

Method Development Advice for Using a TYPE-C HPLC Column - Tips and Suggestions

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Use a Cogent TYPE-C™ Column to Develop New Methods – Tips & Suggestions

Cogent TYPE-C™ HPLC columns provide a powerful, flexible platform for modern chromatographic method development. Their distinctive silicon-hydride surface and dual-mode separation capabilities offer advantages that traditional silica-based phases typically cannot match. This article expands on the original guidance by explaining *why* TYPE-C™ columns behave differently, *how* those differences accelerate method development, and *when* they provide practical laboratory benefits.

1. Introduction: Why TYPE-C™ Columns Stand Out

Cogent TYPE-C™ columns are engineered using a unique silica hydride particle surface. This design eliminates the extensive “water shell” present on classical silica supports, enabling faster equilibration, greater stability, and the ability to switch between multiple chromatographic modes with minimal memory effects. These capabilities have been emphasized by MICROSOLV as defining characteristics that support robust method development workflows.

2. Improved Method Development Efficiency

Traditional reversed-phase HPLC often requires gradient elution due to wide analyte polarity differences. TYPE-C™ columns widen the range of workable conditions, frequently enabling isocratic separations that would otherwise be impractical. This simplifies methods, improves reproducibility, and reduces runtime complexity. Both retrieved sources confirm that isocratic approaches are a key advantage for analyte mixtures with significant polarity contrast.

3. Unique Retention Capabilities

TYPE-C™ phases retain compounds that are difficult—or sometimes impossible—to retain on legacy silica stationary phases. Their surface supports mechanisms that combine reversed-phase, aqueous normal phase (ANP), and traditional normal phase interactions. This multiplicity gives chromatographers an expanded toolbox, enabling retention and separation of analytes ranging from highly polar to highly hydrophobic. Real-world examples cited by MICROSOLV demonstrate successful retention where older phases fail.

4. Rapid Mode Switching with Minimal Memory Effects

Because TYPE-C™ columns lack a persistent surface water layer, switching among reversed phase, ANP, and normal phase modes requires little equilibration time. This characteristic enables rapid method optimization, allows multi-mode experiments on the same column, and supports orthogonal workflows within a single platform. MICROSOLV notes this “virtually memory-free” transition as a major methodological advantage.

5. Multimodal Separation Mechanisms

Unlike conventional columns with fixed selectivity, TYPE-C™ phases exhibit tunable mechanisms depending on mobile-phase composition:

- Reversed Phase: Ideal for hydrophobic molecules
- ANP Mode: Excels with very polar compounds, even those normally unretained
- Normal Phase: Offers alternative selectivity routes

Appropriate bonded-phase selection further modifies these mechanisms, allowing analysts to adjust interactions in a controlled and predictable way. This tunability supports complex mixture profiling, targeted and untargeted workflows, and development of orthogonal methods within a single chromatographic hardware configuration.

6. Increased Selectivity & Orthogonality

Selectivity is often the most powerful lever in chromatographic resolution. TYPE-C™ columns are reported to exhibit high selectivity and, uniquely, can be orthogonal to themselves depending on mode and mobile-phase changes. This is especially valuable in metabolomics, impurity profiling, and untargeted screening, where subtle differences in analyte chemistry benefit from multiple separation mechanisms. Both tools cite this as one of the primary reasons laboratories adopt TYPE-C technology.

7. Supporting Documents & Further Reading

We provide a white paper titled “**Why Labs Should Adopt TYPE-C™ Columns**”, available for download from this CRC page, see below. This document offers deeper theoretical background, practical examples, and comparative performance data.



Attachment: Why Labs Should Adopt TC 52.2 Kb [Download File](#)

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