

# PASSIVE AIR QUALITY MONITORING SERVICES



## Passive Air Quality Sampler

The Passive Air Quality Sampler (PAQS) provides a cost-effective method for collecting air quality data. This system does not require power, making it an excellent tool for sampling in any region, no matter how remote.

An additional advantage to the simple but effective design of this sampling device is the ease in which the PAQS is deployed and operated. The sampling system is portable, does not require electricity, data loggers or pumps, has a protective rain shelter and ensures that there is no active movement of air through the sample.

## How Does the Sampler work?

Passive sampling devices operate on the principles of adsorption and permeation, physically binding to the specific compounds that are being targeted. Air pollutants that are being sampled will diffuse or permeate through a semi-permeable membrane and then collect on a filter that has been chemically treated to adsorb those targeted compounds.

After being exposed, the sampler is analyzed in the laboratory to determine the amount of the targeted compound collected. An average concentration is then calculated based on the duration of exposure, accounting for the effects of relative humidity, temperature and wind speed.

## Passive vs. Continuous Monitoring

At AGAT Laboratories, we offer both continuous air monitoring as well as passive air monitoring. With continuous monitoring, a trailer is installed usually with equipment that runs 24 hours a day, 7 days a week to collect one minute data averages. In passive monitoring, the samplers remain in the field for a month at a time, when they are brought back and analyzed for a monthly average.

For continuous monitoring, the costs are much higher due to the equipment and support required. The trailer is often connected by modem and polling this information at least twice an hour to display the most up-to-date, hourly information on our *WebAIR* software for clients to view.

Passive air monitoring is significantly cheaper and for most purposes, just as effective. Field testing and validation studies in Western Canada (BC and AB) have provided results that indicate a very close comparison in results between the two methods. Added on to AGAT Laboratories' own findings, an independent field testing and validation study has also been conducted in conjunction with the Alberta Environment, which supports these findings.



## Applications

The Passive Air Monitoring Sampler is used as a cost-effective alternative to the Continuous Monitoring Analyzers for numerous applications. These applications include trending purposes, and occupational and hygiene studies. Compliance or regulatory monitoring (static monitoring) is the most common application.

Results can be utilized in long-term trending of collected data and can be operated either independently or as part of a larger network of samplers. The PAQS can continue to be used for repeat sampling as the filters are submitted to our laboratory for analysis. Results can also be used for measuring large areas for the spatial variation of pollutant levels.

## Capabilities

Sampling filter media is currently available for Sulphur Dioxide (SO<sub>2</sub>), Hydrogen Sulphide (H<sub>2</sub>S), Nitrogen Dioxide (NO<sub>2</sub>), Ozone (O<sub>3</sub>) and Volatile Organic Compounds (VOC). The sampling system, which allows for up to four samplers, consists of a rain shelter, mounting hardware and room inside for storing on-site blanks. One shelter can support duplicate sampling of two parameters.

The following table is an example of results that could be gained in a passive field study performed by AGAT Laboratories.

### Passive Field Study Summary

Pollutant	PAQS Results (Passive)	Continuous Analyzer Results (Active)	Per cent (%) Deviation
H <sub>2</sub> S	4.8 ppb	4 ppb	3.1
H <sub>2</sub> S	3.8 ppb	4 ppb	2.2
H <sub>2</sub> S	4.3 ppb	4 ppb	1.9
SO <sub>2</sub>	12.8 ppb	13 ppb	1.3
SO <sub>2</sub>	12.2 ppb	13 ppb	2.2
SO <sub>2</sub>	11.9 ppb	13 ppb	3.3

## Clean Air Laboratory

Our PAQS is composed of chemically treated filters that absorb target compounds. After filters are exposed to the environment, they are analyzed in our Clean Air Laboratory to measure pollution concentrations collected for the duration of exposure.

Laboratory analysis for our passive air quality monitoring systems is performed in our state-of-the-art, positive pressure, Clean Air Laboratory. Ventilated air is first passed through a multi-stage HEPA filtration system which removes 99.99% of all particles in the air. After passing through the filtration system, the air is then directed through a chemical scrubber which removes any air contaminants such as Ozone, Hydrogen Sulphide, Sulphur Dioxide and others. Our air laboratories are designed to meet all US EPA and European Union standard requirements for temperature and humidity, which are precisely controlled through a computerized access panel. This enables AGAT Laboratories to ensure that no contamination will come into contact with the passive monitors and that laboratory controls are of the highest quality possible.

