



Technical Data Bulletin

OH&ESD

#149 August, 2001

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

Acrylonitrile

Background	This bulletin contains updated information on sampling <i>acrylonitrile</i> . 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 acrylonitrile is 43.8 cc/min.
Analytical Recovery	Recovery over a range of 40 to 645 µg using methylene chloride was 99% with a coefficient of variation of 2.4%.
Capacity	The 3500 collected 1.4 mg at 33 ppm during an 8 hour sampling period.
Accuracy	The accuracy is within ± 9.0% as determined from a series of concentration/time, reverse diffusion and humidity experiments (see Tables 1 and 2). Meets OSHA requirements for sampling acrylonitrile at the 95% confidence interval: ± 35% for concentrations at or above the exposure limits, or ± 50% for concentrations below the exposure limits.
Humidity	Not significant (sampling rate within 5%) when monitors were exposed to 6.71 ppm acrylonitrile for 8 hours at 80% RH.
Detection Limit	Assuming an analytical detection limit of 2 µg per monitor, the minimum detectable concentration is 1.4 ppm with a 15 minute sample, and 0.04 ppm with an 8 hour sample.

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- Reverse Diffusion** Not significant (<10%) when exposed to 7.75 ppm acrylonitrile for 4 hours and then 4 hours clean air at 80% RH, or 17.5 ppm for ½ hour followed by 7½ hours clean air at 80 % RH.
- Storage** Samples stored at room temperature (23°C) for 14 days showed a loss of 8%, while refrigerated (4°C) samples showed a 4% loss from initial recovery.
- Temperature** No specific experimental data. No significant effects (<10% bias) observed for Toluene, 1,1,1-Trichloroethane, Methylene Chloride and Hexane.
- Interferences** The sampling rate is not affected by the presence of other solvents provided that the monitor is not overloaded.
- Orientation/ and Air Velocity** No specific experimental data. Extensive testing with for toluene, hexane, 1,1,1-trichloroethane previously have shown that to accurately sample at any orientation, there must be a minimum air velocity of 25 ft/min.

Table 1 indicates the 3500/3510/3520/3530 accuracy for acrylonitrile 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 acrylonitrile at the time that this work was done.

Table 1: 3500/3510/3520/3530 % Accuracies by concentration and sampling time (50%RH).

Conc. (ppm)	15 min	2 hrs	8 hrs
1.2		11.9	10.9
7.4	19.4		
9.3			4.0
19.9	23.3		

Table 2 indicates the 3500/3510/3520/3530 accuracy for acrylonitrile over a range of concentrations and times at 80% RH. According to our protocol, accuracy must be within ±25%. Concentrations were chosen to bracket certain published exposure limits for acrylonitrile at the time that this work was done.

Table 2: 3500/3510/3520/3530 % Accuracies by concentration and sampling time (80%RH).

Conc. (ppm)	30 min	4 hrs	8 hrs
6.7			7.7
7.8		3.6	
18	9.0		