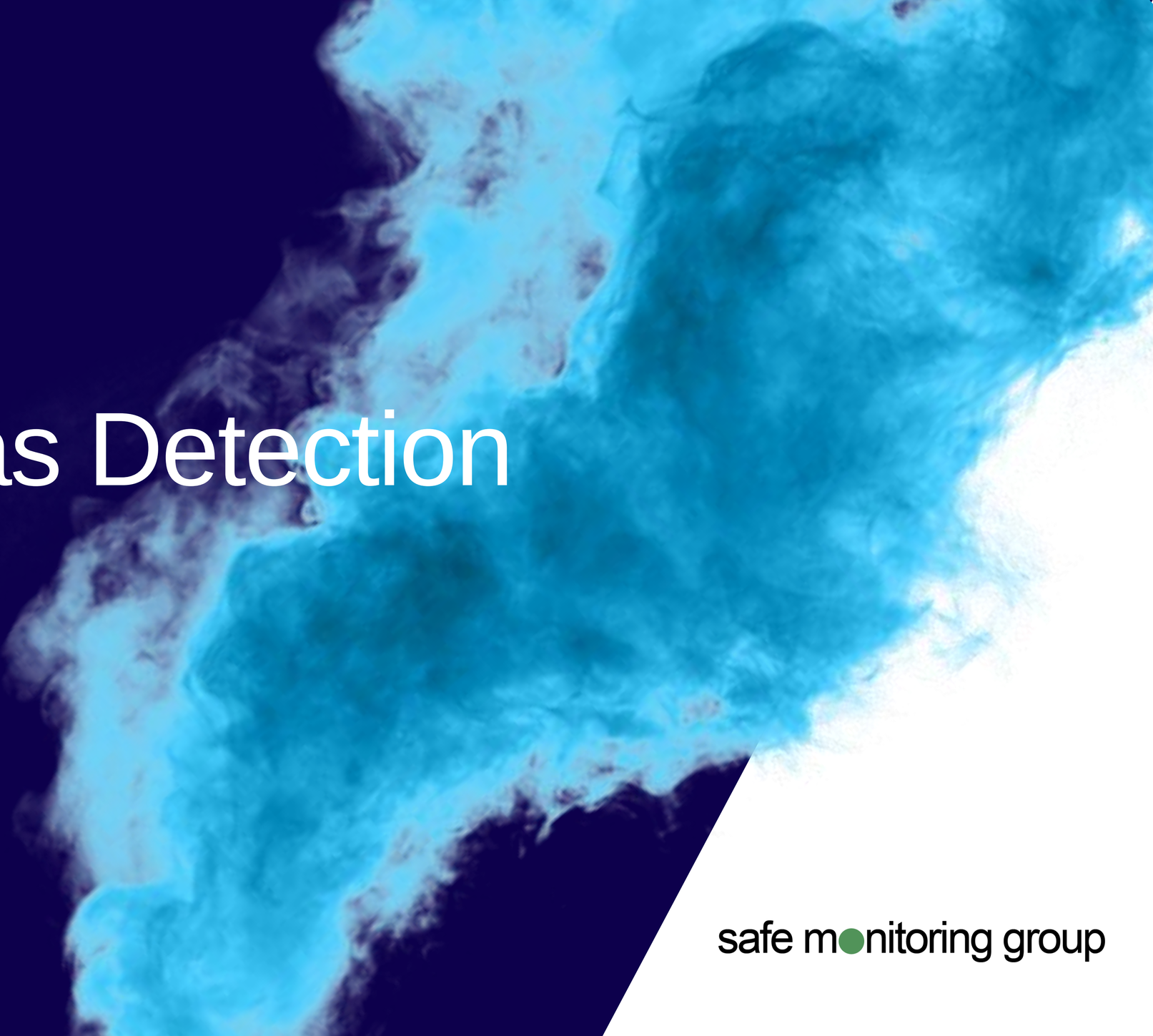
International Gas Detectors

Hydrogen Gas Detection That Works !



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Gas Detection that Works

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Why the Need

Technologies – No Magic Bullet

What to do on Alarm

Applications

Examples

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Mention Hydrogen to Someone

What is the first image that comes to mind?

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All New Technologies Can Have Bad Press

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The Emerging Hydrogen Economy

Does NOT Need Another Hindenburg

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What is the Need for Gas Detection?

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- H2 is the 2nd smallest molecule; prone to leaks (Helium is smaller)
  - Wide flammability range, low ignition energy
- Electrolysis also creates O2
  - Increased flammability on leakage
- Conversion of H2 to Ammonia for storage
  - Ammonia is very toxic and corrosive

If You Aren’t Monitoring for it, You Won’t Know if it’s Leaking or Not

DSEAR Regulations

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- Gas detection may not be specified
- Legal responsibility to ensure atmospheres are below 25% LEL
- ATEX zoning may be a requirement - seek specialist advice

If You Aren’t Monitoring for it, You Won’t Know if it’s Leaking or Not

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HSE - COSHH - EH40

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- Control of Substances Hazardous to Health UK HSE Publication EH 40
- If your substance is on the list if you’re not monitoring, you can't prove compliance
- Legal requirement so if your process is converting H2 to another medium
  - Like ammonia detection is required to prove compliance

If You Aren’t Monitoring for it, You Won’t Know if it’s Leaking or Not

Technologies

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It’s important to match the correct sensor technology to the application

There is no **do it all** sensor technology

Technologies Need to be:

- Reliable
- Field proven
- Third-party verified
- Suitable to meet the application requirements

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Typical H2 detection Technologies

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Electrochemical: Low-level ppm H2, Ammonia, Oxygen and a range of toxics

Pellistor: %LEL detection, responds to any flammable gas

Thermal Conductivity: Non-Specific only really works for binary gas mixtures

Semiconductor: Good sensitivity for portable leak detection, generally not suitable for fixed

MPS: Flammable gas detection, still requires field data and third-party verification

Typical performance standards: IEC/EN 60079-29-1 for flammables

Applications

Generally, look at:

- How is gas stored?
- How is gas transported?
- How is gas used?
- What are the by-products?

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Applications

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Looking at an electrolyser application we are looking at this application backwards

- By-products of the process
  - O2 and H2 Gas is pumped under pressure
- Pipe joints - welds - pumps
- Gas is piped to storage
  - Welded or flanged/threaded, etc?
- Gas is stored under pressure
  - Where/environment

How to Apply Detection

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- Accessories become important not just the detector
- Gas collector cones for point sources
- Gas collector hoods to effectively cover larger areas
- Pitot tube to allow sampling from extraction ducts

Gas Detection Installation Examples

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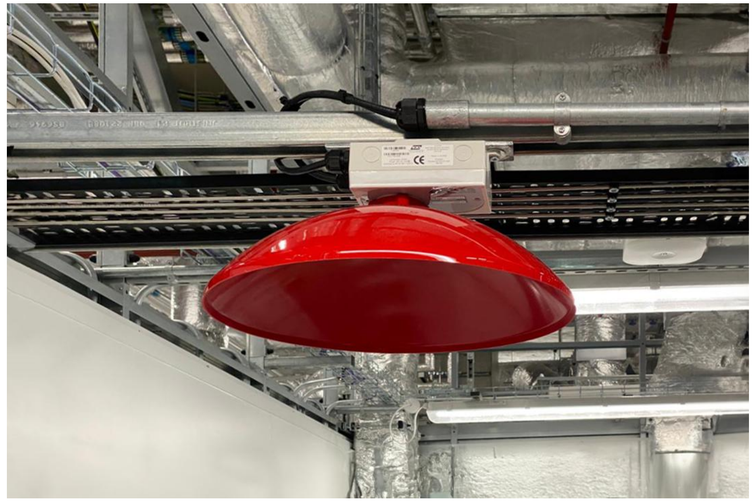

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Gas Detection Installation Examples

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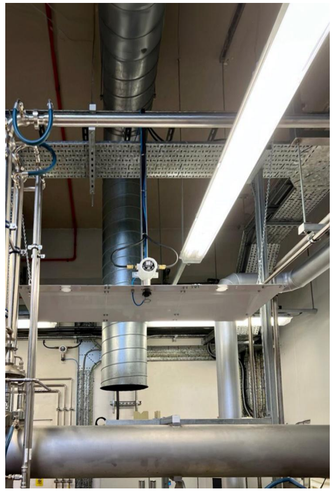

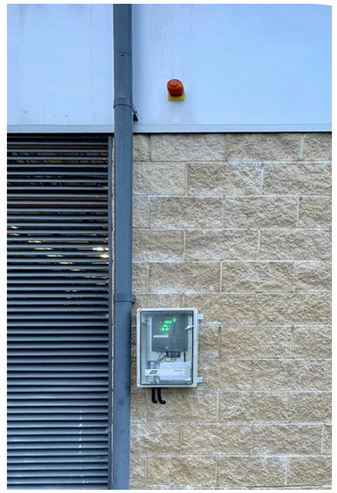

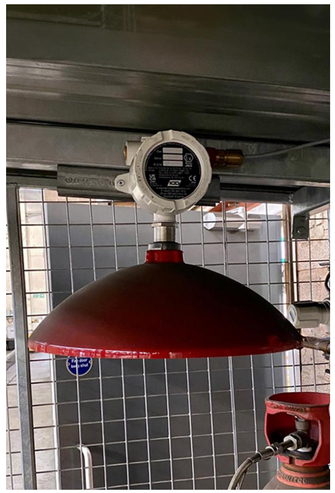

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What to do on Alarm

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What is the SOP (Standard Operating Procedure)

- Process shutdown
- Process ventilation
- Area evacuation
- Remote monitoring, IoT

How does the Gas Detector Interact with Other Systems?

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Standards like 60079-29-1 specify what gas detection controllers need to do and standards for them

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Controllers Provide

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- An approved safety system
- A service breakpoint
- Primary control over alarm levels
- Basic Cause and Effect Interface to other systems
- Relays, Modbus, BACNET, IoT
- Auditable safety circuit

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Examples

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Practically, there could be a mix of fixed and portable systems

E.g. If ammonia is being used as a storage media, then as well as the fixed system, individuals will need portables to cover personal exposure

Fixed and portable systems are complimentary

- A fixed system monitors 24/7
- A fixed system provides automatic alarming which is extremely important on unmanned sites

Containerised Solutions

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Could be viewed as confined spaces:

- In this case both portable and fixed will be required
- Pitot collector cones and hoods
- Controllers (outside hazardous areas)
- IoT connectivity

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Containerised Solutions

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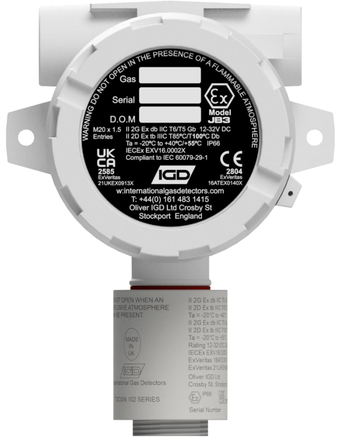

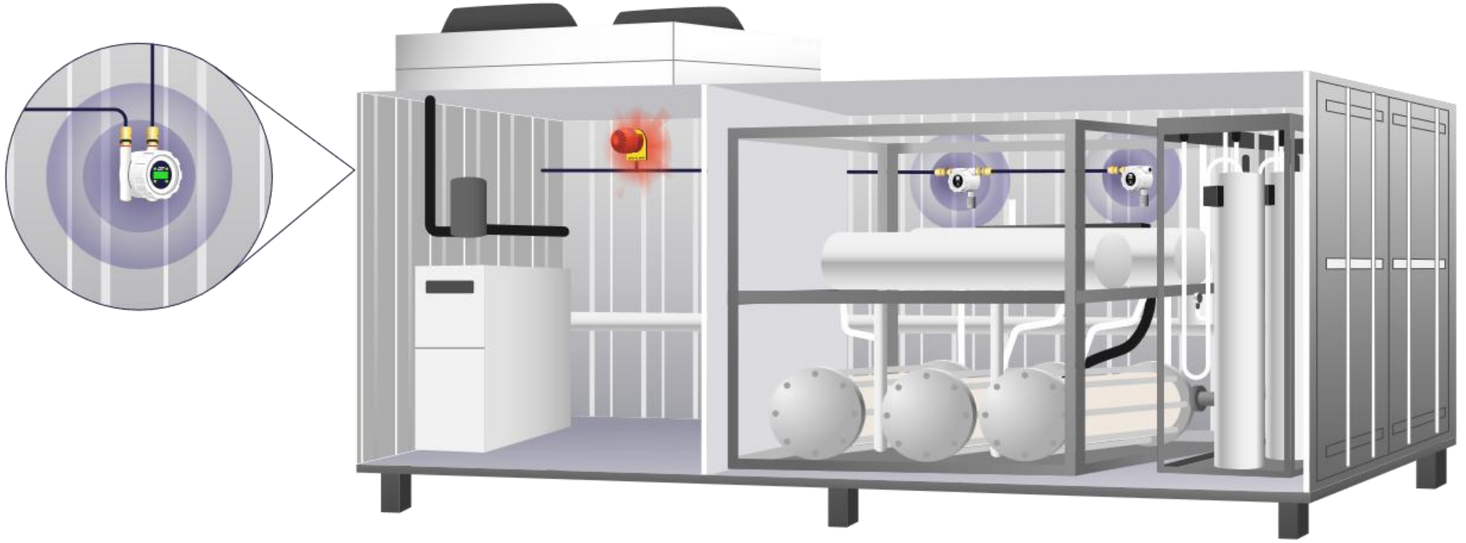

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Containerised Solutions

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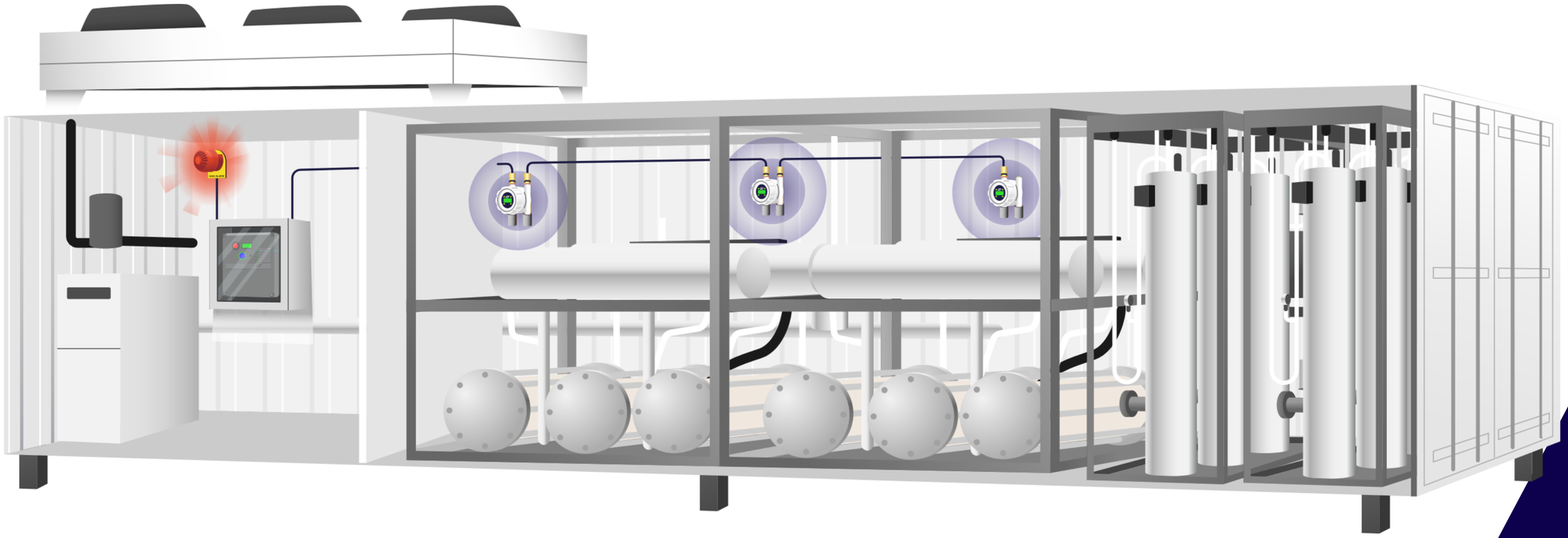

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Summary

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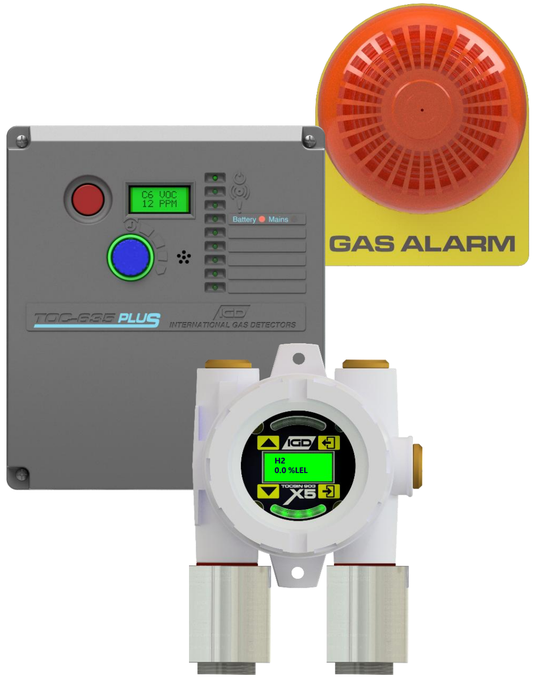
- Ensure the Technology is Suitable for the Application
- Use Controllers for Primary Alarms
- Gas Detection Needs to be an Auditable System
- Ensure Detectors are Correctly Applied
- Leverage controllers to Monitor Externally – Bacnet. Modbus, IOT or Relays to Other Systems
- Fixed Gas Detection Monitors 24/7
- Portables Can be Complimentary to Fixed Systems



Summary

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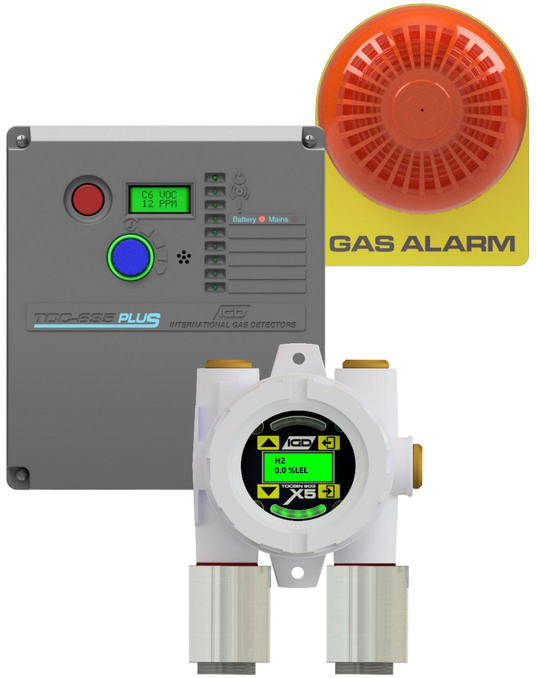
All Gas Detectors Require Maintenance.



Even if your chosen vendor claims extended calibration periods your fitted detectors need to be checked regularly to ensure:

- Still in Calibration
- SOP still Operates
- No Changes to Requirement, Coverage etc
- General Condition

Detectably Better

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Quality

Product

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We invest in people Standard

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