Calculation of TWA Exposures

Both the PEL and the action level are expressed as TWA exposures. TWA measurements account for variable exposure levels over the course of a work shift by averaging periods of higher and lower exposures. The TWA exposure for an 8-hour work shift is calculated using a simple formula:

$$TWA = (C_a T_a + C_b T_b \ldots C_n T_n) \div 8$$

Where:

TWA is the time-weighted average exposure for the work shift

C is the concentration during any period of time (T) where the concentration remains constant; and

T is the duration in hours of the exposure at the concentration (C)

For example, assume that an employee is exposed to respirable crystalline silica in an 8-hour workday as follows:

Two hours exposure at 100 µg/m³
Two hours exposure at 50 µg/m³
Four hours exposure at 10 µg/m³

Entering this information in the formula, we get:

$$(2 \times 100 + 2 \times 50 + 4 \times 10) \div 8 = 42.5 \text{ µg/m}^3$$

Because 42.5 µg/m³ is higher than 25 µg/m³, this employee's TWA exposure would be above the action level, but below the PEL of 50 µg/m³.