

GC CAPILLARY COLUMNS 101

A quick look at the chemistry and specs that affect your chromatography

PHASE POLARITY

LOW ——— MID ——— HIGH

Compound Retention

Nonpolar

Nonpolar & Polar

Polar

Temperature Stability

Higher

Moderate

Lower

Good For

Hydrocarbons
Semivolatiles
Sulfur compounds
Crude oils

Pesticides
Volatiles
Drugs of abuse

FAMES
Glycols
Alcohols
Ketones

TECH TIP: APPLICATION-SPECIFIC

General-purpose columns work for a lot of analyses, but application-specific columns offer optimized selectivity and better separations of specific compounds. For example, an Rxi®-PAH column separates key PAHs that coelute on standard phases.

TECH TIP: SIL COLUMNS

While polar phases generally have lower maximum temperatures than nonpolar, Restek offers "Sil MS" columns that have the similar polarity as their conventional counterparts with higher thermal stability. Lower bleed makes them ideal for MS!

FILM THICKNESS

THIN (0.10 µm) ——— THICK (7 µm)

Retention Times

Shorter

Longer

Bleed

Lower

Higher

Maximum Temperature

Higher

Lower

Sample Loading Capacity

Lower

Higher

Good For

Medium and high molecular weight compounds

Volatiles and low molecular weight compounds

TECH TIP: CONFIRM YOUR PEAKS

When changing either the film thickness or the temperature program, don't forget to confirm your peak identifications as elution order changes can occur.

TECH TIP: THICK VS. THIN

Thin films are great for fast analyses, but it's easy to overload them. Thick films offer more sample loading capacity and are recommended for high-concentration samples.

INNER DIAMETER

NARROW (0.15–0.18 mm) ——— STANDARD (0.25–0.32 mm) ——— WIDE (0.53 mm)

Efficiency

Highest

High

Good

Analysis Time

Shorter

Intermediate

Longer

Sample Loading Capacity

Lower

Moderate

Higher

Good For

Highly complex samples
Fast GC
GC-MS

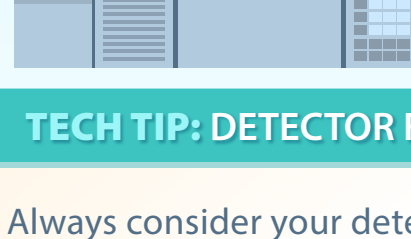
Complex samples
Wide concentration ranges
GC-MS

High-concentration samples
Packed column replacement



TECH TIP: SAMPLE CAPACITY

Exceeding your column's sample loading capacity can cause poor peak shape and a loss of resolution. Inject less or choose a larger ID column with thicker film for high-concentration samples (e.g., purity testing).



TECH TIP: DETECTOR FLOW RATES

Always consider your detector's flow rate requirements when selecting column ID. Wide bore columns are generally not suitable for MS as they require higher flow rates than MS detectors can tolerate.

LENGTH

SHORT (5 m) ——— LONG (150 m)

Efficiency

Good

Best

Analysis Time

Short

Long

Sample Complexity/
Number of Compounds

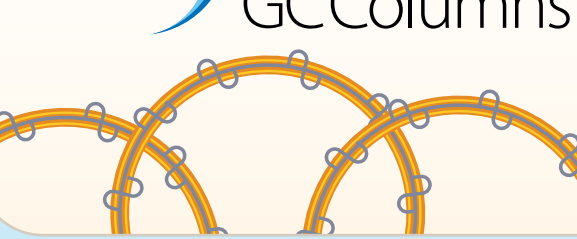
Low

High

TECH TIP: EZGC® METHOD TRANSLATOR

When changing carrier gases or column dimensions, make sure to adjust your method to ensure consistent chromatography. Restek's free, online EZGC® method translator is a great way to translate your method easily and accurately. www.restek.com/ezgc

Get the Right Results with Rxi® Columns



Now that you've got the basics down, visit www.restek.com/rxi to find the best Rxi® column for your application. Highly inert Rxi® columns give you the right results fast and their low bleed means less maintenance and maximum instrument uptime!

Get a Customized Solution in Seconds with Restek's EZGC® Web App

Find the right column for your application without ever making an injection using Restek's EZGC® chromatogram modeler. Just copy/paste your analyte list into the web app and you'll get a recommended solution in seconds!

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