ShinCarbon ST Micropacked GC Columns

Above-Ambient Analyses of Permanent Gases and Light Hydrocarbons

- Separate permanent gases, including CO/CO_2, without cryogenic cooling.
- Rapid separations of permanent gas/light hydrocarbon mixtures.
- Excellent compatibility with most GC detectors—minimal bleed, minimal baseline rise.
- Preconditioned, less than 30 minutes to stabilize.

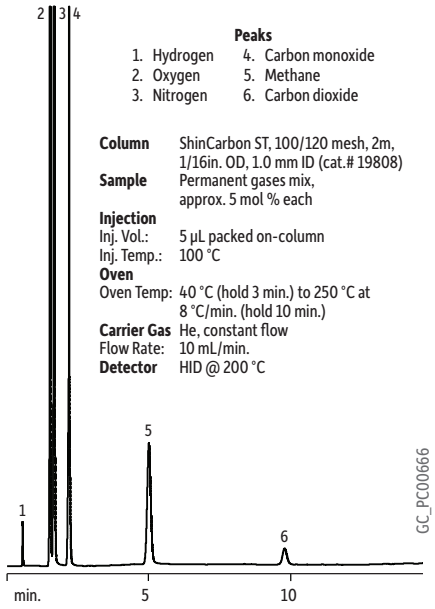
Analyzing the permanent gases oxygen, nitrogen, methane, carbon monoxide, and carbon dioxide has been virtually impossible for a single gas chromatography (GC) or gas-solid chromatography (GSC) column, without sub-ambient temperatures.

Now, Restek's ShinCarbon ST material, a high surface area carbon molecular sieve (~1500 m^2/g), is the ideal medium for separating gases and highly volatile compounds by GSC. A 2 m x 1 mm ID micropacked column containing ShinCarbon ST separates the permanent gases in 10 minutes, without cryogenic cooling (Figure 1).

In addition to providing a breakthrough in analyses of permanent gases, ShinCarbon ST columns can separate light hydrocarbon / permanent gas mixtures. Figure 2 shows an analysis of permanent gases plus acetylene, ethylene, and ethane, completed in less than 20 minutes. Natural gas components (70% methane) also are cleanly separated (Figure 3). Other potential applications for ShinCarbon ST include analyses of sulfur dioxide and Freon® fluorocarbons (Figure 4).*

**For analysis of other low molecular weight sulfur compounds, we recommend Rt®-XLSulfur micropacked and packed columns or Rtx®-1 capillary columns.*

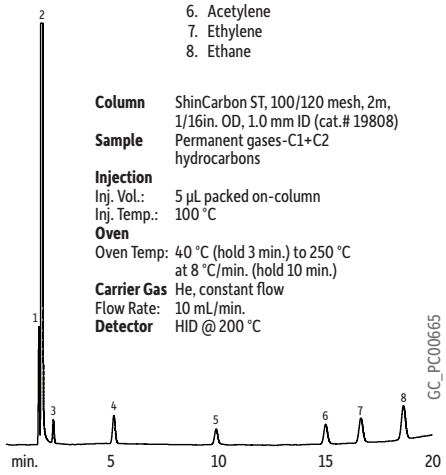
Figure 1 Separate permanent gases in 10 minutes, without cryogenic cooling.



Peaks
1. Hydrogen
2. Oxygen
3. Nitrogen
4. Carbon monoxide
5. Methane
6. Carbon dioxide

Column ShinCarbon ST, 100/120 mesh, 2m, 1/16in. OD, 1.0 mm ID (cat.# 19808)
Sample Permanent gases mix, approx. 5 mol % each
Injection
Inj. Vol.: 5 µL packed on-column
Inj. Temp.: 100 °C
Oven
Oven Temp: 40 °C (hold 3 min.) to 250 °C at 8 °C/min. (hold 10 min.)
Carrier Gas He, constant flow
Flow Rate: 10 mL/min.
Detector HID @ 200 °C

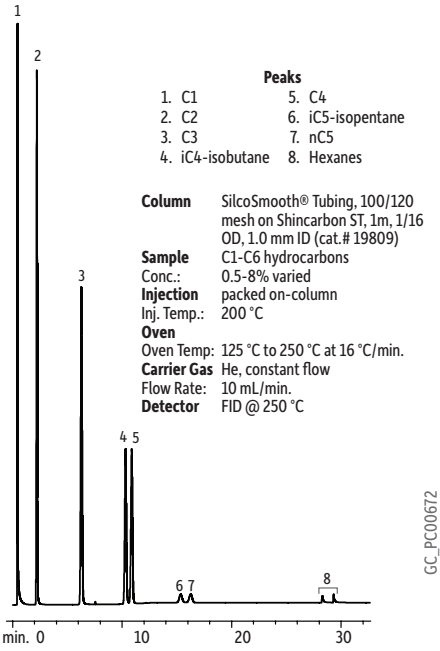
Figure 2 Rapidly analyze light hydrocarbon/permanent gas mixtures.



Peaks
1. Oxygen
2. Nitrogen
3. Carbon monoxide
4. Methane
5. Carbon dioxide
6. Acetylene
7. Ethylene
8. Ethane

Column ShinCarbon ST, 100/120 mesh, 2m, 1/16in. OD, 1.0 mm ID (cat.# 19808)
Sample Permanent gases-C1+C2 hydrocarbons
Injection
Inj. Vol.: 5 µL packed on-column
Inj. Temp.: 100 °C
Oven
Oven Temp: 40 °C (hold 3 min.) to 250 °C at 8 °C/min. (hold 10 min.)
Carrier Gas He, constant flow
Flow Rate: 10 mL/min.
Detector HID @ 200 °C

Figure 3 Separate components in natural gas.



Peaks
1. C1
2. C2
3. C3
4. iC4-isobutane
5. C4
6. iC5-isopentane
7. nC5
8. Hexanes

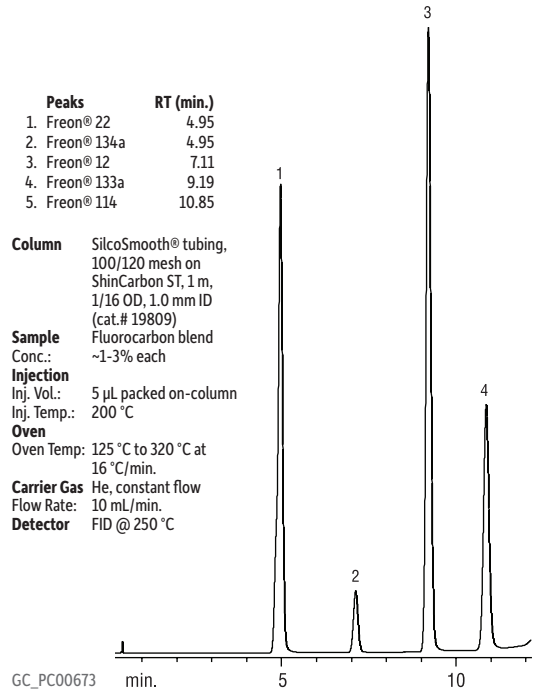
Column SilcoSmooth® Tubing, 100/120 mesh on Shincarbon ST, 1m, 1/16 OD, 1.0 mm ID (cat.# 19809)
Sample C1-C6 hydrocarbons
Conc.: 0.5-8% varied
Injection packed on-column
Inj. Temp.: 200 °C
Oven
Oven Temp: 125 °C to 250 °C at 16 °C/min.
Carrier Gas He, constant flow
Flow Rate: 10 mL/min.
Detector FID @ 250 °C

Go to **www.restek.com/petro** for products and technical information

ShinCarbon ST is a highly stable material. Its 330 °C upper temperature limit minimizes bleed and baseline rise during temperature programming, making the material compatible with most detection systems used for gas analysis, including TCD or HID. 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.

The unique properties of ShinCarbon ST make it an ideal packing material for analyses of gases and highly volatile compounds, including permanent gases, low molecular weight hydrocarbons, and Freon® gases. The rapid, above-ambient analyses these columns provide will be a great convenience. Excellent thermal stability of the high surface area carbon, combined with careful conditioning during column manufacture, ensures low-bleed operation and rapid stabilization when installing a new column. Custom-made ShinCarbon ST columns are available on request.

Figure 4 Fluorocarbon analysis completed in 11 minutes on ShinCarbon ST column.



ShinCarbon ST Columns (micropacked)

(SilcoSmooth® Stainless Steel)**

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

**Does not include column nuts and ferrules. Optional installation kits can be ordered separately at www.restek.com

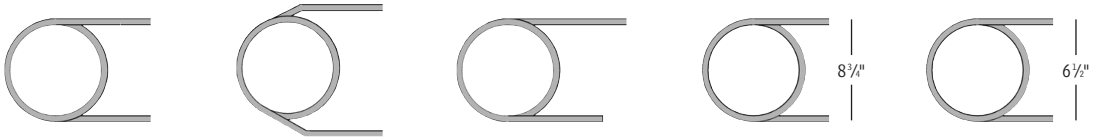
ShinCarbon ST Columns (packed)

(SilcoSmooth® Stainless Steel)*

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

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

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

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 1½" void on detector side.

Installation Kits for Micropacked Columns

Description	qty.	cat.#
Micropacked Column Installation Kit for 1mm ID columns; for valve applications. Kit contains: 1/16" Valco nut (1), 1/16" stainless steel nut (1), 1/16" Vespel/graphite ferrule (1), 1/16" graphite ferrule (1), stainless steel ferrule (1), 1/16" stainless steel front ferrule (1), 1/16" stainless steel back ferrule (1).	kit	21065
Micropacked Column Installation Kit for 1mm ID columns; for direct injections. Kit contains: 1/16" stainless steel nuts (2), 1/16" Vespel/graphite ferrules (2), 1/16" graphite ferrules (2), 1/16" stainless steel front ferrules (2), 1/16" stainless steel back ferrules (2).	kit	21066

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