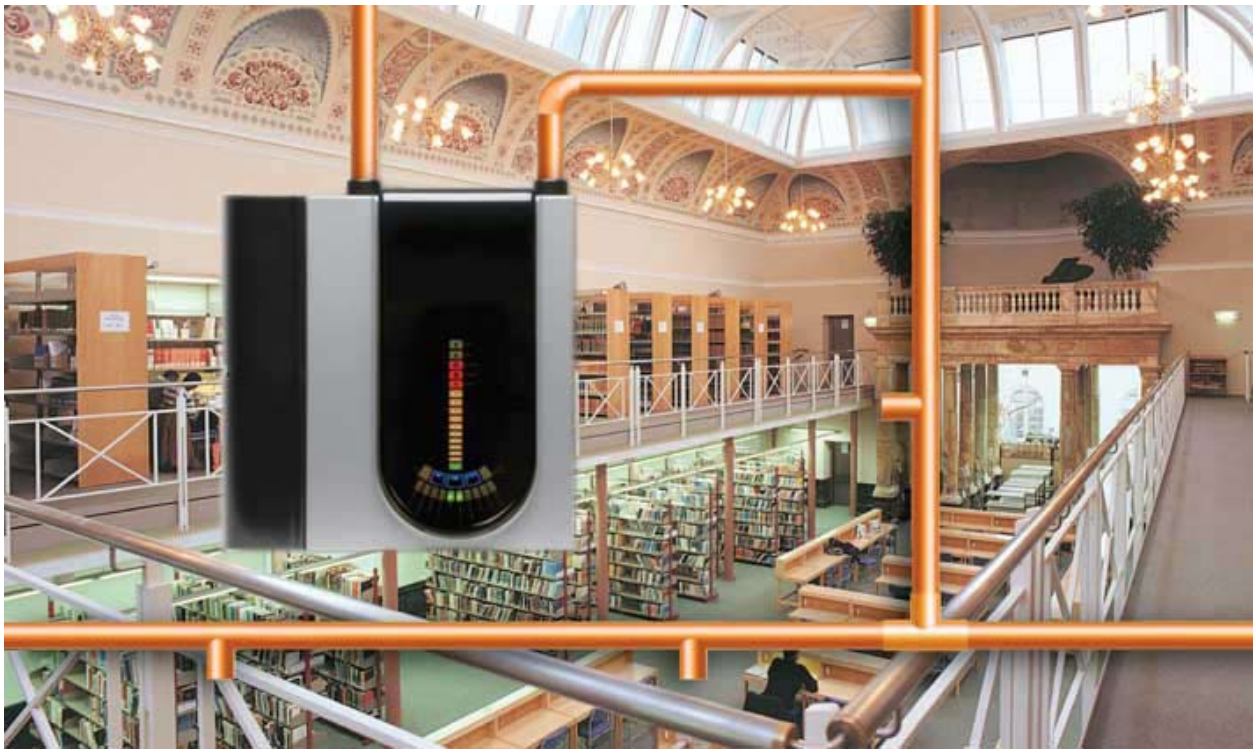
Honeywell



# Aspiration Detection: Positioned to Be More Flexible

***Technology improvements, plus the installation advantages for hard-to-reach or dangerous areas, are widening the market scope for aspiration detection.***

Aspiration detection systems, such as System Sensor FAAST™ Fire Alarm Aspiration Sensing Technology, have been traditionally intended for critical applications that count on catching fire in its incipient stage.

Environments such as telecommunications and financial centers remain the mainstream markets for aspiration where highly sensitive fire detection is necessary to ensure continuity. Clean rooms, computer data centers, laboratories, and other businesses with critical data or property assets, where even a short disruption of business or minimal exposure to smoke could be detrimental, all require incipient fire detection.

Technology advancements, such as the LED and laser sensing technology in FAAST, offer greater reliability while reducing false alarms. Previously, aspiration detection use was limited to only those environments that could tolerate unnecessary disruptions as a compromise for gaining the peace of mind of being alerted to real emergencies. Vast improvements to the false alarm problem make aspiration more feasible to other environments. More imaginative thinking in the field about how aspiration detection could be beneficial in other applications has further broadened opportunities for installing aspiration in less traditional applications — and for reasons other than just business continuity or asset protection.

**Aspiration's Flexibility**

Difficult-to-reach areas and hazardous conditions present challenges for fire protection engineers and installers. Aspiration detection systems can be designed into the fire protection mix to help solve these design challenges.

Options for designing aspiration detection systems, along with or in place of other fire systems and detectors, can eliminate hazardous situations for maintenance personnel. Aspiration systems can provide

a safer working environment, eliminating the need to enter high-voltage or high-ceiling environments to test and maintain detectors.

Dan Ubelhor, Corporate Engineering Manager for Koorsen Fire & Security in Indianapolis, designs aspiration detection into fire safety systems and appreciates the flexibility of aspiration, especially for testing. “Codes require testing of the detectors, but it is difficult, if not impossible, to test them if they are located in high-area environments,” he says. “Sampling pipes can be installed in any area and extended out to reachable levels where the piping can easily be tested.” Tests can include blowing sample smoke into the piping system.

Ubelhor has designed aspiration systems into air handler units and claims the systems work well in high air flow environments. “A lot of times, normal smoke detectors are not listed for high air flow and may not be able to catch the smoke in high air flow areas. Aspiration detection systems actually draw the air in and are well designed to situate in high air flow movement areas,” he says.

Typically, high air exchange areas have some form of mechanical ventilation to maintain constant or cyclical air flow for heating, cooling or other special environments. Smoke tends to travel with the air flow, hence positioning sampling pipes near the return of an air handling unit or heating/air conditioning unit ensures early detection of particulate in the area.

Ubelhor also uses aspiration systems when designing fire systems for high-ceiling environments, such as atria or warehouses. “Many times we’ll run air sampling systems across the air intakes in high atrium areas in order to increase the sampling volume. This would be done instead of sampling at the ceiling level where the air flow would present a minimum amount of air particles,” he says.

Large volume areas and areas with high ceilings require special design considerations for the pipe network design. Stratification can occur in these places where air temperature may be elevated at the ceiling level as well as a lack of ventilation. In applications where stratification is likely to occur, conventional pipe network sampling may not be effective.

One method to overcome the stratification problem is to create a vertical sampling pipe in addition to the horizontal pipe network on the ceiling. The vertical sampling pipe has sampling holes at various heights to sample within any stratification layers in the area. Warehouses with high ceilings are a good example of this type of environment — where having multiple pipe configurations at different sampling levels could work well.

**Difficult or Dangerous Installations**

Scott Golly, Senior Engineer at Hughes Associates Inc. in Baltimore, has also designed aspiration detection into fire systems to overcome positioning difficulties. “A good application for aspiration is when it is difficult to get to the smoke detectors for maintenance,” he says.

UPS battery rooms, for example, do not require the very early detection afforded by aspiration technology, but installing and maintaining smoke or heat detectors above high-amperage UPS batteries can be dangerous. “It’s just an unsafe work environment,” states Golly. “Instead, an aspirating smoke detector can be placed on the wall with an array of sample holes and piping installed above the batteries. A remote sample point for each pipe run can then be extended down the wall, positioned to allow testing and maintenance of the system without putting employees at risk.”

According to Golly, maintenance factors into the application configuration. “Ultimately, the pipes need to be maintained and cleaned. A method of cleaning the pipe that works without climbing over your head is needed. The positioning of the remote sample points is key to accomplishing servicing as well as annual testing without putting anybody at risk,” says Golly. “You can drop a sample point down the wall on the far side of the room, but still make sure that the detection layout on the ceiling is adequate.”

Golly says aspirating detection is also being used more frequently for applications where the environment needing detection is not within the UL listing of a normal smoke or heat detector.

“If smoke detection is preferred by the client in an adverse environment, not heat detection due to the inherent delays associated,” explains Golly, “aspirating system detectors can be placed in a climate-controlled room with the sampling pipes flowing into the adverse climate space. For example, an animal

holding building at a zoo may have a climate-controlled electrical closet, yet detection over the animals is still needed where it's not climate controlled. With care to ensure the sampled air will not adversely affect the detector operation, the detector can be placed in the electrical closet, keeping it within its UL listing and providing smoke detection."

**Sampling Tubes Stay Out of Sight**

When it's more beneficial for the system to be hidden, such as for safety or historical impact reasons, sampling pipes can be in the ceiling or the lighting, typically within capillary tubes. This approach works in correctional facilities, where it's important to have a vandal-proof system to detect smoking or other conditions without sounding a false alarm.

Aspiration technology with hidden piping is also useful for protecting historical buildings, as well as for the irreplaceable assets inside museums and art galleries. (See Fall 2010 issue of LifeSafety at www.systemsensor.com/ls). Concealing the sampling pipes retains the authentic look and environmental aesthetics of preservation projects, while offering the highest level of protection.

The main pipe network is installed in a ceiling void, and capillary tubes are branched off at regular intervals. These capillary tubes are used to monitor the protected area by projecting through the ceiling covering while the main pipe network remains hidden.

In dirty, industrial environments, such as a spray booth for painting appliances or other products, an aspiration system can be programmed at the highest level of sensitivity to tell the difference between a paint particle and smoke particulate. Aspiration systems do require high maintenance in dirty environments, however.

Local codes and regulations can determine the size and spacing between the sample holes in a network, making them a critical part of any pipe design. These requirements change depending on the type of environment monitored. Local codes and standards take precedence over any parameters suggested for aspiration systems.

Aspiration detection systems provide a vast span of detection. Not only is there flexibility with aspiration systems to move the piping for different applications, but these systems also have unique capabilities to program multiple warning levels. At the most basic level, an aspiration system alerts personnel at the incipient stage of a fire. Other options include sending a signal to the building alarm system or automatically initiating a suppression system if certain pre-set conditions are met.

More than ever, companies want the security of knowing that their assets and personnel are safe from fire. Integrating an aspiration detection system into the overall fire and life safety system can provide quick detection and solve challenges such as positioning, aesthetics, security and life safety in both traditional and unique applications.