Comparison of the Analysis of VOCs in Soils by Method 8260 Using the 4552 and 4100 Autosamplers

Introduction

The 4552 or Archon style autosampler has been used for many years to analyze for VOCs in solid matrices. OI Analytical now has a new sample processor for waters and soils available with many improvements. The system is faster and more reliable than its predecessor and generates comparable data.

Methodology

Calibrations were run on the same GC/MS and 4660 purge and trap. GC/MS and purge and trap conditions were identical. USEPA Method 8260B was used.

Results

See Table 1.

Table 1. Cailbration Data

Analyte	Compound	4100 RF	% RSD	4552 RF	% RSD
1	pentafluorobenzene (IS)				
2	dichlorodifluoromethane	0.202	6.97	0.178	R = 0.999
3	chloromethane	0.341	11.18	0.299	6.08
4	vinyl chloride	0.356	4.72	0.415	9.36
5	bromomethane	0.257	6.75	0.353	6.39
6	chloroethane	0.228	5.68	0.270	8.77
7	trichlorofluoromethane	0.450	9.85	0.595	5.28
8	ethyl ether	0.241	5.01	0.292	3.92
9	1,1-dichloroethene	0.374	4.73	0.464	7.72
10	carbon disulfide	1.212	12.62	1.448	3.94
11	1,1,2-trichloro-1,2,2-trifluoroethane	0.384	6.37	0.500	7.01
12	methyl iodide	0.665	3.49	0.892	6.00
13	allyl chloride	0.230	4.10	0.275	8.13
14	methylene chloride	0.406	3.52	0.573	R = 0.999
15	acetone	0.051	R = 0.996	0.054	R = 0.996
16	trans-1,2-dichloroethene	0.482	11.21	0.597	13.19
17	methyl tert-butyl ether	1.015	3.74	1.036	2.87
18	acetonitrile	0.260	12.84	0.235	12.86

Analyte	Compound	4100 RF	% RSD	4552 RF	% RSD
19	chloroprene	0.623	7.21	0.615	3.91
20	1,1-dichloroethane	0.793	3.81	0.854	5.59
21	acrylonitrile	0.623	7.21	0.615	3.91
22	cis-1,2-dichloroethene	0.479	4.18	0.593	3.99
23	2,2-dichloropropane	0.327	8.11	0.437	7.38
24	bromochloromethane	0.259	5.81	0.334	7.03
25	chloroform	0.859	13.39	0.926	5.41
26	methyl acrylate	0.471	3.49	0.423	7.89
27	carbon tetrachloride	0.588	5.10	0.695	5.43
28	dibromofluoromethane (SS)	0.511	1.80	0.505	4.38
29	1,1,1-trichloroethane	0.562	5.82	0.711	4.67
30	2-butanone	0.065	6.65	0.067	7.42
31	1,1-dichloropropene	0.550	4.64	0.629	5.44
32	1,4-difluorobenzene (IS)				
33	benzene	1.053	3.71	1.394	4.45
34	methacrylonitrile	0.196	6.30	0.179	6.26
35	1,2-dichloroethane-d4 (SS)	0.065	2.07	0.072	3.88
36	1,2-dichloroethane	0.360	3.81	0.399	5.46
37	trichloroethene	0.304	4.69	0.444	3.73
38	dibromomethane	0.190	4.15	0.237	7.84
39	bromodichloromethane	0.394	2.16	0.480	4.31
40	1,2-dichloropropane	0.271	4.58	0.317	4.76
41	methyl methacrylate	0.198	5.99	0.209	9.21
42	cis-1,3-dichloropropene	0.412	3.89	0.453	4.16
43	4-methyl-2-pentanone	0.043	8.80	0.053	10.94
44	chlorobenzene-d5 (IS)				
45	toluene-d8(ss)	1.179	1.20	1.300	2.53
46	toluene	0.772	5.71	1.110	10.99
47	2-hexanone	0.259	4.79	0.240	9.52
48	tetrachloroethene	0.283	11.26	0.482	5.80
49	trans-1,3-dichloropropene	0.432	5.49	0.502	3.87
50	ethyl methacrylate	0.351	7.11	0.391	10.70
51	1,1,2-trichloroethane	0.239	2.92	0.318	2.34
52	chlorodibromomethane	0.368	3.28	0.494	2.66
53	1,3-dichloropropane	0.469	3.66	0.562	3.29
54	1,2-dibromoethane	0.305	3.45	0.401	3.88
55	chlorobenzene	0.848	5.20	1.144	3.33
56	ethylbenzene	1.333	6.87	1.730	5.44
57	1,1,1,2-tetrachloroethane	0.318	4.74	0.460	4.11
58	m,p-xylenes	0.514	6.49	0.687	9.00
59	o-xylene	0.477	8.13	0.692	7.12
60	styrene	0.836	10.14	1.065	10.41

Analyte	Compound	4100 RF	% RSD	4552 RF	% RSD
61	bromoform	0.244	3.91	0.344	4.97
62	isopropylbenzene	1.236	9.88	1.723	10.98
63	cis-1,4-dichloro-2-butene	0.114	8.80	0.112	7.56
64	1,4-dichlorobenzene-d4 (IS)				
65	4-bromofluorobenzene (SS)	0.890	1.79	0.724	4.12
66	bromobenzene	0.757	3.38	0.911	3.03
67	1,1,2,2-tertrachloroethane	0.838	4.09	0.969	4.18
68	n-propylbenzene	3.186	8.41	3.736	6.88
69	2-chlorotoluene	1.817	6.77	2.160	4.08
70	1,3,5-trimethylbenzene	2.049	9.73	2.532	10.19
71	1,2,3-trichloropropane	0.993	6.75	1.013	4.63
72	trans-1,4-dichloro-2-butene	0.234	5.67	0.195	4.10
73	4-chlorotoluene	2.142	8.02	2.410	6.69
74	tert-butylbenzene	2.340	11.31	2.394	11.13
75	pentachloroethane	0.383	7.08	0.443	12.40
76	1,2,4-trimethylbenzene	2.113	9.35	2.538	13.06
77	sec-butylbenzene	2.787	9.47	3.435	13.85
78	p-isopropytoluene	2.237	13.32	2.865	14.21
79	1,3-dichlorobenzene	1.309	6.01	1.762	3.83
80	1,4-dichlorobenzene	1.369	5.18	1.840	4.09
81	n-butylbenzene	2.074	11.38	2.734	10.04
82	1,2-dichlorobenzene	1.244	5.23	1.780	2.87
83	1,2-dibromo-3-chloropropane	0.155	5.19	0.189	9.88
84	hexachlorobutadiene	0.338	14.57	0.573	3.57
85	1,2,4-trichlorobenzene	0.686	8.57	1.042	3.80
86	naphthalene	2.186	8.66	2.600	R = 0.999
87	1,2,3-trichlorobenzene	0.662	7.10	0.997	7.52

Conclusions

The 4100 sample processor produces data similar to the 4552 or Archon style autosampler with greater reliability and ease of operation.

O·I·Analytical
a xylem brand
151 Graham Road
PO Box 9010
College Station, Texas
77842-9010
(979) 690-1711
(800) 653-1711 USA/Canada
FAX (979) 690-0440
www.oico.com
E-mail: OI-Mail@Xyleminc.com

Publication 41370415