

## OSHA's Final Ruling on Silica

### Background

Earlier this year, OSHA published the final rule to protect workers from exposure to crystalline silica. Crystalline silica can be found in Quartz and is a basic component in soil, sand, granite and other minerals.

The new rule is to protect more than 2 million workers in the United States that are at risk to silica exposure. The health effects of crystalline silica exposure has been linked to disabling illnesses, fatalities and has been classified as lung carcinogen. Exposure to silica can cause silicosis which is disabling if not fatal by causing scar tissue in the lung and reduces the lungs ability to take in oxygen. High risk workers would include foundry work, stonecutting, rock drilling, quarry work, tunneling and any occupation, which can chip, cut drill or grind off crystalline silica in to respirable size fractions.

In order to minimize the health effects of silica OSHA has established new Permissible Exposure Limit (PEL) over an 8 hour work shift. The new rule reduced the PEL by 50%. The new PEL is 50 ug/m3. Additionally, OSHA also adopted an action level of 25 ug/m3 which is the same level as the ACGIH TLV for quartz and cristobalite”.

### SM-4000: Personal Real-Time Silica Monitor

#### Cross Calibration

Real Time Nephelometer are calibrated with a standardized Test Dust. Test dust varies, however a commonly used test dust is the ISO12103-01A2 Fine Test Dust, or “Arizona Road Dust.” The particle characteristics and properties of silica vary from the test dust, causing a variance in the instrumentation response. To compensate for this variance Cross Calibration is required.

$$\text{Calibration Factor} = \frac{\text{Gravimetric Filter TWA}}{\text{SM1004 TWA}}$$

Traditional Cross Calibration requires two devices; a Reference Sampler and a Real-Time Nephelometers. The Reference Sampler is a pump attached to gravimetric filter. The filter is sent to the lab and compared with the post ex facto real- time readings. The SM-4000 changes the way sampling is performed and reduces the need for two instruments. The SM-4000 has a far superior design compared with other Real-Time Personal Samplers.

The SM-4000 offers a miniature optical sensor mounted in the OSHA defined breathing zone. The sensor is situated between the gravimetric filter and Respirable Cyclone. The SM-4000 is **THE ONLY** device on the market with this unique feature.

## HAZ-DUST Model: SM-4000 Personal Silica Monitor

Application Note: New Product DOC1216

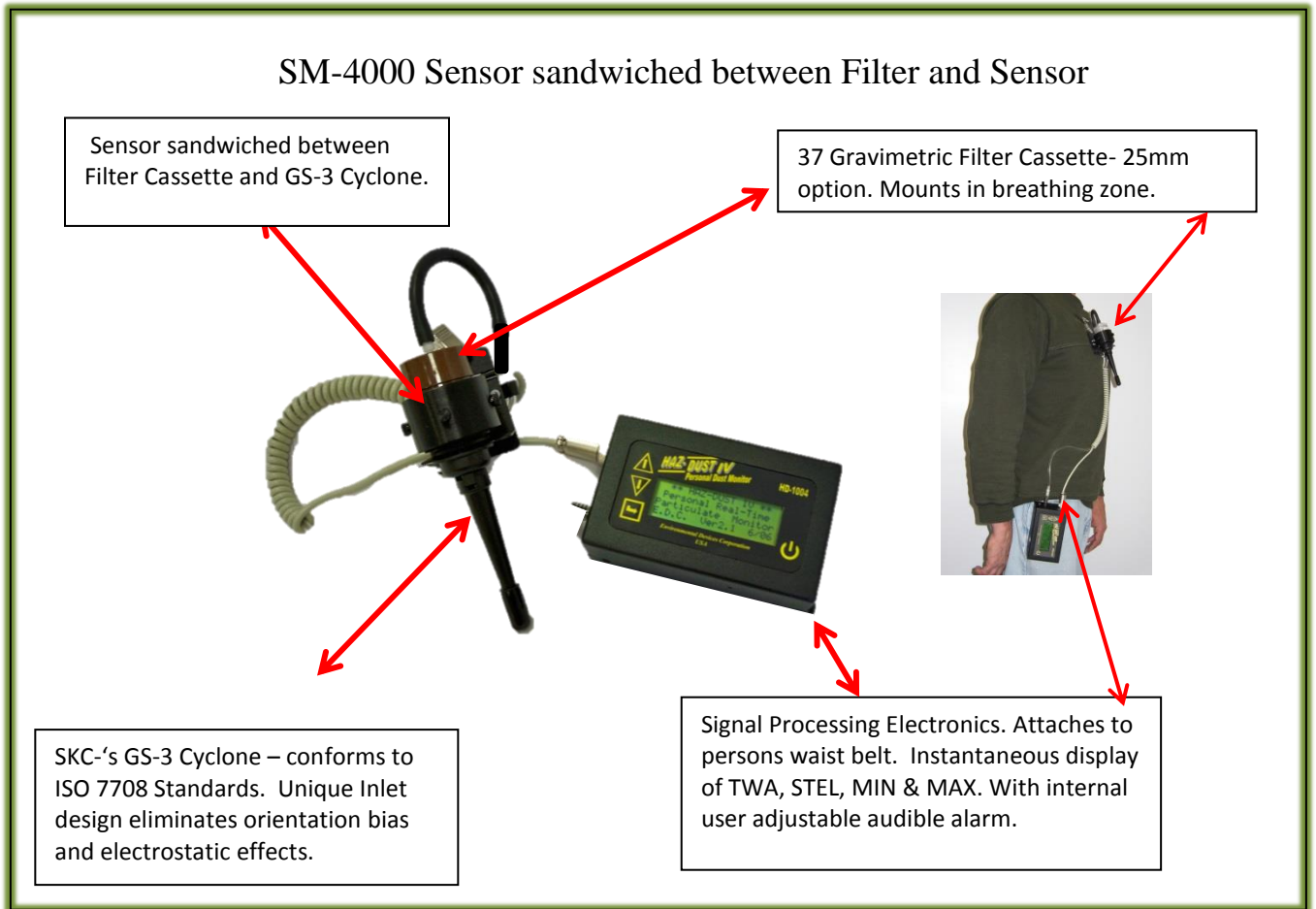
## Design of the SM-4000

### Unique Design – Patent Pending

Having the air sampler mounted in the breathing zone allows for a more accurate representation of workers exposure. In addition, having a Real-Time Optical Sensor placed in the breathing zone, reduces inner wall dust deposition, experienced by other Real-Time optical devices on the market.

Also having a gravimetric filter cassette directly behind the optical sensor allows for maximum particle deposition and thus a more accurate representation of worker exposure.

In addition to the Real-Time Concentration Readings, the DustComm Software allows for graphical analysis and comprehensive time history reporting.



## Specifications of the SM-4000

**DISPLAY :** Alpha-numeric LCD-4line, 20 character mg/m<sup>3</sup> concentration reading

**OPERATIONS :** Four key splash proof membrane switch – menu driven

**CALIBRATION :** Gravimetric reference NIST Traceable – SAE fine test dust-ISO12103-1

**ACCURACY :** +/- 10% to filter gravimetric SAE fine test dust

**SENSING RANGE :** 1-20,000 ug/m<sup>3</sup> (0.001 – 20 mg/m<sup>3</sup>)

**PARTICULATE SIZE RANGE :** 0.1 to 10um using SKC GS-3 Cyclone

**PRECISION:** +/- 3 ug/m<sup>3</sup> (0.003-mg/m<sup>3</sup>)

**REAL-TIME CLOCK and DATA DISPLAY :** Hours, min., sec., day, month, year

**DATA DISPLAY :** concentration in mg/ m<sup>3</sup> & TWA, MAX, MIN, STEL, date, time

**SAMPLING FLOW RATE :** 2.75 Lpm User adjustable

**SAMPLING RATE :** 1 sec., 1 min. and 10 min. intervals

**FILTER CASSETTE :** 37mm (optional 25mm) mounted directly behind sensor

**ALARM OUTPUT:** 90db at 3ft.

**RECORDING TIME:** 1 second to 21 weeks

**DATA STORAGE:** 21,500 data points

**MEMORY & TIME STORAGE:** > 5 years

**DIGITAL OUTPUT:** RS-232

**OPERATING TEMPERATURE:** 0 to 50 C

**STORAGE TEMPERATURE:** -20 to 70 C

**DustComm Pro Software:** Windows driven

**POWER:** NiMH rechargeable battery

**OPERATING TIME :** >/= 8 hours

**CHARGING TIME :** 10 – 12 hours

**HUMIDITY:** 95% non-condensing

**DIMENSIONS & WEIGHT (case):** 5.4" x 3.3" x 2.7" & 1.5lbs

**SENSOR DIMENSIONS:** 1.75" x 1.5"