

Direct Silicon to Carbon Bonds on Cogent TYPE-C HPLC HPLC Columns Produce Longer Column Lifetimes - Tech Information

Date: 1-APRIL-2012 Last Updated: 9-FEBRUARY-2026

Direct Si–C Bonds on Cogent TYPE-C™ Columns: Why They Deliver Longer Column Life and Cleaner Chromatography

Why bonded-phase stability matters

Most conventional silica columns (C8, C18, NH₂, etc.) attach ligands to the silica surface through a siloxane bridge (–Si–O–Si–C–). Under certain mobile-phase conditions, that Si–O linkage is the weak point: it can hydrolyze, cleaving the bonded phase from the particle, which shortens lifetime and can shed material into the LC system.

The TYPE-C™ advantage: true Si–C bonding

Cogent TYPE-C™ columns employ a direct silicon–carbon (Si–C) bond to anchor the ligand to a silica-hydride surface. Because the oxygen atom is absent from this attachment, the linkage is far more resistant to hydrolysis. In practice, this greatly reduces phase loss/bleed, extends column lifetime, and preserves selectivity over longer sequences and harsher conditions.

What you gain in day-to-day work

- Longer service life and ruggedness: Si–C bonded phases endure challenging mobile phases and temperatures that can degrade siloxane-bonded columns, improving reproducibility over time.
- Cleaner systems: With no measurable phase bleed from hydrolytic cleavage, instruments stay cleaner and MS sources require less maintenance.
- Method freedom: The stability of the Si–C anchor lets you explore mobile-phase additives and elevated temperatures that might be impractical with standard columns—useful for difficult separations and robustness testing.

Expanded chemistry options on silica-hydride

Traditional Type-B silica platforms (relying on organosilane routes to form siloxane linkages) limit the palette of ligands you can attach. The patented silica-hydride surface used in TYPE-C™ overcomes those limits, enabling bonding of chemistries previously considered incompatible with silica—including unique phases like UDC-Cholesterol™—and supporting custom phase development when needed.

Quick Reference: Conventional vs. TYPE-C™ Attachment

Platform	Attachment to Silica	Hydrolysis Susceptibility	Practical Effect
Conventional Type A/B silica	Siloxane bridge Si-O-Si-C	Higher (Si-O can cleave in water/acid/base ranges)	Shorter life; potential phase bleed; selectivity drift over time
Cogent TYPE-C™ silica-hydride	Direct Si-C bond	Much lower	Longer lifetime, cleaner system, stable selectivity, broader method space

Practical tips for method developers

- If you're seeing gradual retention/selectivity drift or column failures after aggressive rinses or extended sequences, consider switching to TYPE-C™ Si-C bonded phases to mitigate hydrolytic loss.
- For stubborn separations, leverage Si-C robustness to pilot higher temperatures or alternative additives—often unlocking selectivity not feasible on siloxane-bonded columns.
- When you need non-standard ligands (e.g., UDC-Cholesterol™) or specialty selectivity, the silica-hydride platform supports attachment of chemistries not easily bonded on conventional silica.



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