An overview of dust measurements outdoors

Particulates in the environment can be very harmful to humans. Guidelines published by the Environmental Protection Agency (EPA) in the USA indicate two categories of particulate matter are important when sampling air for suspended particulates. The particle sizes are 10 and 2.5 microns respectively. These are referred to as PM10 and PM2.5 (Particulate Matter) fractions and sampling for these can be achieved by using inline Polyurethane Foam (PUF) Filters before the standard sample collection filter itself or by use of a cyclone. Typical sources of these particulate sizes of interest are byproducts produced by diesel engines, power plant emissions and even natural or man-made disasters such as forest fires. PM2.5 particulates are particularly dangerous as they are small enough to get down into the smallest structures in the lung where they remain, with various negative results depending on their composition. The Casella CEL-712 Microdust Pro in an environmental enclosure allows continuous short-term (12-15 hours) measurements to be made in conjunction with a sample pump and the size selective filters.

Benefits of time history information

Application of personal sampling pumps for monitoring vapors and particulates produces an average concentration level over the entire duration of the measurement. As a result, there is no evidence or knowledge of when the concentration levels were high and when they were not. It can be extremely useful to collect time history information about the temporal distribution of levels during an exposure period in order to examine the processes causing high levels to occur, and apply proper controls to limit personal exposure. Data logging of particulate concentrations at regular time intervals allows you to display and download a graph (using Casella Insight) of the levels showing what happened and at what time. The Microdust Pro measures dust levels in real time, displaying the changing concentration on its color graphic LCD display. This is invaluable for capturing high concentration events that may only last for short periods of time during a measurement period. Examples from industry would include operations that mix powders or similar materials in vats or vessels during the manufacturing process.

Process control applications

Many industrial processes benefit from continuous monitoring of concentration levels for such applications as toxicology laboratories investigating the effects of certain substances on test animals. Legal requirements require testing a wide variety of potentially toxic substances by exposing animals to higher than normal concentrations of products under closely controlled laboratory conditions. The Casella Microdust Pro real time particulate monitor can be installed in a fixed wall mounted system with an airborne material stream drawn through the optical chamber continuously to measure the concentration. An output is available to provide signal to an indicator or process loop. Manufacturing of many products including as cement in powder form or material discharge from manufacture of lead acid batteries can produce high levels of polluting dusts that could escape into the atmosphere. The Casella Microdust Pro is an ideal tool to monitor the manufacturing process and warn of high concentration levels in exhausts or filter systems.