

# Recovery Efficacy for BTEX: Comparison of LESS™ and a Traditional Constant Air Flow Pump

## Background

Samples were collected by the LESS™ sampler and a traditional constant air flow pump on thermal desorption tubes to study the recovery efficacy for BTEX, which is commonly found in ambient air, contaminated soil and ground water. Markes C2-AAX-5270 stainless steel thermal desorption tubes containing two sorbent beds (Carbograph 1TD and Carboxen 1003) were used to collect the samples. The combination of these two beds (one a graphitized carbon black and the other a carbonized molecular sieve) provided a volatility range from n-C<sub>2</sub> to n-C<sub>14</sub>.

## Testing

The test was administered by diluting a certified BTEX gas standard with ultra high purity air to a test concentration of 10 ppb-v and collecting this matrix for 30 minutes per sample at 80 mL/min. Safe sampling volumes were employed to capture analytes of interest above the analytical detection and reporting limit and within recommended breakthrough volumes.

Replicate samples were taken in sequential order across several days with statistical consideration to determine the overall true-positive detection rate. Blank samples were placed in sampling sequence positions before and after active sampling to confirm a leak-free system.

## Analytical

The samples were analyzed at an accredited third-party analytical lab using gas chromatography/mass spectrometry (GC/MS) analysis per U.S. EPA's Compendium Method for the Determination of Toxic Organic Compounds in Ambient Air (Method TO-17). Standard quality assurance/quality controls were implemented for the analysis of the samples per Method TO-17.

## Results

LESS™ collected the spiked compounds consistently across each day of testing with average recoveries in the range of 107–129% at 95% confidence levels.

## Contact Us

Kyle Hunt

kylehunt@signaturescience.com • (512) 583-2463  
8329 North MoPac Expressway • Austin, TX 78759

Comparison of Average Recoveries from LESS™ and Traditional Constant Air Flow Pumps

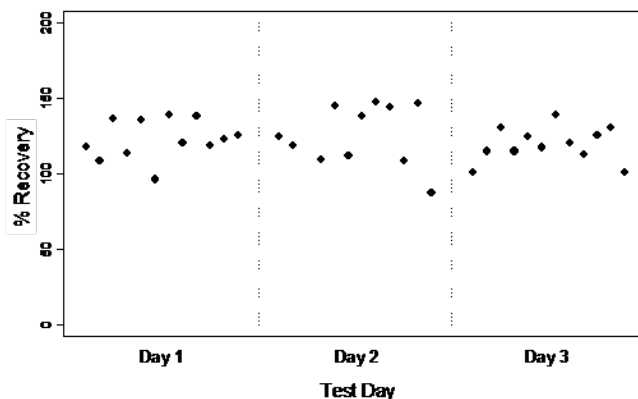
Compound	LESS™ Sampler <sup>a</sup>						Traditional Pump <sup>b</sup>			
	Test 1		Test 2		Test 3		Test 1		Test 2	
	Avg. Rec. (%)	Std. Dev.	Avg. Rec. (%)	Std. Dev.	Avg. Rec. (%)	Std. Dev.	Avg. Rec. (%)	Std. Dev.	Avg. Rec. (%)	Std. Dev.
Benzene	123	13	122	19	124	8.4	158	44	89	46
Toluene	107	14	117	21	118	17	162	51	77	35
Ethyl-benzene	124	13	126	20	120	11	156	48	84	43
m, p-xylene	126	12	127	21	121	12	156	47	85	43
o-xylene	129	14	129	21	127	12	157	48	87	46

<sup>a</sup> For each of the LESS Sampler test days, 12 samples were collected sequentially across 12 manifold positions.

<sup>b</sup> For each of the Traditional Pump test days, 3 samples were collected on 3 different samplers.

No false negatives were reported and blank samples associated with the test resulted in nominal detections for Benzene, Toluene and m, p-Xylene that were below the reporting limit for nearly all detections, the exception being two results for Benzene at the reporting limit. Similar results were noted in laboratory QC blanks.

LESS™ Recoveries for Ethylbenzene



## Conclusions

Collections of a BTEX gas standard with the LESS™ sampler provided better precision and accuracy than similar collections with a constant air flow pump. Average recoveries show no loss of target compounds through the manifold and valves during the test. Cross-contamination between sorbent tubes was not observed, indicating good sealing capabilities of the valves.