Quick-Start Guide to LPGC

How to Know if It's Right for Your Analysis and Get Started Quickly

Determining if LPGC is Right for You

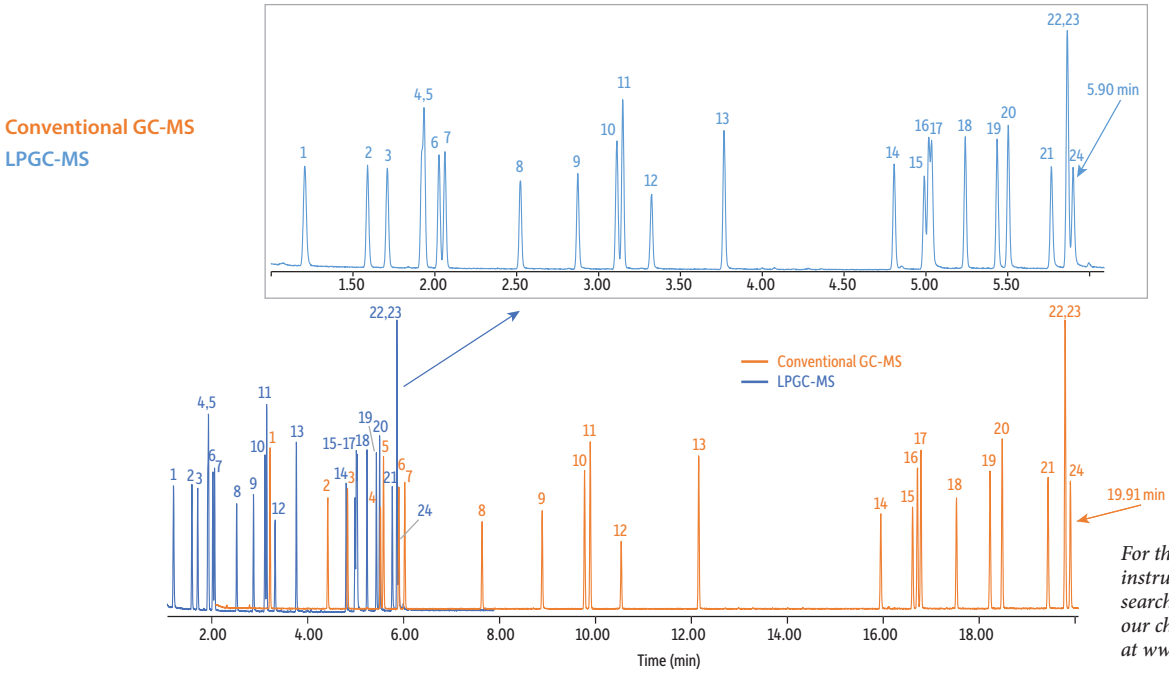
Interested in trying low-pressure gas chromatography (LPGC) in your lab but aren't sure if it will work for you? We can help with that! Restek recommends reviewing a few factors about your analysis to determine if it's amenable to LPGC.

One factor to consider regarding your analysis is critical separations. If there are no critical separations, the analysis is generally amenable to LPGC. If there are critical separations in your conventional GC-MS analysis and those resolutions are important to maintain, then some additional considerations need to be weighed before switching to LPGC. Since the LPGC technique trades resolution for speed, applications requiring the same or better resolution of critical pairs may not be amenable. Applications that require a column longer than 30 m for a conventional GC-MS may not work for LPGC-MS because the length is most likely providing needed resolution of analytes. However, if your critical pairs are not isobars, the spectral resolving power of the MS can be used to separate them while speeding up your analysis times! This means LPGC can work for your analysis and result in significant speed gains (Figure 1).

Featured LPGC Column Kits

LPGC Kit	*Application*
LPGC Rtx-5ms (cat.# 11800 & 11802)	*Multiresidue pesticides*
LPGC Rxi-624Sil MS (cat.# 11803 & 11804)	*Nitrosamines, alkylfurans*
LPGC Rxi-17Sil MS (cat.# 11805)	*MCPDs*
LPGC Rxi-35Sil MS (cat.# 11806)	*Arylamines, phthalates*
LPGC Rtx-200 (cat.# 11807)	*PFAS (Fluorotelomer alcohols)*

Figure 1: LPGC-MS analysis of arylamines is 3.3x faster and uses 81% less helium compared to conventional GC-MS.



For the peak list and instrument conditions, search for GC_GN1244 in our chromatogram library at www.restek.com.

Another factor to consider is the sample capacity and the increase in sensitivity (or S/N) that can result. If you're already running a fast GC method (for example using a 10 m x 0.10 mm ID column), LPGC can provide more sample capacity than the smaller ID columns (short, narrow-bore columns) that are typically used. So, if you have a fast run but would like more sample capacity, LPGC is a good option! Additionally, since LPGC allows for more sample capacity and narrower peaks, using LPGC can result in higher S/N, better sensitivity, and the ability to reach lower detection limits.

Installing and Optimizing Your LPGC Column Kit

Once you've determined if LPGC will work for you, you're ready to select your LPGC kit from our broad catalog offering, install it, and optimize your run conditions! Here's a quick rundown of what you'll need to do:

1. Select your LPGC kit from our website.

To explore our offering of LPGC kits, visit www.restek.com, and search for "LPGC" with "Products" selected in the dropdown menu of the search bar.

2. Install your LPGC kit – it's as easy as a column change!

a. Simply remove your conventional GC column, and then install the LPGC kit with the restrictor column at the inlet.

b. Give the installation a leak check using our electronic leak detector (cat.# 28500).

3. Optimize your run conditions for LPGC.

a. Flow: To achieve the optimal flow for LPGC, set the flow rate using only the dimensions of the restrictor column at the oven's initial temperature. For LPGC kits with a 0.53 mm ID analytical column, the optimal flow rate is 1.5-2.5 mL/min with helium. For LPGC kits with a 0.32 mm ID analytical column, the optimal flow rate is 0.9-1.1 mL/min with helium.

   i. The ideal flow rate is a balance between how fast the MS can work, how fast you want to perform the analysis, and the level of sensitivity needed.

   ii. For 0.53 mm ID columns, higher flows result in lower responses due to overloading the pump. Modern pumps may be able to handle a flow rate of up up to 6 mL/min. However, we recommend checking with your instrument manufacturer to determine the maximum flow rate it can handle.

   iii. For 0.32 mm ID columns, flow rates higher than the ideal range (described in section 3a), may cause LPGC conditions to be lost.

b. Temperature: The temperature program may need to be adjusted when converting from conventional GC to LPGC. A rapid heating program is required for LPGC with the optimal ramp set at 30-35 °C per minute. The start and end temperatures can also be lowered because the flow rate will be higher than a conventional GC column. LPGC takes advantage of a low-pressure system (using the MS to pull vacuum on the analytical column) to increase flow, making analytes elute faster at lower temperatures.

   i. If your GC is having trouble keeping up with these oven ramp rates, try our GC Accelerator Oven Insert Kit (cat.# 23849).

4. Start your run!

a. Be prepared to observe your analysis and optimize your conditions again based on initial data, if necessary. Don't forget, coelution may occur as resolution is decreased with LPGC since it is a tradeoff for a faster run. If the coelutions are not isobars, use the spectral resolving power of the MS to analyze them!

With this simplified setup, you can start processing more samples per shift, have more time for instrument maintenance, or even put off that next big capital investment on a new instrument to accommodate your workload.

To learn more about the benefits of LPGC, visit **www.restek.com/lpgc**

Low-Pressure GC (LPGC) Column Kit

Leverage Your MS Vacuum to Significantly Speed Up Separations

Ideal for fast GC-MS and GC-MS/MS methods, Restek's low-pressure GC column kits are designed to install easily and reliably, making it simple to gain the speed boost and helium savings of LPGC.

- Up to 3.3x faster than conventional GC-MS.
- Saves money by reducing helium use up to 81%.
- Factory-coupled, leak-free kits make set up as simple as a column change.

LPGC kits are comprised of two factory-coupled columns: a 5 m narrow-bore restrictor column and a short, 0.53 or 0.32 mm ID analytical column in dimensions and phases optimized for LPGC-amenable analyses.

11800

Temp. Limits	Description	qty.	cat.#
-60 to 340/340 °C	LPGC Rtx-5ms column kit, includes 15 m x 0.53 mm ID x 1.00 µm Rtx-5ms analytical column w/1 m x 0.53 mm ID integrated transfer line and 5 m x 0.18 mm ID Hydroguard restrictor factory connected via SilTite connector	kit	11800
-60 to 325/350 °C	LPGC Rtx-5ms column kit, includes 10 m x 0.32 mm ID x 1.00 µm Rtx-5ms analytical column and 5 m x 0.15 mm ID Hydroguard restrictor factory connected via SilTite Connector	kit	11802
-20 to 280/310°C	LPGC Rxi-624Sil MS column kit, includes 15 m x 0.53 mm ID x 3.0 µm Rxi-624Sil MS analytical column and 5 m x 0.18 mm ID Rxi restrictor factory connected via SilTite connector	kit	11803
-20 to 300/320°C	LPGC Rxi-624Sil MS column kit, includes 10 m x 0.32 mm ID x 1.8 µm Rxi-624Sil MS analytical column and 5 m x 0.15 mm ID Rxi restrictor factory connected via SilTite connector	kit	11804
40 to 340/360 °C	LPGC Rxi-17Sil MS column kit, includes 10 m x 0.32 mm ID x 0.25 µm Rxi-17Sil MS analytical column and 5 m x 0.15 mm ID Rxi restrictor factory connected via SilTite connector	kit	11805
50 to 340/360 °C	LPGC Rxi-35Sil MS column kit, includes 10 m x 0.32 mm ID x 0.25 µm Rxi-35Sil MS analytical column and 5 m x 0.15 mm ID Rxi restrictor factory connected via SilTite connector	kit	11806
-20 to 290/310 °C	LPGC Rtx-200 column kit, includes 10 m x 0.32 mm ID x 1.00 µm Rtx-200 analytical column and 5 m x 0.15 mm ID Rxi restrictor factory connected via SilTite Connector	kit	11807

Vespel/Graphite Capillary Ferrules for 1/16-Inch Compression-Type Fittings

Ferrule ID	Fits Column ID	Fitting Size	Material	qty.	cat.#
0.8 mm	0.45/0.53 mm (fused silica); 0.53 mm (MXT)	1/16"	VG2, 60% Vespel/40% Graphite	10-pk.	20213
0.5 mm	0.32 mm (fused silica); 0.25/0.32 mm (MXT)	1/16"	VG2, 60% Vespel/40% Graphite	50-pk.	20231
0.4 mm	0.025/0.05/0.075/0.10/0.15/ 0.18/0.20/0.25 mm (fused silica); 0.18 mm (MXT)	1/16"	VG2, 60% Vespel/40% Graphite	10-pk.	20211

GC Accelerator Oven Insert Kit

for Agilent 5890, 6890, 7890, and 8890 instruments

23849

- GC Accelerator kit installs easily without damaging the GC column or interfering with the MS interface.

Designed with GC-MS users in mind, the GC Accelerator kit provides a simple way to speed up sample analysis. By reducing oven volume, these inserts allow faster ramp rates to be attained, which reduces oven cycle time and allows for increased sample throughput and more capacity to process rush samples.

Description	Instrument	qty.	cat.#
GC Accelerator Oven Insert Kit	for Agilent 5890, 6890, 7890, and 8890 instruments	kit	23849

If using a 120 V GC oven, a GC Accelerator oven insert kit (cat.# 23849) may be needed to meet aggressive ramp rates.

Restek Electronic Leak Detector

New and improved! Prevent small leaks from causing big problems with a Restek leak detector.

- Detects a broad range of gases and indicates leak severity with both an LED display and audible tone.
- No more waiting for a full charge—can be operated during charging or used up to 12 hours between charges.
- Charging kit includes both universal AC power adaptor and USB charging cable, so you can charge anywhere, anytime.
- Pinpoint very small gas leaks quickly and accurately before they cause damage and downtime.
- Compact, handheld unit is easy to operate and convenient to use anywhere you need to check for leaks.

Product Name	Units	cat.#
Restek Electronic Leak Detector (includes: carrying case, universal AC power adaptor [U.S., UK, Europe, Australia, Japan], 6-ft USB charging cable)	ea.	28500

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Questions? Contact us or your local Restek representative (www.restek.com/contact-us).

www.restek.com

Lit. Cat.# GNAR4241A-UNV