

Recommended Procedure For Determination of Recovery Coefficients for 3M Organic Vapor Monitor #3500/3520

3M publishes the Recovery Coefficient for many of the organic vapors in the 3500 Compound Guide. This number represents the mean value $\pm$ 2 standard deviations from the tests conducted at 3M. A minimum of 5-fold replication (both monitors and standards) of the recovery test is performed at 3M. However, we encourage the user to verify the recovery coefficients, since techniques and presence of multiple contaminants can affect recovery coefficients.

The recovery coefficient is determined by vapor-state spiking of monitors. This is accompanied by the following steps:

- 1) Remove plastic ring and white film from a monitor.
- 2) Place a 2.5 cm diameter filter paper on spacer plate.
- 3) The closure cap is snapped on the monitor.
- 4) Calculate the amount of material to be injected. The following formula will calculate the injection amount, in milligrams, that corresponds to the amount that would be collected by a monitor at sampling conditions chosen. By varying the chosen concentration levels and exposure times, a Recovery Coefficient curve can be generated.

$$W = (K_o) \times (C) \times (t) \times (10^{-6} \text{ m}^3/\text{cm}^3)$$

Where:

- W = Amount of liquid injection in milligrams
K_o = Sampling rate of monitor cm³/min.
C = Average concentration in mg/m³
t = Sampling time in minutes

For compounds that are solid at room temperature, prepare a solution in Carbon Disulfide such that no more than a 5 microliter injection is needed to spike the required number of milligrams of compound.

A suggested starting point would be assuming an average concentration of one P.E.L. (Permissible Exposure Limit) and an 8 hour exposure period, as long as the amount in milligrams does not exceed the recommended exposure limit of monitor.

- 5) Inject the known quantity of the organic material onto the filter paper through the center port.
- 6) The monitor is allowed to sit 16-24 hours to allow total transfer of the organic material from the filter paper to the sorbent before elution.
- 7) Remove filter paper from monitor.
- 8) Proceed with elution and determination of amount recovered by G.C. analysis. See Sec VII Steps 2-5 of #3500 Organic Vapor Monitor Instructions for Use.

For further assistance, call 3M Occupational Health and Environmental Safety Division Technical Service toll free on 1-800/243 4630, or write 3M Occupational Health and Environmental Safety Division, 3M Center, PO Box 33155, St. Paul, Minnesota 55144-1000.