

A

AB GC -9
Revision Date
3/20/81
3/31/83

DETERMINATION OF PERSONAL EXPOSURE TO
VINYL CHLORIDE BY MINIMONITOR

Equipment

1. Perkin Elmer F-42 Automatic headspace analysis unit. See Appendix 1 for set up instructions.
2. Spectra Physics SP4000 computing integrator.
3. Sample vials and seal for F-42
4. "REAL" minimonitor badges.
5. Crimper for sample vial seals.
6. 5 cc syringe.

Reagents

1. VCM standard gas - about 2100 ppm.
2. Dimethylacetamide (DMA).
3. Activated carbon 20-40 mesh "Darco".
4. Extraction solvent. 30% DMA, 70% water

Preliminary Work

A premeasured charge of Darco 20-40 mesh charcoal is put into a "REAL" minimonitor. The monitor is worn by the person during their work day. At the end of the work day, the carbon is removed from the monitor and placed in a sample vial, stoppered, and brought to the laboratory.

Analysis

1. Be sure the F-42 conditions are set to match those in Appendix 1 and there is fire in the detector.
2. Arrange the samples in the same order that they are in on the VCM Monitor Log Sheet.
3. Crimp seals on each sample.
4. Add 3 ml $\pm$ 0.1 extraction solvent.

Analysis (Cont.)

5. Prepare four (4) standards by filling four vials with standard gas, Cap and seal. Add 3 ml solvent.
6. Put the standards and samples into the F-42 water bath in order with the standards first.
7. Go to the SP 4000 and enter the needed information as follows (Method in Appendix 2):

Press F1 9 enter
Press FS 5 enter
Press SF enter

Press NM (Person name from log sheet) enter
Press SA (Hours exposure calculated) enter

Press XF (Find the XF value from Appendix 3)
and enter

Press ↑

Repeat for each sample in order.

Press ↓
Press SN 1 enter
Press MS 1 enter
Press XX enter
Press CP 1 9 4 # samples 1 1 enter
At 9 enter

8. Allow the samples to remain in the F-42 water bath for 1 hour at 90° C then Press PX1 enter on the SP 4000 and start button on the F-42.
9. Record the results on the VCM Monitor Log Sheet and in the lab notebook.
10. If manual calculation is needed, use following equation:

$$\text{PPM VCM TWA} = \frac{\text{Area Sample}}{\text{Area STD}} \times \frac{\text{CC Value}}{\text{Hr.}} \times \text{XF Value}$$

Standard Preparation

The standards are prepared from VCM in nitrogen standard gas. Multiply the ppm VCM in the gas by 0.298 to obtain the cc value used in the program. The program listed in Appendix 2 is for 500 ppm std. gas. The multiplier is an empirical number and is only for Darco type carbon and the extraction solvent given.

Prepared By: David Steer

Approved By: _____

Issue Date: February 1979

Revision Date: March 1983

APPENDIX 1

F42 Conditions For Carbon Analysis For VCM.

Analysis Column	40" x 1/8" Porapak Q
Water Bath	90° C
Injector	100° C
Oven Temperature	100° C
Detector Temperature	150° C
Detector Range	1
Dosing Time	5 sec.
Analysis Time	1.4 min.
Back Flush Time	1.9 min.
Stabilization Time	1
N ₂ Pressure	1.4
Backflush Pressure	1.1
Hydrogen Pressure	2.2
Air Pressure	2.6

VAB.0001040806

APPENDIX 2

The following is the SP 4000 program for doing personal dosimetry analysis of VCM on Carbon. If you do not know how to enter a program into the SP 4000 see your Supervisor.

Enter the following in order:

Press F1 9 enter

Ch 2

OD 51

FD 1

RO 34

MS 1

T125

MA 50

NM ppm VCM on carbon

FF

AP 2

AR 1

IR 1

↓

TF

RT 205T30

RT 200T31

↑

CF

MN 5

FP 4

R1.05

W1.05

KVO.3

↑

RT 135 (Note this is the retention time for VCM.
Be sure to use the current value.)

KF 1000

CC 149 (Valid only for 500 ppm std gas. See note on
stds if a different gas is used.)

NM ppm VCM

DP 1

XX

VAB.0001040807

APPENDIX 3

Calibration Values For Badge.

Badges are calibrated by the following formula:

$$K = \frac{CT}{W}$$

K = Constant

C = Concentration VCM, ppm

T = Exposure Time In Hours

W = Microliter VCM, On Carbon

<u>Badge #</u>	<u>Calibration Factor</u> (XF VALUE)
----------------	--------------------------------------

213	1.14
298	0.62
538	0.89
534	0.80
541	0.79
582	0.52
594	0.54 .52
606	0.82
610	0.73
625	0.82 .84
586 R	0.56
545	.76
882	.51
884	.54
886	.66
492	.70
494	.61
495	.54
496	.78
497	