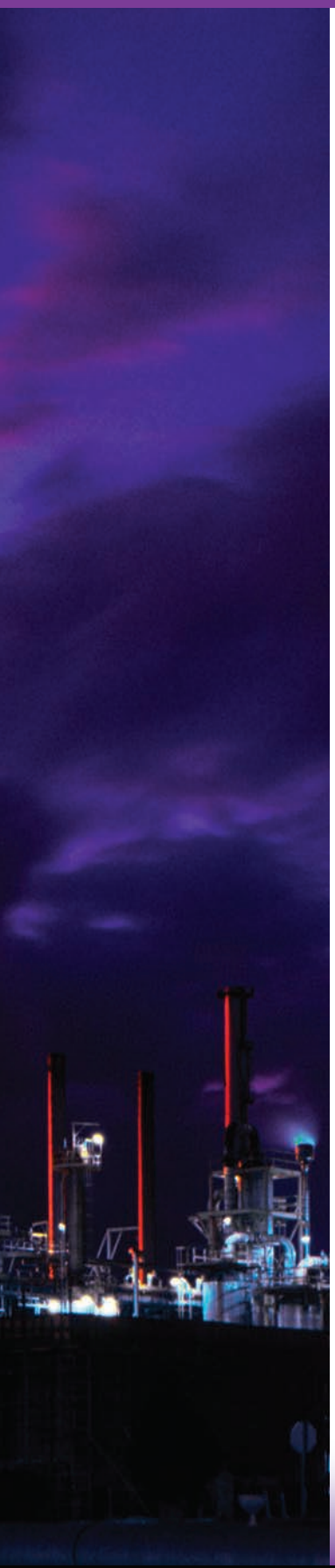
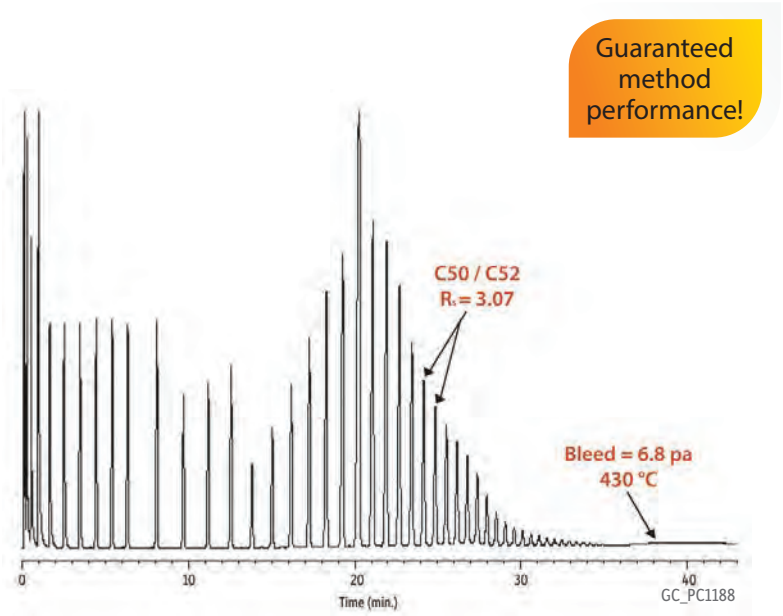
Improve Productivity—Get More Runs from Your SimDist Setup Using Stabilized MXT®-1HT Columns



- Long lasting, low bleed columns are stable up to 450 °C.
- Individually tested for guaranteed performance.
- Meet all ASTM D6352 and D7500 specifications.
- Unbreakable columns offer security when using hydrogen.

Accurate determination of the boiling range distribution of medium and heavy fractions using GC simulated distillation requires columns and phase polymers that are robust enough to withstand the high method temperatures without significant degradation. Metal columns are a much better alternative than fused silica, and the MXT®-1HT SimDist columns, with stabilized dimethyl polysiloxane polymer, are rugged enough to meet critical method parameters, including bleed and C50/C52 resolution (Figures 1 and 2). Field testing of the MXT®-1HT SimDist column shows excellent performance, even under faster analytical conditions than those in the published method. Bleed is minimal, even at 430 °C, which is essential for precise time slices and accurate final boiling point determination. MXT®-1HT SimDist columns are the lowest bleed column on the market, which translates directly into more analyses per calibration and longer column lifetimes. In addition, all Restek® SimDist columns are individually tested up to C90 and thus require only minimal conditioning. This gives you guaranteed method performance while saving you time and money.

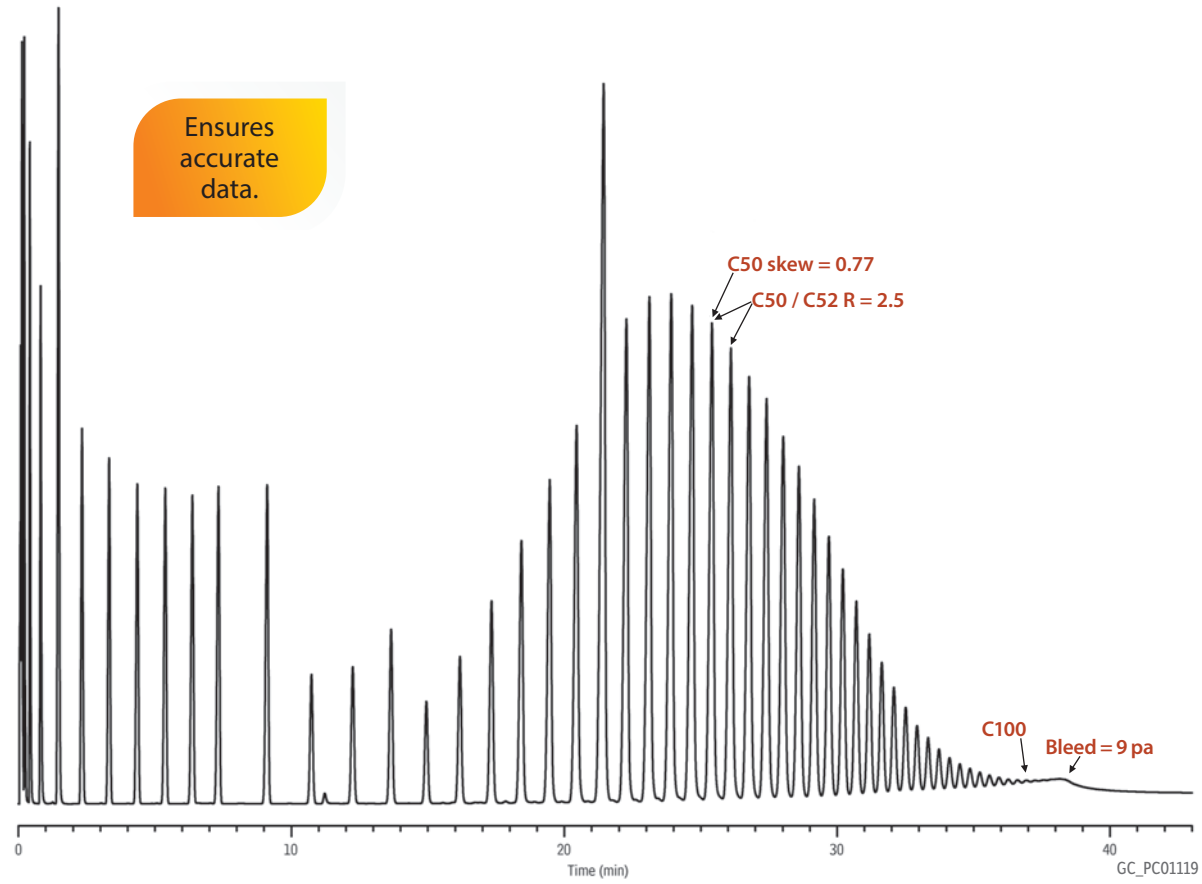
Figure 1: Low-bleed, high-efficiency MXT®-1HT SimDist columns are individually tested for guaranteed performance (ASTM D6352 conditions).



Column: MXT®-1HT SimDist, 5 m, 0.53 mm ID, 0.10 µm (cat.# 70112); **Sample:** C8-C100 hydrocarbons (Separation Systems SD-ss3e-05), Diluent: CS_2, Conc.: 1.0%; **Injection:** Inj. Vol.: 0.5 µL cold on-column, Temp. Program: 53 °C to 430 °C at 10 °C/min (hold 5 min); **Oven:** Oven Temp.: 50 °C to 430 °C at 10 °C/min (hold 5 min); **Carrier Gas**: He, constant flow, Flow Rate: 18 mL/min; **Detector**: FID @ 430 °C, Make-up Gas Flow Rate: 24 mL/min, Make-up Gas Type: N_2; **Instrument**: Shimadzu 2010 GC; **Note:** Inlet temperature program tracks oven temperature program.

Find everything you need for each method in our *ASTM Product Guide* at **www.restek.com/petro**

Figure 2: Superior resolution and peak shape on MXT®-1HT SimDist columns result in more accurate final boiling point determinations.



Column: MXT®-1HT SimDist, 5 m, 0.53 mm ID, 0.20 µm (cat.# 70115); **Sample:** C5-C100, Diluent: carbon disulfide, Conc.: 1 %; **Injection:** Inj. Vol.: 1 µL cold on-column, Inlet Temp. Program: 53 °C to 430 °C at 10 °C/min (hold 5 min); **Oven:** Oven Temp.: 50 °C to 430 °C at 10 °C/min (hold 5 min); **Carrier Gas:** He, constant flow; Flow Rate: 18 mL/min; **Detector:** FID @ 430 °C; **Instrument:** Shimadzu 2010 GC; **Note:** Inlet temperature program tracks oven temperature program.

SimDist Products

Method Recommended Columns

ASTM Method	Hydrocarbon Range	Dimensions	cat.#
D2887	C5–C44	5 m x 0.53 mm, 0.88 µm	70131
		10 m x 0.53 mm, 2.65 µm	70132
D7213 (D2887-ext)	C5–C60	5m x 0.53 mm, 0.88 µm	70131
		5 m x 0.53 mm, 0.20 µm	70115
		5 m x 0.53 mm, 0.10 µm	70112
D5307	crude up to C42	5 m x 0.53 mm, 0.20 µm	70115
D6352	C10–C90	5 m x 0.53 mm, 0.10 µm	70112
		5 m x 0.53 mm, 0.20 µm	70115
D7500	C7–C110	5 m x 0.53 mm, 0.10 µm	70112
		5 m x 0.53 mm, 0.20 µm	70115
D7169	C5–C100	5 m x 0.53 mm, 0.10 µm	70112
		5 m x 0.53 mm, 0.20 µm	70115

MXT®-1HT SimDist Column

(Siltek®-treated stainless steel) (nonpolar phases)

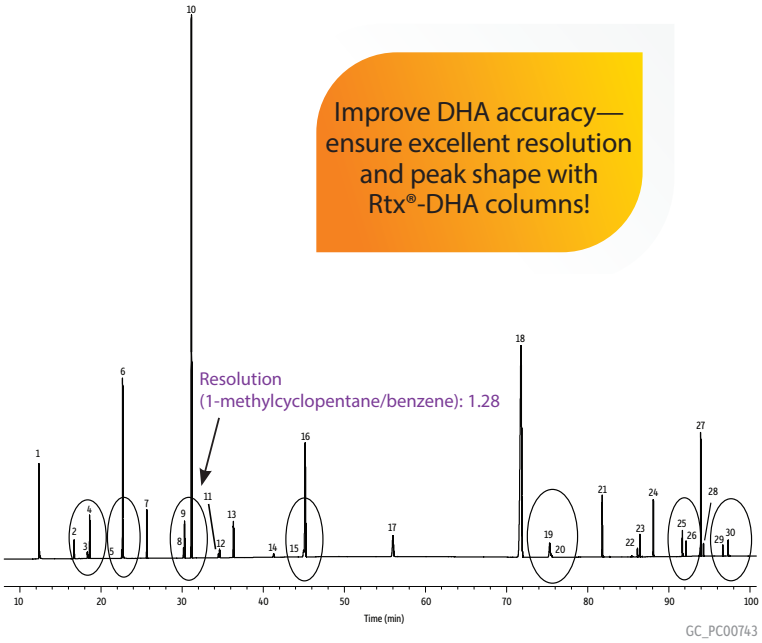
Description	temp. limits	qty.	cat.#
5 m, 0.53 mm ID, 0.10 µm	-60 to 430/450 °C	ea.	70112
5 m, 0.53 mm ID, 0.20 µm	-60 to 400/430 °C	ea.	70115
10 m, 0.53 mm ID, 0.21 µm	-60 to 400/430 °C	ea.	70118
5 m, 0.53 mm ID, 0.88 µm	-60 to 380/430 °C	ea.	70131
10 m, 0.53 mm ID, 0.88 µm	-60 to 400/430 °C	ea.	70134
10 m, 0.53 mm ID, 1.00 µm	-60 to 380/400 °C	ea.	70130
10 m, 0.53 mm ID, 1.20 µm	-60 to 380/380 °C	ea.	70119
10 m, 0.53 mm ID, 2.65 µm	-60 to 360/400 °C	ea.	70132
10 m, 0.53 mm ID, 5.00 µm	-60 to 360/400 °C	ea.	70133

Get More Accurate DHA Analysis Including Alcohols Using Rtx®-DHA Columns

- Columns individually QC tested to meet or exceed all ASTM and CAN/CGSB method guidelines.
- Excellent responses and peak symmetry for polar oxygenates.
- Guaranteed column-to-column reproducibility for resolution, asymmetry, k, and low bleed.
- Columns designed for ASTM Methods D6729, D6730, D6733, D5134, and D5501.

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 outlines a high-resolution GC method for detailed hydrocarbon analysis (DHA) of gasolines. Rtx®-DHA columns are ideal for DHA methods and easily meet or exceed both ASTM D6730 and Canadian General Standards Board CAN/CGSB 14.3-99 requirements (Figure 3). Every Rtx®-DHA column is tested for resolution, asymmetry, k, and bleed—guaranteeing reproducible column-to-column performance.

Figure 3: Critical pairs of gasoline components resolved per ASTM specifications on an Rtx®-DHA column.



Peaks
1. Ethanol
2. C5
3. *tert*-Butanol
4. 2-Methylbutene-2
5. 2,3-Dimethylbutane
6. Methyl *tert*-butyl ether (MTBE)
7. C6
8. 1-Methylcyclopentene
9. Benzene
10. Cyclohexane
11. 3-Ethylpentane
12. 1- *tert*-2-Dimethylcyclopentane
13. C7
14. 2,2,3-Trimethylpentane
15. 2,3,3-Trimethylpentane
16. Toluene
17. C8
18. Ethylbenzene
19. *p*-Xylene
20. 2,3-Dimethylheptane
21. C9
22. 5-Methylnonane
23. 1,2-Methylethylbenzene
24. C10
25. C11 (undecane)
26. 1,2,3,5-Tetramethylbenzene
27. Naphthalene
28. C12 (dodecane)
29. 1-Methylnaphthalene
30. C13 (tridecane)

Circles indicate critical pairs that must be resolved.

Column	Rtx®-DHA-100, 100 m, 0.25 mm ID, 0.50 µm (cat.# 10148) using Rtx®-5 DHA tuning column, 2.62 m, 0.25 mm ID, 1.0 µm (cat.# 10165)
Sample	Custom detailed hydrocarbons analysis (DHA) mix
Conc.:	Neat
Injection	
Inj. Vol.:	0.01 µL split (split ratio 150:1)
Liner:	Cup splitter with Siltek® deactivation (cat.# 20709-214.1)
Inj. Temp.:	200 °C
Oven	
Oven Temp.:	5 °C (hold 15 min) to 50 °C at 5 °C/min (hold 50 min) to 200 °C at 8 °C/min (hold 10 min)
Carrier Gas	He, constant flow
Flow Rate:	2.3 mL/min
Linear Velocity:	28 cm/sec
Detector	FID @ 250 °C

DHA Products

did you know?

Using hydrogen instead of helium can cut analysis time in half! Visit **www.restek.com/petro** for complete analytical details.

similar phases

Petrocol DH, DB-Petro, HP-PONA

Rtx®-DHA Columns (fused silica)

(Crossbond® 100% dimethyl polysiloxane—optimized for hydrocarbon analysis)

Description	temp. limits	qty.	cat.#
50 m, 0.20 mm ID, 0.50 µm	-60 to 300/340 °C	ea.	10147
100 m, 0.25 mm ID, 0.50 µm	-60 to 300/340 °C	ea.	10148
150 m, 0.25 mm ID, 1.00 µm	-60 to 280/340 °C	ea.	10149

Rtx®-5 DHA Tuning Column (fused silica)

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

Description	temp. limits	qty.	cat.#
5 m, 0.25 mm ID, 1.00 µm	-60 to 325/350 °C	ea.	10165

Method Recommended Columns

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

Note: Rtx®-1 PONA columns have been renamed as Rtx®-DHA columns. There are no changes in manufacturing process or column performance.

Protect Equipment and Assure Predictable Retention Times Using Bonded PLOT Column Technology

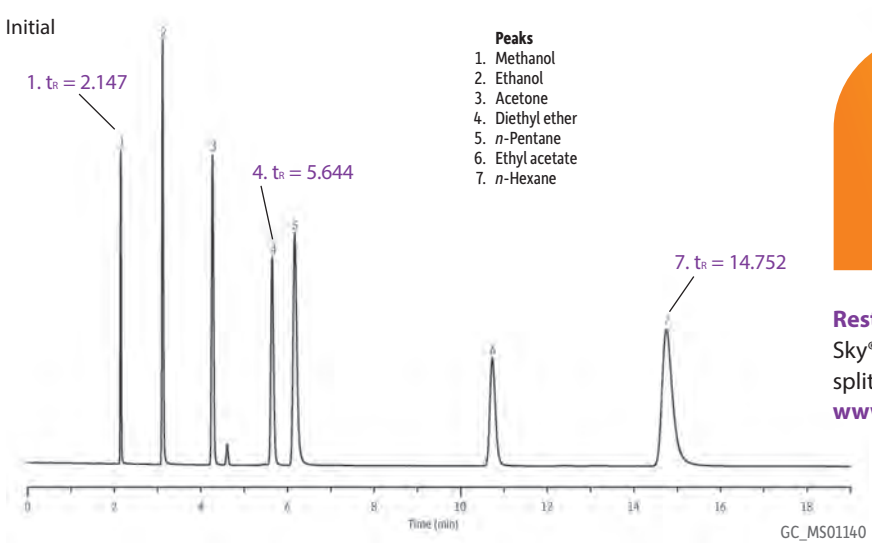
- Bonding process minimizes particle release, reducing column blockage and protecting instrument parts.
- More consistent flow means stable retention times; ideal for Deans and related flow switching techniques.
- Outstanding peak symmetry improves accuracy of impurity analysis for gases, solvents, and hydrocarbons.

PLOT columns are widely used in the petroleum industry because their retention and selectivity characteristics allow gases and volatiles to be separated with high resolution at above ambient temperatures. However, the utility of PLOT columns is significantly limited by the mechanical instability of the particle layers. Routine vibrations or changes in gas pressure can cause a release of particles that clog the column, resulting in highly variable flow behaviors over time and between columns.

Restek has developed a bonding process that established a new benchmark for PLOT column stabilization. This innovative process significantly reduces particle release and column blockage, resulting in highly stable flows and retention times, both run-to-run and column-to-column (Figure 4). By replacing conventional PLOT columns with bonded PLOT columns manufactured using this Restek® technology, labs can increase the accuracy of impurities analysis and make better process decisions.

This stabilization technology is especially beneficial to flow switching applications and is available for porous polymer (4 selectivities), alumina (MAPD, CFC, KCl, and Na_2SO_4 deactivations), and molecular sieve PLOT columns. Our newest PLOT column, the Rt®-Silica BOND PLOT column, is so stable it is virtually particle-free and can be used without pressure conditioning.

Figure 4: Restek® PLOT column technology assures stable retention times, even after 500 pressure cycles.

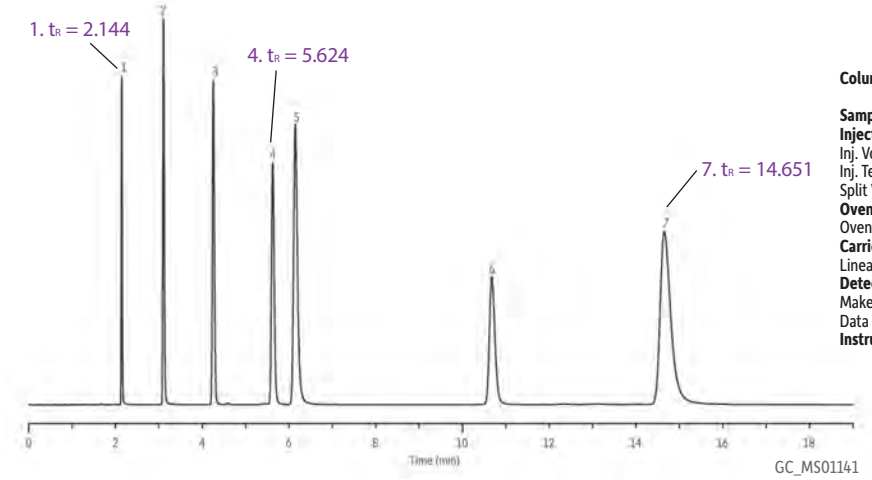


Minimize Downtime With Restek® Bonded PLOT Columns

- Virtually no particle loss.
- Constant retention times for flow switching.

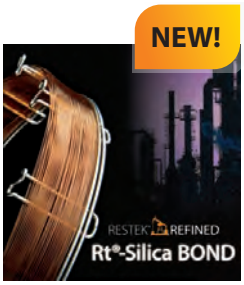
Restek Recommends

Sky® Precision® inlet liners for split injection of liquid samples.
www.restek.com/sky



Column	Rt® -Q-BOND, 30 m, 0.53 mm ID, 20 µm (cat.# 19742)
Sample	QBOND Test Mix
Injection	
Inj. Vol.:	1.0 µL split
Inj. Temp.:	250 °C
Split Vent Flow Rate:	16 mL/min
Oven	
Oven Temp.:	150 °C
Carrier Gas	H_2, constant pressure (3.0 psi, 20.7 kPa)
Linear Velocity:	30 cm/sec @ 150 °C
Detector	FID @ 250 °C
Make-up Gas Type:	N_2
Data Rate:	20 Hz
Instrument	Agilent/HP6890 GC

Fused Silica PLOT Columns



Rt®-Silica BOND Columns (fused silica PLOT)

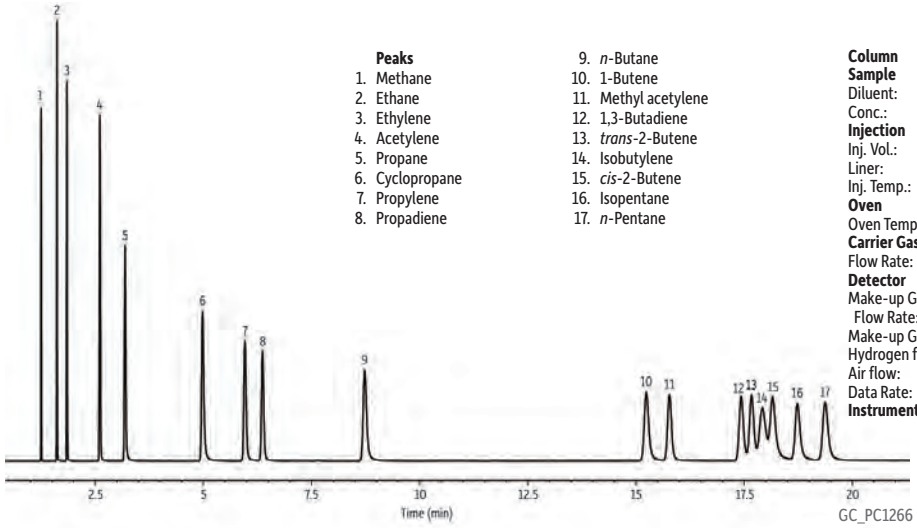
- Versatile column ideal for analysis of light hydrocarbons, sulfur gases, halocarbons, and carbon dioxide.
- Individually QC tested with sensitive C4 probes to ensure consistent selectivity.
- Proprietary manufacturing process practically eliminates particle release, reducing downtime due to clogged FID jets.
- Bonded silica stationary phase minimizes impact of water, resulting in reproducible retention times for water-containing samples.

similar **phases**

GS-GasPro, CP-SilicaPLOT

ID	temp. limits	15-Meter cat.#	30-Meter cat.#	60-Meter cat.#
0.32 mm	-80 to 260 °C	19784	19785	19786

Saturated and Unsaturated Hydrocarbons on Rt®-Silica BOND PLOT Column



GC_PC1266

Peaks
1. Methane
2. Ethane
3. Ethylene
4. Acetylene
5. Propane
6. Cyclopropane
7. Propylene
8. Propadiene
9. *n*-Butane
10. 1-Butene
11. Methyl acetylene
12. 1,3-Butadiene
13. *trans*-2-Butene
14. Isobutylene
15. *cis*-2-Butene
16. Isopentane
17. *n*-Pentane

Column	Rt®-Silica BOND, 30 m, 0.32 mm ID (cat.# 19785)
Sample	Custom DCG gas standard
Diluent:	Nitrogen
Conc.:	1 mole percent
Injection	
Inj. Vol.:	15 µL split (split ratio 35:1)
Liner:	2 mm straight Sky® inlet liner (cat.# 23313.1)
Inj. Temp.:	250 °C
Oven	
Oven Temp.:	60 °C (hold 2 min) to 175 °C at 2 °C/min
Carrier Gas	He, constant flow
Flow Rate:	3.3 mL/min
Detector	FID @ 260 °C
Make-up Gas Flow Rate:	50 mL/min
Make-up Gas Type:	N_2
Hydrogen flow:	40 mL/min
Air flow:	400 mL/min
Data Rate:	10 Hz
Instrument	Agilent 7890A GC

Restek Recommends Sky® straight inlet liners (0.1 mm) for split injection of gas samples. **www.restek.com/sky**

Rt®-Q-BOND Columns (fused silica PLOT)

100% divinylbenzene

- Nonpolar PLOT column incorporating 100% divinylbenzene.
- Excellent for analysis of C1 to C3 isomers and alkanes up to C12.
- High retention for CO_2 simplifies gas analysis; CO_2 and methane separated from $O_2/N_2/CO$ (Note: $O_2/N_2/CO$ not separated at room temperature).
- Use for analysis of oxygenated compounds and solvents.
- Maximum temperature of 300 °C.

ID	df	temp. limits	15-Meter cat.#	30-Meter cat.#
0.25 mm	8 µm	to 280/300 °C	19764	19765
0.32 mm	10 µm	to 280/300 °C	19743	19744
0.53 mm	20 µm	to 280/300 °C	19741	19742

did you know?

Restek® chemists developed a new process for manufacturing PLOT columns. This process bonds the particles to the walls of the tubing, so there is virtually no particle generation. Reduced particle generation assures reproducible selectivity and flow on every run and every column.

Rt®-QS-BOND Columns (fused silica PLOT)

porous divinylbenzene homopolymer

- Intermediate polarity PLOT column incorporating low 4-vinylpyridine.
- Separates ethane, ethylene, and acetylene to baseline.
- Designed for the best possible separation between all C2 isomers.

ID	df	temp. limits	15-Meter cat.#	30-Meter cat.#
0.25 mm	8 µm	to 250 °C	19767	19768
0.32 mm	10 µm	to 250 °C	19739	19740
0.53 mm	20 µm	to 250 °C	19737	19738

Rt®-S-BOND Columns (fused silica PLOT)

porous divinylbenzene homopolymer

- Midpolarity PLOT column, incorporating high 4-vinylpyridine.
- Use for the analysis of nonpolar and polar compounds.

ID	df	temp. limits	15-Meter cat.#	30-Meter cat.#
0.25 mm	8 µm	to 250 °C	19769	19770
0.32 mm	10 µm	to 250 °C	19747	19748
0.53 mm	20 µm	to 250 °C	19745	19746

Rt®-U-BOND Columns (fused silica PLOT)

divinylbenzene ethylene glycol/dimethylacrylate

- Restek's highest polarity porous polymer column.
- Polar PLOT column, incorporating divinylbenzene ethylene glycol/dimethylacrylate.
- Highly inert for the analysis of polar and nonpolar compounds.

ID	df	temp. limits	15-Meter cat.#	30-Meter cat.#
0.25 mm	8 µm	to 190 °C	19771	19772
0.25 mm	12 µm	to 190 °C	19782	—
0.32 mm	10 µm	to 190 °C	19751	19752
0.53 mm	20 µm	to 190 °C	19749	19750

Rt®-Alumina BOND/KCl Columns (fused silica PLOT)

(KCl deactivation)

- Restek's lowest polarity alumina column.
- Low moisture sensitivity reduces the need for frequent regeneration.
- Acetylene elutes before *n*-butane.
- Methyl acetylene (impurity in 1,3-butadiene) elutes before 1,3-butadiene.

ID	df	temp. limits	30-Meter cat.#	50-Meter cat.#
0.25 mm	4 µm	to 200 °C	19776	—
0.32 mm	5 µm	to 200 °C	19761	19762
0.53 mm	10 µm	to 200 °C	19759	19760

Rt®-Alumina BOND/Na_2SO_4 Columns (fused silica PLOT)

(Na_2SO_4 deactivation)

- Acetylene and propadiene elute after butanes.
- Best separation for butene isomers (impurities in butene streams).
- Methyl acetylene elutes after 1,3-butadiene.
- Cyclopropane (impurity in propylene) elutes well before propylene.

ID	ID	temp. limits	30-Meter cat.#	50-Meter cat.#
0.25 mm	4 µm	to 200 °C	19775	—
0.32 mm	5 µm	to 200 °C	19757	19758
0.53 mm	10 µm	to 200 °C	19755	19756

Rt®-Alumina BOND/CFC Columns (fused silica PLOT)

- Improved inertness for chlorofluorocarbon (CFC) compounds.
- Highly selective alumina-based column, separates most CFCs.
- High retention and capacity for CFCs.

ID	df	temp. limits	30-Meter cat.#
0.53 mm	10 µm	to 200 °C	19763

Rt®-Alumina BOND/MAPD Columns (fused silica PLOT)

- Optimized deactivation produces maximum response when analyzing trace levels of acetylene, methyl acetylene, and propadiene.
- Stable response factors make this column ideal for process-type applications where recalibration must be minimized.
- High loadability reduces peak tailing and improves separations.
- Extended temperature range up to 250 °C for fast elution of high molecular weight (HMW) hydrocarbons and accelerated column regeneration following exposure to water.

ID	df	temp. limits	30-Meter cat.#	50-Meter cat.#
0.25 mm	4 µm	to 250 °C	19781	—
0.32 mm	5 µm	to 250 °C	19779	19780
0.53 mm	10 µm	to 250 °C	19777	19778

Rt®-Msieve 5A Columns (fused silica PLOT)

- Fast separation of all inert/permanent gases, including argon and oxygen at temperatures above ambient.
- Special deactivation ensures carbon monoxide elutes as a sharp peak allowing ppm level quantification.
- Unique immobilization process ensures minimal particle generation—even after continuous valve cycling.
- Stable up to 300 °C for fast regeneration following exposure to water or carbon dioxide.
- Available in flexible 0.53, 0.32, and 0.25 mm ID fused silica tubing for easy installation, cutting, and coupling.

ID	df	temp. limits	15-Meter cat.#	30-Meter cat.#
0.25 mm	20 µm	to 300 °C	19773	—
0.32 mm	30 µm	to 300 °C	19720	19722
0.53 mm	50 µm	to 300 °C	19721	19723

Metal MXT® PLOT Columns

Advantages of metal MXT® PLOT columns include:

- Can be made in small coil diameters—perfect for tight spaces.
- Rugged material withstands rough handling and shock.
- Designed for robust performance in process GCs and field instruments.
- Available in 3.5"-coil diameter or 7"-diameter, 11-pin cage.

ID	df	temp. limits	3.5" coil 15-Meter cat.#	7" diameter 11-pin cage 15-Meter cat.#	3.5" coil 30-Meter cat.#	7" diameter 11-pin cage 30-Meter cat.#
MXT-Msieve 5A						
0.25 mm	20 µm	to 300 °C	79717-273	79717	—	—
0.53 mm	50 µm	to 300 °C	—	—	79723-273	79723
MXT-Alumina BOND/Na_2SO_4						
0.53 mm	10 µm	to 200 °C	—	—	79714-273	79714
MXT-Alumina BOND/MAPD						
0.53 mm	10 µm	to 250 °C	—	—	79728-273	79728
MXT-Q-BOND						
0.25 mm	8 µm	to 300 °C	79718-273	79718	—	—
0.53 mm	20 µm	to 280/300 °C	—	—	79716-273	79716
MXT-S-BOND						
0.53 mm	20 µm	to 250 °C	—	—	79712-273	79712

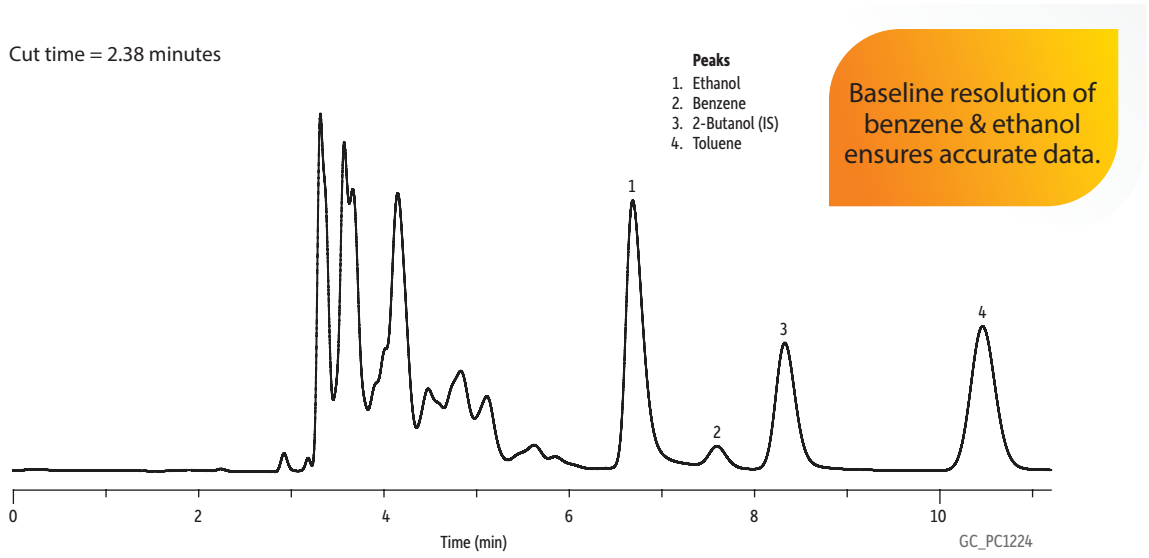
Visit **www.restek.com/petro** for more PLOT column applications.

Ensure Accurate Results for Benzene and Toluene in Spark Ignition Fuels Using the D3606 Column Set

- Complete baseline resolution makes accurate quantification easy and reliable.
- Guaranteed performance: every set is tested for method application and includes chromatogram.
- Fully conditioned, ready-to-use column set.

Laboratories analyzing aviation fuel or reformulated spark ignition fuels that contain ethanol for the determination of benzene and toluene must use a modified ASTM D3606 method to prevent the coelution of ethanol and benzene. The primary challenge in this analysis is twofold: the tailing of the ethanol peak into benzene and the retention time shift of the aromatics, particularly benzene, toward the ethanol peak. Restek solved these issues by developing the D3606 column set, specifically for the modified ASTM D3606 application. Using this column set, which is specified in the Method D3606 Addendum, the aromatic compounds are fully resolved and can easily be quantified using the internal standard 2-butanol (Figure 5). This column set is fully conditioned and ready to use out of the box with only a 10-minute carrier gas purge at ambient temperature, followed by a 30-minute hold at 165 °C. It can be used for the analysis of gasoline with or without ethanol, using either helium or nitrogen carrier gas.

Figure 5: Complete resolution of benzene from ethanol using a D3606 column set for modified ASTM D3606.



Column: D3606 application column (2 column set). Column 1: 6' (1.8 m), 1/8" OD, 2.0 mm ID, nonpolar Rtx®-1; Column 2: 16' (4.9 m), 1/8" OD, 2.0 mm ID, proprietary packing material (cat.# 83606-800); **Sample**: Ethanol-containing gasoline with internal standard (IS), Diluent: ; **Injection:** Direct, Sample Loop Vol.: 1.5 µL, Valve Temp.: 135 °C; **Oven:** Oven Temp: 135 °C (hold 12 min); **Carrier Gas**: He, constant flow, Flow Rate: 20.0 mL/min; **Detector**: TCD @ 200 °C; **Notes**: 2.38 minute backflush (must be determined for each GC system).

D3606 Products

D3606 Application Column (2 column set)

Description	cat.#*
D3606 Application Column (2 column set)**	
Column 1: 6' (1.8 m), 1/8" OD, 2.0 mm ID, nonpolar Rtx-1	83606-
Column 2: 16' (4.9 m), 1/8" OD, 2.0 mm ID, proprietary packing material	

*Please add column instrument configuration suffix number to cat.# when ordering. See chart on next page.

**The column set is designed to accommodate both valve injection and/or syringe injection. Column 1 is configured with a 2" inlet void to facilitate on-column injection. The inlet is identified on both column 1 and column 2. Note: The inlet of column 2 is identified for proper orientation for connection to the valve.

ordering note

www.restek.com/petro for a complete list of D3606 standards.

Single Column Separation of CO and CO_2 in Presence of O_2/N_2 Using a ShinCarbon ST Packed/Micropacked Column

- Separate permanent gases, as well as CO/CO_2, without cryogenic cooling.
- Excellent compatibility with most GC detectors—low bleed and minimal baseline rise.
- Preconditioned; takes less than 30 minutes to stabilize.

Analyze oxygen, nitrogen, methane, carbon monoxide, and carbon dioxide with one column and at room temperature. Restek's ShinCarbon ST material is a high surface area carbon molecular sieve (~1,500 m^2/g) that is ideal for separating gases and highly volatile compounds by gas-solid chromatography (GSC). ShinCarbon ST is an exceptionally stable material with good loadability. Its 300 °C upper temperature limit minimizes bleed and baseline rise during temperature programming, making it compatible with most detection systems, including TCD or HID (Figure 6). All ShinCarbon ST columns are fully conditioned in an oxygen/moisture-free environment to prevent contamination. This minimizes stabilization time (less than 30 minutes) when installing a new column, which, in turn, minimizes downtime. Custom-made ShinCarbon ST columns are available on request.

Restek® innovation!

ShinCarbon ST is an ideal packing material for permanent gases, low molecular weight hydrocarbons, sulfur dioxide, and Freon® gases.

a plus 1 story

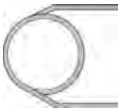
"Being one of the first labs to utilize the ShinCarbon column in a real working environment, I was pleased to find that I was able to do all my permanent gas analysis on one column instead of the customary two. The peaks were sharper than I had experienced in the past and run time was significantly reduced. We are extremely pleased with the performance of the ShinCarbon column and will continue to find even more applications for it."
Bruce Nasser, Quality Control Chemist, Oxygen Service Spec Lab

ordering note

Installation kits available at **www.restek.com**

Packed Column Instrument Configurations

General Configuration
Suffix -800



Agilent 5880, 5890, 5987, 6890, 7890:
Suffix -810*

Varian 3700, Vista Series, FID:
Suffix -820

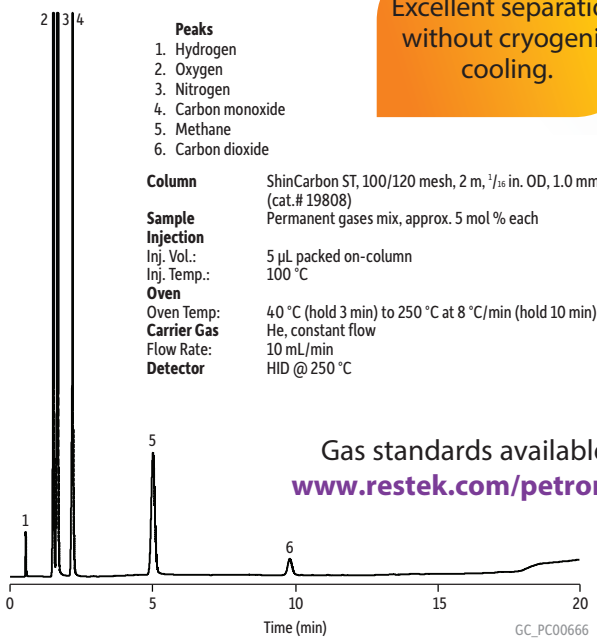
PE 900-3920, Sigma 1,2,3:
Suffix -830

PE Auto System 8300, 8400, 8700:
Suffix -840

Visit www.restek.com for additional configurations.

Note: Initial 2" of column will be empty to accommodate a needle. For a completely filled column (not on-column) add suffix -901.
*-810 suffix also includes 1 1/2" void on detector side.

Figure 6: Separate permanent gases in 10 min, without cryogenics.



ShinCarbon Products

ShinCarbon ST Columns (packed) (SilcoSmooth® Stainless Steel)*

OD	ID	Mesh	2-Meter cat.#*
1/8" Silcosmooth	2.0 mm	80/100	80486-

ShinCarbon ST Columns (micropacked) (SilcoSmooth® Stainless Steel)**

OD	ID	Mesh	1-Meter cat.#	2-Meter cat.#
1/16"	1.0 mm	100/120	19809	19808
0.95 mm	0.75 mm	100/120	19810	—
0.74 mm	0.53 mm	80/100	19045	19043

*Please add column instrument configuration suffix number to cat.# when ordering.
**Does not include column nuts and ferrules. Optional installation kits can be ordered separately.

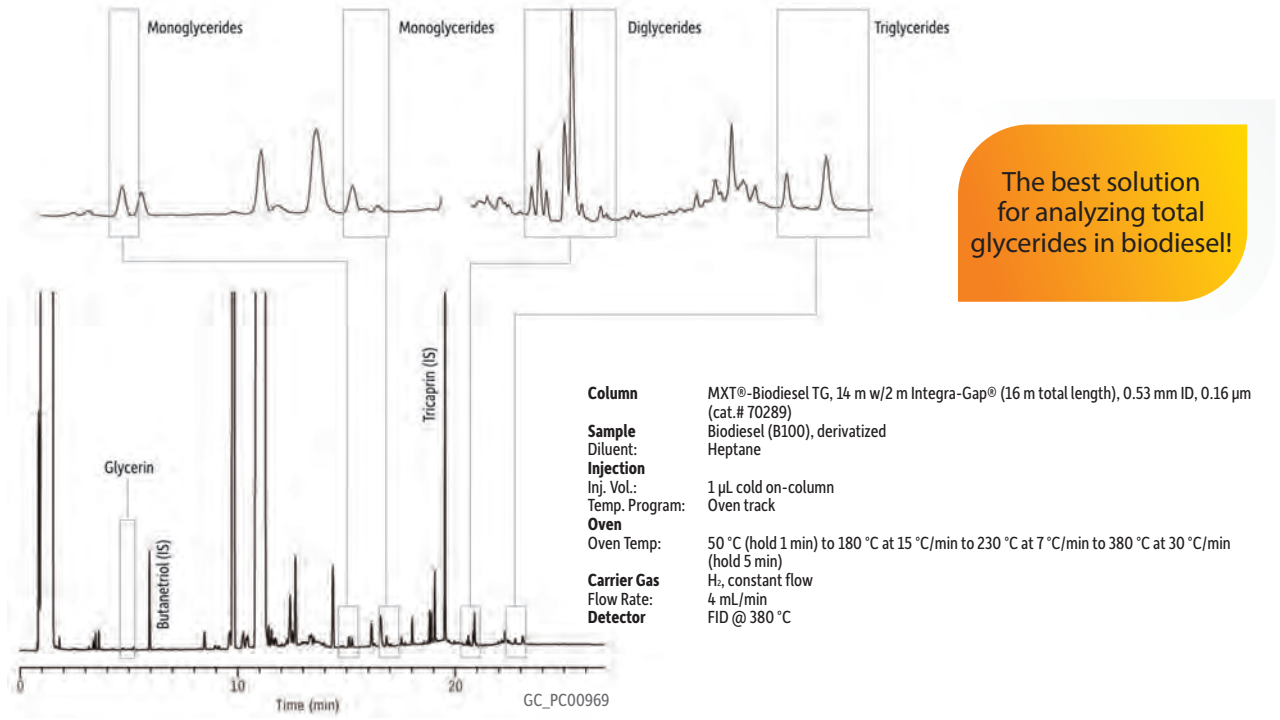
Visit **www.restek.com/packed** to order a custom packed column.

Accurate, Reliable Analysis of Glycerides in Biodiesel Using Either Metal or High Temperature Fused Silica Column Solutions

- Complete resolution of all compounds from interference peaks.
- Columns available in metal and fused silica.
  - Use Rtx®-Biodiesel TG fused silica columns up to 380 °C—low bleed for accurate, reliable results.
  - Use MXT®-Biodiesel TG metal columns up to 430 °C—same performance as fused silica with longer column lifetimes.

One of the biggest challenges in biodiesel analysis is the accurate determination of residual glyceride content. The high temperatures required to elute triglycerides cause most fused silica columns to deteriorate rapidly. Restek offers high-temperature fused silica columns that are stable up to 380 °C, and the metal MXT®-Biodiesel TG column line is an even better solution. MXT®-Biodiesel TG columns offer the same chromatographic performance as fused silica columns, but are designed for maximum heat tolerance, even up to 430 °C. These columns provide good resolution and peak shape for all glycerides, as well as highly reproducible retention times (Figure 7). Additionally, metal MXT® columns are available with Integra-Gap® technology, a built-in retention gap that eliminates connector-related leaks, reducing tailing and minimizing downtime for maintenance.

Figure 7: Robust metal MXT®-Biodiesel TG columns meet resolution criteria and show excellent response for determining glycerides in biodiesel.



Biodiesel Products

MXT®-Biodiesel TG Columns (Siltek®-treated stainless steel)

Description	temp. limits	3.5" Coil cat.#	7" diameter 11-pin cage cat.#
14 m, 0.53 mm ID, 0.16 µm with 2 m Integra-Gap*	-60 to 380/430 °C	70289-273	70289
10 m, 0.32 mm ID, 0.10 µm	-60 to 380/430 °C	—	70292
10 m, 0.32 mm ID, 0.10 µm with 2 m x 0.53 mm Retention Gap**	-60 to 380/430 °C	70290-273	70290
15 m, 0.32 mm ID, 0.10 µm	-60 to 380/430 °C	—	70293
15 m, 0.32 mm ID, 0.10 µm with 2 m x 0.53 mm Retention Gap**	-60 to 380/430 °C	70291-273	70291
2 m x 0.53 mm MXT Biodiesel TG Retention Gap		—	70294

*Total column length = 16 meters.
**Connected with low dead volume MXT connector.

Rtx®-Biodiesel TG Columns (fused silica)

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

**Connected with Alumaseal® connector.

Visit **www.restek.com/biodiesel** for a complete list of biodiesel standards, products, and applications.

Reference Standards

Petroleum

Gravimetrically prepared, NIST-traceable by weight, and verified by one or more analytical methods.

Sulfur Simulated Distillation Standard (SSDS)

30 ppm total sulfur by weight from ethanethiol
60 ppm total sulfur by weight from 1-propanethiol
30 ppm total sulfur by weight from 1-butanethiol
60 ppm total sulfur by weight from 1-pentanethiol
30 ppm total sulfur by weight from 1-hexanethiol
60 ppm total sulfur by weight from 1-heptanethiol
30 ppm total sulfur by weight from 3,5-dimethylbenzenethiol
60 ppm total sulfur by weight from 1-octanethiol
30 ppm total sulfur by weight from 1-nonanethiol
60 ppm total sulfur by weight from 1-decanethiol
30 ppm total sulfur by weight from 1-pentadecanethiolol
60 ppm total sulfur by weight from 1-hexadecanethiol
30 ppm total sulfur by weight from 1-octadecanethiol
Balance: toluene:isooctane (1:15)

1 mL pre-scored amber ampul.
cat.# 33049 (ea.)

SimDist

D2887 Calibration Mix (17 components)

Compound	Conc. (% w/w)	Compound	Conc. (% w/w)
n-Hexane (C6) (110-54-3)	6	*n*-Eicosane (C20) (112-95-8)	2
n-Heptane (C7) (142-82-5)	6	*n*-Tetracosane (C24) (646-31-1)	2
n-Octane (C8) (111-65-9)	8	*n*-Octacosane (C28) (630-02-4)	1
n-Nonane (C9) (111-84-2)	8	*n*-Dotriacontane (C32) (544-85-4)	1
n-Decane (C10) (124-18-5)	12	*n*-Hexatriacontane (C36) (630-06-8)	1
n-Undecane (C11) (1120-21-4)	12	*n*-Tetracontane (C40) (4181-95-7)	1
n-Dodecane (C12) (112-40-3)	12	*n*-Tetratetracontane (C44) (7098-22-8)	1
n-Tetradecane (C14) (629-59-4)	12		
n-Hexadecane (C16) (544-76-3)	10		
n-Octadecane (C18) (593-45-3)	5		

Packaged 1 mL/ampul
cat.# 31222 (ea.)

No data pack available.

ASTM D2887-12 Calibration Standard

(20 components)

n-Pentane (C5) (109-66-0)
n-Hexane (C6) (110-54-3)
n-Heptane (C7) (142-82-5)
n-Octane (C8) (111-65-9)
n-Nonane (C9) (111-84-2)
n-Decane (C10) (124-18-5)
n-Undecane (C11) (1120-21-4)
n-Dodecane (C12) (112-40-3)
n-Tetradecane (C14) (629-59-4)
n-Pentadecane (C15) (629-62-9)
n-Hexadecane (C16) (544-76-3)
n-Heptadecane (C17) (629-78-7)
n-Octadecane (C18) (593-45-3)
n-Eicosane (C20) (112-95-8)
n-Tetracosane (C24) (646-31-1)
n-Octacosane (C28) (630-02-4)
n-Dotriacontane (C32) (544-85-4)
n-Hexatriacontane (C36) (630-06-8)
n-Tetracontane (C40) (4181-95-7)
n-Tetratetracontane (C44) (7098-22-8)

1% w/w in carbon disulfide, 1 g solution/ampul
cat.# 31674 (ea.)

5% w/w, Neat, 1 g /ampul
cat.# 31675 (ea.)

No data pack available.

Polywax Standards

These high molecular weight hydrocarbon waxes are useful for simulated distillation and other high-temperature GC work.

Volume is 1 mL/ampul.

Compound	CAS #	Solvent	Conc.	cat.#
Polywax 500	9002-88-4	Neat	1 g	36224
Polywax 655	9002-88-4	Neat	1 g	36225
Polywax 850	9002-88-4	Neat	1 g	36226
Polywax 1,000	9002-88-4	Neat	1 g	36227

No data pack available.

Reference Standards

DHA

DHA PONA Standard (188 components)

This standard is a qualitative mixture of various gasoline and refinery materials prepared to provide nearly every component that may be encountered in feedstock and finished gasolines. Some oxygenates have been added to allow this blend to be used by refineries for Detailed Hydrocarbon Analysis (DHA) method setup and to fulfill requirements such as ASTM Methods D6729, D6730, and D6733.

Neat, 0.15 mL in Autosampler Vial
cat.# 30731 (ea.)

No data pack available.
For a full component list, visit www.restek.com and search for "30731".

Oxy Set-Up Blend (30 components)

Gravimetrically prepared and NIST-traceable.
Visit **www.restek.com/petromixes** for a component list.
2 mL prescored ampul
cat.# 33034 (ea.)

PiONA Blends

These standards are produced for refineries performing detailed hydrocarbon analysis (DHA) of crude oil feedstocks and fuels. They help with calibrating complex hydrocarbon analyses and provide the greatest number of gravimetrically determined values for quantitative calibration to help customers optimize production and maximize profitability—while fulfilling requirements such as ASTM Methods D6729, D6730, and D6733.

DHA PiONA Standard (133 components)

Neat, 0.15 mL in Autosampler Vial
cat.# 30730 (ea.)

No data pack available.

DHA Paraffins Standard (11 components)

Neat, 0.15 mL in Autosampler Vial
cat.# 30725 (ea.)

No data pack available.

DHA Isoparaffins Standard (33 components)

Neat, 0.15 mL in Autosampler Vial
cat.# 30726 (ea.)

No data pack available.

DHA Olefins Standard (26 components)

Neat, 0.15 mL in Autosampler Vial
cat.# 30727 (ea.)

No data pack available.

DHA Naphthenes Standard (26 components)

Neat, 0.15 mL in Autosampler Vial
cat.# 30728 (ea.)

No data pack available.

DHA Aromatics Standard (37 components)

Neat, 0.15 mL in Autosampler Vial
cat.# 30729 (ea.)

No data pack available. Quantity discounts not available.

D3606

ASTM D3606 Calibration Kit Without Internal Standard — kit

Contains 25 mL each of these mixtures.
30647: ASTM D3606 Calibration Standard #1 Without Internal Standard
30648: ASTM D3606 Calibration Standard #2 Without Internal Standard
30649: ASTM D3606 Calibration Standard #3 Without Internal Standard
30650: ASTM D3606 Calibration Standard #4 Without Internal Standard
30651: ASTM D3606 Calibration Standard #5 Without Internal Standard
30652: ASTM D3606 Calibration Standard #6 Without Internal Standard
30653: ASTM D3606 Calibration Standard #7 Without Internal Standard
Contains 25 mL each of these mixtures.
cat.# 30672 (kit)

ASTM D3606 Calibration Kit With MEK Internal Standard — kit

Contains 1 mL each of these mixtures.
30654: ASTM D3606 Calibration Standard #1 With MEK Internal Standard
30655: ASTM D3606 Calibration Standard #2 With MEK Internal Standard
30656: ASTM D3606 Calibration Standard #3 With MEK Internal Standard
30657: ASTM D3606 Calibration Standard #4 With MEK Internal Standard
30658: ASTM D3606 Calibration Standard #5 With MEK Internal Standard
30659: ASTM D3606 Calibration Standard #6 With MEK Internal Standard
30660: ASTM D3606 Calibration Standard #7 With MEK Internal Standard
Contains 1 mL each of these mixtures.
cat.# 30673 (kit)

ASTM D3606 Calibration Kit With *sec*-Butanol Internal Standard — kit

Contains 1 mL each of these mixtures.
30661: ASTM D3606 Calibration Standard #1 With *sec*-Butanol Internal Standard
30662: ASTM D3606 Calibration Standard #2 With *sec*-Butanol Internal Standard
30663: ASTM D3606 Calibration Standard #3 With *sec*-Butanol Internal Standard
30664: ASTM D3606 Calibration Standard #4 With *sec*-Butanol Internal Standard
30665: ASTM D3606 Calibration Standard #5 With *sec*-Butanol Internal Standard
30666: ASTM D3606 Calibration Standard #6 With *sec*-Butanol Internal Standard
30667: ASTM D3606 Calibration Standard #7 With *sec*-Butanol Internal Standard
Contains 1 mL each of these mixtures.
cat.# 30674 (kit)

ASTM D3606 Quality Control Standard with MEK Internal Standard (3 components)

Benzene (71-43-2)	0.6432% vol/vol
2-Butanone (MEK) (78-93-3)	4
Toluene (108-88-3)	4.8

In isooctane, 25 mL/ampul
cat.# 30669 (ea.)

ASTM D3606 Quality Control Standard with *sec*-Butanol Internal Standard (3 components)

Benzene (71-43-2)	0.6432% vol/vol
2-Butanol (*sec*-butyl alcohol) (78-92-2)	4
Toluene (108-88-3)	4.8

In isooctane, 25 mL/ampul
cat.# 30670 (ea.)

Visit **www.restek.com/petromixes** for our complete line of petrochemical reference standards.
For custom standards, visit **www.restek.com/solutions**

Natural Gas and Refinery Gas Standards

- Each available in three varying concentrations.
- Mini-regulator designed specifically for these standards.

Natural Gas Standards

Available in three mixes, from lean to rich. Each has an extended list of C6+ components.

	Natural Gas Standard #1 cat.# 34438, ea. **% each compound***	**Natural Gas Standard #2** cat.# 34439, ea. **% each compound***	**Natural Gas Standard #3** cat.# 34440, ea. **% each compound***
nitrogen	1.000	2.500	5.000
carbon dioxide	0.500	1.000	1.500
methane UHP	94.750	85.250	70.000
ethane UHP	2.000	5.000	9.000
propane	0.750	3.000	6.000
isobutane	0.300	1.000	3.000
n-butane	0.300	1.000	3.000
isopentane	0.150	0.500	1.000
n-pentane	0.150	0.500	1.000
hexanes plus	0.100	0.250	0.500
Concentration	mole	mole	mole
Volume	13.16 L @ 200 psig (1,379 kPa)	13.16 L @ 200 psig (1,379 kPa)	5.5 L @ 75 psig (517 kPa)
Ideal Heating Value (Dry BTU/SCF)	1,048 gross	1,142 gross	1,317 gross

Refinery Gas Standards

Available in three mixes with varying C5 unsaturates or extended C6+ components.

	Refinery Gas Standard #1 cat.# 34441, ea. **% each compound***	**Refinery Gas Standard #2** cat.# 34442, ea. **% each compound***	**Refinery Gas Standard #5** cat.# 34443, ea. **% each compound***
hydrogen	40.750	12.500	12.500
argon	0.500	1.000	1.000
nitrogen	4.000	37.200	37.200
carbon monoxide	1.000	1.000	1.000
carbon dioxide	3.000	3.000	3.000
methane	8.500	5.000	5.000
ethane	6.000	4.000	4.000
ethylene	2.000	2.000	2.000
acetylene	—	1.000	1.000
propane	7.000	6.000	6.000
propylene	3.000	3.000	3.000
propadiene	0.850	1.000	1.000
cyclopropane	—	0.040	—
isobutane	6.000	5.000	5.000
n-butane	4.000	4.000	4.000
isobutylene	2.000	1.000	1.000
1,3 butadiene	3.000	3.000	3.000
cis-2-butene	2.000	2.000	2.000
trans-2-butene	2.000	3.000	3.000
1-butene	2.000	2.000	2.000
2-methyl-2-butene	—	0.200	0.200
isopentane	1.000	1.000	1.000
n-pentane	1.000	1.000	1.000
cis-2-pentene	—	0.400	0.400
trans-2-pentene	—	0.160	0.200
pentene-1	—	0.400	0.400
n-hexane	0.500	0.100	—
hexanes plus	—	—	0.100
Concentration	mole	mole	mole
Volume	5.2 L @ 70 psig (483 kPa)	4.9 L @ 60 psig (414 kPa)	4.6 L @ 60 psig (414 kPa)

*Precise concentrations are provided on the data sheet included with each cylinder and may vary slightly from those listed here.

cylinder design

DCG Partnership Cylinders:

Size: 7.6 x 24 cm
CGA-170/110 connection
U.S. DOT Specs:
DOT-4B-240ET

Please note: This cylinder is not approved for use in Canada.

Need a regulator?

Request **cat.# 22032**.

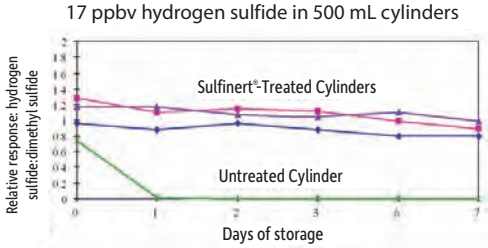
Please note: Gas standards on this page are not available in Pi-marked (TPED-rated) cylinders required for EU countries.

Sample Cylinders, Valves & Accessories

Sulfinert®-Treated High-Pressure Sample Cylinders

- Sulfinert® coating provides stable storage of sulfur and mercury at ppb levels in petroleum samples.
- Inert coating doesn't flake; more durable than PTFE.
- TPED compliant cylinders now available for shipping into EU countries.
- All cylinders have 1/4" female NPT threads on both ends.

Sulfur compounds are stable in Sulfinert®-treated stainless steel systems.



also available

Certificates are available upon request.

Visit **www.restek.com** for our complete line of gas cylinder accessories!

Sample Cylinders, High Pressure
(Stainless Steel & Sulfinert® Treated)

	1,800 psig (12,411 kPa), 304L SS		TPED, 1,450 psig (9,997 kPa), 304L SS	
	Stainless Steel	Sulfinert Treated	Stainless Steel	Sulfinert Treated
Size	cat.#	cat.#	cat.#	cat.#
75 cc	22921	24130	22921-PI	24130-PI
150 cc	22922	24131	22922-PI	24131-PI
300 cc	22923	24132	22923-PI	24132-PI
500 cc	22924	24133	22924-PI	24133-PI
1,000 cc	22925	24134	22925-PI	24134-PI
2,250 cc	22926	21394	22926-PI	21394-PI

Sample Cylinders, Ultra-High Pressure
(Stainless Steel & Sulfinert® Treated)

	5,000 psig (34,474 kPa), 316L SS		TPED, 4,350 psig (29,992 kPa), 316L SS	
	Stainless Steel	Sulfinert Treated	Stainless Steel	Sulfinert Treated
Size	cat.#	cat.#	cat.#	cat.#
150 cc	22927	22111	22927-PI	22111-PI
300 cc	22928	22112	22928-PI	22112-PI
500 cc	22929	22113	22929-PI	22113-PI

Metering Control Valves (Stainless Steel & Sulfinert® Treated)

- Reduces pressure between sample cylinder and GC injector.
- Maintains fine metering control.
- Contains Kel-F® seat.

Description	Stainless Steel cat.#	Sulfinert Treated cat.#
3,500 psig (24,132 kPa) DOT Pressure Rating		
Metering Control Valve, 1/4" Male NPT x 1/4" Male NPT	26326	26327

Sample Cylinder Valves (Stainless Steel & Sulfinert® Treated)

- Multiple valve configurations, including dip tube and rupture disks.
- Large, durable, Kel-F® seat ensures leak-free operation.
- Temperature range: -40 °C to 120 °C

Description	Stainless Steel cat.#	Sulfinert Treated cat.#
3,500 psig (24,132 kPa) DOT Pressure Rating		
1/4" Male NPT x 1/4" Male NPT	26297	21400
1/4" Male NPT x 1/4" Female NPT	26298	26299
1/4" Male NPT x 1/4" Male Compression	26300	21401
1/4" Male NPT x 1/4" Male NPT w/5.25" Dip Tube*	26301	21402*
1/4" Male NPT x 1/4" Male NPT w/1,800 psi (12,411 kPa) Rupture Disc	26302	26303
1/4" Male NPT x 1/4" Female NPT w/1,800 psi (12,411 kPa) Rupture Disc	26304	26305
Replacement Rupture Disc, 1,800 psig (12,411 kPa)	26320	—
5,000 psig (34,474 kPa) DOT Pressure Rating		
1/4" Male NPT x 1/4" Male NPT	26306	26307
1/4" Male NPT x 1/4" Female NPT	26308	26309
1/4" Male NPT x 1/4" Male Compression	26310	26311
1/4" Male NPT x 1/4" Male NPT w/5.25" Dip Tube*	26312	26313
1/4" Male NPT x 1/4" Male NPT w/2,850 psi (19,650 kPa) Rupture Disc	26314	26315
1/4" Male NPT x 1/4" Female NPT w/2,850 psi (19,650 kPa) Rupture Disc	26316	26317
Replacement Rupture Disc, 2,850 psig (19,650 kPa)	26324	—

*To order a sample cylinder valve with dip tube, please call Customer Service at 800-356-1688, ext. 3, or contact your Restek representative. Specify dip tube length or % outage when ordering (maximum length = 5.25"/ 13.3 cm). Note: End of part will not be treated after cutting tube to length.


21400


21401


21402


26298


26300


26314

Sample Cylinders, Valves & Accessories

Gas Sampling Valves and Sample Loops (Sulfinert® Treated)

- Ideal for samples containing low concentrations of sulfur or other active compounds.
- Sample loop sizes from 5 µL to 5 mL.

Sulfinert® treatment eliminates active sites in the valve or loop for better recovery of active compounds.


20585

Gas Sampling Valves & Replacement Rotors (Sulfinert® Treated)

(1/16" Fittings, 0.40 mm Port Diameter; "W Type" Valve)

Description	qty.	cat.#
Sulfinert Gas Sampling Valve; 4-Port	ea.	20584
Sulfinert Gas Sampling Valve; 6-Port	ea.	20585
Sulfinert Gas Sampling Valve; 10-Port	ea.	20586

Replacement Rotors (Not Coated)

Description	qty.	cat.#
Replacement Rotor (not coated) for 4-Port Sulfinert Gas Sampling Valve	ea.	20587
Replacement Rotor (not coated) for 6-Port Sulfinert Gas Sampling Valve	ea.	20588
Replacement Rotor (not coated) for 10-Port Sulfinert Gas Sampling Valve	ea.	20589

Gas Sample Loops (Sulfinert® Treated) (1/16" fittings, for "W Type" valves)

Description	Size	qty.	cat.#
Sample Loops, Sulfinert Treated	5 µL	ea.	22840
Sample Loops, Sulfinert Treated	10 µL	ea.	22841
Sample Loops, Sulfinert Treated	20 µL	ea.	22842
Sample Loops, Sulfinert Treated	25 µL	ea.	22843
Sample Loops, Sulfinert Treated	50 µL	ea.	22844
Sample Loops, Sulfinert Treated	100 µL	ea.	22845
Sample Loops, Sulfinert Treated	250 µL	ea.	22846
Sample Loops, Sulfinert Treated	500 µL	ea.	22847
Sample Loops, Sulfinert Treated	1 mL	ea.	22848
Sample Loops, Sulfinert Treated	2 mL	ea.	22849
Sample Loops, Sulfinert Treated	5 mL	ea.	22850

Jumbo Syringe

Clear acrylic syringes, ideal for holding and dispensing large volumes of gas. An adjustable plunger on the O-ring ensures that the syringe is gas-tight over a long period of time. The central port is supplied with a luer lock fitting; the secondary port is supplied with a septum nut. This enables access to the gas sample for adding standards or removing a subsample. The plunger stem is detachable, making sample storage easy.

21276

	SGE		Restek	
Volume	Model	cat.#	qty.	cat.#
500 mL	500MAR-LL-GT	009910	ea.	21275
1,000 mL	1000MAR-LL-GT	009920	ea.	21276
2,000 mL	2000MAR-LL-GT	009930	ea.	21277

Syringe O-Rings

Syringe Volume	SGE cat.#	Restek qty.	Restek cat.#
500 mL	032527	ea.	21278
1,000 mL	032532	ea.	21279


21279
21278

Restek® Filter Base Plates

- End fittings available in brass or stainless steel.
- Base plates fit all stand alone Super Clean® gas filters offered.

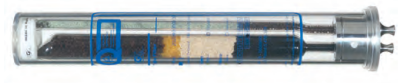

22025

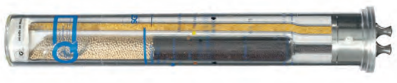

22026


22027

	Brass		Stainless Steel	
Description	**qty.**	**cat.#**	**qty.**	**cat.#**
Filter Base Plate, Single-Position	ea.	22025	ea.	22344
Filter Base Plate, 2-Position	ea.	22026	ea.	22345
Filter Base Plate, 3-Position	ea.	22027	ea.	22346

Each single-position base plate unit measures: 4" x 4" x 1 7/8" (10.2 x 10.2 x 4.8 cm)
Each 2-position base plate unit measures: 8" x 4" x 1 7/8" (10.2 x 10.2 x 4.8 cm)
Each 3-position base plate unit measures: 12" x 4" x 1 7/8" (10.2 x 10.2 x 4.8 cm)
Standard base plate inlet/outlet fittings accept 1/8" tubing. To adapt to 1/4" tubing, order 1/8" to 1/4" tube end reducers.


22020


22022


base plate

Restek® Super Clean® Gas Filter Kits and Replacements

- High-purity output ensures 99.9999% pure gas (at max. flow of 2 L/min).
- "Quick connect" fittings for easy, leak-tight filter cartridge changes.
- Glass inside to prevent diffusion; polycarbonate housing outside for safety.
- All traps measure 10 5/8" x 1 3/4" (27 x 4.4 cm).
- Each base plate unit measures 4" x 4" x 1 7/8" (10.2 x 10.2 x 4.8 cm).

Description	**qty.**	**cat.#**
Carrier Gas Cleaning Kit Includes: mounting base plate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon triple gas filter	kit	22019
Fuel Gas Purification Kit Includes: mounting base plate, 1/8" inlet/outlet fittings, and hydrocarbon/moisture fuel gas filter	kit	22021
Ultra-High Capacity Hydrocarbon Filter	ea.	22030
Ultra-High Capacity Moisture Filter	ea.	22028
Ultra-High Capacity Oxygen Filter	ea.	22029
Replacement Triple Gas Filter (removes oxygen, moisture, and hydrocarbons)	ea.	22020
Replacement Fuel Gas Filter (removes moisture and hydrocarbons)	ea.	22022
Helium-Specific Carrier Gas Cleaning Kit Includes: mounting base plate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon helium-specific filter	kit	21983
Replacement Helium-Specific Gas Filter (removes oxygen, moisture, and hydrocarbons)	ea.	21982
Gas Filter Bundle Kit Includes: one triple gas filter (cat.# 22020) and two fuel gas filters (cat.# 22022)	kit	22031

Dynamic Duo (Restek® Leak Detector and ProFLOW 6000 Flowmeter)

Protect your instrument and improve data quality with this powerful pair from Restek. Checking for leaks and verifying flows before you start helps you avoid costly problems later.

Description	qty.	cat.#
Dynamic Duo Combo Pack (Restek Leak Detector and ProFLOW 6000 Flowmeter)	kit	22654
Related Products and Accessories		
Leak Detector With Hard-Sided Carrying Case and Universal Charger Set (U.S., UK, European, Australian)	ea.	22655
Small Probe Adaptor for Leak Detector	ea.	22658
Restek ProFLOW 6000 Electronic Flowmeter With Hard-Sided Carrying Case	ea.	22656
Soft-Sided Storage Case for Leak Detector or ProFLOW 6000 Flowmeter	ea.	22657

Restek's New Leak Detector

Redesigned and better than ever, our new leak detector is an essential tool for troubleshooting and routine maintenance of your gas chromatograph. Don't risk damaging your system or losing sensitivity; check for leaks often and protect your GC column and instrument with a Restek® leak detector!

Leak Detector Specifications

Detectable Gases:	Helium, nitrogen, argon, carbon dioxide, hydrogen
Battery:	Rechargeable lithium ion internal battery pack (12 hours normal operation)
Operating Temperature Range:	32–120 °F (0–48 °C)
Humidity Range:	0–97%
Warranty:	One year
Certifications:	CE, Ex, Japan
Compliance:	WEEE, RoHS

Limits of Detection

These gases can be detected with the Restek® electronic leak detector at the following leak rates:

Minimum Detectable Gas Limits and Indicating LED Color:
Helium, 1.0 x 10^{-5}, red LED
Hydrogen*, 1.0 x 10^{-5}, red LED
Nitrogen, 1.4 x 10^{-3}, yellow LED
Argon, 1.0 x 10^{-4}, yellow LED
Carbon dioxide, 1.0 x 10^{-4}, yellow LED

Gas detection limits measured in atm cc/sec.

ProFLOW 6000 Flowmeter

With its wide range of capabilities, the ProFLOW 6000 flowmeter simplifies gas flow measurement in the lab. Real-time measurements can be made for various types of flow paths, including continually changing gas types.

Flowmeter Specifications:

Type of Flowmeter:	Volumetric
Battery:	2-AA
Operating Temp. Range:	32–120 °F (0–48 °C)
Warranty:	One year
Certifications:	CE, Ex
Compliance:	WEEE, RoHS

Patented.

*Caution: The Restek® electronic leak detector is designed to detect trace amounts of hydrogen in a noncombustible environment. It is NOT designed for determining leaks in a combustible environment. A combustible gas detector should be used for determining combustible gas leaks under any condition. When using it to detect hydrogen, the Restek® electronic leak detector may only be used for determining trace amounts in a GC environment.

Sulfinert® and Silcosteel®-CR Treated Tubing and Fittings

Restek sets the standard in tubing for analytical and process applications. Complete your system with precleaned or treated tubing and treated fittings and valves for an inert, corrosion-resistant pathway. Restek offers the following coatings:

Silcosteel®-CR

A corrosion-resistant layer that increases the lifetime of system components in acidic environments containing hydrochloric acid, nitric acid, or seawater.

Sulfinert®

The ultimate passivation of treated surfaces; ideal for automotive exhaust testing, stack gas sampling, or analyzing for parts-per-billion levels of organosulfur compounds.

Minimum Bend Radius for Coated Tubing

OD	Min. Bend Radius
1/16"	1" (2.5 cm)
1/8"	2" (5.1 cm)
1/4"	4" (10.2 cm)
3/8"	6" (15.2 cm)

did you know?

Other lengths and diameters of treated tubing are available on a custom basis.

Call for availability of lengths greater than 1,000 ft

ordering note

Required length in meters x 3.2808 = length in feet.

Treated Welded/Drawn 304 Grade Stainless Steel Tubing

Our most popular grade of tubing. Recommended for:

- Chromatography applications.
- Gas delivery systems.
- Lower pressures.
- Inert applications.

Maximum temperature of 450 °C in an inert atmosphere.

Siltek®/Sulfinert® Treated (Coiled)

OD	ID	Wall Thickness	cat.#
0.022" (0.56 mm)	0.011" (0.28 mm)		22500
0.029" (0.74 mm)	0.021" (0.53 mm)		22501
1/16" (1.59 mm)	0.010" (0.25 mm)		22502
1/16" (1.59 mm)	0.020" (0.51 mm)		22503
1/16" (1.59 mm)	0.030" (0.76 mm)		22504
1/16" (1.59 mm)	0.040" (1.02 mm)		22505
1/8" (3.18 mm)	0.085" (2.16 mm)	0.020"	22506
1/4" (6.35 mm)	0.210" (5.33 mm)	0.020"	22507

Minimum order is 5 ft.

*The availability of long lengths is subject to inventory constraints. Lead times may vary depending on the continuous length needed. Please inquire before ordering. Maximum continuous lengths are: 200** ft (cat.#22500–22501), 2,000 ft (cat.# 22502–22505), 1,500 ft (cat.# 22506), and 750 ft (cat.# 22507).

** Contact us if longer length is needed for cat.# 22500-22501

Treated Seamless 316L Grade Stainless Steel Tubing

High durability tubing. Recommended for:

- Inert applications.
- High temperatures.
- High pressures.
- Corrosive environments.
- Zero bleed.

Siltek®/Sulfinert® Treated (Coiled)

OD	ID	Wall Thickness	cat.#
1/8" (3.18 mm)	0.055" (1.40 mm)	0.035"	22508
1/4" (6.35 mm)	0.180" (4.57 mm)	0.035"	22509
3/8" (9.52 mm)	0.277" (7.04 mm)	0.049"	22914

Silcosteel®-CR Treated (Coiled)

OD	ID	Wall Thickness	cat.#
1/8" (3.18 mm)	0.055" (1.40 mm)	0.035"	22896
1/4" (6.35 mm)	0.180" (4.57 mm)	0.035"	22897
3/8" (9.52 mm)	0.277" (7.04 mm)	0.049"	22915

*The availability of long lengths is subject to inventory constraints. Lead times may vary depending on the continuous length needed. Please inquire before ordering.

1/8" OD: 5 ft to 1,500 ft in one continuous coil; 1/4" OD: 5 ft to 750 ft in one continuous coil; 3/8" OD: 5 ft to 250 ft in one continuous coil. Longer lengths will be more than one coil.

Treated Seamless Electropolished 316L Grade Stainless Steel Tubing

Our highest performing tubing. Recommended for:

- Demanding/corrosive environments.
- High temperatures.
- Ultimate inertness.

Siltek®/Sulfinert Treated (Coiled)

OD	ID	Wall Thickness	cat.#
1/8" (3.18 mm)	0.085" (2.16 mm)	0.020"	22538
1/4" (6.35 mm)	0.180" (4.57 mm)	0.035"	22539

Silcosteel®-CR Treated (Coiled)

OD	ID	Wall Thickness	cat.#
1/8" (3.18 mm)	0.085" (2.16 mm)	0.020"	22536
1/4" (6.35 mm)	0.180" (4.57 mm)	0.035"	22537

1/8" OD: 5 ft to 95 ft in one continuous coil; 1/4" OD: 5 ft to 300 ft in one continuous coil. Longer lengths will be more than one coil.

Note: required length in meters x 3.2808 = length in feet.

Swagelok® Fittings (Siltek®/Sulfinert® & Silcosteel®-CR Treated)

- Full line of treated 1/16", 1/8", and 1/4" fittings.
- Silcosteel®-CR treatment enhances corrosion resistance by 10x or more.
- For custom treatment on any Swagelok® fitting or other system parts not listed here, call us or contact your Restek representative.

			Siltek/Sulfinert Treated		Silcosteel-CR Treated	
Fitting Type	**Size**	**Swagelok #**	**qty.**	**cat.#**	**qty.**	**cat.#**
Union	1/16"	SS-100-6	ea.	22540	ea.	22575
	1/8"	SS-200-6	ea.	22541	ea.	22576
	1/4"	SS-400-6	ea.	22542	ea.	22577
	3/8"	SS-600-6	ea.	22909	ea.	22904
Tee	1/16"	SS-100-3	ea.	22543	ea.	22578
	1/8"	SS-200-3	ea.	22544	ea.	22579
	1/4"	SS-400-3	ea.	22545	ea.	22580
	3/8"	SS-600-3	ea.	22910	ea.	22905
Reducing Union	1/8" to 1/16"	SS-200-6-1	ea.	22546	ea.	22581
	1/4" to 1/16"	SS-400-6-1	ea.	22547	ea.	22582
	1/4" to 1/8"	SS-400-6-2	ea.	22548	ea.	22583
	3/8" to 1/4"	SS-600-6-4	ea.	22911	ea.	22906
Elbow	1/8"	SS-200-9	ea.	22549	ea.	22584
	1/4"	SS-400-9	ea.	22550	ea.	22585
Plug	1/8"	SS-200-P	ea.	22573	ea.	22620
	1/4"	SS-400-P	ea.	22574	ea.	22597
Cross	1/8"	SS-200-4	ea.	22551	ea.	22586
	1/4"	SS-400-4	ea.	22552	ea.	22587
Tube End Reducer	1/8" to 1/16"	SS-100-R-2	ea.	22553	ea.	22588
	1/4" to 1/16"	SS-100-R-4	ea.	22554	ea.	22589
	1/8" to 1/4"	SS-400-R-2	ea.	22555	ea.	22590
	1/4" to 1/8"	SS-200-R-4	ea.	22556	ea.	22591
Port Connector	1/8"	SS-201-PC	ea.	22557	ea.	22592
	1/4"	SS-401-PC	ea.	22558	ea.	22593
	1/8" to 1/4"	SS-401-PC-2	ea.	22559	ea.	22594
Male Connector	1/8" to 1/8" NPT	SS-200-1-2	ea.	22561	ea.	22595
	1/4" to 1/4" NPT	SS-400-1-4	ea.	22562	ea.	22596
	1/16" to 1/8" NPT	SS-100-1-2	ea.	22563	ea.	22610
	1/8" to 1/4" NPT	SS-200-1-4	ea.	22564	ea.	22611
	1/4" to 1/8" NPT	SS-400-1-2	ea.	22565	ea.	22612
	3/8" to 3/8" NPT	SS-600-1-6	ea.	22912	ea.	22907
Female Connector	1/8" to 1/8" NPT	SS-200-7-2	ea.	22566	ea.	22613
	1/4" to 1/4" NPT	SS-400-7-4	ea.	22567	ea.	22614
	1/4" to 1/8" NPT	SS-400-7-2	ea.	22568	ea.	22615
	1/8" to 1/4" NPT	SS-200-7-4	ea.	22569	ea.	22616
Bulkhead Union	1/8"	SS-200-61	ea.	22570	ea.	22617
	1/4"	SS-400-61	ea.	22571	ea.	22618


union


tee


reducing union


elbow


plug


cross


tube end reducer


port connector


male connector


female connector


bulkhead union

Ask Our Experts How to Improve Your Analyses!

At Restek, we have invested in highly focused product development and a world-class team of industry professionals. We are dedicated to bringing you the innovative chromatography solutions you need to make better process-control decisions.

Jan Pijpelink

Market Research Manager

Jan is a 30-plus-year veteran of the petrochemical industry with extensive international experience in petro laboratories and with process applications throughout North America, Europe, and Asia. Jan leads our scientific collaborations and key industry partnerships in the petro market. Jan also serves as chairman of ASTM Section D02.D0.03

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Jaap de Zeeuw

International GC Specialist

Jaap is a renowned chromatographer with over 30 years of petrochemical experience, including 28 years with Varian/Chrompack where he focused primarily on industrial analysis issues. Jaap is widely published and travels extensively for seminars and international workshops.

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Barry Burger

Sr. Petrochemical Innovations Chemist

Barry has more than 30 years of chromatography experience and has been a voting member of the ASTM D2 committee for over12 years. He specializes in petrochemical applications and the development of capillary, packed, and micropacked GC columns.

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Katarina Oden

Petrochemical Innovations Chemist

Katarina came to Restek with a B.S. in Chemistry from the University of Ljubljana, Slovenia, and research experience in both commercial and university labs. After three years as a QA Analyst, she joined Innovations, where she supports the petroleum and chemical markets.

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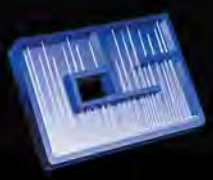

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