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Indus[illegible]ylene

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RE: PRECISION OF ASBESTOS METHOD

Attached is some additional information regarding the above captioned. The table taken from the NIOSH Criteria Document shows the number of fields required to count 100 fibers for varying concentrations and sampling times. For example, for a 0.2 f/mL concentration and a 240 minute sample at 1 L/min, 260 fields would have to counted. If we were to use 100 fields as the determining factor, the table says we would need a minimum sample volume of 864 liters for the 0.2 f/mL level. This was all based on some initial data given in the document that showed the RSD (or CV) of the method to be 10% and the 95% confidence level to be 20%.

The other attachment is a summary of data from the PAT program for laboratory quality control. Please note that the CV is in reality 24-30%, based on summary statistics. It is also important to realize that the fiber levels on the PAT samples range from 100 to 500 fibers/100 fields. So in reality the field requirements presented in the table from the Criteria Document should be increased.

Based on the low sampling time we frequently see for asbestos samples, it would be impossible to measure levels of 0.1 f/mL with any confidence, and in fact for most samples this would also apply to the 0.5 level. Also, to require greater than 100 fields counted would be overly burdensome to the counter. If you have any additional questions, please contact us.

D. R. Balya

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Attachments

cc: R. S. Danchik
T. B. Bonney, Pittsburgh-6
[redacted]berger, Pittsburgh-6



The sample should be collected on a 37-millimeter Millipore type AA* filter mounted in an open-face filter holder. The holder should be fastened to the worker's lapel and air drawn through the filter by means of a battery-powered personal sampler pump similar to those approved by NIOSH under the provisions of 30 CFR 74. The filters are contained in plastic filter holders and are supported on pads which also aid in controlling the distribution of air through the filter. To yield a more uniform sample deposit, the filter-holder face-caps should be removed. Sampling flow rates from 1.0 liter per minute (lpm) up to the maximum flow rate of the personal sampler pump (usually not over 2.5 lpm) and sampling time from 15 minutes to eight hours are acceptable provided the following restraints are considered:

(a) In order to obtain an accurate estimate of the number of fibers the statistical error resulting from the random distribution of the fibers must be kept to an acceptably low level. Since fiber counts follow a Poisson distribution, a count of 100 fibers in a sample would have a standard deviation of $\sqrt{100}$ or 10 fibers or $\pm$ 10%. Thus the 95% confidence limits would be approximately 2 standard deviations or $\pm$ 20%. Since the 37 mm filter has an effective collecting area of 855 mm^2 and the projected field area of the Porton reticle is 0.005 mm^2, each field represents 1/171000 of the sample. Based on this ratio the following number of fields must be counted to measure the various limits in various sampling times:

*Mention of commercial products does not constitute endorsement by the Public Health Service or U. S. Department of Health, Education and Welfare.

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Sampling Time Minutes	Flow Rate lpm	Number of Fields for 100 Fibers 0.2 fibers/ml	2.0 fibers/ml	10 fibers/ml
10	2	4350	435	91
15	2	2860	286	58
30	2	1430	143	29
90	1	1000	100	20
90	2	500	50	10
240	1	260	26	7
240	2	180	18	4
480	1	180	18	4

(b) Do not count a field containing over 20 fibers because in addition to the fibers being counted, there are also present a number of grains, which interfere with the accuracy of the count.

Based on these restraints, i.e., number of fields to be counted and maximum number of fibers per field, acceptable sampling parameters for the various limits are underlined in the above table.

The following conclusions may be drawn from this analysis:

(1) The short-term limit should be for a period of at least 15 minutes and preferably 30 minutes.

(2) The 2.0 fiber/cc limit may be evaluated over periods of from 90 to 480 minutes.

As many fields as required to yield at least 100 fibers should be counted. In general the minimum number of fields should be 20 and the maximum 100.

Mounting Sample

The mounting medium used in this method is prepared by dissolving 0.05 g of membrane filter per ml of 1:1 solution of dimethyl phthalate

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DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
National Institute for
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To: PAT PARTICIPANTS

Enclosed are your results from the NIOSH Proficiency Analytical Testing (PAT) Program for round 70. Round 70 was the third round analyzed using the new statistical protocol. Summary statistics calculated from reference laboratory data are similar to those found on the last two rounds.

The coefficients of variation[1] were:

4.0 - 5.7% for lead
4.7 - 5.7% for cadmium
4.7 - 6.3% for zinc
18 - 23% for silica
24 - 30% for asbestos
6.3 - 7.4% for methyl chloroform

Methyl chloroform was included in PAT for the first time this round. The methyl chloroform samples did have some minor contamination, however, the contamination did not appear to increase the variability of data reported or result in a larger number of laboratories being classified as outliers. To date, the following desorption efficiencies for organics have been reported:

Round	Solvent	Code	Median	Semi-quartile Range
64	Benzene	(BNZ)	98%	95 - 100%
65	P-Dioxane	(PDX)	94%	91 - 98%
65	o-Xylene	(OXY)	96%	94 - 99%
66	Toluene	(TOL)	98%	96 - 100%
67	Carbon Tetrachloride	(CTC)	99%	97 - 101%
67	Trichloroethylene	(TCE)	99%	97 - 101%
68	o-Xylene	(OXY)	97%	97 - 98%
69	Benzene	(BNZ)	99%	96 - 100%
69	Toluene	(TOL)	98%	96 - 100%
70	Methyl chloroform	(MCM)	100%	98 - 100%

Several participants have experienced mail delays. Sample kits are mailed to participants by the first day of the quarter, and should be received within a week. If you have not received samples on time or have damaged a sample before analysis is complete, my office should be immediately contacted by phone or wire so that replacement samples can be sent.