

Separations of Petroleum Hydrocarbon

General separation technologies, Inc.

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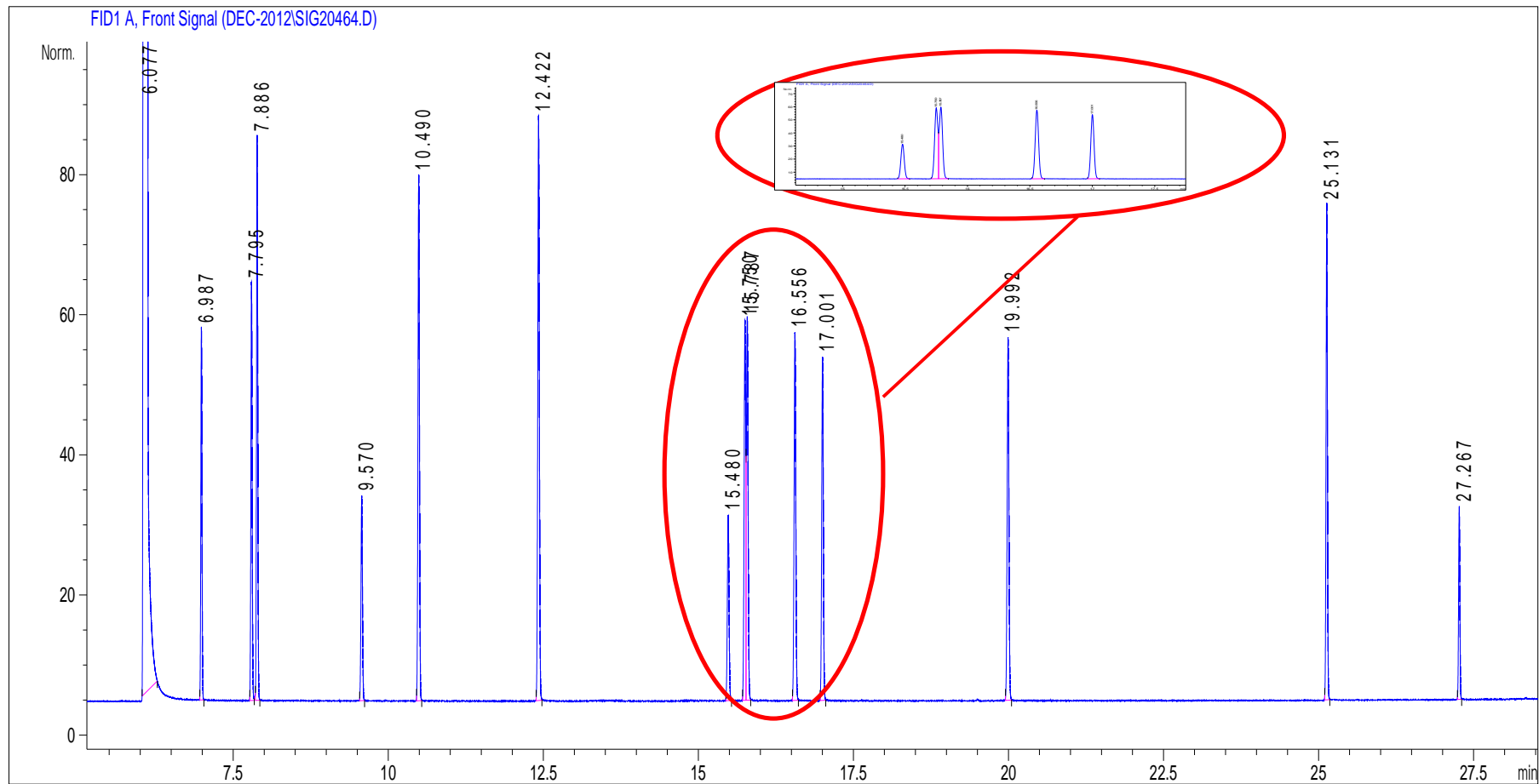
Background

- Spills and releases of petroleum fuels have become the leading source of environmental contamination in Massachusetts. Volatile Petroleum Hydrocarbons (VPHs), which are widely present in contaminated soil and water now, pose a serious threat to the people's health.
- The blending of fuel oxygenate compounds into motor gasoline has increased dramatically in recent 20 years due to necessity of combustion improvement. Unfortunately, because of leaking underground storage tanks or spills, there have been increasing detections of oxygenates in ground water and reservoirs, which is harmful to human being.
- Separating and analyzing VPHs/oxygenates could be achieved with gas chromatography (GC). Non-polar columns such as 1-MS column are widely used. However, the separation of a few pairs of VPHs has a low resolution which can actually be improved with highly efficient columns providing adequate retentions, as demonstrated by GS-Tek's results presented in the following.

Instrumentation Conditions

- GC: Agilent 7890 w/ FID
- Column: GsBP-VPH, 100m x 0.25mm x 0.5um
- Cat no: 9006-Pona
- Oven: 50°C(1min) 5 °C /min to 150°C (1min) 15 °C /min to 260°C(5min)
- Carrier: Hydrogen, column flow 1.3ml/min
- Inlet: Split, 275 °C, split flow 60ml/min
- Detector: FID 325 °C

14 VPH Separations on a 9006-Pona Column



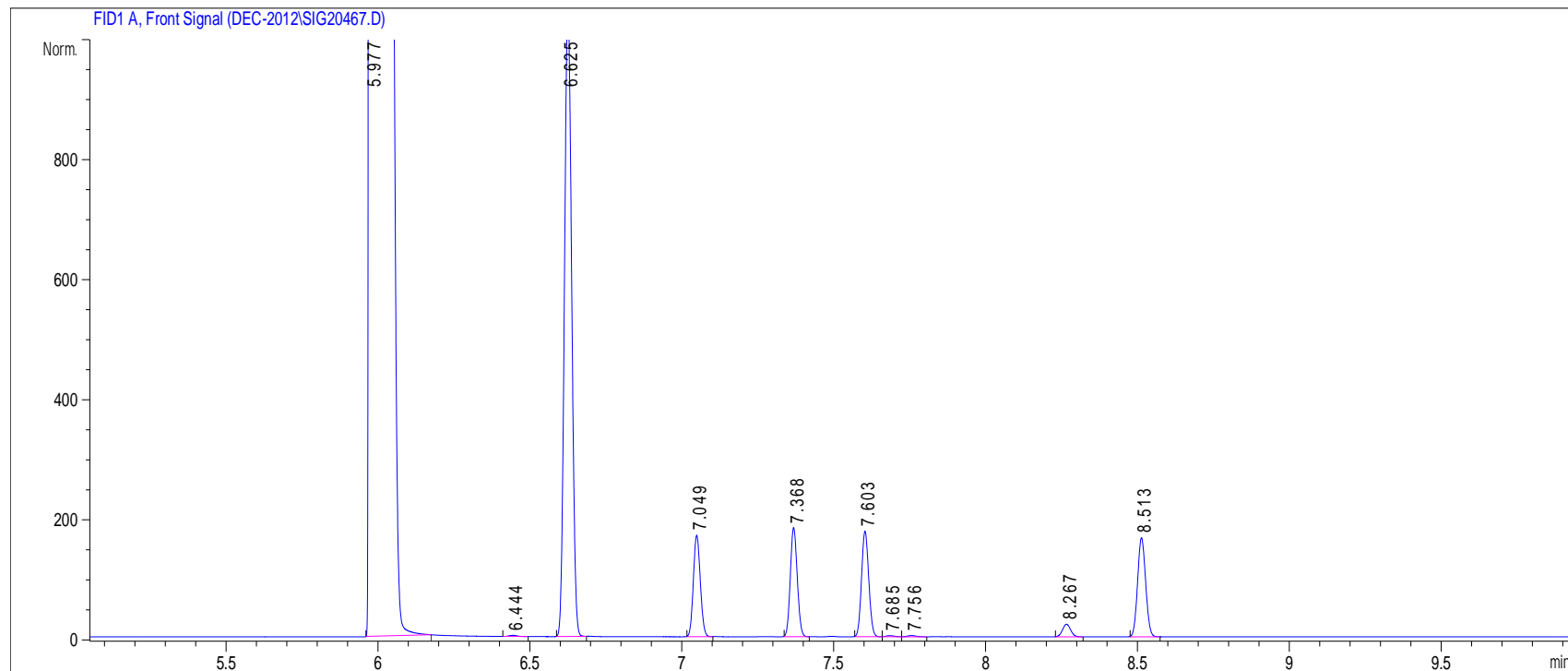
Sample: 1ul 14 components MA VPH Standard With Surrogate

Peak Identifications and Resolutions

Peak #	Component	MeasRetTime	Resolution
1	Methanol	6.077	
2	Pentane	6.987	
3	MTBE	7.795	
4	2-Methyl pentane	7.886	4.09
5	Benzene	9.570	
6	Issoctane	10.490	
7	Toluene	12.422	
8	Ethylbenzene	15.480	
9	m-Xylene	15.750	
10	p-Xylene	15.787	1.31
11	o-Xylene	16.556	
12	Nonane	17.001	
13	2,5-Dibromotoluene	19.992	
14	1,2,4-Trimethylbenzene	25.131	
15	Naphthalene	27.267	

5 Oxygenates Separations on a 9006-Pona Column

Sample: 1ul 5 components California oxygenates standard



Peak Identifications and Resolutions

Peak #	Component	MeasRetTime	Resolution
1	Methanol	5.977	
2	Tert-butyl alcohol	6.444	
3	Methyl tert-butyl ether(MTBE)	7.049	
4	Ethyl tert-butyl ether (ETBE)	7.368	
5	Tertiary amyl methyl ether(TAME)	7.603	
6	Benzene	8.267	
7	Diisopropyl ether	8.513	

Conclusion

- *The baseline separations of 14 VPH standards and 5 oxygenate standards are achieved on a 9006-Pona column.*
- *9006-Pona column exhibits a very good column inertness for components.*
- *The resolutions of critical separated pairs of VPH, namely, MTBE and 2-methyl pentane(3/4), m-xylene and p-xylene(9/10) are improved using 9006-Pona.*