Proficiency Analytical Testing (PAT) Program May 1999

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PAT ROUND 137 APRIL 1999

A total of 1169 laboratories were enrolled in the PAT Program with 1048 laboratories submitting results on Round 137. Of the 1048 laboratories submitting results, 949 used the Internet data entry system (www.aiha.org/proftest.htm). Table I lists the reference values, performance limits, and participants for each sample type in the PAT Program. Table II presents the summary of the PAT proficiency ratings for each analytical area.

PAT ROUND 138 JULY 1999

PAT Round 138 was sent to participating laboratories on July 1, 1999. For this round, the organic solvent was methanol (MOH) and the metals were cadmium, chromium, and lead. Asbestos/fibers were amosite with one man-made fiber sample.

BACKGROUND

The Proficiency Analytical Testing (PAT) Program is managed by the American Industrial Hygiene Association (AIHA) in Fairfax, Virginia. The PAT Program provides quality control reference samples to approximately 1200 occupational health and environmental laboratories in 17

TABLE I. Reference Values, Performance Limits, and Participants for Each Sample Type PAT Round 137 (April 1999)

Contaminant	Sample Number	No. of Labs	Reference Value	RSD (%)	Performance Limits		No. of Outliers
					Lower	Upper	
Cadmium (mg)	1	287	0.0048	5.1	0.0040	0.0055	21
	2	287	0.0143	4.1	0.0125	0.0161	22
	3	287	0.0096	4.4	0.0083	0.0108	19
	4	287	0.0076	4.6	0.0066	0.0087	21
Lead (mg)	1	291	0.0385	4.5	0.0333	0.0438	21
	2	291	0.0530	4.2	0.0462	0.0597	25
	3	291	0.0243	5.1	0.0206	0.0280	16
	4	291	0.0673	4.1	0.0581	0.0756	28
Zinc (mg)	1	284	0.1407	4.6	0.1214	0.1601	24
	2	284	0.0814	4.9	0.0694	0.0935	22
	3	284	0.1011	4.8	0.0866	0.1156	20
	4	284	0.1690	4.5	0.1463	0.1912	25
Silica (mg)	1	70	0.1026	16.4	0.052	0.1093	2
	2	70	0.0583	19.2	0.0248	0.1240	2
	3	70	0.0881	17.1	0.0430	0.1333	3
	4	70	0.0977	16.6	0.0489	0.1465	7
Asbestos/fibers (chrysotile) (f/mm²) (man-made fiber)	1	894	227.5	20.0	111.47	384.44	167
	2	894	282.8	20.0	138.58	477.94	164
	3	894	150.6	20.0	73.80	254.52	51
	4	894	192.6	20.0	94.40	325.57	171
1,2 Dichloroethane (mg)	1	268	0.1535	4.8	0.1328	0.1757	23
	2	268	1.0227	4.2	0.8942	1.1513	20
	3	268	0.8091	4.2	0.7067	0.9116	15
	4	268	0.5049	4.3	0.4396	0.5702	28
Tetrachloroethylene (mg)	1	268	1.1021	4.6	0.9484	1.2545	24
	2	268	0.2599	5.9	0.2138	0.3060	23
	3	268	0.6970	4.9	0.5953	7988	18
	4	268	0.3919	5.4	0.3287	0.4551	27
Trichloroethylene (mg)	1	268	0.5047	4.4	0.4388	0.5706	26
	2	268	0.7180	4.2	0.6265	0.8095	24
	3	268	0.2570	4.7	0.2210	0.2930	27
	4	268	0.9395	4.2	0.8215	1.0575	28

TABLE II. Current Sets of Samples in Proficiency Analytical Testing (PAT) Program

Metals	cadmium	
	chromium	
	lead	
	zinc	
Silica	quartz	
Asbestos/Fibers	amosite	
	chrysotile	
	man-made fibers	
Organic solvents	benzene	methyl ethyl ketone
	n-butyl acetate	methyl isobutyl ketone
	chloroform	tetrachloroethylene
	1,2-dichloroethane	toluene
	p-dioxane	1,1,1-trichloroethane
	ethyl acetate	trichloroethylene
	isopropanol	o-xylene
	methanol	

countries. Although one objective of the PAT Program is to evaluate the analytical ability of participating laboratories, the primary objective is to assist these laboratories in improving their laboratory performance.

Each calendar quarter (designated as a round), samples are mailed to participating laboratories, and the data are analyzed to evaluate laboratory performance on a series of analyses. Each mailing and subsequent data analysis is completed in time for participants to obtain repeat samples and to correct analytical problems before the next calendar quarter begins. The PAT Program currently includes four sets of samples as shown in Table III. A mixture of 3 of the 4 possible metals, and 1 to 3 of the 15 possible organic solvents are rotated for each round. Fibers alternate between amosite and chrysotile asbestos and man-made fibers; no fiber mixtures are provided. Each set consists of four concentrations and a blank. The metals, silica, and fiber samples are on filters, and the organic solvents are on charcoal, carbon molecular sieve, or silica gel tubes. The organic solvent set also includes five blank tubes for desorption efficiency determination. Every other round includes two diffusive samplers with benzene, o-xylene, and toluene.

Laboratories are evaluated for each analysis by comparing their reported results against an acceptable performance limit for each PAT Program sample the laboratory analyzes. After the data from all laboratories are collected and statistically treated, the mean of the collected data is calculated, and the performance limits equal the mean ±3 standard deviations. The performance limits for all analytes (metals, silica, asbestos, and organic solvents) are calculated using a maximum relative standard deviation of 20% and a minimum relative standard deviation of 4%. For diffusive samplers, performance limits are based on the reference values ±3 standard deviations, and the relative standard deviation is assumed to be 6%. The reference value is the calculated value from the generation system. Data are acceptable if they fall within the performance limits. Data falling outside the performance limits are reported as outliers.

Laboratories are rated based on performance in the PAT Program over the last year (i.e., four calendar quarters), as well as on individual contaminant performance. Individual contaminants are metals, silica, asbestos/fibers, organic solvents, and diffusive samplers. Individual contaminant performance is rated as (1) proficient if all results have been reported and all are classified as acceptable for the last two consecutive rounds; and (2) proficient in all other cases if three-fourths or more of the results reported in the last four (two rounds per diffusive samplers) consecutive rounds are classified as acceptable.[1]

TABLE III. PAT Proficiency Ratings Based on Rounds 134 to 137 (July 1998–June 1999)

Contaminant	Number of Labs Rated	Number of Labs Rated Proficient	Percent Labs Rated Proficient
Metals	284	273	96
Silica	70	69	99
Asbestos/Fibers	894	801	90
Organic Solvents	268	244	91

References

1. Esche, C.A., J.H. Groff, P.C. Schlecht, and S.A. Shulman: *Laboratory Evaluations and Performance Reports for the Proficiency Analytical Testing (PAT) and Environmental Lead Proficiency Analytical Testing (ELPAT) Programs.* DHHS (NIOSH) no. 95-104. Cincinnati, Ohio: National Institute for Occupational Safety and Health, 1994.