Combustible Gas Safety Monitoring: Infrared vs. Catalytic Gas Detectors

The two main technologies used today when designing combustible gas monitoring systems are infrared gas detection and catalytic bead gas detection. Both technologies reliably detect gas at or below the lower explosive limit (LEL). Each one of these sensing technologies has specific advantages, depending on your application. A thorough analysis of your application’s unique field environment is needed to select the correct performance in terms of reliability, and cost-effectiveness. A quick decision, of course, can lead to potential consequences in safety, performance, maintenance, and life-cycle cost consequences.

Catalytic Sensing

With many years of proven-field performance, catalytic bead (or pellet) detectors are based on a highly responsive technology. They are single-point detectors for combustible gas detection applications. Based upon the simple principle that as combustible gas oxidizes it produces heat and the sensor converts the temperature change via a standard Wheatstone Bridge to a sensor signal, the secret of a catalytic detector’s accuracy, longevity, and reliability is in the design of the bead type temperature transducer to a sensor signal. The infrared gas detector is based to maintain an abundance of active sites as some may become poisoned in service.

Catalytic Detector Advantages

The major advantages of catalytic detectors are:

- Reliability
- Simple to operate
- Ideal for start-up and shutdown use
- Easy to install, calibrate and use
- Affordable long life and a low life-cycle cost
- Proven technology – exceptional reliability and predictability
- Easy replacement of individual cells or modules
- Immunity to contamination and poisoning
- Fail-to-safe operation
- Ease of individual calibration to gases such as hydrogen

Catalytic Detector Disadvantages

There are two primary limiting factors in catalytic detector technology: Catalytic can become poisoned or inactive due to contamination. The only means of identifying detector sensitivity loss is by checking with the appropriate gas on a routine basis and recalibrating as required.

Infrared (IR) Gas Detector Principles

Infrared gas detectors rely on two wavelengths in order to perform, one at 8.8 μm for ethylene and a second at 4.5 μm for hydrogen. The gas to be measured must be infrared active and when it absorbs IR energy, it produces a temperature rise. Gas concentration is determined by comparing the relative temperature rise of the two wavelengths.

Infrared Gas Detector Advantages

The major advantages of IR gas detectors are:

- Fault-tolerant
- Immunity to contamination and poisoning
- Ability to operate in presence of gas
- Ability to operate in continuous presence of gas
- Life-cycle performance is determined by the replacement means of the two wavelengths.

Infrared Gas Detector Disadvantages

The limiting factors of IR technology are:

- The gas to be measured must be infrared active
- Detectors are sensitive to carbon dioxide
- Gas cannot be detected (IR energy such as hydrogen)
- Can only detect 8.8 μm gases
- Cannot replace the IR source in the field
- Failure to perform well for multiple gas applications

Site Location and Experience Factors

A key advantage of both IR point detectors and catalytic detectors is that they have demonstrated long life performance, including in severe environments. In the harsh environment of refineries, IR detectors offer fail-tolife operation, but still should be checked for gas specificity to verify that gas is free to enter the optical path. Experience has shown that users of both IR and catalytic technology do prefer to check the detectors with gas, and as such, perhaps there is no significant difference in the overall maintenance requirements. In climates with low and high temperature extremes, very humid conditions, and around hot operating machinery, catalytic detectors are the best choice.

Conclusions

A clear distinction is required for both IR and catalytic detectors. While IR detectors offer enhanced durability due to their fail-to-life style, only a few percent and ability to function without oxygen, catalytic detectors offer application flexibility, simple maintenance, and low life-cycle operational costs. Both technologies are reliable in detecting gas, and as such, perhaps there is no significant difference in the overall maintenance requirements. In climates with low and high temperature extremes, very humid conditions, and around hot operating machinery, catalytic detectors are the best choice.

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Combustible Gas Detector Provides Rapid 2-Second Response to Dangerous Leaks

Our Advanced Model IR400 Point IR Combustible Gas Detector features an industry-leading two-second response time to the presence of hydrocarbon-based gases, which allows plant operators to respond quickly to gas leaks and avoid potential accidents.

With its fast three-second response time, the Model IR400 Infrared Gas Detector provides an added margin of safety in protecting people, equipment, and plants from potential hazards. The IR400 features rapid fail-to-lifesafe continuous gas monitoring using any gas with a lower explosive limit (LEL) that reliably alerts plant employees to take steps to prevent potential accidents.

The IR400 infrared gas detector responds within three seconds to gas leaks even with a single splash guard. In many cases, the addition of a splashguard shows the IR400 response time is even faster.

The low maintenance IR400 gas detector monitors hydrocarbon-based gases including methane, propane, ethane, ethylene, butane, heptane, pentane and benzene. It features a self-diagnostic design to prevent false alarms and process shutdowns. Monitors such conditions as supported by optical and path integrity. The IR400 also features heated optics to eliminate condensation, and a digital optical indicator helps discriminate between true alarms and maintenance needs.

The user-friendly Model IR400 uses only 4.8 W of power. It is design-leaded, efficient, and offers exceptional speed and system problem-detection capability. Additionally, the detector requires no routine calibration, a feature that reduces detector maintenance.

Distractions Happen On The Job

Those who text while driving are 23 times more likely to be in a crash. You and your team members must be aware that your actions affect your coworkers both when you’re on the job and when you’re on your own time.

That’s why at General Monitors we urge you to put safety first whenever you’re on the driver’s seat by following these tips:

- Be Smart: Don’t use an app while you drive. No task is worth a life.
- Be Careful: Don’t send a text when you know your coworker, family member or friend is driving.
- Be Proactive: Highlight use your phone to take pictures, send and read messages, make videos, check email, or check your driving.
- Be Aware: A recent survey found that 77 percent of teens say adults tell them not to text and drive – yet it does them exactly “all the time.”
- Be Careful: If you have teens, some wireless companies offer parents an easy way to manage their teens’ phone functionality.
- Be Proactive: Take the pledge, join General Monitors, and commit to never text and drive at: www.itcanwait.com.

It only takes a split second to find yourself in a collision. Our number one safety priority: Our life. When it comes to texting and driving, it really is vital: When it comes to texting and driving, it really is

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