

From singing to sensing

IECEX certifies modern gas detectors and sensors

A BBC News item dated 30 December 1986 announced that more than 200 canaries still employed in UK mines were to be made gradually redundant throughout 1987. The article stated that “new electronic detectors will replace the birds because they are said to be cheaper in the long run and more effective in indicating the presence of pollutants in the air otherwise unnoticed by miners.”

Like a canary in a coal mine

The use of canaries as gas detectors had been a mining tradition in the UK since 1911. Toxic gases such as carbon monoxide, carbon dioxide or methane in the mine would kill the bird before affecting the miners. Because canaries tend to sing much of the time, they would stop singing prior to succumbing to the gas, so alerting miners to the danger.

As reliable as canaries might have been, the switch to electronic gas detectors actually made sense and brought

greater safety. Technologies are evolving constantly and modern gas detection devices are state-of-the-art, extremely sophisticated devices that use sensors to identify potentially hazardous gas leaks. They are usually part of larger safety systems that can be found in a wide variety of locations such as mines, oil rigs, refineries, paper mills and industrial and waste water treatment plants. They are also widely used by firefighters. These devices often interface with control systems so that a process can be shut down automatically in dangerous situations.

Sophisticated sensors

Gas detectors can be portable, battery-operated devices worn on clothing or a belt, or can be fixed units. They transmit warnings through alarms, flashing lights and often visual displays, when dangerous levels of gas vapours are detected. As detectors measure a gas concentration, the sensor responds to a calibration gas, which serves as the reference point or scale. As a sensor's



Until the 1980s, canaries were used as gas detectors in mines

detection exceeds a preset alarm level, the alarm or signal will be activated. Originally, detectors were produced to detect a single gas, but modern units may detect several toxic or combustible gases, or even a combination of both types.

The various types of gas detectors are classified according to their operation mechanism: semiconductors, oxidation, catalytic, infrared, and so forth.

Instant detection anywhere and everywhere

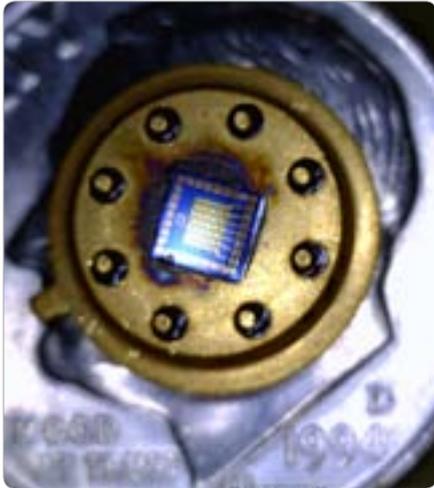
To ensure the safety of those working in hazardous areas, the instant and accurate detection of life-threatening gas concentrations is essential. Equally important is the ability of a monitoring device to operate reliably in the harsh and extreme conditions often found on an offshore platform, in a mine, a refinery or an industrial plant.

The trend in gas sensors goes towards wireless sensing, where sensors and sensor networks can be deployed anywhere and everywhere to provide a constant stream of information about the people who use them and their environment.

Based on MEMS (microelectro-mechanical systems) technology, these



Ultrasonic gas leak detector built to detect ultrasonic frequencies generated from pressurised gas leaks (Photo: a1-cbiss)



The new generation of sensors is so small it can be fitted into clothing and portable devices

new wireless sensors are ultra-low power, ultra-thin and flexible, have a long lifetime and can be “tuned” to detect specific gases. They can be integrated into modern electronic platforms such as smart phones, tiny wireless sensor modules, ultra-thin RFID (radio-frequency identification) and portable devices. They can also be fitted into clothing or be placed in strategic areas in refineries, offshore platforms, mines and any other hazardous locations.

Ensuring safety and reliability through IECEx

Today, gas detection devices are an integral part of the basic equipment

of anyone working in a hazardous environment. As such, they must undergo the same testing and certification process as any other piece of equipment used by the Ex (explosive) industry.

A great number of companies that manufacture such devices rely on IECEx, the IEC System for Certification to Standards Relating to Equipment for Use in Explosive Atmospheres, for the testing and certification of their products. Manufacturers have to meet the very strict requirements specified in the IEC 60079 series of International Standards on explosive atmospheres as well as those put in place by national or regional regulations and legislation. Proving their adherence to those requirements can be costly and time-intensive.

Testing, assessment and/or certification conducted within the IECEx is accepted in all its member countries and way beyond. It is widely recognized as the truly international system for Ex equipment, provides access to the global market and drastically reduces costs by eliminating multiple re-testing and certification.

Highly skilled staff

To cover all safety aspects in Ex environments and to complement

the Certified Equipment Scheme, IECEx has developed the IECEx Certification of Personnel Competence Scheme to assess and certify individuals working in potentially hazardous areas.

The IECEx CoPC (Certificate of Personnel Competence) provides independent proof that the certificate holder has the required qualifications and experience for working on electrical equipment located in hazardous areas and can implement IEC International Standards covering explosive atmospheres.

For the CoPC, competence is defined as “the ability to apply knowledge” rather than simply assessing knowledge. In this sense, the assessment of persons includes assessing their ability to perform certain Ex-related tasks.

To obtain a CoPC, a person submits an application to an approved IECEx Certification Body. Regular re-assessment also ensures that the certified person maintains these competencies. The certificate is personal, non-transferable and is valid across international borders.