The chemical industry is a major player in the global economy, with 2011 sales reported as being worth some €2800 billion with a growth rate approaching 12% as the developed and developing economies recovered from recession. Manufacturing the materials that are used throughout industrial sectors, it is one of the powerhouses underpinning improvements in the living standards for millions, if not billions of people.

As well as protecting the workers themselves, personal gas detectors also act as mobile leak detectors, a useful back up to fixed leak detectors.

"Gas Detection"

The gas sensing industry plays the key role in enabling the industry to meet its obligations, with many different technologies used to monitor the emissions from the different parts of a typical chemical plant.

Gaseous Emissions Analysis

Stack emission from chemical plants is obviously the largest source of the gases produced during the process. Recognising that some gaseous emissions cannot be avoided, the quota system to manage emissions has been developed. To comply with the requirements of the emissions control quota system, Continuous Emission Monitoring Systems (CEMS), provide real-time monitoring and recording of a range of gases emitted from stacks. Typically, CEMS systems will monitor for sulphur dioxide, nitrogen monoxide, nitrogen dioxide, carbon monoxide, carbon dioxide, oxygen, hydrogen sulphide, total hydrocarbons and opacity. Additional gases are added to the core list depending on the specific process.

In addition to the main processing equipment, a chemical factory will normally contain a number of small power plants, used for a variety of purposes from space heating for on-site buildings through to pre-heating various chemicals before they are injected into the main processing plant. Depending on the availability of the different materials, the fuel source will usually be natural gas, LPG, light and heavy oils, biomass, wood pellets, coal, propane or butane.

Flue gas emissions are monitored for two main reasons, firstly monitoring the efficiency of the burning process and taking a reading for emission control purposes. They will normally be fitted with electrochemical sensors, which are arguably the most versatile sensors available, offering a number of benefits over alternative technologies.

The sensors are physically small, enabling the analysers themselves to be correspondingly compact. Internal filtration ensures that the readings for the target gas are immune to cross-contamination from other gases commonly present in the flue gases. The latest generation of oxygen sensors use lead-free catalytic technology derived from toxic gas sensors, improving response times, reducing current consumption and offering a quicker start up from cold. Electrochemical sensors characterised to a large number of different gases are available, enabling monitoring in specialised applications to be implemented quickly and easily.

Leak Detection

Leaks are an ever-present hazard even in the best run chemical plants. Depending on the severity of the leak and the gas involved, the effects can potentially be very serious both within and without the perimeter of the plant. An explosion or fire will damage plant and put workers at risk, while toxic gases can spread rapidly, also putting the public at risk. Even a minor small leak has an economic impact on the plant’s profitability as material is being wasted and the fault has to be rectified. To monitor for leaks, fixed gas detectors are integrated into the plant at key weak points such as valves, joints and pumps. The sensors used will usually depend on the nature of the gas to be detected. For flammable gases, photoelectric devices are widely used. This sensor works by burning the target gas, the heat generated producing a change in the resistance of the detecting element of the sensor proportional to the gas concentration. To detect hydrocarbons, NDIR sensors are widely used.

Ultrasonic gas leak detectors measure the ultrasonic sound level, typically between 25 kHz to 10 MHz frequencies. Ultrasonic gas detectors are mainly used for outdoor environments where weather conditions can easily dissipate escaping gas before allowing it to reach gas leak detectors that require contact with the gas in order to detect it. These detectors are most useful in facilities with a lot of outdoor pipeline.

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Reliable, Robust and Cost-Effective Oxygen Sensing

SGX Sensortech (UK) Ltd (UK) now offer a highly reliable and innovative oxygen sensor that offers a different method of operation that circumvents many of the inherent problems affecting performance and quality found with many other oxygen sensors on the market today. The EC410 has an lengthy expected lifetime of 36 months and can operate reliably in a wide range of different conditions at extremely high and low temperature and humidity levels. The sensor’s reaction to pressure is equal or better than all other oxygen sensors.

This sensor is compliant with EU RoHS regulations (Restriction of Hazardous Substances), as it contains no toxic metals. The absence of lead makes the EC410 lighter than many competitive sensors. This also means that dropping the sensor would not be too detrimental as there is no lead mass to move that can cause output spikes.

Leakages are all but eliminated as the liquid is almost completely contained with the water absorbing layer. The liquid content is considerably lower than in a vast majority of other oxygen sensors. In addition, the internal pressure of the EC410 is stable throughout the sensor’s life. This further reduces the potential of leakage internally, which can cause the sensor to lose lifespan and external leakage, which can also cause sensor damage, not to mention damaging the surrounding circuits.

This highly accurate and cost-effective sensor is just one of the recent developments from SGX Sensortech, who offer world class sensor expertise globally to a wide range of industries.

Sample Service for Developers – the Online Shop

With the “Masterpieces” service, Gardner Denver Thomas (Germany) is now running an online shop selling sample pumps for design engineers and developers.

Samples of oil-free OEM pumps can be ordered online at www.thomas-masterpieces.com.

At thomas-masterpieces, customers enjoy a really decisive product development advantage: Time! The promise is this: Goods will be shipped anywhere in the world within 24 hours. Payment is done easily and simply with a credit card.

After entering the online shop, a selection of products is seen from the extensive standard range of Gardner Denver Thomas.

Often complete with wireless communications to allow for remote monitoring, local area monitors are frequently deployed after an incident to provide perimeter monitoring around the location of a leak, thereby giving first responders additional protection.

Open Area Protection - Storage Tanks

Infrared open-path gas detectors send out a beam of infrared light, detecting gas anywhere along the path of the beam, which is typically a few metres up to a few hundred metres in length. They are increasingly used in the petrochemical industry for example in the detection of leaks from storage tanks, mainly to achieve very rapid gas leak detection for flammable gases at concentrations comparable to the lower flammable limit, typically a few percent by volume.

Conclusions

As this brief overview shows, the gas sensor industry has developed a number of different technologies, each of which has strengths and weaknesses for use in specific applications. All manufacturers share a common purpose in improving the effectiveness of life and property protection in potentially dangerous environments.

Advances in sensor design are generally aimed at producing faster response, greater specificity, better stability, longer life and greater reliability. In capital-intensive industries such as the chemical sector, which produces toxic, corrosive, explosive and flammable gases as a matter of routine, plant protection rightly has a very high priority.

Global Distribution Centre Opened

Industrial Scientific (USA), global specialists in Gas Detection as a Service, announced recently that operations went live earlier in 2013 at its newly leased 19,500-square foot facility near Pittsburgh.

The new global distribution centre supports global order fulfillment along with Industrial Scientific’s regional manufacturing and instrument repair operations. Previously housed at the company’s headquarters at 1001 Oakdale Road in Oakdale, Pa., these functions faced operational challenges brought on by business growth.

The distribution centre improves the efficiency of order processing as well as overall responsiveness to customers with its dedicated international, domestic ground, and domestic air processing stations for customer orders.

“Industrial Scientific has experienced significant growth over the last decade,” said Jim Quasey, vice president of global operations. “The distribution centre provides the space needed to efficiently deliver to our customers the life-saving products that they rely on every day.”

The global distribution centre is located in the Imperial Business Park at 150 Crown Court, Oakdale, PA, 15071.

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