

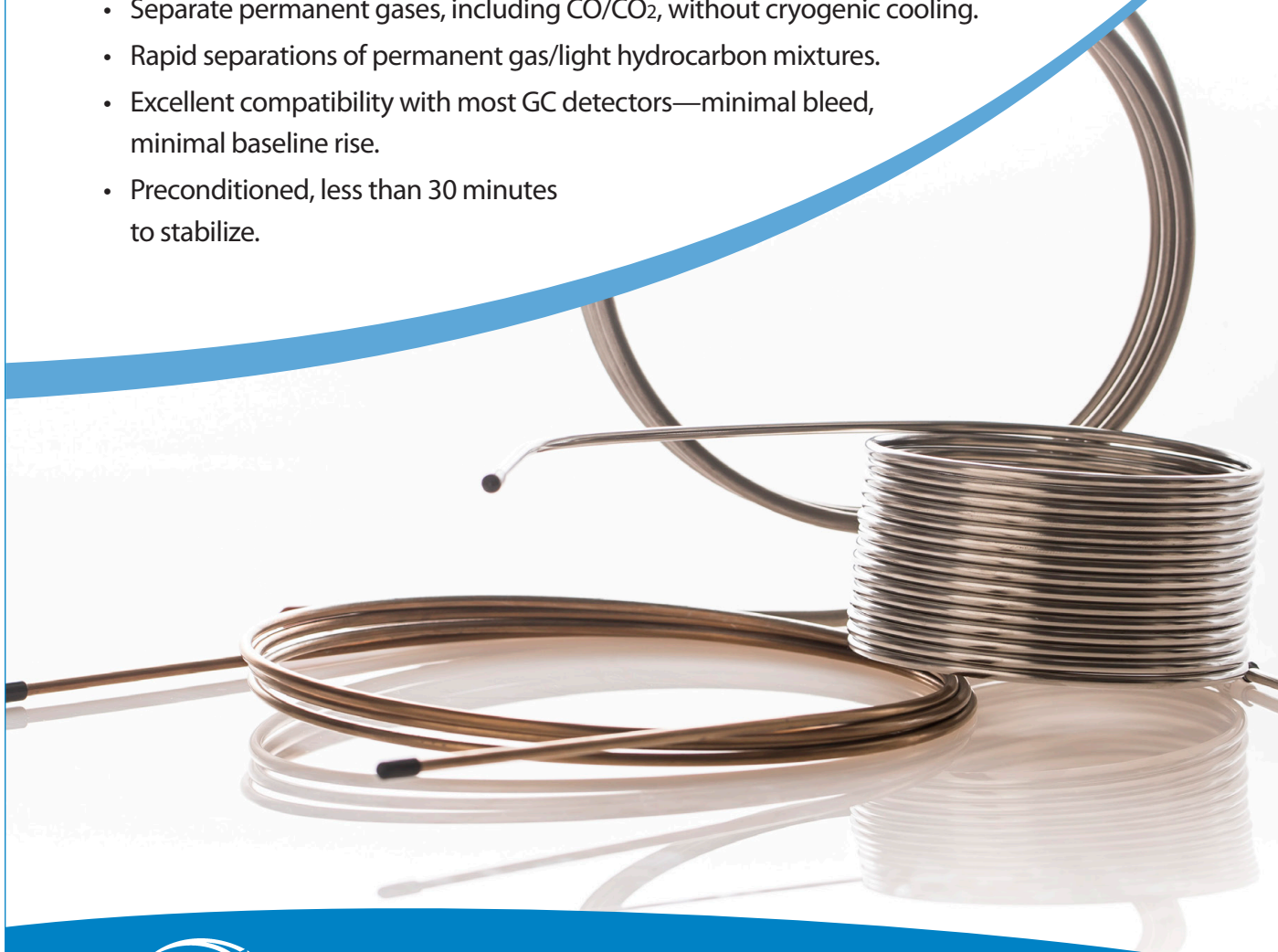


Restek GC

# ShinCarbon ST Micropacked GC Columns

## Above-Ambient Analyses of Permanent Gases and Light Hydrocarbons

- Separate permanent gases, including CO/CO<sub>2</sub>, 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.



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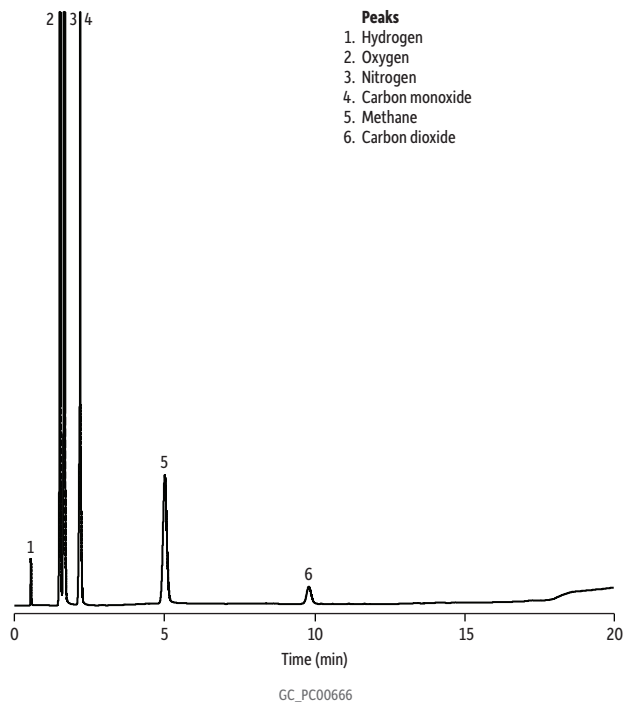


Analyzing the permanent gases oxygen, nitrogen, methane, carbon monoxide, and carbon dioxide has been virtually impossible for a single gas chromatography (GC) or gas-solid chromatography (GSC) column without sub-ambient temperatures.

Restek's ShinCarbon ST material, a high-surface-area carbon molecular sieve (~1500 m<sup>2</sup>/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).

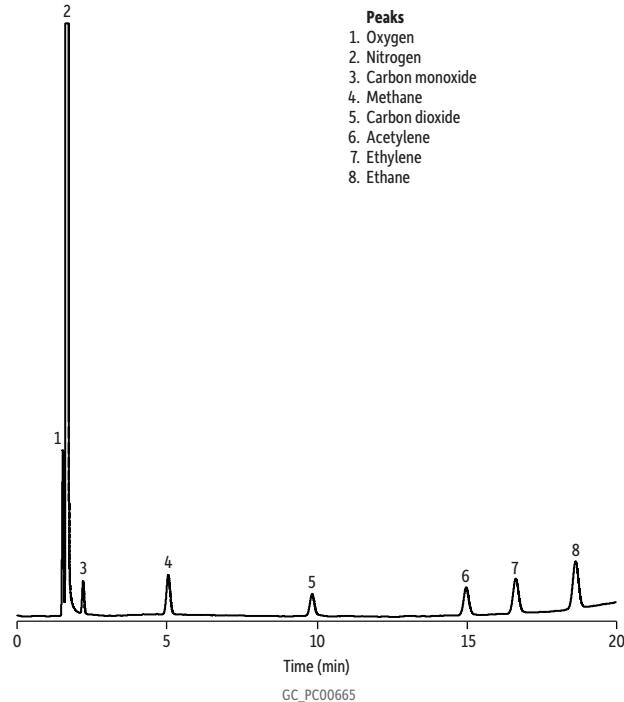
In addition to providing a breakthrough in analyses of permanent gases, ShinCarbon ST columns can separate light hydrocarbon/permanent gas mixtures. Figure 2 shows an analysis of permanent gases, plus acetylene, ethylene, and ethane, that was completed in less than 20 minutes. Natural gas components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

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



**Column** 100/120 mesh, ShinCarbon ST, 2 m, 1/16 in. OD, 1.0 mm ID (cat.# 19808)  
**Standard/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 @ 250 °C

**Figure 2:** Rapidly analyze light hydrocarbon/permanent gas mixtures.

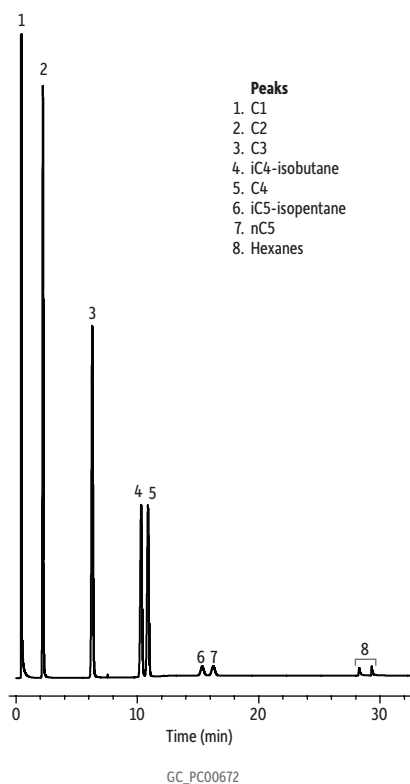


**Column** 100/120 mesh, ShinCarbon ST, 2 m, 1/16 in. OD, 1.0 mm ID (cat.# 19808)  
**Standard/Sample** Permanent gases-C1+C2 hydrocarbons  
**Injection**  
 Inj. Vol.: 5 µL packed on-column  
 Inj. Temp.: 100 °C  
**Oven**  
 Oven Temp.: 40 °C (hold 3 min) to 250 °C at 8 °C/min (hold 10 min)  
**Carrier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

ShinCarbon ST is a highly stable material. Its 300 °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.

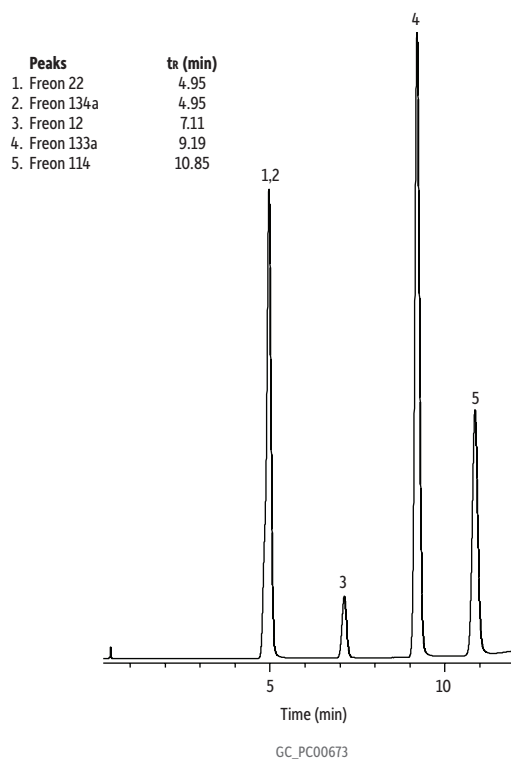
The unique properties of ShinCarbon ST make it an ideal packing material for analyses of gases and highly volatile compounds, including permanent gases, low molecular weight hydrocarbons, and Freon gases. The rapid, above-ambient analyses these columns provide will be a great convenience. Excellent thermal 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 3:** Separate components in natural gas.



**Column** 100/120 mesh on ShinCarbon ST, SilcoSmooth tubing, 1 m, 1/16 OD, 1.0 mm ID (cat.# 19809)  
**Standard/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 (hold 25.2 min)  
**Carrier Gas** He, constant flow  
**Flow Rate:** 10 mL/min  
**Detector** FID @ 250 °C

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



**Column** 100/120 mesh on ShinCarbon ST, SilcoSmooth tubing, 1 m, 1/16 OD, 1.0 mm ID (cat.# 19809)  
**Standard/Sample** Fluorocarbon blend  
**Conc.:** ~1-3% each  
**Injection** 5 µL packed on-column  
**Inj. Temp.:** 200 °C  
**Oven**  
**Oven Temp.:** 125 °C to 320 °C at 16 °C/min  
**Carrier Gas** He, constant flow  
**Flow Rate:** 10 mL/min  
**Detector** FID @ 250 °C



19043



80486-800

## ordering notes

Custom packed and micropacked column also available by request.

## ShinCarbon ST Micropacked Columns

SilcoSmooth Stainless Steel

Note: Columns do not include column nuts and ferrules. Optional installation kits can be ordered separately.

Description	Mesh	ID	OD	Length	Temp. Limits	Material	qty.	cat.#
ShinCarbon ST Micropacked Column	80/100	0.53 mm	0.74 mm	1 m	up to 300 °C	SilcoSmooth Tubing	ea.	19045
	80/100	0.53 mm	0.74 mm	2 m	up to 300 °C	SilcoSmooth Tubing	ea.	19043
	100/120	0.75 mm	0.95 mm	1 m	up to 300 °C	SilcoSmooth Tubing	ea.	19810
	100/120	1.00 mm	1/16"	1 m	up to 300 °C	SilcoSmooth Tubing	ea.	19809
	100/120	1.00 mm	1/16"	2 m	up to 300 °C	SilcoSmooth Tubing	ea.	19808

## ShinCarbon ST Packed Columns

SilcoSmooth Stainless Steel

Note: Columns do not include column nuts and ferrules. Optional installation kits can be ordered separately.

Description	Mesh	ID	OD	Length	Column Config	Material	qty.	cat.#
ShinCarbon ST Packed Column	80/100	2.0 mm	1/8"	2 m	General	SilcoSmooth Tubing	ea.	80486-800
	80/100	2.0 mm	1/8"	2 m	Agilent	SilcoSmooth Tubing	ea.	80486-810
	80/100	2.0 mm	1/8"	2 m	Varian	SilcoSmooth Tubing	ea.	80486-820
	80/100	2.0 mm	1/8"	2 m	PE Auto Sys	SilcoSmooth Tubing	ea.	80486-840

### Column Configuration Key:

- 800 General—General Configuration
- 810 Agilent—(HP) 5880, 5890, 5987, 6890, 7980
- 820 Scion (Bruker 430, 450) (Varian 3700, Vista Series, FID)
- 830 PE/Sigma—PE 900-3920, Sigma 1, 2, 3
- 840 PE Auto Sys—PE Auto System 8300/8400/8700, Clarus 500
- 850 Shimadzu 14A—Shimadzu 14A, 2014

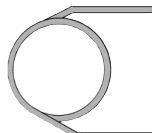
Other column configurations available.

Note: Columns do not include column nuts and ferrules. Optional installation kits can be ordered separately.

## 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, add suffix -901.

Agilent configuration also includes 1 1/2" void on detector side.

## Installation Kits for Micropacked Columns

Description	Includes	Used with	qty.	cat.#
Micropacked Column Installation Kit	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)	for 1 mm ID columns; for valve applications.	kit	21065
	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)	for 1 mm ID columns; for direct injections.	kit	21066



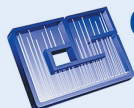
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