

## Aromatics &amp; Oxygenates in Gasoline Analysis

**Rt®-TCEP Columns** (fused silica)

(highly polar phase; 1,2,3-tris[2-cyanoethoxy]propane—not bonded)

- General-purpose columns, ideal for aromatics and oxygenates in gasoline.
- Temperature range: 0 °C to 135 °C.

Most gasolines contain aliphatic hydrocarbons up to *n*-dodecane (C12). To improve identification of the aromatics and oxygenates, it is desirable to elute benzene after C11 and toluene after C12. The extremely polar Rt®-TCEP stationary phase provides a retention index for benzene greater than 1,100 and permits the separation of alcohols and aromatics from the aliphatic constituents in gasoline.

Rt®-TCEP columns have the same high polarity as TCEP packed columns (precolumns in ASTM Method D4815 for the analysis of petroleum oxygenates), with the efficiency of a capillary column. The result is a column that can separate a wide variety of compounds with an elution pattern unattainable using other high polarity siloxanes.

The Rt®-TCEP column incorporates a nonbonded stationary phase coated on a surface specialized for enhanced polymer stability and extended column lifetime. Solvent rinsing should be avoided. Conditioning is necessary only if the column is to be used at temperatures near the maximum operating temperature.

ID	df	temp. limits	30-Meter cat.#	60-Meter cat.#
0.25 mm	0.40 µm	0 to 135 °C	10998	10999

**similar phases**

SPB-TCEP, CP-TCEP

**free literature**

Analyzing Oxygenates in Gasoline Using TCEP and Rt®-1/MXT®-1 Columns

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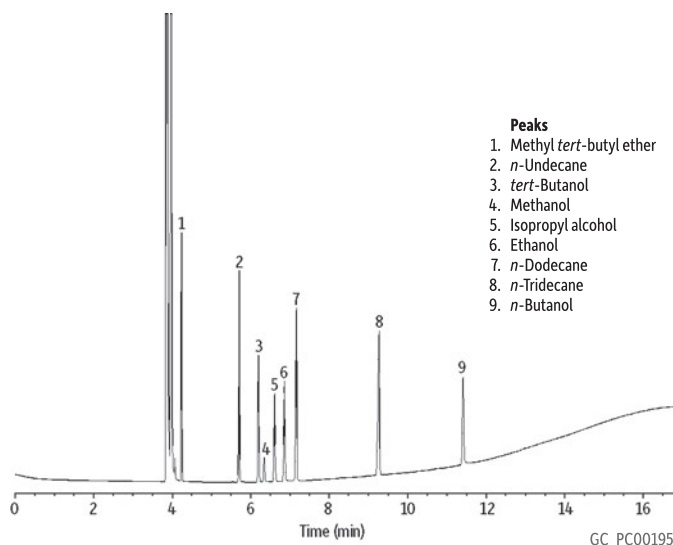
lit. cat.# 59587A

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**Petroleum Oxygenates on Rt®-TCEP**

- Peaks**
1. Methyl *tert*-butyl ether
  2. *n*-Undecane
  3. *tert*-Butanol
  4. Methanol
  5. Isopropyl alcohol
  6. Ethanol
  7. *n*-Dodecane
  8. *n*-Tridecane
  9. *n*-Butanol

**Column** Rt®-TCEP, 60 m, 0.25 mm ID, 0.40 µm (cat.# 10999)  
**Sample** 500 ppm  
**Conc.:** 500 ppm  
**Injection** 1.0 µL split  
**Inj. Vol.:** 1.0 µL split  
**Inj. Temp.:** 200 °C  
**Split Vent**  
**Flow Rate:** 46 mL/min  
**Oven**  
**Oven Temp.:** 60 °C (hold 5 min) to 100 °C at 5 °C/min (hold 10 min)  
**Carrier Gas** He, constant pressure  
**Linear Velocity:** 30 cm/sec @ 80 °C  
**Detector** FID @ 200 °C  
**Notes** FID sensitivity: 6.4 x 10<sup>-11</sup> AFS

## Biodiesel Fuels Analysis

### Rtx®-Biodiesel TG Columns (fused silica)

- Linearity for all reference compounds exceeds method requirements.
- Columns with retention gaps feature Alumaseal® connectors to prevent leaks and extend column life.
- Low column bleed at high temperatures.
- For glycerin and glycerides analysis, according to ASTM D6584 and EN 14105 methods.
- Stable to 350 °C.

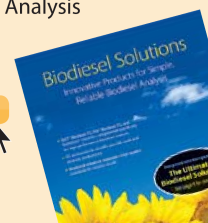
### free literature

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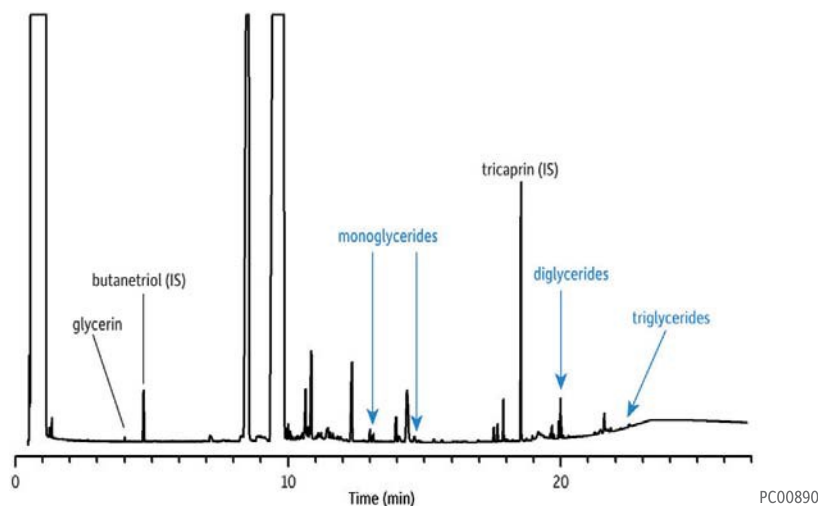
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lit. cat.#  
PCFL1409-UNV



Description	temp. limits	cat.#
10 m, 0.32 mm ID, 0.10 µm	to 330/380 °C	10292
10 m, 0.32 mm ID, 0.10 µm with 2 m x 0.53 mm ID Retention Gap	to 330/380 °C	10291
15 m, 0.32 mm ID, 0.10 µm	to 330/380 °C	10294
15 m, 0.32 mm ID, 0.10 µm with 2 m x 0.53 mm ID Retention Gap	to 330/380 °C	10293

### Glycerin in Biodiesel on Rtx®-Biodiesel TG



**Column** Rtx®-Biodiesel TG, 10 m, 0.32 mm ID, 0.10 µm using Hydroguard® tubing 2 m, 0.53 mm ID, with Alumaseal® connector (cat.# 10291)

**Sample Injection**  
Inj. Vol.: 1.0 µL cold on-column  
Temp. Program: oven track

**Oven**  
Oven Temp.: 50 °C (hold 1 min) to 180 °C at 15 °C/min (hold 7 min) to 230 °C at 30 °C/min to 380 °C at 30 °C/min (hold 5 min)

**Carrier Gas** H<sub>2</sub>, constant flow

**Flow Rate:** 4 mL/min

**Detector** FID @ 380 °C

**did you know?**

Using hydrogen instead of helium can cut analysis time in half! Visit [www.restek.com](http://www.restek.com) to learn more.

**similar phases**

HP-PONA, DB-Petro, CP-SII PONA C8, Petrocol DH

**Method Recommended**

ASTM Method	Column	cat. #	Dimensions
D6729	Rtx-DHA-100	10148	100 m x 0.25 mm, 0.50 $\mu$ m
D6730	Rtx-DHA-100 & Rtx-5 DHA Tuning Column	10148 & 10165	100 m x 0.25 mm, 0.50 $\mu$ m w/ precolumn
D6733	Rtx-DHA-50	10147	50 m x 0.20 mm, 0.50 $\mu$ m
D5501	Rtx-DHA-150	10149	150 m x 0.25 mm, 1.0 $\mu$ m

**free literature**

Detailed Hydrocarbon Analysis  
Featuring Rtx<sup>®</sup>-DHA Columns

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lit. cat.#  
PCFL1007B-UNV

**Detailed Hydrocarbon Analysis (DHA)****Rtx<sup>®</sup>-DHA Columns** (fused silica)

(Crossbond<sup>®</sup> 100% dimethyl polysiloxane—optimized for hydrocarbon analysis)

- Columns meet or exceed all ASTM D6730-01 and CAN/CGSB 3.0 No. 14.3-99 method guidelines; test report for method D6730 supplied with each column.
- Excellent responses and peak symmetry for polar oxygenates.
- Stable to 340 °C.

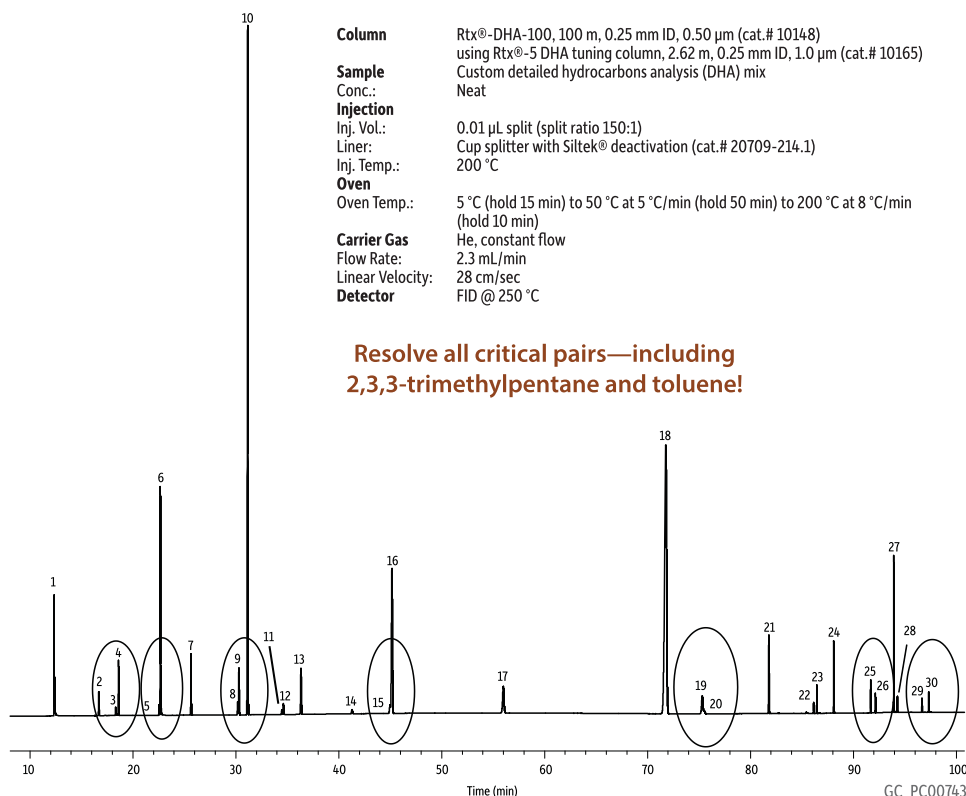
Gasolines are complex mixtures of hundreds of compounds. Information about concentrations of the individual components is important for evaluating raw materials and for controlling refinery processes. ASTM D6730-01 outlines a high-resolution GC method for detailed hydrocarbon analysis (DHA) of gasolines. Rtx<sup>®</sup>-DHA columns are ideal for DHA methods and easily meet or exceed both ASTM D6730-01 and Canadian General Standards Board CAN/CGSB 3.0 No. 14.3-99 requirements. Every Rtx<sup>®</sup>-DHA column is tested for retention, efficiency, stationary phase selectivity, and bleed—guaranteeing reproducible column-to-column performance.

ID	df	temp. limits	50-Meter cat.#	100-Meter cat.#	150-Meter cat.#
0.20 mm	0.50 $\mu$ m	-60 to 300/340 °C	10147		
0.25 mm	0.50 $\mu$ m	-60 to 300/340 °C		10148	
	1.00 $\mu$ m	-60 to 280/340 °C			10149

**Rtx<sup>®</sup>-5 DHA Tuning Column** (fused silica)

(Crossbond<sup>®</sup> 5% diphenyl/95% dimethyl polysiloxane—optimized for hydrocarbon analysis)

ID	df	temp. limits	5-Meter cat.#
0.25 mm	1.00 $\mu$ m	-60 to 325/350 °C	10165

**Detailed Hydrocarbons Analysis on Rtx<sup>®</sup>-DHA-100**

## Simulated Distillation Analysis (C5-C44)

### Rtx®-2887 Column (fused silica)

(nonpolar phase; Crossbond® 100% dimethyl polysiloxane—for simulated distillation)

- Application-specific column for simulated distillation.
- Stable to 360 °C.

The Rtx®-2887 column's stationary phase, column dimensions, and film thickness have been optimized to exceed the resolution and skewing factor requirements specified in ASTM Method D2887. Each column is individually tested to guarantee a stable baseline with low bleed and reproducible retention times. The Crossbond® methyl silicone stationary phase has increased stability compared to packed columns, ensuring stable baselines and shorter conditioning times.

ID	df	temp. limits	10-Meter cat.#
0.53 mm	2.65 µm	-60 to 360 °C	10199

### similar phases

DB-2887, Petrocol 2887, Petrocol EX2887

### also available

MXT®-1HT SimDist  
and more simulated  
distillation products

See pages 113–115.



### free literature

#### Rtx®-2887/MXT®-2887

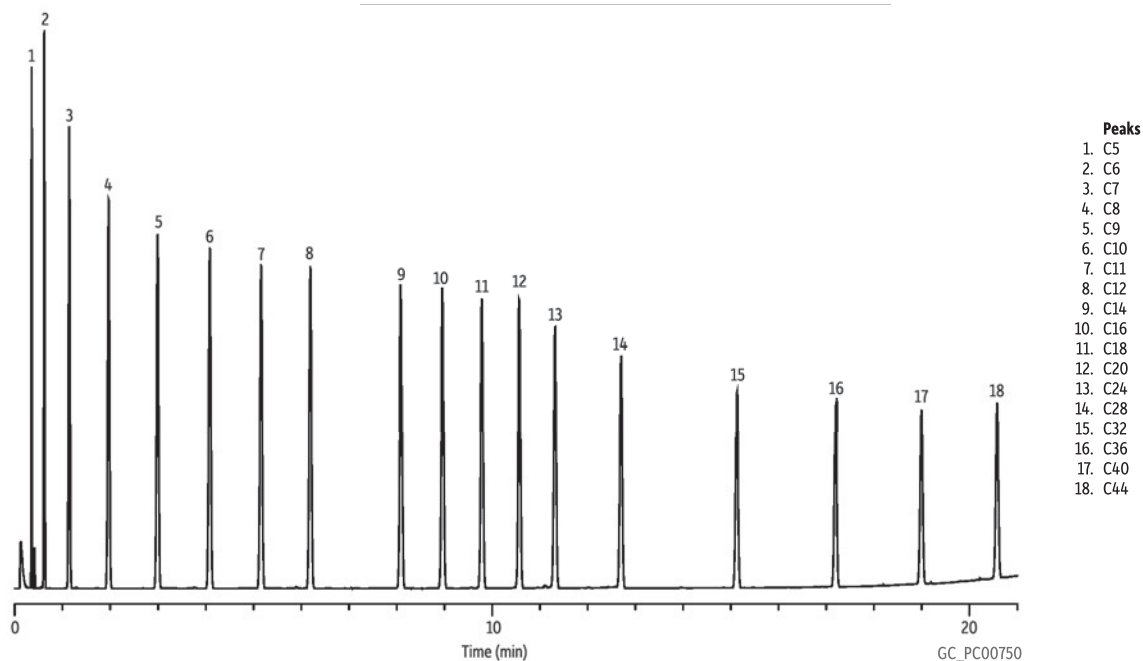
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### Simulated Distillation (C5-C44) on Rtx®-2887



**Column** Rtx®-2887, 10 m, 0.53 mm ID, 2.65 µm (cat.# 10199)  
**Sample** C5 to C44 hydrocarbon standard  
**Diluent:** Carbon disulfide  
**Conc.:** 0.01-0.1 wt. %  
**Injection**  
**Inj. Vol.:** 1 µL direct  
**Inj. Temp.:** 360 °C  
**Oven**  
**Oven Temp.:** 35 °C to 360 °C at 15 °C/min (hold 5 min)  
**Carrier Gas** He, constant flow  
**Flow Rate:** 15 mL/min  
**Linear Velocity:** 112 cm/sec  
**Detector** FID @ 360 °C