Maestro Digital Mine

Real time data means more time at the face.

Maestro DustMon™ PM

Particulate Matter Monitor

Engineered for the harsh underground mine environment.

The **DustMon™ PM** is an economical, compact, real-time particulate matter and respirable dust monitoring sensor that can be added to any existing Vigilante AQS™ or Zephyr AQS™ air quality station.

Real-time particulate matter & respirable dust monitoring

Applications:

- Haulage ramps
- Rock breakers
- Crushers
- Conveyor belts and transfer points
- Ore pass load outs
- Equipment service bays

Real-time monitoring of dust loading can be used to discover trouble areas allowing quick mitigation and dust suppressant optimization whether it is water, surfactants, salt solutions, petroleum resins, polymers or adhesives.

The **DustMon™ PM** is simply mounted to the back of the drift or any work area and connected to the **Vigilante AQS™** or **Zephyr AQS™** air quality station.

The air sample is drawn through the sensor body, by an internal fan, while the optical laser counts the particulate matter and groups the particles by size (PM1.0; PM2.5 & PM10) and mass flow (mg/m3).

The only form of maintenance is a simple replaceable filter that is used to eliminate larger particle fractions from the sample. The filter can easily be changed by hand in less than 10 seconds without the requirement of a tool set.

MaestroLink™ Server software monitors both the data and the diagnostics of **DustMon™ PM** notifying the user when the instrument requires service. Empirical base line testing is done to calibrate the system and alarms and output ranges can be set from the built-in webpage.

Particulate matter (PM) is a huge challenge in the mining industry. Anything below 10 µm is a health issue for people's respiratory system underground.

Improving the health and safety of workers underground

Changing conditions underground requires new health and safety monitoring methods

Underground mines are harsh environments and require real-time monitoring, measurement and control of the environmental conditions to keep the miners safe while meeting production targets. With the integration of more environmentally friendly technologies underground, such as battery power vehicles, **the reduction in diesel emissions is a major step forward in improving the air quality for the workers but this ultimately will not reduce dust emissions, noise and heat.**

Advantages:

- Optimize dust suppressants
- Locate high dust loading spots
- Bush fire monitoring of fresh air
- Monitor diesel particulate

In recent years, advancements to enhance how we monitor the underground working environment have significantly improved in terms of gas exposure, airflow rate and worker heat stress. It is also vital to monitor and control the dust created by drilling, blasting, conveyance and haulage of ore and rock. **Overexposure to respirable dust leads to long term worker health challenges as well as regulatory concerns.**

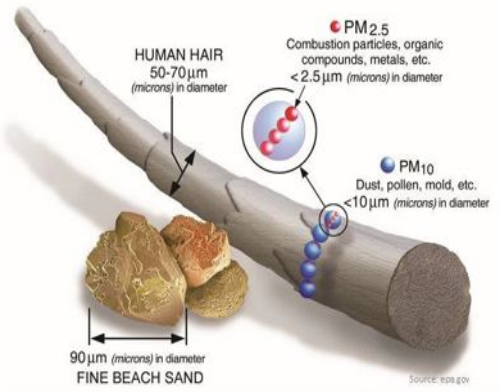
According to the National Institute for Occupational Safety and Health (NIOSH), occupational exposure to respirable crystalline silica dust can have several adverse health consequences, including silicosis, tuberculosis, chronic bronchitis, emphysema, and chronic renal disease and has classified crystalline silica as a potential occupational carcinogen.

Standards for Monitoring Dust Loads

Particles are commonly classified according to their size as either coarse or fine. Fine particles have a diameter of 2.5µm (PM2.5) or less, and coarse particles are 10µm or less (PM10).

Ultra-fine particles are commonly generated through combustion or by secondary gas to particle reactions. PM1.0 and lower are so minute that they can be inhaled, penetrate the lungs and end up in our blood stream causing serious long-term health problems.

Particulate matter (PM) is a huge challenge in the mining industry. Anything below 10 µm is a health issue for people's respiratory system underground. Particulate matter that has a diameter over 100 µm tends not to stay airborne long enough to be measured, therefore not seen as a risk to workers.



It is an economical, compact, plug and play, IIoT device!

Real-time vs Spot Measurement

Real-time monitoring of PM concentrations can be achieved using optical instruments. These instruments measure either light scattering, light absorption or light extinction caused by particulate matter.

The **DustMon™ PM** uses an optical particle counter (OPC), in the form of a laser diode, to illuminate particles and dual photodetectors with an elliptical mirror to measure particle light scatter and velocity. Each sensor is factory calibrated with traceable monodispersed, polystyrene latex (PSL) particles.

Measurements may be periodically verified and calibrated using data from gravimetric instruments. OPC instruments allow real-time measurement, low operating costs vs. gravimetric meters that require a filter to collect the material and a laboratory to analyse the particulate fraction.

Although gravimetric meters provide excellent data, it is like looking through the rear-view mirror after you have run over a pothole. The data is 1-5 days old and will not be useful in controlling dust levels in real-time.

Available as a direct plug in or remote mounted sensor for the Vigilante AQS™ or Zephyr AQS™

Technical Specifications

DustMon™ PM - Technical Specifications
PM1, PM2.5 and PM10 output range and mg/m3
0.24 litre/minute flow rate
10,000/second maximum particle count rate
-10 to 45°C temperature range
Class 1 optical laser
0 to 95% (non-condensing) relative humidity range (rh)
Direct plug in to any Vigilante AQS™ or Zephyr AQS™ - integral or remote mounted
Direct integration into MaestroLink™ Server software

Maestro Digital Mine manufactures Industrial Internet of Things (IIoT) measurement and control instrumentation for the optimization of underground mine ventilation and underground digital networks for last mile of communication. Our products are made exclusively for the underground mine automation, IT and ventilation sectors that delivers energy savings and productivity improvements while meeting the highest health and safety standards.

To learn more about Maestro Digital Mine's digital solutions and the **DustMon™ PM**, visit us at www.maestrodigitalmine.com

Contact us at sales@maestrodigitalmine.com

We make the complex, simple!

Maestro Digital Mine

We leave no one stranded

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