#123, September, 1996

**3M Organic Vapor Monitors 3500/3510/3520/3530**

**1,1,1-Trichloroethane**

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**Background**

This report contains supplemental information for sampling 1,1,1-Trichloroethane using 3M organic vapor monitors. Please see Tech Data Bulletin #124 for more information on the test protocol used to generate this report.

**Sampling Rate**

The published sampling rate for 1,1,1 Trichloroethane is 30.9 ± 0.3 cc/min.

**Analytical Recovery**

Recovery over a range of 2.68 to 28.1 mg using carbon disulfide was 100% with a coefficient of variation of 2.0%.

**Accuracy**

The accuracy is within ±25% as determined from a series of concentration and time experiments (See Table 1 on page 2).

**Humidity**

Uptake rate was linear when monitors were exposed to 200 ppm for 2, 4, 6 and 8 hour periods at 50% RH. The 3520/3530 should be used for exposures above 350 ppm longer than 6 hours at 80% RH (see Figures 1 and 2 on page 2 and 3).

**Detection Limit**

Assuming an analytical detection limit of 2 µg per monitor, the minimum detectable concentration is 1 ppm with a 15 minute sample, and 0.02 ppm with an 8 hour sample.

**Reverse Diffusion**

Not significant (<10%) when exposed to 700 ppm 1,1,1-Trichloroethane for 30 minutes, and then 450 minutes clean air at 80% RH, 23°C.

**Storage**

Samples may be stored at room temperature (23°C) or refrigerated (4°C) for 21 days without significant change from initial recovery.

**Temperature**

Not significant (<10%) in the range of 10-40°C (50-104°F).
**Interferences**  
The sampling rate is not affected by the presence of other solvents provided that the monitor is not overloaded.

**Orientation/Air Velocity**  
To accurately sample at any orientation, there must be a minimum air velocity of 25 ft/min.

Table 1 indicates the sampler accuracy for 1,1,1-Trichloroethane over a range of concentrations and times at 50% RH. According to our protocol, accuracy must be within ±25%. Concentrations were chosen to bracket certain published exposure limits for 1,1,1-Trichloroethane at the time that this work was done.

Table 1: % Accuracies by concentration and sampling time.

<table>
<thead>
<tr>
<th>Concentration</th>
<th>15 minutes</th>
<th>8 hours</th>
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</thead>
<tbody>
<tr>
<td>35 ppm</td>
<td>12.9 %</td>
<td>5.2 %</td>
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</tbody>
</table>
| 700 ppm       | 12.9 %     | 16.6 %  (3500)  
               |            | 14.4 %  (3520)  |

Figures 1 and 2 give the uptake rates for the 3500/3510 and the 3520/3530 at 50 and 80% RH.

![Graph showing 1,1,1-Trichloroethane uptake at 50% RH, 350 ppm](image-url)
Figure 2. 1,1,1-Trichloroethane uptake at 80% RH, 350 ppm

mg collected

minutes

6 hour sampling limit for 3500

Linear

3500

3520