APRIL 2013

The Monitor

GENERAL MONITORS

Your total solution provider for gas and flame detection

Combustible Gas Safety Monitoring: Infrared vs. Catalytic Gas Detectors

The two main technologies used today when designing combustible gas safety monitoring systems are infrared gas detection and catalytic bead gas detection. Both technologies reliably detect gas at or below the lower explosive limit (0-100% 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 ensure optimal performance, safety, reliability, and cost-effectiveness. A quick decision, of course, can lead to poor detector choices as well as safety, performance, maintenance, and life-cycle cost consequences.

Catalytic Sensing

With over 50 years of proven field performance, catalytic bead (or pellistor) 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-type temperature transducer to a sensor signal. The secret of a catalytic detector's accuracy, longevity, and reliability is in the design of the bead and catalyst system. It is critical to maintain an abundance of active sites as some may become poisoned in service.

Catalytic Detector Advantages

The major advantages of catalytic detectors are:

- Robust
- Simple to operate
- Ideal for multi-gas applications
- Easy to install, calibrate and use
- Offer long life and a low life-cycle cost
- Proven technology - exceptional reliability and predictability
- Ease of individual calibration to gases such as hydrogen

Catalytic Detector Disadvantages

There are two primary limiting factors in catalytic detector technology:
Catalysts 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 re-calibrating as required.

Infrared (IR) Gas Detector Principles

Infrared gas detectors rely on two wavelengths in order to perform, one at the gas-absorbing wavelength and the other at a wavelength not absorbed by gas. If a gas intervenes between the source and the detector, the level of radiation falling on the detector is reduced and can be continuously monitored. Gas concentration is determined by comparing the relative values between the two wavelengths.

Infrared Gas Detector Advantages

- The major advantages of IR gas detectors are:
- Fail-to-safe operation
- Immunity to contamination and poisoning
- Ability to operate in continuous presence of gas
- Ability to operate in the absence of oxygen or in enriched oxygen

Infrared (IR) Gas Detector Disadvantages

- The limiting factors in IR technology are:
- The gas to be measured must be infrared active
- Gases that do not absorb IR energy (such as hydrogen) are not detectable
- Cannot replace the IR source in the field
- Does not 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-to-safe operation, but still should be checked with gas periodically 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 or vibrating machinery, catalytic detectors are the best choice.

Conclusions

There is clearly a requirement for both IR and catalytic detectors. While IR detectors do offer enhanced reliability due to their fail-to-safe style, immunity to poisons, and ability to function without oxygen, catalytic detectors offer application flexibility, simple maintenance, and low replacement costs. Both technologies are reliable, fast detecting, and accurate. When making a choice, consider the field environment and variables in detector design from manufacturer to manufacturer. Life-cycle cost assumptions will not hold true in all environments. The same can be said for detector mean-time-to-repair or failure data among various manufacturers. Careful analysis of detectors, suppliers, and field experience will help in selecting the best detector for your application.

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Combustible Gas Detector Provides Rapid 3-Second Response to Dangerous Leaks

Our advanced Model IR400 Point IR Combustible Gas Detector features an industry-leading three-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 potentially explosive gas leaks. The IR400 features rapid fail-to-safe continuous gas/vapor monitoring within the lower explosive limit (LEL). It reliably alerts plant employees to gas leaks and warns them to shut down processes in affected areas.

The IR400 infrared gas detector responds within three seconds to gas leaks even with a splash guard installed to protect it from rain and other environmental conditions. It is important to note that most industrial point IR gas detection applications require a splash guard. Process and plant engineers need to be sure when specifying a gas detector that its speed of response is the same with a splash guard. In many cases, the addition of a splash guard slows the speed of response considerably.

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

The user-friendly Model IR400 uses only 4.8 W of power. It is designed for operational efficiency and system problem-detection capability. Additionally, the detector requires no routine calibration, a feature that reduces demand for field technician maintenance time.

Distracted Driving Happens On The Job Too

Those who text while driving are 23 times more likely to be in a crash. You and your family are important to your employer and your coworkers both when you're on the job and when you're on your own time.

That's why we at General Monitors are urging you to put safety first whenever you are in the driver's seat by following these tips:

- **Be Smart:** Don't text and drive. No text message is worth a life.
- **Be Caring:** Don't send a text when you know your coworkers, family members or friends are driving.
- **Be Focused:** Never use your phone to take pictures, send and read messages, record video, or watch TV while driving.
- **Be an Example:** A recent survey found that 77 percent of teens say adults tell them not to text and drive -- yet do it themselves "all the time."
- **Be Aware**: If you have teens, some wireless companies offer parents an easy way to manage their teen's 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 an accident. Our message is simple, yet vital: When it comes to texting and driving, it can wait.