Gas leak detection for boiler rooms in commercial and industrial property
The Hazard:
Natural gas is one of the most widely used fuels for heating commercial and industrial property. In the event of an undetected leak it can present an explosive risk leading to structural damage, the loss of life or an expensive waste of fuel.

Most boiler plant rooms are visited infrequently and therefore any leak will go undetected. An automatic gas detection system will provide early warning of a gas release during unmanned periods.

Honeywell Analytics has, manufactured, installed and serviced gas detection systems for nearly 50 years. These systems detect a gas release and generate an alarm before it reaches dangerous concentrations.

This fact sheet aims to provide an overview of gas detection as used in boiler plant rooms for commercial and industrial property.

For recommendations related to a specific project or site, our team of Area Managers are on hand to offer advice, a site survey and product demonstrations all free of charge.

Gas Facts:
Natural gas is predominately Methane. It is approximately half the weight of air and will rise towards the ceiling or roof space of a plant room.

Each and every flammable gas has a minimum and maximum concentration in air, when if ignited will generate and explosion. This is called the explosive or flammable range.

The minimum gas concentration in air that will generate an explosion; if ignited; is called the ‘Lower Flammable Limit’ (LFL). The LFL for Methane is 4.4%* by volume.

This value is now ratified across Europe replacing the former British (Lower Explosive Level (LEL) of 5.0% by volume.

Potential sources of ignition can include any uncertified electrical equipment, e.g. lighting, switches control panels etc.

Honeywell Analytics gas detection systems are designed to provide a minimum of two stages of alarm prior to the Lower Flammable Level being reached.

Boiler plant room ventilation:
The prime objective for boiler plant room ventilation is to ensure an adequate supply of combustion air. It can also help reduce the build up of a flammable gas concentration, however this can not be guaranteed. It is for this very reason that gas detection systems are so widely used.

The Detection System:
A gas detection system consists of a number of strategically located sensors hard wired to a control panel. Upon the detection of gas, alarm relay contacts within the control panel are used to activate audible and visual alarms. Should the gas concentration reach a higher level, a second set of contacts are used to remove the power to an electrically operated solenoid valve fitted to the gas supply line.

Another option is to use gas sensors that provide an output suitable for direct interface to a Building Management System (BMS). The BMS then cuts the gas supply and switches off any potential ignition sources.
Gas sensors:

Several types of gas sensor are available on the market. The most reliable are the catalytic bead type. These are more specific and less prone to false alarms than the lower cost Solid State or Semi-Conductor types which are affected by changes in ambient temperature and humidity. The best catalytic bead detectors are ‘poison resistant’ which offer a longer operational life, typically 3-5 years or more.

Gas fired boiler rooms are usually designated as a ‘safe area’ i.e. not requiring hazardous area certified equipment. However it is considered good practice to use certified gas sensors to remove the possibility of the sensor being the source of ignition. This permits the operation of the gas sensors when all other potential ignition sources have been switched off at the 2nd of higher alarm level.

Not all gas sensors on the market are certified to the latest European, hazardous area and performance standards**.

Honeywell Analytics produces gas sensors certified to the latest European; ATEX; regulations.

Location of Gas Sensors:

Natural gas is lighter than air and therefore gas sensors should be located over potential leak areas. These include:

- The gas burner assembly.
- The gas train assembly.
- The pressure boosters (if fitted).
- The gas shut off valve
- The combustion air intake.
- The gas meter.

On a small gas boiler installation a number of these points may be close together requiring a single point of detection. On installations using large shell type boilers (as in hospitals, factories or large blocks of flats) it may be necessary to fit one detector over each of these areas.

Consideration must be paid to mechanical ventilation and its likely effect upon the path of leaking gas when locating a gas sensor.

Location of Control Equipment:

Most gas detection control panels are not certified for use in hazardous areas and should be mounted away from the gas installation. An ideal location would be outside the boiler plant room to enable gas readings can be checked prior to entry.

Control panels are available in a number of mechanical configurations for ease of application, these include:

- Din rail mounting for inclusion within other plant control panels
- Wall mounting
- Rack mounting

An alternative power supply in the event of power failure is also good practice and battery back-up systems are also available.

Further Considerations:

This Fact Sheet is concerned with Natural Gas fired boiler installations. For installations using Liquefied Petroleum Gas (LPG), which is heavier than air, gas sensors would need to be mounted near to the floor or in pipe and cable ducts.

Routine service:

All safety systems including gas detection systems should be regularly serviced to ensure safe and reliable operation. Commercial / industrial gas detection systems are typically serviced and recalibrated twice a year.

This routine service should only be undertaken by the manufacturer of an approved service agent.

Contact your local Honeywell Analytics representative for further information and assistance in selecting the best system for your application.

References:

EN50073:1999 Guide for selection, installation, use and maintenance of apparatus for the detection and measurement of combustible gases or oxygen.

*BS EN 61779-1:2000 electrical apparatus for the detection and measurement of flammable gases - Part 1: General requirements and test methods

**EN60079 Series, Electrical Apparatus for use in explosive atmospheres
Perfectly placed

to deliver innovation in gas detection

Upholding a reputation for innovation, quality and reliability, Honeywell Analytics is the World leader in gas detection solutions, protecting people and premises in the most demanding environments.

MDA Scientific is the leading fixed solution for the semiconductor industry

Neotronics is the tough, portable range of gas detectors

Sieger’s robust fixed detection is crucial for gas monitoring in extreme conditions

Zareba makes compliance with health and safety simple

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