



Ex Hazardous equipment

3 Day Training Course



Scope The training would take place over three days, the three days being knowledge transfer in a suitable training room. The lists below are the subject headings to be covered in the classroom followed by a more detailed description of the topics covered.

- Part 01 Hazardous Areas and General Principles.
- Part 02 Standards, Certification and Marking IEC, ATEX and North American
- Part 03 Flameproof Ex 'd' Protection Type
- Part 04 Wiring Systems
- Part 05 Inspection and Maintenance
- Part 06 Increased Safety Ex 'e' Protection Type
- Part 07 Non-Incendive Ex 'n' Protection Type
- Part 08 Pressurization Ex 'p' Protection Types
- Part 09 Intrinsic Safety Ex 'i' Protection Types
- Part 10 Other Types of Ex Protection
- Part 11 Combined Types Of Ex Protection

Part 01 Hazardous Areas and General Principles.

General Principles of explosions, fire triangle, sources of ignition, LEL, UEL, Flammable ranges, Flash point, MIE, Ignition temperature, Oxygen enrichment, T Classification (ATEX, IEC, N America), Ambient Temperature, Vapor density, Area Classification definition, drawings (ATEX, IEC, N America), Gas/Dust groups and sub divisions (ATEX, IEC, N America), Ingress Protection, NEMA Guide.

Part 02 Standards, Certification and Marking IEC, ATEX and North American

History of electricity use in Hazardous environments, Standards (ATEX, IEC, N America), Notified Bodies, ATEX Explained, Manufacturing Standards, Product certification, Certification process, Evolution of Standards, Certification marking ATEX, IEC, Equipment Protection Levels (EPL), Data plate information.



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Part 03 Flameproof Ex 'd' Protection Type

Exd Standards, Definition, Construction, Flame path joints, IIC Gases and Acetylene, Influence of gap dimensions, Typical equipment and materials including motors, Alternative flame paths, Cable and Gland entries, Unused apertures, Pressure piling, Obstruction of flame paths, Weather proofing, Direct and Indirect entry, Overload and short circuit protection (Electrical design), Modification of equipment, Maintenance checklist.

Part 04 Wiring Systems

IEC 60079-14, Qualification of personnel, Fixed apparatus, Aluminium conductors, Portable and transportable equipment, Cable types and gland requirements, Cold flow, Jointing of cables, Gland selection, Conduit selection, Sealing of conduit, Containment systems containing light metals, Intrinsic circuit - cable selection, Earthing and Bonding, Static electricity, Lightning protection, Cathodic protection.

Part 05 Inspection and Maintenance

IEC 60079-17, Qualification of personnel, Manufacturers recommendations, Principal causes of deterioration, Grades and Types of Inspection, Off and on site preparation, Required documentation, Repair details, Maintenance of spare parts.

Part 06 Increased Safety Ex 'e' Protection Type

Exe Standards, Definition, Construction, Certified terminals and components, Creepage and clearance distances, Grades of Insulation, Installation and maintenance, Exe motors and "Te" times,

Part 07 Non-Incendive Ex 'n' Protection Type

Exn Standards, History and development of Exn, Definition, Construction, Certified terminals and components, Additional protection nA, nC, nR, nZ, nL,

Part 08 Pressurisation Ex 'p' Protection Types

Exp Standards, Definition, Construction, pX, pY, pZ, Monitoring systems, Applications, Purge cycle, Enclosures, Safety requirements, Protective gas, Nitrogen, Control circuit and Safety devices, Ductwork, Pressurisation techniques, Temperature class.

Part 09 Intrinsic Safety Ex 'i' Protection Types

Exi Standards, Definition, Advantages, System designer, Basic Principles, System concepts, Associated apparatus, The Zener barrier, Galvanic and optical isolators, Levels of protection, Ignition curves, Is earthing, Enclosures, Simple apparatus, Energy storage, Installation practices, Cable screens.

Part 10 Other Types of Ex Protection

Definitions and basic principles of the Ex protection methods, Exm, Exo, Exq, Exs, Definitions and basic principles of the non electrical equipment Ex protection methods.

Part 11 Combined Types Of Ex Protection

Definition and description on combined or Hybrid methods of Ex protection concepts.

There will also be scope for a detailed inspection of the clients own equipment that has been previously installed as a practical exercise in inspection to maintain certification conformity.