Experience in the design, manufacture and installation of typical Cathodic Protection equipment for use in hazardous areas.

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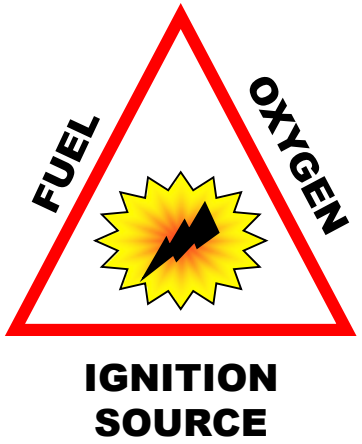
Basic Principles Of Explosive Atmospheres

- Mixture of air under atmospheric conditions and flammable substances in the form of gases, vapours, mists or dusts in which, after ignition has occurred, combustion spreads to the entire unburned mixture.
- Atmospheric conditions typically:
  - -20°C to +40°C
  - 0.8 to 1.1 bar
- Ignition sources:
  - Electric arcs and/or sparks
  - Flames
  - Electrostatic sparks
  - Mechanical sparks produced by grinding

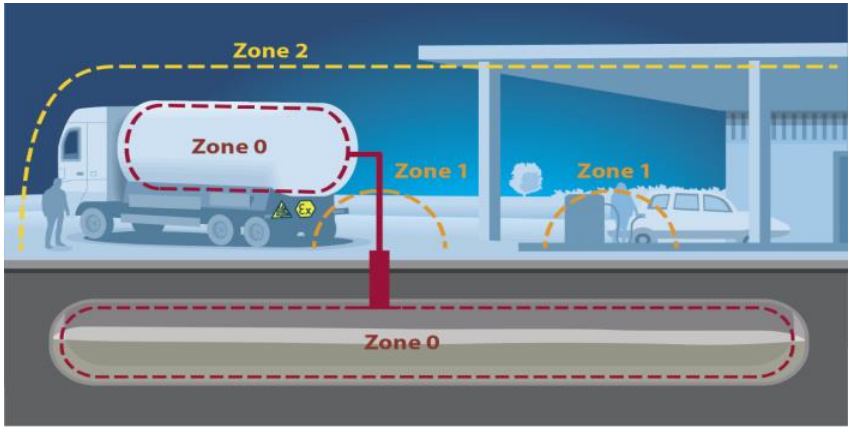


Differences between IECEx and ATEX

- Main difference between them is that ATEX 95 is law-driven and IECEx 02 is standard-driven.
- ATEX and IECEx both use the same standards (eg EN-IEC 60079-0), so in terms of technical content, there is basically no difference. Only visible difference is in many cases the marking on the device.
- **ATEX 95**
- ATEX 95 directive is leading in the EU, which contains general requirements for products in the EU. To meet these requirements the underlying standards (eg EN-IEC 60079-0) can be used. The fact that the directive provides information on general requirements and standards may be used as aid means that there is more room for interpretations and deviation from the requirements of the standards is possible.
- **IECEx 02**
- For IECEx the standards are leading, which means that products must meet the relevant requirements in the standards. Within IECEx 02 there is little room for interpretations and deviations from the standards are almost impossible.
- **Quality System**
- ATEX and IECEx both have a quality assurance system. Besides the product certification, in both cases a quality system must be set up by the manufacturer and will periodically be checked by a Notified Body. For both systems, the quality system is mainly based on ISO 9001 with additional requirements for the design, manufacture and testing of explosion proof products.

Area Classifications

- Zone 0
  - A place in which an explosive atmosphere is present continuously, for long periods or frequently.
- Zone 1
  - A place in which an explosive atmosphere is likely to occur in normal operation, occasionally.
- Zone 2
  - A place in which an explosive atmosphere is not likely to occur in normal operation but, if it does occur, will persist for a short period only



Protection Types – Exia / Exib / Exic Intrinsically Safe

- Intrinsic safety is a protection technique that limits the energy, both electrical and thermal, available for ignition.
- In signal and control circuits that can operate with low currents and voltages, the intrinsic safety approach simplifies circuits and reduces installation cost over other protection methods.
- High-power circuits such as electric motors or lighting cannot use intrinsic safety methods for protection.

Protection Types – Exd Explosion Proof

- Ex d or explosion proof is a commonly used protection technique for safe operation of electrical equipment in hazardous areas. An Ex d enclosure is a substantial metallic construction that is designed to control any explosion that may happen inside it and prevent it's transfer to the outside world. This allows you to use almost any components inside an Ex d enclosure.

Protection Types – Exe Enhanced Safety

- Ex e or explosion proof is another commonly used protection technique for safe operation of electrical equipment in hazardous areas. An Ex e enclosure can be a metallic, or plastic, it is designed to only contain equipment that will not create a spark under operation therefore the components that you can use in this enclosure type are limited.

Protection Types – Exo Oil Encapsulated

- Ex o or oil encapsulated is a more rarely seen protection concept it relies on the presence of insulating oil for spark protection
- Circuitry needs to be present to ensure the oil doesn’t overheat and is always present, i.e. level control

Protection Types – Exp Air Purged

- Ex p or air purged is another rarely used protection concept, it is relatively expensive but does give benefits in that the contents are not as restricted as Ex e. An Ex p enclosure purges clean air through an enclosure at a pressure slightly above atmospheric, this ensures that only clean air can leak into the hazardous area and no flammable contaminants can enter the enclosure.

The limitations between component and system certification

- Component Certification certifies only the component.
  - If you purchase an enclosure and add terminals or glands you would need to self-certify the system.
- System certification certifies a system, generally an enclosure with components
  - Purchasing an integrated system rules out this restriction.

Installation and maintenance advice

- Seals and flame paths are easily damaged and make an enclosure unfit for use.
- Design files and product certification must be maintained.
- Standards should be purchased and understood.
- Check certification of complex components and ensure a good test authority has verified them.
- Don’t assume providers understand the standards, mistakes are easy to make.
- Competent persons / CompEx Scheme.