



## **Canister Vs Bag – An Empirical Study**

Even though, soil vapor sampling and testing have been done for the past quarter of a century, it is often difficult to find all the practitioners on the same page regarding the sampling media. The central theme of the debate often revolves around canister vs. bag. Many individuals and companies have done studies attempting to prove the superiority of one way over the other; Torrent's goal is to present the factual data and leave it up to the reader to make their own judgment.

For this study, Torrent prepared a canister with 20 ppbv concentration of TO-15 compounds. Similarly, several bags were also spiked with 20 ppbv TO-15 compounds at the same time. Then both medias, canister and bags, were analyzed over the period of five days (Monday – Friday) to measure the stability of the subject media.

In order to provide the most meaningful information we have selected the most requested compounds including the notorious Naphthalene! Please review the table below and read the discussion afterwards.

<i>Analyte</i>	<i>Canister</i>	<i>Canister</i>	<i>Canister</i>	<i>Canister</i>	<i>Canister</i>	<i>Avg.</i>	<i>Std Dev.</i>	<i>%Rec</i>	<i>% RPD</i>
	<i>Day 1</i>	<i>Day 2</i>	<i>Day 3</i>	<i>Day 4</i>	<i>Day 5</i>				
<b>Spike Volume</b>	<b>20 ppb</b>	<b>20 ppb</b>	<b>20 ppb</b>	<b>20 ppb</b>	<b>20 ppb</b>	<b>20 ppb</b>			
Vinyl Chloride	20.1	19.54	20.23	22.13	18.69	20.14	1.268	100.69	6.3
MTBE	21.52	18.92	19.03	20.04	18.46	19.59	1.221	97.97	6.2
Chloroform	22.05	21.96	21.3	22.9	20.39	21.72	0.936	108.6	4.3
Benzene	20.87	18.83	19.69	21.48	18.26	19.83	1.350	99.13	6.8
Trichloroethylene	21.1	24.17	23.9	20.94	21.01	22.22	1.657	111.12	7.5
Toluene	21.31	24.19	23.71	22.55	21.45	22.64	1.298	113.21	5.7
Tetrachloroethylene	21.83	25.47	24.39	21.96	21.87	23.10	1.711	115.52	7.4
Ethyl Benzene	21.09	22.69	23.16	20.82	20.38	21.63	1.222	108.14	5.7
m,p-Xylene	40.63	45.6	42.29	41.18	39.99	41.94	2.214	105	5.3
o-Xylene	21.38	23.3	23.53	22.44	20.38	22.21	1.325	111.03	6.0
Naphthalene	17.97	19.28	20.64	19.08	18.79	19.15	0.970	95.76	5.1
<i>Analyte</i>	<i>Bag</i>	<i>Bag</i>	<i>Bag</i>	<i>Bag</i>	<i>Bag</i>	<i>Average</i>	<i>Std Dev.</i>	<i>%Rec</i>	<i>% RPD</i>
	<i>Day 1</i>	<i>Day 2</i>	<i>Day 3</i>	<i>Day 4</i>	<i>Day 5</i>				
<b>Spike Volume</b>	<b>20 ppb</b>	<b>20 ppb</b>	<b>20 ppb</b>	<b>20 ppb</b>	<b>20 ppb</b>	<b>20 ppb</b>			
Vinyl Chloride	18.73	12.61	16.82	12.38	14.8	15.07	2.730	75.34	18.1
MTBE	19.56	13.05	15.91	13.31	14.34	15.23	2.667	76.17	17.5
Chloroform	19.33	13.08	16.97	12.49	15.28	15.43	2.818	77.15	18.3
Benzene	19.38	12.14	14.93	12.53	13.66	14.53	2.922	72.64	20.1
Trichloroethylene	20.06	16.36	18.37	14.32	15.53	16.93	2.290	84.64	13.5
Toluene	19.38	14.51	18.11	13.76	15.99	16.35	2.372	81.75	14.5
Tetrachloroethylene	20.86	16.3	17.23	14.39	15.8	16.92	2.432	84.58	14.4
Ethyl Benzene	18.06	14.04	14.83	11.71	13.69	14.47	2.315	72.33	16.0
m,p-Xylene	37.05	26.68	28.08	23.77	25.73	28.26	5.156	70.5	18.2
o-Xylene	18.05	13.28	13.53	12.18	12.32	13.87	2.408	69.36	17.4
Naphthalene	3.93	2.8	0.16	0.32	0.48	1.54	1.719	7.69	111.8



### **Discussion:**

Looking at the Canister data, we can observe the fact that average % recoveries (accuracy), Standard Deviation % RPD (precision) and the stability (holding time) of the standard prepared in the canister shows excellent values. Even notorious Naphthalene shows exceptional accuracy, precision and stability.

Reviewing the bag data, the accuracy and precision fluctuate radically - average recoveries show a 20 to 98% drop from the assigned/true values for most compounds, and % RPD values are three times higher than those in the canister data. As far as stability, from day one Naphthalene is almost completely lost in the bag and poor stability of most other compounds is evident as well.

### **Conclusion:**

Torrent would recommend canister over a bag; unless, you are doing a pre screening. However, even in that situation, you could be losing up to 98% of compounds such as Naphthalene.