Analysis of BTEX in Vehicles by NovaTest P100 Compact Gas Chromatograph

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INTRODUCTION

The health effect of VOCs in human life has attracted intense attention since the new century over worldwide countries. The finishes and decorative materials in a vehicle could emits copious amounts of VOCs. They come with unpleasant smells and can cause dizziness, headache, and long-term health effect, etc. even with only trace amount. However, the airborne VOCs do not go away completely with the fade of smell or natural diffusion over time, and the level of these chemicals is sometimes above the recommended value. The detection or analysis of VOCs in such case tends to require a good portability, fast analyzing speed as well as excellent analysis performance, as the VOCs are in low concentrations and the loss of samples needs be minimized.

NovaTest P100 is a compact gas chromatograph (GC) with patented microfluidic technology and utilizes micro PID for trace detection. In this study, the P100 was used to determine the quantity of BTEX in a vehicle.

ANALYSIS SETUP

The NovaTest P100 compact GC has pre-programmed built-in methods and is fully automated. The analysis was easily setup with the following steps:

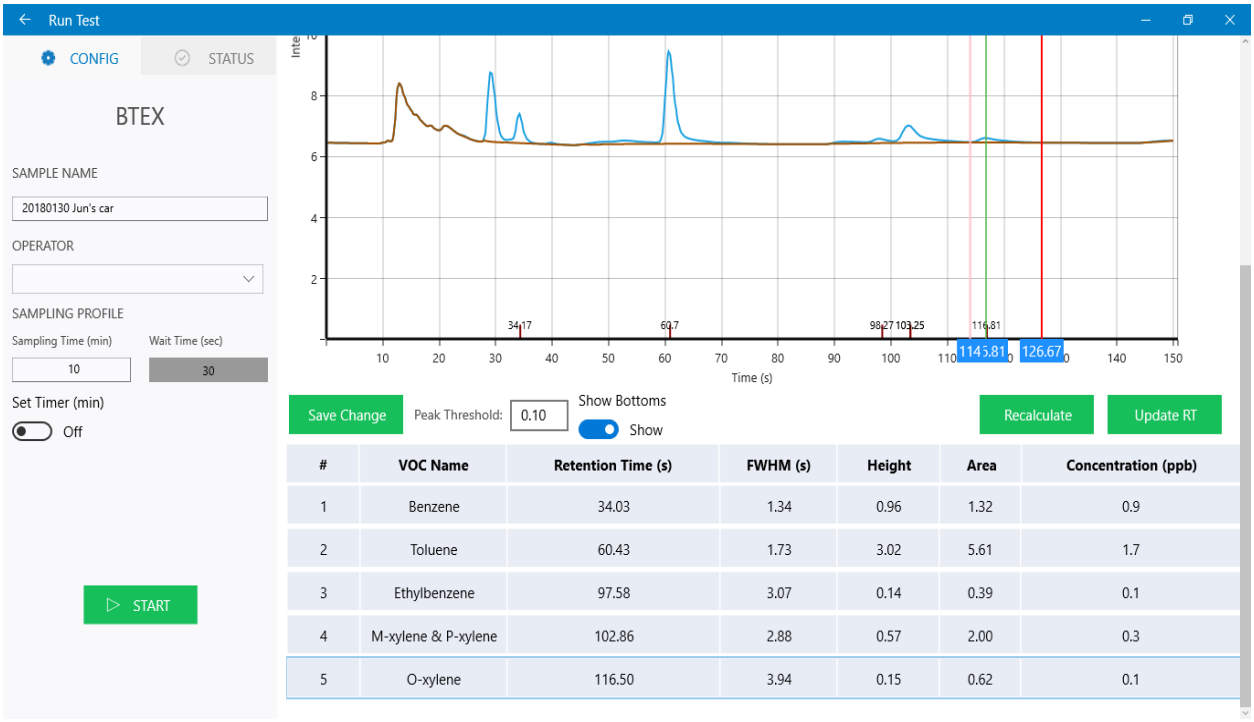
1. Take the NovaTest P100 compact GC to the field and connect the device to a laptop through USB cable;
2. Turn on the carrier gas regulator to 15 psi. Power on the device;

3. Open the NovaSoft user interface, select Run Test → BTEX. The 'Run Test' mode includes a list of built-in methods, where every programming parameter has been preset to enable users to run expedited tests;
4. Input a file name, operator name, and sampling time;
5. Start analysis by clicking on "Start".

RESULTS

Figure 1 shows the instant report with a sampling time of 10 min. The sampling time was set considering the low concentration of each compound expected.

The compounds of interest were matched, and their concentrations were calculated automatically. All compounds were eluted within 3 min, with full width at half minimum (FWHM) less than 5 s. The the concentrations detected for most compounds are below 1 ppbv with an exception of 1.7 ppbv for toluene.



#	VOC Name	Retention Time (s)	FWHM (s)	Height	Area	Concentration (ppb)
1	Benzene	34.03	1.34	0.96	1.32	0.9
2	Toluene	60.43	1.73	3.02	5.61	1.7
3	Ethylbenzene	97.58	3.07	0.14	0.39	0.1
4	M-xylene & P-xylene	102.86	2.88	0.57	2.00	0.3
5	O-xylene	116.50	3.94	0.15	0.62	0.1

Figure 1. Instant report of BTEX in a vehicle by NovaTest P100 compact GC.

CONCLUSION

The NovaTest P100 is fully automated with built-in methods, greatly minimizing manual operation and increasing testing efficiency without sacrificing comparable performance. An instant report with the calculated concentration of every targeted compound was generated in field. The separation of BTEX took only 2 minutes, and the chromatograph in the report showed that the FWHM of each compound was less than 5 seconds. P100 well detects toluene at 1.7 ppbv and other compounds at a sub-ppb level. It can be used to effectively determine the air quality and evaluate the interior environmental safety in a vehicle.

For more information about the device, please visit us at
www.nanovaenv.com

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