



# BEST PRACTICES FOR FIRE AND GAS DETECTION

Understanding how to set up and maintain a fire and gas safety system in hazardous environments can help you protect workers, processes and facilities.

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*Editor's Note: This article is adapted from a white paper, "Best practices for fire protection in hazardous locations." Visit <http://bit.ly/2krIVo6> to download the full technical white paper to get details about 10 proven procedures for detecting combustible gas, smoke and flames.*



The danger of fire in processing and manufacturing facilities often stems from the very production processes taking place, which frequently involve volatile and potentially flammable materials. Industrial facilities need to know and follow best practices for life-safety fire systems.

Best practices are defined as professional procedures that have been shown by research and experience to

produce optimal results. A number of organizations such as the National Fire Protection Agency (NFPA) prescribe specific procedures in their standards related to fire and gas detection, and some best practices can be affirmed through years of practical experience.

So, let's examine three best practices that can help you reduce fire-related risks to personnel, processes and facilities.

## Best Practice #1: Be Aware of Standards and Certifications

An important preliminary step is reviewing applicable standards, such as the fire standards from the NFPA. In particular, plant operators should review NFPA 70\* (also

## Research from the NFPA reported that almost 65% of combined industrial or manufacturing facility structure fires occurred specifically in manufacturing properties.

known as the NFPA 70<sup>®</sup> National Electrical Code<sup>®</sup>, or NEC<sup>®</sup>) and NFPA 72<sup>®</sup>: National Fire Alarm and Signaling Code<sup>®</sup>.

Chapter 5 of the NEC addresses “special occupancies.” Within that chapter, Article 500 stipulates that locations be classified based on flammables that could be present, as well as their concentration or quantity.

Hazardous-area classifications specific to electrical equipment are considered in this section. Class I areas are those in which flammable gases, flammable liquid-produced vapors, or combustible liquid-produced vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

Many NFPA codes and standards for specific processes reference NFPA 72, the National Fire Alarm and Signaling Code. Chapter 17 of NFPA 72 provides requirements for various types of devices that can be used to detect indications of fire. The surest way to know that detectors meet safety standards is to specify equipment with third-party approval certifications by an accredited certification agency. Performance testing and certification verify that a device will operate as specified by the manufacturer under a range of conditions — and that it is compliant with applicable standards.

### Best Practice #2: Locate Gas Detectors Carefully

Point detector technologies require gas to travel to the detector, which can require a large number of installation points and a sophisticated placement strategy. Since the detector must come in contact with the gas or vapor cloud, it should be placed adjacent to the equipment being protected.

In addition, flow considerations from ventilation, fans, wind, convection, etc., must be taken into account for proper placement of gas detectors and to determine the number required for adequate coverage.

For detection of gases heavier than air, point detectors should be positioned below the level of exhaust ventilation openings and close to the floor. For detection of gases lighter than air, the detector should be placed above the level of exhaust ventilation openings and close to the ceiling. Point detectors should be installed in accordance with the manufacturer’s instruction manual to ensure proper operation.

As for line-of-sight (LOS) detectors, they should be mounted to a rigid and stable surface so the optical alignment of the transmitter and receiver is maintained consistently. In addition, component placement must be performed carefully, because the system requires an unobstructed line of sight between the transmitter and receiver.

Many LOS detectors are self-monitoring and will alert users in the case of a blocked light beam or some other fault that adversely affects detector operation. If possible, gas detectors should be placed in locations that are easy to access.

### Best Practice #3: Combine Gas Detection Technologies

Because each of the gas detection technologies has benefits and limitations, a common strategy is combining the technologies and placing them in locations that maximize their effectiveness.

In many industrial plants, for example, LOS detectors work with point detectors to provide optimal protection. In situations like this, the point detectors should be installed at or near high-risk gas leakage points or accumulation areas to provide gas-level information. LOS detectors, on the other hand, often are installed at plant or process-area boundaries where they can monitor the perimeter and track gas cloud movement in and out of an area. □

*Det-Tronics, based in Minneapolis, is a participating Encompass<sup>™</sup> Product Partner in the Rockwell Automation Partner-Network<sup>™</sup> program. Det-Tronics makes the Eagle Quantum Premier<sup>®</sup> (EQP) flame and gas safety controller with DLR outputs, a SIL 2 capable, fault-tolerant, addressable system that integrates with a process control system.*

### >> Download the Free White Paper

Download the complete white paper, “Best practices for fire protection in hazardous locations,” at <http://bit.ly/2krlVo6> from Det-Tronics. Learn 10 proven procedures for detecting combustible gas, smoke and flames.