



Which type of Dust Monitor should we use?

When it comes to monitoring smoke and dust emissions, understanding the right particulate matter (PM) measurement technique is essential. Both smoke and dust fall under the category of PM, which can be measured using various methods, including Opacity and Triboelectric detection. The choice of the most suitable technique depends on several factors, including the specific requirements of your installation and regulatory guidelines.

Opacity Measurement

Opacity is a method used to measure how much light is attenuated as it travels through a column of dust. As light crosses the column, some of it is lost due to scattering, absorption, and reflection caused by the PM present in the column. The degree of light attenuation depends directly on the size and quantity of particles in the air. This reduction in light intensity is quantified as opacity. Opacity measurement can be utilised either as a direct volumetric assessment or converted into a mass concentration value (Dust) using a calibration factor specific to the installation. This calibration ensures that the measured values are representative of the actual emissions.

Opacity is particularly useful for installations where the emission limits are reported in terms of percentage opacity. It is often employed in smaller plants and scenarios where regulatory standards require this type of reporting. However, for installations that require reporting in terms of Dust (mg/Nm^3), a conversion to mass concentration is necessary.

Triboelectric Measurement

Triboelectric detectors use a different principle. They rely on an in-situ probe that detects the impact of charged particles onto an electrically isolated metallic probe. The collision of particles generates a voltage, which can then be converted to the PM concentration. Triboelectric systems are known for their sensitivity and are commonly used in environments where direct, real-time monitoring is required.

The decision between opacity and triboelectric measurement techniques involves considering several factors, such as the PM range, installation cost, duct size, operational temperature, flow rate, moisture content (H_2O), and the regulatory framework applicable to the site.

Regulatory Considerations

The output units you select for your dust monitor are primarily dictated by the regulatory body overseeing emissions for your industry. For large industrial plants, emissions are typically reported as Dust in mg/Nm^3 . In contrast, smaller plants may only need to report their emissions in terms of opacity percentage.

SHAPA's Expertise and Support

At SHAPA, our members treat every measurement location as a unique installation. This ensures that you receive professional advice tailored to your specific needs. Whether you are determining which measurement technique to use or selecting the most appropriate analyser model, SHAPA members can provide the expertise and support required.



For a comprehensive solution, the SHAPA community offers a complete design, installation, and testing service for dust monitoring systems. To explore your options, visit our **Equipment Finder** at <https://www.shapa.co.uk/equipment.php>. You can also access a wealth of free to download related technical documents at <https://www.shapa.co.uk/technical.php> or email your inquiry to info@shapa.co.uk. Let SHAPA help you achieve effective, reliable dust monitoring at an economic cost throughout the lifetime of your installation.