NEW LN2 FREE 7200CTS

Introducing The Cryogen-Free 7200*CTS*

The Only Capillary Column Based TO15 Preconcentrator

Entech is proud to release the world's first multi-capillary column trapping system (MCCTS) *patent pending*, for the precise concentration of vapor phased volatile chemicals in the boiling point range of -50°C to 230°C without the need for liquid nitrogen or complicated electronic cooling. With over 28 years of continued improvements and industry feedback, the 7200CTS is as established and reliable as it is new and improved. Many of the important advancements that have led to its unparalleled reproducibility, such as quantitative volumetric measurements utilizing "Accu-Sample Technology," and digital valve isolation, are left unchanged. The core trapping system, however, has been completely reengineered, giving way to a technology that will likely replace the utilization of packed traps for most, if not all methods requiring the preconcentration of vapor phase volatile organic compounds.

"One of The Biggest Technological Leaps the TO15 Market Has Ever Seen."

"A Game Changer For All Environmental Labs"

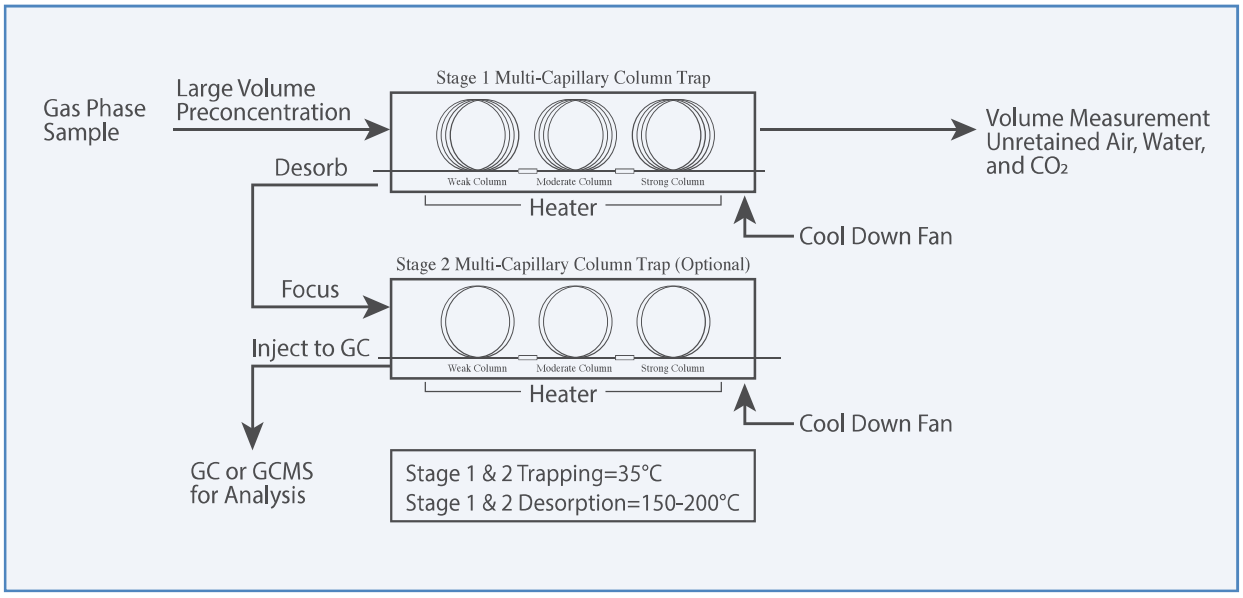
7200*CTS* Features

- **Elimination of cryogen.**
  Save thousands in annual LN2 costs and enjoy greater convenience, reliability, and easier maintenance.
- **A new standard of system hygiene & uptime.**
  The elimination of packed traps has led to a system with unrivalled uptime as there is virtually no trap carry-over, even after high concentration samples.
- **Improved precision and sensitivity.**
  Full TO15 validation with single-digit %RSDs for most compounds in 0.1-30PPBv standard curve.
- **Wide dynamic range (sub-PPB to PPM).**
- **Near complete elimination of water!**
  Water is almost unretained when using capillary traps without the need for cyrogen or complex electronic cooling, resulting in many analytical improvements.
- **Not influenced by sample humidity levels.**
  Complete removal of water eliminates any response variations when going from 0 to 100% Relative Humidity.
- **Less maintenance of GCMS.**
  Less water means less column bleed, longer GC column lifetimes, and fewer MS Source cleanings, all of which improves productivity while lowering costs.
- **Wider standard/sample pressure range.**
  Reduced system volume allows accurate small volume measurements even at higher canister/standard pressures, eliminating the need for canister regulators known to cause VOC adsorption issues.

Multi-Capillary Column Trapping

The Future of Vapor Phase Volatiles Analysis

The MCCTS in the 7200CTS concentrates all TO15 compounds at 35°C, which is conveniently achieved by using simple cooling fans. Two stages of traps are used: the first preconcentrates the sample, calibration standards, and internal standard; and the second further focuses the concentrate prior to GCMS injection. The new solution uses multiple capillary columns in series with increasing strength to trap compounds boiling from -50°C to >250°C, using volumes of 10-500cc. The design shows considerably less susceptability to contamination when exposed to high concentration soil gas samples, reducing the downtime laboratories experience when accidently analyzing these samples prior to dilution. With the 7200CTS, full TO15 validation is easily achieved, including blank levels immediately following higher concentration samples containing BTEX, PCE, and TCE, which are compounds often found in soil gas at high concentrations.



Understanding The Limitations of Packed Traps

Packed column traps have been used for many decades to preconcentrate samples for GC or GCMS analysis, but they suffer from two major impediments: 1. a phenomenon known as "***channeling***", and 2. equally as problematic, the physical size of the the adsorbent particles that the traps are packed with. These two concepts are further explained here.

Packed traps work well if you understand their limitations and take steps to prevent contamination, but now there's a better solution that not only eliminates contamination worries, but also makes much better financial sense.

The 'Channeling Effect' can be described as the continuous formation and collapse of channels throughout the length of an adsorbent bed, coinciding with the normal heating and cooling cycles of the trapping system. Since all materials including adsorbents have a Coefficient of Thermal Expansion, the contraction of the adsorbent upon cooling prior to the next trapping event is inevitable, causing the creation of channels or "gaps" within the adsorbent or along the walls of the tubing containing the adsorbent. Channeling poses a major challenge to quantitative sample recovery, as the creation of low impedance flow paths throughout an adsorbent bed promotes both deeper penetration of target analytes into the bed, and a higher analyte saturation into the adsorbent particles contiguous with the channels. This leads to an uneven distribution of chemicals throughout the trap. As packed traps heat up, these channels collapse as the adsorbent expands, making it more difficult for many heavier or thermally labile compounds to be recovered. The result is not only reduced recovery, but

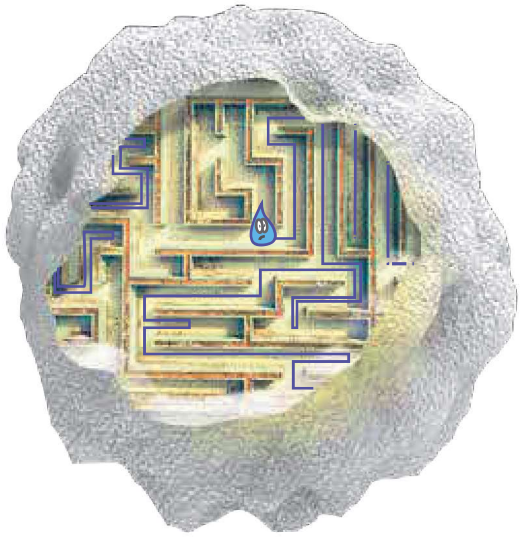
increased carryover, increased thermal degradation due to longer residence times on the hot, active adsorbent, and reduced adsorbent bed lifetime. Channeling can be especially prevalent along the walls of the adsorbent bed.

Open Tubular Columns Solve Channeling

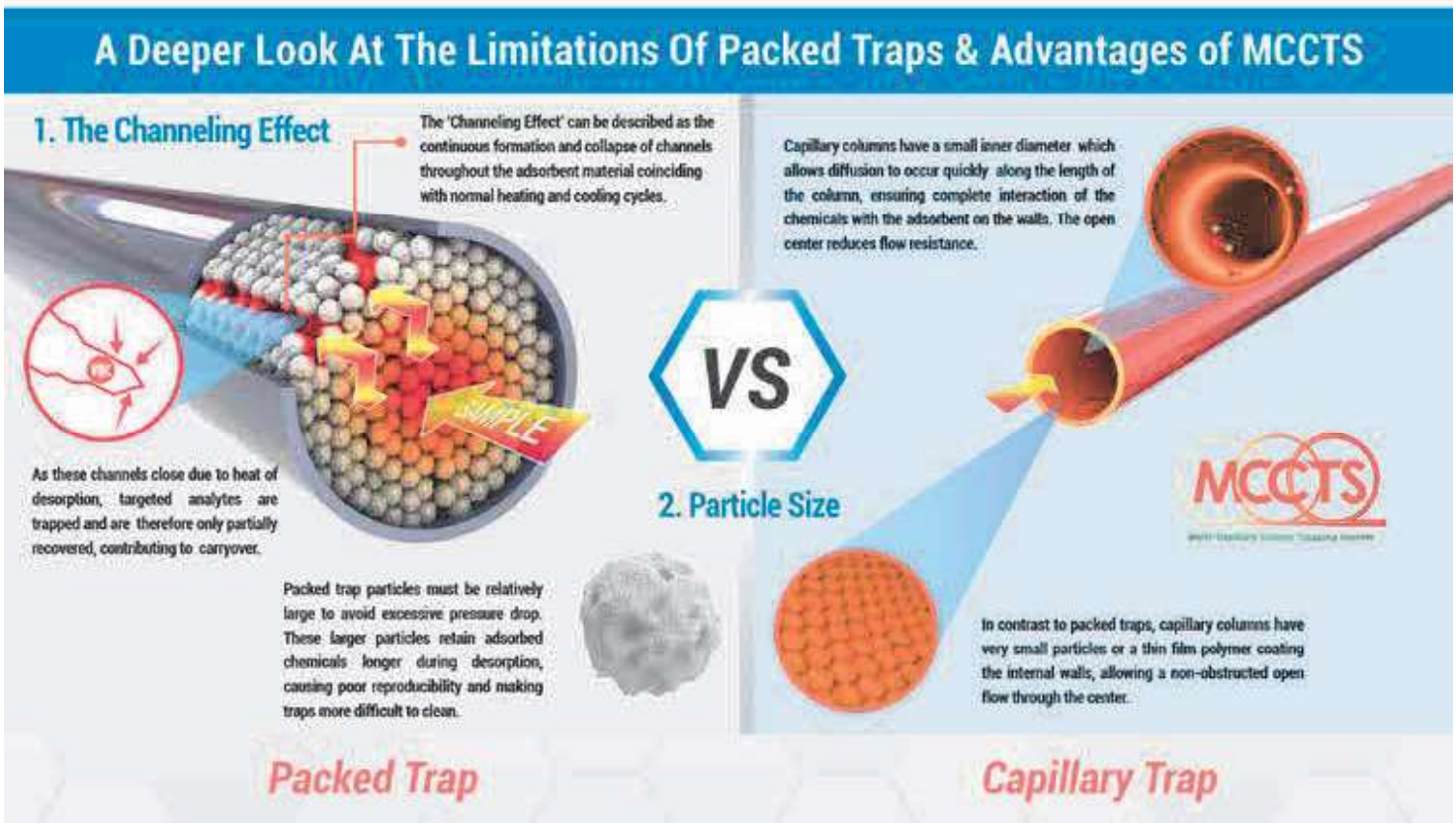
MCCTS uses multiple open tubular capillary columns with increasing strength to trap complex air samples containing compounds over a wide range of volatilities. The lightest compounds are trapped by the strongest phase placed at the back of the trap, while weaker columns are placed closer to the front of the trap to collect the heavier compounds. Only the walls of the capillary columns are coated, so there is no chance for channeling to occur. During heating and cooling, the difference in the size of the opening through the traps is negligible, preventing any possibility of excessive penetration during trapping, and therefore any inconsistencies in recovery during desorption. By utilizing 2 or 3 columns connected in series with increasing adsorbent strength and then backflushing the trapped compounds, the 7200CTS effectively recovers a much wider range of compounds than with packed traps, while minimizing memory effects (carryover).

Larger Particles in Packed Traps Pose Another Problem - Sample & Water Retention

The particles in packed traps must be relatively large to avoid excessive pressure drop across the bed, but these larger particles retain adsorbed chemicals longer during the desorption processes, causing poor run to run reproducibility and difficulty cleaning up the traps when exposed to higher concentrations or heavier molecular weight compounds. Even hydrophobic adsorbents, such as Tenax™, can accumulate water due to the complex inner surfaces of these larger particles and the statistical challenge for molecules to escape their inner 'maze'.



Water vapor has a statistically more challenging escape from packed trap particles than capillary column particles, even in hydrophobic adsorbents!



Superior Water Management

Water management improves dramatically with the Multi-Capillary Column trap design. Water is almost unretained by the traps, resulting from both the hydrophobic nature of the adsorbent, and the much smaller particle sizes than those used in packed traps. Even though they are hydrophobic, any particles with pores will have water molecules diffusing through them. The larger the particle, the longer it will take for the diffusion to release enough water to reduce the effect on the GCMS. The extremely small particles in the new capillary traps require almost no dry purging to remove the water because water can more quickly diffuse in and out of these particles.

Typical water peaks when scanning m/z 18 are up to 10,000 times smaller than when using packed traps or cold trap dehydration, meaning that the mass spectrometer will have almost no water to bake out, resulting in vastly improved sensitivity stability even when running many samples in any given day with shorter intervals between injections.

"...the mass spectrometer will have almost no water to bake out, resulting in vastly improved sensitivity stability..."

Finally, systems which eliminate water via cold trapping at -10 to -40°C show losses of more highly polar compounds such as 1,4-Dioxane, many alcohols, light fatty acids, and mono-glycol esters. These compounds are recovered perfectly using the new Multi-Capillary Column Trapping System, offering a more complete solution for measuring a wider range of compounds.

Superior Water Management

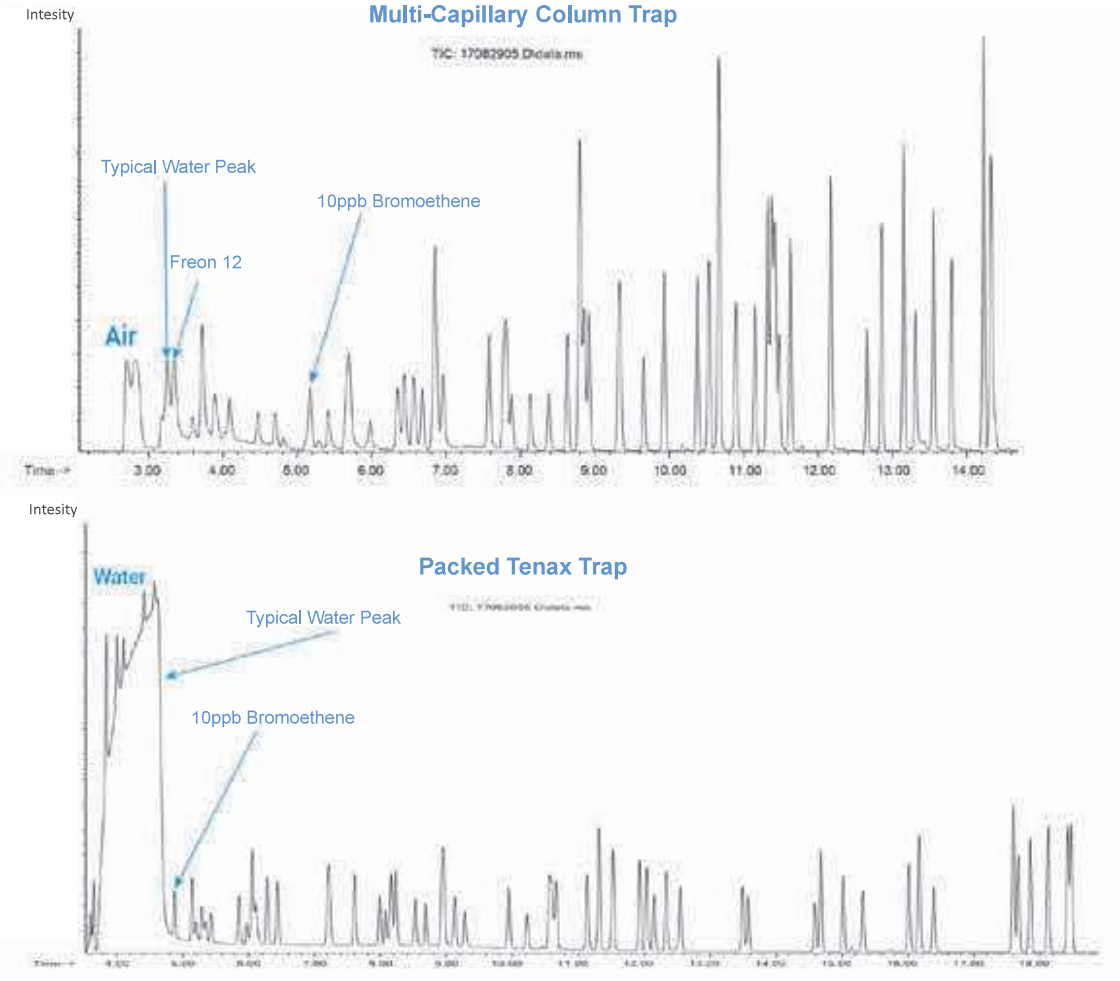


Figure 1,2 - Although the two chromatograms above are not on the same Y and X axis scale, as they were run using two different instruments, both chromatograms show a 10ppb TO15 standard at 50% RH. TO15 standard compound Bromoethene, shown at 10ppb for both runs, can be used to visually compare the relative amount of water found when scanning down to mass 18 for water using a packed trap vs a capillary column trap. At 25°C, 50% RH is equivalent to 15 million PPBv of water. A typical water peak using packed traps or cold trap water management is 0.5-1 minutes wide, which causes MS suppression of the front-end compounds.

Save Thousands Annually With Elimination of Cryogen

After trapping TO15 compounds on a primary, multi-stage trap, the sample is back-flushed during heating to a second trap with smaller column lengths to allow even faster injection into the GCMS to yield optimal peak shape of the lightest through the heaviest compounds. Both the first and second stages operate at 35°C during trapping, so only fan cooling is needed. This avoids complicated and maintenance intensive Peltier cooled traps.

Just think how much your lab will save annually!

DESCRIPTION	PART #	UNIT
7200 | 7650-M, MillionAir Analysis System*		
System Includes:		
7200 Cryogen-Free VOC Preconcentrator (Includes 1cc Loop Valve and diaphragm pump)	7200CTS-01	EA
7200 Cryo-Free 230V/50Hz VOC Preconcentrator (Includes 1cc Loop Valve and diaphragm pump)	7200CTS-01-HV	EA
7200CTS-01 Bundle - All Rotary Valves & Fittings (Silonite Coating Option)	7200CTS-A21	EA
7200CTS M1 Multi-Capillary Column Trap & Mandrel (For TO15 Analysis)	7200CTS-M1-01	EA
7200CTS M2 Multi-Capillary Column Focusing Trap & Mandrel (For TO15 Analysis)	7200CTS-M2-01	EA

*Order 7200-01-HV and 7650-M-HV for 220/240VAC Operation.

Peak Shape Comparison to Peltier Cooled Packed Traps

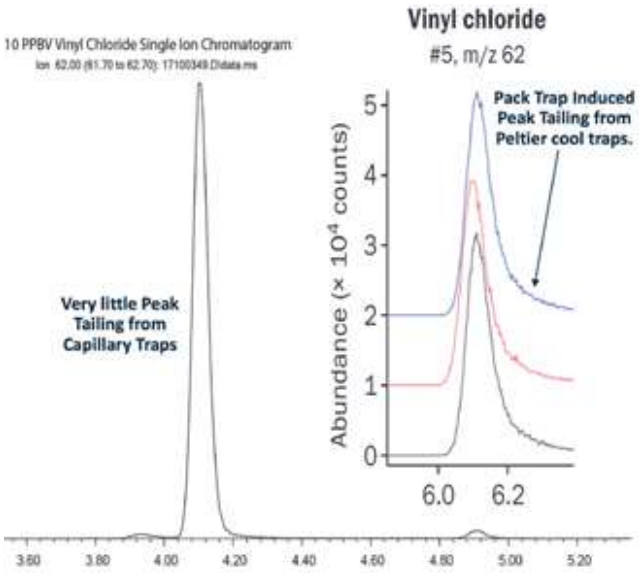


Figure 3 - Peak shape comparison

Cryogen-Free Fast Injection

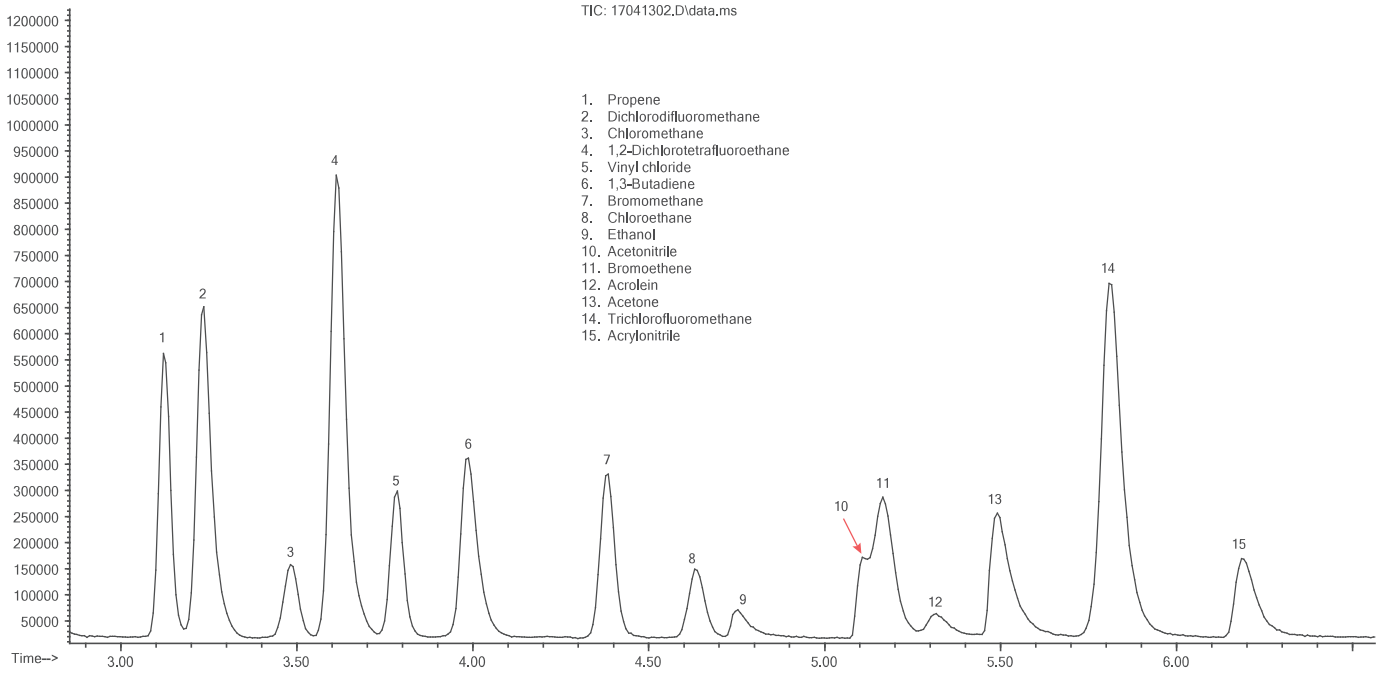


Figure 4 - TO15, 84 Compound Standard, 250cc, 10PPBV **-** The total ion chromatogram above demonstrates the cryogen-free fast injection of the light end with excellent separation and little or no peak tailing.

250cc at 30 PPB, 84 Component TO15 Std

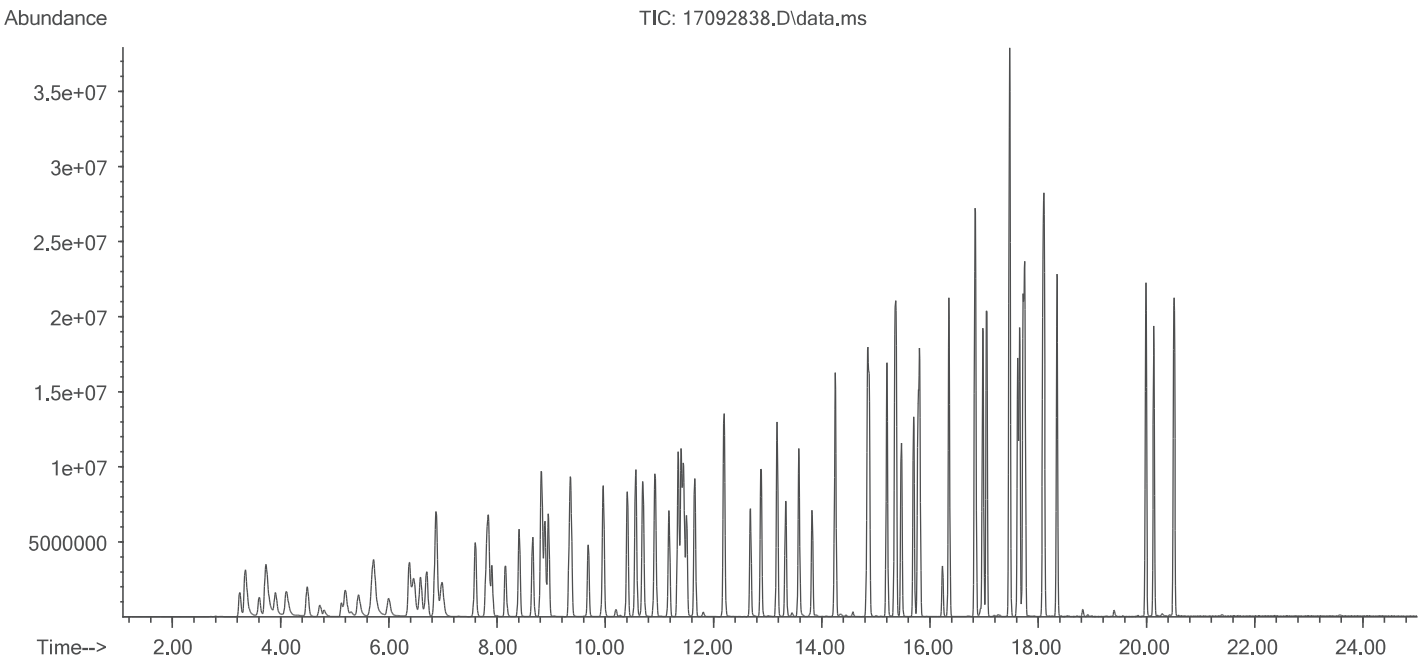


Figure 5 - Complete recovery through High Boilers.

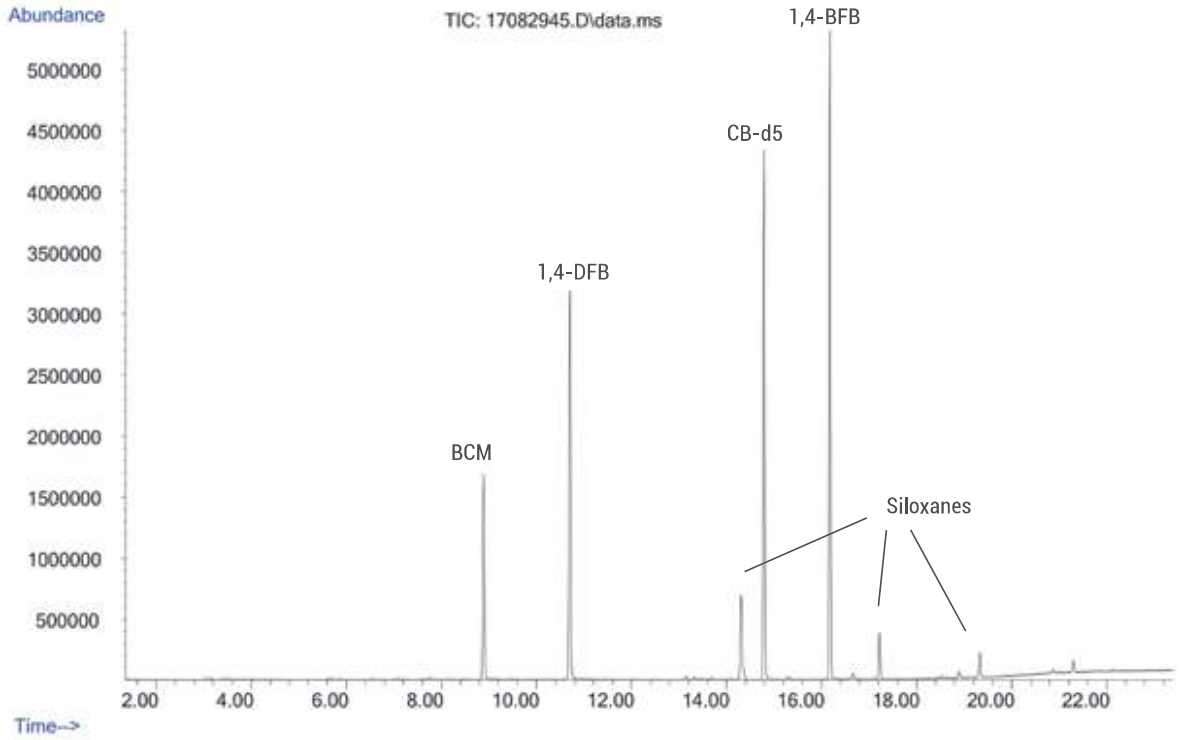


Figure 6 - Blank following high point calibration curve containing no reportable target compounds. The four major peaks shown are the internal standards. Low level peaks are siloxane compounds.