
- Ex o
- Ex q
- Ex s
- Labelling and certification



## Installation, Inspection and Maintenance, Legislation, and Record-Keeping

- Installation and maintenance in-depth
- Codes of protection
- Cabling and cable entry
- Equipment inspection
- Legal aspects
- Putting everything together



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