nanozen
know the air you breathe

DUSTCOUNT® APPLICATION NOTE: FOUNDRY DUST MONITORING

OVERVIEW

The DustCount combines the advantages of real-time dust monitoring with the ability to do the standard method all in a compact, lightweight package.

The application is using the DustCount to monitor worker exposure to dangerous dust over an 8-hour shift in a foundry.

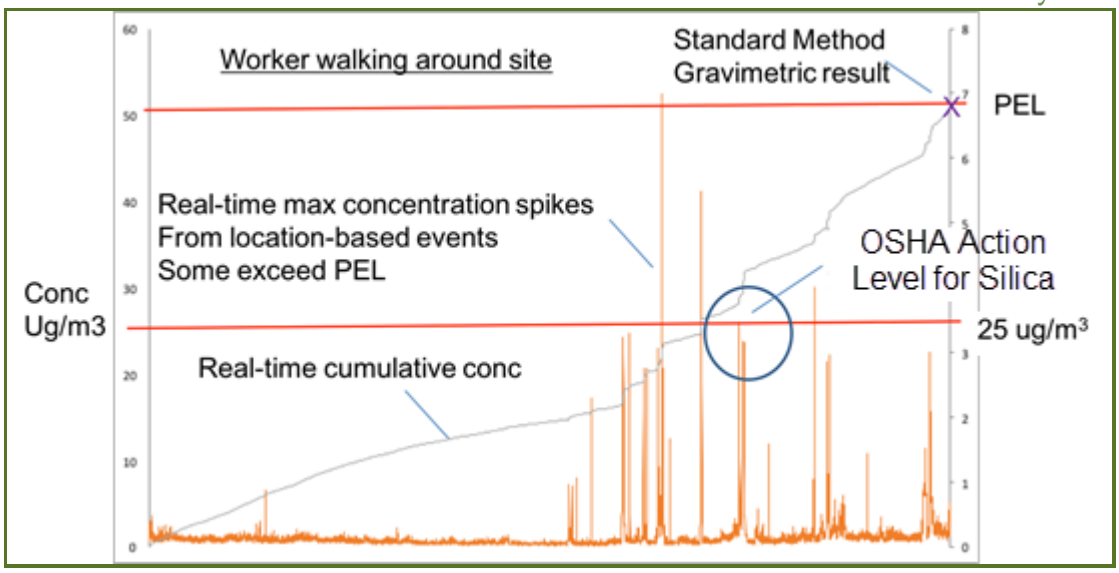
The Industrial Hygienist (IH) connects the DustCount to the PC via Bluetooth and uses the DustCount software to configure the unit prior to running the test. A HEPA filter is used to purge and zero check the initial reading. The alarm threshold is set at 50 ug/m3 for respirable silica. The IH puts the DustCount on the worker. In this case the DustCount is worn under the protective clothing and the tube is run up to the breathing zone and clipped to the workers lapel.

The IH monitors the PC for any alarms that would signify that the worker has exceeded the danger threshold. At the end of the shift the IH collects the monitor, downloads the data and removes the sample filter to send off to the lab for gravimetric and XRD analysis.

RESULTS

The Real-time readings from the DustCount are correlated with the workers activities during the shift. Some customers have even placed video cameras on the workers so that they can easily correlate the real-time readings with the actual events.

In this application, the worker is preparing to do a batch using a computer program so there is not much activity in the morning. In the afternoon, the worker prepares the crucible and the molds to do the pour. Spikes start almost immediately. Dust is disturbed on the foundry floor when the crucible is moved around. The mold is moved, quenched and left to cool, after cooling the mold is opened and some base sanding is performed.



Eight Hour Shift Results – Real-time Data + Mass concentration vs time

Filter analysis shows 76% crystalline Silica and real-time analysis shows a high base level of dust concentration leading to high cumulative results very early in the shift. Respirator protection is essential.

At one point the worker is exposed to what seems to be a dangerous plume of dust. Once the composition is analyzed at the lab it shows that the percentage of dangerous dust in this foundry is 76 percent of the sample. This coefficient factor can be input into the DustCount for fine tuning future test results.

Note that the Gravimetric analysis shows the daily exposure to be just under the new Silica standard of 50 ug/m3. This correlates perfectly with the real-time meter.

CONCLUSIONS

The key to the value of real-time devices is the accuracy and amount of data that an IH gets from the shift vs the standard method alone. This allows more depth of analysis of causes and locations of danger, which can then be controlled. With the DustCount the gravimetric sample is the SAME DUST that is tested in real time resulting in perfect correlation with standard method and direct reading. Furthermore, the results from the gravimetric, XRD or IRA can be fed back into the meter to fine-tune factors in the readings.

Finally, the DustCount provides a 20-point particle distribution reading for each sample. This can be used to determine the type of danger the worker is being exposed to. Larger particles can cause lung cancer, emphysema and COPD but smaller particles go through the lungs air exchange system and end up in organs such as the liver and the brain.