

Technical Note

Supplementing Flame Detection in Gas Detection Applications

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Fire is a random and chaotic phenomenon of combustion. In many cases, Combustible Gas Detection provides the earliest detection of hazards due to fire, especially in industrial environments.

The most important advantage that combustible gas detectors provide is detection at less than combustible levels or below the LEL/LFL (Lower Explosive Limit / Lower Flammable Limit). At these levels an industrial facility can be given advance notification of a pending hazardous condition, providing time to remedy the condition or to evacuate personnel. Current technologies provide for Portable, Fixed Point or Open Path Detection.

Portable Gas Detectors are usually worn by personnel entering a potentially hazardous area and provide the wearer with levels of gas at his/her location.

Fixed Point Gas Detectors are usually positioned near potential leak sources and provide facilities with levels of gas at that location, prior to personnel entering the immediate area.

Open Path Detection provides gas detection between two points along an optical path. Gas that crosses the optical path is detected. Typically, Open Path Detectors are placed along a perimeter or in locations with large open areas that require monitors.

In the case of the Portable and Fixed Point Gas Detectors, the hazardous gas must migrate to the Gas Detector to be detected. Similarly, with the Open Path Detectors, the hazard (gas) needs to migrate between two fixed points to be detected.

Secondary protection against the hazards of fire may include Electro-Optical Flame Detectors. These devices are positioned to cover a three-dimensional space that includes potential leak or ignition sources. Electro-Optical is a scientific term used for light, visible and invisible. Visible light is, of course, what we see with our eyes. Invisible light includes Ultraviolet (UV) and Infrared (IR) wavelengths of energy. Fires emit UV and IR light and it is this invisible light that an Electro-Optical Flame Detector looks for while monitoring an area.

The primary advantage of Electro-Optical Flame Detectors is notification of a fire when it occurs. One of the drawbacks is that these devices have a Field of View (or Cone of Vision) which means they must have an unobstructed line of sight to the flames for the detector to Alarm. The mounting position can impact overall coverage of Electro-Optical Flame Detectors. For example, elevating the position of Electro-Optical Flame Detectors during installation and pointing them downward will maximize the area of coverage and reduce the effects of ground level obstructions. Additionally, the downward orientation reduces the amount of dirt and airborne debris that will adhere to the Optical surface of the Electro-Optical Flame Detector.

Under certain conditions a Combustible Level of Gas may leak into a hazardous area and find an ignition source before it is detected by a Combustible Gas Detector. The flame that is ultimately produced will consume the Combustible Gas, leaving none to be detected. Therefore, in applications where Combustible Gas Detectors are installed, it is wise to supplement these installations with Electro-Optical Flame Detection.

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