

Gas detector

A **gas detector** is a device which detects the presence of various gases within an area, usually as part of a safety system. This type of equipment is used to detect a gas leak and interface with a control system so a process can be automatically shut down. A gas detector can also sound an alarm to operators in the area where the leak is occurring, giving them the opportunity to leave the area. This type of device is important because there are many gases that can be harmful to organic life, such as humans or animals.

Gas detectors can be used to detect combustible, flammable and toxic gases, and oxygen depletion. This type of device is used widely in industry and can found in a variety of locations such as on oil rigs, to monitor manufacture processes and emerging technologies such as photovoltaic. They may also be used in firefighting.

Gas detectors are usually battery operated. They transmit warnings via a series of audible and visible signals such as alarms and flashing lights, when dangerous levels of gas vapors 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 detection exceeds a preset alarm level, the alarm or signal will be activated. As units, gas detectors are produced as portable or stationary devices. 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.^[1]

Types

Gas detectors come in two main types: portable devices and fixed gas detectors. The first is used to monitor the atmosphere around personnel and is worn on clothing or on a belt/harness. They can also be classified according to the operation mechanism (semiconductors, oxidation, catalytic, infrared, etc.).

Oxygen concentration

Oxygen deficiency gas monitors are used for employee and workforce safety. Cryogenics such as liquid nitrogen (LN₂), helium (He), and argon (Ar) are inert and can displace oxygen (O₂) in a confined space if a leak is present. A rapid decrease of oxygen can provide a very dangerous environment for employees. With this in mind, an oxygen gas monitor is important to have when cryogenics are present. Laboratories, MRI rooms, pharmaceutical, semiconductor, and cryogenic suppliers are typical customers.

Oxygen fraction in a breathing gas is measured by electro-galvanic fuel cell sensors. They may be used stand-alone, for example to determine the proportion of oxygen in a nitrox mixture used in scuba diving,^[2] or as part of feedback loop which maintains a constant partial pressure of oxygen in a rebreather.^[3]



Portable gas detector

Hydrocarbons and VOCs

Detection of hydrocarbons can be based on the mixing properties of gaseous hydrocarbons – or other volatile organic compounds – and the sensing material incorporated in the sensor.^[4] The selectivity and sensitivity depends on the molecular structure and concentration; however it is difficult to design a sensor capable of detecting only one single type of molecule.

Combustible

- Catalytic bead sensor
- Explosimeter
- Infrared point sensor
- Infrared open path detector

Other

- Flame ionization detector
- Nondispersive infrared sensor
- Photoionization detector
- Zirconium oxide sensor cell
- Catalytic sensors
- Metal oxide semiconductor
- Gold film
- Detector tubes
- Sample collection and chemical analysis
- Piezoelectric microcantilever
- Holographic Sensor
- Thermal Conductivity Detector

Manufacturers

- Detcon Inc. ^[5]
 - Sensidyne
 - 3M ^[6]
 - Honeywell Analytics
 - MSR Electronic
 - Sperian
 - Dräger
 - Industrial Scientific Corporation
 - Uniphos
 - Linde G-TECTA ^[7]
 - respoRAE ^[8]
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References

- [1] How Gas Detectors Work (<http://www.thomasnet.com/articles/instruments-controls/How-Gas-Detectors-Work>)
- [2] Lang, M.A. (2001). *DAN Nitrox Workshop Proceedings* (<http://archive.rubicon-foundation.org/4855>). Durham, NC: Divers Alert Network. p. 197. . Retrieved 2009-03-20.
- [3] Goble, Steve (2003). "Rebreathers" (<http://archive.rubicon-foundation.org/7782>). *South Pacific Underwater Medicine Society Journal* **33** (2): 98–102. . Retrieved 2009-03-20.
- [4] holographic sensor
- [5] <http://www.detcon.com>
- [6] Detection and Monitoring (http://solutions.3m.com/wps/portal/3M/en_US/Health/Safety/Products/Catalog/?PC_7_RJH9U5230GE3E02LES9MG812H2_nid=ZM7KMG29F8beCJMCGKJR71gl)
- [7] http://hiq.linde-gas.com/international/web/lg/spg/like351gspg.nsf/docbyalias/equip_gas_detectors
- [8] Natural Gas Detector, Portable Gas Detector, Multi Gas Detector India (<http://www.resporaesystems.com>)

External links

- OSHA Workshop (http://www.osha.gov/dts/ctc/gas_detec_instruments/toc.html)
- Gasdetectie (<http://www.ericboomgasdetectie.nl>)
- Adsistor Tech (<http://www.adsistor.com>)

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