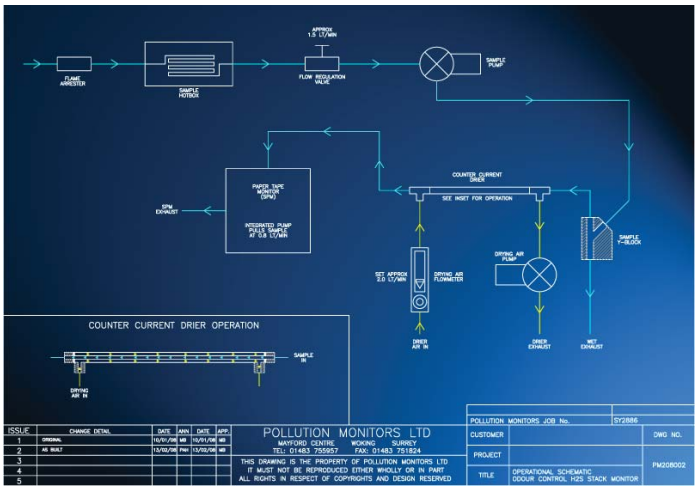
Pollution Monitors

Intelligence for Tomorrow

Sampling Systems for Industry

We have spent over 20 years designing, manufacturing, installing and commissioning bespoke sampling systems for gas detection and environmental monitoring applicants.

Our design team have a wealth of experience in solving industry specific problems where a probe, sensor, monitor or “off the shelf” system will not suit the application.



FACILITIES AVAILABLE

- Design
- Manufacture
- Delivery
- Installation
- Commission
- Demonstration
- Training
- Servicing

Many industries require online monitoring for gases to aid their process, check performance of third party equipment such as abatement systems, protect against explosive environments or merely to record emission levels. Often the conditions with the duct, stack, vessel or wet well are likely to produce unreliable readings on the monitoring device. The presence of water, high relative humidity, flammable gases, particulates, variable pressure, fluctuating flow rates, high or low temperature, cross sensitive or corrosive gases at the point of detection often fall outside the working perimeters of the sensor.

Thousands of pounds can be spent on instrumentation, which is proved to be unreliable, produce inaccurate readings or is damaged by contamination because inappropriate sampling and conditioning equipment has been included in the design package.

Whatever your application we would be pleased to work with you to design a bespoke system, which can overcome these problems and give you exactly what is necessary for your application. Whether you are looking for sequential sampling, dilution and/or a conditioning system lets work together to solve your problem.

We have solved many problems for process monitoring on Waste Water Treatment Works, Climatic Chambers, Semiconductor Plants, Tobacco Plants, Chemical Plants, Pharmaceutical Plants, Bus Depots, Research Labs, University Clean Rooms and Industrial Spray booths.

HISTORICAL APPLICATIONS SOLVED

We were approached by Qinetiq to solve a long standing problem they had with unreliability of their traditional gas detection system, which was intended to monitor Carbon Monoxide and Oxygen Depletion within a Climatic Chamber.

The chamber temperature would drop below zero and above 70°C as part of the testing process. A Nitrogen Blanket is used within the chamber to deplete the oxygen as part of the clients trials. The customer was also keen to expand the detection system to include for monitoring leakage of aviation fuel.

Working closely with the end user we designed two identical sampling systems. Both cabinets were mounted external to the chamber on suitable framework for floor standing, one on the east and one on the west side.

Two permanent stainless steel sample lines were run from each cabinet to the side of the chamber walls. Termination plates were installed inside the chamber wall and a set of flexible sample lines supplied with the system. After the aircraft had been positioned inside the chamber, the flexible sample lines were connected to the termination plates and run to the perimeter of the aircraft, two on each side. The sampling systems were switched on and the internal pumps used to extract a sample up each of the four lines. Over the length of the permanent stainless steel sample lines the temperature dropped to below the required level for standard gas detection sensors. Each sample line was fitted with end of line filters to remove particulates.

A coalescent filter was used to remove condensation created by the cooling process. A flow failure device was installed within each line to alarm locally and within the main control room as necessary. An electrochemical cell sensor for Carbon Monoxide, another for oxygen depletion and a Photo Ionisation Detector was used in series for detection of the required gases. A local display was provided with alarm and fault LED's, in addition to repeating the information within the control room on a standard gas detection control panel.

A GSM unit was used to transmit SMS text messages to the Site Manager in the event of alarms and faults during unmanned trials.

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We were approached by a major design and build company within the Waste Water industry requesting a system to monitor parts per million of Hydrogen Sulphide, percent by volume levels of Methane and Oxygen within two Bio-gas pipe lines. The pipe lines were Zone 1 classified, contained high relative humidity, up to 1,000 ppm of H_2S and the nearest designated safe area was over 30 metres away.

Our design team proposed a single sampling system located within the designated safe area, with the capability to switch between the ducts. The cabinet was supplied in GRP, IP65 rated on Hot Dip Galvanised Unistrut framework suitable for Waste Water Treatment plant environments. Sample lines made of special material which is non porous to H_2S, CH_4 and O_2 were run from each duct to the instrumentation cabinet, where they entered ATEX approved Flame Arresters. These Arresters prevented flash backs up the sample line and protected the plant against explosion from the high concentrations of Methane (CH_4). The sample pump diaphragms were supplied in PTFE to reduce the potential of sample loss or corrosion from the H_2S.

A flow failure device also made from PTFE was used inline to check for flow and alarm as necessary.
A manifold block was used to split the sample into two streams. One stream would pass through a counter current drier to remove moisture but maintain integrity of the sample gas, through a dilution system electronically operated by Mass Flow Controllers to reduce the H_2S concentration, before being passing across a standard electrochemical cell H_2S sensor. This sample was returned to the duct via another Flame Arrester. The reading from the sensor was multiplied up by the dilution ratio for accurate measurement.

At the same time another pump would pull a section of the sample from the manifold block through another counter current drier, through a carbon filter to remove H_2S before being passed across an Infra Red sensor for detection of % by volume levels of CH_4, across an electrochemical cell oxygen sensor, through an ATEX approved Flame Arrester and back to the duct.

Every few minutes a PLC within the control cabinet would switch the sample between each duct and illuminate an LED on the front panel for indication of the stream being sampled and the gas concentrations. The information was duplicated via 4–20 mA signals and volt free contacts to the clients control room.

The PLC was also used to control switching of the H_2S sample stream between monitoring mode and introduction of fresh air. The fresh air sample was used to stabilise the sensor zero point.

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We were asked to monitor levels of Hydrogen Sulphide (H_2S), Oxygen (O_2), Methane (CH_4) and petrol vapour within a wet well on an industrial site. The well was zone 1 classified and contained high relative humidity. Our design team proposed a single sampling system control cabinet with viewing window and locks supplied for wall or floor mounting in the safe area. A total of four tubes were run from the well to the instrumentation cabinet each 40 metres long. One Fluorinated Ethylene Propylene tube was used for the sampling of H_2S, O_2 and petrol vapour, one nylon tube for the sample of CH_4 and another two nylon tubes for two exhaust lines. The CH_4 would rise to the top of the well (assuming no forced extraction) and therefore the tubing was mounted near the top. The other gases needed to be monitored near the water level hence the second sample line.

Each sample was drawn from the wet well continuously with the aid of dedicated pumps mounted inside the cabinet. A catch pot was installed in each sample line to collect water droplets from the tubing. These were fitted with an automatic drain facility to eliminate the need for operator maintenance.

After the catch pots, the samples would pass through filters designed to remove particulates but maintain the gas integrity. Thereafter the sample would pass through an ATEX approved Detonation Arrester to prevent flash backs up the sample line. An extraction fan was fitted on the side of the instrumentation cabinet to create air movement throughout as an additional safety measure.

After the Detonation Arresters, the samples passed through a Flow Failure Meter and a counter current drier (used to remove relative humidity) before being passed across the sensors. Additional pumps and flow meters were used to operate the counter current driers. The exhaust from each stream was returned to the wet well via additional Detonation Arresters. Electrochemical cell sensors were used for the detection of Hydrogen Sulphide and oxygen. Infra Red sensors were used for the detection of petrol vapour and Methane.

We wired the 4–20mA signal from each sensor to a control panel mounted inside the cabinet, which in turn allowed the user to wire the volt free contacts for alarm and faults to SCADA whilst providing a local display of gas concentrations and alarms.

The low level sample line was connected to a bespoke "float" which allowed continued detection of the gases even when the water levels rose. A manual PTFE 3 way valve was inserted in each line enabling the operator to isolate a single sample line at a time.

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