

Rapidly Determine Benzene and Toluene in Gasolines

Micropacked GC Columns Reduce Analysis Time by 63%

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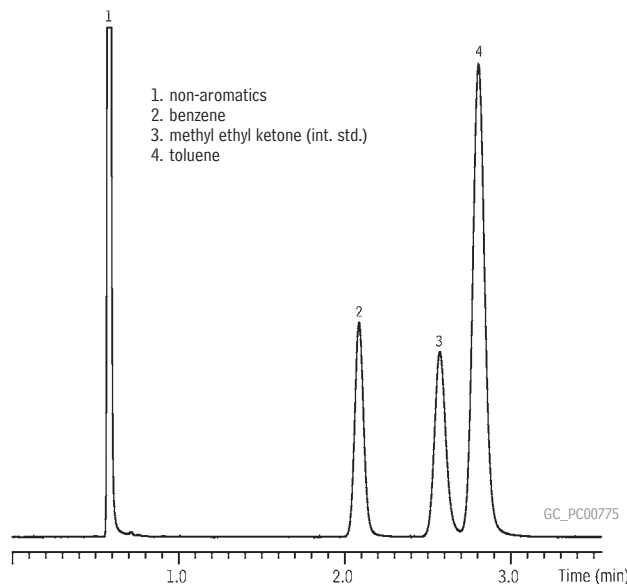
- 3-Minute Cycles for ASTM Method D-3606-99.
- Nearly triple sample throughput.
- Easy set-up, using Restek adaptor kit.

American Society for Testing and Materials test method D-3606-99 is focused on measuring benzene and toluene in finished motor and aviation gasolines: benzene can be determined from 0.1% to 5% by volume and toluene from 2.0% to 20% by volume. The method requires two columns connected in series. Typically, column A is a 0.8 meter x 1/8 inch stainless steel packed column containing a 10% loading of a nonpolar stationary phase, such as Rtx®-1 or OV®-101. This column separates sample components by boiling point. After n-octane (C8) elutes, the column is back-flushed to prevent heavier compounds from entering column B, the main analytical column. The light compounds, C8 and below, pass into column B, a 4.0 meter x 1/8 inch stainless steel packed column containing highly polar 1,2,3 tris(2-cyanoethoxy) propane (TCEP). Here, the aromatic compounds are separated from the non-aromatics, and quantitative information is obtained.

For method D-3606-99, micropacked column technology is an efficient, practical, time-saving alternative to 1/8 inch packed columns. Micropacked column A is a 0.8 meter x 1/16 inch x 1mm ID Silcosteel® column packed with 10% Rtx®-1 crosslinked on 60/80 Chromosorb® WAW. Micropacked column B is a 4.0 meter x 1/16 inch x 1mm ID Silcosteel® column packed with 20% TCEP on 80/100 Chromosorb® PAW. We installed the columns in an Agilent 6890 GC capillary inlet, configured in the on-column injection mode using our Micropacked Column Adaptor Kit for On-Column Injection (cat.# 22425). We used hydrogen as the carrier gas and, to attain the 9mL/min. flow rate, we adjusted the column head pressure to 44psig at 145°C.

Figure 1 illustrates the analysis of a sample containing 1% benzene, 2% toluene, and internal standard methyl ethyl ketone (MEK), in *n*-pentane (C5). The cycle time, just under 3 minutes, is greatly reduced, relative to the 8 minute cycle imposed by 1/8 inch packed columns and helium carrier gas. The micropacked column / hydrogen carrier gas combination reduces analysis time by 63%, nearly tripling sample throughput. If you are performing method D-3606-99 analyses, and time is important to you, we highly recommend this micropacked column approach.

Figure 1 Benzene, toluene, and internal standard resolved in 3 minutes, using a micropacked column.



Column: A: 10% Rtx® 1 on 60/80 Chromosorb® WAW, 0.8m x 1/16 inch x 1mm ID Silcosteel® tubing
B: 20% TCEP on 80/100 Chromosorb® PAW, 4.0m x 1/16 inch x 1mm ID Silcosteel® tubing
connected in series and using Micropacked Column On-Column Injection Kit (cat.# 22425)
Sample: benzene, toluene, methyl ethyl ketone in pentane
Inj.: 1.0µL, on-column, 4mm ID splitless inlet liner (cat.# 20772)
Carrier gas: hydrogen, constant flow
Flow rate: 9.0mL/min.
Inj. temp.: 200°C
Oven temp.: 145°C
Det.: FID @ 200°C

Micropacked Columns

1/16 inch micropacked columns containing 10% Rtx®-1 on 60/80 Chromosorb® W or 20% TCEP on 80/100 Chromosorb® PAW are prepared on request. For details, please contact your Restek representative.

Micropacked Inlet Conversion Kits

Convert a capillary GC split/splitless inlet for use with 1/16" OD micropacked columns.

- For use with Agilent 5890 and 6890 GCs.
- Sample pathways deactivated for ultimate inertness.

Description	qty.	cat.#
Micropacked Column Adaptor Kit for On-Column Injection*		
Complete kit with FID and injection port adaptors		
Kit includes: Dual Vespel® Ring Inlet Seal, large bore; reducing nut, large bore; FID adaptor, large bore; 1/4" ferrule, Vespel®/graphite; 1/4" nut, stainless steel; 1/16" ferrules, Vespel®/graphite (2); Siltek®-treated metal liner installation guide; 1/16" nuts, stainless steel (2)	kit	22425

*For use with packed column FIDs only.