

PROFICIENCY ANALYTICAL TESTING (PAT) PROGRAM

Proficiency Analytical Testing (PAT) Program November 1999

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PAT ROUND 139 OCTOBER 1999

A total of 1141 labs were enrolled in the PAT Program with 1025 labs submitting results on Round 139. Of the 1141 labs submitting results, 966 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 140 JANUARY 2000

PAT Round 140 was sent to participating labs on January 2000. For this round, the organic solvents were benzene, toluene, and o-xylene, and the metals were chromium, lead, and zinc. Asbestos/fibers were amosite with one man-made fiber sample.

BACKGROUND

The Proficiency Analytical Testing (PAT) Program is managed by AIHA in Fairfax, Virginia. The PAT Program provides quality control reference samples to approximately 1200 occupational health and environmental labs in 17 countries. Although one objective of the PAT Program

TABLE I. Reference Values, Performance Limits, and Participants for Each Sample Type; Round 139 (November 1999)

Contaminant	Sample Number	No. of Labs	Reference Value	RSD (%)	Performance Limits		No. of Outliers
					Lower	Upper	
Cadmium (mg)	1	277	0.0085	4.5	0.0074	0.0097	36
	2	277	0.0143	4.1	0.0125	0.0160	32
	3	277	0.0094	4.4	0.0082	0.0107	41
	4	277	0.0076	4.6	0.0066	0.0087	26
Lead (mg)	1	283	0.0292	4.8	0.0249	0.0334	29
	2	283	0.0580	4.2	0.0507	0.0653	25
	3	283	0.0242	5.1	0.0205	0.0279	28
	4	283	0.0871	4.0	0.0766	0.0975	27
Zinc (mg)	1	276	0.0906	4.9	0.0774	0.1038	27
	2	276	0.0612	5.2	0.0516	0.0707	25
	3	276	0.2066	4.4	0.1793	0.2340	39
	4	276	0.1000	4.8	0.0857	0.1144	17
Silica (mg)	1	75	0.1185	15.9	0.0619	0.1751	7
	2	75	0.1036	16.4	0.0526	0.1546	4
	3	75	0.0695	18.2	0.0316	0.1075	7
	4	75	0.0849	17.2	0.0410	0.1288	5
Asbestos/fibers (amosite) (f/mm ²) (man-made fiber)	1	881	259.2	20.0	127.03	438.12	138
	2	881	333.6	20.0	163.45	563.75	128
	3	881	378.3	20.0	185.37	639.33	165
	4	881	129.6	20.0	63.50	219.03	76
N-Butyl Acetate (mg)	1	256	0.1943	7.1	0.1527	0.2360	15
	2	256	0.3936	7.1	0.3092	0.4780	9
	3	256	0.8901	7.1	0.6992	1.0810	10
	4	256	0.3053	7.1	0.2398	0.3707	17
Ethyl acetate (mg)	1	255	0.1870	7.3	0.1462	0.2278	18
	2	255	1.1667	7.3	0.9121	1.4213	16
	3	255	0.6064	7.3	0.4741	0.7387	9
	4	255	1.0153	7.3	0.7937	1.2369	14
2-Propanol (mg)	1	255	0.1915	12.7	0.1183	0.2646	8
	2	255	0.2575	12.7	0.1591	0.3558	8
	3	255	0.7933	12.7	0.4903	1.0963	6
	4	255	0.5125	12.7	0.3168	0.7083	8

PAT PROGRAM

TABLE II. PAT Proficiency Ratings Based on Rounds 136 to 139 (December 1998–November 1999)

Contaminant	Number of Labs Rated	Number of Labs Rated Proficient	Percent Labs Rated Proficient
Metals	305	252	83
Silica	80	69	86
Asbestos/fibers	974	752	77
Organic solvents	287	238	83

is to evaluate the analytical ability of participating labs, the primary objective is to assist these labs in improving their performance.

Each calendar quarter (designated as a round), samples are mailed to participating labs, and the data are analyzed to evaluate lab 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 starts. 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.

Labs are evaluated for each analysis by comparing their reported results against an acceptable performance limit for each PAT Program sample the lab analyzes. After the

data from all labs 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%. Data are acceptable if they fall within the performance limits. Data falling outside the performance limits are reported as outliers.

TABLE III. Current Sets of Samples in the PAT Program

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

Labs 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⁾

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, OH: National Institute for Occupational Safety and Health, 1994.