

## AN124 – Hydrophobic Filters Used on Diffusion Data Loggers

This application note explains the hydrophobic (water repelling) filters covering the air vents in our 1% and 30% CO<sub>2</sub>, %RH and Temperature diffusion data loggers model numbers CM-0016, CM-0017, CM-0018, CM-0019.

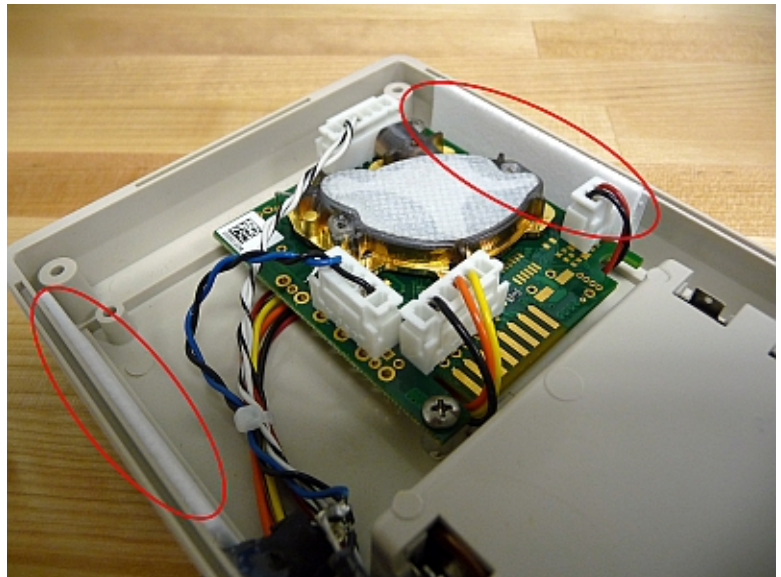
### Overview

The portable diffusion data loggers are often used in extremely hostile environments, yet are required to measure carbon dioxide, temperature and relative humidity with high accuracy. A filter that does not allow foreign substances like water droplets, dirt, dust or mold spores, yet allows free passage of ambient air to the internal sensors is required. This makes our data logger suitable for:

- In-situ Incubation
- Caving
- Mushroom Growers

### Properties

We use 1.5mm sheets of the Porex brand polypropylene (PP) material to achieve the desired filtering. The filter is rated at 120 to 50 microns. This means that the outside of the filter accepts particles in ambient air up to 120 microns, but the porosity is reduced so that by the time ambient air reaches the inside of the data logger, only particles smaller than 50 microns are passed through.



### Effect on Reaction Time

Any material that limits air flow over a diffusion sensor will have some small effect on sensor reaction time. However, we have discovered in testing that the PP material does not slow down the reaction time when the data logger interval is set to 30 seconds or greater. If a higher rate of reaction time is required, you should consider a sampling data logger with a built-in pump (models CM-0001, 0002, 0003, 0050, 0056 or a sample draw meter with built-in pump (models CM-0004, 0005, 0006, 0051, 0057).

While the filters should last a lifetime, under the most extreme conditions it is possible that they may become contaminated. As a rule, PP may be used at temperatures ranging from 200 to 300° F (93°C to 149°C). Thus, PP products can be sterilized in an autoclave. You may also send the data logger into CO2Meter.com for filter replacement.

### Sensor Filter

In addition to the PP filters, all our NDIR diffusion CO<sub>2</sub> sensors have an additional filter on top of the sensor. This filter must remain clean and dry to insure accurate CO<sub>2</sub> level readings. If the CO<sub>2</sub> sensor filter gets wet, it will no longer accurately read CO<sub>2</sub> levels. Under normal conditions, you may be able to simply let this filter dry out to start working again. However, moisture inside the data logger could ruin other components, and will void the warranty.