Sensidyne Nephelometer

Frequently Asked Questions

Q: Why the name Nephelometer?

A: When light scatter devices were first developed a century ago to measure turbidity in fluids, they were called nephelometers. They were named for the Greek word nephos, meaning cloud. When light scatter technology was applied to airborne dust monitors a half century later, the nephelometer name was also applied. A light scatter dust meter responds to clouds of dust, so it is a nephelometer.

Q: Why does the unit require K factors?

A: With any light scatter device, the signal is a function of the light reflected off the passing particles. A white particle will not reflect light the same as a black one or a brown one. To determine a correction, or K factor for your dust, you need to run a side by side test with a personal monitoring pump set up for NIOSH Method 0600. There are three K factors pre-set in the library when you receive your Nephelometer; limestone, coal fly ash and Arizona Road Dust (ARD). If you don't determine your own K factor you may choose one of these. Most instruments of this type have a calibration based on ARD. If you run the Nephelometer in that mode, you will match most instruments on the market, as they operate out of the box.

Q: What is Arizona Road Dust, and why do we use it as a reference?

A: When light scatter dust monitors were first developed, over 50 years ago, the only standard dust available was Arizona Road Dust (ARD). This comes to us from the Society of Automotive Engineers, who had specified a standard dust for rating automotive air filters and oil filters beginning in 1940.

Q: What particle sizes does the unit detect?

A: The basic detection principle can see particles from about 50 microns down to 0.1 micron in diameter. However, a light scatter device may be tuned to respond to particles in a certain size range. This is done by choosing the angle between the light beam and the detector. Our Nephelometer is a 90° unit. That is, the detector is at a right angle from the beam. This format provides a peak response for smaller particles. Our Nephelometer is therefore tuned to see particles that are between 0.1 and 10 microns, with its peak response at particles 0.6 microns in diameter. The graph on the following page illustrates the Nephelometer response.

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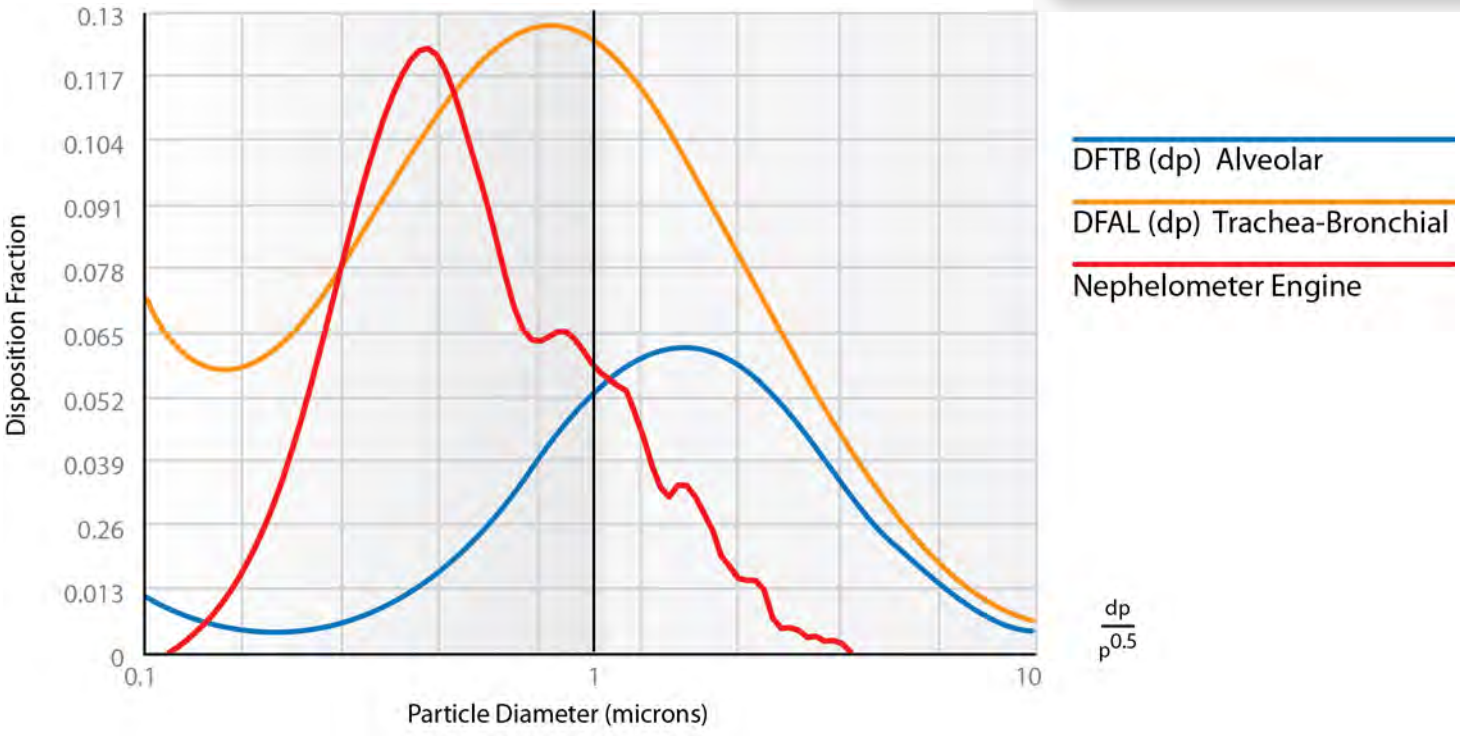

Q: What is sheath air?

A: In its normal operation the Nephelometer draws an air sample through the detector via an internal pump. That format alone leads to maintenance issues, because some portion of the sampled dust will wind up deposited inside the detector. Over time, the dust buildup becomes a problem. Sheath air prevents the buildup, and thereby reduces maintenance. Sheath air is a second stream of pre-filtered air passing through the detector that keeps the detector clean. Light-scatter dust monitors that incorporate sheath air will require far less maintenance than those models that do not have it.

Q: What airborne dust concentration range does the Nephelometer cover?

A: The measuring range for the Nephelometer is 1-10,000 µg/m3. This equates to 0.001 to 10 mg/M3.

Q: What is the allowable dust concentration according to OSHA?

A: OSHA allows 15 mg/M3 for total inert nuisance dust and 5 mg/M3 for the respirable fraction. For dusts containing silica, the allowable level depends upon the percent silica in the dust, such that the higher the silica level the lower the concentration of dust allowed.

The equation below is used for respirable crystalline silica:

$$\frac{10\ mg/m^3}{\%SiO2+2}$$

Where a 1% silica dust would produce an allowable level of 3.33 mg/M3 (i.e., 10/3 = 3.33). Similarly, the equation for total silica dust is below.

$$\frac{30\ mg/m^3}{\%SiO2+2}$$

Where a 1% silica dust would produce an allowable level of 10 mg/M3 (i.e., 30/3 = 10)

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