# VF-5ht UltiMetal™

## EXTREMELY DURABLE COLUMNS FOR HIGH TEMPERATURE GC

*Varian's unique UltiMetal coated columns are extremely durable and inert, even under extreme conditions. Compared to conventional column types, UltiMetal columns benefit from very low bleed and low baselines for greatly improved trace analysis at high temperatures. The columns are so robust that they withstand the rigors of long term, high temperature use. The stabilized coating provides long column lifetimes to reduce replacement costs. The end result is a GC column with the best combination of high resolution and long column lifetime to maximize performance and minimize downtime.*

The VF-5ht UltiMetal column is the latest addition to Varian's respected FactorFour™ range of low bleed GC columns. FactorFour columns are superior GC capillaries offering bleed specifications up to four times lower than competitive products. The columns are synthesized using a proprietary stabilization technology that results in the highest signal-to-noise ratios for trace analysis, lower detector contamination for reduced maintenance, better spectra, fewer background ions and faster stabilization. In short, they provide greatly improved chromatography.

### Key Benefits

- Extremely durable column immune to damage caused by high temperatures - spend more time gathering information and less time replacing broken columns.
- Stabilized liquid phase coating gives low bleed and low baselines for excellent trace analyses.
- Retention gaps and leak-tight couplings permit large sample volume injections for improved peak shape.

### UltiMetal for the Ultimate in Durability

Traditional GC columns are made from fused silica with a polyimide outer coating. This is ideal for most applications, however, temperatures above 350 °C degrade this coating and reduce the physical strength of the column, making the capillary fragile and liable to breakage. The condition of the outer coating cannot be assessed through chromatographic performance and so column lifetime is unpredictable; breakages occur at the most inconvenient time. Column breakage jeopardizes productivity, increases cost and is hazardous if hydrogen is the carrier gas. Developments in polyimide chemistry result in slight improvements but column breakage still occurs. Other outer coating materials for traditional GC capillary columns are not widely available. Capillary tubes made from stainless steel may be very robust and resistant to high temperatures but are not suitable for chromatography because the reactivity of the steel gives low column inertness and poor quality chromatography.

# VF-5ht UltiMetal

The robustness of Varian's UltiMetal coating means that column breakage is a thing of the past. In addition, the column's coating renders the stainless steel inert and so stationary phase bonding is enhanced, lowering column bleed and improving detection limits.

## UltiMetal for Enhanced Phase Stability

Phase stability is a major requirement for high temperature GC. Figure 1 shows the stabilization times of several commercially available high temperature GC columns (based on a 5 % phenyl, 95 % polydimethylsiloxane phase). The lowest bleed performance and the shortest stabilization time of VF-5ht UltiMetal is clearly evident. The UltiMetal column gives the highest signal-to-noise ratio and greatest productivity, providing laboratories with the highest level of confidence in the experimental results and the lowest cost per analysis.

In GC columns, crosslinking in the stationary phase makes it more stable at higher temperatures, resulting in low column bleed. However, too many crosslinks make the stationary phase less liquid, giving rise to degraded peak shapes even for inactive compounds such as alkanes. Varian's advanced phase chemistry keeps the stationary phase of the VF-5ht UltiMetal very stable, without limiting chromatographic performance. The benefit is clear in Figure 2 which shows the analysis of a Polywax® 655 sample, with details of the peak shape of the components eluting at higher temperature.

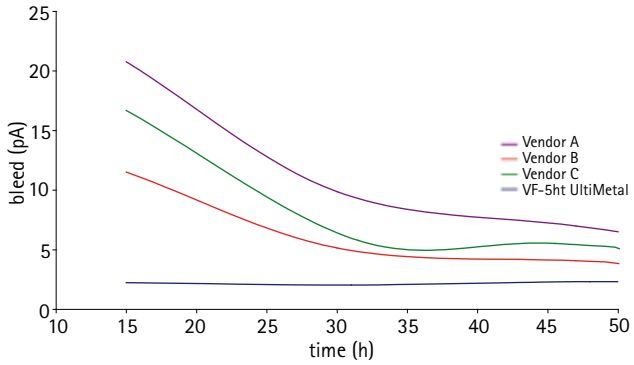


Figure 1. The superior performance of VF-5ht UltiMetal is apparent in a comparison of column stabilization times at 400 °C.

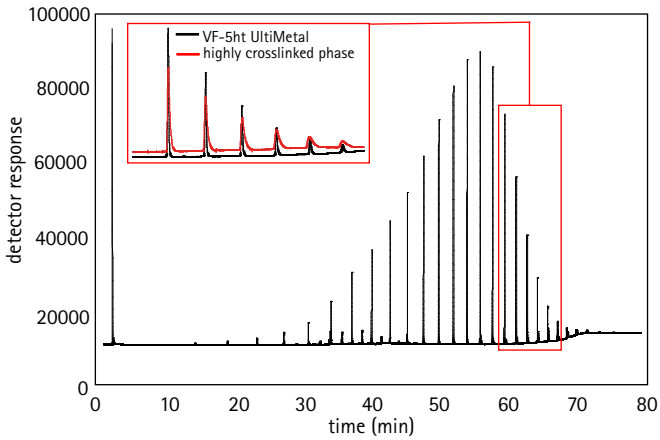


Figure 2. Polywax 655 analysis using VF-5ht UltiMetal. The detail indicates how the column delivers superior peak shapes.

Technique: Varian GC; Column: Varian VF-5ht UltiMetal, 30 m x 0.25 mm x 0.1 µm (pn: CP9092); Solvent: $CS_2$; Carrier Gas: Hydrogen, 65 kPa (9 psi); Injector: Splitless, 325 °C; Injection Volume: 0.2 µL; Temperature: 50 °C to 400 °C @ 5 °C/min; Detection: FID, 340 °C

## Ordering Information

| VF-5ht UltiMetal | | | | | | | $T_{max}$ Iso/Prog 430/450 °C, $T_{min}$ -60 °C |
|---|---|---|---|---|---|---|---|
| Part No. | Internal Diameter (mm) | Length (m) | Df (µm) | Guard | Bleed (pA) | Asymmetry | N/m |
| CP9090 | 0.25 | 15 | 0.10 | | 4 | 1.14 | 3500 |
| CP9091 | 0.25 | 15 | 0.10 | 2 m x 0.53 m | 4 | 1.14 | 2500 |
| CP9092 | 0.25 | 30 | 0.10 | | 7.5 | 1.14 | 3500 |
| CP9093 | 0.25 | 30 | 0.10 | 2 m x 0.53 m | 7.5 | 1.14 | 2500 |
| CP9094 | 0.32 | 15 | 0.10 | | 6 | 1.14 | 2700 |
| CP9095 | 0.32 | 15 | 0.10 | 2 m x 0.53 m | 6 | 1.14 | 2500 |
| CP9096 | 0.32 | 30 | 0.10 | | 12 | 1.14 | 2700 |
| CP9097 | 0.32 | 30 | 0.10 | 2 m x 0.53 m | 12 | 1.14 | 2500 |


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