Capillary GC Columns and Guard Columns/Retention Gaps

GCxGC Columns: *Non-Polar Secondary (2°) Columns*

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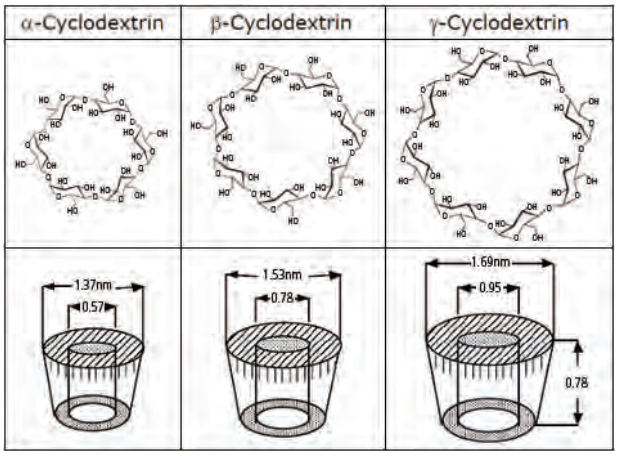
Non-polar GC columns are made with the least selective GC stationary phases. Interactions are primarily dispersive (van der Waals forces). Phases with phenyl functional groups can also undergo a moderate amount of π-π interactions. Elution order generally follows the boiling points of the analytes. Choices are:

- **SLB-5ms**: 5% phenyl, the best choice due to high temperature limits. Maximum temperature of 340 °C (isothermal) or 360 °C (programmed).
- **Equity-5**: alternative 5% phenyl choice. Maximum temperature of 325 °C (isothermal) or 350 °C (programmed).
- **Equity-1**: 100% methyl, provides less selectivity than obtained with a 5% phenyl. Maximum temperature of 325 °C (isothermal) or 350 °C (programmed).

I.D. (mm)	d_f (µm)	L (m)	Beta Value	Cat. No.	Qty
SLB®-5ms Capillary GC Column					
0.10	0.10	10	250	28465-U	1 ea
	0.10	15	250	28466-U	1 ea
Equity®-5 Capillary GC Column					
0.10	0.10	15	250	28083-U	1 ea
Equity®-1 Capillary GC Column					
0.10	0.10	15	250	28039-U	1 ea

Chiral Columns

GC columns that employ a chiral stationary phase (CSP) are suitable for enantiomer separations. We offer two cyclodextrin-based column lines, **Astec CHIRALDEX®** and **Supelco DEX**. Cyclodextrins are macromolecules composed of 6 or more D(+)-glucose residues bonded through α-glycosidic linkages. They are classified according to the number of glucose residues they contain: α-cyclodextrins contain six residues, β-cyclodextrins contain seven residues, and γ-cyclodextrins contain eight residues. All hydroxyl groups, whether at the 2, 3 or 6 position of each residue, can be selectively modified with a derivative to impart unique selectivities. Without derivatization, no enantiomeric selectivity is exhibited in GC.



Cyclodextrin molecules showing dimensions

Selectivity of cyclodextrin-based phases is a function of the derivative, the degree of derivatization, the position of the derivative on the cyclodextrin, whether the derivatized cyclodextrin is used neat or doped into a polysiloxane polymer, and if doped, at what percentage. Certain CSPs are more selective for given molecular structures. Often, more than one CSP will achieve a separation. CSPs may be chosen to optimize resolution, but also elution order or analysis time. Cyclodextrin-based CSPs are grouped into three general categories:

- Surface Interactions, Complex Derivatives
- Surface/Inclusion Interactions, Simple Derivatives
- Inclusion Interactions

Chiral GC Column Screening Kits

Predicting the best column for a new chiral method is difficult, if not impossible. Unless a published method exists for your precise analytes, multi-column screening is still the only way. Our Column Screening Kits contain the most popular Astec CHIRALDEX® or Supelco DEX phases, along with a comprehensive method development guide. The kits are priced at a substantial savings over the cost of the columns sold separately.

- **Astec CHIRALDEX® Kit** contains G-TA, B-DM, and B-DA
- **Supelco DEX Kit I** contains α-DEX 120, β-DEX 120, and γ-DEX 120
- **Supelco DEX Kit II** contains β-DEX 325, β-DEX 225, γ-DEX 225, and β-DEX 120

Astec CHIRALDEX® GC Column Screening Kit

Description	Cat. No.	Qty
30 m kit	71030AST	1 kit

Supelco DEX™ GC Column Screening Kit

Description	Cat. No.	Qty
kit I	24340	1 kit
kit II	24328-U	1 kit

Group 1: Surface Interactions, Complex Derivatives

Sigma-Aldrich is the only supplier of complex derivatives for chiral GC. There are four members in this important group:

- Astec CHIRALDEX® TA (Trifluoroacetyl derivatives)
- Astec CHIRALDEX® PN (Propionyl derivatives)
- Astec CHIRALDEX® DP (Dipropionyl derivatives)
- Astec CHIRALDEX® BP (Butyryl derivatives)

Because the predominant mechanism of retention for phases in this group is based on surface interaction, the γ-cyclodextrin, with 8 glucose residues, has been shown to be the most useful. Compared to α- and β-cyclodextrins, the greater number of glucose residues in a γ-cyclodextrin results in the greater number of hydroxyl functional groups available for derivatization. High derivative concentration is beneficial for maximizing surface interactions.

Astec CHIRALDEX® G-TA is the first choice in this group. This phase has been shown to be the most broadly selective phase for the pharmaceutical industry, especially in the analysis of chiral intermediates and drug studies in various stages of clinical trials. Separations occur without the inclusion mechanism and are typically faster and more efficient than most other CSPs. This phase does not contain a polysiloxane polymer carrier and, therefore, there are no deleterious effects at low temperatures. The ability of this phase to separate parent drug enantiomers and their metabolites has proven quite beneficial.

A modified version of the Astec CHIRALDEX® G-TA is the **Astec CHIRALDEX® G-PN**. It functions like the Astec CHIRALDEX® G-TA but shows higher selectivity toward certain amines (amphetamine, methamphetamine). This phase is more stable to moisture than the Astec CHIRALDEX® G-TA.

The **Astec CHIRALDEX® G-DP** phase was introduced to enhance selectivity for both aliphatic and aromatic amines in additional to aliphatic and some aromatic esters. This phase is especially useful for polar racemates. This phase demonstrates better hydrolytic and thermal stability than the Astec CHIRALDEX® G-TA.

The **Astec CHIRALDEX® G-BP** phase can be used as a general purpose column but it is especially useful for amino acids.