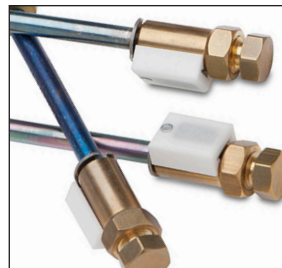
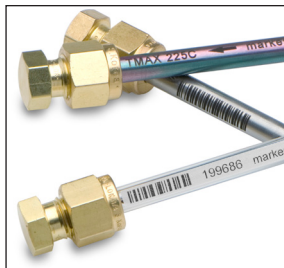


# Thermal desorption tubes

Ultimate solutions for dependable VOC  
sampling and analysis



# Choosing sorbent tubes and traps for optimal analytical performance

Selection of sampling tubes and focusing traps for thermal desorption (TD) is key to successful analyses and involves consideration of a variety of factors. Packed with appropriate sorbent(s), tubes and traps allow quantitative analysis of a wide range of compounds, from C<sub>2</sub> hydrocarbons and freons to semi-volatiles such as PCBs, phthalates and PAHs, without requiring liquid cryogen coolant.

	Application	Standard methods	Analyte range	Sampling	Tube type	Tube material	Part number	Cold trap
<b>Ambient air</b>	Air quality	US EPA TO-17, ISO 16017-1, EN 14662-1	C <sub>2</sub> -C <sub>14</sub>	Active	Universal	Stainless steel	C3-AAXX-5266	Air toxics
	Air quality	ISO 16017-2, EN 14662-2	C <sub>2</sub> -C <sub>14</sub>	Passive	Dependent on target analytes		C3-BAXX-5259	
	SVOCs	—	C <sub>6</sub> -C <sub>40</sub>	Active	SVOC air	Stainless steel	C2-AAXX-5342	High-boilers
	Unknown atmospheres	—	C <sub>2</sub> -C <sub>15</sub>	Active	Universal – SafeLok	Stainless steel	C3-DAXX-5266	Air toxics
<b>Land analysis</b>	Soil gas analysis	—	C <sub>4</sub> -C <sub>32</sub>	Active	Soil gas	Stainless steel	C3-AAXX-5304	Soil gas
	Vapour intrusion	ASTM D7663	C <sub>4</sub> -C <sub>32</sub>	Active	Sulfur	Inert-coated	C2-CAXX-5314	Soil gas
	Vapour intrusion	ASTM D7758	C <sub>4</sub> -C <sub>32</sub>	Passive	Dependent on target analytes			Soil gas
<b>Workplace</b>	Workplace	MDHS 72, EN 1076, ISO 16017-1	C <sub>2</sub> -C <sub>14</sub>	Active	Universal	Stainless steel	C3-AAXX-5266	Air toxics
	Workplace	EN 838, ISO 16017-2, MDHS 80	C <sub>2</sub> -C <sub>14</sub>	Passive	Dependent on target analytes		C2-BAXX-5259	
<b>Indoor air</b>	In-vehicle	ISO 12219 series, OEM-specified	C <sub>4</sub> -C <sub>32</sub>	Active	Material emissions	Stainless steel	C3-AAXX-5304	Material emissions
	Indoor	ISO 16000-6, ISO 16017-1, ASTM D6196	C <sub>4</sub> -C <sub>16</sub>	Active	Material emissions	Stainless steel	C3-AAXX-5304	Material emissions
C <sub>6</sub> -C <sub>30</sub>			Active	Indoor air – Tenax	Stainless steel	C1-AAXX-5003	Material emissions	
<b>Chemical content &amp; emissions</b>	Products and materials	ISO 16000-6, ASTM D6196	C <sub>4</sub> -C <sub>32</sub>	Active	Material emissions	Stainless steel	C3-AAXX-5304	Material emissions
	Direct desorption	VDA 278	C <sub>6</sub> -C <sub>25</sub> ; C <sub>14</sub> -C <sub>32</sub>	Direct	Empty	Glass, 30 mm restriction	C0-NXXX-0000	General-purpose hydrophobic
	Cleanroom	VDI 2083-17	C <sub>4</sub> -C <sub>32</sub>	Active	Material emissions	Stainless steel	C3-AAXX-5304	Material emissions
	Automotive	ISO 12219, ISO 16000-6	C <sub>4</sub> -C <sub>32</sub>	Active	Material emissions	Stainless steel	C3-AAXX-5304	Material emissions
<b>Industrial emissions</b> <small>(Note that VOST methods based on TD have been superseded)</small>	Landfill gases	LFTGN 04	Thiols	Active	Odour	Inert-coated	C2-CAXX-5314	Sulfur
	Refineries	US EPA 325, UK Protocol	BTEX & butadiene	Passive	EPA 325	Inert-coated with TubeTAG	C1-CCAX-5020	325
	Odorous analysis	—	Thiols	Active	Odour	Inert-coated	C2-CAXX-5314	Sulfur

## TD tube sampling for VOCs and SVOCs

### Active sampling

- Analytes captured onto sorbent tubes using pumps, chambers or sampling bags.
- Tubes can contain single or multiple sorbents.



### Passive/diffusive monitoring

- Short-term (1 to 8 hours) for workplace analyses.
- Long-term (up to 4 weeks) for indoor/outdoor air.
- Always uses single-bed sorbent tubes.

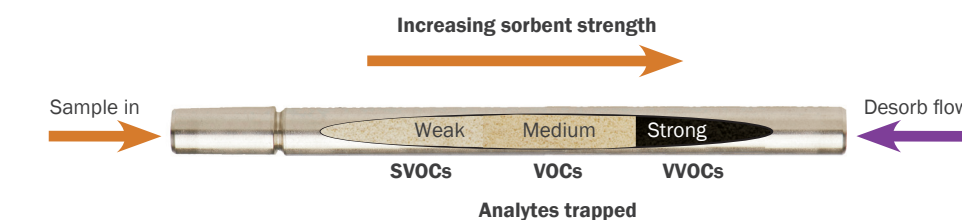
### Direct thermal desorption

- Solids/liquids placed inside empty tubes for chemical profiling.
- Minimal sample preparation required.

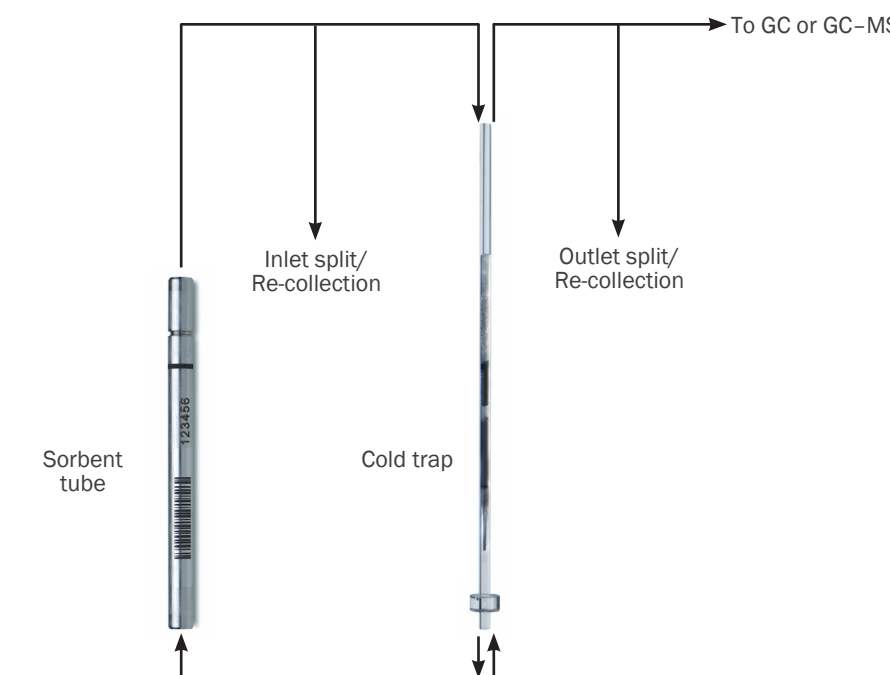


This table focuses on application-specific sorbent tubes – other tubes are available. All tubes in this table are supplied conditioned and fitted with storage caps.

**Multi-bed sorbent tubes and cold traps** allow a wider range of analytes to be adsorbed than the single-bed equivalent. They are trapped in one direction and desorbed off in the opposite direction to avoid irreversible binding of compounds to stronger sorbents.



**Markes' patented heated valve** allows quantitative sample re-collection of inlet and outlet split flows, for confirmatory analysis and validation of results.



## Unparalleled range of sampling tubes and accessories for the utmost sample integrity and full traceability

- Industry-standard size sorbent tubes, with different sorbents and in various materials, each with unique ID number and barcode.
- SafeLok™ tubes – Patented technology to prevent sample contamination and sample loss.
- DAAMS tubes for chemical defence and counter-terrorism applications.
- DiffLok™ caps – Preventing artefact ingress and loss of analytes throughout the whole analytical sequence.
- TubeTAG™ – Electronic RFID option for a robust chain of custody and to record the history of each tube.
- Tubes supplied either conditioned or unconditioned.
- Customised solutions available: non-standard tube sizes; alternative sorbents, bed lengths or packing mixes; repacking of tubes with fresh sorbent; tube conditioning.

Since 1997



### Markes International

**UK:** Gwaun Elai Medi-Science Campus, Llantrisant, RCT, CF72 8XL **T:** +44 (0)1443 230935  
**USA:** 2355 Gold Meadow Way, Gold River, Sacramento, California 95670 **T:** +1 866-483-5684 (toll-free)  
**Germany:** Bieberer Straße 1-7, 63065 Offenbach am Main **T:** +49 (0)69 6681089-10  
**P.R. China:** No. 1 Building, No. 7 Guiqing Road, Xuhui District, Shanghai 200233 **T:** +86 21 5465 1216  
**E:** enquiries@markes.com **W:** www.markes.com

