



Training Program:

Hazardous Area Classification In The Industrial Plant

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Introduction:

Hazardous Areas occur in many industries but they are most commonplace in the oil and gas, petrochemical and chemical industries. Electrical Equipment used in hazardous areas must be selected to suit the potentially explosive atmosphere and it must be installed and maintained in such a way that its protective function is not compromised. This training seminar is intended to give an in depth understanding of hazardous areas from the initial nature of the problem with some case studies of industrial accidents, through the identification and classification of the hazard, selection and use of protected and finally the administration of hazardous areas in terms of record keeping and certificates.

FORMAT & PREREQUISITES

This five-day seminar is a single and comprehensive training package spread over 5 days which involves a combination of formal lectures, practical exercises, demonstrations and written exercises. It is primarily aimed at electrical, instrument and safety craftsmen or managers. It is assumed that most attendees will be familiar with industrial electrical practice although specific prior knowledge of hazardous areas is not a prerequisite.

Who Should Attend?

Individuals involved with process industry fieldwork including safety officers, management, plant operators, maintenance personnel and construction.

Course Objectives:

This training seminar will provide a clear understanding of hazardous area current custom and practice with particular respect to the following:

- Defining the hazard, classifying hazard materials, understanding the nature of the risk and the necessity to eliminate sources of ignition
- The relationship between area classification and the various different types of Ex apparatus
- The relationship between electrical equipment and gas groups and temperature classes
- The installation and maintenance of the different types of equipment i.e. flameproof, increased safety, intrinsic safety etc.
- The need for, and typical approach to, electrical equipment inspection.
- The documentation of the hazardous area

Course Outline

Day One

INTRODUCTION & HISTORY

- A brief history of Industrial fires and explosions.

MATERIALS

- Understanding the important characteristics of hazard materials and how they behave when they are ignited. Looking at the data tables and seeing how, Flash point, boiling point, L.E.L. etc. influence our approach to the materials.

AREA CLASSIFICATION

- A look at the techniques and the procedures that result in the formal allocations of zones zero, one and two.
- Sources of Hazard, duration of release, extent of zones, calculations nature of hazard and release characteristics.

DAY 2

AREA CLASSIFICATION EXERCISE

- An exercise carried out in syndicate groups where a small plant is classified against the IP code of practice. This will give attendees a much clearer idea of what zone 0, zone1, and zone2 really mean at their own place of work

APPARATUS GROUPS AND TEMPERATURE CLASSES

- How apparatus and hazard materials are matched together in terms of ignition energies, flame transmission characteristics and ignition temperatures. How groups and T Classes have changed over the years and from country to country and where to find the information to make comparisons.

SOURCE OF IGNITION

- A look at some of the possible sources of ignition, e.g. static electricity, light metal thermite reactions, friction etc., which can occur in hazardous areas. Also considering some of the steps which can be taken to eliminate them.

METHODS OF PROTECTION

- Considering the recognised methods of protection. The fundamental concept in each case and the zones in which they may be employed
1. Ex d Flameproof
 2. Ex i Intrinsic Safety
 3. Ex e Increased Safety
 4. Ex p Pressurised
 5. Ex N Type N
 6. Ex m, Ex o, Ex q, Ex s.

EXERCISE

- A written exercise in which the relationship between zones, Apparatus groups, temperature classes and certifies electrical equipment is examined.

Ex d FLAMEPROOF

- Considering in depth the concept of Flameproof protection, how it works, how is must be installed, how it must be inspected & maintained. Looking at weatherproofing, corrosion, gaps, fasteners, etc.

DAY 3

EQUIPMENT INSPECTION EXERCISE SESSION 1

- Examining samples and answering questions about them.

INTRINSIC SAFETY

- As for flameproof, an in depth look at the subject considering minimum ignition energies, associated apparatus and systems, simple apparatus, IS clean earth, floating systems, system matching, etc.

INTRINSIC SAFETY INSTALLATION

- Segregation of cables, screens and armour, earthing and bonding, induction and invasion, creepage and clearance etc.

INCREASED SAFETY

- An in depth look at this concept of protection making comparisons with flameproof, and stressing the vital importance of correct installation. Also looking at weatherproofing IP rating, CTI, stoppers and bolts, derating etc.

EQUIPMENT INSPECTION EXERCISE SESSION 2

DAY 4

Ex p PRESSURISED APPARATUS

- A close examination of this method of protection, what it can be applied to, when certification is possible and how to maintain it. Where pressurised rooms fit in and how uncertified pressurised enclosures may be used in zone 2.

TYPE N

- A thorough examination of type N considering non-sparking, enclosed break, energy limitation, and restricted breathing concepts. Also making comparisons with the concepts of protection already covered in detail.

THE LESS COMMON TYPES OF PROTECTION

- A look at Ex m, Ex o, Ex q, and Ex s considering each in turn and pointing out the safety critical features. Also considering combined or dual certification and the combination of many concepts of protection into one item of equipment.

EQUIPMENT INSPECTION EXERCISE SESSION 3

LABELS, MARKING AND CERTIFICATES

- A look at the codings, certificate numbers and other essential markings on labels and certificates. Including a paper exercise to identify equipment and assess its suitability for given environment.

DAY 5

INSTALLATION, INSPECTION AND MAINTENANCE

- Considering the guidance of National codes of practice in terms of wiring and cabling, identification, isolation, inspections and maintenance. Examining inspection schedules and referring back to the concepts of protection to ensure that the attendees are comfortable with the inspection requirements for all types of equipment. Prioritising repairs, i.e. which failures are immediately life threatening and which could become so in time.

CABLE ENTRIES

- Considering cable and conduit entries to all types of enclosures and protection concepts. Also looking at adapters and reducers, plugs and correct selection in each circumstance.

EQUIPMENT INSPECTION EXERCISE FINAL SESSION

LEGISLATION

- What the Law has to say, standards, certificates, codes, European directives, the HSE and how it all ties together.

ADMINISTRATION AND RECORD KEEPING

- Considering the records that should be kept by a company in order to manage a hazardous area installation.

GENERAL DISCUSSION: ANY OUTSTANDING QUESTIONS.

ANSWERS TO THE INSPECTION EXERCISE.

Accreditation:

BTS attendance certificate will be issued to all attendees completing a minimum of 80% of the total course duration.