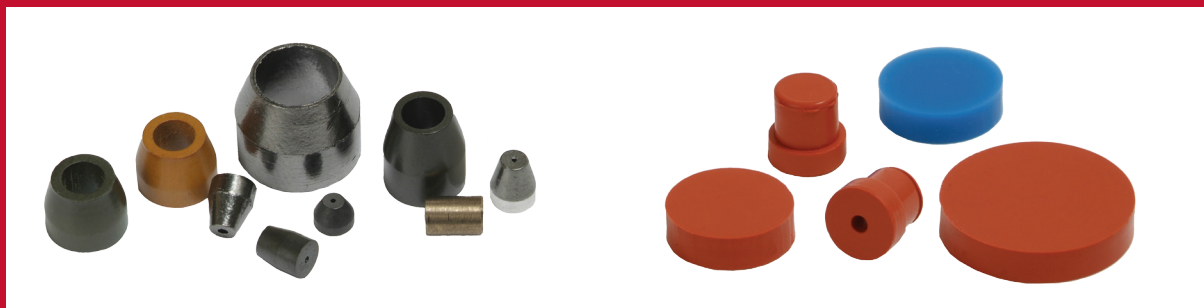




# Gas Chromatography Catalogue



## Gas Chromatography

<u>Content</u>	<u>Page</u>	<u>Content</u>	<u>Page</u>
Teknokroma Capillary Columns - General Information	8-11	TRB-608	83
Stationary Phase Cross Reference	12-13	TR-TCEP	84
SAPIENS-1MS	14-16	MetaBLOOD 1 & MetaBLOOD 2	85
SAPIENS-5MS	16-19	TRB-BIODIESEL	86
SAPIENS-X5MS	20-25	Teknokroma Microbore Columns (0.1 mm ID)	87-89
SAPIENS-WAX.MS	25-26	Custom Capillary Columns	90
SAPIENS-WAX.HT	27-28	Teknokroma Metal Capillary Columns	90
SAPIENS-624MS	29-31	Columns for Agilent GC 6850	90
SAPIENS-200	32-34	Guard Columns (Retention Gap)	91-92
TRB-1	35-36	USP Capillary Column Equivalents	93
TRB-1HT	37	EPA Test Methods	94-95
TRB-1HT Sim Dist	37	ASTM Methods	96-97
TRB-1MS	38	NIOSH Regulatory Methods	98-99
TRB-SULFUR	39	Packed Columns	100-102
TRB-PETROL	40		
TRB-50.2PONA	41	<b>Diskobolus™ Septa</b>	103-105
TRB-2887 / TKM-2887	41	Diskobolus™ Septa General Information	103-104
TRB-PETRO.150	42-43	Diskobolus™ AS (auto-sampler)	104
TRB-5	44-45	Economy Diskobolus™ Blue Septa (Blue)	104
TRB-5HT	46	Diskobolus™ BTO Premium Septa	105
TRB-STEROL	46		
TRB-5MS	47-48	<b>TEIDE™ Ferrules</b>	106-108
TRB-5AMINE	49	TEIDE™ Ferrules General Information	106
MetAMINE-VOL	50	Graphite Ferrules (100%)	107
TRB-5.625	51	Vespel/Graphite Ferrules	108
TRB-G27	51	Vespel Ferrules	108
MTI-5	52-53		
Meta.X5	54-55	<b>Teknokroma Liners</b>	109-110
Meta.X5 Triazine	56	Agilent Liners	109
Meta.XLB	56-57	Liners for Perkin Elmer	109
TRB-1301	58	Liners for Varian	110
TRB-624	59-60	Teknokroma 525 GC Flowmeter	111
TRB-G43	60-61	Teknokroma 2t Headspace Sampler	112-114
TRB-14	62	Headspace Vials & Accesories	115
TRB-20	63	Super-Clean Gas Filters	116-117
TRB-35	64	Click-On Inline Super-Clean™ Purifiers®	118-119
TRB-1701	65	SGT Super Big Traps	119
TRB-225	66		
TRB-50	67		
TRB-50HT	68-69		
TRB-F50	70		
TRB-PAG	71		
SupraWAX-280	71-73		
TRB-WAX	74		
TRB-FFAP	75		
TR-WAX.DB	76		
TRB-WAXOmega	77		
Meta.WAX	78		
Meta.WAX 400	79		
TR-CN100	79-81		
TR-CRESOL	82		
TR-17	82		
Meta.VOC	83		

Teknokroma has been at the forefront of chromatographic developments in Spain. From its beginnings at 1978, and in order to find the right solutions to the wide array of analytical problems that appear daily in a laboratory, Teknokroma has always been involved in the Spanish and European market, not only with columns from the leading world manufactures, but also of those of our own manufacture.

A few years ago, Teknokroma introduced the basic line of high resolution capillary columns (Teknokroma columns) which were very well received in the market.

Due to the on going research effort carried out by our Research Department in collaboration with the Consejo Superior de Investigaciones Científicas (CSIC) and the Instituto Químico de Sarriá (IQS) and the support obtained from various public administrations (CDTI, CIDEM, MINER and FCTAC) we have been able to continuously update and expand our product line with other stationary phases.

All of our columns are manufactured according to a strict established protocol, and within the ISO 9001:2000 quality rules.

**Stage 1:** Hydrothermal treatment

**Stage 2:** Deactivation process

**Stage 3:** Coating, bonding and crosslinking

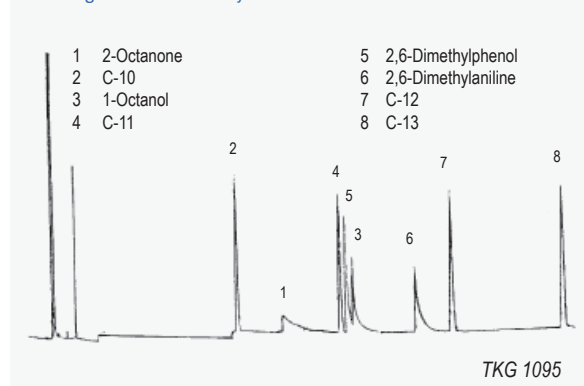
**Stage 4:** Quality control

## Stage 1: Hydrothermal Treatment

Teknokroma starts its manufacturing process with the selection of the best possible fused silica tubing. This tube presents an extremely reduced tolerance of internal diameters and has a polyimide outer coating capable of withstanding the highest temperatures without loss of its flexible mechanical characteristics. Each one of the batches of silica used in the process is conveniently characterized as an essential step to set the Hydrothermal treatment conditions (Fig. 1) that will give rise to a surface containing a high and constant density of silanol groups, which will later be properly deactivated.

This treatment is indispensable, as the different capillary tubing manufactured batches present a very low and irregularly distributed silanol group density due to the high temperature manufacturing process (~2200°C).

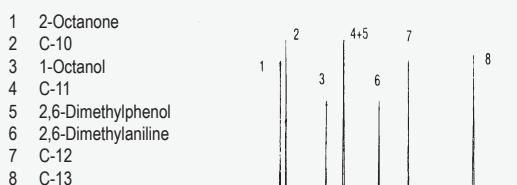
Fig. 1. Verification of Hydrothermal Treatment



## Stage 2: Deactivation process

The deactivation process, which is different for each type of stationary phase, is carefully controlled (fig. 2), ensuring that the tubing surface has acquired the necessary chemical inertness and surface tension in order to be able to proceed with the second stage of stationary phase deposition. This step also facilitates the introduction of specific functional groups on the tubing wall which are very useful for the later binding of the stationary phase or to give the columns a given end point characteristics.

Fig. 2. Deactivation Stage (Intermediate Test)



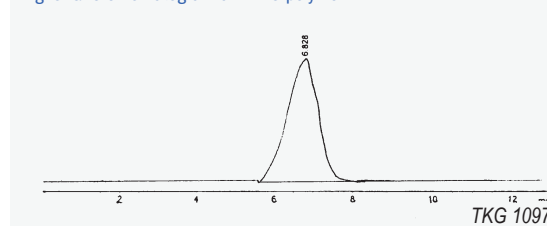
## Stage 3: Coating, bonding and crosslinking

Stationary phase selection for optimum wetting of the column is a critical point in regards to column quality. Teknokroma uses extremely pure polymers for its phases, in order to guarantee that our columns will respond to the requirements that our customers expect in terms of efficiency, reproducibility, stability and minimal bleeding.

The polymers used are carefully fractionated to eliminate the low molecular weight components and trace catalyst. This results in a higher thermal stability and lower bleeding. Then, these polymers are tested by means of spectroscopic (FTIR, UV, NMR), chromatographic (GPC) techniques and by differential thermal analysis. Fig. 3 shows the molecular exclusion chromatography of the polymer TRB-5 with its corresponding thermogravimetric curve in Fig. 4.

The crosslinking and bonding of the stationary phase is achieved by avoiding the use of peroxides which are the cause of many of the problems related to residual activity due to phase degradation and thermal instability exhibited in numerous imported columns.

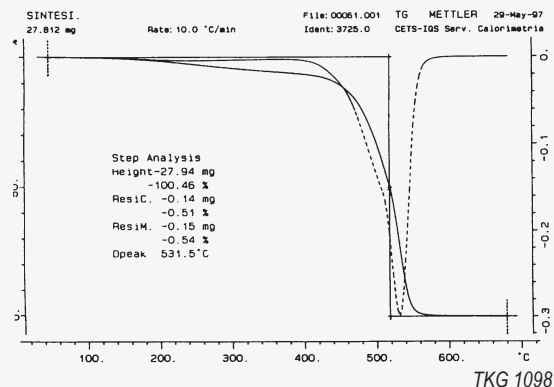
Fig. 3. GPC Chromatogram of TRB-5 polymer





The fact that a given stationary phase is crosslinked and/or chemically bonded to the capillary tube inner wall allows, if necessary, the recovery or regeneration of an accidentally contaminated column by washing it with the adequate series of solvents.

Fig. 4. DTA Curve of TRB-polymer



## Stage 4. Quality Control

### SELECT PROVEN QUALITY

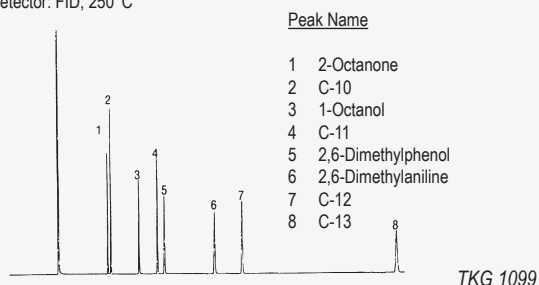
When you buy a Teknokroma capillary column you receive a product designed and manufactured in our laboratory with the aim to help you solve your analytical problems and which meets all of our quality criteria.

At the same time you obtain from our Technical Department at Teknokroma the assurance that we will be at your side to help you with all the problems and concerns experience in the lab.

Remember that each column is individually tested and the accompanying test data is the proof that the column meets our quality specifications and thus we expect it to meet your demands. Each one of the columns obtained by this process is rigorously controlled by means of a strict Quality Control Test (fig. 5 and 6), which ensures that you will receive a guaranteed quality product.

Fig. 5 Quality Control Test

Column: **TRB-5**, 60m x 0.25 mm ID x 0.25 µm  
 Carrier gas: He, 25 psi  
 Oven: 110°C (Isothermal)  
 Injection: 1µL, split 1:100, 250°C  
 1µL, SP-4-7300 test Approx. 5 ng of each compound on column  
 Detector: FID, 250°C



## Stationary Phase

The selection of the ideal column for a given analysis may look like a complex problem since we need to be right on the selection of the polarity of the stationary phase as well as column length, internal diameter and film thickness.

The polarity of the stationary phase is chosen depending on the kind of compounds you wish to separate. Non polar phases, such as TRB-1 and TRB-5, separate compounds by their boiling points. Intermediate polarity phases such as TRB-WAX, TRB-1701, combine retention by boiling point with the more selective interaction through hydrogen bridges or dipolar moments, etc., and thus provide a higher selectivity. The principal mechanisms of polar phases such as TR-CN100 (Cyanosilicone with 100% of cyano propyl groups) lie in the dipole-dipole interactions between the functional groups of the stationary phase and those from the substances to be separated. These type of phases retain polar compounds more than non polar ones.

In general, non polar phases are more thermally stable than the polar phases. In other words, the higher the column polarity, the lower its thermal stability. Most of the Teknokroma columns are cross-linked, which results in high thermal stability.

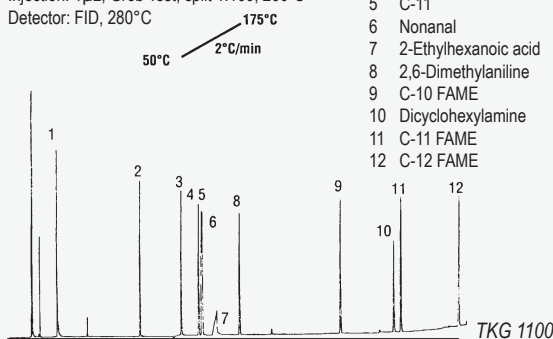
The cross-linking in a stationary phase produces slight changes in the physicochemical characteristics of the phase as well as in its polarity relative to the uncross-linked phase. Thus TEKNOKROMA also offers in its catalog columns with non bonded phases that show the selectivity of the original phase (for instance TR-SE30, TR-SE54, TR-20M, etc.).

## Length

The efficiency of a chromatographic column (number of theoretical plates per meter) is a function of its length. The standard length used for most of the separations is 25-30 meters. With this length one can obtain a high efficiency with relative short times of analysis. Columns of 15m are used for rapid control analyses, reaction monitoring, etc. as well as for the chromatography of high molecular weight substances while columns of 50-60 m, 100 m or 150 m are used for very complex samples. Teknokroma exclusively manufactures a 150 m column for detail analyses of

Fig. 6. GROB test

Column: **TRB-5**, 30m x 0.25 mm ID x 0.25 µm  
 Carrier gas: He, 12 psi  
 Injection: 1µL, Grob Test, split 1:100, 260°C  
 Detector: FID, 280°C



petroleum and essential oil hydrocarbons. As a general rule, we can say that in a constant temperature chromatographic analysis, the number of theoretical plates and analysis time are directly proportional to the column length while resolution is directly proportional to the square root of the theoretical plates. Thus, we need to take into account that when we double column length, its resolution only increases by 40% whereas analysis time doubles.

## Internal Diameter

The column internal diameter is inversely proportional to its separation power. The smaller the diameter, the larger the efficiency and thus a higher resolution but at the same time the loading capacity decreases.

For samples containing a large number of substances where you may need a given resolution, it is recommended to use small internal diameter columns (0.20-0.25 mm) and for samples with a high range of concentrations higher internal diameter columns are recommended (0.32-0.53 mm) since these larger diameters allow for the injection of a higher sample amount.

Columns of 0.53 mm ID (semicapillary) have a loading capacity similar to that of packed columns, which they replace in many analyzes, with better resolution, higher chemical inertness and lower analysis time.

The 0.32-0.53 mm ID columns can be used with either the injector for capillary columns or with the packed column injector, due to the high flow-rates at which they can operate.

In the increasingly used GC-MS systems it is recommended to work with small ID columns (0.10mm, 0.15mm, 0.18mm, 0.20 mm and 0.22 mm) so as not to exceed the capacity of the vacuum system. Recently, capillary columns of 0.1 mm ID have appeared on the market. These generate high plate numbers or, in other words, to reduce analysis time without losing resolution. The high efficiency of these columns (7000-10000 plates/meter) allows the resolution of complex samples using shorter column lengths, thus with very short analysis times, with the resulting cost reduction for the laboratory. Evidently, their loading capacity is a limiting factor and in order to obtain the best performance from these columns we need to take into account instrumental factors (injector-detector).

## Film Thickness

The film thickness of the stationary phase deposited inside the capillary column exerts an influence on the number of effective theoretical plates that can be obtained with the column for a given separation, on its loading capacity, on the bleed level and on the elution temperature of a compound.

A film thickness of 0.25-0.32  $\mu\text{m}$  is the standard thickness allowing for a compromise between loading capacity and resolution; and for the injection of samples with a wide volatility range.

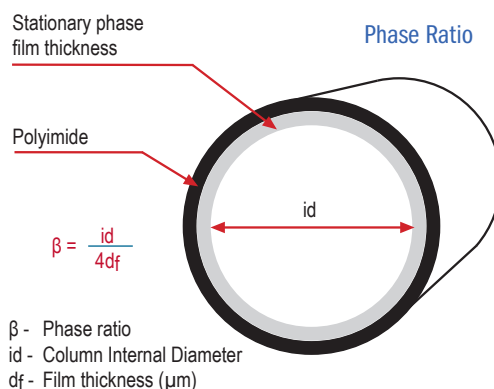
Thick films increase retention of the most volatile components whereas thin films provide faster elution at lower temperatures. As a general rule, thin films (0.1  $\mu\text{m}$ ) must be used for compounds with a high molecular weight such as triglycerides, antioxidants,

etc., which have elution temperatures over 300°C. Thick films must be used for low boiling substances because thick films increase the interaction between the substances and the stationary phase. Specifically, 3-5  $\mu\text{m}$  films are used to separate solvents, gases, and very volatile substances at room temperature or lower.

When the thickness of the stationary phase increases, thermal stability decreases, and thus the bleed level is higher which will limit the maximum operating temperature of the column.

The  $\beta$  factor defines the relation between the column internal diameter and the stationary phase thickness, thereby helping you to select the most appropriate column for your analysis.

In addition, the  $\beta$  factor allows for the easy exchange of columns since, for a given analysis with the same stationary phase, similar  $\beta$  factors will result in the same or very similar retention times and capacity factors. Of course, this implies taking into account the column loading capacity (phase thickness and internal diameter).



## Factor $\beta$

$\beta$	Column suitable for the separation of:
>400	High molecular weight compounds
100 - 400	All purpose use
<100	Volatile compounds of low molecular weight

## Bleed Level

The bleed level of stationary phase from a capillary column is the parameter which will determine the level of sensitivity in a given assay. It is directly related to the amount of stationary phase in the column and thus with the film thickness. It also increases exponentially with temperature (fig.7).

A low bleed level will allow you to work without problems with the whole range of modern high sensitivity detectors and at the same time will result in less contamination. This will also allow the quantification of high boiling point or high molecular weight compounds which are analyzed by means of high temperature gradients.

## Maximum Efficiency

All manufacturing stages for capillary columns have been optimized in order to be able to offer our customers columns of very high efficiency.

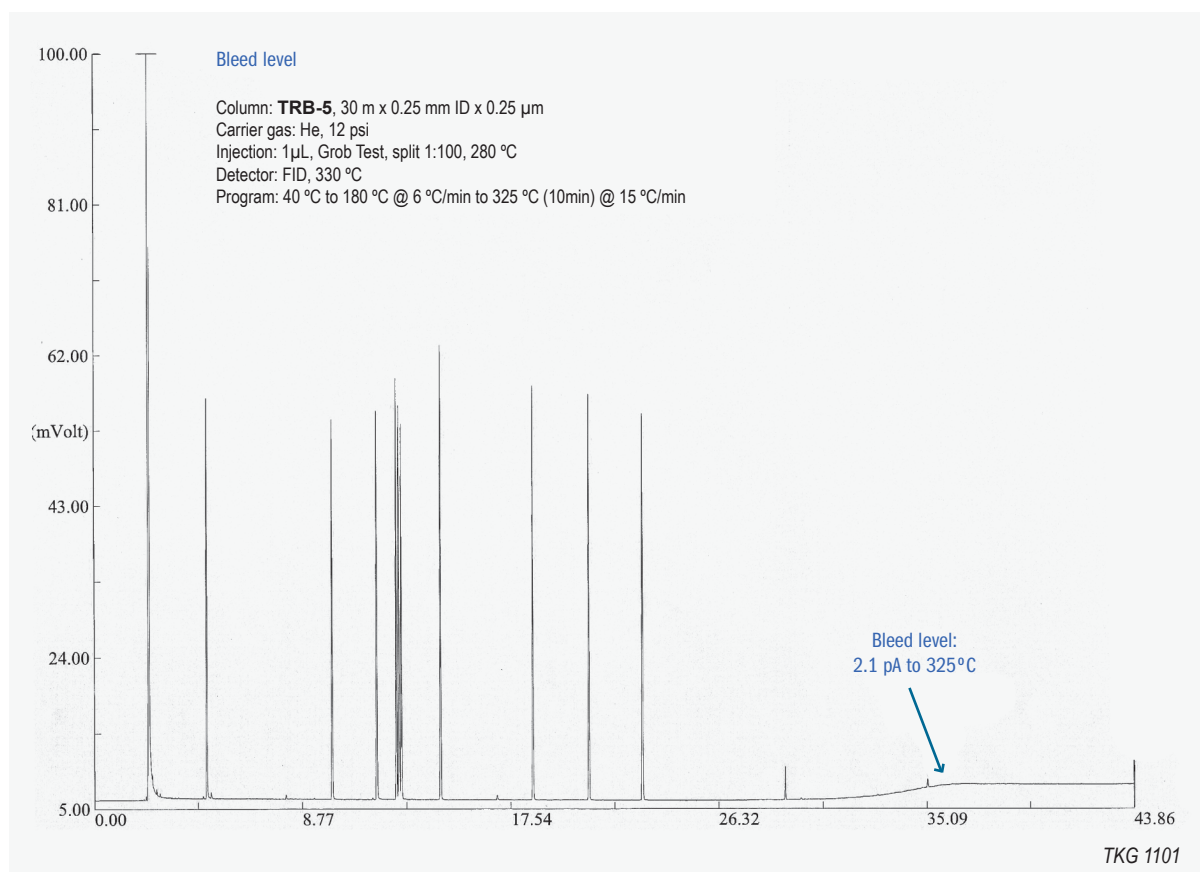
## Wide Stationary Phase Selection

Teknokroma incorporates in its catalogue a selection of capillary columns prepared with the stationary phases most commonly used in the field of gas chromatography (Table 1).

## Maximum Reproducibility

When you select a Teknokroma column for your analyses you can be assured that each of the steps in the production process has been thoroughly controlled to ensure that there are no deviations from the established quality parameters. All of the steps incorporate the maximum possible automation procedures. This translates into a high reproducibility level with regards to the chromatographic performance of our columns.

Internal diameter (mm)	Theoretical Plates (N/m)
0,10	7.000 - 9.000
0,20	4.700 - 5.500
0,25	3.300 - 4.600
0,32	2.700 - 3.700
0,53	1.400 - 2.200





# Teknokroma Capillary Columns

TEKNOKROMA	PHASE COMPOSITION	USP CODE	AGILENT	PHENOMENEX	RESTEK	SGE	SUPELCO (MERCK)
Sapiens-1MS	100% Dimethyl Polysiloxane	G1, G2, G9, G38	DB-1MS UI, HP-1 MS UI, VF-1MS	ZB-1 Plus	Rxi-1MS	SOL-GEL-1MS	SLB-1MS
Sapiens-5MS	95% Dimethyl - 5% Diphenyl polysiloxane	G27, G36, G41	HP-5 MS UI	ZB-5 Plus	Rxi-5MS		
Sapiens-X5MS	Silphenylene Phase equivalent to SAPIENS-5MS		DB-5MS UI, VF-5MS	ZB-5 Plus	Rxi-5SII MS	BPX5	SLB-5MS
Sapiens-WAX-1MS	100% Polyethylene Glycol (PEG)	G14, G15, G16, G20, G39, G47	VF-WAXMS, DB-WAX UI, DB-WAX-MS	ZB-WAX Plus	STABILWAX MS	SoGel-WAX	SupelcoWAX 10
Sapiens-624MS	Silphenylene phase eq. to 6% Cyanopropylphenyl polysiloxane	G43	DB-624 UI, VF-624MS, VF-1301MS, DB-Select 624 UI, for <467>		Rxi-624SII MS	BPX-Volatille	
Sapiens-200	35% Trifluoropropyl-methylpolysiloxane	G6	DB-200, DB-210		Rxi-200		
TRB-1MS	100% Dimethyl Polysiloxane	G1, G2, G9, G38	HP-1MS, DB-1MS, CP-SII 5 CB MS	ZB-1MS	Rxi-1MS	SOLGEL-1MS, BPX-1	Equity-1
TRB-5MS	95% Dimethyl - 5% Diphenyl Polysiloxane	G27, G36, G41	HP-5MS, PAS-5, VF-5MS, CP-SI 8 CB MS	ZB-5MS I	Rxi-5 MS		Equity-5
Meta.X5	Silphenylene phase eq. to 5% Phenylpolysiloxane		HP-5TA, DB-5MS, CP-SII 8 CB Low Bleed/MS VF-5MS	ZB-5MS	Rxi-5SII MS	BPX5, BP5M	
Meta.X5 Triazine	Silphenylene phase (proprietary phase)						
Meta.XLB	Silphenylene phase (proprietary phase)		DB-XLB, VF-XMS	ZB-XLB	Rxi-XLB		MDN 12
Sapiens-WAX-HT	100% Polyethylene Glycol	G14, G15, G16, G20, G38, G47				SoGel-WAX	
TRB-1HT/TKM-1HT	100% Dimethyl Polysiloxane	G1, G2, G9, G38	DB-1HT, Select Mineral Oil	ZB-1HT Inferno, ZB-1XT SimDist	Rxi-1HT, Six-1HT	BPX1	
TKM-1HTSimDist	100% Dimethyl Polysiloxane	G1, G2, G9, G38	DB-HT SimDist, CP-SimDist ultimate	ZB-1HT Inferno, ZB-1XT SimDist	MXT-1HT SimDist	BPX1	HT5
TRB-5HT/TKM-5HT	95% Dimethyl - 5% Diphenyl Polysiloxane	G27, G36, G41	DB-5HT, VF-5HT	ZB-5HT Inferno	Rxi-5HT, MXT-5HT	HT5	HT5
TRB-50HT	50% Diphenyl- 50% Dimethyl Polysiloxane	G3, G17	DB-17ht, CP-TAP		Rxi-65TG, MXT-65TG	BPX50	
TRB-BIODIESEL/TKM	Proprietary Bonded and crosslinked phase		Biodiesel, Select Biodiesel	ZB-Bioethanol	Rxi-Biodiesel		MET-Biodiesel
TRB-1	100% Dimethyl Polysiloxane	G1, G2, G9, G38	HP-1, HP-101, Ultra-1, DB-1, CP-SII 5 CB	ZB-1	Rxi-1	BP1	SPB-1, Equity-1
TRB-SULFUR	100% Dimethyl Polysiloxane	G1, G2, G9, G38	CP-Select CB for Sulfur, CP-SII 5CB for sulfur				SPB-1-Sulfur
TRB-PETROL	100% Dimethyl Polysiloxane	G1, G2, G9, G38	CP-SII PONA CB, DB-PETRO, HP-1	ZB-DHA-PONA	Rxi-DHA-100	BP1 PONA	Petrocol DH
TRB-50.2PONA	100% Dimethyl Polysiloxane	G1, G2, G9, G38	HP-PONA, CP-SII PONA CB, HP-1	ZB-DHA-PONA	Rxi-DHA-50	BP1 PONA	Petrocol DH 50.2
TRB-2887/TKM-2887	100% Dimethyl Polysiloxane	G1, G2, G9, G38	DB-2887	ZB-1HT Inferno, ZB-1XT SimDist	Rxi-2887, MXT-2887	BPX1, BP1 PONA	Petrocol-2887, Petrocol-EX2887
TRB-Petro.150	100% Dimethyl Polysiloxane	G1, G2, G9, G38	DB-1, CP-SII PONA CB	ZB-DHA-PONA	Rxi-DHA-150	BP1 PONA	Petrocol DH 150
TRB-5	95% Dimethyl - 5% Diphenylpolysiloxane	G27, G36, G41	HP-5, Ultra-2, DB-5, CP-SII 8 CB	ZB-5	Rxi-5	BP5	SPB-5, MDN-5
TRB-STEROL	95% Dimethyl - 5% Diphenylpolysiloxane	G27, G36, G41					SAC-5
MetAMINE-VOL	Proprietary Bonded and crosslinked phase		CP-Volamine		Rxi-Volatille Amine		

Ultra Low bleed & Ultra Inertness (MS) Applications

Ultra Low bleed (MS) applications

Low bleed High Temperature

Low bleed General applications

# Teknokroma Capillary Columns



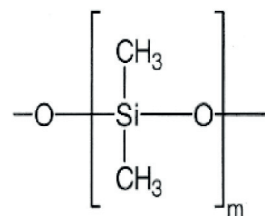
TEKNOKROMA	PHASE COMPOSITION	USP CODE	AGILENT	PHENOMENEX	RESTEK	SGE	SUPELCO (MERCK)
TRB-5AMINE	95% Dimethyl - 5% Diphenyl Polysiloxane	G27	CP-Sil 8 CB for amines		Rtx-5Amine		PTA-5
TRB-5.625	95% Dimethyl - 5% Diphenyl Polysiloxane	G27	DB-5.625				PTE-5
TRB-G27	95% Dimethyl - 5% Diphenyl Polysiloxane	G27			Rtx-G27		G27
MTI-5	5% Phenyl - 95% Methyl Polysiloxane	G27	HP-5MSi		Rxt-5MS		PTE-5
TRB-1301	94% Dimethyl -6% Cyanopropyl-Phenyl Polysiloxane	G43	HP-1301, DB-1301, CP-1301	ZB-624	Rtx-1301	BP624	SPB-1301
TRB-624	94% Dimethyl -6% Cyanopropyl-Phenyl Polysiloxane	G43	HP-624, DB-624, CP-Select 624 CB	ZB-624	Rtx-624, Rtx-1301	BP624	OVI-G43, SPB-624
TRB-G43	94% Dimethyl -6% Cyanopropyl-Phenyl Polysiloxane	G43	HP-624, DB-624, CP-Select 624 CB, DB-624UI	ZB-624	Rtx-G43	BP624	OVI-G43
TRB-14	14% Diphenyl - 86% Dimethyl Polysiloxane		CP-Sil 13 CB				
TRB-20	20% Diphenyl - 80% Dimethyl Polysiloxane	G28, G32			Rtx-20		SPB-20
TRB-35	35% Diphenyl - 65% Dimethyl Polysiloxane	G42	HP-35, DB-35	ZB-35	Rtx-35		SPB-35
TRB-1701	14% Cyanopropyl-Phenyl-86% Dimethyl Polysiloxane	G46	HP-1701, PAS-1701, DB-1701, CP-Sil 19 CB	ZB-1701	Rtx-1701	BP10	SPB-1701, Equity 1701
TRB-225	50% Cyanopropyl-Phenyl-50% Dimethyl Polysiloxane	G7, G19	HP-225, DB-225, CP-Sil 43 CB		Rtx-225	BP225	SPB-225
TRB-50	50% Diphenyl - 50% Dimethyl Polysiloxane	G3, G17	HP-50, DB-17, CP-Sil 24 CB, DB-EUPH	ZB-50	Rtx-50, Rxt-17		SPB-50, SPB-2250
TRB-F50	50% Trifluoropropyl - 50% Methyl Polysiloxane	G6	DB-210, DB-200		Rtx-200		
TRB-PAG	50% Polyethylene - 50% Polypropylene Glycol	G18					PAG
SupraWAX-280	100% Polyethylene Glycol	G14, G15, G16, G20, G39, G47	DB-WAX etr			SoiGel-WAX	SupelcoWAX-10
TRB-WAX	100% Polyethylene Glycol	G14, G15, G16, G20, G39, G47	HP-20M, HP-InstaWAX, DB-WAX, Carbowax 20M, CP-WAX 52 CB, HP-WAX	ZB-WAX	StabiWAX, Rtx-WAX	BP20	CarboWAX 20M
TRB-FFAP	Polyethylene Glycol esterified with nitroterephthalic acid	G25, G35	HP-FFAP, DB-FFAP, CP-WAX 58 FFAP CB	ZB-FFAP	StabiWAX-DA	BP21	Nulcol, SPB-1000
TR-WAX,DB	Treated Polyethylene Glycol for basic compounds		CAM, HP-BasicWAX, CP-WAX 51 CB for amines, CP-WAX for volatile amines		StabiWAX-DB		CarboWAX-Amine
TRB-WAXOmega	100% Polyethylene Glycol (PEG)				FameWAX		OmegaWAX
Meta.WAX	100% Polyethylene Glycol (PEG)		HP-WAX, DB-WAX, CP-WAX 57 CB, DB-WAX FF	ZB-WAX	Rtx-WAX	BP20	Nulcol
Meta.WAX 400	100% Polyethylene Glycol (PEG)	G20	CP-Carbowax 400				
TR-CN100	100% Cyanopropyl Polysiloxane	G5	SelectFAME, CP-Sil 88, HP-88	ZB-FAME, ZB-88	Rt-2330, Rt-2560	BPX-70, BPX-90	SP-2340, SP-2380, SP-2560, SP-2330
TR-CRESOL	Proprietary Nonbonded phase		CP-Cresol				
TR-17	Poly (Methyl Phenylsiloxane)	G3	HP-17, DB-17	ZB-50	Rxt-17		SPB-17
TRB-608	Proprietary Bonded and crosslinked phase		HP-608, DB-608			BP608	SPB-608
TR-TCEP	1,2,3-Tris (2-cyanoethoxy) propane		CP-TCEP		Rt-TCEP		TCEP
Meta.VOC	Proprietary Bonded and crosslinked phase		DB-502.2, HP-VOC		Rtx-502.2, Rtx-Volatile		VOCOL
MetaBLOOD 1 & MetaBLOOD 2	Proprietary Bonded and crosslinked phase		DB-ALC1, DB-ALC2	ZB-BAC1, ZB-BAC2	Rtx-BAC1, Rtx-BAC2, Rtx-BAC1 Plus, Rtx-BAC2 Plus		

General applications (FID/CD)  
Low Bleed



## Line of SAPIENS Capillary Columns

- We are pleased to introduce a superb new generation of capillary columns.
- Columns for today's demanding applications
- Our columns are able to compete with the best columns in the market, with ultra-low bleed and high inertness with respect to active, acid and basic compounds.



Structure of Poly (dimethyl) siloxane

### SAPIENS-1MS

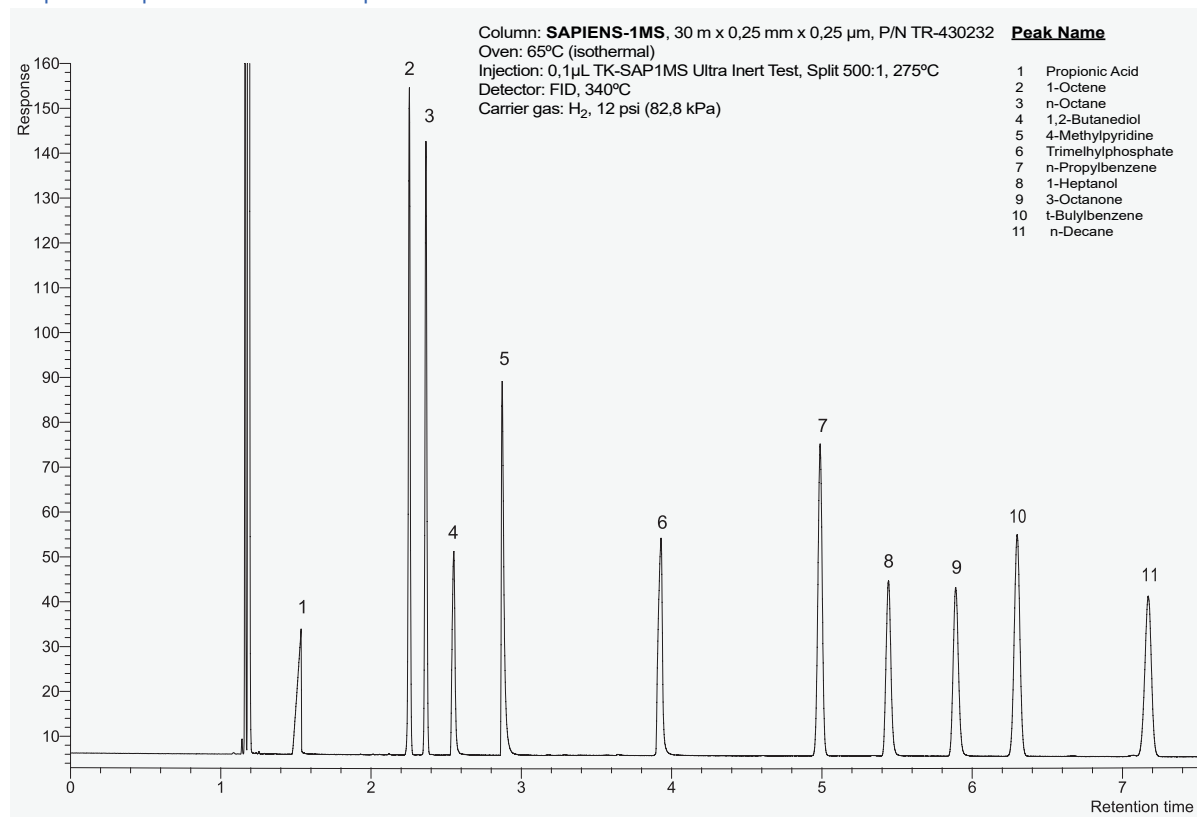
#### 100% Dimethyl polysiloxane, bonded and crosslinked phase, manufactured with MSP technology

- General purpose non polar column
- Ultra low bleed, improved signal-to-noise ratio for GC-MS
- Excellent chemical inertness and thermal stability making it ideal for trace analysis and GC/MS
- Solvent rinsable
- Developed with a new integral technology
- Molecular Stabilization Process incorporated (MSP)
- Highest inertness for polar, acid and basic compounds
- Guaranteed reproducibility between batches
- Perfect for use with Retention Time Locking (RTL) software

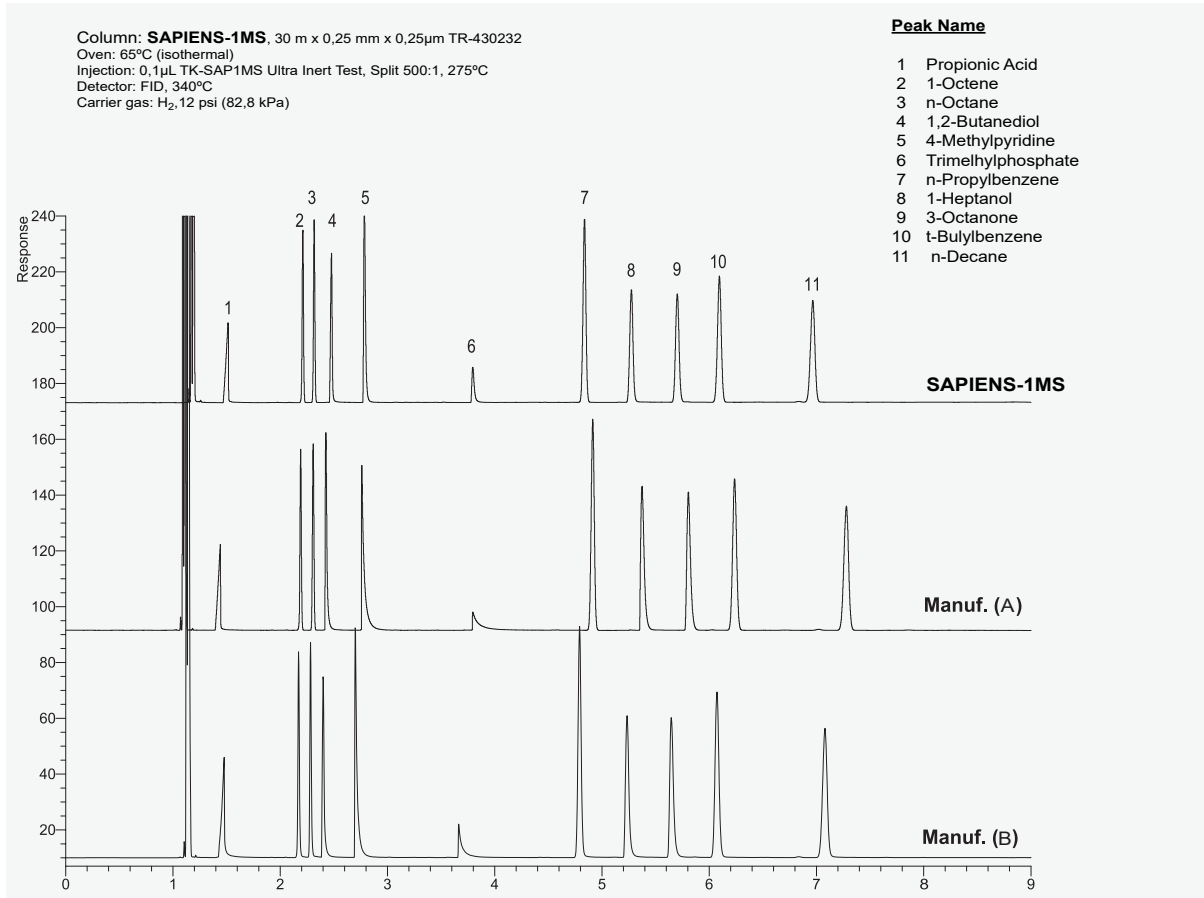
#### SAPIENS-1MS Equivalent Phase

**Agilent:** DB1-MS UI, HP-1 MS UI, VF-1MS  
**Restek:** Rxi-1MS  
**Phenomenex:** ZB-1Plus  
**GL Sciences:** InertCap 1MS  
**Sigma-Aldrich:** SLB-1MS  
**SGE:** SOL-GEL-1MS  
**Macherey-Nagel:** OPTIMA-1MS Accent

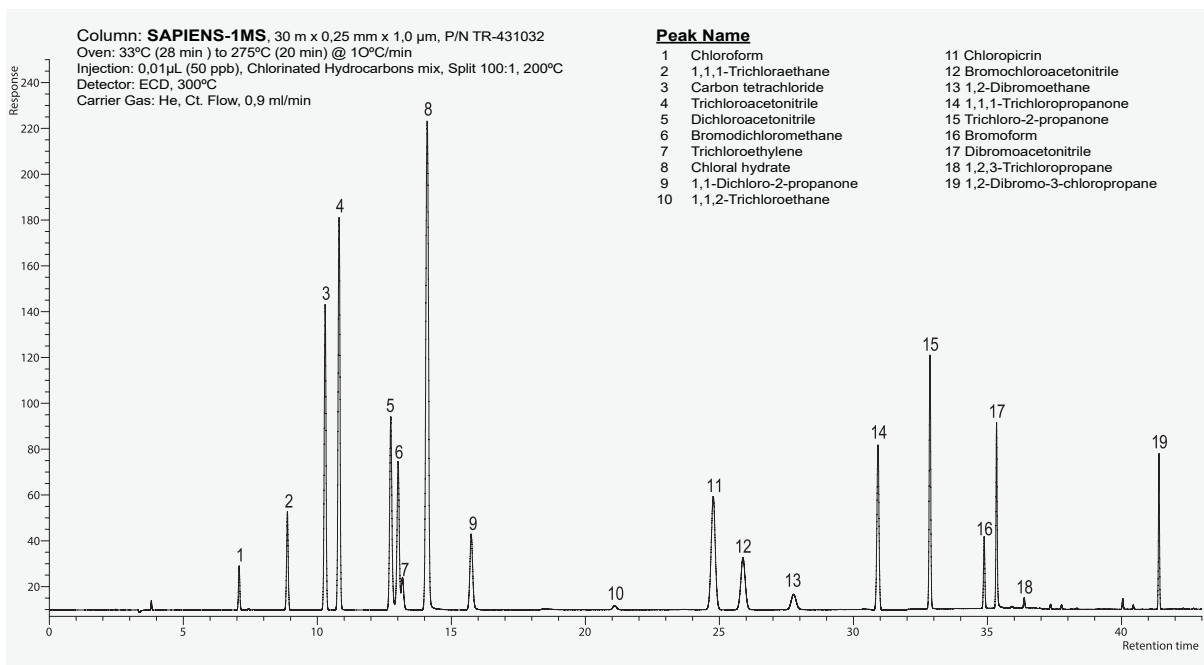
#### SAPIENS-1MS: Ultra Inert Test, Good peak (TK-SAP1MS). Shape and response for all active compounds



## SAPIENS-1MS: Ultra Inert Test (TK-SAP1MS) Performance against major ultra inert column manufacturers



## SAPIENS-1MS: Analysis chlorinated solvents and desinfection by-products (EPA 551.1)



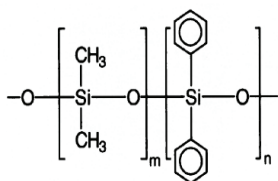
## SAPIENS-1MS

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,10	10	0,10	-60 to 325/350	TR-430141
	20	0,10	-60 to 325/350	TR-430181
0,18	20	0,18	-60 to 325/350	TR-430984
	20	0,36	-60 to 325/350	TR-433484
0,20	12	0,33	-60 to 325/350	TR-4333B9
	25	0,33	-60 to 325/350	TR-433329
	30	0,50	-60 to 325/350	TR-430532
0,25	15	0,25	-60 to 325/350	TR-430212
	30	0,25	-60 to 325/350	TR-430232
	30	1,00	-60 to 325/350	TR-431032
	60	0,25	-60 to 325/350	TR-430262
0,32	15	0,25	-60 to 325/350	TR-430213
	25	0,52	-60 to 325/350	TR-435223
	30	0,25	-60 to 325/350	TR-430233
	30	1,00	-60 to 325/350	TR-431033

## SAPIENS-5MS

### 95% Dimethyl - 5% diphenylpolysiloxane, bonded and crosslinked phase

- Ultra low bleed and high chemical inertness
- Excellent thermal stability
- Selectivity identical to TRB-5
- Minimum peak tailing for active analytes. Specifically tested for chemical inertness towards active compounds
- Ideal for trace analysis by GC/MS. Improves mass spectral integrity and quantitation at low concentrations.



Structure of poly (dimethyl-diphenyl) siloxane

### SAPIENS-5MS Equivalent Phase

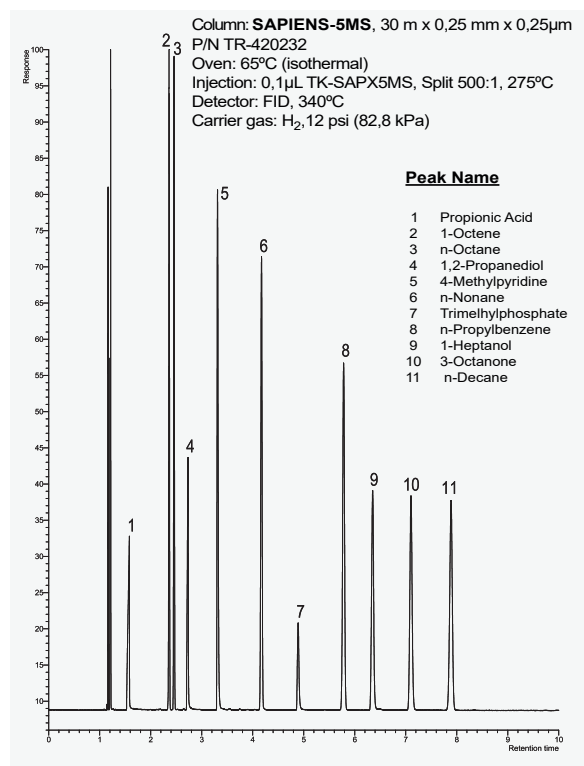
**Agilent:** HP-5 MS UI

**Restek:** Rxi-5MS

**Phenomenex:** ZB-5Plus

**Macherey-Nagel:** OPTIMA-5MS

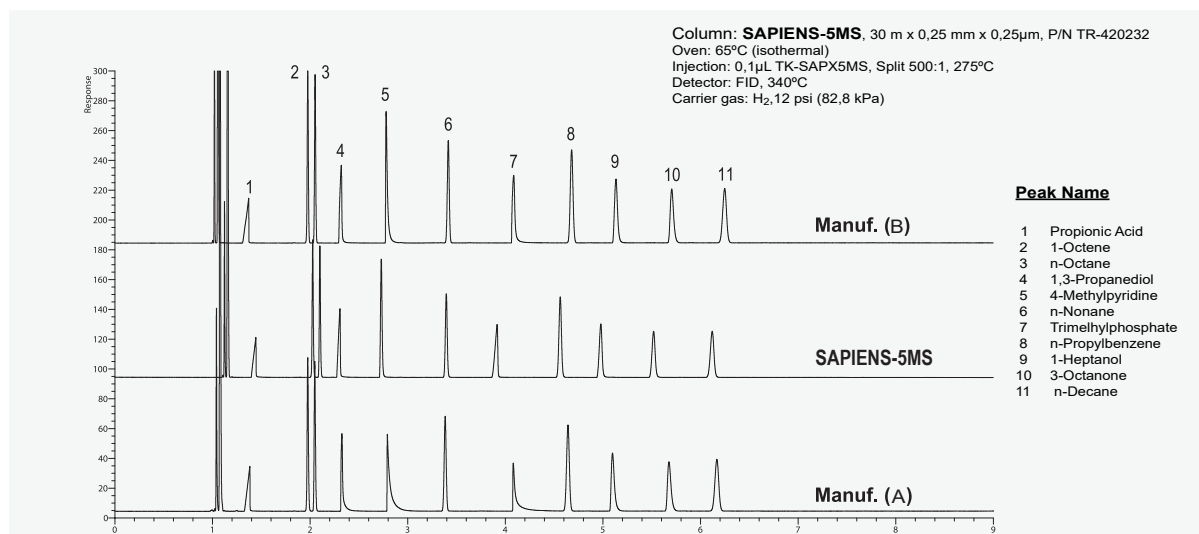
### SAPIENS-5MS: Ultra Inert Test (TK-SAPX5MS). Excellent performance for all key compounds



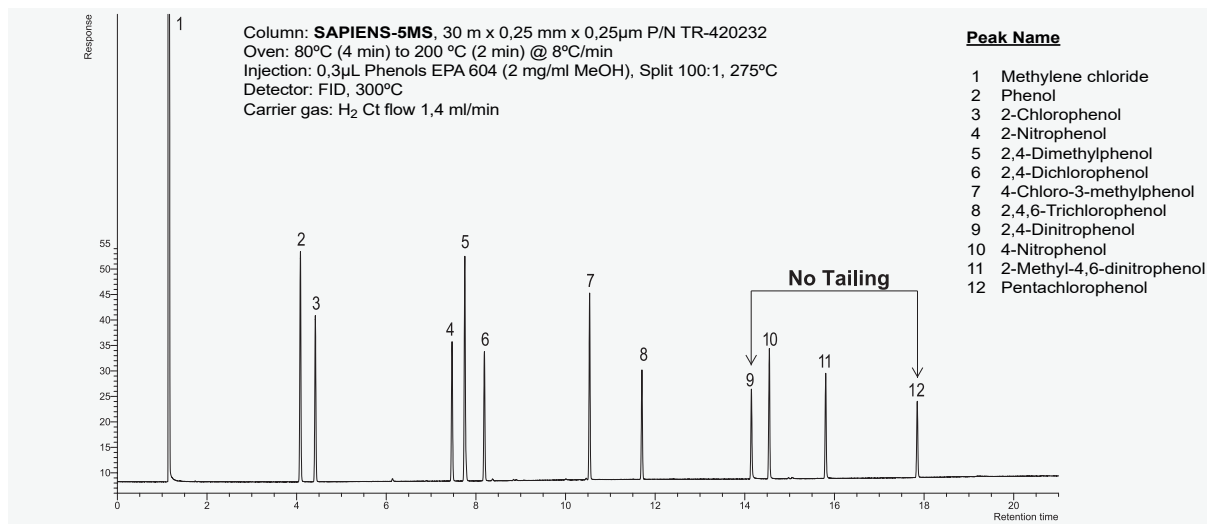
## Ultra Inert Test TK-SAPX5MS (composition)

Elution	Compound	Key Control Parameter
1	Propionic Acid	Basicity
2	1-Octene	Polarity
3	n-Octane	Hydrocarbon
4	1,2-Propanediol	Silanol
5	4-Methylpyridine	Acidity
6	n-Nonane	Hydrocarbon
7	Trimethylphosphate	Acidity
8	n-Propylbenzene	Hydrocarbon
9	1-Heptanol	Silanol
10	3-Octanone	Polarity
11	n-Decane	Hydrocarbon

## SAPIENS-5MS: Ultra Inert Test (TK-SAPX5MS). Performance against major ultra inert column manufacturers Excellent performance for all key compounds



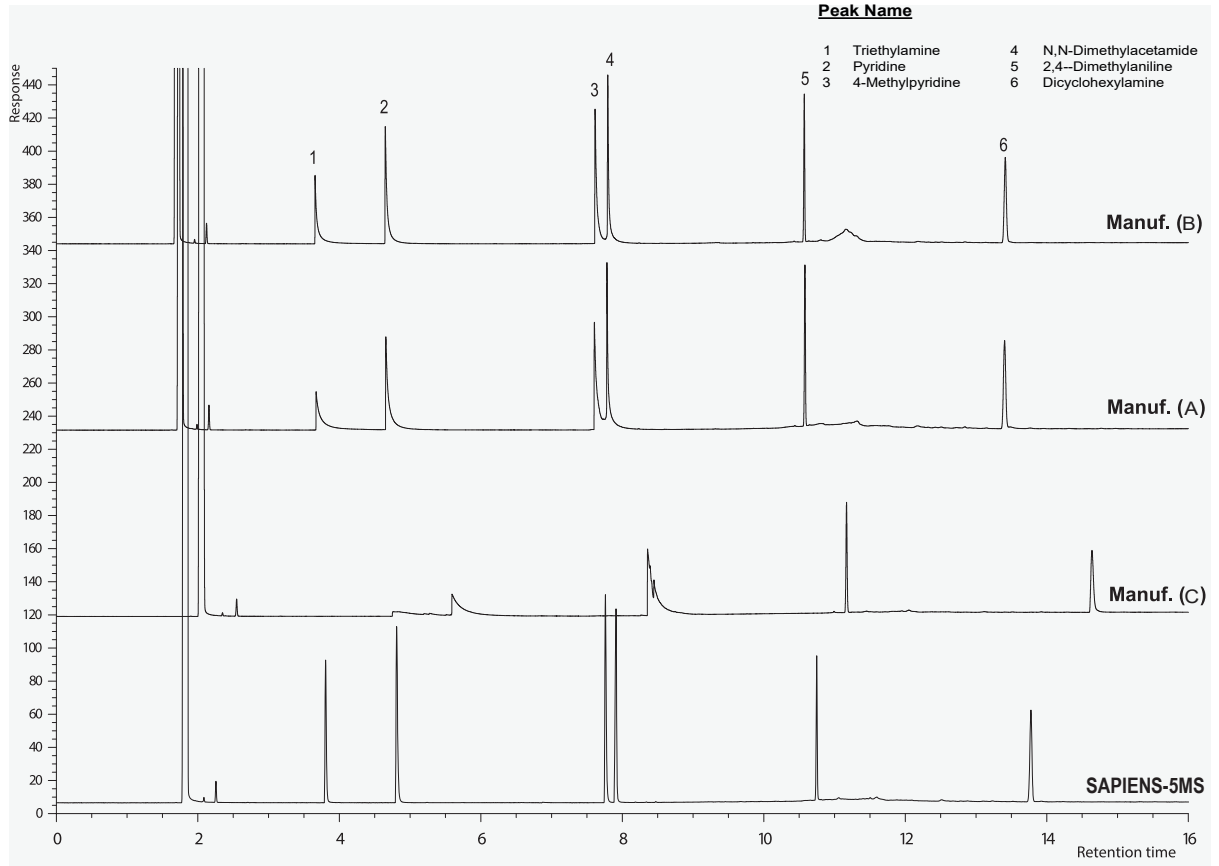
## SAPIENS-5MS: Acidity Test - Perfect peak shapes





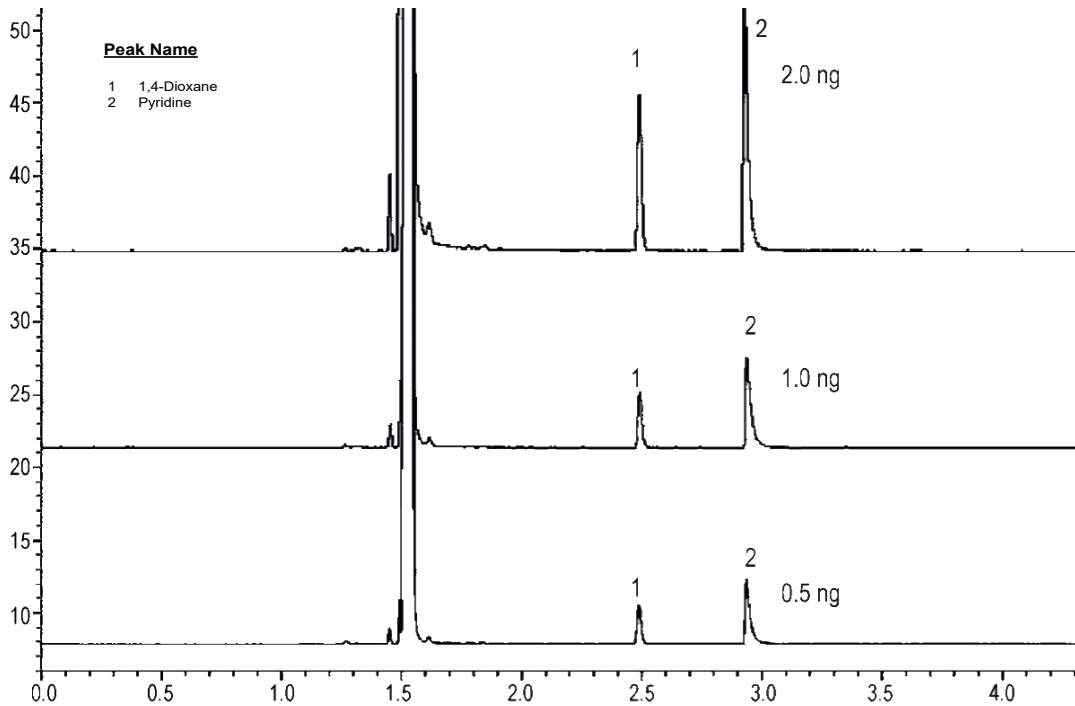
# Teknokroma Capillary Columns

SAPIENS-5MS: Basicity test Performance against major ultra inert column manufacturers



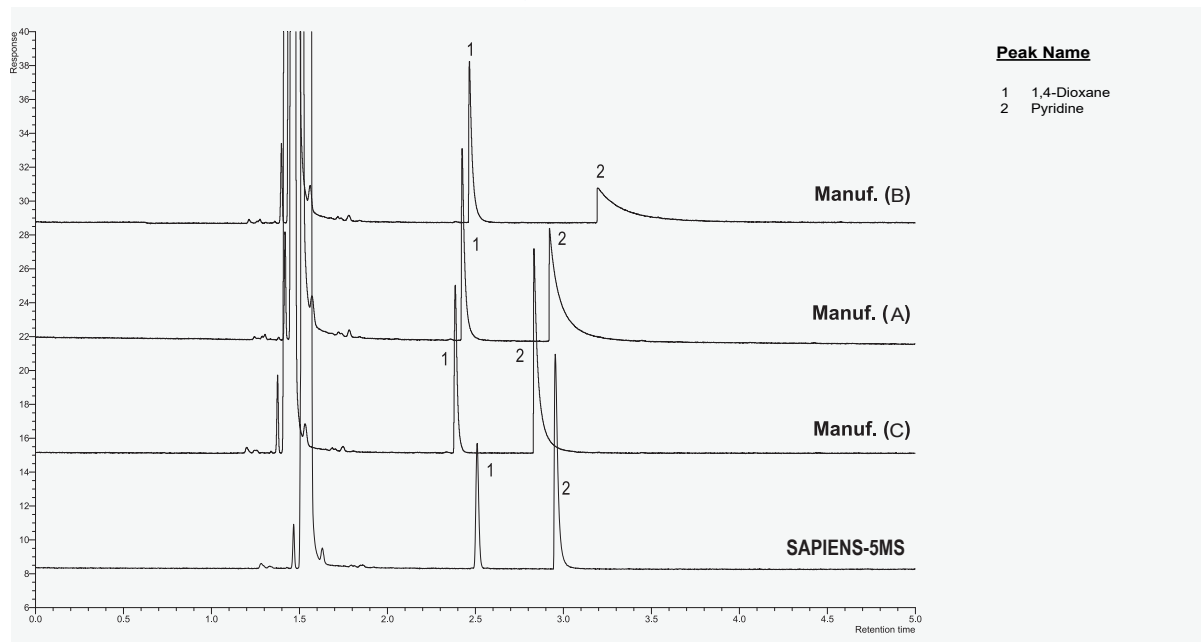
SAPIENS-5MS: High column inertness for 1,4-dioxane and pyridine

No retention time shifts for pyridine at low concentration (no surface activity)



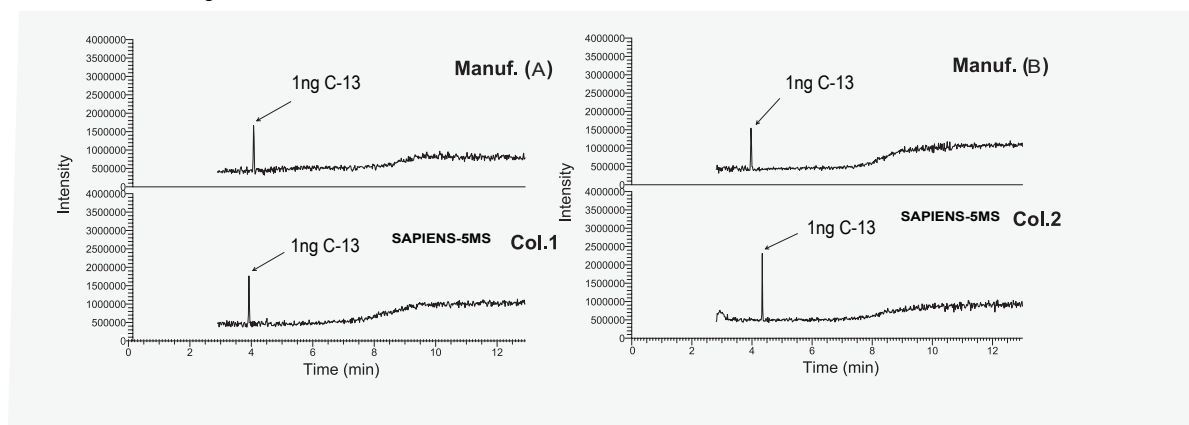


## SAPIENS-5MS: 1,4-dioxane and pyridine Performance against major ultra inert column manufacturers



## SAPIENS-5MS: Bleed (GC-MS) comparison test

Bleed Curves related to 1 ng of tridecane in MS detector



## SAPIENS-5MS

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,10	10	0,10	-60 to 325/350	TR-420141
	20	0,10	-60 to 325/350	TR-420181
0,18	20	0,18	-60 to 325/350	TR-420984
0,20	12	0,33	-60 to 325/350	TR-4233B9
	25	0,33	-60 to 325/350	TR-4233Z9
0,25	15	0,25	-60 to 325/350	TR-420212
	30	0,25	-60 to 325/350	TR-420232
	30	0,50	-60 to 325/350	TR-420532
	30	1,00	-60 to 325/350	TR-421032
	60	0,25	-60 to 325/350	TR-420262
0,32	30	0,25	-60 to 325/350	TR-420233
	30	1,00	-60 to 325/350	TR-421033

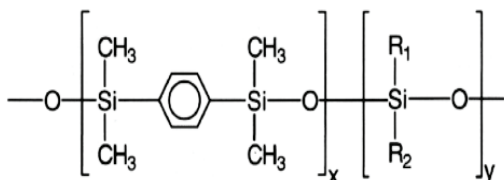
## SAPIENS-X5MS

### Polysiloxane containing p-silphenylene

- Ideal column for semivolatile compounds.
- selectivity similar to Meta.X5
- New generation of column incorporates arylene groups in the polymer structure to provide improved thermal stability, reduced column bleed and optimal resolution for aromatic compounds.
- Stringent quality control test guarantees total and optimal signal/ noise ratio for the more active compounds such as 2,4-dinitrophenol, 4-nitroaniline and pentachlorophenol that normally suffer adsorption problems.

### SAPIENS-X5MS Equivalent Phase

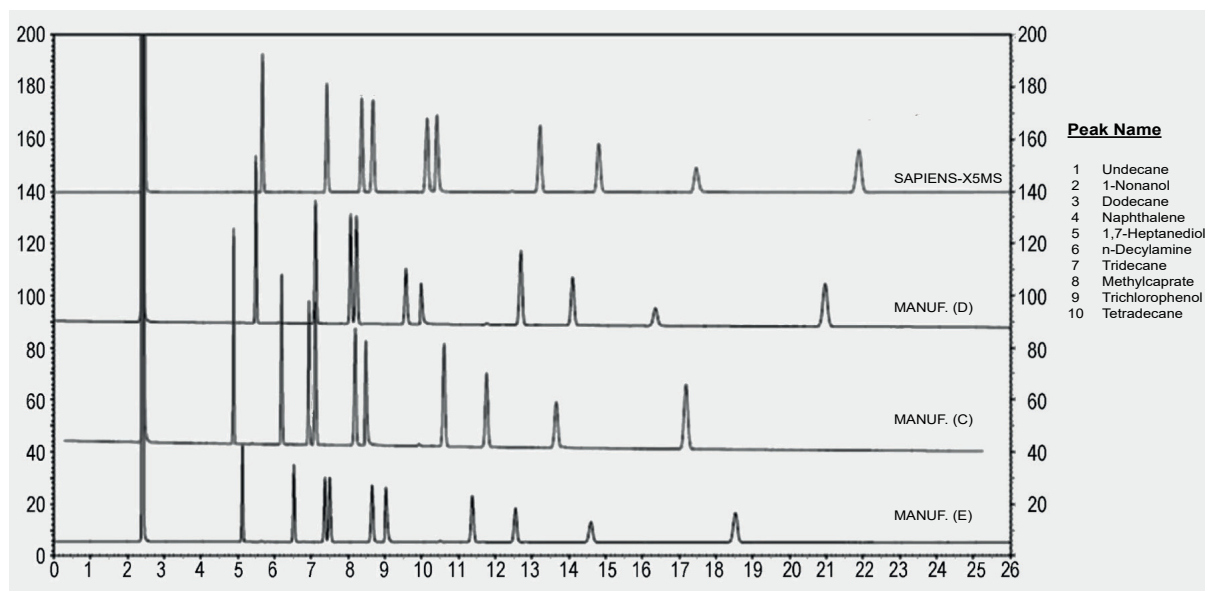
**Agilent:** DB-5MS UI, VF-5MS  
**Restek:** Rxi-5Sil MS  
**Phenomenex:** ZB-5Plus  
**SGE:** BPX5  
**Sigma-Aldrich:** SLB-5MS  
**Macherey-Nagel:** OPTIMA-5MS Accent



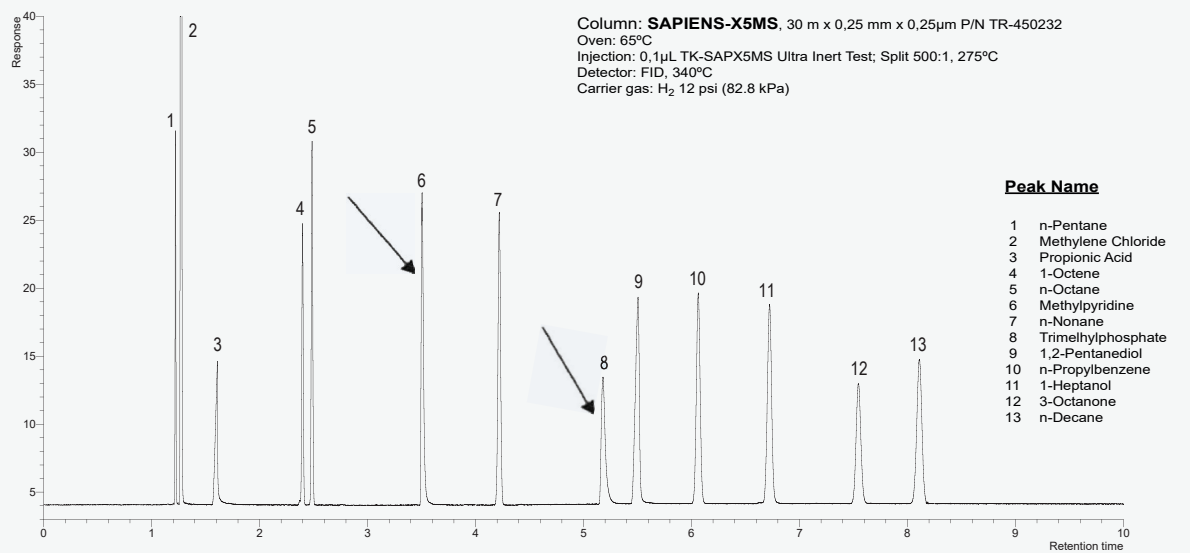
Structure of Polysiloxane containing p-silphenylene

### SAPIENS-X5MS: Classical Inertness Test comparison vs major manufacturers

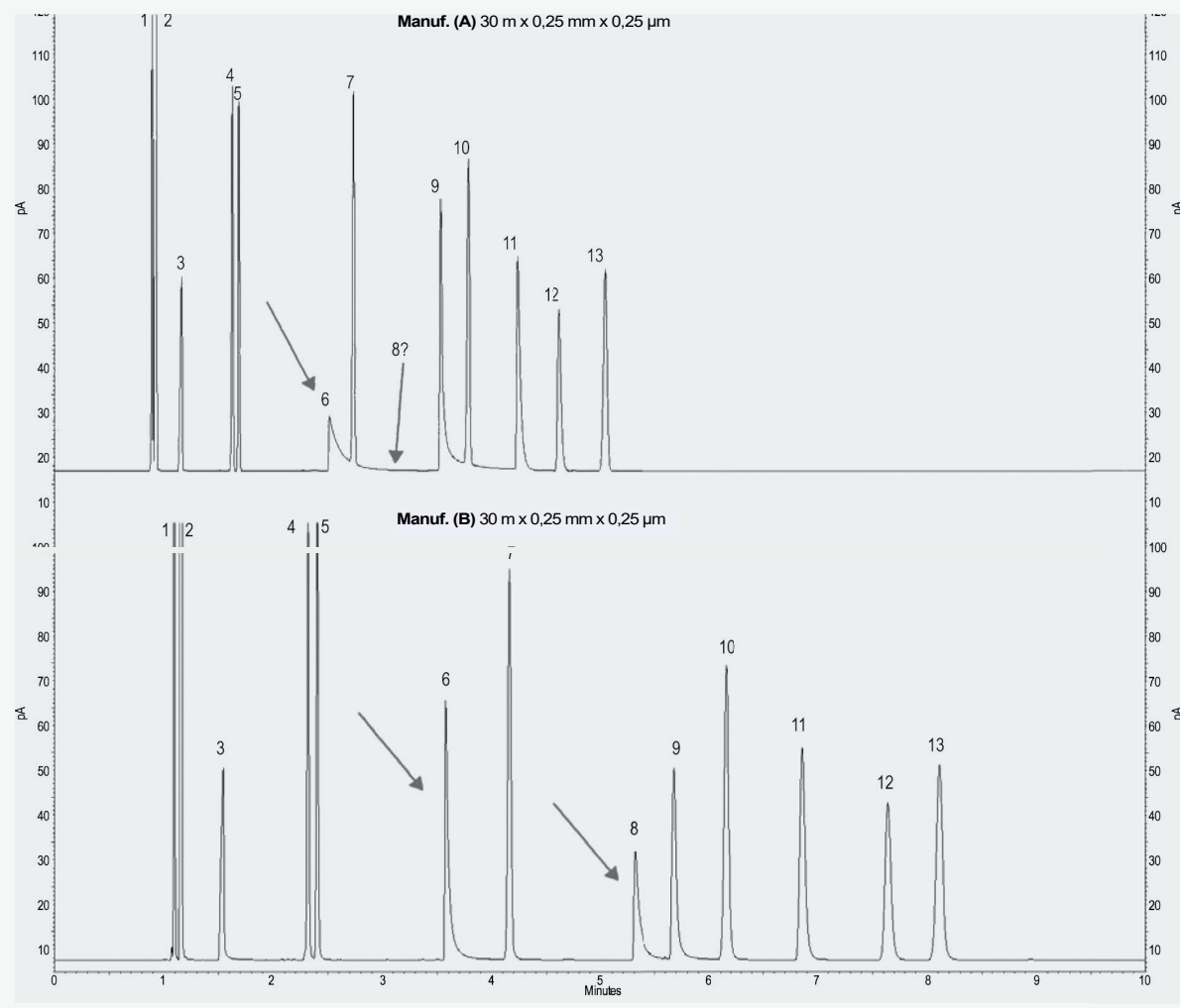
All columns are good



SAPIENS-X5MS: Ultra Inert Test \* Performance against major ultra inert column manufacturers  
 Superior quality and peak shape for all active compounds \*( J.Luong et al. J.Sep.Sci. 2007)

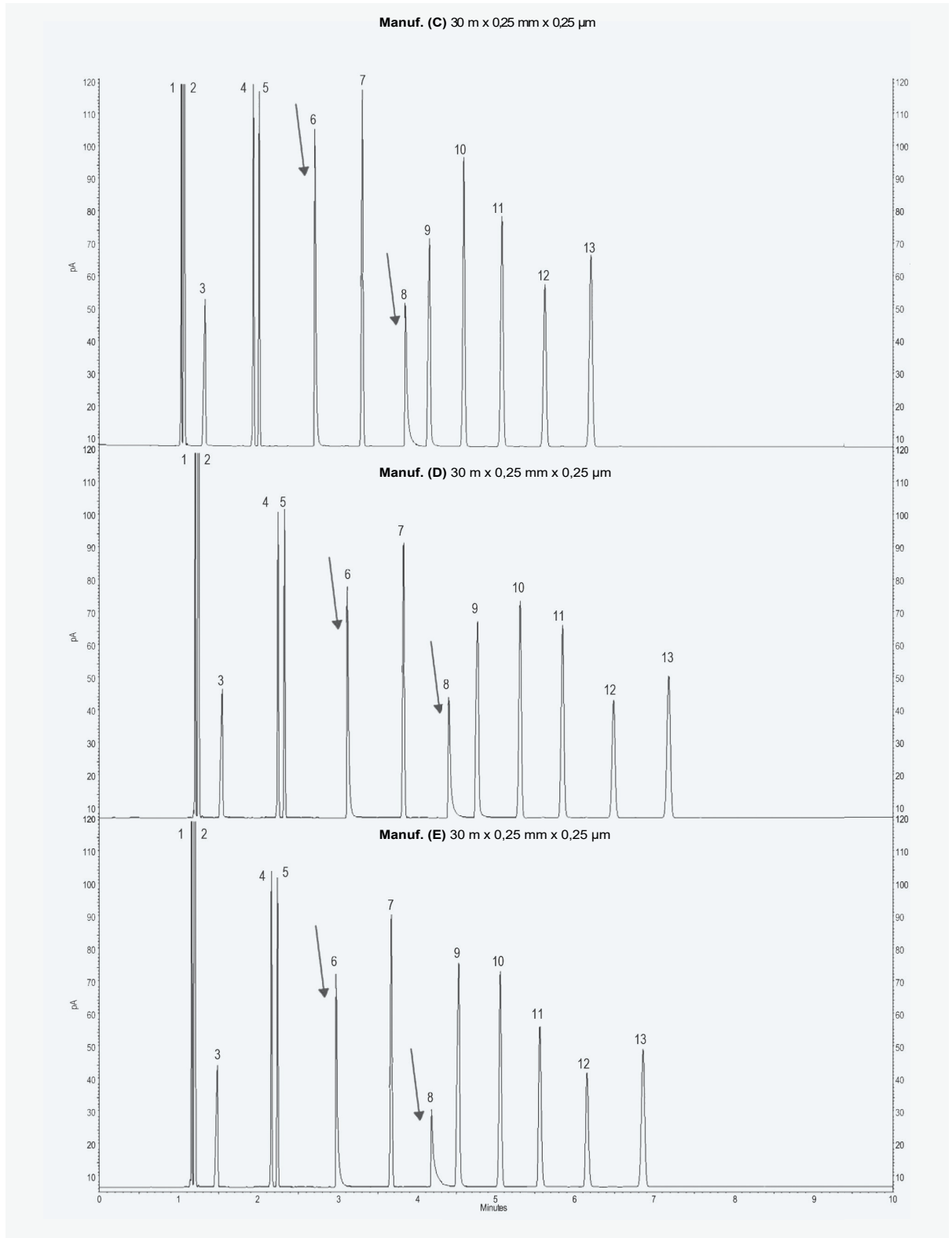


All columns are very good with a classical test but not all are excellent against a more demanding test



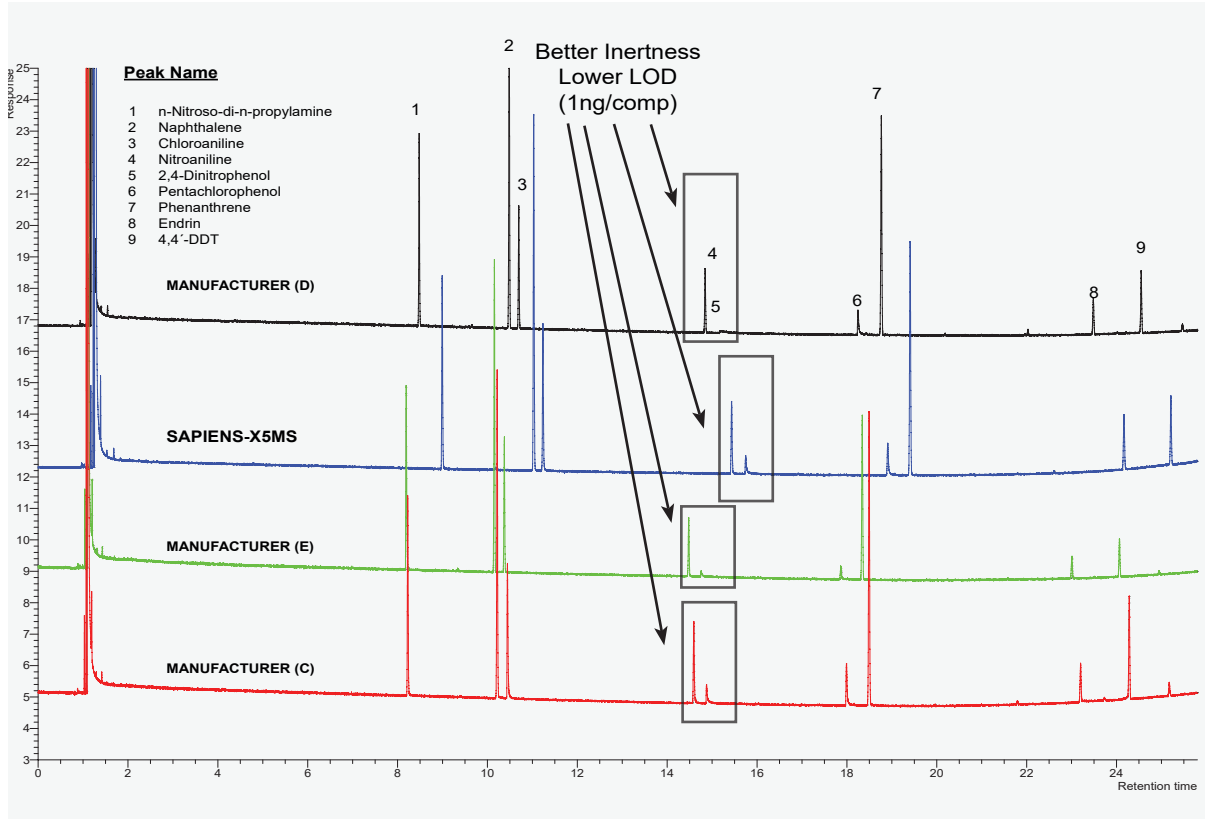


# Teknokroma Capillary Columns

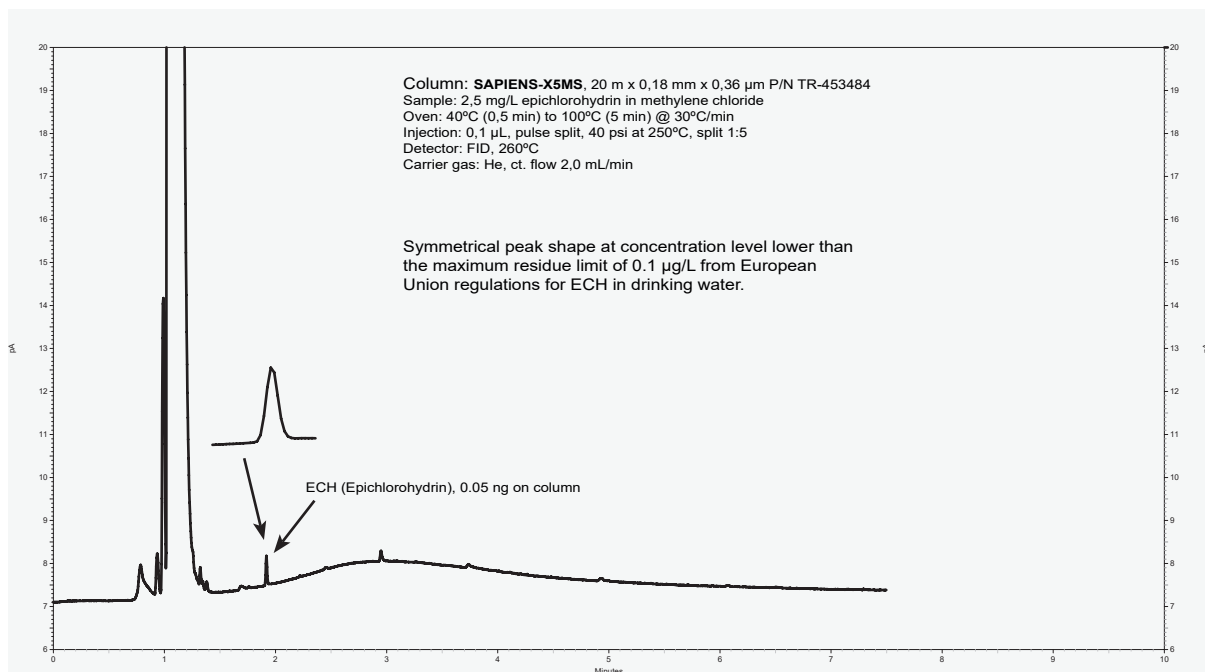


\* Columns used for comparison are from: Agilent, Phenomenex, Supelco, SGE and Restek (listed in random order)

SAPIENS-X5MS: Alinines, Phenols and Pesticides test Performance against major ultra inert column manufacturers  
Improved performance for active compounds



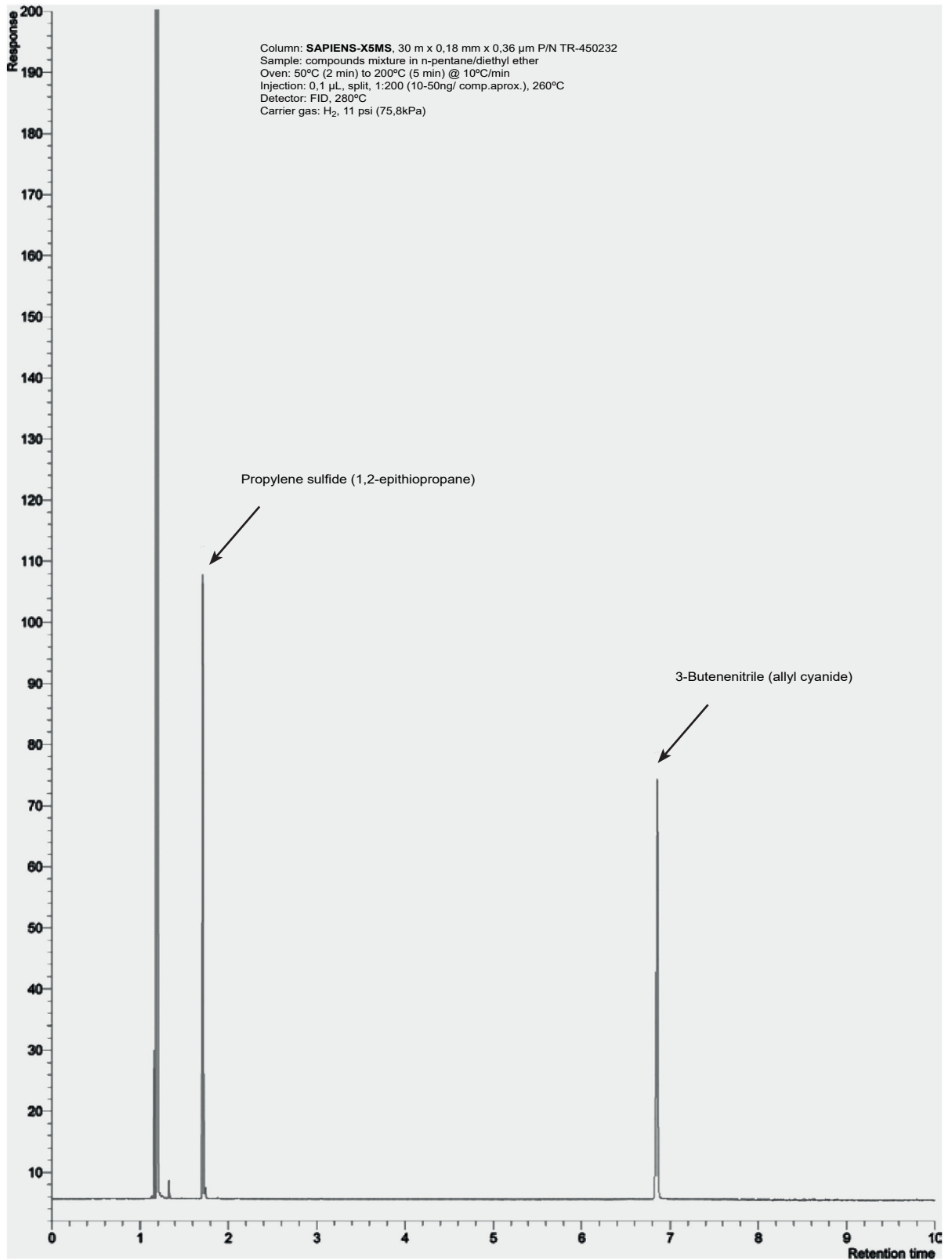
SAPIENS-X5MS: Epichlorohydrin GC analysis in drinking water with SAPIENS-X5MS column







# Teknokroma Capillary Columns



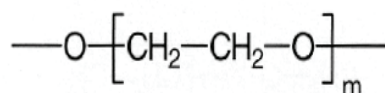
## SAPIENS-X5MS

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,10	10	0,10	-60 to 325/350	TR-450141
	20	0,10	-60 to 325/350	TR-450181
0,18	20	0,18	-60 to 325/350	TR-450984
	20	0,36	-60 to 325/350	TR-453484
0,25	15	0,25	-60 to 325/350	TR-450212
	15	1,00	-60 to 325/350	TR-451012
	25	0,25	-60 to 325/350	TR-450222
	30	0,25	-60 to 325/350	TR-450232
	30	0,50	-60 to 325/350	TR-450532
	30	1,00	-60 to 325/350	TR-451032
	50	0,25	-60 to 325/350	TR-450252
	60	0,25	-60 to 325/350	TR-450262
0,32	60	1,00	-60 to 325/350	TR-451062
	15	0,25	-60 to 325/350	TR-450213
	30	0,25	-60 to 325/350	TR-450233
	30	0,50	-60 to 325/350	TR-450533
	30	1,00	-60 to 325/350	TR-451033
	60	1,00	-60 to 325/350	TR-451063

## SAPIENS-WAX.MS

**100% polyethylene glycol, bonded and cross-linked phase**

- Specifically designed for polar compounds
- Lower bleed for trace analysis
- Solvent rinsable
- Equivalent to USP G14, G15, G16, G20, G39, G47 phases



Structure of Polyethylene glycol

### SAPIENS-WAX.MS Equivalent Phase

**Agilent:** VF-WAXms, DB-WAX UI, DB-WAX.MS

**Restek:** STABILWAX MS

**Phenomenex:** ZB-WAX Plus

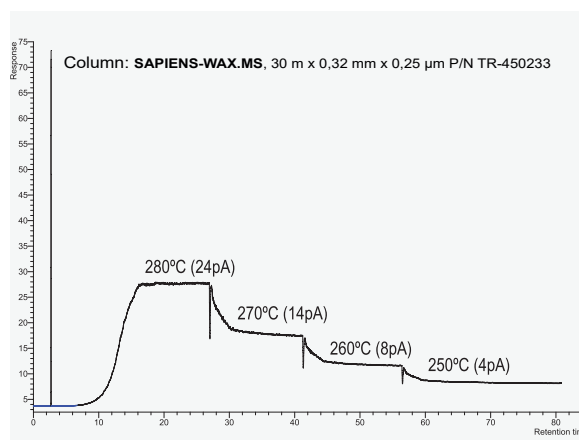
**Supelco:** Supelcowax-10

**SGE:** SOLGEL-WAX

**Macherey-Nagel:** OPTIMA-WAXplus



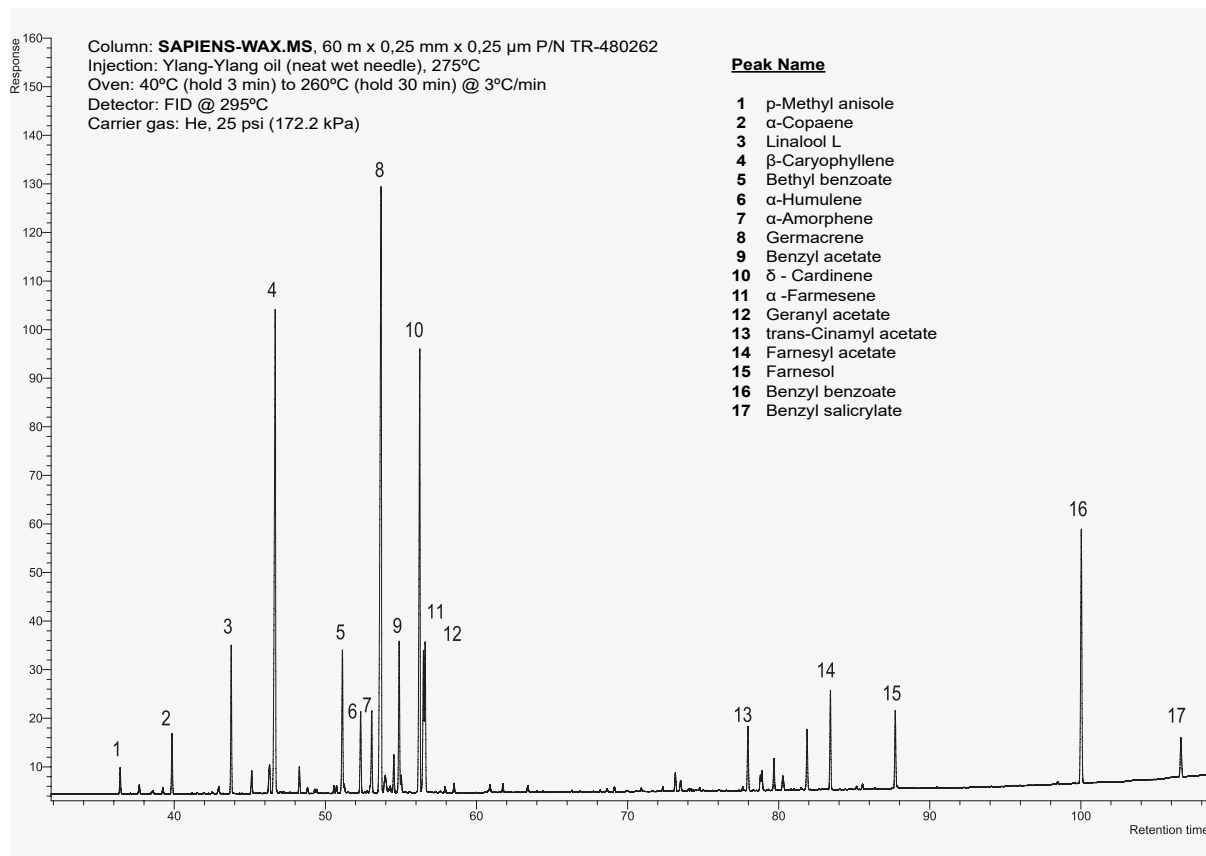
### SAPIENS-WAX.MS: Bleed vs Temperature





# Teknokroma Capillary Columns

## SAPIENS-WAX.MS: Ylang-Ylang Oil by GC-FID



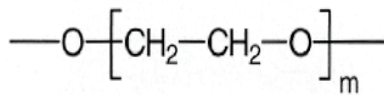
### SAPIENS-WAX.MS

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,10	10	0,10	35 to 280	TR-480141
	10	0,20	35 to 280	TR-482141
	20	0,10	35 to 280	TR-480181
0,25	15	0,25	35 to 280	TR-480212
	15	0,50	35 to 280	TR-480512
	25	0,20	35 to 280	TR-482122
	30	0,25	35 to 280	TR-480232
	30	0,50	35 to 280	TR-480532
	30	1,00	35 to 280	TR-481032
	60	0,25	35 to 280	TR-480262
0,32	30	0,25	35 to 280	TR-480233
	30	0,50	35 to 280	TR-480533
	30	1,00	35 to 280	TR-481033
	60	0,25	35 to 280	TR-480263
	60	0,50	35 to 280	TR-480563
	60	1,00	35 to 280	TR-481063

## SAPIENS-WAX.HT

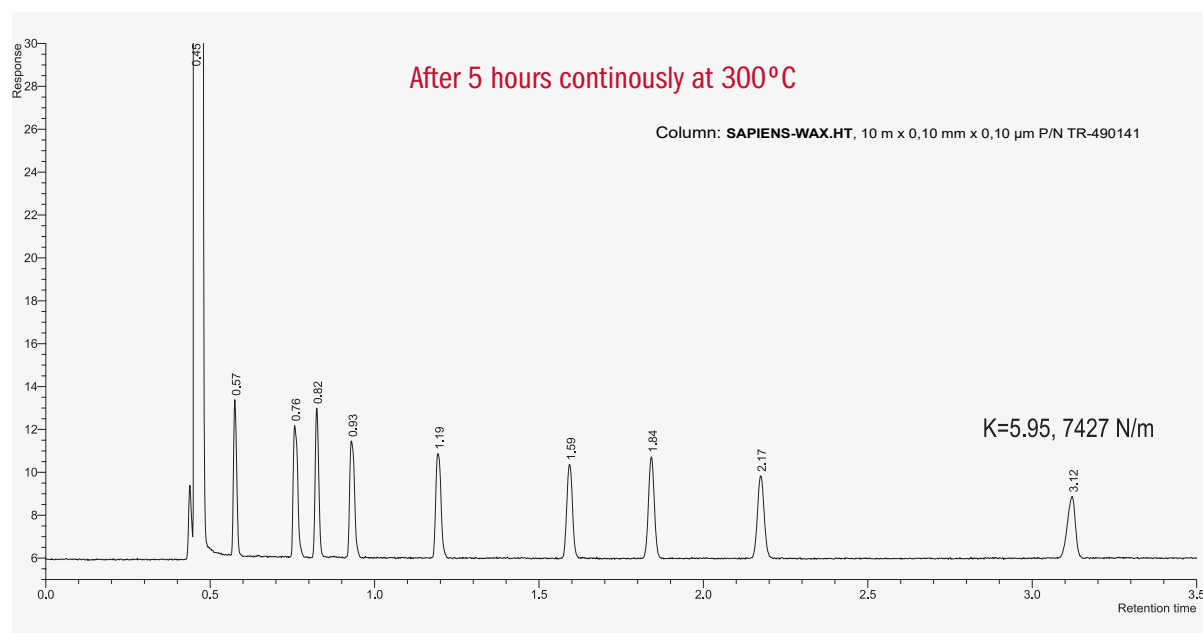
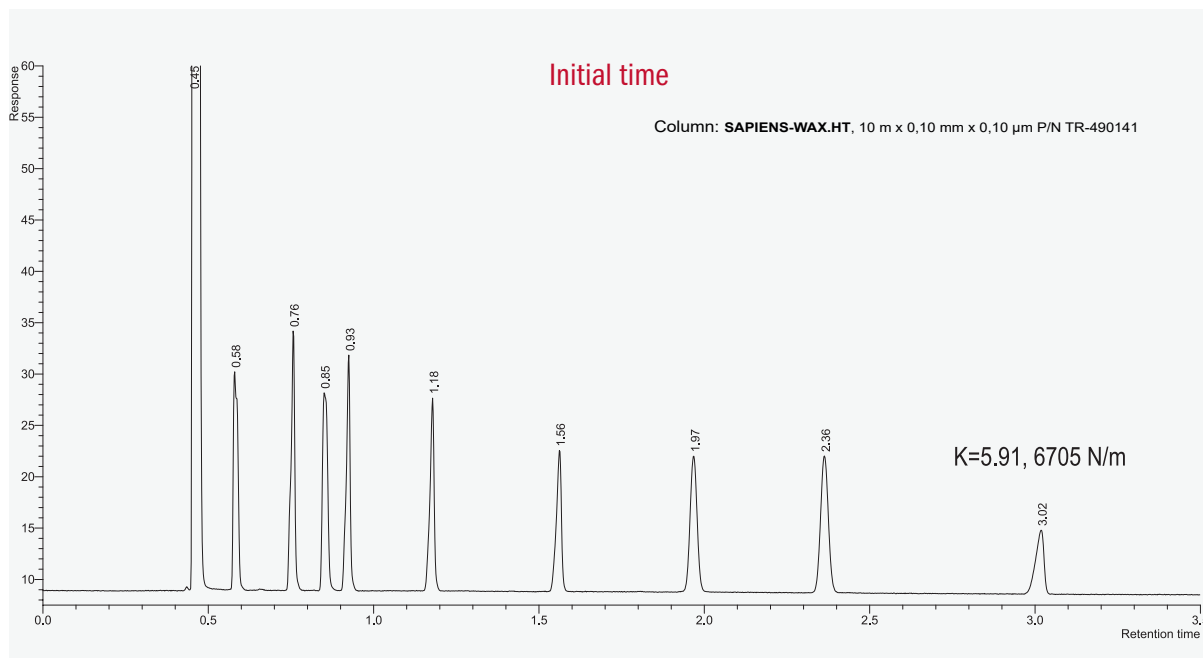
**Polyethylene glycol that can withstand up to 300 °C**

- Specifically designed for Fast GC and GC x GC analysis
- MSP High Performance



Structure of Polyethylene glycol

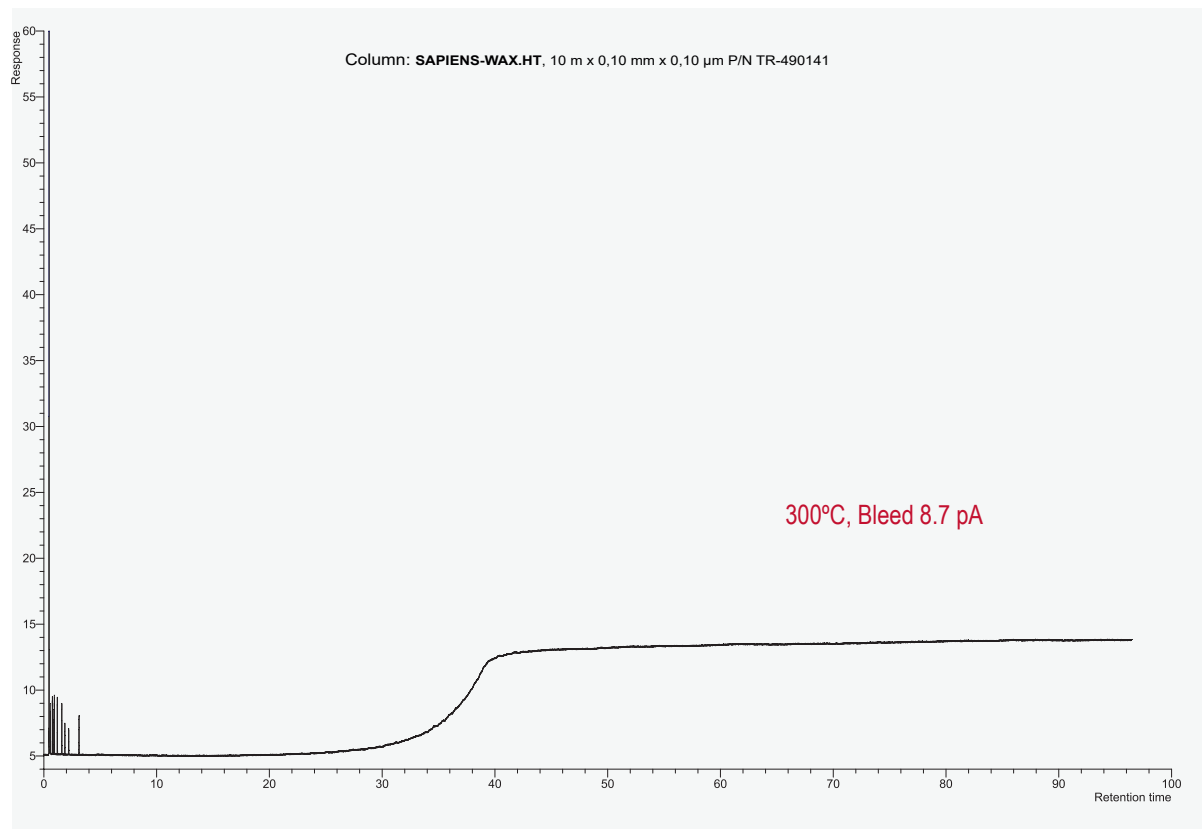
SAPIENS-WAX.HT: After 5hrs continuously at 300°C no degradation of the stationary phase is detected





# Teknokroma Capillary Columns

## SAPIENS-WAX.HT: Bleeding at 300°C



### SAPIENS-WAX.HT

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,10	2	0,10	35 to 300	TR-4901D1
	5	0,10	35 to 300	TR-4901A1
	10	0,10	35 to 300	TR-490141



## SAPIENS-624MS

**Silphenylene phase equivalent to 94% methyl-6% cyanopropylphenyl, polysiloxane bonded and cross-linked**

- Intermediate polarity
- Highly inert, excellent chromatographic performance for acidic, basic and polar compounds
- Low bleed column especially design for superior thermal stability up to 280°C
- Suitable for environmental analysis of organic volatile compounds and residual solvents in pharmaceutical products
- Meets specifications of USP <467> and PhEur 2.4.24
- Phase equivalent to USP G43

### SAPIENS-624MS Equivalent Phase G43

**Agilent:** DB-624UI, VF-624MS, VF-1301MS, DB-Select 624UI for <467>

**Restek:** Rxi-624SilMS

**SGE:** BPX-Volatile

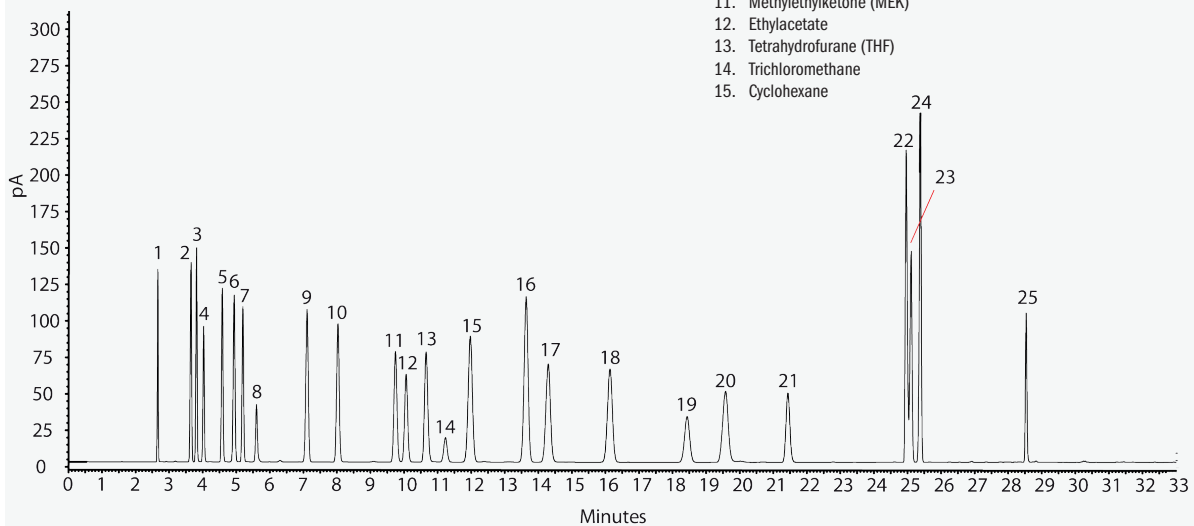
### SAPIENS-624MS

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,18	20	1,00	-20 to 260/280	TR-591084
0,20	25	1,12	-20 to 260/280	TR-591129
0,25	30	1,40	-20 to 260/280	TR-591432
	60	1,40	-20 to 260/280	TR-591462
0,32	30	1,80	-20 to 260/280	TR-591833
	60	1,80	-20 to 260/280	TR-591863
0,53	30	3,00	-20 to 260/280	TR-593035
	60	3,00	-20 to 260/280	TR-593065
	75	3,00	-20 to 260/280	TR-593075
	105	3,00	-20 to 260/280	TR-5930K5

### SAPIENS-624MS: Residual Solvents

Column: **SAPIENS-624MS**, 30 m x 0,32 mm x 1,8 µm, P/N TR-591833  
 Sample: 0.1 µl Residual Solvent mix (0,1%)  
 Injection: 260°C, Split: 1:50  
 Detector: FID @ 260°C  
 Carrier gas: He, 10 psi  
 Oven: 35°C (20 min) to 150°C (2min) @ 12°C/min

1. Methanol
2. Pentane
3. Ethanol
4. Diethylether
5. Acetone
6. 2-Propanol
7. Acetonitrile
8. Dichloromethane
9. n-Hexane
10. 1-Propanol
11. Methyllethylketone (MEK)
12. Ethylacetate
13. Tetrahydrofurane (THF)
14. Trichloromethane
15. Cyclohexane
16. Benzene
17. 2-Methylpropanol
18. Heptane
19. Trichloroethylene
20. n-Butanol
21. 1,4-Dioxane
22. Methylisobutylketone (MIBK)
23. Pyridine
24. Toluene
25. N,N-Dimethylformamide

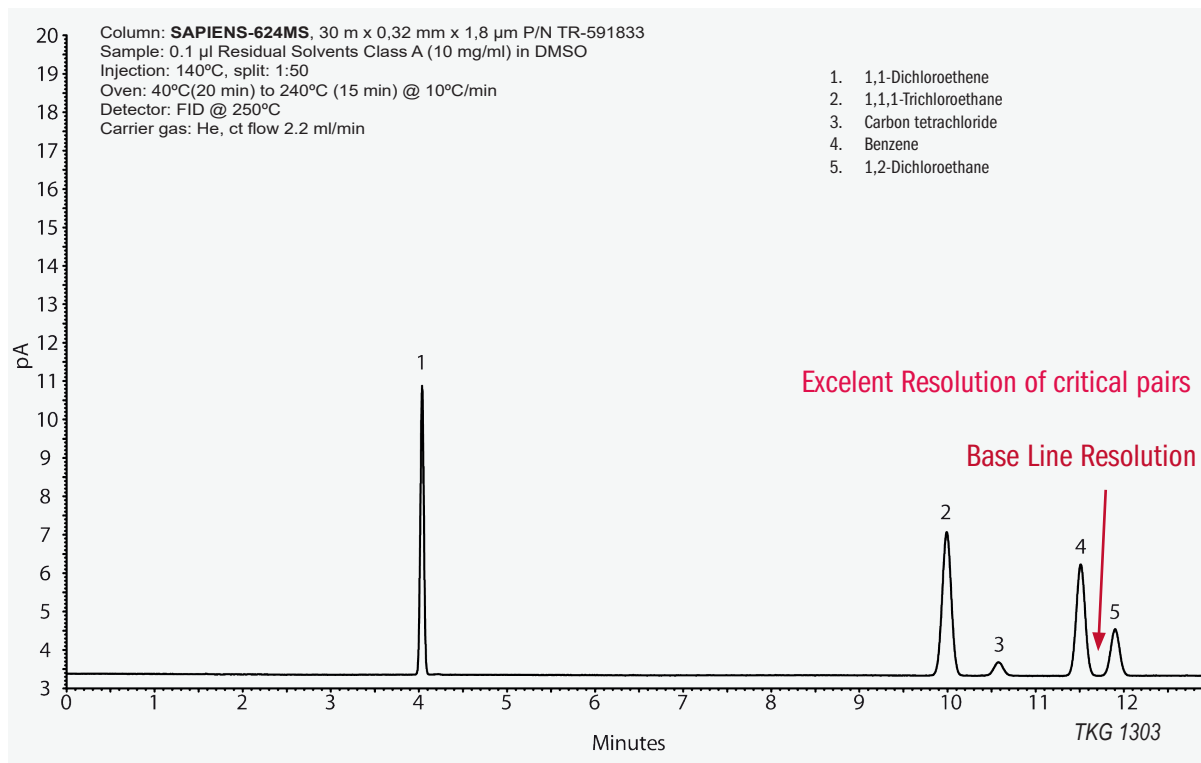


TKG 1302

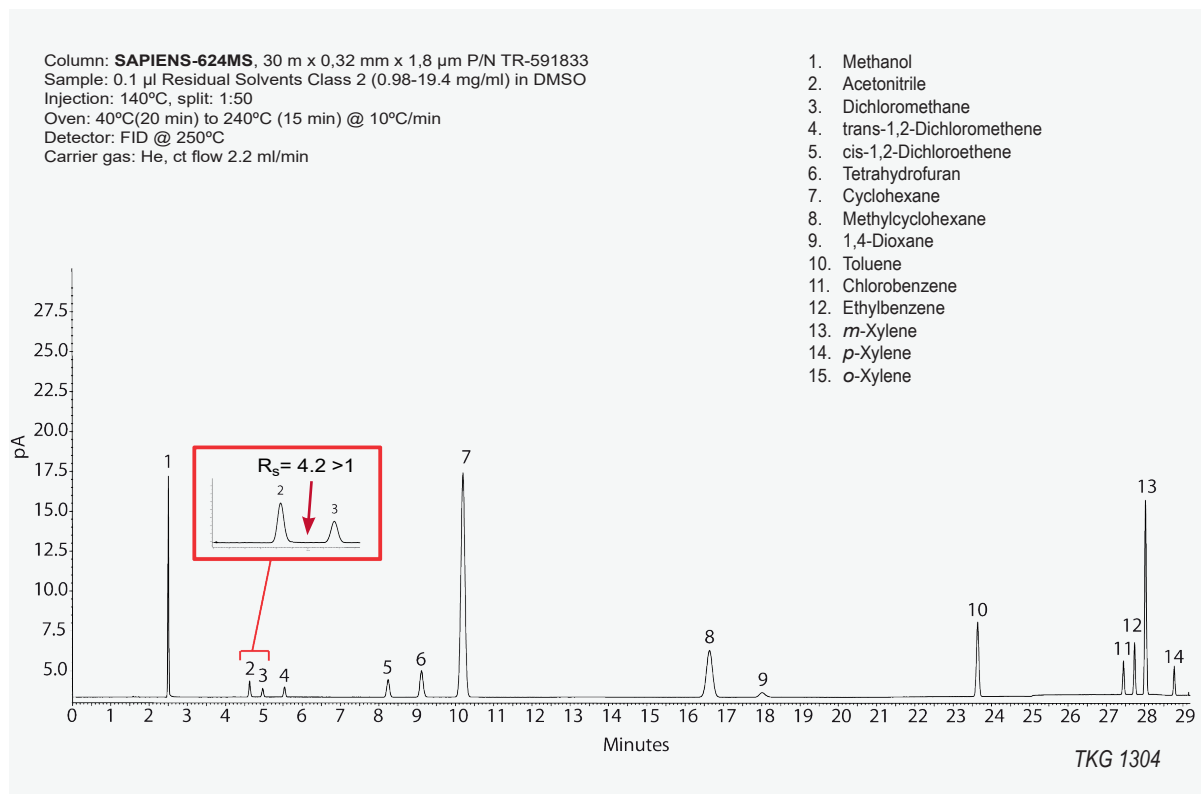


# Teknokroma Capillary Columns

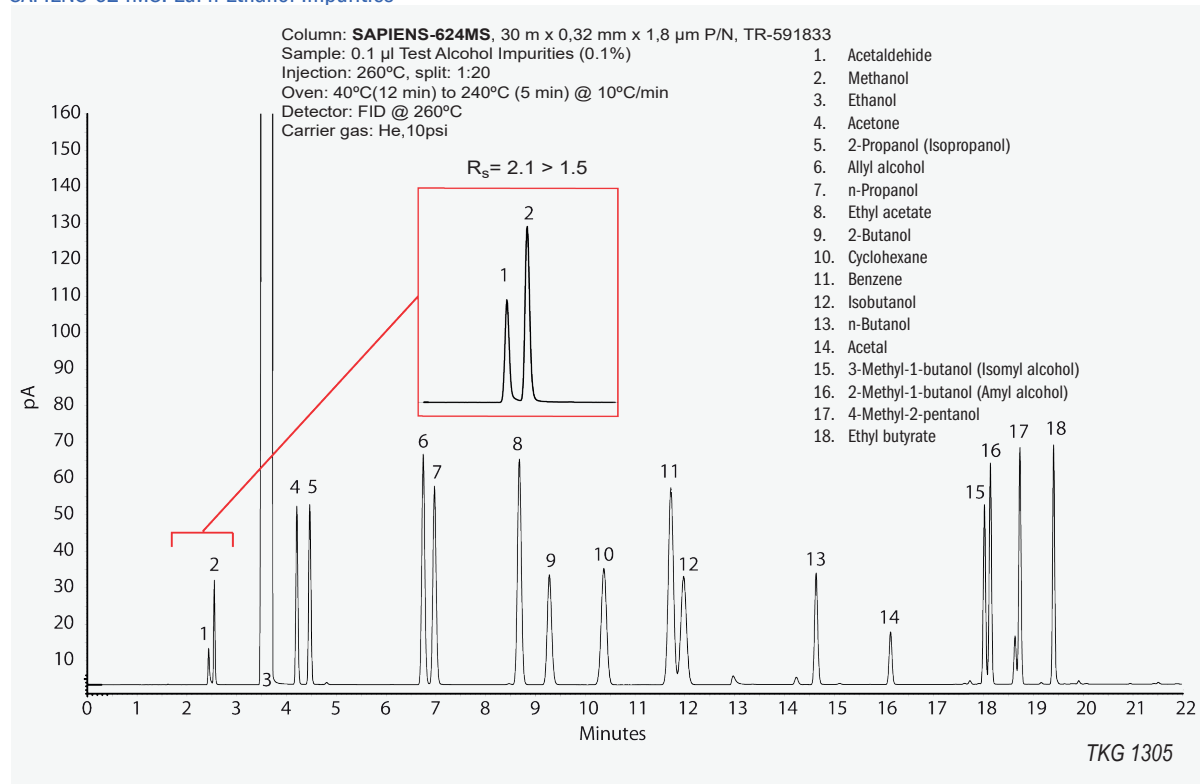
## SAPIENS-624MS: USP <467> Residual Solvents Class 1



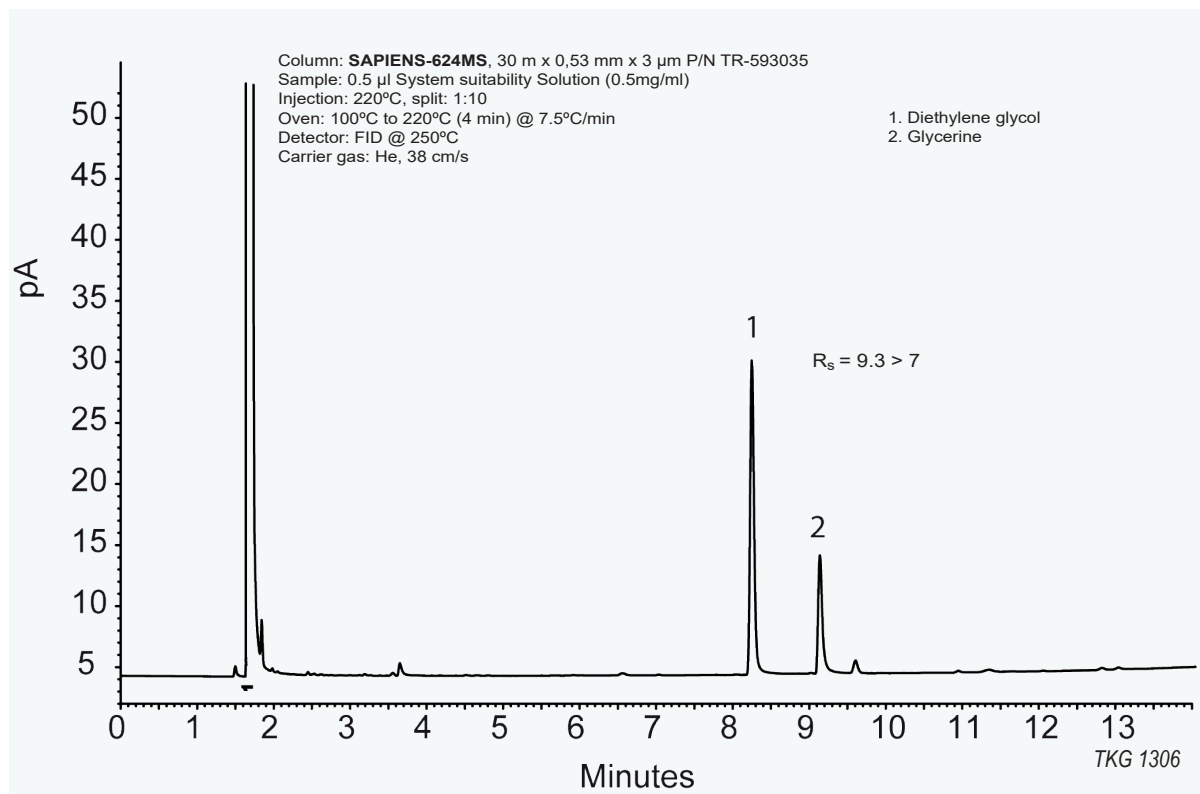
## SAPIENS-624MS: USP <467> Residual Solvents Class 2



## SAPIENS-624MS: EuPh Ethanol Impurities



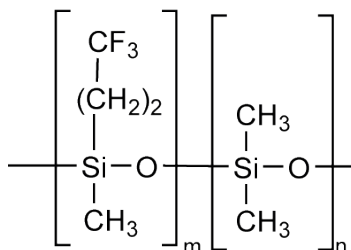
## SAPIENS-624MS: USP Glycerin monograph; Related compounds System Suitability Solution



## SAPIENS-200

**35% Trifluoropropyl-methyl polysiloxane, bonded and cross-linked phase**

- Intermediate polarity
- Unique selectivity based on the high electron acceptance of fluorine atoms
- Column of choice for the separation of compounds with electron-donor groups such as ketones, esters, nitriles, secondary and tertiary amines, nitro and chlorinated compounds, PAHs, CFCs and silanes
- Low bleed, ideal for NPD, ECD and MS detectors



Structure of Poly (dimethyltrifluoropropylmethyl) siloxane

## SAPIENS-200 Equivalent Phase

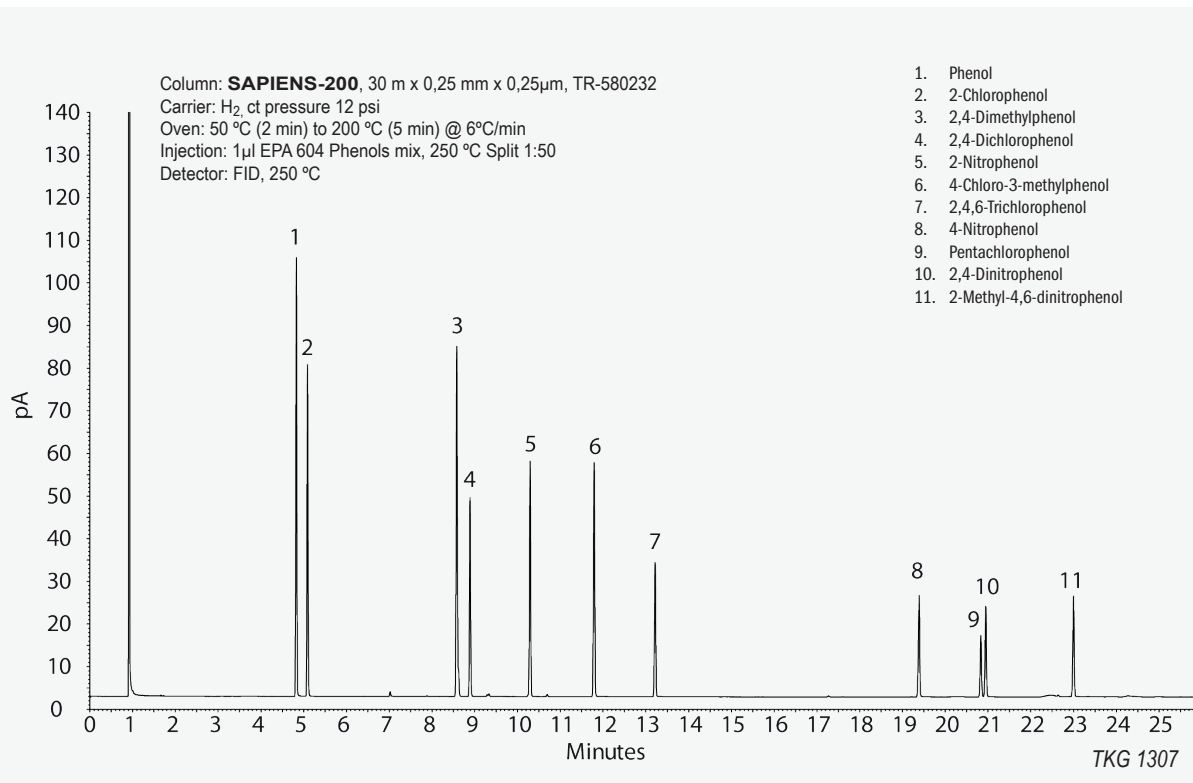
Agilent: DB-200

Restek: Rtx-200

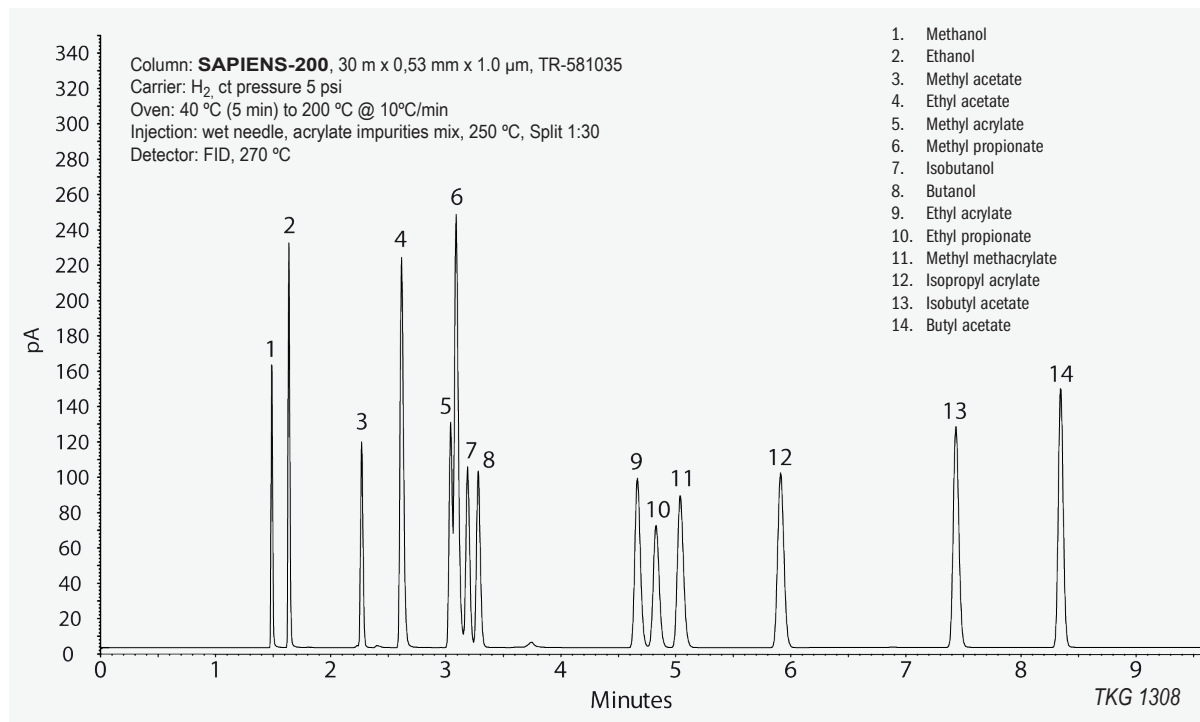
## SAPIENS-200

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,25	15	0,25	30 to 300/320	TR-580212
	30	0,25	30 to 300/320	TR-580232
	60	0,25	30 to 300/320	TR-580262
	30	0,50	30 to 300/320	TR-580532
	60	0,50	30 to 300/320	TR-580562
	30	1,00	30 to 280/300	TR-581032
	60	1,00	30 to 280/300	TR-581062
0,32	30	0,25	30 to 300/320	TR-580233
	60	0,25	30 to 300/320	TR-580263
	30	0,50	30 to 300/320	TR-580533
	60	0,50	30 to 300/320	TR-580563
	30	1,00	30 to 280/300	TR-581033
	60	1,00	30 to 280/300	TR-581063
	30	1,80	30 to 270/300	TR-581833
	60	1,80	30 to 270/300	TR-581863
0,53	30	0,25	30 to 300/320	TR-580235
	60	0,25	30 to 300/320	TR-580265
	30	0,50	30 to 300/320	TR-580535
	60	0,50	30 to 300/320	TR-580565
	30	1,00	30 to 280/300	TR-581035
	60	1,00	30 to 280/300	TR-581065
	60	3,00	30 to 260/280	TR-583065

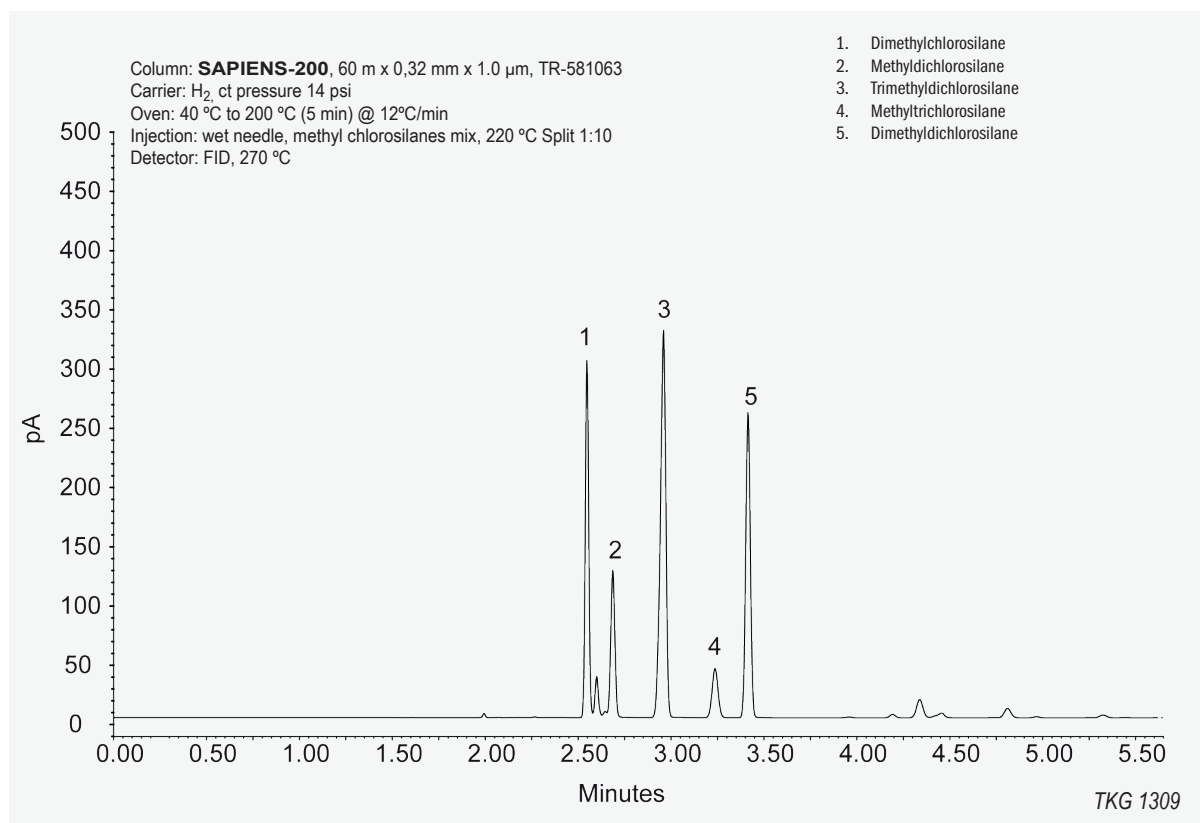
## SAPIENS-200: EPA 604 Phenols



## SAPIENS-200: Acrylate Impurities



## SAPIENS-200: Methyl Chlorosilanes





# Teknokroma Capillary Columns

## SAPIENS-200: Solvents

Column: **SAPIENS-200**, 30m x 0.32mm x 1.0um, TR-581033

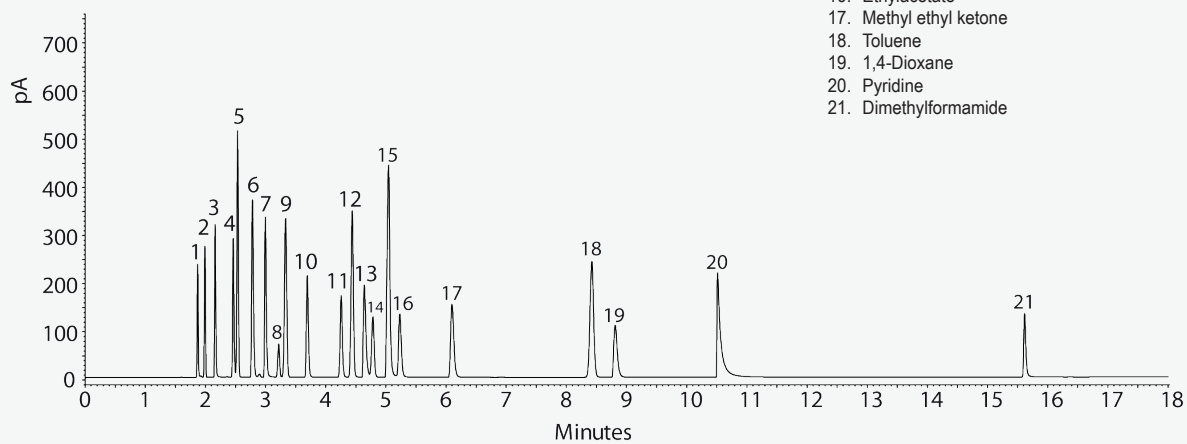
Injection: solvents mix, wet needle, 250°C, split 1:50

Carrier gas: He, ct. pressure 10psi (68.9kPa)

Oven program: 40°C (8min) to 150°C @ 12°C/min

Detector: FID, 300°C

1. Methanol
2. n-Pentane
3. Ethanol
4. Isopropanol
5. Methylene chloride
6. t-Butanol
7. n-Propanol
8. Chloroform
9. Cyclohexane
10. Acetone
11. Acetonitrile
12. Benzene
13. Tetrahydrofuran
14. Trichloroethylene
15. n-Butanol
16. Ethylacetate
17. Methyl ethyl ketone
18. Toluene
19. 1,4-Dioxane
20. Pyridine
21. Dimethylformamide



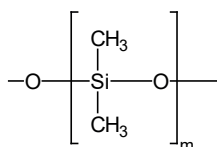
TKG 1310



## TRB-1

### 100% Dimethyl polysiloxane, bonded and crosslinked phase

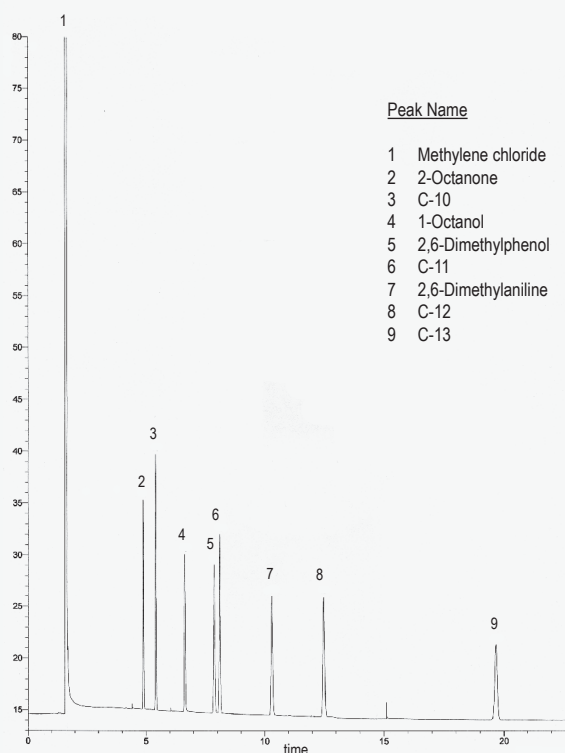
- 100% Dimethyl polysiloxane
- Non-polar phase
- Column for general use
- High thermal stability
- Ideal column for the analysis of petrochemical products and industrial solvents



Structure of Poly (dimethyl) siloxane

### TRB-1: Test

Column: **TRB-1**, 25m x 0.15mm x 1.2µm, P/N TR-111226  
 Oven: 145°C (isothermal)  
 Injection: 1 µL Test SP-4-7300, split 1:100, 280°C  
 Carrier gas: H<sub>2</sub>, ct pressure 22 psi (151.6 kPa)  
 Detector: FID, 300°C



#### Peak Name

- 1 Methylene chloride
- 2 2-Octanone
- 3 C-10
- 4 1-Octanol
- 5 2,6-Dimethylphenol
- 6 C-11
- 7 2,6-Dimethylaniline
- 8 C-12
- 9 C-13

TKG 1102

### TRB-1

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,10	5	0,12	-60 to 325/350	TR-1107A1
	10	0,10	-60 to 325/350	TR-110141
	10	0,40	-60 to 320/340	TR-110441
	20	0,10	-60 to 325/350	TR-110181
	20	0,40	-60 to 320/340	TR-110481
	40	0,20	-60 to 325/350	TR-1121C1
	40	0,40	-60 to 320/340	TR-1104C1

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,18	10	0,18	-60 to 325/350	TR-110944
	10	0,20	-60 to 325/350	TR-112144
	10	0,40	-60 to 325/350	TR-110444
	20	0,18	-60 to 325/350	TR-110984
	20	0,40	-60 to 325/350	TR-110484
	40	0,40	-60 to 325/350	TR-1104C4



# Teknokroma Capillary Columns

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
<b>0,20</b>	12	0,33	-60 to 325/350	<b>TR-1133B9</b>
	15	0,15	-60 to 325/350	<b>TR-111319</b>
	15	0,35	-60 to 325/350	<b>TR-110319</b>
	15	0,50	-60 to 325/350	<b>TR-110519</b>
	25	0,15	-60 to 325/350	<b>TR-111329</b>
	25	0,33	-60 to 325/350	<b>TR-113329</b>
	25	0,35	-60 to 325/350	<b>TR-110329</b>
	25	0,50	-60 to 325/350	<b>TR-110529</b>
	30	0,15	-60 to 325/350	<b>TR-111339</b>
	30	0,35	-60 to 325/350	<b>TR-110339</b>
	30	0,50	-60 to 325/350	<b>TR-110539</b>
	50	0,15	-60 to 325/350	<b>TR-111359</b>
	50	0,33	-60 to 325/350	<b>TR-113359</b>
	50	0,35	-60 to 325/350	<b>TR-110359</b>
	60	0,15	-60 to 325/350	<b>TR-111369</b>
	60	0,50	-60 to 325/350	<b>TR-110569</b>
<b>0,25</b>	15	0,10	-60 to 325/350	<b>TR-110112</b>
	15	0,25	-60 to 325/350	<b>TR-110212</b>
	15	0,50	-60 to 325/350	<b>TR-110512</b>
	15	1,00	-60 to 325/340	<b>TR-111012</b>
	25	0,10	-60 to 325/350	<b>TR-110122</b>
	25	0,25	-60 to 325/350	<b>TR-110222</b>
	25	0,50	-60 to 325/350	<b>TR-110522</b>
	25	1,00	-60 to 320/340	<b>TR-111022</b>
	30	0,10	-60 to 325/350	<b>TR-110132</b>
	30	0,25	-60 to 325/350	<b>TR-110232</b>
	30	0,50	-60 to 325/350	<b>TR-110532</b>
	30	1,00	-60 to 320/340	<b>TR-111032</b>
	50	0,10	-60 to 325/350	<b>TR-110152</b>
	50	0,25	-60 to 325/350	<b>TR-110252</b>
	50	0,50	-60 to 325/350	<b>TR-110552</b>
	50	1,00	-60 to 320/340	<b>TR-111052</b>
	60	0,10	-60 to 325/350	<b>TR-110162</b>
	60	0,25	-60 to 325/350	<b>TR-110262</b>
	60	0,50	-60 to 325/350	<b>TR-110562</b>
	60	1,00	-60 to 325/350	<b>TR-111062</b>
	100	1,00	-60 to 325/350	<b>TR-111092</b>
	105	1,00	-60 to 325/350	<b>TR-1110K2</b>
<b>0,32</b>	15	0,10	-60 to 325/350	<b>TR-110113</b>
	15	0,25	-60 to 325/350	<b>TR-110213</b>
	15	0,50	-60 to 325/350	<b>TR-110513</b>
	15	1,00	-60 to 325/350	<b>TR-111013</b>
	15	3,00	-60 to 280/300	<b>TR-113013</b>
	25	0,10	-60 to 325/350	<b>TR-110123</b>
	25	0,25	-60 to 325/350	<b>TR-110223</b>
	25	0,50	-60 to 325/350	<b>TR-110523</b>
	25	1,00	-60 to 325/350	<b>TR-111023</b>
	25	3,00	-60 to 280/300	<b>TR-113023</b>
	30	0,10	-60 to 325/350	<b>TR-110133</b>
	30	0,25	-60 to 325/350	<b>TR-110233</b>

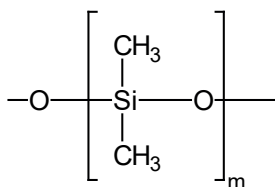
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
	30	0,50	-60 to 325/350	<b>TR-110533</b>
	30	1,00	-60 to 325/350	<b>TR-111033</b>
	30	3,00	-60 to 280/300	<b>TR-113033</b>
	50	0,10	-60 to 325/350	<b>TR-110153</b>
	50	0,25	-60 to 325/350	<b>TR-110253</b>
	50	0,50	-60 to 325/350	<b>TR-110553</b>
	50	1,00	-60 to 325/350	<b>TR-111053</b>
	50	3,00	-60 to 280/300	<b>TR-113053</b>
	60	0,10	-60 to 325/350	<b>TR-110163</b>
	60	0,25	-60 to 325/350	<b>TR-110263</b>
	60	0,50	-60 to 325/350	<b>TR-110563</b>
	60	1,00	-60 to 325/350	<b>TR-111063</b>
	60	3,00	-60 to 280/300	<b>TR-113063</b>
	60	5,00	-60 to 260/280	<b>TR-115063</b>
<b>0,53</b>	10	2,65	-60 to 300/310	<b>TR-112645</b>
	15	0,10	-60 to 320/340	<b>TR-110115</b>
	15	0,50	-60 to 320/340	<b>TR-110515</b>
	15	1,50	-60 to 310/330	<b>TR-111515</b>
	15	3,00	-60 to 270/290	<b>TR-113015</b>
	15	5,00	-60 to 270/290	<b>TR-115015</b>
	15	7,00	-60 to 260/280	<b>TR-117015</b>
	25	0,10	-60 to 320/340	<b>TR-110125</b>
	25	0,50	-60 to 320/340	<b>TR-110525</b>
	25	1,50	-60 to 310/330	<b>TR-111525</b>
	25	3,00	-60 to 270/290	<b>TR-113025</b>
	25	5,00	-60 to 270/290	<b>TR-115025</b>
	30	0,10	-60 to 320/340	<b>TR-110135</b>
	30	0,50	-60 to 320/340	<b>TR-110535</b>
	30	0,88	-60 to 310/330	<b>TR-110835</b>
	30	1,50	-60 to 310/330	<b>TR-111535</b>
	30	2,65	-60 to 270/290	<b>TR-112635</b>
	30	3,00	-60 to 270/290	<b>TR-113035</b>
	30	5,00	-60 to 270/290	<b>TR-115035</b>
	30	7,00	-60 to 260/280	<b>TR-117035</b>
	50	0,10	-60 to 320/340	<b>TR-110155</b>
	50	0,50	-60 to 320/340	<b>TR-110555</b>
	50	1,50	-60 to 310/330	<b>TR-111555</b>
	50	3,00	-60 to 270/290	<b>TR-113055</b>
	50	5,00	-60 to 270/290	<b>TR-115055</b>
	60	0,10	-60 to 320/340	<b>TR-110165</b>
	60	0,50	-60 to 320/340	<b>TR-110565</b>
	60	1,50	-60 to 310/330	<b>TR-111565</b>
	60	3,00	-60 to 270/290	<b>TR-113065</b>
	60	5,00	-60 to 270/290	<b>TR-115065</b>
	60	7,00	-60 to 240/260	<b>TR-117065</b>
	100	3,00	-60 to 270/290	<b>TR-113095</b>
	105	3,00	-60 to 270/290	<b>TR-1130K5</b>



## TRB-1HT/TKM-1HT

**100% Dimethyl polysiloxane, bonded and crosslinked phase.**

- Non-polar phase
- Produced specially for high temperature analyses (Max. temp. 400°C)
- Available in fused silica (TRB-1HT) and metal tubing (TKM-1HT) add "M" at the end of the desired P/N
- Uses: analysis of compounds with high boiling point, triglycerides, waxes, etc.



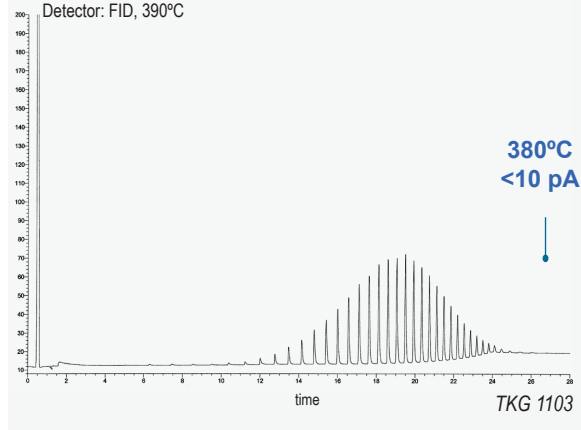
Structure of Poly (dimethyl) siloxane

### TRB-1HT Equivalent Phase

**Agilent:** DB-1HT, Select Mineral Oil  
**Restek:** Stx-1HT, Rxi-1HT  
**Phenomenex:** ZB-1HT Inferno, ZB-XTSimDist  
**SGE:** BPX1

## TRB-1HT

Column: Retention Gap (intermediate polarity) 5 m x 0.53 mm (TR-200055) + **TRB-1HT** (TR-610113) 15 m x 0.32 mm x 0.10 µm  
 Oven: 50°C (2 min) to 380°C (5 min) @ 15°C/min  
 Injection: 0,3 µL Poliowax 655 (0,1% in CS<sub>2</sub>), on column (sec. cool 30 s), 280°C  
 Carrier gas: H<sub>2</sub>, ct flow 2mL/min  
 Detector: FID, 390°C



## TRB-1HT

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,25	15	0,10	-60 to 400	TR-610112
	30	0,10	-60 to 400	TR-610132
0,32	15	0,10	-60 to 400	TR-610113
	30	0,10	-60 to 400	TR-610133

## TKM-1HT SimDist

**100% Dimethyl polysiloxane, bonded and crosslinked phase.**

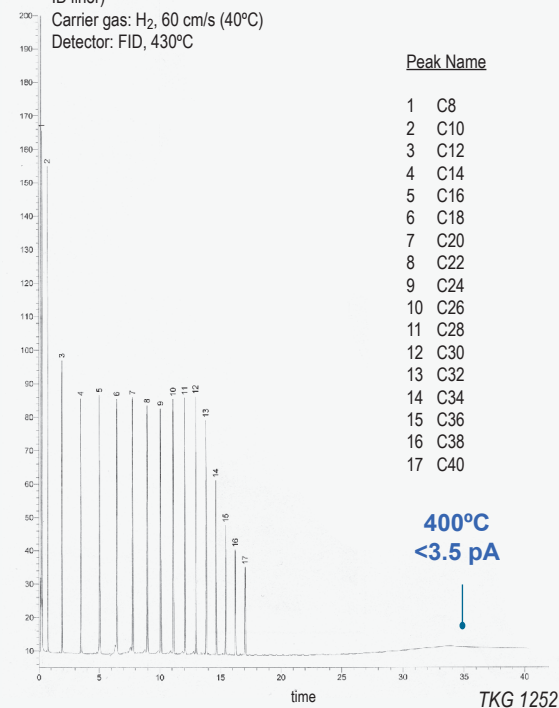
- True methyl silicone polarity
- Unbreakable, specially treated stainless steel
- Maximum temperature 430°C
- Low bleed at 400°C (Typical values of 4-6 pA)
- Distillation range C6 to C120

### TKM-1HT SimDist Equivalent Phase

**Agilent:** DB-HT SimDist, CP-SimDist Ultimetall  
**Restek:** MXT-1HT SimDist  
**Phenomenex:** ZB-1HT Inferno, ZB-XTSimDist  
**SGE:** BPX1  
**SUPELCO:** HT5

## TKM-1HT SimDist

Column: **TKM-1HT SimDist**, 5m x 0.53mm x 0.10µm, P/N TR-2301A5M  
 Oven: 40°C to 400 °C (15 min) @ 15°C/min  
 Injection: 0,4 µL Hydrocarbons C8-C40 (500 ng/µL), 300°C, split 1:20 (3mm ID liner)  
 Carrier gas: H<sub>2</sub>, 60 cm/s (40°C)  
 Detector: FID, 430°C



## TKM-1HT SimDist

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,53	5	0,10	-60 to 400/430	TR-2301A5M
	5	0,15	-60 to 400/430	TR-2313A5M

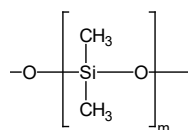


# Teknokroma Capillary Columns

## TRB-1MS

**100% Dimethyl polysiloxane, bonded and crosslinked phase.**

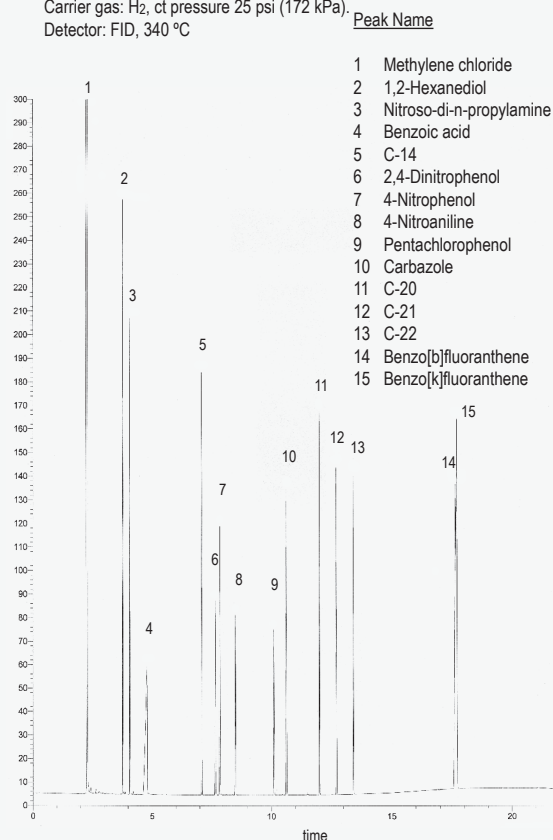
- These columns gives identical selectivity to the TRB-1, fulfil column bleed specifications that make them compatible with analysis of trace components with GC/MS. Therefore, the standard column of 30 m x 0.25 mm x 0.25 µm has a guaranteed maximum bleed of 4 pA at 320 °C
- Great chemical inertness towards active compounds and excellent thermal stability
- Improved signal/noise ratio, which enables greater sensitivity with MS, ECD, NPD, SCD, etc. detectors and provides greater precision in quantitative analysis at trace levels
- Less column bleed means less detectors contamination and faster column conditioning



Structure of Poly (dimethyl) siloxane

### TRB-1MS: MX5 Test

Column: **TRB-1MS**, 60m x 0.25mm x 0.25µm, P/N TR-510262  
 Oven: 100°C to 325 °C (5 min) @ 6°C/min  
 Injection: 1µL Test MX5 (10 to 20 ng/comp. on column), split 1:100, 280°C  
 Carrier gas: H<sub>2</sub>, ct pressure 25 psi (172 kPa).  
 Detector: FID, 340 °C



TKG 1104

### TRB-1MS Equivalent Phase

**Agilent:** HP-1MS, DB-1MS, VF-1MS, CP-SIL 5 CB MS  
**Restek:** Rtx-1MS  
**Phenomenex:** ZB-1MS  
**Macherey-Nagel:** OPTIMA-1MS, OPTIMA-1MS Accent  
**Supelco:** EQUITY-1  
**SGE:** SOLGEL-1MS, BPX-1

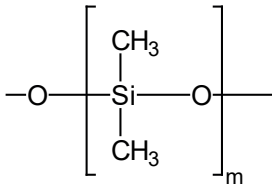
### TRB-1MS

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
<b>0,10</b>	10	0,10	-60 to 325/350	<b>TR-510141</b>
	10	0,40	-60 to 325/350	<b>TR-510441</b>
	20	0,10	-60 to 325/350	<b>TR-510181</b>
<b>0,18</b>	20	0,40	-60 to 325/350	<b>TR-510481</b>
	40	0,18	-60 to 325/350	<b>TR-510984</b>
<b>0,20</b>	40	0,18	-60 to 325/350	<b>TR-5109C4</b>
	12	0,33	-60 to 325/350	<b>TR-5133B9</b>
<b>0,25</b>	15	0,33	-60 to 325/350	<b>TR-513319</b>
	25	0,33	-60 to 325/350	<b>TR-513329</b>
	30	0,33	-60 to 325/350	<b>TR-513339</b>
	50	0,33	-60 to 325/350	<b>TR-513359</b>
	60	0,33	-60 to 325/350	<b>TR-513369</b>
	15	0,25	-60 to 325/350	<b>TR-510212</b>
<b>0,32</b>	15	1,00	-60 to 325/350	<b>TR-511012</b>
	30	0,10	-60 to 325/350	<b>TR-510132</b>
	30	0,25	-60 to 325/350	<b>TR-510232</b>
	30	1,00	-60 to 325/350	<b>TR-511032</b>
	60	0,10	-60 to 325/350	<b>TR-510162</b>
	60	0,25	-60 to 325/350	<b>TR-510262</b>
	60	1,00	-60 to 325/350	<b>TR-511062</b>
	15	0,10	-60 to 325/350	<b>TR-510113</b>
	15	0,25	-60 to 325/350	<b>TR-510213</b>
	15	0,50	-60 to 325/350	<b>TR-510513</b>
	15	1,00	-60 to 325/350	<b>TR-511013</b>
	60	1,00	-60 to 325/350	<b>TR-511062</b>
	30	0,10	-60 to 325/350	<b>TR-510133</b>
	30	0,25	-60 to 325/350	<b>TR-510233</b>
	30	0,50	-60 to 325/350	<b>TR-510533</b>
30	1,00	-60 to 325/350	<b>TR-511033</b>	
60	0,10	-60 to 325/350	<b>TR-510163</b>	
60	0,25	-60 to 325/350	<b>TR-510263</b>	
60	0,50	-60 to 325/350	<b>TR-510563</b>	
60	1,00	-60 to 325/350	<b>TR-511063</b>	
<b>0,53</b>	15	0,50	-60 to 320/340	<b>TR-510515</b>
	15	1,00	-60 to 320/340	<b>TR-511015</b>
	15	1,50	-60 to 310/330	<b>TR-511515</b>
	30	0,50	-60 to 320/340	<b>TR-510535</b>
	30	1,00	-60 to 320/340	<b>TR-511035</b>
30	1,50	-60 to 310/330	<b>TR-511535</b>	

## TRB-SULFUR

**100% Dimethyl polysiloxane, bonded and crosslinked phase.**

- Column specially designed for the analysis of sulphurous compounds (in natural gas, petrol derivatives, wines, beer, etc.)
- Guaranteed thermal stability, with low column bleed



Structure of Poly (dimethyl) siloxane

### TRB-SULFUR Equivalent Phase

**Agilent:** CP-Select CB for Sulfur, CP-Sil 5CB for Sulfur  
**Supelco:** SPB-1 SULFUR

### TRB-SULFUR

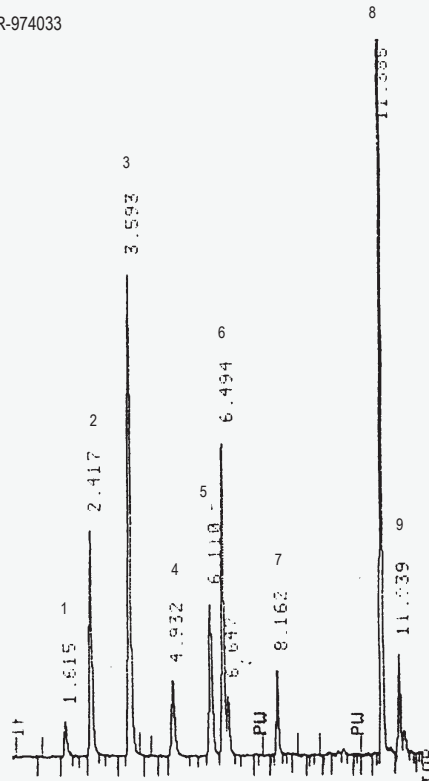
Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,32	30	4,00	-60 to 270/290	TR-974033

## TRB-SULFUR: MERCAPTANS

Column: **TRB-SULFUR**, 30 m x 0.32 mm x 4.0 µm, TR-974033

### Peak Name

- 1 SH<sub>2</sub>
- 2 Methyl mercaptan
- 3 Ethyl mercaptan
- 4 2-Propylmercaptan
- 5 Terbutyl mercaptan
- 6 Methyl ethyl sulfide
- 7 1-Propylmercaptan
- 8 2-Butyl mercaptan
- 9 T.H.T.



TKG 1105

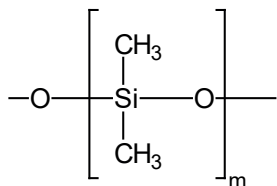


# Teknokra Capillary Columns

## TRB-PETROL

**100% Dimethyl polysiloxane, bonded and crosslinked phase.**

- Column for analyzing complex mixtures of hydrocarbons according to the ASTM regulations (American Society for Testing and Materials)
- Sufficient resolution power to undertake PNA, PONA and PIANO analysis



Structure of Poly (dimethyl) siloxane

### TRB-PETROL Equivalent Phase

**Agilent:** DB-Petro,HP-1, CP-Sil PONA CB

**Supelco:** Petrocol DH

**Phenomenex:** ZB-DHA-PONA

**Restek:** Rtx-DHA-100

**SGE:** BP1 PONA

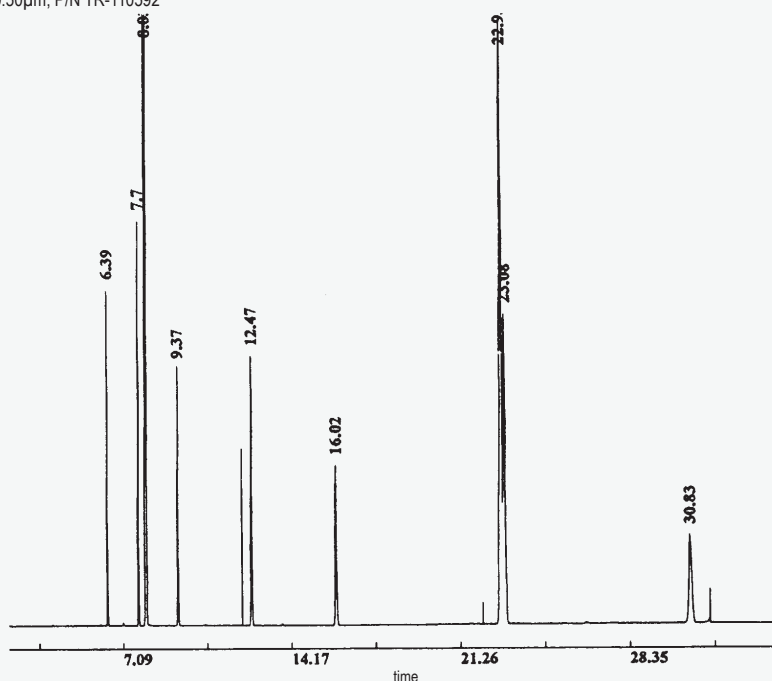
### TRB-PETROL

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N° (P/N)
0,25	100	0,50	-60 to 300/320	TR-110592

### TRB-PETROL: HYDROCARBONS

Column: **TRB-PETROL**, 100m x 0.25mm x 0.50µm, P/N TR-110592  
 Oven: 60°C (isothermal)  
 Injector: 260°C  
 Carrier gas: H<sub>2</sub>, 34 psi  
 Injection: Test for hydrocarbons, split (1:100)  
 Detector: FID, 260°

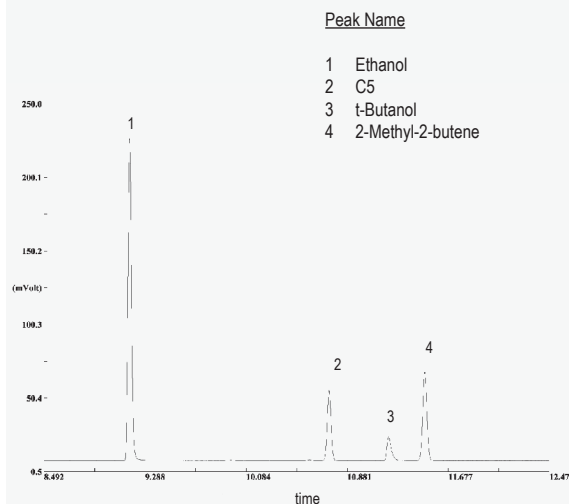
tr (min.)	Compound
6.39	n-Hexane
7.70	Benzene
8.03	Cyclohexane
9.37	n-Heptane
12.47	Toluene
16.02	n-Octane
22.93	m-Xylene
23.08	p-Xylene
30.83	n-Nonane



TKG 1106

## TRB-PETROL (PONA column) meets all ASTM specifications

	ASTM D-6730 Specifications
C5 efficiency (total theoretical plates): 618.503	450.000-550.000
K (C5): 0.47	0.45-0.50
t-Butanol skewness: 1.62	> 1.00 - < 5.00
Resolution t-Butanol/2-Methylbutene-2: 4.41	3.25-5.25

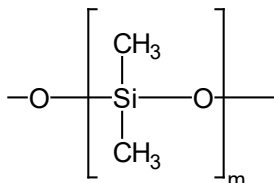


TKG 1254

## TRB-50.2PONA

**100% Dimethyl polysiloxane, bonded and crosslinked phase.**

- Column designed for the complete analysis of PONA hydrocarbons (Paraffins, Olefins, Naphthenes and Aromatics) in petrol-derived products according to the ASTM regulations, method D5134



Structure of Poly (dimethyl) siloxane

### TRB-50.2PONA Equivalent Phase

**Agilent:** HP-PONA, CP-SIL PONA CB, HP-1  
**Supelco:** Petrocol DH 50.2  
**Restek:** Rtx-DHA-50  
**SGE:** BP1 PONA  
**Phenomenex:** ZB-DHA-PONA

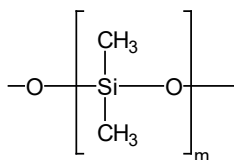
### TRB-50.2PONA

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,20	50	0,50	-60 to 320/340	TR-110559

## TRB-2887 / TKM-2887

**100% Dimethyl polysiloxane, bonded and crosslinked phase.**

- 100% Dimethylpolysiloxane
- Designed specifically for simulated distillation according to the ASTM method D2887
- Available in fused silica (TRB-2887) and metal Tubing (TKM-2887)



Structure of Poly (dimethyl) siloxane

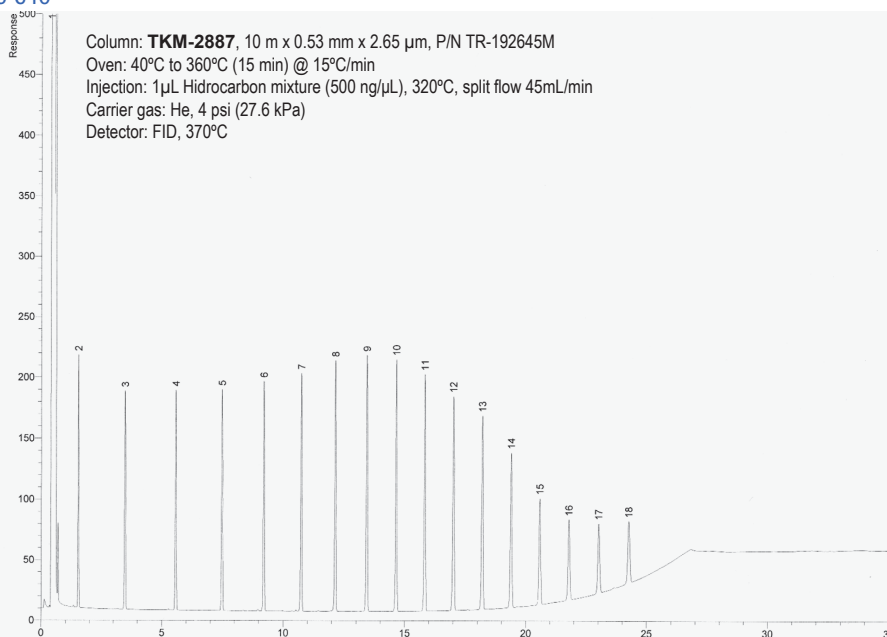
### TRB-2887/ TKM-2887 Equivalent Phase

**Agilent:** DB-2887  
**Supelco:** Petrocol-2887; Petrocol-EX2887  
**Restek:** Rtx-2887, MXT-2887  
**Phenomenex:** ZB-1HT Inferno, ZB-1XT SimDist  
**SGE:** BPX1, BP1 PONA

### TRB-2887/ TKM-2887

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,53	10	2,65	-60 to 340/360	TR-192645
0,53	10	2,65	-60 to 360/400	TR-192645M

## TKM-2887: HYDROCARBONS C6-C40



TKG 1108

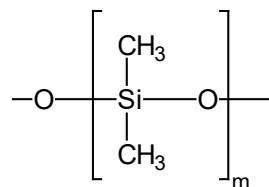


# Teknokroma Capillary Columns

## TRB-Petro.150

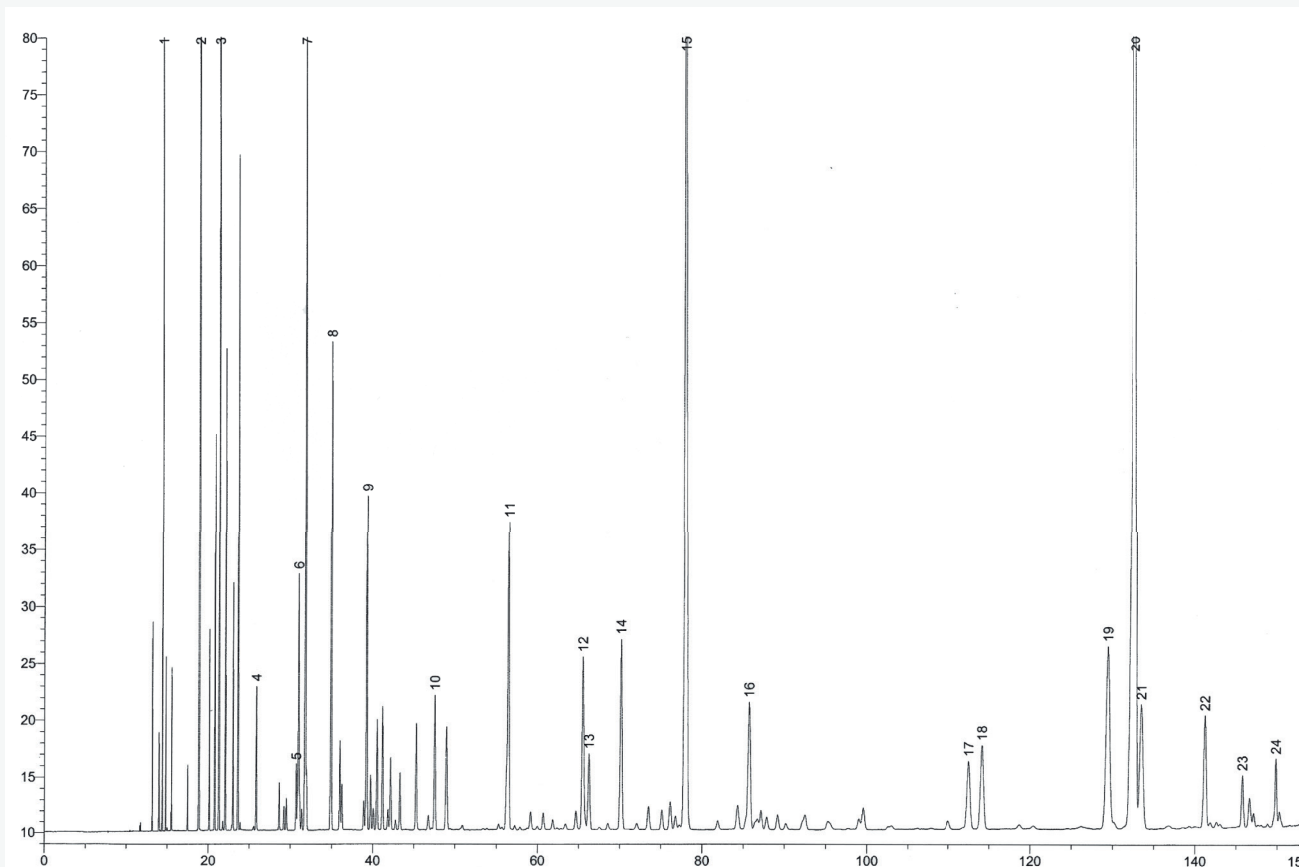
100% Dimethyl polysiloxane, bonded and crosslinked phase.

- Maximum resolution for hydrocarbon analysis



Structure of Poly (dimethyl) siloxane

## TRB-PETRO.150



- 1 n-Butane
- 2 Isopentane
- 3 n-Pentane
- 4 2,2-Dimethylbutane
- 5 Cyclopentane
- 6 2,3-Dimethylbutane
- 7 2-Methylpentane
- 8 3-Methylpentane
- 9 n-Hexane
- 10 2,4-Dimethylpentane

- 11 Benzene
- 12 2-Methylhexane
- 13 2,3-Dimethylpentane
- 14 3-Methylhexane
- 15 2,2,4-Trimethylpentane
- 16 n-Heptane
- 17 2,5-Dimethylhexane
- 18 2,4-Dimethylhexane
- 19 2,3,4-Trimethylpentane
- 20 Toluene

- 21 2,3,3-Trimethylpentane
- 22 2,3-Dimethylhexane
- 23 2-Methylheptane
- 24 3-Methylheptane
- 25 2-Methyl-1-heptene
- 26 n-Octane
- 27 Ethylbenzene
- 28 m-Xylene
- 29 p-Xylene
- 30 o-Xylene

## TRB-Petro.150 Equivalent Phase

**Agilent:** DB-1, CP-Sil PONA CB

**Supelco:** Petrocol DH 150

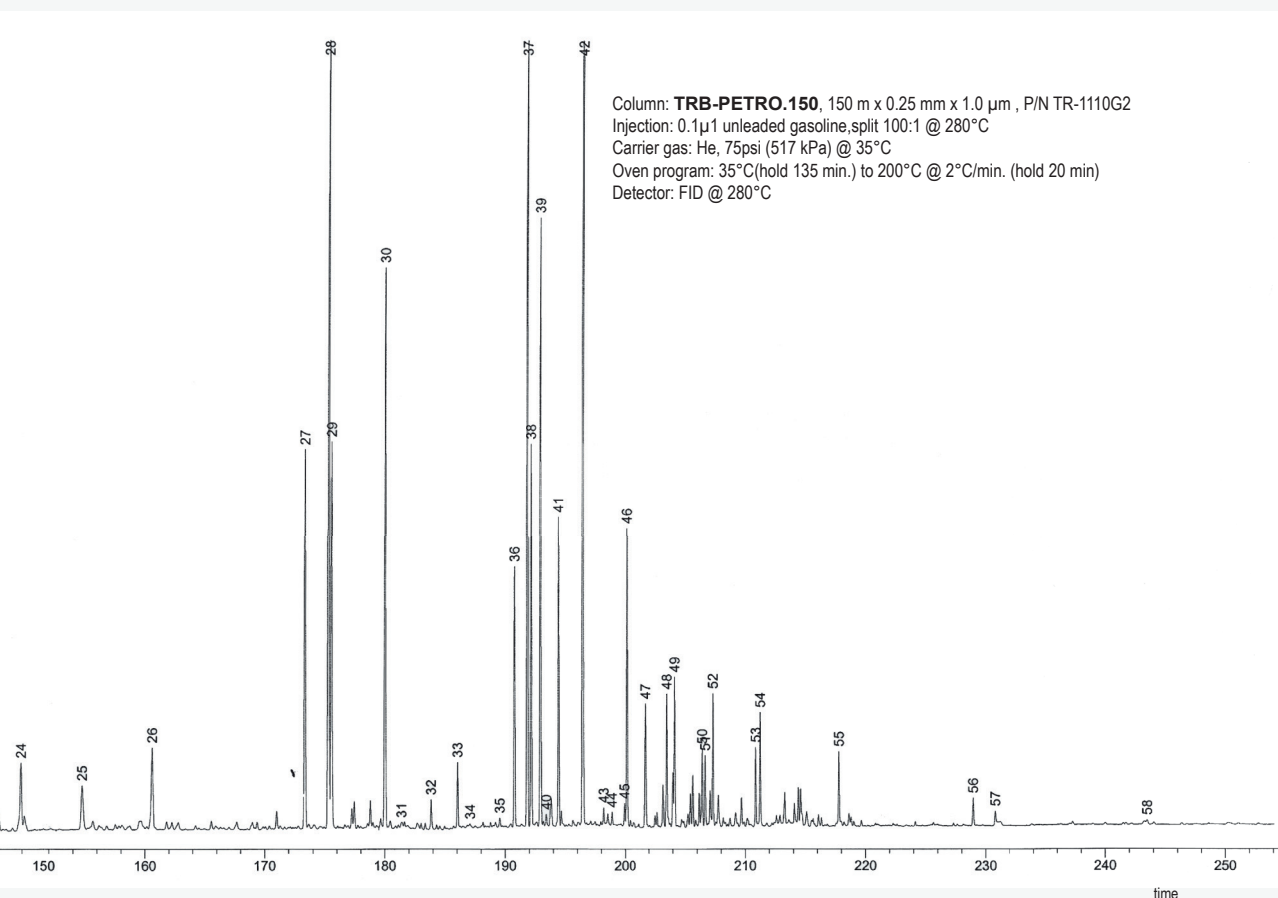
**Restek:** Rtx-DHA-150

**Phenomenex:** ZB-DHA-PONA

**SGE:** BP1 PONA

## TRB-Petro.150

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,25	150	1,00	-60 to 300/320	TR-1110G2



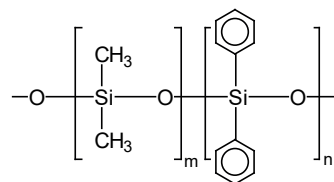
- |                            |                                |                                 |
|----------------------------|--------------------------------|---------------------------------|
| 31 1-Nonene                | 41 1-Methyl-2-ethylbenzene     | 51 1,3- Dimethyl-4-ethylbenzene |
| 32 n-Nonane                | 42 1,2,4- Trimethylbenzene     | 52 1,2-Dimethyl-4-ethylbenzene  |
| 33 Isopropylbenzene        | 43 Isobutylbenzene             | 53 1,2,4,5- Tetramethylbenzene  |
| 34 3,3,5- Trimethylheptane | 44 sec-Buthylbenzene           | 54 1,2,3,5-Tetramethylbenzene   |
| 35 2,4,5- Trimethylheptane | 45 n-Decane                    | 55 Naphthalene                  |
| 36 n-Propylbenzene         | 46 1,2,3- Trimethylbenzene     | 56 2-Methylnaphthalene          |
| 37 1-Methyl-3-ethylbenzene | 47 Indane                      | 57 1-Methylnaphthalene          |
| 38 1-Methyl-4-ethylbenzene | 48 1,3-Diethylbenzene          | 58 Dimethylnaphthalenes         |
| 39 1,3,5-Trimethylbenzene  | 49 n-Butylbenzene              |                                 |
| 40 3,3,4- Trimethylheptane | 50 1,4-Dimethyl-2-ethylbenzene |                                 |

TKG 1107

## TRB-5

**95% Dimethyl- 5% diphenyl polysiloxane, bonded and crosslinked phase.**

- Most versatile and universal stationary phase in the gas chromatography analysis field
- Characteristic affinity towards compounds with aromatic rings.
- Great thermal stability and chemical inertness for analyzing acidic and basic compounds
- Ideal for analysis in the environmental field; dioxines, PCB's, PCT's, polyaromatic compounds, phenols, herbicides, organochlorinated and organophosphorus pesticides, aromatic hydrocarbons, solvents, drugs, oils, etc...



Structure of Poly (dimethyldiphenyl) siloxane

## TRB-5 Equivalent Phase

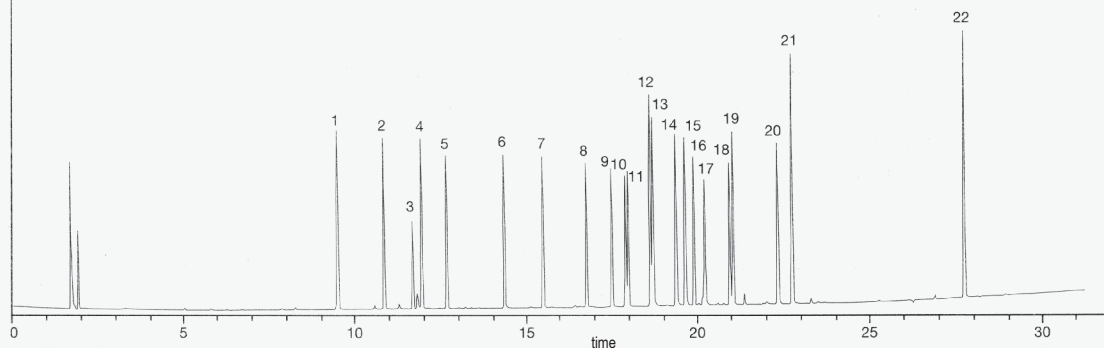
**Restek:** Rtx-5  
**Agilent:** HP-5, Ultra-2, DB-5, CP-SIL8CB  
**Supelco:** SPB-5, MDN-5  
**Macherey-Nagel:** OPTIMA-5  
**Phenomenex:** ZB-5  
**SGE:** BP5

## TRB-5: CHLORINATED PESTICIDES

Column: **TRB-5**, 30 m x 0.25 mm x 0.25 µm, P/N TR-120232  
 Injection: 1 µL chlorinated pesticides mixture, splitless @ 230°C (25-270 ppb on column)  
 Oven: 150°C to 225°C (10 min.) @ 2°C/min  
 Carrier gas: H<sub>2</sub>, ct pressure 12 psi (87.7 kPa) 150°C  
 Detector: ECD, 310°C

## Peak Name

1	2,4,5,6-Tetrachloro- <i>m</i> -xylene	12	4,4'-DDE
2	γ-BHC	13	Dieldrin
3	δ-BHC	14	Endrin
4	Heptachlor	15	4,4'-DDD
5	Aldrin	16	Endosulfan II
6	β-BHC	17	4,4'-DDT
7	δ-BHC	18	Endrin aldehyde
8	Heptachlor epoxide	19	Endosulfan sulfate
9	Endosulfan I	20	Methoxychlor
10	γ-Chlordane	21	Endrin ketone
11	α-Chlordane	22	Decachlorobiphenyl



TKG 1109



## TRB-5

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part.	
				N°. (P/N)	
<b>0,10</b>	10	0,10	-60 to 325/350	<b>TR-120141</b>	
	10	0,17	-60 to 320/350	<b>TR-121941</b>	
	10	0,33	-60 to 320/350	<b>TR-123341</b>	
	10	0,40	-60 to 320/350	<b>TR-120441</b>	
	20	0,10	-60 to 325/350	<b>TR-120181</b>	
	20	0,40	-60 to 320/350	<b>TR-120481</b>	
<b>0,18</b>	10	0,18	-60 to 325/350	<b>TR-120944</b>	
	10	0,40	-60 to 325/350	<b>TR-120444</b>	
	20	0,18	-60 to 325/350	<b>TR-120984</b>	
	20	0,40	-60 to 325/350	<b>TR-120484</b>	
	40	0,18	-60 to 325/350	<b>TR-1209C4</b>	
<b>0,20</b>	12	0,18	-60 to 325/350	<b>TR-1233B9</b>	
	15	0,15	-60 to 325/350	<b>TR-121319</b>	
	15	0,35	-60 to 325/350	<b>TR-120319</b>	
	15	0,50	-60 to 325/350	<b>TR-120519</b>	
	25	0,15	-60 to 325/350	<b>TR-121329</b>	
	25	0,33	-60 to 325/350	<b>TR-123329</b>	
	25	0,35	-60 to 325/350	<b>TR-120329</b>	
	25	0,50	-60 to 325/350	<b>TR-120529</b>	
	30	0,15	-60 to 325/350	<b>TR-121339</b>	
	30	0,35	-60 to 325/350	<b>TR-120339</b>	
	30	0,50	-60 to 325/350	<b>TR-120539</b>	
	50	0,15	-60 to 325/350	<b>TR-121359</b>	
	50	0,33	-60 to 325/350	<b>TR-123359</b>	
	50	0,35	-60 to 325/350	<b>TR-120359</b>	
	50	0,50	-60 to 325/350	<b>TR-120559</b>	
	60	0,15	-60 to 325/350	<b>TR-121369</b>	
	60	0,35	-60 to 325/350	<b>TR-120369</b>	
	60	0,50	-60 to 325/350	<b>TR-120569</b>	
<b>0,25</b>	15	0,10	-60 to 325/350	<b>TR-120112</b>	
	15	0,25	-60 to 325/350	<b>TR-120212</b>	
	15	0,50	-60 to 325/350	<b>TR-120512</b>	
	15	1,00	-60 to 320/350	<b>TR-121012</b>	
	25	0,10	-60 to 325/350	<b>TR-120122</b>	
	25	0,25	-60 to 325/350	<b>TR-120222</b>	
	25	0,50	-60 to 325/350	<b>TR-120522</b>	
	25	1,00	-60 to 320/350	<b>TR-121022</b>	
	30	0,10	-60 to 325/350	<b>TR-120132</b>	
	30	0,25	-60 to 325/350	<b>TR-120232</b>	
	30	0,50	-60 to 325/350	<b>TR-120532</b>	
	30	1,00	-60 to 320/350	<b>TR-121032</b>	
	50	0,10	-60 to 325/350	<b>TR-120152</b>	
	50	0,25	-60 to 325/350	<b>TR-120252</b>	
	50	0,50	-60 to 325/350	<b>TR-120552</b>	
	50	1,00	-60 to 320/350	<b>TR-121052</b>	
	60	0,10	-60 to 325/350	<b>TR-120162</b>	
	60	0,25	-60 to 325/350	<b>TR-120262</b>	
	60	0,50	-60 to 325/350	<b>TR-120562</b>	
	60	1,00	-60 to 325/350	<b>TR-121062</b>	
	<b>0,32</b>	15	0,10	-60 to 325/350	<b>TR-120113</b>
		15	0,25	-60 to 325/350	<b>TR-120213</b>

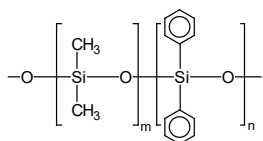
## TRB-5

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part.
				N°. (P/N)
<b>0,32</b>	15	0,50	-60 to 325/350	<b>TR-120513</b>
	15	1,00	-60 to 325/350	<b>TR-121013</b>
	15	3,00	-60 to 280/350	<b>TR-123013</b>
	25	0,10	-60 to 325/350	<b>TR-120123</b>
	25	0,25	-60 to 325/350	<b>TR-120223</b>
	25	0,50	-60 to 325/350	<b>TR-120523</b>
	25	1,00	-60 to 325/350	<b>TR-121023</b>
	25	3,00	-60 to 280/350	<b>TR-123023</b>
	30	0,10	-60 to 325/350	<b>TR-120133</b>
	30	0,25	-60 to 325/350	<b>TR-120233</b>
	30	0,50	-60 to 325/350	<b>TR-120533</b>
	30	1,00	-60 to 325/350	<b>TR-121033</b>
	30	3,00	-60 to 280/350	<b>TR-123033</b>
	50	0,10	-60 to 325/350	<b>TR-120153</b>
	50	0,25	-60 to 325/350	<b>TR-120253</b>
	50	0,50	-60 to 325/350	<b>TR-120553</b>
	50	1,00	-60 to 325/350	<b>TR-121053</b>
	50	3,00	-60 to 280/350	<b>TR-123053</b>
	60	0,10	-60 to 325/350	<b>TR-120163</b>
	60	0,25	-60 to 325/350	<b>TR-120263</b>
	60	0,50	-60 to 325/350	<b>TR-120563</b>
	60	1,00	-60 to 325/350	<b>TR-121063</b>
	60	3,00	-60 to 280/350	<b>TR-123063</b>
	<b>0,53</b>	10	2,65	-60 to 270/290
15		0,10	-60 to 320/340	<b>TR-120115</b>
15		0,50	-60 to 320/340	<b>TR-120515</b>
15		1,50	-60 to 310/330	<b>TR-121515</b>
15		3,00	-60 to 270/290	<b>TR-123015</b>
15		5,00	-60 to 270/290	<b>TR-125015</b>
25		0,10	-60 to 320/340	<b>TR-120125</b>
25		0,50	-60 to 320/340	<b>TR-120525</b>
25		1,50	-60 to 310/330	<b>TR-121525</b>
25		3,00	-60 to 270/290	<b>TR-123025</b>
25		5,00	-60 to 270/290	<b>TR-125025</b>
30		0,10	-60 to 320/340	<b>TR-120135</b>
30		0,50	-60 to 320/340	<b>TR-120535</b>
30		0,88	-60 to 310/330	<b>TR-120835</b>
30		1,50	-60 to 310/330	<b>TR-121535</b>
30		2,65	-60 to 270/290	<b>TR-122635</b>
30		3,00	-60 to 270/290	<b>TR-123035</b>
30		5,00	-60 to 270/290	<b>TR-125035</b>
50		0,10	-60 to 320/340	<b>TR-120155</b>
50		0,50	-60 to 320/340	<b>TR-120555</b>
50		1,50	-60 to 310/330	<b>TR-121555</b>
50		3,00	-60 to 270/290	<b>TR-123055</b>
50		5,00	-60 to 270/290	<b>TR-125055</b>
60		0,10	-60 to 320/340	<b>TR-120165</b>
60	0,50	-60 to 320/340	<b>TR-120565</b>	
60	1,50	-60 to 310/330	<b>TR-121565</b>	
60	3,00	-60 to 270/290	<b>TR-123065</b>	
60	5,00	-60 to 270/290	<b>TR-125065</b>	

## TRB-5HT / TKM-5HT

**95% Dimethyl- 5% diphenyl polysiloxane, bonded and crosslinked phase.**

- Produced specially for analysis at high temperature up to 400°C
- Available in fused silica (TRB-5HT) and metal tubing (TKM-5HT) add "M" at the end of the desired P/N
- Excellent symmetry for compounds with high boiling points
- For analysis of waxes, triglycerides, sterol esters, polyoxyethylenated alcohols, etc.



Structure of Poly (dimethyldiphenyl) siloxane

### TRB-5HT Equivalent Phase

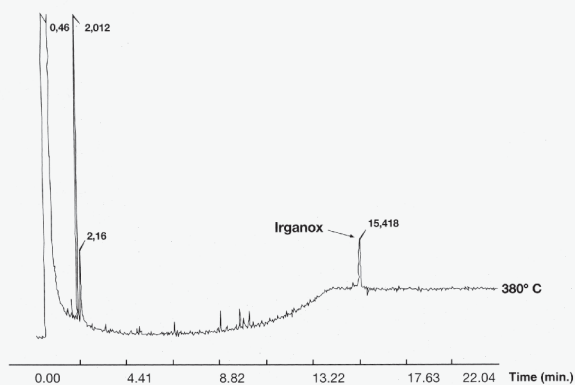
**Agilent:** DB-5HT, VF-5HT  
**Phenomenex:** ZB-5HT Inferno  
**Restek:** Rxi-5HT, MTX-5HT

### TRB-5HT

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
<b>0,25</b>	15	0,10	-60 to 400	<b>TR-620112</b>
	30	0,10	-60 to 400	<b>TR-620132</b>
<b>0,32</b>	15	0,10	-60 to 400	<b>TR-620113</b>
	30	0,10	-60 to 400	<b>TR-620133</b>

### TRB-5HT: Irganox® 1010

Column: **TRB-5HT**, 15m x 0,25 mm x 0,10 µm, P/N TR-620112  
 Injection: 1µL (Irganox 1010, 12 mg/ml chloroform), split (1:60), 370°C  
 Carrier gas: H2, 6psi (41,3 kPa)  
 Oven: 150°C to 380°C (10 min) @ 30°C/min  
 Detector: FID to 390°C

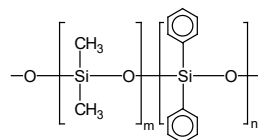


TKG 1110

## TRB-STEROL

**95% Dimethyl- 5% diphenyl polysiloxane, bonded and crosslinked phase.**

- Column specifically designed for the analysis of complex mixtures of sterols, from either animal or plant origin.
- The deactivation layer developed by Teknokroma, guarantees high chemical inertness and low bleeding level.
- Allows analysis of sterols without derivatization.
- Column specifically tested for sterols



Structure of Poly (dimethyldiphenyl) siloxane

### TRB-STEROL Equivalent Phase

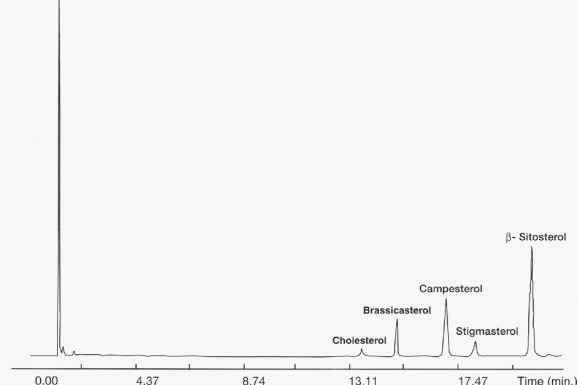
**Supelco:** SAC-5

### TRB-STEROL

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
<b>0,22</b>	30	0,22	-60 to 325-350	<b>TR-182238</b>
	30	0,12	-60 to 325-350	<b>TR-180738</b>

### TRB-STEROL: Sterols

Column: **TRB-STEROL**, 30m x 0,22 mm x 0,22 µm, P/N TR-182238  
 Oven: 265°C  
 Injector: 280°C  
 Carrier gas: H2, 18 psi (124 kPa)  
 Injection: 0,5 µL sterols standard (25 mg/ml), split (1:100)  
 Detector: FID 300°C



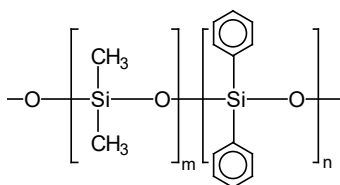
TKG 1111



## TRB-5MS

**95% Dimethyl- 5% diphenyl polysiloxane, bonded and crosslinked phase.**

- Same polarity as TRB-5, but the polymer synthesis, the deactivation process and the bonding and crosslinking procedures have been optimized to obtain minimum bleeding and exceptional chemical inertness. Ideal for MS detectors.
- The bleeding specifications for a column of 30 m x 0,25 mm x 0,25 µm (P/N 520232) indicate that it is lower than 4 pA at 320°C.
- Column recommended to work with any selective detector



Structure of Poly (dimethyldiphenyl) siloxane

### TRB-5MS Equivalent Phase

**Restek:** Rtx-5ms  
**Agilent:** HP-5MS, CP-Sil8-CB MS, PAS-5  
**Supelco:** Equity-5  
**Macherey-Nagel:** OPTIMA-5ms  
**Phenomenex:** ZB-5MSi

## TRB-5MS

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,10	10	0,10	-60 to 325-350	TR-520141
	10	0,40	-60 to 325-350	TR-520441
	20	0,10	-60 to 325-350	TR-520181
	20	0,40	-60 to 325-350	TR-520481
0,18	20	0,18	-60 to 325-350	TR-520984
	40	0,18	-60 to 325-350	TR-5209C4
0,20	12	0,33	-60 to 325-350	TR-5233B9
	15	0,33	-60 to 325-350	TR-523319
	25	0,33	-60 to 325-350	TR-523329
	30	0,33	-60 to 325-350	TR-523339
	50	0,33	-60 to 325-350	TR-523359
	60	0,33	-60 to 325-350	TR-523369
	60	0,33	-60 to 325-350	TR-523369
0,25	15	0,10	-60 to 325-350	TR-520112
	15	0,25	-60 to 325-350	TR-520212
	15	1,00	-60 to 325-350	TR-521012
	30	0,10	-60 to 325-350	TR-520132
	30	0,25	-60 to 325-350	TR-520232
	30	1,00	-60 to 325-350	TR-521032
	60	0,10	-60 to 325-350	TR-520162
	60	0,25	-60 to 325-350	TR-520262
	60	1,00	-60 to 325-350	TR-521062
	60	1,00	-60 to 325-350	TR-521062
0,32	15	0,10	-60 to 325-350	TR-520113
	15	0,25	-60 to 325-350	TR-520213
	15	0,50	-60 to 325-350	TR-520513
	15	1,00	-60 to 325-350	TR-521013
	30	0,10	-60 to 325-350	TR-520133
	30	0,25	-60 to 325-350	TR-520233
	30	0,50	-60 to 325-350	TR-520533
	30	1,00	-60 to 325-350	TR-521033
	60	0,10	-60 to 325-350	TR-520163
	60	0,25	-60 to 325-350	TR-520263
	60	0,50	-60 to 325-350	TR-520563
	60	1,00	-60 to 325-350	TR-521063
0,53	15	0,50	-60 to 320-340	TR-520515
	15	1,00	-60 to 320-340	TR-521015
	15	1,50	-60 to 310-330	TR-521515
	30	0,50	-60 to 320-340	TR-520535
	30	1,00	-60 to 320-340	TR-521035
	30	1,50	-60 to 310-330	TR-521535
	30	1,50	-60 to 310-330	TR-521535



# Teknokroma Capillary Columns

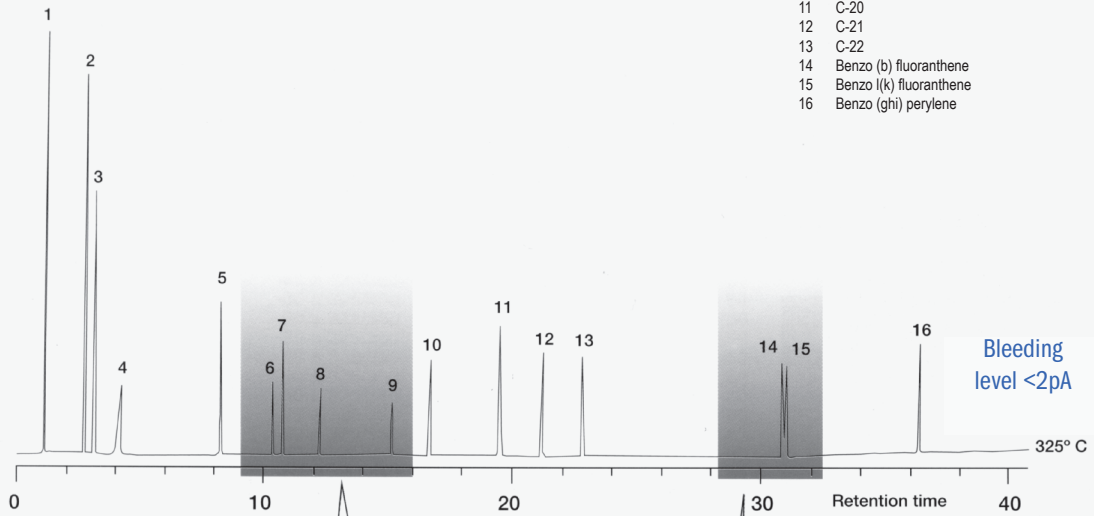
The TRB-5MS column has an excellent resolution and symmetry in all polarity range, for neutral, acid and basic compounds. All these substances that appear in the analysis of semivolatiles traces (for example, EPA official methods) can be analyzed in only one column.

## TRB-5MS: Test MX5

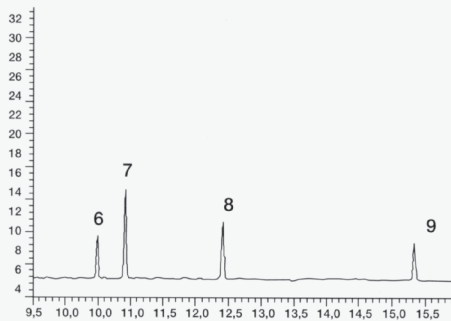
Column: **TRB-5MS**, 30 m x 0,25 mm x 0,25  $\mu$ m, P/N TR-520232  
Injection: 1  $\mu$ L, split (1:100), 5 to 10 ng/comp. on column, 280°C  
Carrier gas: H<sub>2</sub>, 12 psi (87,7 kPa)  
Oven: 100°C to 325°C (5 min) @ 6°C/min  
Detector: FID, 300°C  
Sample: Test MX5

### Peak Name

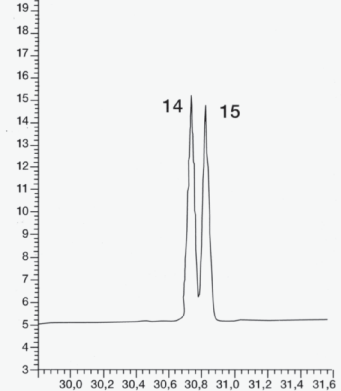
- 1 Methylene chloride
- 2 1,2-Hexanediol
- 3 Nitroso-di-n-propylamine
- 4 Benzoic acid
- 5 C-14
- 6 2,4-Dinitrophenol
- 7 4-Nitrophenol
- 8 4-Nitroaniline
- 9 Pentachlorophenol
- 10 Carbazole
- 11 C-20
- 12 C-21
- 13 C-22
- 14 Benzo (b) fluoranthene
- 15 Benzo (k) fluoranthene
- 16 Benzo (ghi) perylene



Injection of 1ng/peak on column  
Exceptional symmetry



Excellent resolution

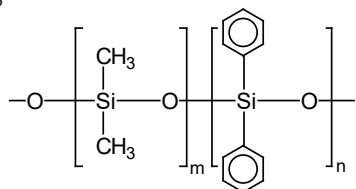


TKG 1112

## TRB-5AMINE

**95% Dimethyl- 5% diphenyl polysiloxane, bonded and crosslinked phase.**

- Column specially designed for the analysis of amines
- Proprietary deactivation that minimizes absorption and tailing of basic compounds, like alkylamines, alcoholamines, basic pharmaceuticals, aromatic amines, etc.
- Selectivity and thermal stability equivalent to the TRB-5 columns



Structure of Poly (dimethyldiphenyl) siloxane

### TRB-5AMINE Equivalent Phase

**Agilent:** CP-Sil 8 CB for Amines

**Restek:** Rtx-5Amine

**Supelco:** PTA-5

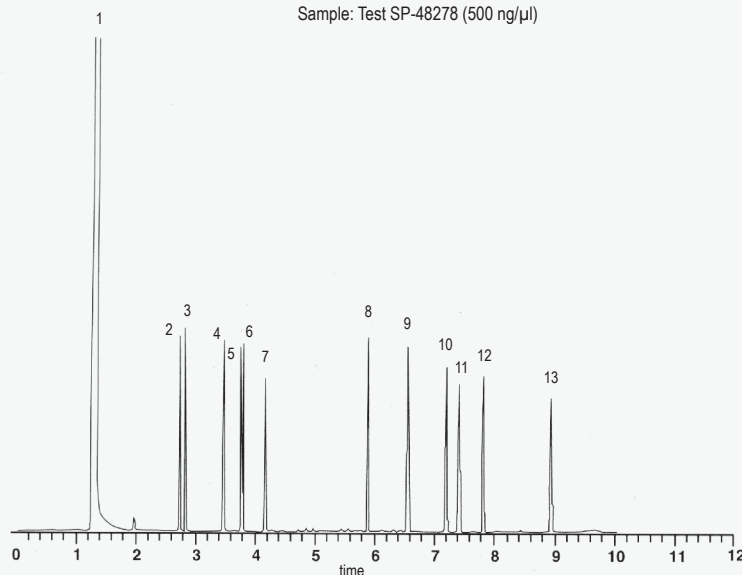
**Macherey-Nagel:** OPTIMA-5A

## TRB-5AMINE

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)	
0,25	15	0,50	-60 to 300/315	<b>TR-210512</b>	
	15	1,00	-60 to 300/315	<b>TR-211012</b>	
	30	0,50	-60 to 300/315	<b>TR-210532</b>	
	30	1,00	-60 to 300/315	<b>TR-211032</b>	
	60	0,50	-60 to 300/315	<b>TR-210562</b>	
	60	1,00	-60 to 300/315	<b>TR-211062</b>	
0,32	15	0,50	-60 to 300/315	<b>TR-210513</b>	
	15	1,00	-60 to 300/315	<b>TR-211013</b>	
	15	1,50	-60 to 290/305	<b>TR-211513</b>	
	30	0,50	-60 to 300/315	<b>TR-210533</b>	
	30	1,00	-60 to 300/315	<b>TR-211033</b>	
	30	1,50	-60 to 290/305	<b>TR-211533</b>	
	60	0,50	-60 to 300/315	<b>TR-210563</b>	
	60	1,00	-60 to 300/315	<b>TR-211063</b>	
	60	1,50	-60 to 290/305	<b>TR-211563</b>	
	0,53	15	1,00	-60 to 290/305	<b>TR-211015</b>
		15	3,00	-60 to 280/295	<b>TR-213015</b>
		30	1,00	-60 to 290/305	<b>TR-211035</b>
30		3,00	-60 to 280/295	<b>TR-213035</b>	
60		1,00	-60 to 290/305	<b>TR-211065</b>	
60		3,00	-60 to 280/295	<b>TR-213065</b>	

## TRB-5AMINE: Amines Test

Column: **TRB-5AMINE**, 30 m x 0.25 mm x 0.50 µm, P/N TR-210532  
 Injection: 1 µL (split 1:50), 280°C  
 Carrier gas: H<sub>2</sub>, 12 psi (87.7 kPa)  
 Oven: 100°C to 280°C (5 min) @ 20 °C/min  
 Detector: FID, 300°C  
 Sample: Test SP-48278 (500 ng/µl)



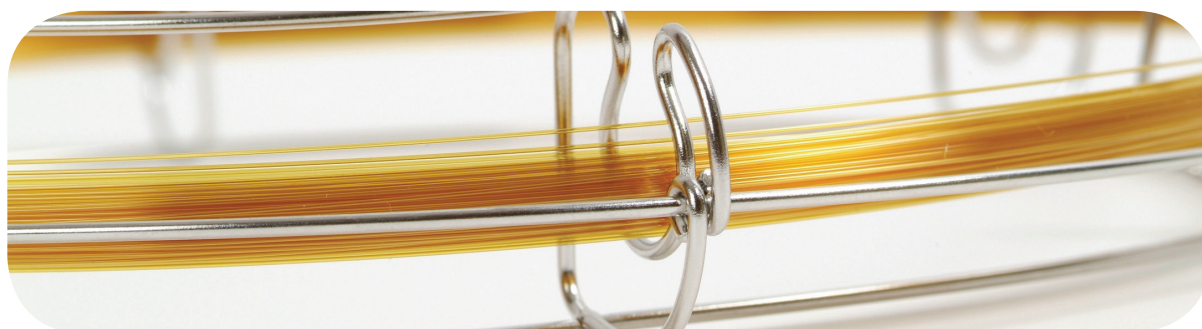
### Peak Name

- 1 Methyl tert-butyl ether
- 2 Benzylamine
- 3 n-Octylamine
- 4 n-Nonylamine
- 5 2,4-Dimethylaniline
- 6 2,6-Dimethylaniline
- 7 n-Decylamine
- 8 C-15
- 9 C-16
- 10 C-17
- 11 Tri-n-hexylamine
- 12 C-18
- 13 C-20

TKG 1113



# Teknokroma Capillary Columns



## MetAmine-VOL

- For separation of volatile amines (optimized separation) and alcohols.
- Fully compatible with water samples
- Good peak shape for volatile alcohols

### MetAmine-VOL Equivalent Phase

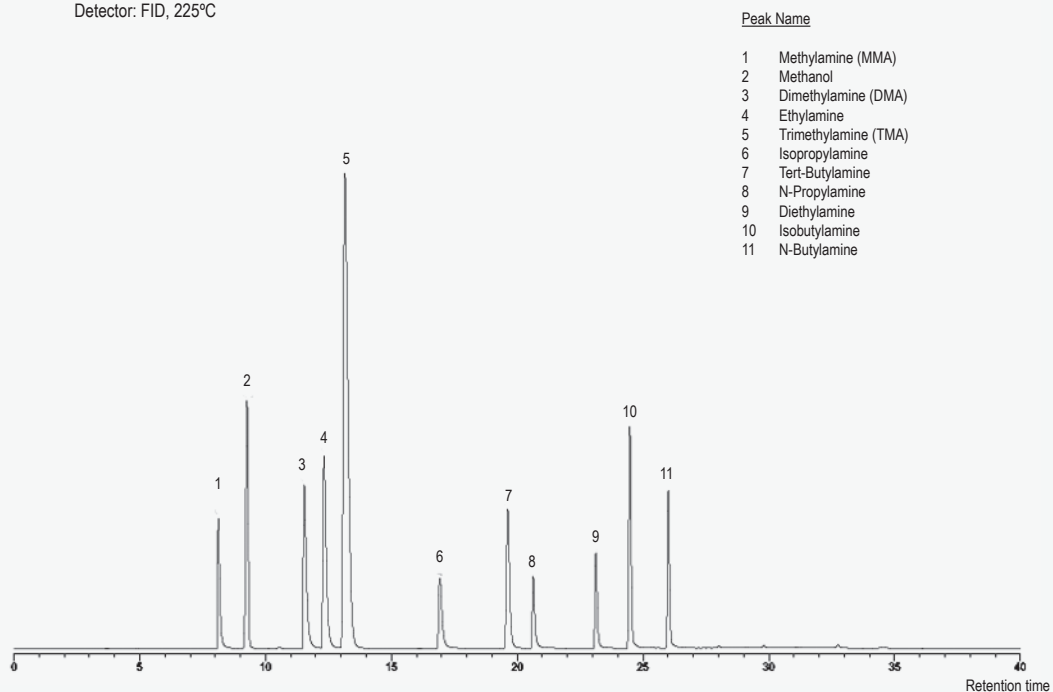
**Agilent:** CP-Volamine  
**Restek:** Rtx-Volatile Amine

### MetAmine-VOL

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,32	15	Optimized	260/280	TR-635013
	30	Optimized	260/280	TR-635033
	60	Optimized	260/280	TR-635063

## MetAmine-VOL: Volatile Amines in water

Column: **MetAmine-VOL**, 60 m x 0.32 mm, P/N TR-635063  
Injection: 100 µL Head Space 2t, (75°) split 1:15, 180°C  
Sample: mix of amines in water  
Carrier gas: He, 14 psi (96.5 kPa)  
Oven: 40 °C (10 min) to 200 °C @ 10 °C/min  
Detector: FID, 225°C

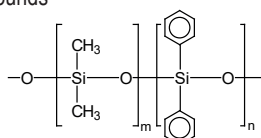


TKG 1256

## TRB-5.625

**95% Dimethyl- 5% diphenyl polysiloxane, bonded and crosslinked phase.**

- Column specially manufactured to fulfil the level of inertness required by the EPA methods for the analysis of semivolatle compounds, designed for methods 625, 1625, 8270 and CLP protocols
- Inertness and minimum absorption of acidic, basic and neutral compounds



Structure of Poly (dimethyldiphenyl) siloxane

### TRB-5.625 Equivalent Phase

**Supelco:** PTE-5  
**Agilent:** DB-5.625

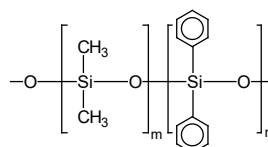
## TRB-5.625

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,18	20	0,18	-60 to 325/350	TR-260984
	20	0,36	-60 to 325/350	TR-263484
0,20	12	0,33	-60 to 325/350	TR-2633B9
	25	0,33	-60 to 325/350	TR-263329
	50	0,33	-60 to 325/350	TR-263359
0,25	15	0,10	-60 to 325/350	TR-260112
	15	0,25	-60 to 325/350	TR-260212
	15	0,50	-60 to 325/350	TR-260512
	15	1,00	-60 to 325/350	TR-261012
	30	0,10	-60 to 325/350	TR-260132
	30	0,25	-60 to 325/350	TR-260232
	30	0,50	-60 to 325/350	TR-260532
	30	1,00	-60 to 325/350	TR-261032
	60	0,10	-60 to 325/350	TR-260162
	60	0,25	-60 to 325/350	TR-260262
0,32	15	0,10	-60 to 325/350	TR-260113
	15	0,25	-60 to 325/350	TR-260213
	15	0,50	-60 to 325/350	TR-260513
	15	1,00	-60 to 325/350	TR-261013
	30	0,10	-60 to 325/350	TR-260133
	30	0,25	-60 to 325/350	TR-260233
	30	0,50	-60 to 325/350	TR-260533
	30	1,00	-60 to 325/350	TR-261033
	60	0,10	-60 to 325/350	TR-260163
	60	0,25	-60 to 325/350	TR-260263
0,53	15	1,50	-60 to 320/340	TR-261515
	30	0,50	-60 to 320/340	TR-260535
	30	1,00	-60 to 310/330	TR-261035
60	0,25	-60 to 325/350	TR-260265	

## TRB-G27

**95% Dimethyl- 5% diphenyl polysiloxane, bonded and crosslinked phase.**

- Fulfils the specifications of the American Pharmacopea (USP) for the analysis of organic volatile impurities (OVI) in pharmaceutical products (Methods <USP 467>).



Structure of Poly (dimethyldiphenyl) siloxane

### TRB-G27 Equivalent Phase

**Restek:** Rtx-G27  
**Supelco:** G27

## TRB-G27

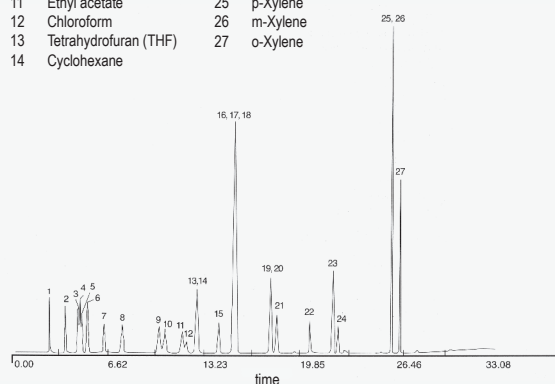
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,53	30	5,00	-60 to 270/290	TR-175035

### TRB-G27: Residual solvents in pharmaceutical products

Column: **TRB-G27**, 30 m x 0,53 mm x 5,0 µm, P/N TR-175035  
Injection: 220°C, split 1:80, 5 m phenylmethyl deactivated retention gap  
Carrier Gas: He, 4.5 psi (31 kPa), 35 cm/s to 35°C  
Oven: 35°C (10 min) to 100°C @ 5°C/min to 240°C (5 min) @ 25°C/min  
Detector: FID, 250°C  
Sample: 0,02 µL solvent mixture

#### Peak Name

1	Methanol	15	1,2-Dichloroethane
2	Ethanol	16	Benzene
3	Acetonitrile	17	Carbon tetrachloride
4	Acetone	18	n-Butanol
5	Isopropanol	19	n-Heptane
6	Ethyl ether	20	Trichloroethylene
7	Methylene chloride	21	1,4-Dioxane
8	n-Propanol	22	Pyridine
9	Methyl ethyl ketone (MEK)	23	Toluene
10	n-Hexane	24	Dimethylformamide (DMF)
11	Ethyl acetate	25	p-Xylene
12	Chloroform	26	m-Xylene
13	Tetrahydrofuran (THF)	27	o-Xylene
14	Cyclohexane		



TKG 1114

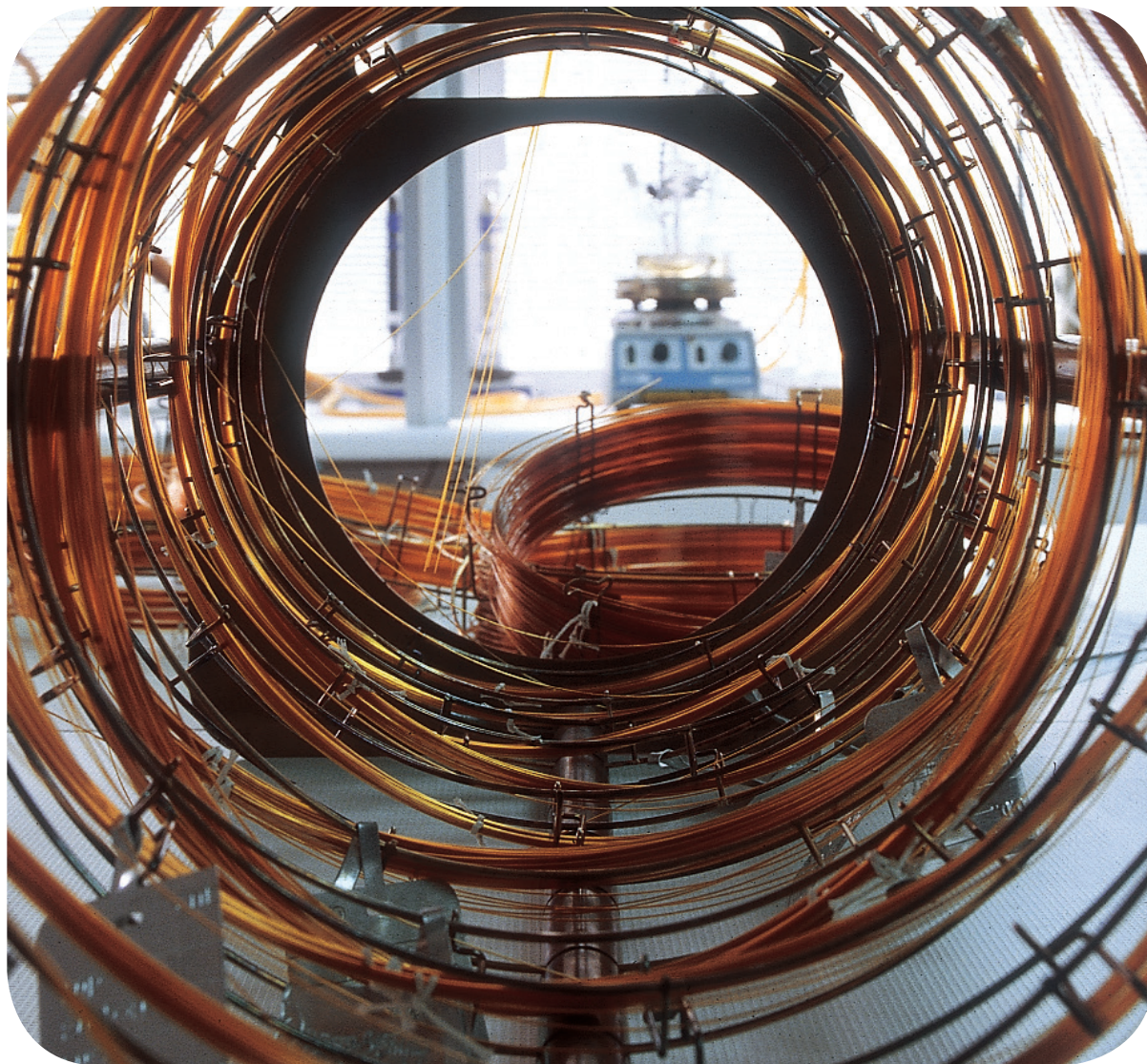




## Teknokroma Capillary Columns

### MTI-5

5% Phenyl- 95% methyl polysiloxane, bonded and crosslinked phase.



- Polarity equivalent to Supelco PTE-5 and Agilent HP-5Msi columns
- High inertness and ultra low bleeding
- Column contrasted for analyses of semivolatile contaminant agents (EPA 625, 1625, 8770)
- Maximum thermal stability (360°)

#### MTI-5 Equivalent Phase

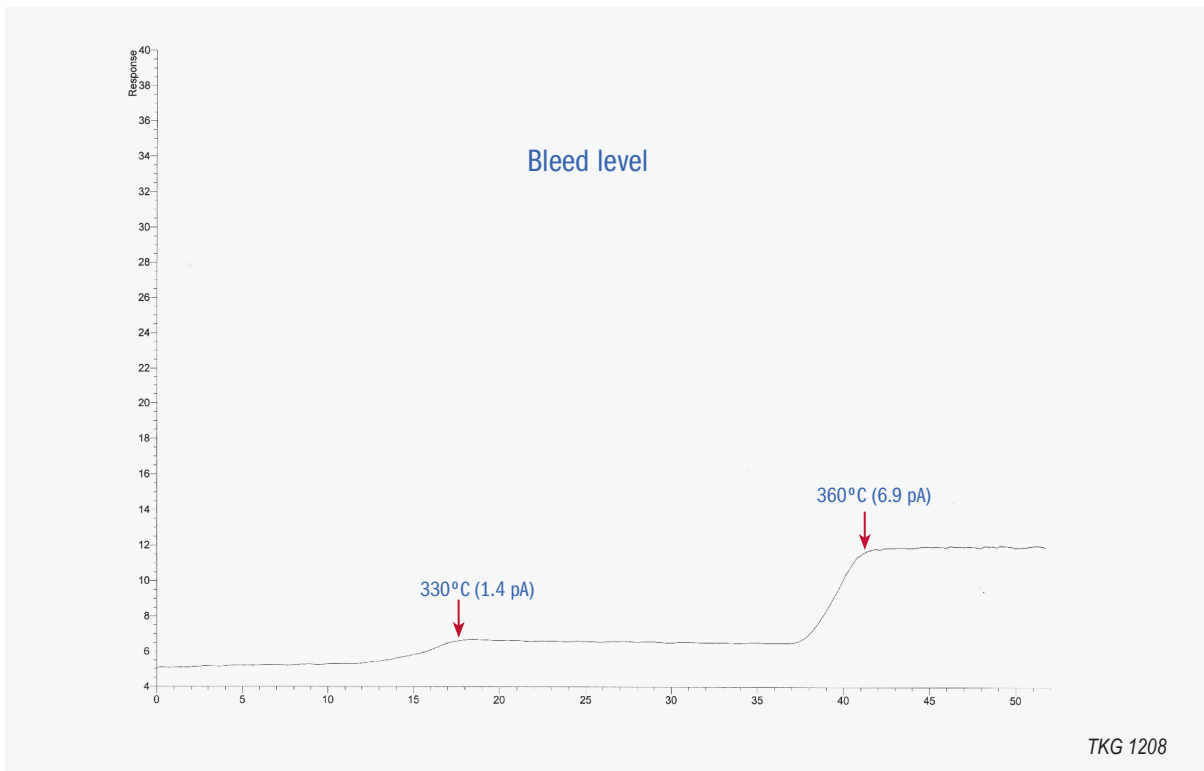
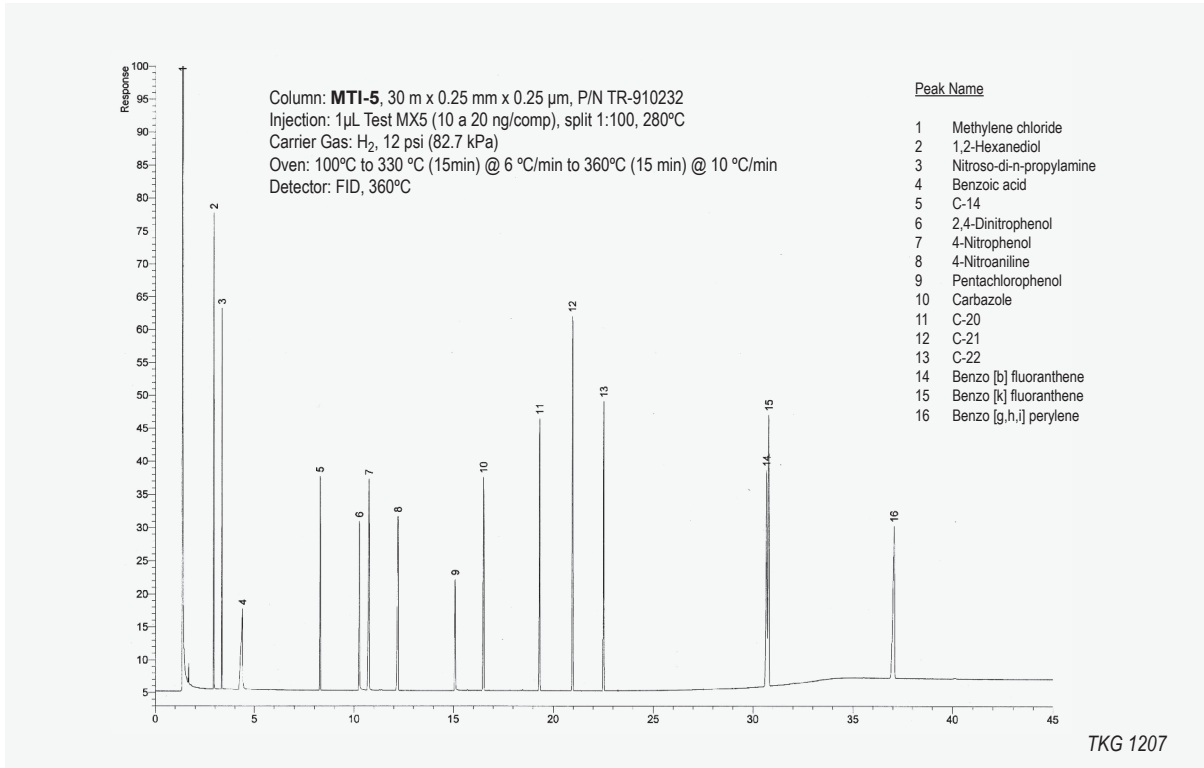
**Supelco:** PTE-5  
**Agilent:** HP-5Msi

#### MTI-5

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,25	30	0,25	-60 to 360	TR-910232
0,32	30	0,25	-60 to 360	TR-910233
0,53	15	0,50	-60 to 330/360	TR-910515



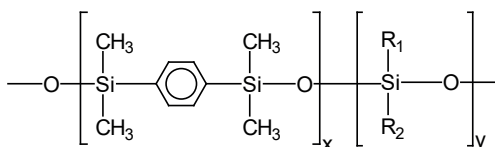
## MTI-5: Test



## Meta.X5

**Silphenylene phase, selectivity similar to TRB-5, bonded and crosslinked phase.**

- Column of choice for the analysis of semivolatile compounds by GC-MS
- Selectivity similar to TRB-5
- New generation of column incorporates arylene groups in the polymer structure, improves thermal stability, reduces bleeding level and provides optimal resolution for aromatic compounds
- Manufacturing procedures guarantees maximal inertness and minimal bleeding level



Structure of Polysiloxane containing p-silphenylene

### Meta.X5 Equivalent Phase

**Restek:** Rtx-5Sil MS

**Agilent:** DB-5 MS, HP-5TA, CP-SIL8CB Low bleed/MS, VF-5MS

**SGE:** BPX5, BP5M

**Phenomenex:** ZB-5MS

### Meta.X5: Signal-to-Noise ratio

**The reduction of bleeding level allows the detection of trace compounds at high temperature**

Column: **Meta.X5**, 30m x 0.25mm x 0.25 µm, P/N TR-820232

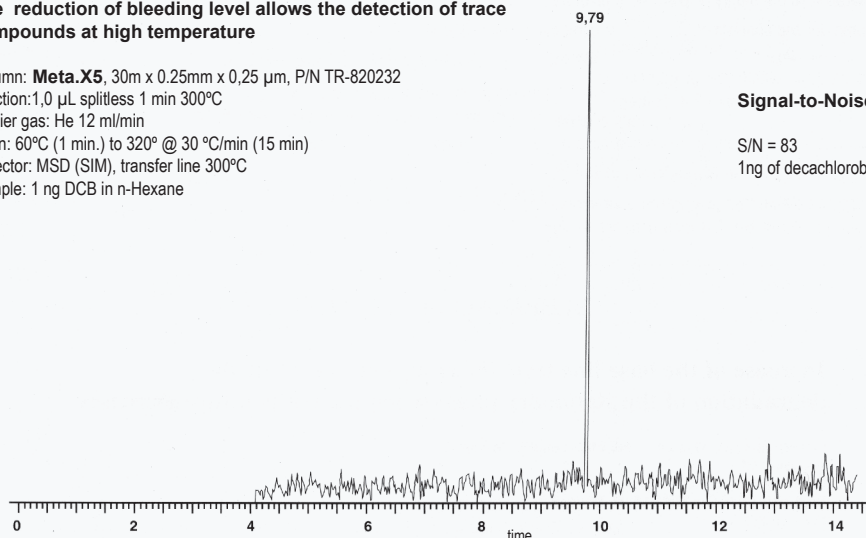
Injection: 1.0 µL splitless 1 min 300°C

Carrier gas: He 12 ml/min

Oven: 60°C (1 min.) to 320° @ 30 °C/min (15 min)

Detector: MSD (SIM), transfer line 300°C

Sample: 1 ng DCB in n-Hexane



**Signal-to-Noise ratio**

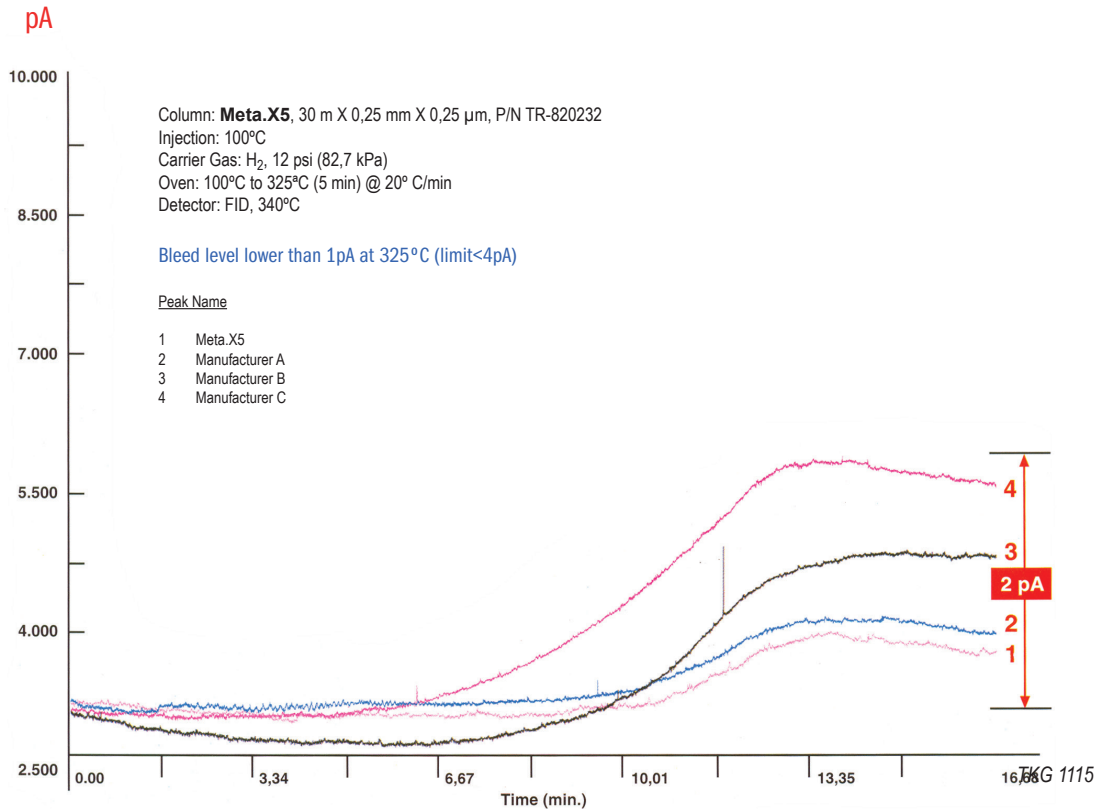
S/N = 83

1ng of decachlorobiphenyl (DCB)

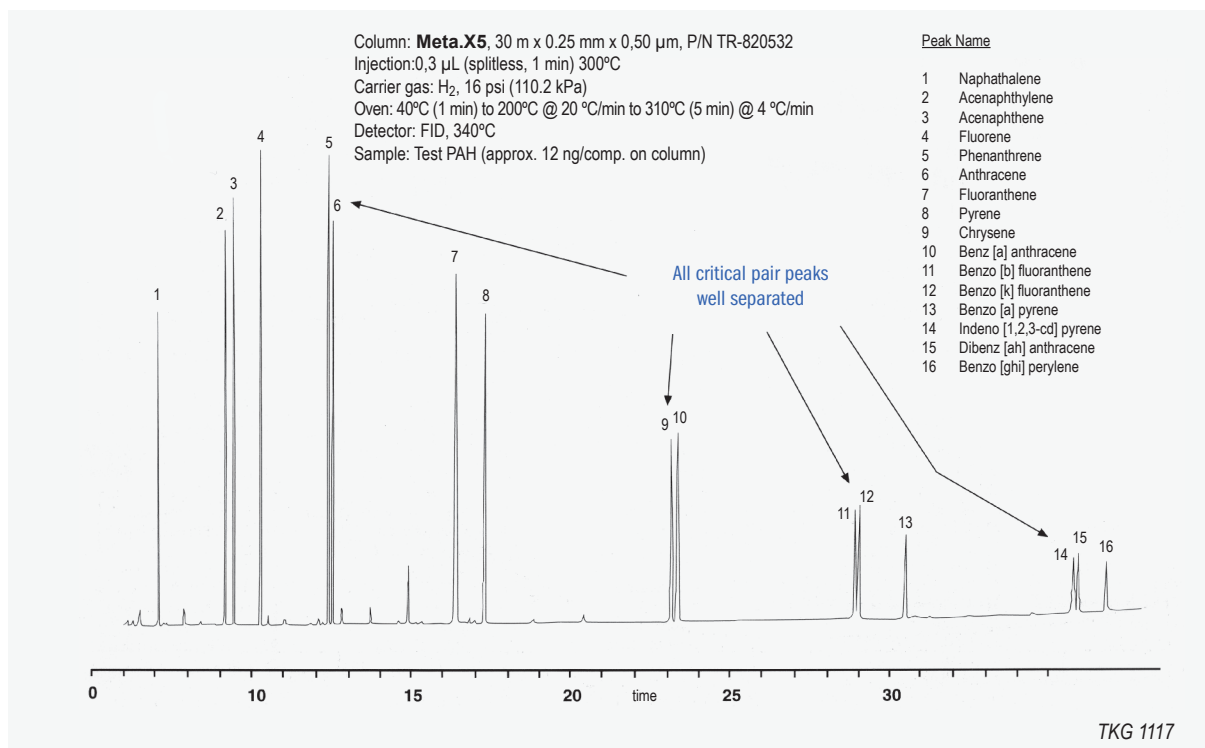
## Meta.X5

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)	
<b>0,18</b>	20	0,18	-60 to 325/350	<b>TR-820984</b>	
	20	0,36	-60 to 325/350	<b>TR-823484</b>	
	40	0,18	-60 to 325/350	<b>TR-8209C4</b>	
<b>0,20</b>	12	0,33	-60 to 325/350	<b>TR-8233B9</b>	
	25	0,33	-60 to 325/350	<b>TR-8233Z9</b>	
	50	0,33	-60 to 325/350	<b>TR-8233S9</b>	
<b>0,25</b>	15	0,10	-60 to 325/350	<b>TR-820112</b>	
	15	0,25	-60 to 325/350	<b>TR-820212</b>	
	15	0,50	-60 to 325/350	<b>TR-820512</b>	
	15	1,00	-60 to 325/350	<b>TR-821012</b>	
	30	0,10	-60 to 325/350	<b>TR-820132</b>	
	30	0,25	-60 to 325/350	<b>TR-820232</b>	
	30	0,50	-60 to 325/350	<b>TR-820532</b>	
	30	1,00	-60 to 325/350	<b>TR-821032</b>	
	60	0,10	-60 to 325/350	<b>TR-820162</b>	
60	0,25	-60 to 325/350	<b>TR-820262</b>		
<b>0,32</b>	15	0,10	-60 to 325/350	<b>TR-820113</b>	
	15	0,25	-60 to 325/350	<b>TR-820213</b>	
	15	0,50	-60 to 325/350	<b>TR-820513</b>	
	15	1,00	-60 to 325/350	<b>TR-821013</b>	
	30	0,10	-60 to 325/350	<b>TR-820133</b>	
	30	0,25	-60 to 325/350	<b>TR-820233</b>	
	30	0,50	-60 to 325/350	<b>TR-820533</b>	
	30	1,00	-60 to 325/350	<b>TR-821033</b>	
	60	0,10	-60 to 325/350	<b>TR-820163</b>	
	60	0,25	-60 to 325/350	<b>TR-820263</b>	
	<b>0,53</b>	15	0,50	-60 to 320/340	<b>TR-820515</b>
		15	1,00	-60 to 320/340	<b>TR-821015</b>
15		1,50	-60 to 320/340	<b>TR-821515</b>	
30		0,50	-60 to 320/340	<b>TR-820535</b>	
30		1,00	-60 to 320/340	<b>TR-821035</b>	
30		1,50	-60 to 310/330	<b>TR-821535</b>	

## Meta.X5: Column Bleed comparison



## Meta.X5: Polycyclic aromatic hydrocarbons PAHs Method (EPA Method 610)





# Teknokroma Capillary Columns

## Meta.X5 TRIAZINE (proprietary phase)

**Silphenylene phase, selectivity similar to TRB-5, bonded and crosslinked.**

- New formulation of Meta.X5 stationary phase. Ideal for separation of Triazine herbicides from EPA 609 method.
- Low bleed and excellent inertness for the analysis of traces of herbicides by GC/MS.
- General purpose column for pesticides.

### Meta.X5 TRIAZINE

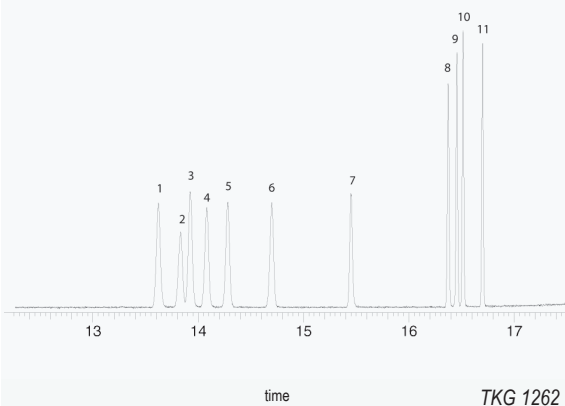
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
<b>0,30</b>	30	0,25	325/350°C	<b>TR-410232</b>

### Meta.X5 TRIAZINE: Triazine Herbicides

Column: **Meta.X5 TRIAZINE**, 30m x 0.25mm x 0,25 µm, P/N TR-410232  
 Injection: split 1:25, 250 °C  
 Carrier gas: He, ct flow 1.0 ml/min  
 Oven: 80 °C (0.5 min) to 160 °C (7 min) @ 30 °C/min to 195°C @ 7 °C/min to 290 °C (3 min) @ 45 °C/min  
 Transfer Line: 290°C  
 Ionization mode: EI  
 Scan range: 50-450 amu  
 Sample: Triazine herbicides EPA 619 2 ng/compound on column

#### Peak Name

- 1 Atraton
- 2 Simazine
- 3 Prometon
- 4 Atrazine
- 5 Propazine
- 6 Terbutylazine
- 7 Secbumeton
- 8 Simetryn
- 9 Ametryn
- 10 Prometryn
- 11 Terbutryn



## Meta.XLB (proprietary phase)

**Silphenylene phase, bonded and crosslinked**

- Low polarity phase with Extreme Low Bleed.
- Directly replace for DB-XLB
- General purpose column with extended temperature range (30 to 340/360°C)
- Ideal column for GC-MS analysis
- Unique selectivity for aromatic compounds (PCBs,PAHs,PBDEs)
- Excellent column for pesticides and herbicides

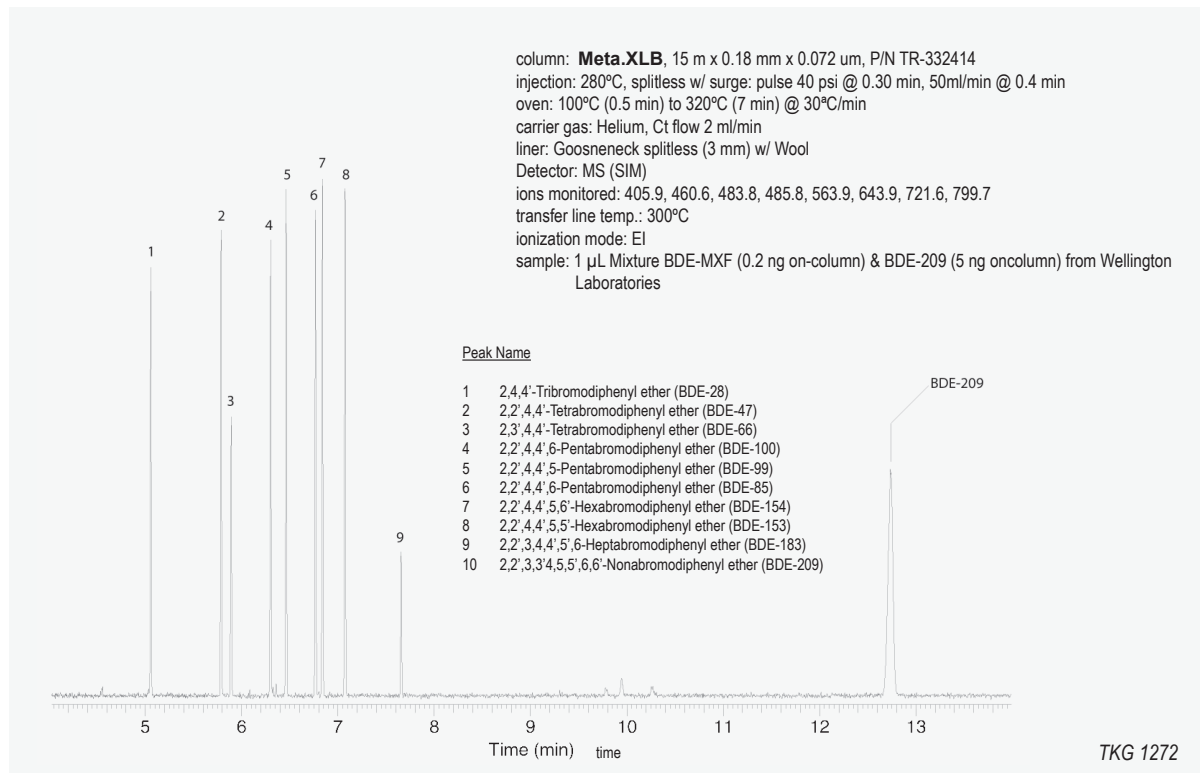
### Meta.XLB Equivalent Phase

**Restek:** Rxi-XLB  
**Agilent:** DB-XLB, VF-XMS  
**Supelco:** MDN 12  
**Phenomenex:** ZB-XLB  
**Macherey-Nagel:** OPTIMA XLB

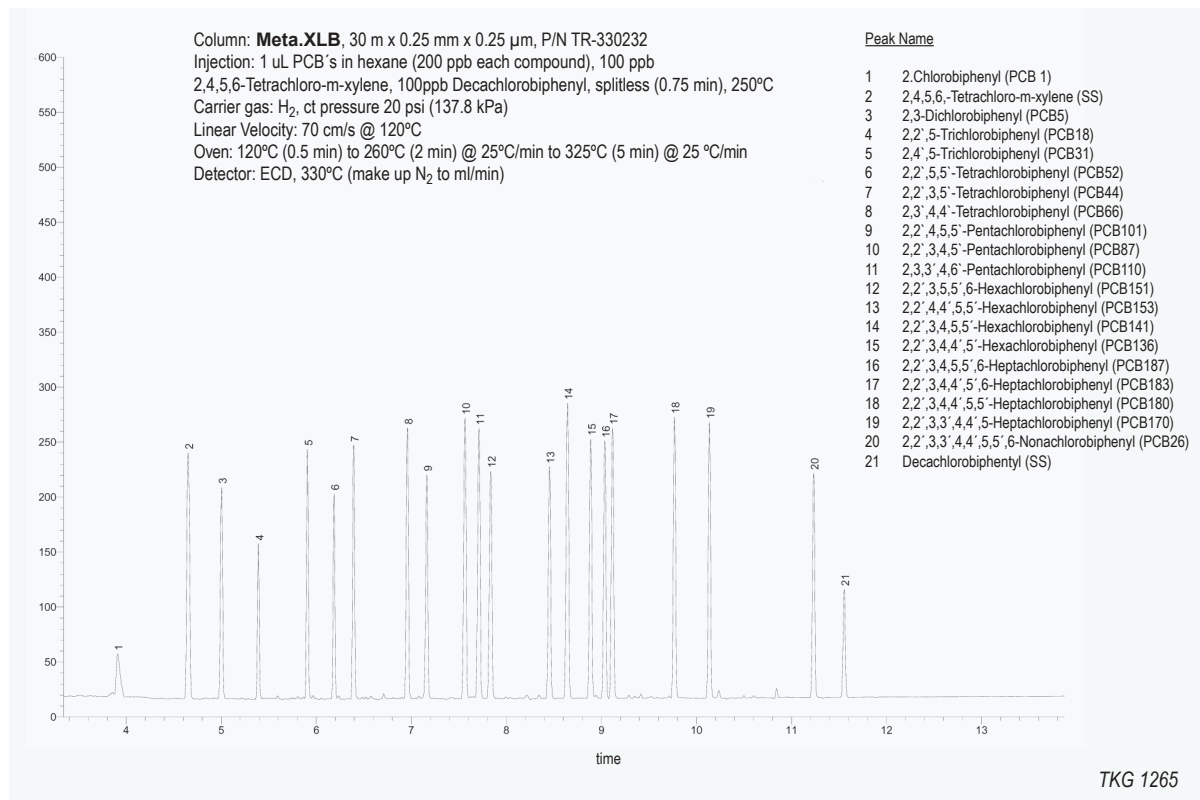
### Meta.XLB

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)	
<b>0,10</b>	10	0,10	30 to 340/360°C	<b>TR-330141</b>	
	<b>0,18</b>	20	0,18	30 to 340/360°C	<b>TR-330984</b>
		30	0,18	30 to 340/360°C	<b>TR-330934</b>
<b>0,25</b>	60	0,18	30 to 340/360°C	<b>TR-330964</b>	
	<b>0,32</b>	15	0,10	30 to 340/360°C	<b>TR-330112</b>
		15	0,25	30 to 340/360°C	<b>TR-330212</b>
	15	1,00	30 to 340/360°C	<b>TR-331012</b>	
	30	0,10	30 to 340/360°C	<b>TR-330132</b>	
	30	0,25	30 to 340/360°C	<b>TR-330232</b>	
<b>0,53</b>	30	0,50	30 to 340/360°C	<b>TR-330532</b>	
	30	1,00	30 to 340/360°C	<b>TR-331032</b>	
	60	0,25	30 to 340/360°C	<b>TR-330262</b>	
	<b>0,32</b>	15	0,25	30 to 340/360°C	<b>TR-330213</b>
		15	1,00	30 to 340/360°C	<b>TR-331013</b>
	30	0,10	30 to 340/360°C	<b>TR-330133</b>	
	30	0,25	30 to 340/360°C	<b>TR-330233</b>	
	30	0,50	30 to 340/360°C	<b>TR-330533</b>	
	30	1,00	30 to 340/360°C	<b>TR-331033</b>	
	60	0,25	30 to 340/360°C	<b>TR-330263</b>	
	<b>0,53</b>	15	1,50	30 to 320/340°C	<b>TR-331515</b>
		30	1,50	30 to 320/340°C	<b>TR-331535</b>

## Meta.XLB: Analysis of brominated flame retardants (Polybrominated Diphenyl Ethers, PBDEs)



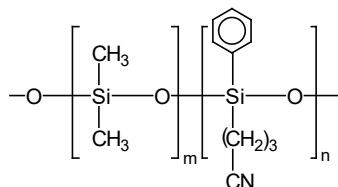
## Meta.XLB: Polychlorinated biphenyl (PCB)



## TRB-1301

**94% Dimethyl- 6% cyanopropyl-phenyl polysiloxane, bonded and crosslinked phase.**

- Ideal column for analyzing mixtures of acidic and basic compounds with a wide range of polarity
- Intermediate polarity column useful for analyzing pesticides and herbicides



Structure of Poly (dimethylcyanopropylphenyl) siloxane

### TRB-1301 Equivalent Phase

**Agilent:** HP-1301, DB-1301, CP-1301

**Supelco:** SPB-1301,

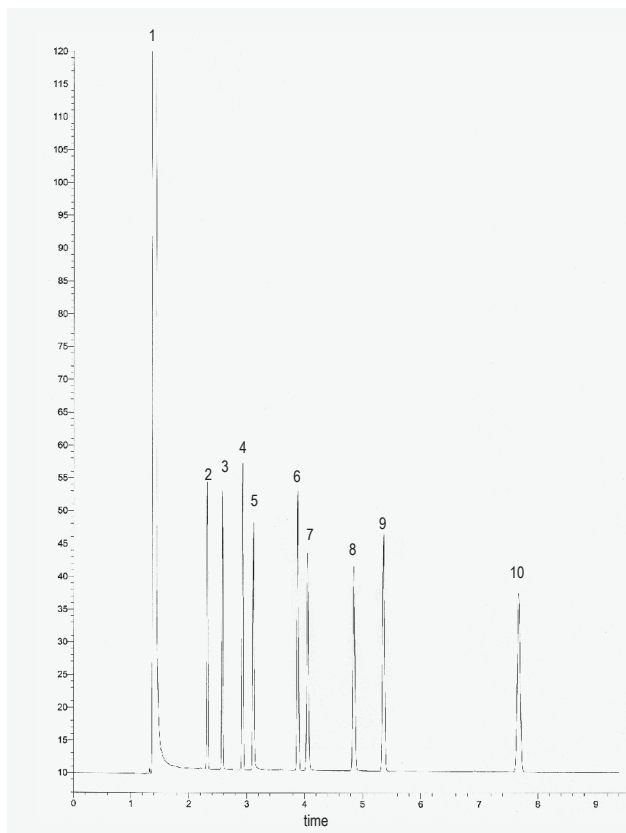
**Restek:** Rtx-1301, Rtx-624

**SGE:** BP624

## TRB-1301

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
<b>0,18</b>	10	0,40	-20 to 280/300	<b>TR-640444</b>
<b>0,25</b>	15	0,25	-20 to 280/300	<b>TR-640212</b>
	15	1,00	-20 to 260/280	<b>TR-641012</b>
	30	0,25	-20 to 280/300	<b>TR-640232</b>
<b>0,32</b>	30	1,00	-20 to 260/280	<b>TR-641032</b>
	60	0,25	-20 to 280/300	<b>TR-640262</b>
	60	1,00	-20 to 260/280	<b>TR-641062</b>
<b>0,53</b>	15	0,25	-20 to 280/300	<b>TR-640213</b>
	15	1,00	-20 to 260/280	<b>TR-641013</b>
	30	0,25	-20 to 280/300	<b>TR-640233</b>
	30	1,00	-20 to 260/280	<b>TR-641033</b>
	60	0,25	-20 to 280/300	<b>TR-640263</b>
	60	1,00	-20 to 260/280	<b>TR-641063</b>

### TRB-1301: SP-4-7301 Test



Column: **TRB-1301**, 30 m x 0.25 mm x 1.0 µm, P/N TR-641032  
 Injection: 0.5 µL standard SP-4-7301 (500 ng/mL), split 1:50, 260 °C  
 Carrier gas: H<sub>2</sub>, ct pressure 12 psi (82.7 kPa)  
 Oven: 165°C  
 Detector: FID, 280 °C

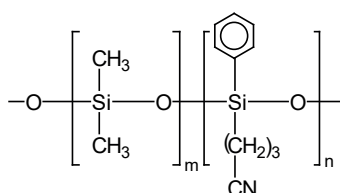
#### Peak Name

- 1 Methylene chloride
- 2 C-10
- 3 2-Octanone
- 4 C-11
- 5 1-Octanol
- 6 C-12
- 7 2,6-Dimethylphenol
- 8 2,6-Dimethylaniline
- 9 C-13
- 10 C-14

## TRB-624

**94% Dimethyl- 6% cyanopropyl-phenyl polysiloxane, bonded and crosslinked phase.**

- Column specially developed for environmental analysis of volatile compounds (Volatile Priority Pollutants)
- Column compatible with EPA methods 501.3, 502.2, 524.2, 601, 602, 8010, 8015, 8020, 8221, 8240 and 8260.
- Excellent inertness.



Structure of Poly (dimethylcyanopropylphenyl) siloxane

### TRB-624 Equivalent Phase

**Agilent:** HP-624, DB-624, CP- Select 624 CB

**Supelco:** OVI-G43, SPB-624

**Restek:** Rtx-1301, Rtx-624

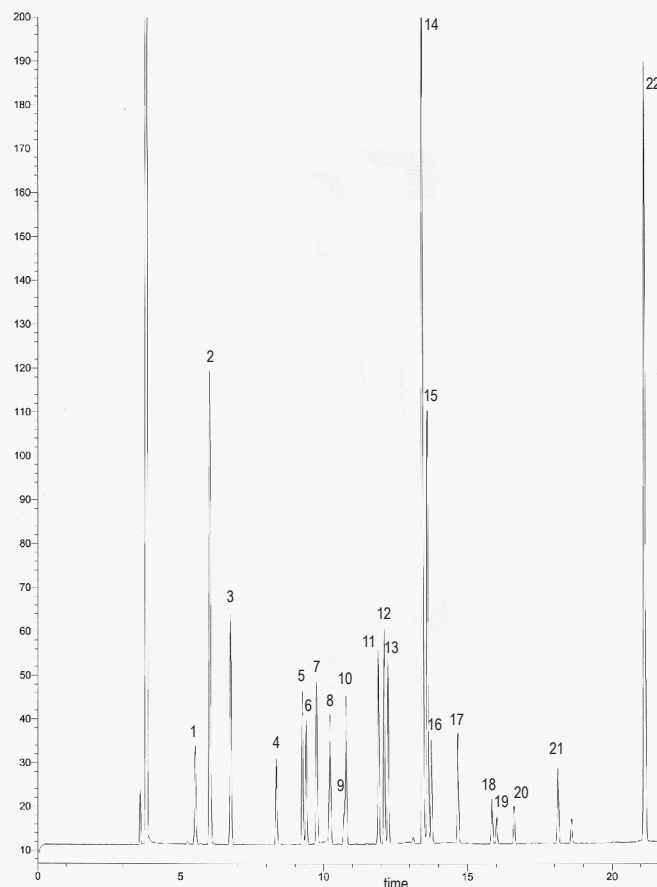
**SGE:** BP624

**Phenomenex:** ZB-624

### TRB-624

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,18	20	1,00	-20 to 240/260	<b>TR-601084</b>
0,20	25	1,12	-20 to 240/260	<b>TR-601129</b>
0,25	30	1,40	-20 to 240/260	<b>TR-601432</b>
	60	1,40	-20 to 240/260	<b>TR-601462</b>
0,32	30	1,80	-20 to 240/260	<b>TR-601833</b>
	60	1,80	-20 to 240/260	<b>TR-601863</b>
0,53	30	3,00	-20 to 240/260	<b>TR-603035</b>
	60	3,00	-20 to 240/260	<b>TR-603065</b>
	75	3,00	-20 to 240/260	<b>TR-603075</b>
	105	3,00	-20 to 240/260	<b>TR-6030K5</b>

### TRB-624: Solvents



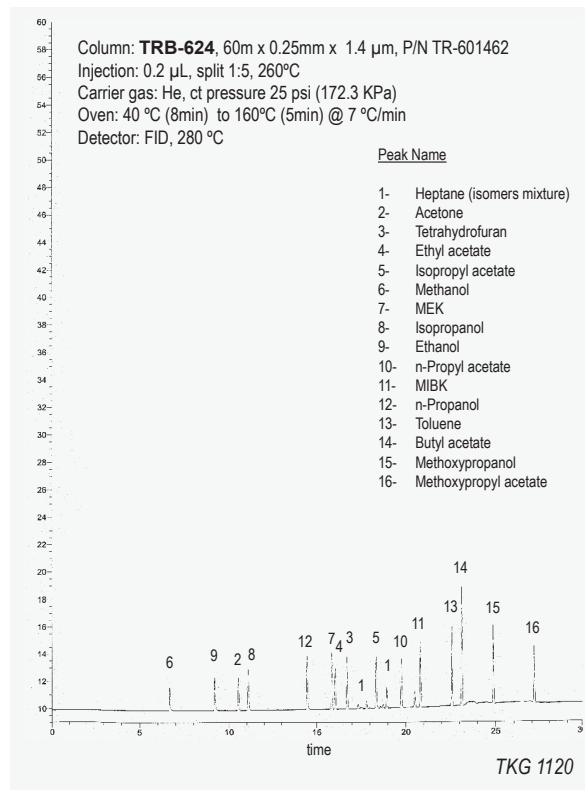
Column: **TRB-624**, 60 m x 0.25mm x 1.4 µm, P/N TR-601462  
 Injection: 1 µL solvents mixture, split 1:100 (20-600 ng/comp), 260 °C  
 Carrier gas: H<sub>2</sub>, ct pressure 25 psi (172.3 kPa)  
 Oven: 50 °C (5min) to 220 °C @ 6 °C/min  
 Detector: FID, 280 °C

#### Peak Name

- 1 Diethylether
- 2 Acetone
- 3 Methyl acetate
- 4 Vinyl acetate
- 5 MEK
- 6 Ethyl acetate
- 7 Tetrahydrofuran
- 8 Cyclohexane
- 9 Benzene
- 10 Isopropyl acetate
- 11 2-Pentanone
- 12 3-Pentanone
- 13 Propyl acetate
- 14 Pyridine
- 15 Toluene
- 16 Isobutyl acetate
- 17 Butyl acetate
- 18 Ethyl benzene
- 19 m-Xylene/p-Xylene
- 20 o-Xylene
- 21 Diisobutylketone
- 22 Nitrobenzene

TKG 1119

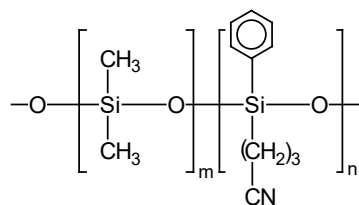
## TRB-624: Solvents



## TRB-G43

### 94% Dimethyl- 6% cyanopropyl-phenyl polysiloxane, bonded and crosslinked phase.

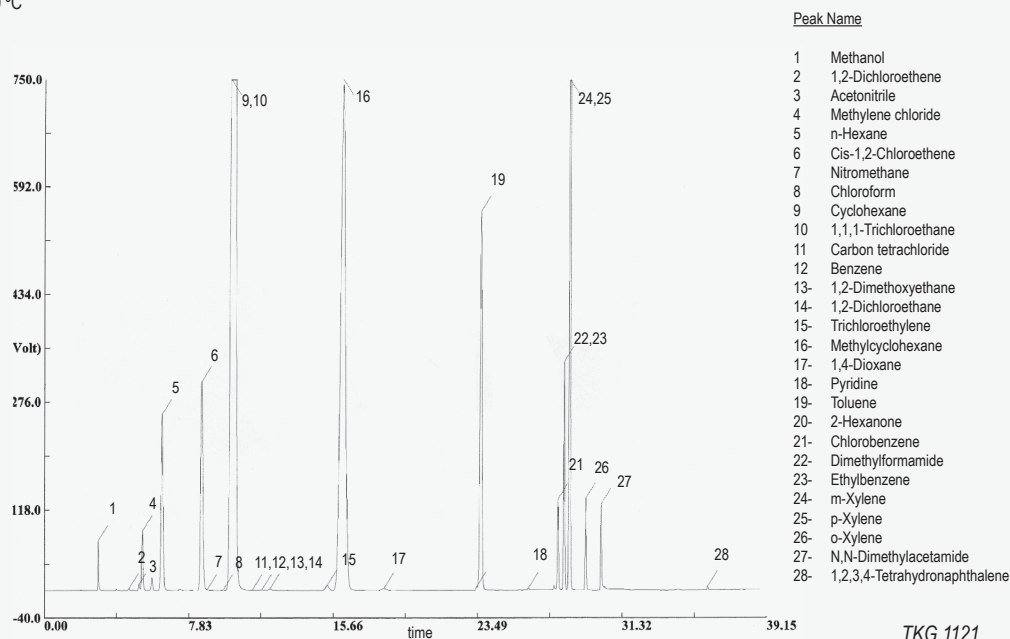
- USP G43
- Fulfills specifications of the American (USP) and European (EP) pharmacopoeia for the analysis of residual solvents (OVI) in pharmaceutical products, USP method <467> and EP method 2.4.24
- High inertness and low bleed guaranteed.
- Specially tested for complete separation of the five solvents regulated by USP Method 467
- For USP <467>, pharmacopoeia recommends the use of a guard column of 5m (P/N TR-200055) to trap the non-volatile impurities in the sample



Structure of Poly (dimethylcyanopropylphenyl) siloxane

## TRB-G43: Class 1 and Class 2 Residual Solvents

Column: **TRB-G43**, 30 m x 0.53 mm x 3.0  $\mu$ m, P/N TR-163035  
 Injection: split 1:2, 250 °C, 5 m x 0.53 mm intermediate polarity retention gap (TR-200055)  
 Sample: 0.5 mL headspace 80°C (2t static head space sampler) 28 Class 1 Mix and Class 2 Mix A, Mix B residual solvents at the regulatory limit concentration  
 Carrier gas: He, ct pressure 4.8 psi (33.1 kPa), 35 cm/s (40°C)  
 Oven: 40 °C (20 min) to 240 °C (10 min) @ 10°C/min  
 Detector: FID, 250 °C





# Teknokroma Capillary Columns



## TRB-G43

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,53	30	3,00	-20 to 240/260	TR-163035



### TRB-G43 Equivalent Phase

**Agilent:** HP-624, DB-624, CP-Select 624 CB, DB-624 UI

**Supelco:** OVI-G43

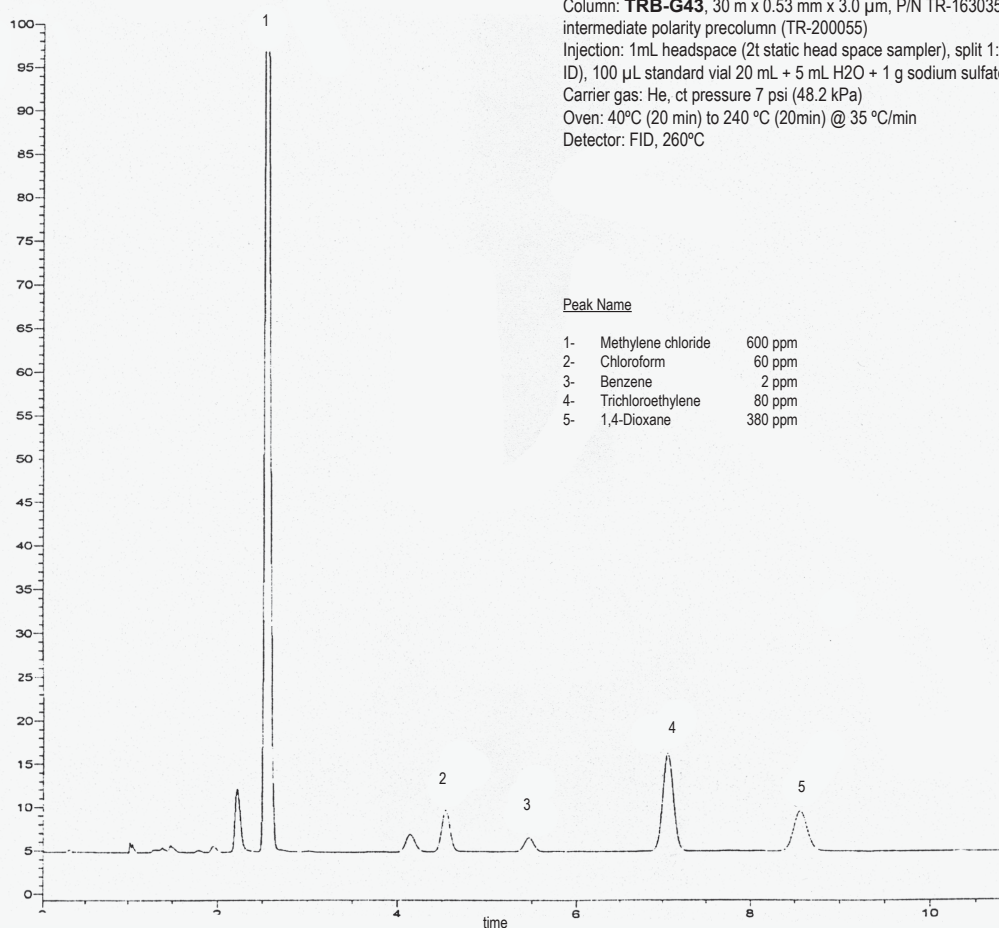
**Restek:** Rtx-G43

**SGE:** BP624

**Phenomenex:** ZB-624

**USP Nomenclature:** G43

## TRB-G43: Solvents

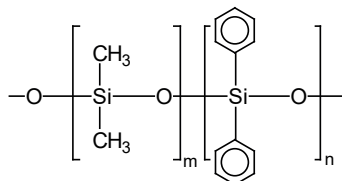


TKG 1122

## TRB-14

**14% Diphenyl - 86% dimethyl polysiloxane, bonded and crosslinked phase.**

- Intermediate polarity column with phenyl groups in its structure
- Chemical inertness and low bleed guaranteed
- Confirmation column alongside TRB-1 and TRB-5



Structure of Poly (dimethyldiphenyl) siloxane

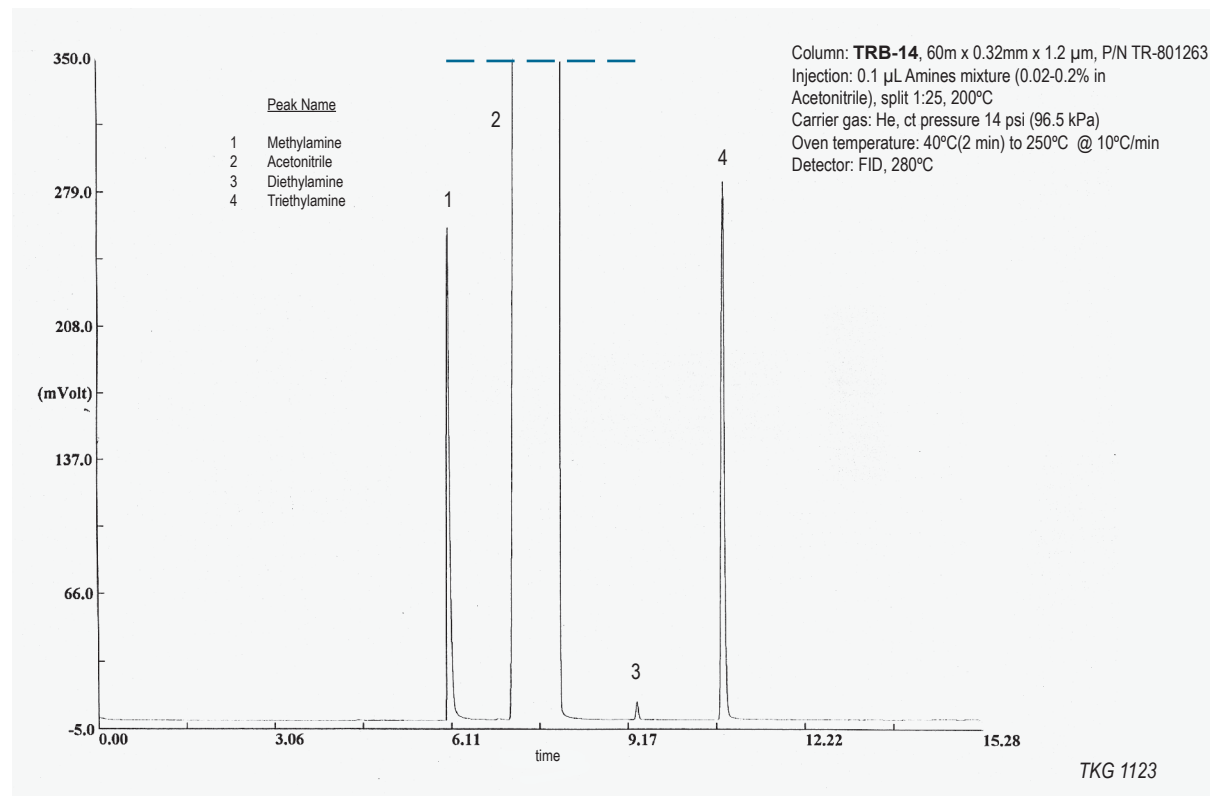
TRB-14 Equivalent Phase

Agilent: CP-SIL 13 CB

## TRB-14

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)	
0,25	15	0,20	-20 to 300/330	TR-802112	
	15	0,40	-20 to 300/330	TR-800412	
	15	1,20	-20 to 300/330	TR-801212	
	30	0,20	-20 to 300/330	TR-802132	
	30	0,40	-20 to 300/330	TR-800432	
	30	1,20	-20 to 300/330	TR-801232	
	60	0,20	-20 to 300/330	TR-802162	
	60	0,40	-20 to 300/330	TR-800462	
	60	1,20	-20 to 300/330	TR-801262	
	0,32	15	0,20	-20 to 300/330	TR-802113
		15	0,40	-20 to 300/330	TR-800413
		15	1,20	-20 to 300/330	TR-801213
30		0,20	-20 to 300/330	TR-802133	
30		0,40	-20 to 300/330	TR-800433	
30		1,20	-20 to 300/330	TR-801233	
60		0,20	-20 to 300/330	TR-802163	
60		0,40	-20 to 300/330	TR-800463	
60		1,20	-20 to 300/330	TR-801263	
0,53		15	1,00	-20 to 300/330	TR-801015
		15	2,00	-20 to 300/330	TR-802015
		30	1,00	-20 to 300/330	TR-801035
	30	2,00	-20 to 300/330	TR-802035	
	60	1,00	-20 to 300/330	TR-801065	
	60	2,00	-20 to 300/330	TR-802065	

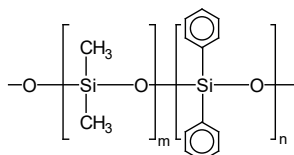
## TRB-14: Amines



## TRB-20

**20% Diphenyl - 80% Dimethyl polysiloxane, bonded and crosslinked phase.**

- Intermediate polarity column with phenyl groups in its structure
- Excellent confirmation column



Structure of Poly (dimethyldiphenyl) siloxane

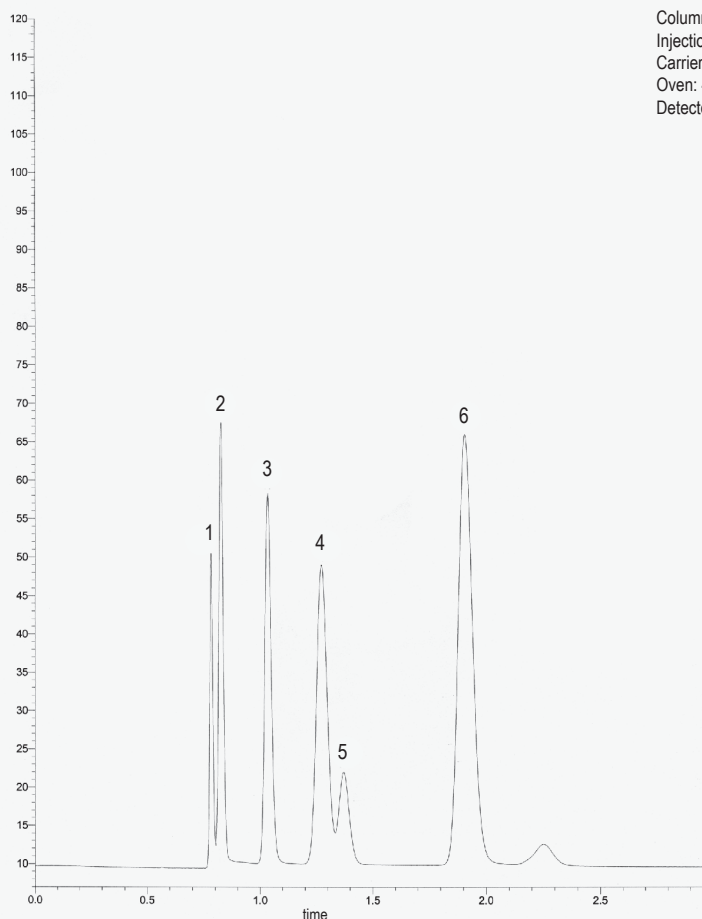
### TRB-20 Equivalent Phase

**Supelco:** SPB-20  
**Quadrex:** 007-502  
**Restek:** Rtx-20

## TRB-20

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
<b>0,25</b>	15	0,25	-20 to 300/320	<b>TR-200212</b>
	15	1,00	-20 to 280/300	<b>TR-201012</b>
	30	0,25	-20 to 300/320	<b>TR-200232</b>
	30	1,00	-20 to 280/300	<b>TR-201032</b>
	60	0,25	-20 to 300/320	<b>TR-200262</b>
	60	1,00	-20 to 280/300	<b>TR-201062</b>
<b>0,32</b>	15	0,25	-20 to 300/320	<b>TR-200213</b>
	15	1,00	-20 to 280/300	<b>TR-201013</b>
	30	0,25	-20 to 300/320	<b>TR-200233</b>
	30	1,00	-20 to 280/300	<b>TR-201033</b>
	60	0,25	-20 to 300/320	<b>TR-200263</b>
	60	1,00	-20 to 280/300	<b>TR-201063</b>
<b>0,53</b>	15	0,50	-20 to 260/280	<b>TR-200515</b>
	15	1,00	-20 to 260/280	<b>TR-201015</b>
	30	0,50	-20 to 260/280	<b>TR-200535</b>
	30	1,00	-20 to 260/280	<b>TR-201035</b>
	60	0,50	-20 to 260/280	<b>TR-200565</b>
	60	1,00	-20 to 260/280	<b>TR-201065</b>

## TRB-20: Alcohols in blood



Column: **TRB-20**, 30 m x 0.53 mm x 3.0 µm, P/N TR-203035  
 Injection: Alcohols in blood, 0.5 µL Head Space, split 5:1, 200 °C  
 Carrier gas: He, ct pressure 10 psi (69 kPa)  
 Oven: 40 °C (isothermal)  
 Detector: FID, 200 °C

### Peak Name

- 1- Methanol
- 2- Acetaldehyde
- 3- Ethanol
- 4- Isopropanol
- 5- Acetone
- 6- n-Propanol

TKG 1124

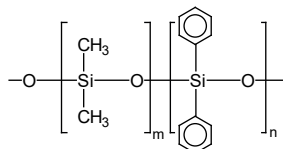


# Teknokroma Capillary Columns

## TRB-35

**35% Diphenyl - 65% Dimethyl polysiloxane, bonded and crosslinked phase.**

- Intermediate polarity column with phenyl groups in its structure
- Excellent confirmation column



Structure of Poly (dimethyldiphenyl) siloxane

### TRB-35 Equivalent Phase

**Agilent:** HP-35, DB-35

**Supelco:** SPB-35

**Restek:** Rtx-35

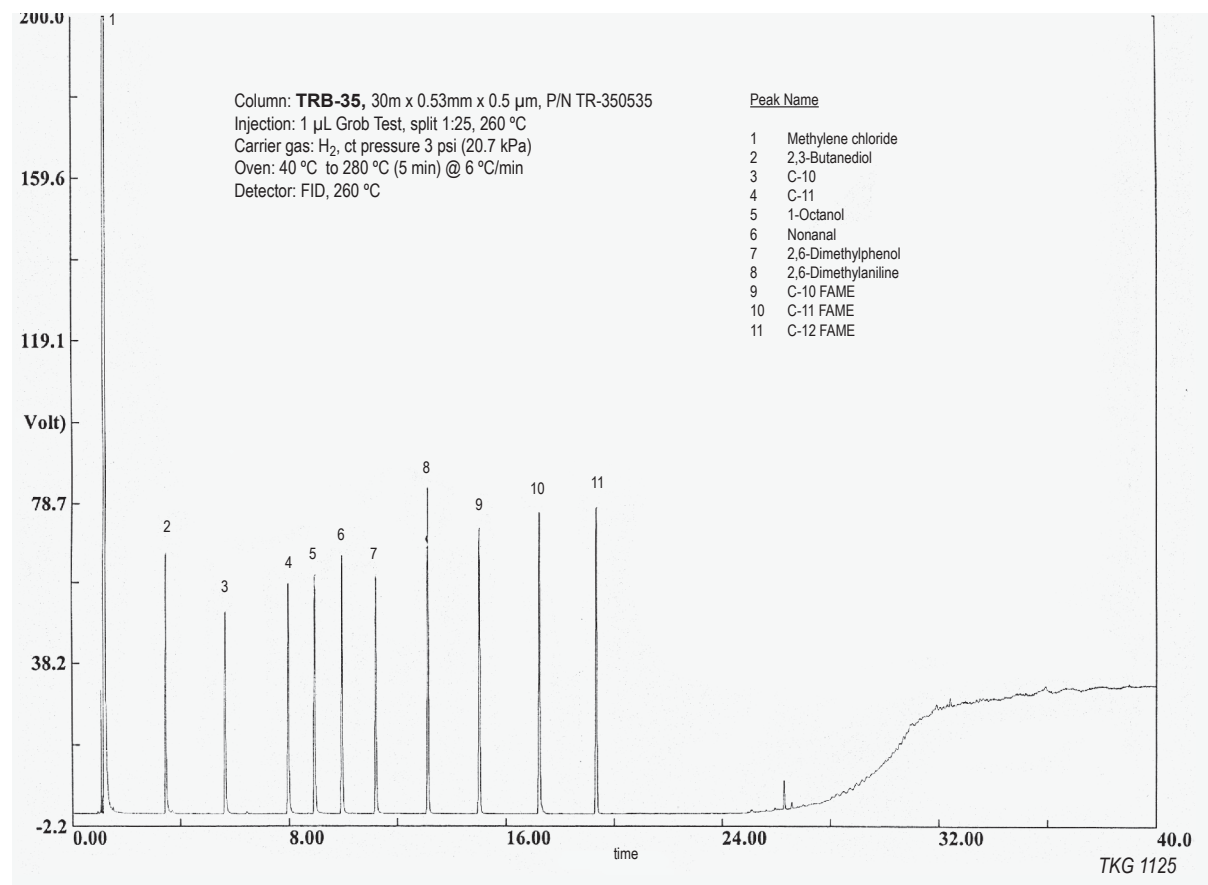
**Quadrex:** 007-11

**Phenomenex:** ZB-35

## TRB-35

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,25	15	0,15	-20 to 300/320	TR-351312
	15	0,25	-20 to 300/320	TR-350212
	30	0,15	-20 to 300/320	TR-351332
	30	0,25	-20 to 300/320	TR-350232
	60	0,15	-20 to 300/320	TR-351362
	60	0,25	-20 to 300/320	TR-350262
0,32	15	0,15	-20 to 300/320	TR-351313
	15	0,25	-20 to 300/320	TR-350213
	15	0,50	-20 to 290/310	TR-350513
	30	0,15	-20 to 300/320	TR-351333
	30	0,25	-20 to 300/320	TR-350233
	30	0,50	-20 to 290/310	TR-350533
	60	0,15	-20 to 300/320	TR-351363
	60	0,25	-20 to 300/320	TR-350263
	60	0,50	-20 to 290/310	TR-350563
	0,53	15	0,50	-20 to 260/280
15		1,00	-20 to 260/280	TR-351015
30		0,50	-20 to 260/280	TR-350535
30		1,00	-20 to 260/280	TR-351035
60		0,50	-20 to 260/280	TR-350565
60		1,00	-20 to 260/280	TR-351065

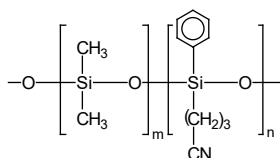
### TRB-35: Grob Test



## TRB-1701

**14% Cyanopropyl phenyl - 86% dimethyl polysiloxane, bonded and crosslinked phase.**

- Intermediate polarity column of wide use
- Historically used in the analysis of pesticides.



Structure of Poly (dimethylcyanopropylphenyl) siloxane

### TRB-1701 Equivalent Phase

**Agilent:** HP-1701, PAS-1701, DB-1701, CP-SIL 19 CB

**Supelco:** SPB-1701, Equity 1701

**Restek:** Rtx-1701

**SGE:** BP10

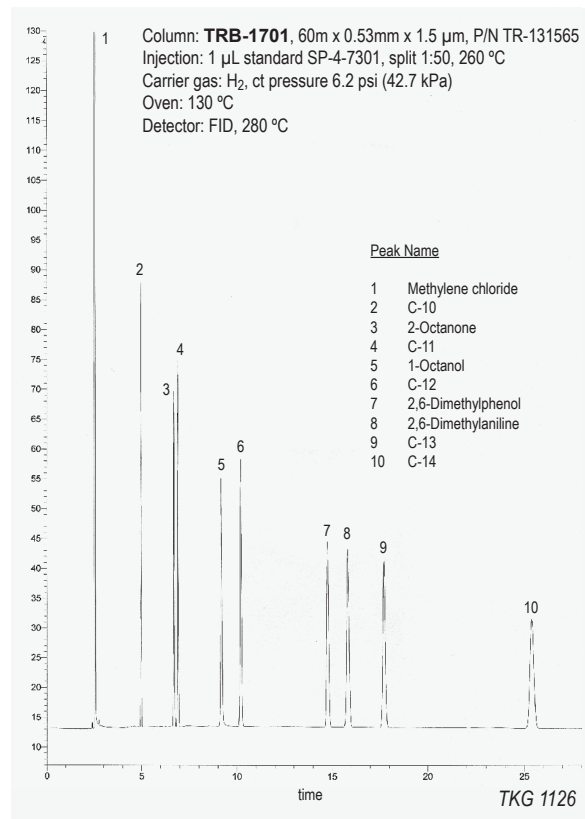
**Quadrex:** 007-1701



### TRB-1701

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
<b>0,10</b>	20	0,10	-20 to 280/280	<b>TR-130181</b>
	20	0,40	-20 to 280/280	<b>TR-130481</b>
<b>0,18</b>	10	0,40	-20 to 280/280	<b>TR-130444</b>
	20	0,18	-20 to 280/280	<b>TR-130984</b>
<b>0,20</b>	15	0,20	-20 to 280/280	<b>TR-132119</b>
	30	0,20	-20 to 280/280	<b>TR-132139</b>
	60	0,20	-20 to 280/280	<b>TR-132169</b>
<b>0,25</b>	15	0,25	-20 to 280/280	<b>TR-130212</b>
	15	0,50	-20 to 270/280	<b>TR-130512</b>
	15	1,00	-20 to 260/280	<b>TR-131012</b>
	30	0,10	-20 to 280/280	<b>TR-130132</b>
	30	0,25	-20 to 280/280	<b>TR-130232</b>
	30	0,50	-20 to 270/280	<b>TR-130532</b>
	30	1,00	-20 to 260/280	<b>TR-131032</b>
	60	0,10	-20 to 280/280	<b>TR-130162</b>
	60	0,25	-20 to 280/280	<b>TR-130262</b>
	60	0,50	-20 to 270/280	<b>TR-130562</b>
<b>0,32</b>	60	1,00	-20 to 260/280	<b>TR-131062</b>
	15	0,10	-20 to 280/280	<b>TR-130113</b>
	15	0,25	-20 to 280/280	<b>TR-130213</b>
	15	0,50	-20 to 270/280	<b>TR-130513</b>
	15	1,00	-20 to 260/280	<b>TR-131013</b>
	30	0,10	-20 to 280/280	<b>TR-130133</b>
	30	0,25	-20 to 280/280	<b>TR-130233</b>
	30	0,50	-20 to 270/280	<b>TR-130533</b>
	30	1,00	-20 to 260/280	<b>TR-131033</b>
	60	0,10	20 to 280/280	<b>TR-130163</b>
<b>0,53</b>	60	0,25	-20 to 280/280	<b>TR-130263</b>
	60	0,50	-20 to 270/280	<b>TR-130563</b>
	60	1,00	-20 to 260/280	<b>TR-131063</b>
	15	0,10	-20 to 270/280	<b>TR-130115</b>
	15	0,50	-20 to 260/270	<b>TR-130515</b>
	15	1,00	-20 to 250/270	<b>TR-131015</b>
	15	1,50	-20 to 240/260	<b>TR-131515</b>
	30	0,10	-20 to 270/280	<b>TR-130135</b>
	30	0,50	-20 to 260/270	<b>TR-130535</b>
	30	1,00	-20 to 250/270	<b>TR-131035</b>
30	1,50	-20 to 240/260	<b>TR-131535</b>	
60	0,10	-20 to 270/280	<b>TR-130165</b>	
60	0,50	-20 to 260/270	<b>TR-130565</b>	
60	1,00	-20 to 250/270	<b>TR-131065</b>	
60	1,50	-20 to 240/260	<b>TR-131565</b>	

### TRB-1701: SP-4-7301 Test



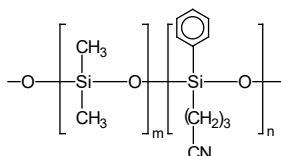


# Teknokroma Capillary Columns

## TRB-225

**50% Cyanopropyl phenyl - 50% dimethyl polysiloxane, bonded and crosslinked phase.**

- Medium/high polarity column
- Excellent for separating cis-trans isomers of FAMES and sugar derivatives.



Structure of Poly (dimethylcyanopropylphenyl) siloxane

### TRB-225 Equivalent Phase

**Agilent:** HP-225, DB-225, CP-SIL 43 CB

**Restek:** Rtx-225

**SGE:** BP225

**Quadrex:** 007-225

**Supelco:** SPB-225

## TRB-225

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,10	20	0,10	40 to 220/240	TR-250181
0,18	20	0,18	40 to 220/240	TR-252184
0,20	15	0,20	40 to 220/240	TR-252119
	30	0,20	40 to 220/240	TR-252139
0,25	15	0,15	40 to 220/240	TR-251312
	15	0,25	40 to 220/240	TR-250212
	30	0,15	40 to 220/240	TR-251332
	30	0,25	40 to 220/240	TR-250232
0,32	15	0,15	40 to 220/240	TR-251313
	15	0,25	40 to 220/240	TR-250213
	30	0,15	40 to 220/240	TR-251333
	30	0,25	40 to 220/240	TR-250233
0,53	15	1,00	40 to 200/220	TR-251015
	30	1,00	40 to 200/220	TR-251035

## TRB-225: Food Industry FAME Mix

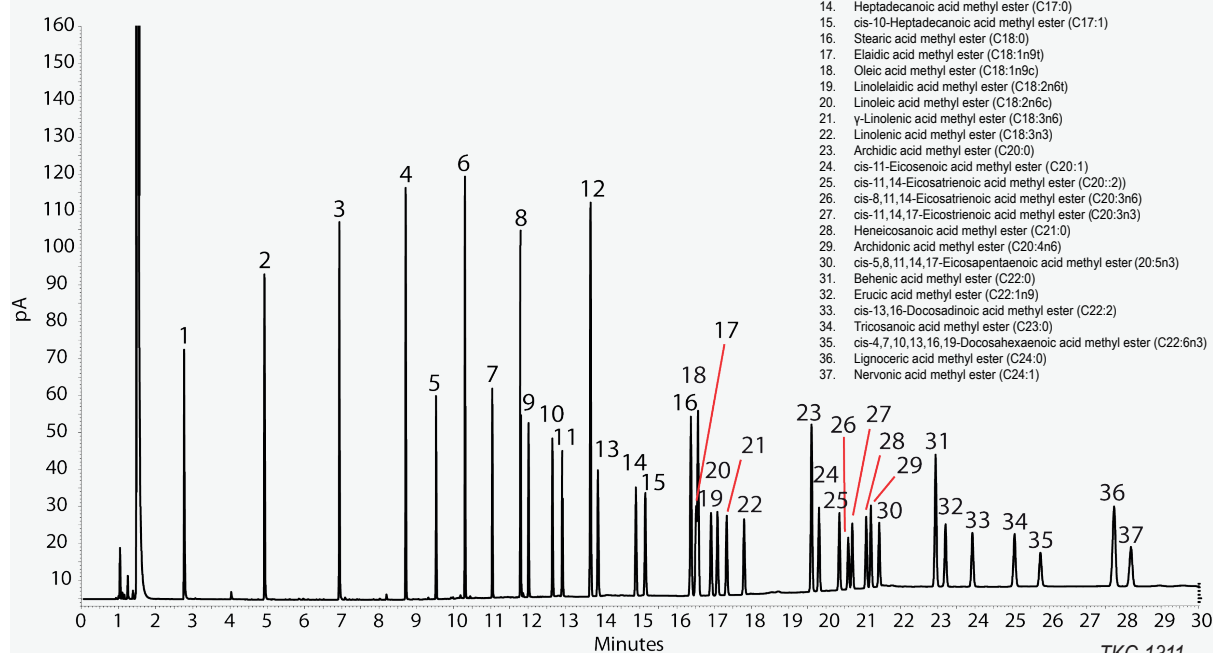
Column: **TRB-225**, 30 m x 0.25 mm x 0.25 µm, P/N TR-250232

Injection: 0,7 µL Food Industry FAME MIX (RS-35077) (30 mg/mL), split 1:50, 260 °C

Carrier gas: H<sub>2</sub>, ct pressure, 12 psi

Oven: 35 °C (1 min) to 195 °C @ 16 °C/min to 205°C @ 1.9 °C/min to 230 °C (15 min) @ 5.1 °C/min

Detector: FID, 260 °C

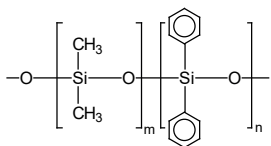


TKG 1311

## TRB-50

**50% Diphenyl- 50% dimethyl polysiloxane, bonded and crosslinked phase.**

- Medium polarity column
- Excellent confirmation column for TRB-5 analyses



Structure of Poly (dimethyldiphenyl) siloxane

### TRB-50 Equivalent Phase

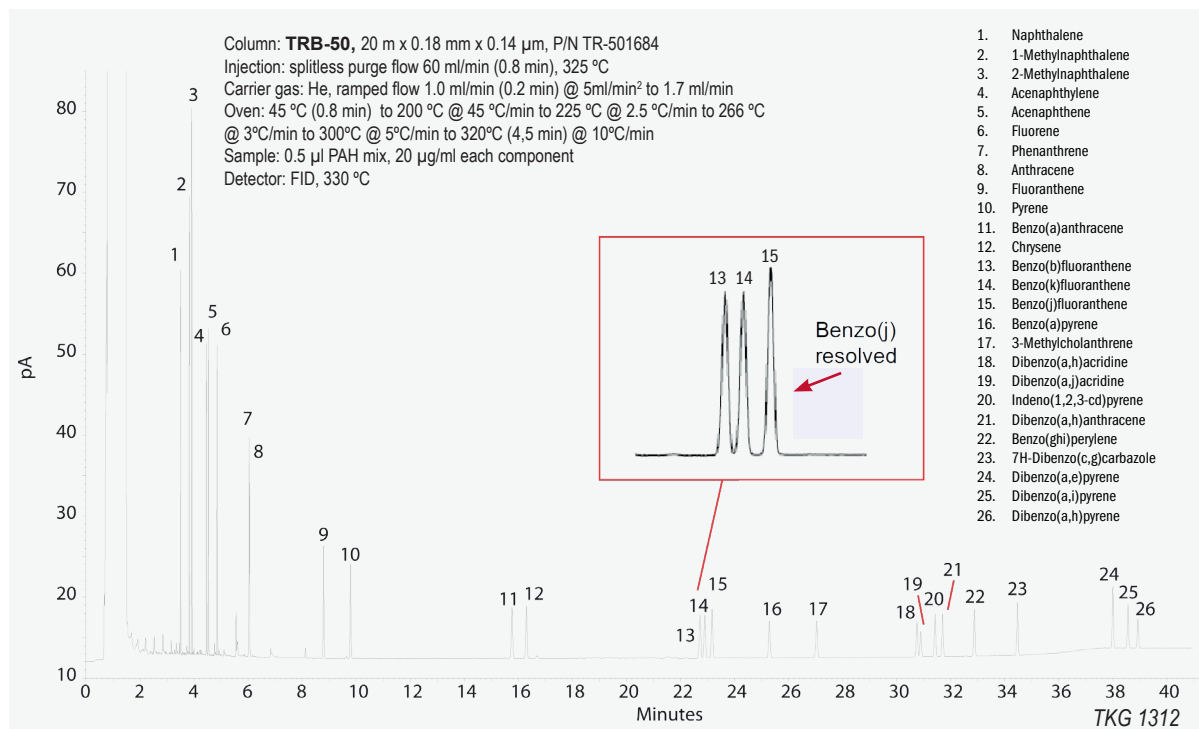
**Agilent:** HP-50\*, DB-17, CP-SIL 24 CB, DB-EuPh  
**Supelco:** SPB-50, SPB-2250  
**Restek:** Rtx-50, Rxi-17  
**Quadrex:** 007-17  
**Phenomenex:** ZB-50

## TRB-50

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,10	10	0,10	40 to 280/300	TR-500141
	10	0,20	40 to 280/300	TR-502141
	20	0,10	40 to 280/300	TR-500181

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,18	20	0,18	40 to 280/300	TR-500984
	20	0,30	40 to 280/300	TR-502984
0,25	15	0,15	40 to 280/300	TR-501312
	15	0,25	40 to 280/300	TR-500212
	15	0,50	40 to 280/300	TR-500512
	30	0,15	40 to 280/300	TR-501332
	30	0,25	40 to 280/300	TR-500232
	30	0,50	40 to 280/300	TR-500532
	60	0,15	40 to 280/300	TR-501362
	60	0,25	40 to 280/300	TR-500262
	60	0,50	40 to 280/300	TR-500562
	0,32	15	0,15	40 to 280/300
15		0,25	40 to 280/300	TR-500213
15		0,50	40 to 280/300	TR-500513
30		0,15	40 to 280/300	TR-501333
30		0,25	40 to 280/300	TR-500233
30		0,50	40 to 280/300	TR-500533
60		0,15	40 to 280/300	TR-501363
60		0,25	40 to 280/300	TR-500263
60		0,50	40 to 280/300	TR-500563
0,53		15	0,50	40 to 260/280
	15	1,00	40 to 260/280	TR-501015
	30	0,50	40 to 260/280	TR-500535
	30	1,00	40 to 260/280	TR-501035
	60	0,50	40 to 260/280	TR-500565
	60	1,00	40 to 260/280	TR-501065

## TRB-50: Polynuclear Aromatic Hydrocarbons (PAHs) Analysis







# Teknokroma Capillary Columns

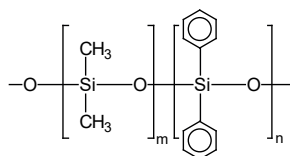
## TRB-50HT

**50% Diphenyl- 50% dimethylpolysiloxane, bonded and crosslinked phase.**

- Medium polarity column with high thermal stability
- Best column for triglycerides analysis

### TRB-50HT Equivalent Phase

**Agilent:** DB-17ht, CP-TAP CB  
**Restek:** Rtx-65TG, MXT-65TG  
**Quadrex:** 007-65HT  
**SGE:** BPX50



Structure of Poly (dimethyldiphenyl) siloxane

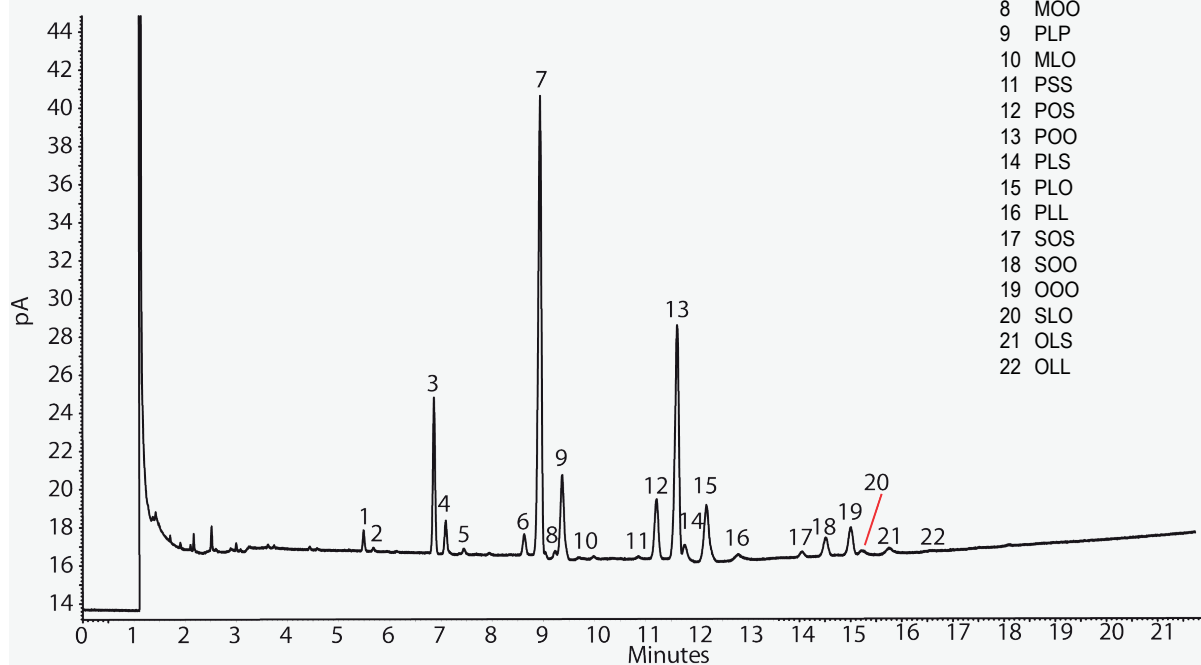
### TRB-50HT

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,25	15	0,10	50 to 370	TR-530112
	15	0,15	50 to 370	TR-531312
	30	0,10	50 to 370	TR-530132
	30	0,15	50 to 370	TR-531332

## TRB-50HT: Palm oil

Column: **TRB-50HT**, 30 m x 0.25 mm x 0.1 µm, P/N TR-530132  
 Injection: 1 µl Palm oil, 10 mg/ml in Isooctane, split 1:50, 360 °C  
 Liner: Single taper w/wool 4 mm ID  
 Carrier gas: H<sub>2</sub>, ct pressure, 17 psi  
 Oven: 350 °C (1 min) to 360 °C @ 0.5 °C/min  
 Detector: FID, 370 °C

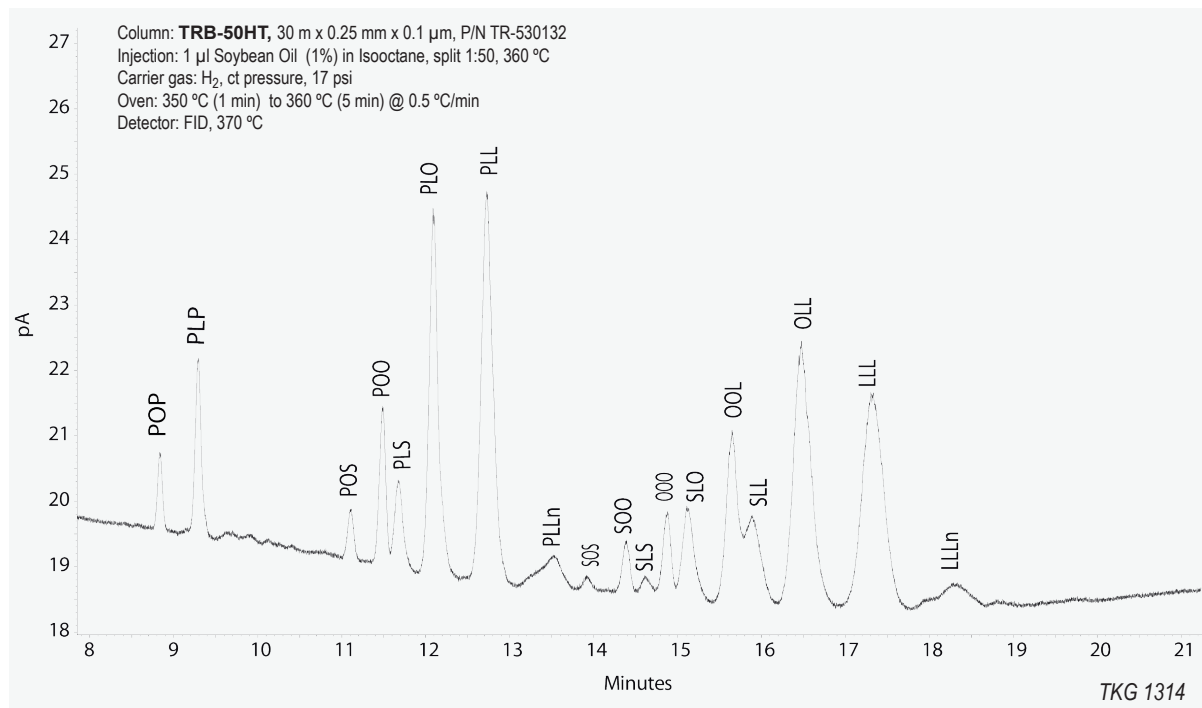
Peak Name
1 MPP
2 MOM
3 PPP
4 MOP
5 MLP
6 PPS
7 POP
8 MOO
9 PLP
10 MLO
11 PSS
12 POS
13 POO
14 PLS
15 PLO
16 PLL
17 SOS
18 SOO
19 OOO
20 SLO
21 OLS
22 OLL



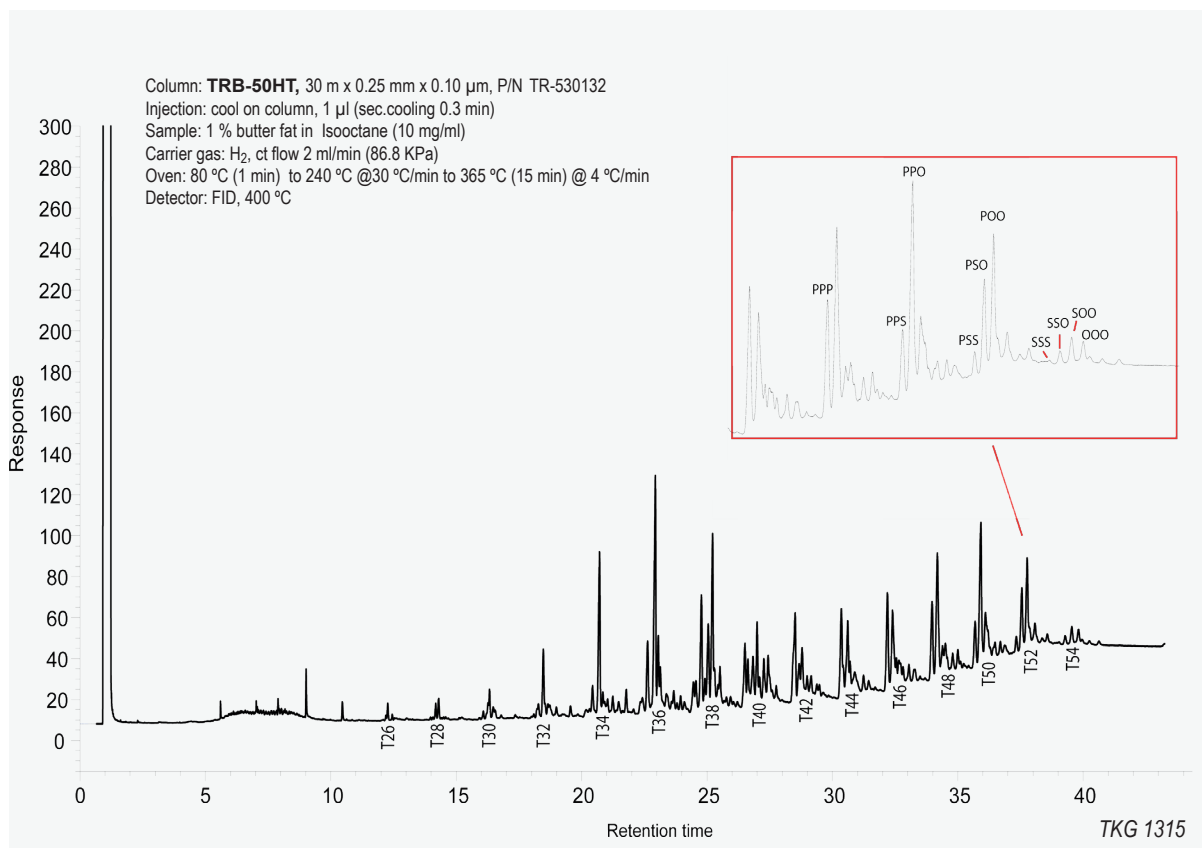
TKG 1313



## TRB-50HT: Soybean Oil



## TRB-50HT: Butter Triglycerides



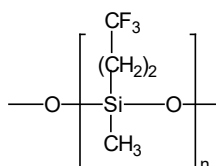


# Teknokroma Capillary Columns

## TRB-F50

**50% Trifluoropropyl- 50% Methyl polysiloxane, bonded and crosslinked phase.**

- High polarity column
- Column designed for the EPA 609 and 8140 methods



Structure of Poly (methyltrifluoropropyl) siloxane

### TRB-F50 Equivalent Phase

**Agilent:** DB-210, DB-200

**Restek:** Rtx-200

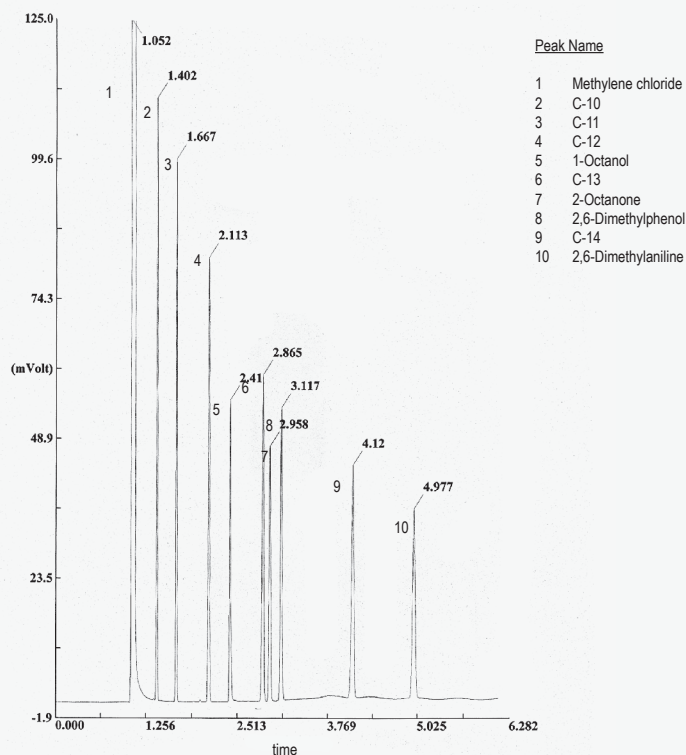
**Quadrex:** 007-210

## TRB-F50

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
<b>0,18</b>	20	0,20	45 to 240/260	<b>TR-572184</b>
<b>0,25</b>	15	0,15	45 to 240/260	<b>TR-571312</b>
	15	0,25	45 to 240/260	<b>TR-570212</b>
	15	0,50	45 to 240/260	<b>TR-570512</b>
<b>0,32</b>	30	0,15	45 to 240/260	<b>TR-571332</b>
	30	0,25	45 to 240/260	<b>TR-570232</b>
	30	0,50	45 to 240/260	<b>TR-570532</b>
<b>0,53</b>	15	0,15	45 to 240/260	<b>TR-571313</b>
	15	0,25	45 to 240/260	<b>TR-570213</b>
	15	0,50	45 to 240/260	<b>TR-570513</b>
	30	0,15	45 to 240/260	<b>TR-571333</b>
	30	0,25	45 to 240/260	<b>TR-570233</b>
	30	0,50	45 to 240/260	<b>TR-570533</b>
<b>0,53</b>	15	1,00	45 to 220/240	<b>TR-571015</b>
	30	1,00	45 to 220/240	<b>TR-571035</b>

## TRB-F50: SP-4-7301 Test

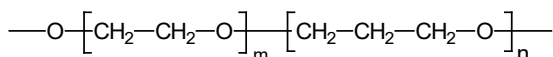
Column: **TRB-F50**, 30 m x 0.32 mm x 0.5 µm, P/N TR-570533  
 Injection: 1 µL standard SP-4-7301 (500 ng/mL comp), split 1:50, 260 °C  
 Carrier gas: H<sub>2</sub>, ct pressure, 7psi (48.2 kPa)  
 Oven: 100 °C  
 Detector: FID, 280°C



## TRB-PAG

**50% Polyethylene - 50% polypropylene glycol, bonded and crosslinked phase.**

- Phase polarity slightly lower than TRB-WAX due to the introduction of propylene oxide groups
- Polarity similar to UCON phase



Structure of Poly (ethylenepropylene) glycol

### TRB-PAG Equivalent Phase

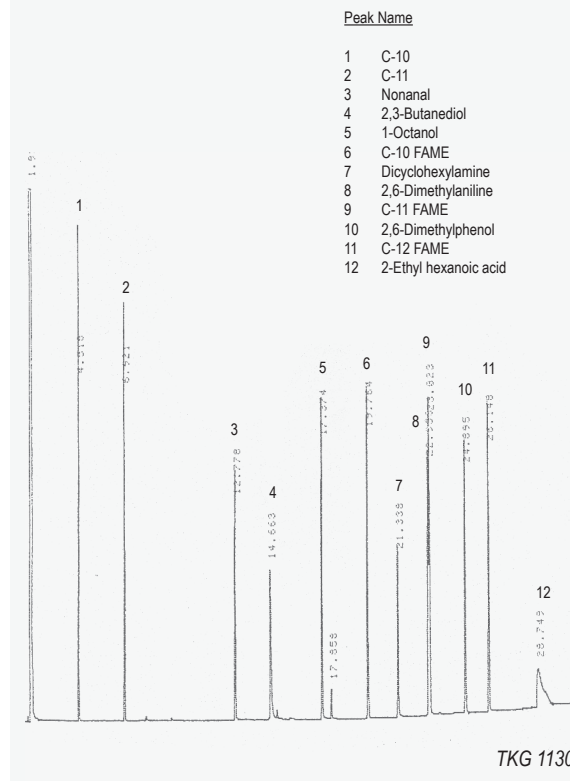
**Supelco:** PAG

### TRB-PAG

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,25	15	0,25	30 to 220/230	TR-550212
	30	0,25	30 to 220/230	TR-550232
	60	0,25	30 to 220/230	TR-550262
0,32	15	0,25	30 to 220/230	TR-550213
	30	0,25	30 to 220/230	TR-550233
	60	0,25	30 to 220/230	TR-550263
0,53	15	0,50	30 to 220/230	TR-550515
	30	0,50	30 to 220/230	TR-550535
	60	0,50	30 to 220/230	TR-550565

## TRB-PAG: Grob Test

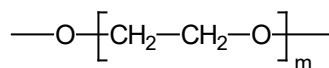
Column: **TRB-PAG**, 30 m x 0.25 mm x 0.25 µm, P/N TR-550232  
 Injection: 1 µL Test Grob, split 1:25, 260 °C  
 Carrier gas: H<sub>2</sub>, ct pressure 11 psi (75.8 kPa)  
 Oven: 40 °C to 230 °C (5 min) @ 6 °C/min  
 Detector: FID, 260 °C



## SupraWAX-280

**Column totally equivalent to the Supelcowax™-10. Based in the popular phase Carbowax 20M.**

- 100 % Polyethylene glycol (PEG), bonded and cross-linked phase
- Column of high polarity
- Phase practically equivalent to the USP G16 phase
- Wide range of operating temperatures and high thermal stability (35°C-280°C)
- Compatible with water and methanol injections, providing that these solvents must be completely vaporized when they enter into the column.
- Reproducibility among columns guaranteed
- Column used for the analysis of methyl esters of fatty acids (FAMES) solvents, fragrances, alcohols and aromatic compounds in the alimentary and flavor and fragrance industry.



Structure of Polyethylene glycol

### SupraWAX-280 Equivalent Phase

**Agilent:** DB-WAX etr  
**Supelco:** Supelcowax™ 10  
**SGE:** SolGel-WAX

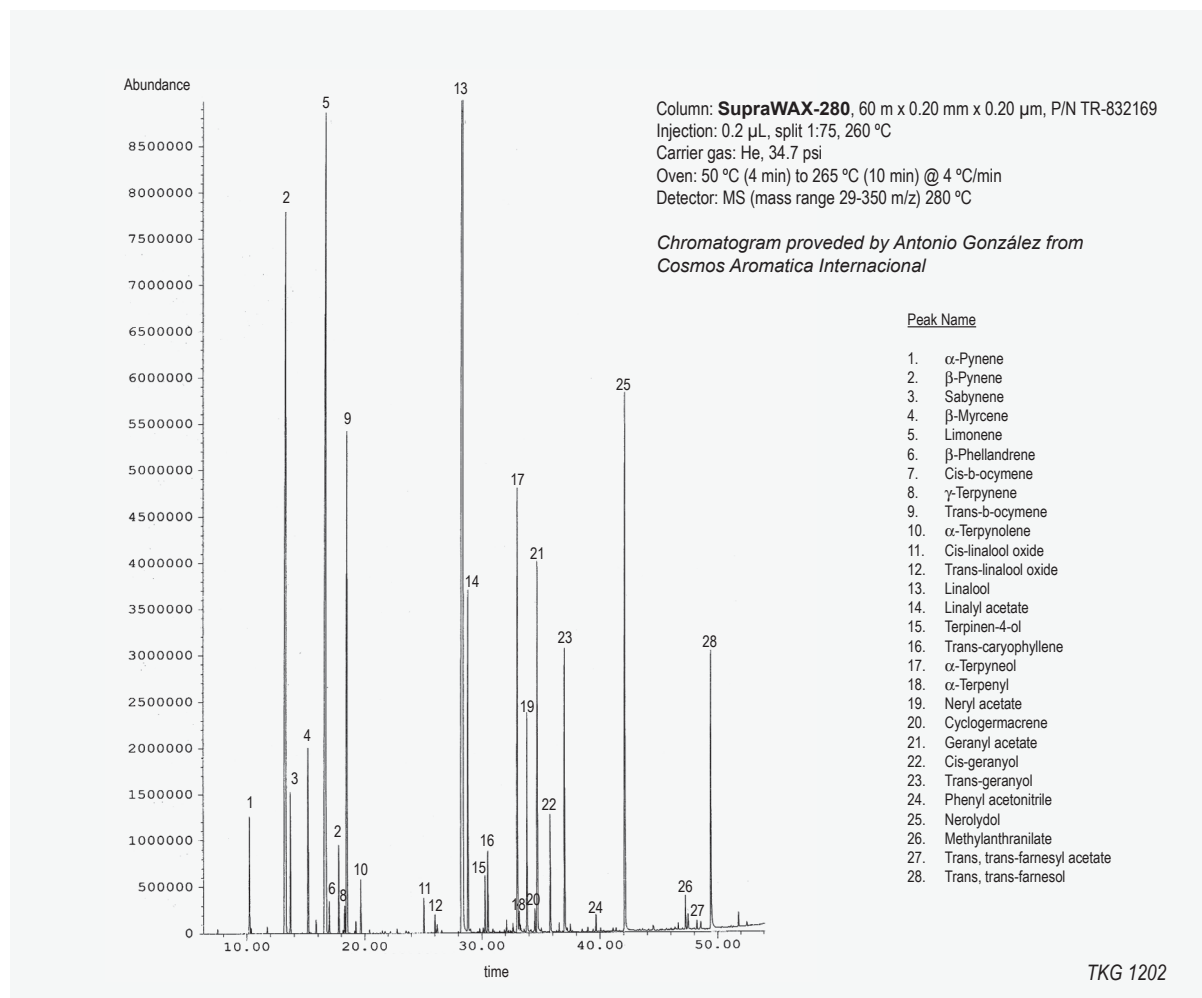


# Teknokroma Capillary Columns

## SupraWAX-280

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)	Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)					
<b>0,10</b>	10	0,10	35 to 280	<b>TR-830141</b>	60	0,25	0,25	35 to 280	<b>TR-830262</b>					
	15	0,10	35 to 280	<b>TR-830111</b>										
	20	0,10	35 to 280	<b>TR-830181</b>										
	20	0,20	35 to 280	<b>TR-832181</b>										
	15	0,20	35 to 280	<b>TR-832111</b>										
<b>0,18</b>	10	0,18	35 to 280	<b>TR-830944</b>	15	0,25	0,25	35 to 280	<b>TR-830213</b>					
	20	0,18	35 to 280	<b>TR-830984</b>										
	20	0,30	35 to 280	<b>TR-832984</b>										
	40	0,30	35 to 280	<b>TR-8329C4</b>										
<b>0,20</b>	30	0,20	35 to 280	<b>TR-832139</b>	15	1,00	0,25	35 to 280	<b>TR-830515</b>					
	60	0,20	35 to 280	<b>TR-832169</b>										
	60	0,40	35 to 280	<b>TR-830469</b>										
<b>0,25</b>	15	0,25	35 to 280	<b>TR-830212</b>	30	0,50	0,50	35 to 280	<b>TR-830535</b>					
	15	0,50	35 to 280	<b>TR-830512</b>										
	30	0,25	35 to 280	<b>TR-830232</b>										
	30	0,50	35 to 280	<b>TR-830532</b>										
<b>0,32</b>	60	0,25	35 to 280	<b>TR-830262</b>	60	0,50	0,25	35 to 280	<b>TR-830562</b>					
										<b>0,32</b>	15	0,25	35 to 280	<b>TR-830213</b>
											15	0,50	35 to 280	<b>TR-830513</b>
										30	0,25	35 to 280	<b>TR-830233</b>	
											0,50	35 to 280	<b>TR-830533</b>	
										30	1,00	35 to 280	<b>TR-831033</b>	
											60	0,25	35 to 280	<b>TR-830263</b>
										60	0,50	35 to 280	<b>TR-830563</b>	
											1,00	35 to 280	<b>TR-831063</b>	
										<b>0,53</b>	60	2,00	35 to 280	<b>TR-831063</b>
15	1,00	35 to 280	<b>TR-831015</b>											
	0,50	35 to 280	<b>TR-830535</b>											
30	1,00	35 to 280	<b>TR-831035</b>											
	2,00	35 to 280	<b>TR-832035</b>											
60	1,00	35 to 280	<b>TR-831065</b>											
	2,00	35 to 280	<b>TR-832065</b>											

## SupraWAX-280: Essential Oil of Flower of Orange Tree (Neroli)

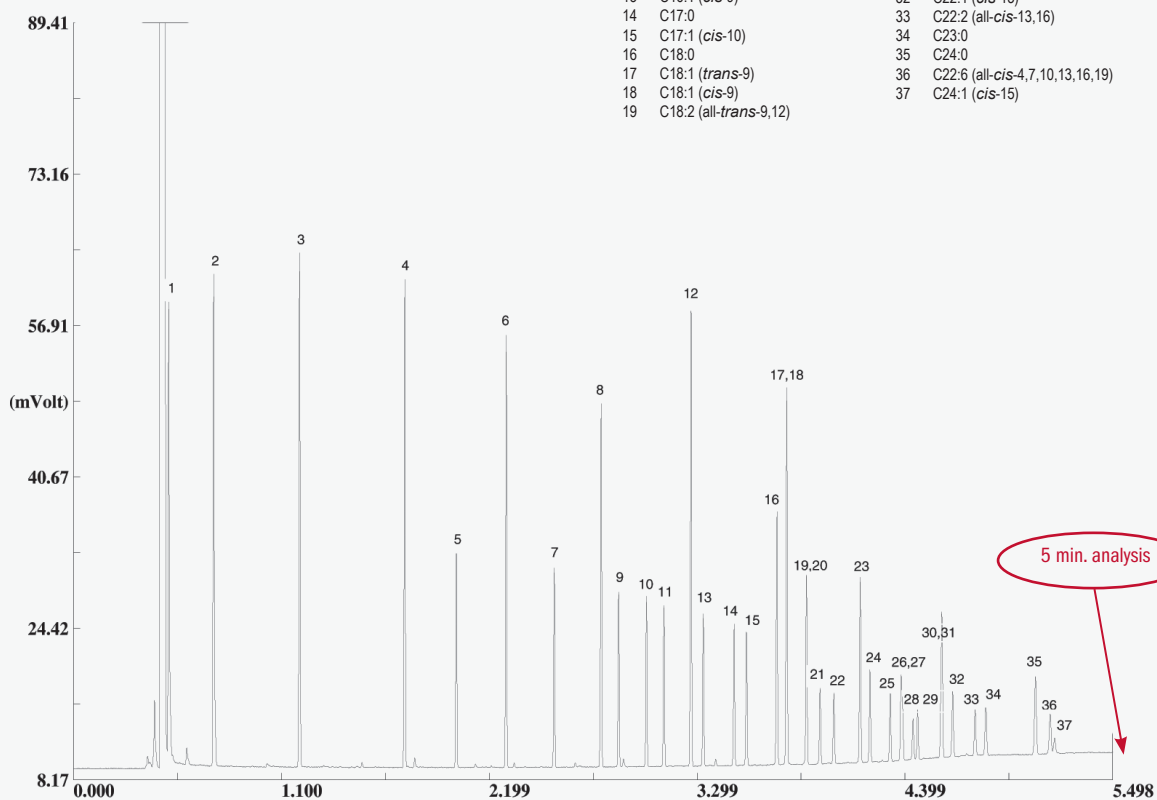


## SupraWAX-280: Food Industry FAME mix (37 compounds)

Column: **SupraWAX-280**, 15 m x 0.10 mm x 0.10  $\mu$ m, P/N TR-830111  
 Injection: 0.3  $\mu$ L Food Industry FAME Mix 10 mg/ml in methylene chloride  
 280°C, split 200:1, precision liner  
 Carrier gas: H<sub>2</sub>, 45 psi (310.05 kPa)  
 Oven: 100 °C (0.5 min) to 280 °C (2 min) @ 50 °C/min  
 Detector: FID, 280 °C

Peak Name

1	C4:0	20	C18:2 (all- <i>cis</i> -9,12)
2	C6:0	21	C18:3 (all- <i>cis</i> -6,9,12)
3	C8:0	22	C18:3 (all- <i>cis</i> -9,12,15)
4	C10:0	23	C20:0
5	C11:0	24	C20:1 ( <i>cis</i> -11)
6	C12:0	25	C20:2 (all- <i>cis</i> -11,14)
7	C13:0	26	C20:3 (all- <i>cis</i> -8,11,14)
8	C14:0	27	C21:0
9	C14:1 ( <i>cis</i> -9)	28	C20:3 (all- <i>cis</i> -11,14,17)
10	C15:0	29	C20:4 (all- <i>cis</i> -5,8,11,14)
11	C15:1 ( <i>cis</i> -10)	30	C20:5 (all- <i>cis</i> -5,8,11,14,17)
12	C16:0	31	C22:0
13	C16:1 ( <i>cis</i> -9)	32	C22:1 ( <i>cis</i> -13)
14	C17:0	33	C22:2 (all- <i>cis</i> -13,16)
15	C17:1 ( <i>cis</i> -10)	34	C23:0
16	C18:0	35	C24:0
17	C18:1 ( <i>trans</i> -9)	36	C22:6 (all- <i>cis</i> -4,7,10,13,16,19)
18	C18:1 ( <i>cis</i> -9)	37	C24:1 ( <i>cis</i> -15)
19	C18:2 (all- <i>trans</i> -9,12)		



TKG 1247

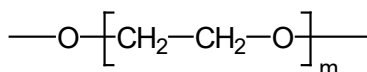


# Teknokroma Capillary Columns

## TRB-WAX

**100% polyethylene glycol, bonded and cross-linked phase.**

- High polarity column
- Ideal for separating alcohols, aldehydes, ketones and aromatic isomers (BTX)



Structure of Polyethylene glycol

### TRB-WAX Equivalent Phase

**Agilent:** HP-INNOWAX, DB-WAX, CP-WAX 52 CB, HP-20M, HP-WAX

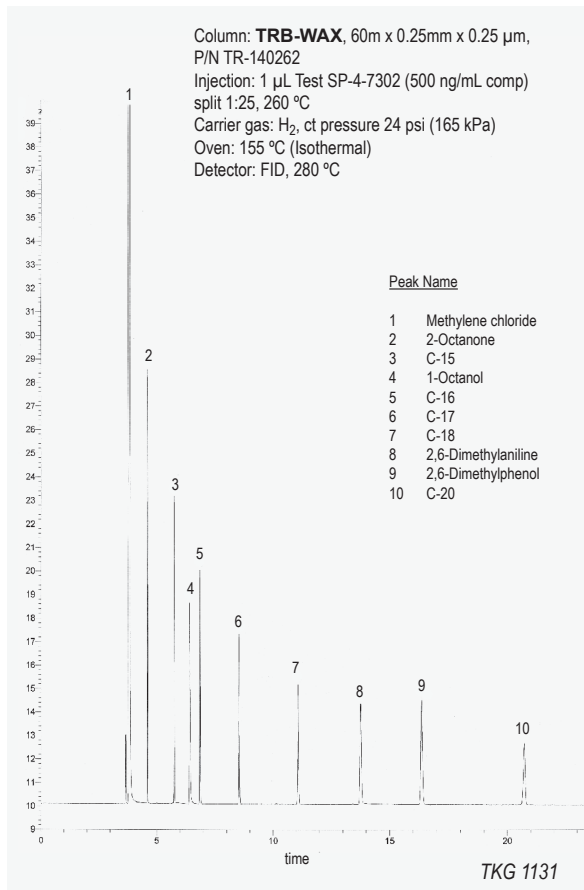
**Supelco:** Carbowax 20M

**Restek:** STABILWAX, Rtx-WAX

**SGE:** BP20

**Phenomenex:** ZB-WAX

### TRB-WAX: SP-4-7302 Test

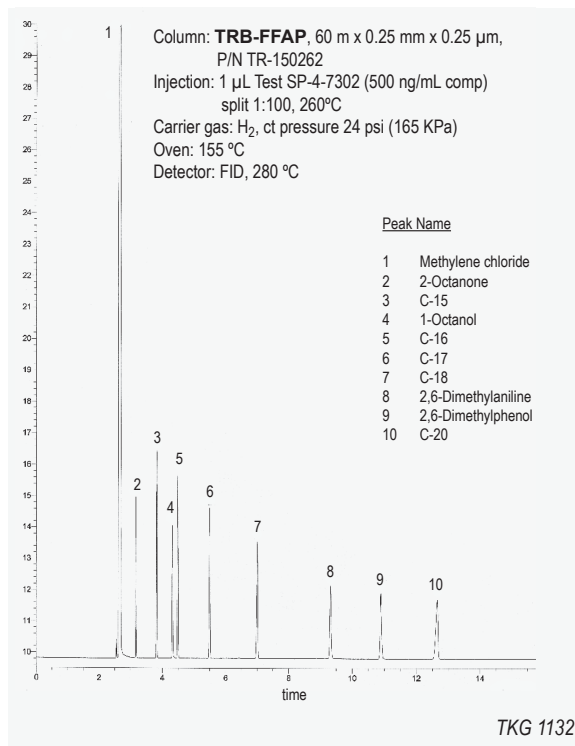


## TRB-WAX

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
<b>0,10</b>	10	0,10	40 to 260/270	<b>TR-140141</b>
	10	0,20	40 to 260/270	<b>TR-142141</b>
	20	0,10	40 to 260/270	<b>TR-140181</b>
	20	0,20	40 to 260/270	<b>TR-142181</b>
<b>0,20</b>	15	0,20	40 to 260/270	<b>TR-142119</b>
	15	0,40	40 to 260/270	<b>TR-140419</b>
	30	0,20	40 to 260/270	<b>TR-142139</b>
	30	0,40	40 to 260/270	<b>TR-140439</b>
	60	0,20	40 to 260/270	<b>TR-142169</b>
	60	0,40	40 to 260/270	<b>TR-140469</b>
<b>0,25</b>	15	0,10	40 to 260/270	<b>TR-140112</b>
	15	0,25	40 to 260/270	<b>TR-140212</b>
	15	0,50	40 to 260/270	<b>TR-140512</b>
	30	0,10	40 to 260/270	<b>TR-140132</b>
	30	0,25	40 to 260/270	<b>TR-140232</b>
	30	0,50	40 to 260/270	<b>TR-140532</b>
	60	0,10	40 to 260/270	<b>TR-140162</b>
	60	0,25	40 to 260/270	<b>TR-140262</b>
	60	0,50	40 to 260/270	<b>TR-140562</b>
	<b>0,32</b>	15	0,10	40 to 260/270
15		0,25	40 to 260/270	<b>TR-140213</b>
15		0,50	40 to 260/270	<b>TR-140513</b>
30		0,10	40 to 260/270	<b>TR-140133</b>
30		0,25	40 to 260/270	<b>TR-140233</b>
30		0,50	40 to 260/270	<b>TR-140533</b>
50		1,20	40 to 230/240	<b>TR-141253</b>
60		0,10	40 to 260/270	<b>TR-140163</b>
60		0,25	40 to 260/270	<b>TR-140263</b>
60		0,50	40 to 260/270	<b>TR-140563</b>
<b>0,53</b>	60	1,00	40 to 230/240	<b>TR-141063</b>
	60	1,20	40 to 230/240	<b>TR-141263</b>
	100	1,00	40 to 230/240	<b>TR-141093</b>
	10	1,00	40 to 240/250	<b>TR-141045</b>
	15	1,00	40 to 240/250	<b>TR-141015</b>
	30	1,00	40 to 240/250	<b>TR-141035</b>
30	1,33	40 to 240/250	<b>TR-141735</b>	
30	2,00	40 to 240/250	<b>TR-142035</b>	
60	1,00	40 to 240/250	<b>TR-141065</b>	
60	2,00	40 to 240/250	<b>TR-142065</b>	



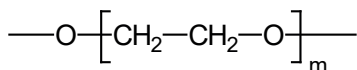
TRB-FFAP: SP-4-7302 Test



## TRB-FFAP

**Polyethylene glycol esterified with nitroterephthalic acid, bonded and crosslinked phase.**

- Ideal for analysis of free acids (without derivatization), phenols and glycols
- Thermal stability up to (250°C)



Structure of Polyethylene glycol

### TRB-FFAP Equivalent Phase

**Agilent:** HP-FFAP, DB-FFAP, CP-WAX 58 FFAP CB

**Supelco:** NUKOL, SPB-1000

**Restek:** STABILWAX-DA

**SGE:** BP21

**Quadrex:** 007-FFAP

**Phenomenex:** ZB-FFAP

### TRB-FFAP

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
<b>0,10</b>	10	0,10	40 to 240/250	<b>TR-150141</b>
	10	0,20	40 to 240/250	<b>TR-152141</b>
	15	0,10	40 to 240/250	<b>TR-150111</b>
	20	0,10	40 to 240/250	<b>TR-150181</b>
<b>0,20</b>	15	0,30	40 to 240/250	<b>TR-152119</b>
	30	0,30	40 to 240/250	<b>TR-152139</b>
	60	0,30	40 to 240/250	<b>TR-152169</b>
<b>0,25</b>	15	0,25	40 to 240/250	<b>TR-150212</b>
	30	0,25	40 to 240/250	<b>TR-150232</b>
	60	0,25	40 to 240/250	<b>TR-150262</b>
<b>0,32</b>	15	0,25	40 to 240/250	<b>TR-150213</b>
	15	0,50	40 to 240/250	<b>TR-150513</b>
	30	0,25	40 to 240/250	<b>TR-150233</b>
	30	0,50	40 to 240/250	<b>TR-150533</b>
	60	0,25	40 to 240/250	<b>TR-150263</b>
	60	0,50	40 to 240/250	<b>TR-150563</b>
<b>0,53</b>	15	0,50	40 to 240/250	<b>TR-150515</b>
	15	1,00	40 to 230/240	<b>TR-151015</b>
	30	0,50	40 to 240/250	<b>TR-150535</b>
	30	1,00	40 to 230/240	<b>TR-151035</b>
	60	0,50	40 to 240/250	<b>TR-150565</b>
	60	1,00	40 to 230/240	<b>TR-151065</b>

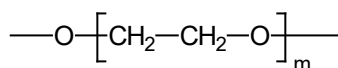


# Teknokroma Capillary Columns

## TR-WAX.DB

### 100% Polyethylene glycol, nonbonded phase.

- Basic deactivated Polyethylene glycol (PEG)
- Excellent for analysing basic nonderivatized compounds
- Ideal for separating amines and nitrosamines



Structure of Polyethylene glycol

### TR-WAX.DB Equivalent Phase

**Agilent:** CAM, HP-BasicWax, CP-WAX 51 CB for Amines  
CP-WAX for Volatile Amines

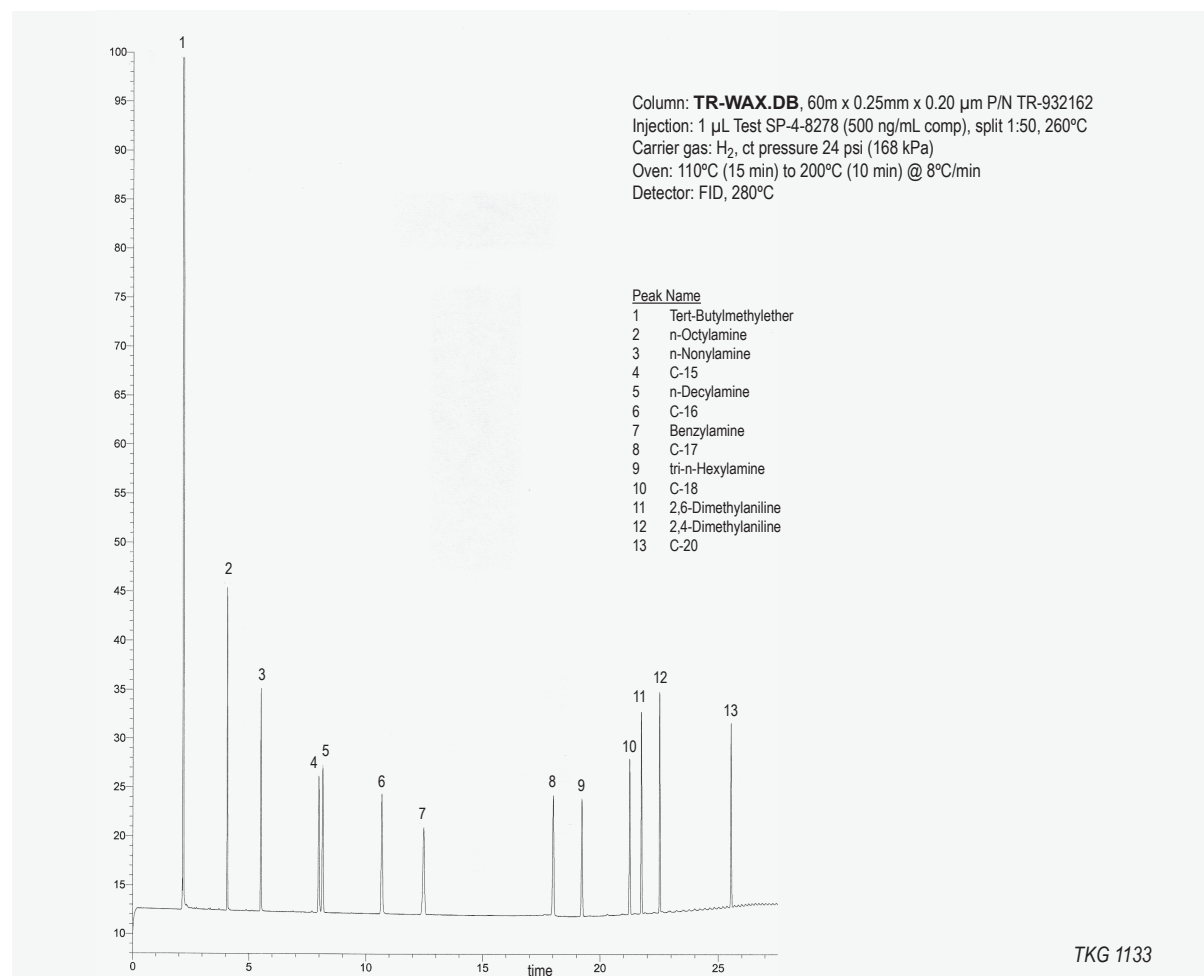
**Supelco:** Carbowax-Amine

**Restek:** Stabilwax-DB

## TR-WAX.DB

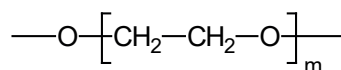
Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,25	15	0,20	60 to 210/220	TR-932112
	15	0,25	60 to 210/220	TR-930212
	30	0,20	60 to 210/220	TR-932132
	30	0,25	60 to 210/220	TR-930232
	30	0,50	60 to 210/220	TR-930532
	60	0,20	60 to 210/220	TR-932162
0,32	15	0,25	60 to 210/220	TR-930213
	30	0,25	60 to 210/220	TR-930233
	30	0,50	60 to 210/220	TR-930533
	30	1,00	60 to 210/220	TR-931033
	60	1,00	60 to 210/220	TR-931063
	0,53	15	1,00	60 to 210/220
30		0,50	60 to 210/220	TR-930535
30		1,00	60 to 210/220	TR-931035
30		1,50	60 to 210/220	TR-931535
60		1,00	60 to 210/220	TR-931065

## TR-WAX.DB: SP-4-8278 Test



TKG 1133





Structure of Polyethylene glycol

## TRB-WAXOmega Equivalent Phase

**Supelco:** Omegawax  
**Restek:** Famewax

## TRB-WAXOmega

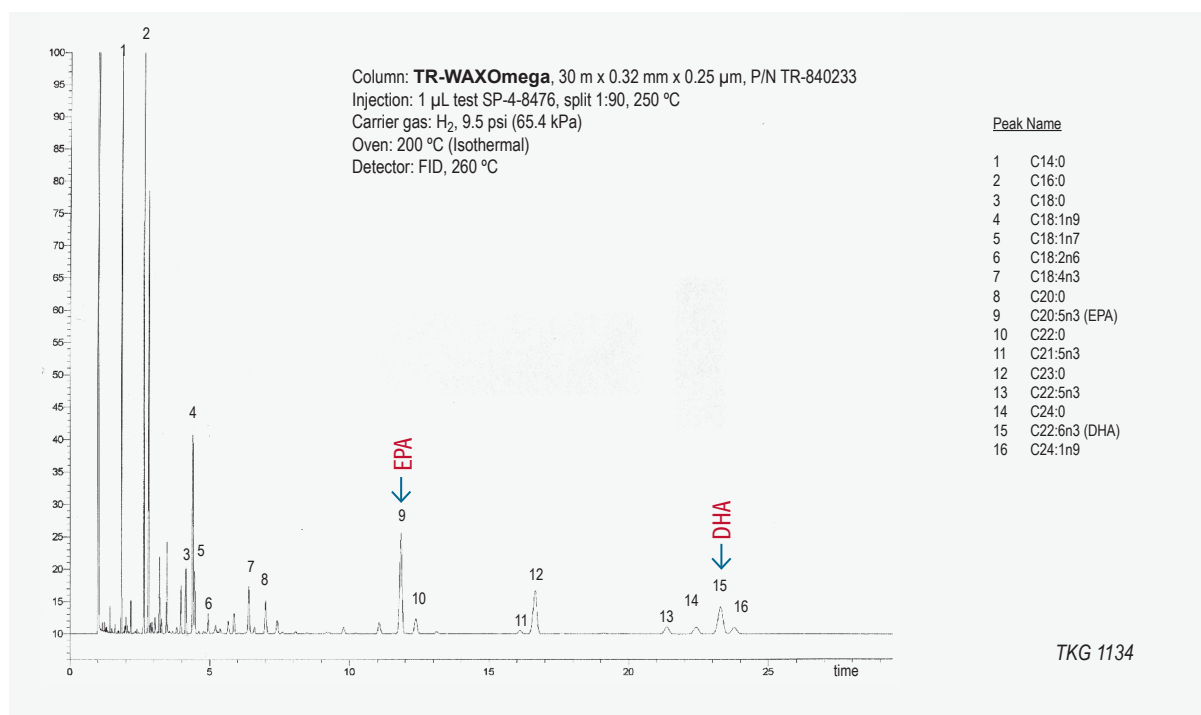
**100% Polyethylene glycol, bonded and crosslinked phase.**

- High polarity column
- Specially designed for the analysis of Omega-3 and Omega-6 fatty acids methyl esters

## TRB-WAXOmega

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,25	30	0,25	40 to 260/270	TR-840232
0,32	30	0,25	40 to 260/270	TR-840233
0,53	30	0,50	40 to 260/270	TR-840535

## TRB-WAXOmega: SP-4-8476 Test



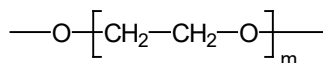


# Teknokroma Capillary Columns

## Meta.WAX

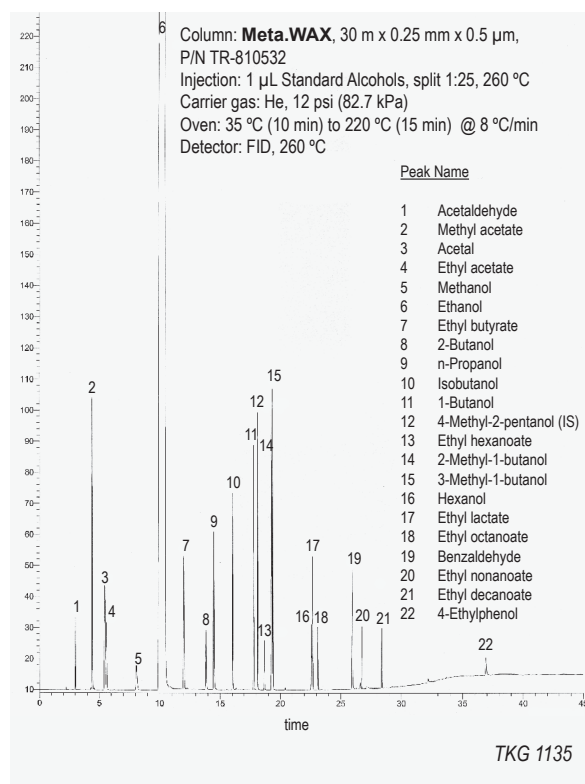
**100% Polyethylene glycol, bonded and cross-linked phase.**

- High polarity column
- Minimum operating temperature 20° C
- Designed for analyzing volatiles in alcoholic beverages
- Excellent symmetry for aldehyde and glycol peaks



Structure of Polyethylene glycol

## Meta.WAX: Alcohols



## Meta.WAX Equivalent Phase

**Agilent:** HP-WAX, DB-WAX, CP-WAX 57 CB, DB-WAX FF

**Restek:** Rtx-WAX

**Phenomenex:** ZB-WAX

**SGE:** BP20

**Supelco:** Nukol

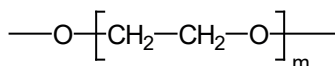
## Meta.WAX

Internal Diam.(mm)	Length (m)	Film Thickness (μm)	Temp limits (°C)	Part. N°. (P/N)
<b>0,10</b>	10	0,10	20 to 240/250	<b>TR-810141</b>
	10	0,20	20 to 240/250	<b>TR-812141</b>
	20	0,10	20 to 240/250	<b>TR-810181</b>
<b>0,18</b>	20	0,20	20 to 240/250	<b>TR-812181</b>
	10	0,18	20 to 240/250	<b>TR-810944</b>
	20	0,18	20 to 240/250	<b>TR-810984</b>
<b>0,25</b>	20	0,30	20 to 240/250	<b>TR-812984</b>
	40	0,18	20 to 240/250	<b>TR-8109C4</b>
	40	0,30	20 to 240/250	<b>TR-8129C4</b>
<b>0,32</b>	15	0,10	20 to 240/250	<b>TR-810112</b>
	15	0,25	20 to 240/250	<b>TR-810212</b>
	15	0,50	20 to 240/250	<b>TR-810512</b>
	30	0,10	20 to 240/250	<b>TR-810132</b>
	30	0,25	20 to 240/250	<b>TR-810232</b>
	30	0,50	20 to 240/250	<b>TR-810532</b>
<b>0,53</b>	60	0,20	20 to 240/250	<b>TR-812162</b>
	60	0,25	20 to 240/250	<b>TR-810262</b>
	15	0,25	20 to 240/250	<b>TR-810213</b>
	15	0,50	20 to 240/250	<b>TR-810513</b>
	15	1,00	20 to 230/240	<b>TR-811013</b>
	30	0,25	20 to 240/250	<b>TR-810233</b>
<b>0,53</b>	30	0,50	20 to 240/250	<b>TR-810533</b>
	30	1,00	20 to 230/240	<b>TR-811033</b>
	60	0,25	20 to 240/250	<b>TR-810263</b>
	60	0,50	20 to 240/250	<b>TR-810563</b>
	60	0,64	20 to 240/250	<b>TR-816463</b>
	60	1,00	20 to 230/240	<b>TR-811063</b>
<b>0,53</b>	15	1,00	20 to 230/240	<b>TR-811215</b>
	30	1,00	20 to 230/240	<b>TR-811235</b>

## Meta.WAX 400

**100% Polyethylene glycol (PEG), nonbonded phase.**

- Column designed for the analysis of volatiles in alcoholic beverages and solvents
- Maximum resolution of amylic alcohols
- High number of plates even at very low temperature (<20°C)



Structure of Polyethylene glycol

Meta.WAX 400 Equivalent Phase

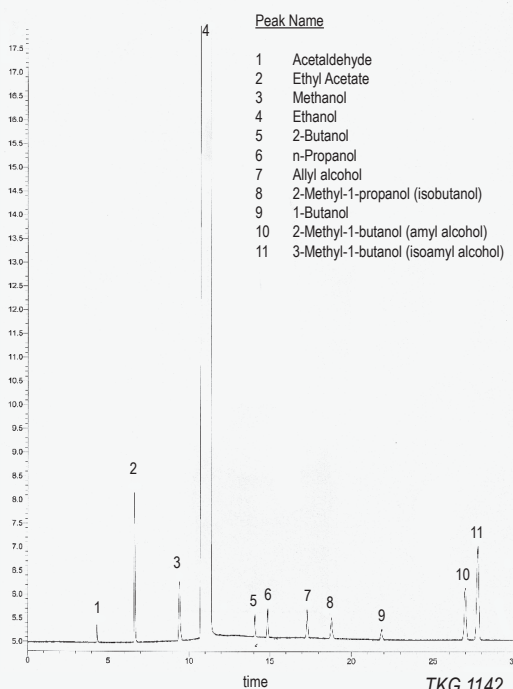
**Agilent:** CP-Carbowax 400

### Meta.WAX 400

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,32	50	0,20	0 to 60/80	TR-402153

### Meta.WAX 400: Alcohols

Column: **Meta.WAX 400**, 50 m x 0.32 mm x 0.20 µm, P/N TR-402153  
 Injection: 1 µL standard (split 1:50), 175 °C  
 Carrier gas: He, 11 psi (75.8 kPa)  
 Oven: 30 °C (5 min) to 60 °C (10 min) @ 4 °C/min  
 Detector: FID, 175 °C

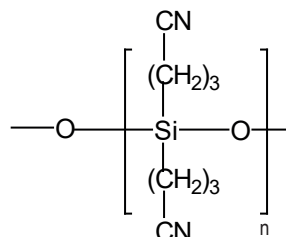


TKG 1142

## TR-CN100

**100% Cyanopropyl polysiloxane, nonbonded phase**

- Column of maximum polarity
- Designed for separating fatty acids methyl esters (FAME)
- High selectivity towards cis-trans isomers of FAME



Structure of Poly (biscyanopropyl) siloxane

TR-CN100 Equivalent Phase

**Agilent:** CP-SIL 88, HP-88, Select FAME  
**Supelco:** SP-2340, SP-2380, SP-2560, SP-2330  
**Restek:** Rt-2330, Rt-2560  
**Phenomenex:** ZB-FAME, ZB-88  
**SGE:** BPX70, BPX90

### TR-CN100

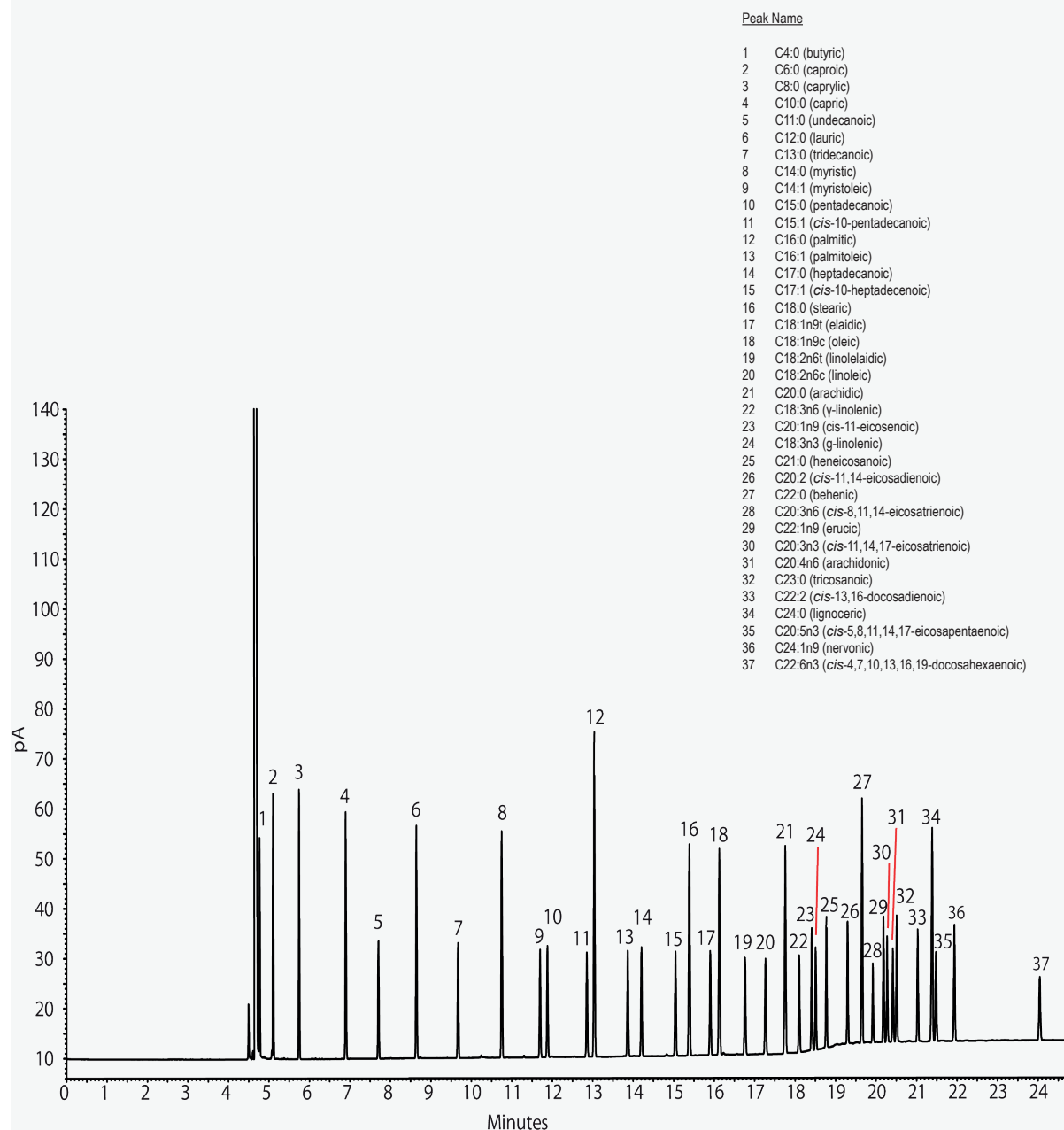
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,18	75	0,14	40 to 240/250	TR-881674
0,25	15	0,20	40 to 240/250	TR-882112
	30	0,20	40 to 240/250	TR-882132
	60	0,20	40 to 240/250	TR-882162
	100	0,20	40 to 240/250	TR-882192
0,32	200	0,20	40 to 240/250	TR-8821P2
	15	0,20	40 to 240/250	TR-882113
	30	0,20	40 to 240/250	TR-882133
0,53	60	0,20	40 to 240/250	TR-882163
	15	0,20	40 to 225/250	TR-882115
	30	0,20	40 to 225/250	TR-882135
60	0,20	40 to 225/250	TR-882165	



# Teknokroma Capillary Columns

## TR-CN100: SEPARATION OF METHYL ESTERS (FAMES) FAST TEST

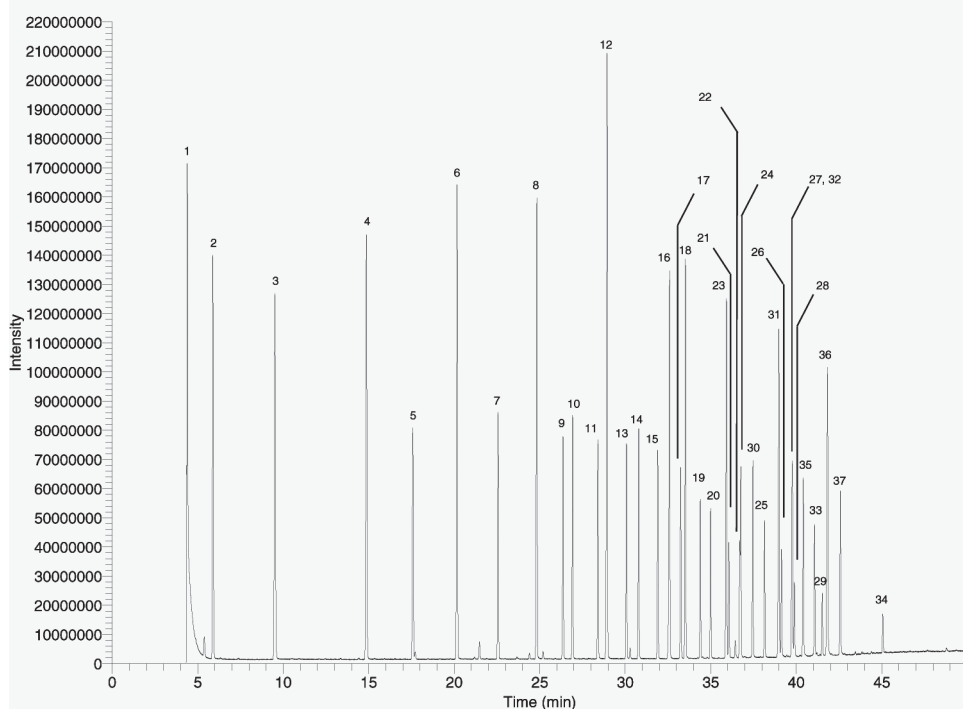
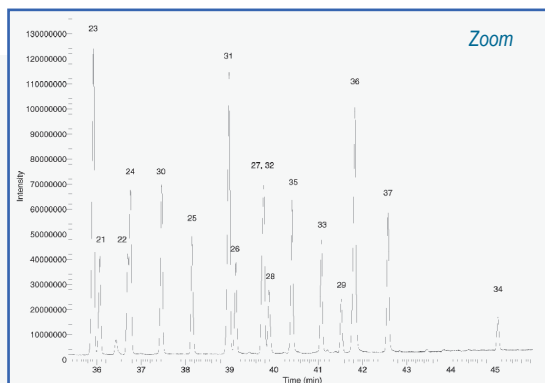
Column: **TR-CN100**, 100 m x 0.25 mm x 0.20  $\mu$ m, P/N TR-882192  
Injection: 0.7  $\mu$ L 37 FAMES (RS-35077) (30 mg/mL), split 1:100, 260  $^{\circ}$ C  
Carrier gas: H<sub>2</sub> at pressure 42 psi (2.4 ml/min)  
Oven: 140  $^{\circ}$ C (5 min) to 180  $^{\circ}$ C @ 8  $^{\circ}$ C/min to 210  $^{\circ}$ C @ 4 $^{\circ}$ C/min to 240  $^{\circ}$ C (10 min) @ 20 $^{\circ}$ C/min  
Detector: FID, 260  $^{\circ}$ C  
Liner: 4 mm ID, Single taper w/wool



TKG 1316

## TR-CN100: Food Industry FAME Mix - 60 m column (MSD)

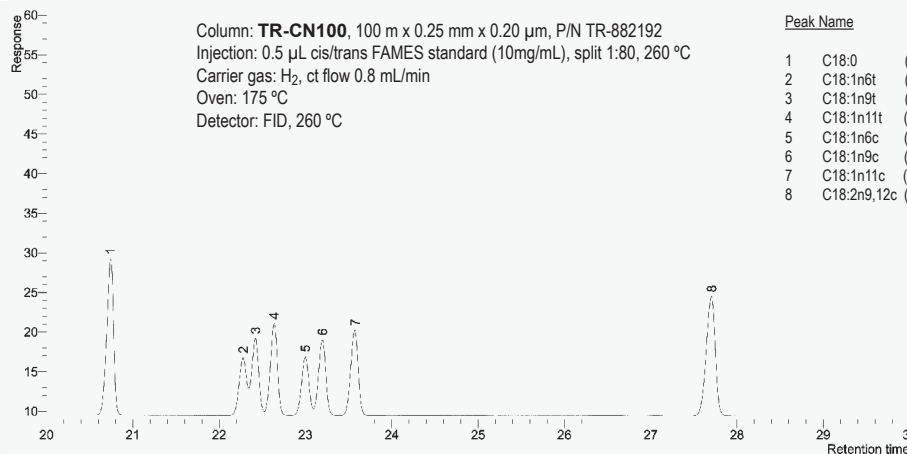
Column: **TR-CN100**, 60 m x 0.25 mm x 0.20 µm, P/N: TR-882162  
 Injection: 280°C, split 50:1  
 Carrier gas: He, ct pressure 24 psi (165,6 kPa)  
 Oven: 90 °C (7 min) to 240 °C (3 min) @ 4 °C/min  
 Detector: MS  
 Transfer line: 230 °C  
 Ionization mode: EI  
 Scan range: 40-450 amu  
 Sample: 0.5µL Food Industry FAME Mix 10 mg/ml in methylene chloride



Peak Name
1. C4:0
2. C6:0
3. C8:0
4. C10:0
5. C11:0
6. C12:0
7. C13:0
8. C14:0
9. C14:1(cis-9)
10. C15:0
11. C15:1(cis-10)
12. C16:0
13. C16:1(cis-9)
14. C17:0
15. C17:1(cis-10)
16. C18:0
17. C18:1(trans-9)
18. C18:1(cis-9)
19. C18:2(all-trans-9,12)
20. C18:2(all-cis-9,12)
21. C18:3(all-cis-6,9,12)
22. C18:3(all-cis-9,12,15)
23. C20:0
24. C20:1(cis-11)
25. C20:2(all-cis-11,14)
26. C20:3(all-cis-8,11,14)
27. C20:3(all-cis-11,14,17)
28. C20:4(all-cis-5,8,11,14)
29. C20:5(all-cis-5,8,11,14,17)
30. C21:0
31. C22:0
32. C22:1(cis-13)
33. C22:2(all-cis-13,16)
34. C22:6 (all-cis-4,7,10,13,16,19)
35. C23:0
36. C24:0
37. C24:1(cis-15) TKG 1251

## TR-CN100: MAXIMUM SEPARATION OF CIS-TRANS FAME

Column: **TR-CN100**, 100 m x 0.25 mm x 0.20 µm, P/N TR-882192  
 Injection: 0.5 µL cis/trans FAMES standard (10mg/mL), split 1:80, 260 °C  
 Carrier gas: H<sub>2</sub>, ct flow 0.8 mL/min  
 Oven: 175 °C  
 Detector: FID, 260 °C



Peak Name
1 C18:0 (stearic acid methyl ester)
2 C18:1n6t (petroselaic acid methyl ester)
3 C18:1n9t (elaidic acid methyl ester)
4 C18:1n11t (transvaccenic acid methyl ester)
5 C18:1n6c (petroselinic acid methyl ester)
6 C18:1n9c (oleic acid methyl ester)
7 C18:1n11c (vaccenic acid methyl ester)
8 C18:2n9,12c (linoleic acid methyl ester)

TKG 1255

## TR-CRESOL

### Proprietary nonbonded phase.

- Column specially designed for the analysis of phenolic compounds (phenols, cresylic acids)
- Derivatization of phenolic compounds is not required to obtain suitable resolution
- Resolves m-cresol/p-cresol and 2,4-xyleneol/2,5-xyleneol pairs, which are not separated with other columns used for this analysis such as TRB-5 and TRB-WAX

### TR-CRESOL Equivalent Phase

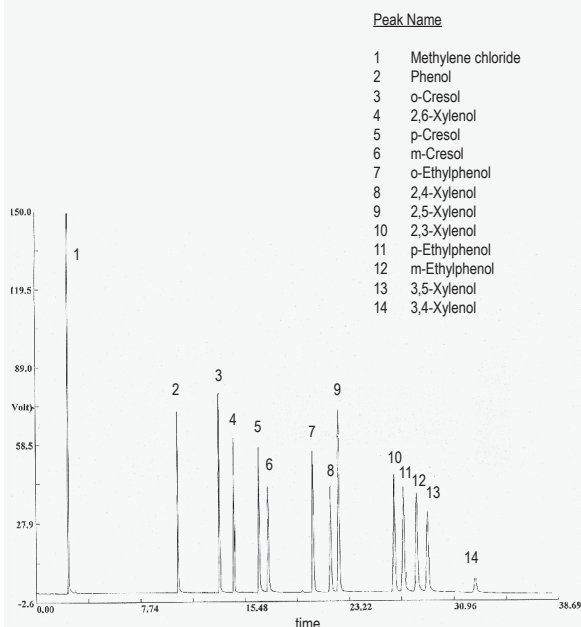
**Agilent:** CP-CRESOL

### TR-CRESOL

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
<b>0,25</b>	30	0,20	130	<b>TR-702132</b>
	60	0,20	130	<b>TR-702162</b>

### TR-CRESOL: Cresols

Column: **TR-CRESOL**, 60 m x 0.25 mm x 0.20 µm, P/N TR-702162  
 Injection: 1 µL standard Cresols (5000 ng/mL comp), split 1:25, 150°C  
 Carrier gas: H<sub>2</sub>, ct pressure 24 psi (165 kPa)  
 Oven: 130 °C  
 Detector: FID, 150 °C

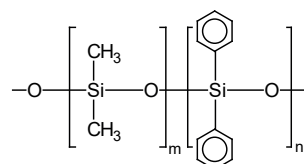


TKG 1137

## TR-17

### Poly (methylphenylsiloxane)

- Not bonded phase
- Recommended by pharmacopoeia for determining the impurities of sodium saccharin (o-p-Toluenesulfonamides)



Structure of Poly (dimethyldiphenyl) siloxane

### TR-17 Equivalent Phase

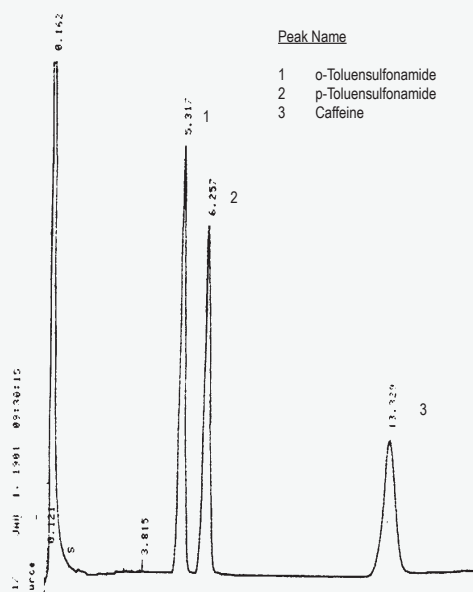
**Agilent:** HP-17, DB-17  
**Restek:** Rtx-17

### TR-17

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
<b>0,53</b>	10	2,00	40 to 220/240	<b>TR-712045</b>

### TR-17: Impurities of sodium saccharin

Column: **TR-17**, 10 m x 0.53 mm x 2.0 µm, P/N TR-712045  
 Injector: 260 °C  
 Carrier gas: He, 6.5 psi  
 Injection: 1ml standard, split 1:4  
 Oven: 180 °C  
 Detector: FID, 280 °C



TKG 1138

## Meta.VOC

Proprietary bonded and crosslinked phase.

- Developed for the analysis of volatile organic compounds (VOC)
- Intermediate polarity column

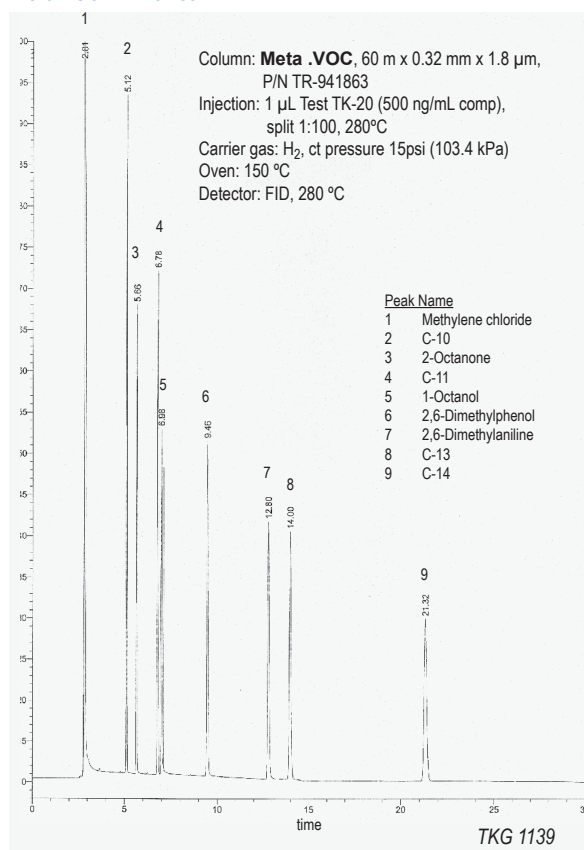
### Meta.VOC Equivalent Phase

**Agilent:** DB-502.2, HP-VOC  
**Supelco:** VOCOL  
**Restek:** Rtx-502.2, Rtx-Volatile

### Meta.VOC

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,18	20	1,00	-20 to 240/250	TR-941084
0,20	10	1,20	-20 to 240/250	TR-941249
0,25	30	1,50	-20 to 240/250	TR-941532
	60	1,50	-20 to 240/250	TR-941562
0,32	60	1,80	-20 to 240/250	TR-941863
	60	3,00	-20 to 230/240	TR-943063
0,53	30	3,00	-20 to 230/240	TR-943035
	60	3,00	-20 to 230/240	TR-943065
	105	3,00	-20 to 230/240	TR-9430K5

### Meta.VOC: TK-20 Test



## TRB-608

Proprietary bonded and crosslinked phase.

- Specifically designed for analysing chlorinated pesticides and PCBs
- Suitable for EPA 508, 608 and 8080 methods.

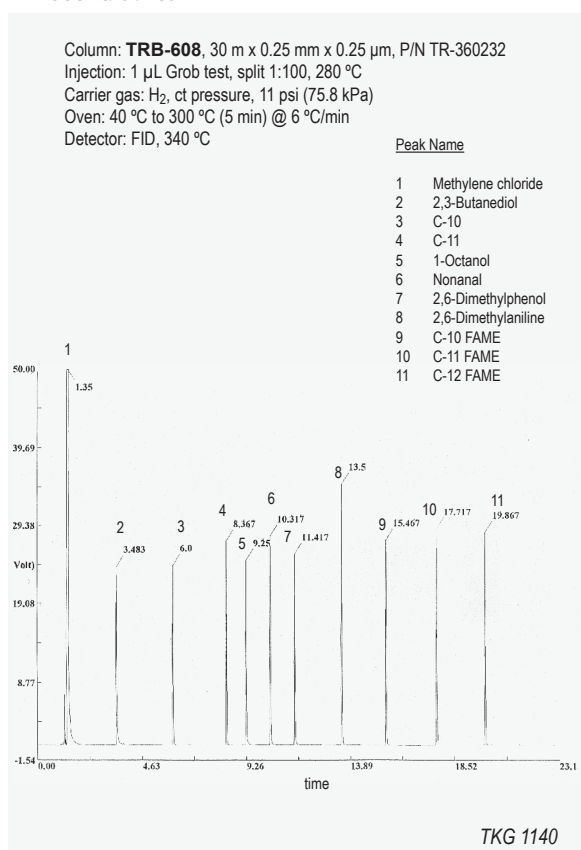
### TRB-608 Equivalent Phase

**Agilent:** HP-608, DB-608  
**Supelco:** SPB-608  
**SGE:** BP608

### TRB-608

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,18	20	0,18	-20 to 300/310	TR-360984
0,25	30	0,25	-20 to 300/310	TR-360232
0,53	15	0,50	-20 to 290/300	TR-360515
	30	0,50	-20 to 290/300	TR-360535

### TRB 608: Grob Test





## TR-TCEP

### 1, 2, 3-Tris (2-cyanoethoxy) propane, nonbonded phase

- High polarity column
- Column for the analysis of alcohols in gasoline
- Separation of the aliphatic hydrocarbons up to C12 in aromatics

#### TR-TCEP Equivalent Phase

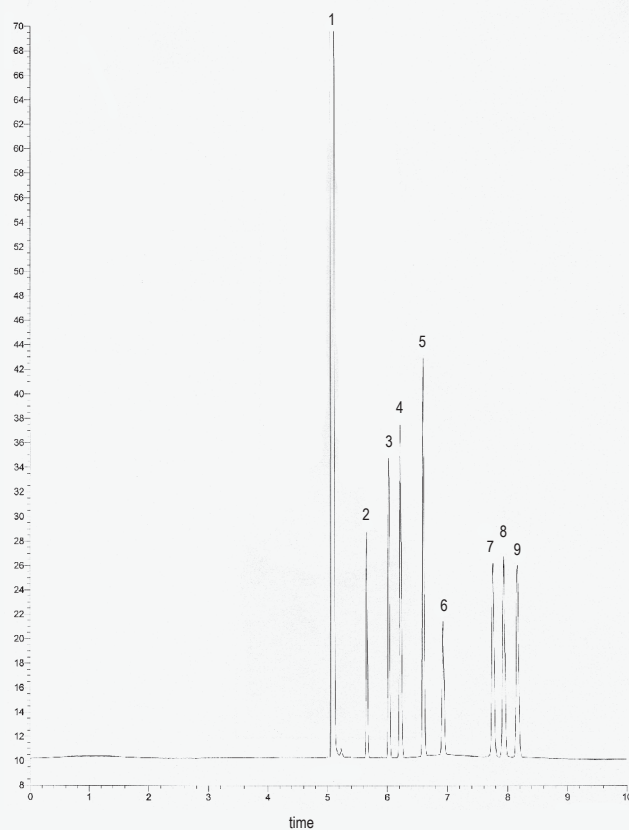
**Agilent:** CP-TCEP  
**Supelco:** TCEP  
**Restek:** Rt-TCEP

#### TR-TCEP

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,25	30	0,40	0 to 135	<b>TR-960432</b>
	60	0,40	0 to 135	<b>TR-960462</b>

#### TR-TCEP: TR-TCEP Test

Column: **TR-TCEP**, 60 m x 0.25 mm x 0.40 µm, P/N TR-960462  
Injection: 1 µL standard (20 ng/mL comp.), split 1:50, 170 °C  
Carrier gas: H<sub>2</sub>, ct pressure 24 psi (165 kPa)  
Oven: 110 °C  
Detector: FID, 170 °C



TKG 1141





## MetaBLOOD 1 & MetaBLOOD 2

### Proprietary bonded and crosslinked phases

- For analysis of volatile compounds in biological fluids such as blood.
- Extremely low analysis time
- Used as analytical column and confirmation column.
- MetaBLOOD 1 and MetaBLOOD 2 have different elution order for some compounds

### MetaBLOOD 1 and MetaBLOOD 2 Equivalent Phases

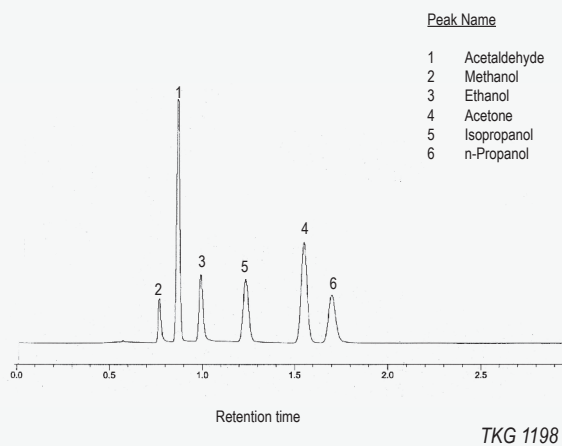
**Agilent:** DB-ALC1, DB-ALC2

**Restek:** Rtx-BAC1, Rtx-BAC2, Rtx-BAC 1 Plus, Rtx-BAC 2 Plus

**Phenomenex:** ZB-BAC1, ZB-BAC2

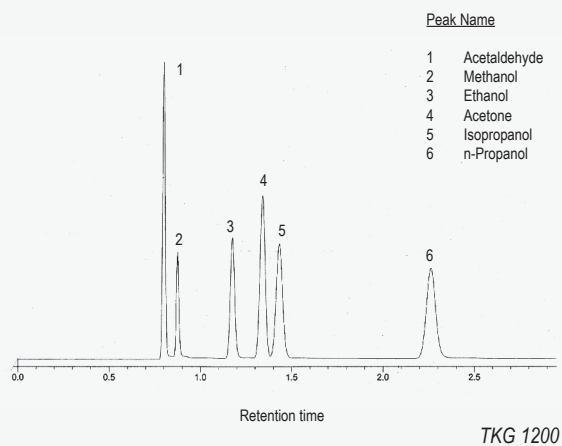
### MetaBLOOD 1: Alcohols in Blood

Column: **MetaBLOOD 1**, 30 m x 0.53 mm x 3.0  $\mu$ m, P/N TR-853035  
 Injection: 1 mL Head Space 2t, blood alcohols mix, split 1:10, 250  $^{\circ}$ C  
 Carrier gas: He, 80 cm/s (40  $^{\circ}$ C)  
 Oven: 40  $^{\circ}$ C (Isothermal)  
 Detector: FID, 260  $^{\circ}$ C



### MetaBLOOD 2: Alcohols in Blood

Column: **MetaBLOOD 2**, 30 m x 0.53 mm x 2.0  $\mu$ m, P/N TR-862035  
 Injection: 1 mL Head Space 2t, blood alcohols mix, 250  $^{\circ}$ C  
 Carrier gas: He, 80 cm/s (40  $^{\circ}$ C)  
 Oven: 40  $^{\circ}$ C (Isothermal)  
 Detector: FID, 260  $^{\circ}$ C



### MetaBLOOD 1

Internal Diam.(mm)	Length (m)	Film Thickness ( $\mu$ m)	Temp limits ( $^{\circ}$ C)	Part. N $^{\circ}$ . (P/N)
0,32	30	1.80	-20 to 240/260	TR-851833
0,53	30	3.00	-20 to 240/260	TR-853035

### MetaBLOOD 2

Internal Diam.(mm)	Length (m)	Film Thickness ( $\mu$ m)	Temp limits ( $^{\circ}$ C)	Part. N $^{\circ}$ . (P/N)
0,32	30	1.20	-20 to 240/260	TR-861233
0,53	30	2.00	-20 to 240/260	TR-862035



# Teknokroma Capillary Columns

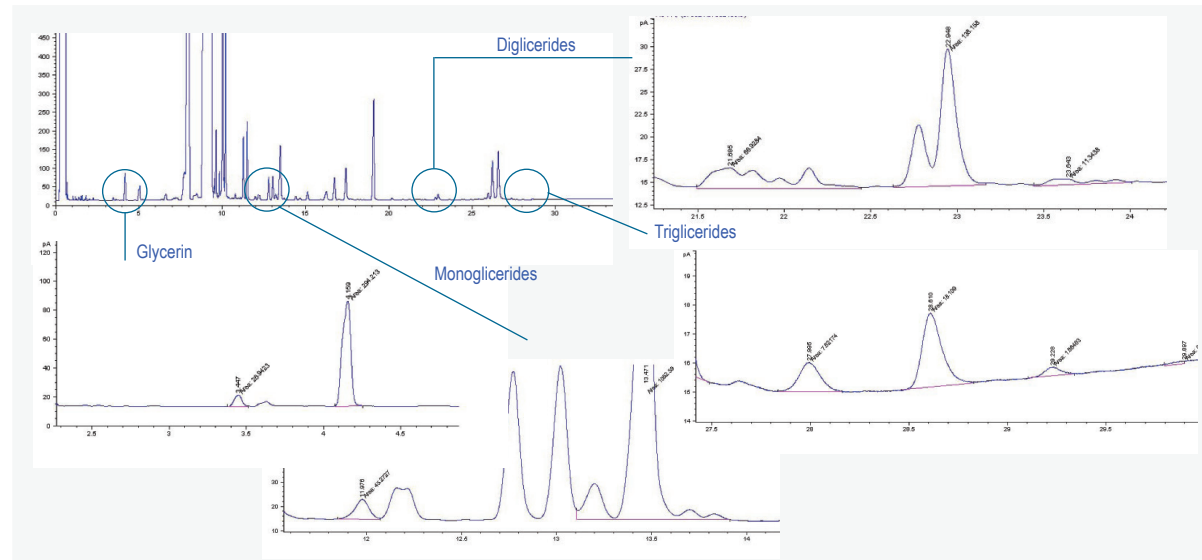
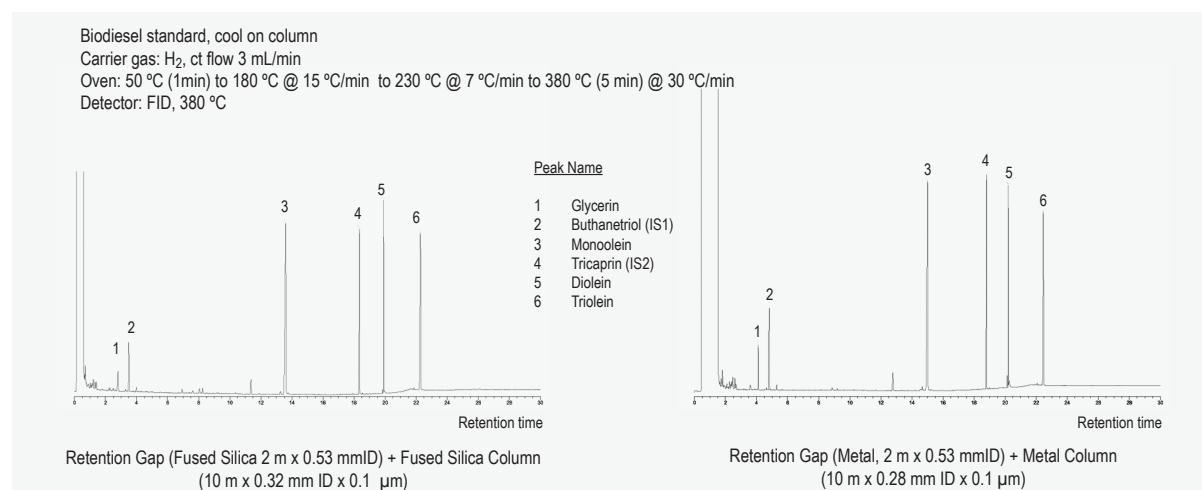
## TRB-BIODIESEL / TKM-BIODIESEL

- Glycerin and Mono-Di-Triglycerides analysis tested under EN14105/ASTM D6584 methods
- Chemical inertness guaranteed for a good response for glycerin analysis
- Low column bleed at high temperatures
- Available in fused Silica and metal tubing

## TRB-BIODIESEL / TKM-BIODIESEL

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
<b>0,32 (Fused Silica)</b>	10 + 2 m x 0.53 mm retention gap attached using SS connector	0.10	400	<b>TR-G780143</b>
<b>0,32 (Metal)</b>	10 + 2 m x 0.53 mm retention gap attached using SS connector	0.10	400	<b>TR-G780143M</b>

### Analysis of Glycerin and Glycerides (EN14105/ASTM D6584) Low Bleed at 370°C



### Also for Biodiesel analysis

Methanol analysis (EN-14110)  
FAMES and Linolenic acid methyl ester analysis (EN-14103)

**TRB-1**, 30 m x 0.32 mm x 3.0 µm, TR-113033  
**SupraWAX-280**, 30 m x 0.32 mm x 0.25 µm, TR-830233





# Teknokroma Microbore Columns (0.10 mm ID)

## Limiting factors

### 1. Working Pressure (Gas Flow)

With microbore columns the working pressures are higher so that more precautions should be taken regarding gas leaks at the injector and connections.

At optimum pressure the carrier gas flow is low (H<sub>2</sub>~0.2cc/min, He ~0.1cc/min), which is good for working with mass detectors, since it does not exceed its emptying capacity. Not optimizing these parameters may cause losses in peak resolution.

### 2. Sample Capacity

Narrow bore columns have a very limited sample capacity, approximately 10 times less than that of 0.25 mm ID.

### 3. Injector

The columns of 0.10 mm ID are compatible with the injection techniques in Split-splitless. It is not recommended to work with direct or on-column injection.

The glass liners, with internal diameters of 2-4 mm, are not the most suitable since, due to their large dead volume, and the fact that one is working with small gas carrying flows, it is difficult for there to be a correct sweep in the injection zone. This transforms into an enlarging of peaks, with the subsequent loss of resolution (especially for liners of 4 mm). It is highly recommended to work with liners of 0.75-1 mm diameter.

Working with this type of small volume liner, along with the microbore columns, means that one must be extremely careful with the purity of the samples that are injected. The samples must be clean and the non-volatile residues must be minimised in order to avoid contaminations that cause absorption of analytes, decompositions, the appearance of ghost peaks, etc.

### 4. Detector

The gas flows of the detector must be optimised for working with the microbore columns. It is possible that in some detectors the auxiliary gas flow (make up) will have to be increased in order to minimise its dead volume and enable the correct sweep of the compounds that leave the column at very low flow levels.

Since the peaks elute very fast and are very narrow (the peak widths are generally less than 1 s) it is necessary to work at very high speeds on the electrometer and with fast integration so that the quantification of the peaks is correct.

The small volume of these columns means that the stationary phase quantity deposited in them is very small compared to a conventional column. This, along with the low flow levels with which it works, causes the bleed level (proportional to the quantity of the phase and flow) to be minimal, even at high temperatures, thus favouring the signal/noise ratio and contributing to the detectors not getting contaminated.

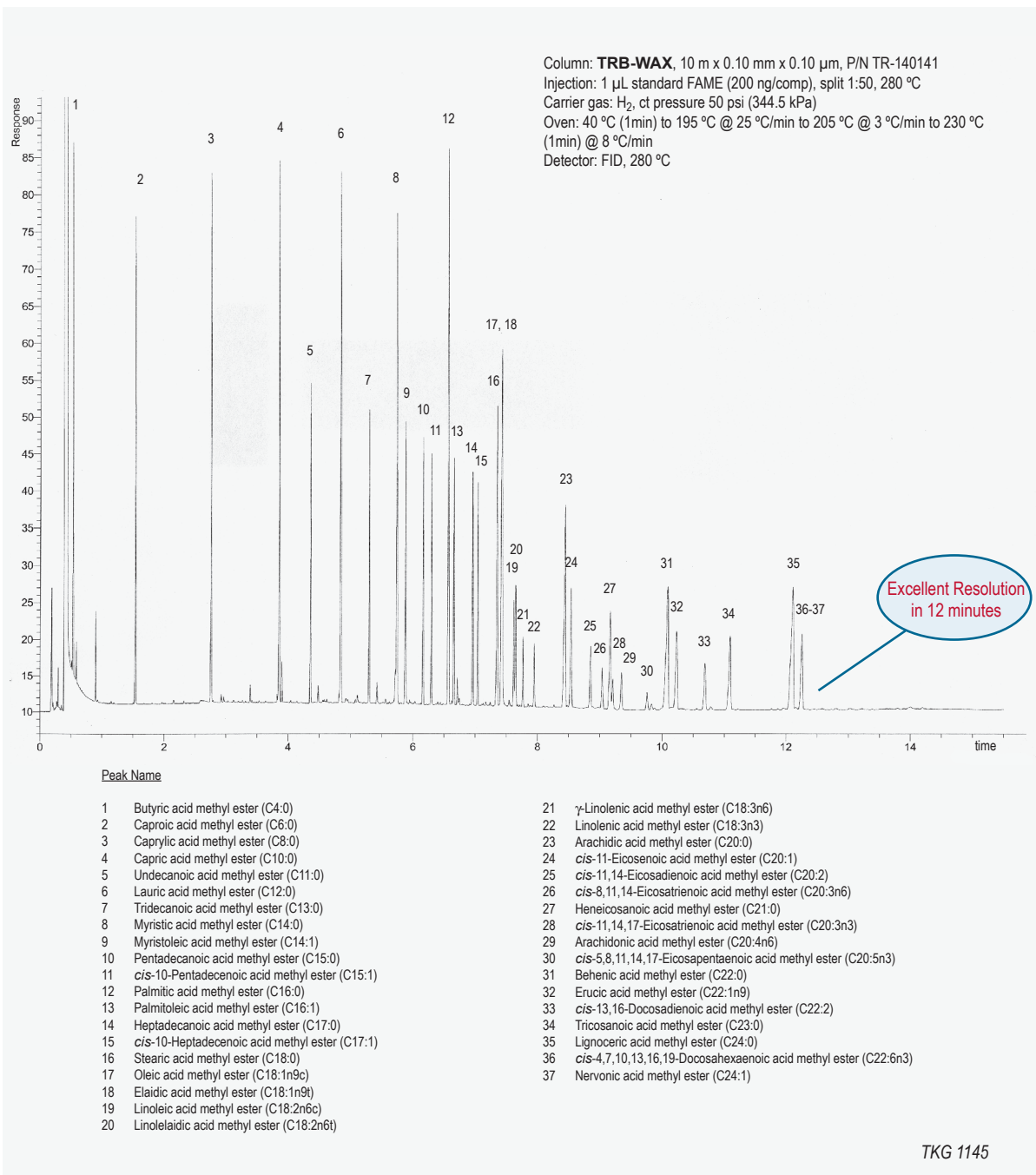
## Teknokroma Microbore Columns of 0.10 mm ID

Phase	Length (m)	(df µm)	P/N
<b>TRB-1</b>	5	0.12	<b>TR-1107A1</b>
	10	0.10	<b>TR-110141</b>
	10	0.40	<b>TR-110441</b>
	20	0.10	<b>TR-110181</b>
	20	0.40	<b>TR-110481</b>
	40	0.20	<b>TR-1121C1</b>
<b>TRB-1MS</b>	40	0.40	<b>TR-1104C1</b>
	10	0.10	<b>TR-510141</b>
	10	0.40	<b>TR-510441</b>
	20	0.10	<b>TR-510181</b>
<b>TRB-5</b>	20	0.40	<b>TR-510481</b>
	10	0.10	<b>TR-120141</b>
	10	0.17	<b>TR-121941</b>
	10	0.33	<b>TR-123341</b>
<b>TRB-5MS</b>	10	0.40	<b>TR-120441</b>
	20	0.10	<b>TR-120181</b>
	20	0.40	<b>TR-120481</b>
	10	0.10	<b>TR-520141</b>
<b>TRB-50</b>	10	0.40	<b>TR-520441</b>
	20	0.10	<b>TR-520181</b>
	20	0.40	<b>TR-520481</b>
<b>TRB-225</b>	10	0.10	<b>TR-500141</b>
	10	0.20	<b>TR-502141</b>
	20	0.10	<b>TR-500181</b>
<b>TRB-1701</b>	20	0.10	<b>TR-250181</b>
	20	0.40	<b>TR-130181</b>
<b>Meta.WAX</b>	20	0.40	<b>TR-130481</b>
	10	0.10	<b>TR-810141</b>
	10	0.20	<b>TR-812141</b>
	20	0.10	<b>TR-810181</b>
<b>TRB-WAX</b>	20	0.20	<b>TR-812181</b>
	10	0.10	<b>TR-140141</b>
	10	0.20	<b>TR-142141</b>
	20	0.10	<b>TR-140181</b>
<b>SupraWAX-280</b>	20	0.20	<b>TR-142181</b>
	10	0.10	<b>TR-830141</b>
	15	0.10	<b>TR-830111</b>
	20	0.10	<b>TR-830181</b>
<b>TRB-FFAP</b>	20	0.20	<b>TR-832181</b>
	15	0.20	<b>TR-832111</b>
	10	0.10	<b>TR-150141</b>
	10	0.20	<b>TR-152141</b>
	15	0.10	<b>TR-150111</b>
	20	0.10	<b>TR-150181</b>

# Teknokroma Microbore Columns (0.10 mm ID)



TRB-WAX: 37 FAME mix







## Custom Capillary Columns



Teknokroma also provides you with the possibility of working with nonbonded and bonded custom capillary columns, which are still described today in official methods, or which appear in the scientific bibliography. We can supply you with these columns in the size and phase thickness that you require for a similar price as our standard Teknokroma columns. As an example:

TR-101 - 100% polydimethylsiloxane phase (silicone fluid).

TR-SE-30 - 100% polydimethylsiloxane phase.

TR-SE-52 - 5% phenyl-95% dimethylpolysiloxane phase.

TR-SE-54 - 5% phenyl-1% vinyl-94% dimethylpolysiloxane phase.

TR-20M - 100% polyethylene glycol (Carbowax 20M) phase.

We can also supply you with columns for inverse gas chromatography, used for the characterisation of polymers. Teknokroma can coat your polymer in our fused silica column.

**For other phases not included in this list contact our technical department**

### Stainless steel Teknokroma columns (TKM)



- Chemical inertness comparable to that of fused silica
- Ideal for chromatographs in industrial control processes
- Practically unbreakable
- Enables the highest analysis temperatures

Teknokroma can supply you stainless steel columns with a 0.53 mm internal diameter and an external diameter similar to that of fused silica semi-capillary columns, compatible with standard ferrules of 0.8 mm ID.

These columns are available with our most popular stationary phases.

#### To order a metallic column:

“simply add the M at the end of the corresponding reference to the column in the catalog.”

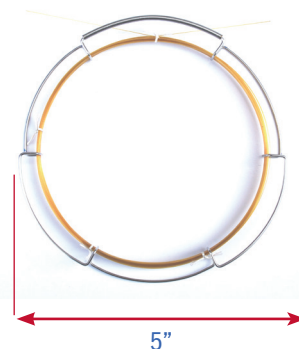
For instance: TRB-2887 of 10 m x 0.53 mm x 2.65 µm

**P/N TR-192645**

With stainless steel tube, 10 m x 0.53 mm x 2.65 µm (TKM-2887)

**P/N TR-192645M**

### Columns for the Agilent GC 6850 5-inch column cage



For columns that have to be placed in the oven of the 6850 chromatograph, the column must be rolled up in a 5 inch cage.

#### To order a column in a 5 inch cage:

you just need to add a 5 to the end of the catalog number of the corresponding column.

For instance: TRB-5, 30m x 0.25 mm x 0.25µm

**P/N TR-120232**

With 5 inch cage, TRB-5, 30m x 0.25 mm x 0.25µm

**P/N TR-1202325**

# Guard Columns (Retention Gap)



NON POLAR  
 MEDIUM POLAR (INTERMEDIATE)  
 POLAR  
 AQUASAFE  
 BASE-DEACTIVATED

## NON POLAR

Methyl deactivated, suitable for pentane/hexane and other non polar solvents.

Internal Diam.(mm)	Length (m)	Part. N°. (P/N)
<b>0,25</b>	3 unit x 1	<b>TR-100012</b>
	1 unit x 5	<b>TR-100052</b>
	1 unit x 10	<b>TR-100042</b>
	1 unit x 20	<b>TR-100082</b>
<b>0,32</b>	3 unit x 1	<b>TR-100013</b>
	1 unit x 5	<b>TR-100053</b>
	1 unit x 10	<b>TR-100043</b>
	1 unit x 20	<b>TR-100083</b>
<b>0,53</b>	3 unit x 1	<b>TR-100015</b>
	1 unit x 5	<b>TR-100055</b>
	1 unit x 10	<b>TR-100045</b>
	1 unit x 20	<b>TR-100085</b>

## MEDIUM POLAR (INTERMEDIATE)

Phenyl-methyl deactivated, USP <467> suitable for methylene chloride, hexane, toluene, and a wide range of similar solvents

Internal Diam.(mm)	Length (m)	Part. N°. (P/N)
<b>0,25</b>	3 unit x 1	<b>TR-200012</b>
	1 unit x 5	<b>TR-200052</b>
	1 unit x 10	<b>TR-200042</b>
	1 unit x 20	<b>TR-200082</b>
<b>0,32</b>	3 unit x 1	<b>TR-200013</b>
	1 unit x 5	<b>TR-200053</b>
	1 unit x 10	<b>TR-200043</b>
	1 unit x 20	<b>TR-200083</b>
<b>0,53</b>	3 unit x 1	<b>TR-200015</b>
	1 unit x 5	<b>TR-200055</b>
	1 unit x 10	<b>TR-200045</b>
	1 unit x 20	<b>TR-200085</b>

## POLAR

Polyethylene glycol deactivated, suitable for methanol, water and a wide range of similar polar solvents.

Internal Diam.(mm)	Length (m)	Part. N°. (P/N)
<b>0,25</b>	3 unit x 1	<b>TR-300012</b>
	1 unit x 5	<b>TR-300052</b>
	1 unit x 10	<b>TR-300042</b>
	1 unit x 20	<b>TR-300082</b>
<b>0,32</b>	3 unit x 1	<b>TR-300013</b>
	1 unit x 5	<b>TR-300053</b>
	1 unit x 10	<b>TR-300043</b>
	1 unit x 20	<b>TR-300083</b>
<b>0,53</b>	3 unit x 1	<b>TR-300015</b>
	1 unit x 5	<b>TR-300055</b>
	1 unit x 10	<b>TR-300045</b>
	1 unit x 20	<b>TR-300085</b>



## Guard Columns (Retention Gap)

### AQUASAFE

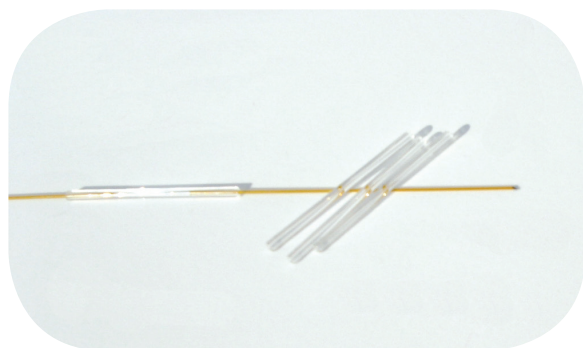
Proprietary deactivation suitable for water direct aqueous injections.

Internal Diam.(mm)	Length (m)	Part. N°. (P/N)
<b>0,25</b>	3 unit x 1	<b>TR-310012</b>
	1 unit x 5	<b>TR-310052</b>
	1 unit x 10	<b>TR-310042</b>
	1 unit x 20	<b>TR-310082</b>
<b>0,32</b>	3 unit x 1	<b>TR-310013</b>
	1 unit x 5	<b>TR-310053</b>
	1 unit x 10	<b>TR-310043</b>
	1 unit x 20	<b>TR-310083</b>
<b>0,53</b>	3 unit x 1	<b>TR-310015</b>
	1 unit x 5	<b>TR-310055</b>
	1 unit x 10	<b>TR-310045</b>
	1 unit x 20	<b>TR-310085</b>

### BASE-DEACTIVATED

Proprietary deactivation suitable for the analysis of amines and other basic compounds

Internal Diam.(mm)	Length (m)	Part. N°. (P/N)
<b>0,25</b>	3 unit x 1	<b>TR-320012</b>
	1 unit x 5	<b>TR-320052</b>
	1 unit x 10	<b>TR-320042</b>
	1 unit x 20	<b>TR-320082</b>
<b>0,32</b>	3 unit x 1	<b>TR-320013</b>
	1 unit x 5	<b>TR-320053</b>
	1 unit x 10	<b>TR-320043</b>
	1 unit x 20	<b>TR-320083</b>
<b>0,53</b>	3 unit x 1	<b>TR-320015</b>
	1 unit x 5	<b>TR-320055</b>
	1 unit x 10	<b>TR-320045</b>
	1 unit x 20	<b>TR-320085</b>



### UNIVERSAL PRESS FIT CONNECTORS

Deactivated Universal	Description
<b>TR-330001</b>	Universal Press Fit 12pk
<b>TR-330002</b>	Universal Press Fit Angled Y/ 1 unit
<b>TR-330032</b>	Universal Press Fit Angled Y/ 3 units

### INTEGRATED GUARD COLUMNS

Some of the most popular Teknokroma capillary columns can be built with an integrated guard column. Built-in guard column is a connection-free solution that protects and preserves the integrity of your column.

Teknokroma also offers the option to build your column with both guard and after column.

to order a column with an integrated guard column use the below formula:

**TR-G[ P/N Column ]-[ meters precolumn ]-[ meters post column ]**

for instance: Meta XLB 30 m x 0.25 mm x 0.25 µm **P/N TR-330232**

with pre and poscolumn:

Meta XLB 30 m x 0.25 mm x 0.25 µm + 5 meters pre column + 1 meter post column **P/N TR-G330232-5-1**



# USP Capillary Column Equivalents



USP CODE	General Description	Teknokroma Recommended Capillary Equivalent
G1	Dimethylpolysiloxane oil	TRB-1, TRB-1ms
G2	Dimethylpolysiloxane gum	TRB-1, TRB-1ms
G3	50% phenyl-50%methylpolysiloxane	TRB-50
G5	3-cyanopropylsiloxane	TR-CN100
G6	Poly(ethylenepropylene)glycol	TRB-F50
G8	90%-3-cyanopropyl-10% phenylmethylsiloxane	TR-CN100
G9	Methylvinylpolysiloxane	TRB-1, TRB-1ms
G14	Polyethylene glycol (MW = 951-1050)	TRB-WAX
G15	Polyethylene glycol (MW = 3000-3070)	TRB-WAX
G16	Polyethylene glycol (MW = 15000)	TRB-WAX
G19	25% phenyl-25%cyanopropylmethylsiloxane	TRB-225
G20	Polyethylene glycol (MW = 400-420)	Meta.WAX 400
G25	Polyethylene glycol TPA	TRB-FFAP
G27	5% phenyl-95%methylpolysiloxane	TRB-5, TRB-5ms, Meta.X5
G28	25% phenyl-75%-dimethylpolysiloxane	TRB-20
G32	20% phenylmethyl-80%-dimethylpolysiloxane	TRB-20
G35	Polyethylene glycol with Nitroterephthalic acid	TRB-FFAP
G36	1%vinyl-5% phenylmethylpolysiloxane	TRB-5, TRB-5ms, Meta.X5
G39	Polyethylene glycol (MW=1500)	TRB-WAX
G42	35% diphenyl-65% dimethylpolysiloxane	TRB-35
G43	6%cyanopropylphenyl-94% dimethylpolysiloxane	TRB-624, TRB-1301, TR-G43
G46	14%cyanopropylphenyl-86% dimethylpolysiloxane	TRB-1701



# EPA Test Methods

## EPA Drinking Water Test Methods

EPA Method	Application	Recommended Teknokroma Capillary Column	Part Number
<b>501.3</b>	Trihalomethanes by GC/MS and SIM	TRB-624	TR-603035
		TRB-624	TR-603075
		TRB-624	TR-6030K5
		TRB-624	TR-601032
<b>502.2</b>	Volatile halogenated Organics in Water by Purge & Trap GC/PIDE/LOD	30m x 0.25mm x 3.0 µm	TR-603035
<b>503.1</b>	Volatile Aromatics & Unsaturated Organics by Purge & Trap GC	TRB-624	TR-603035
		TRB-624	TR-601432
<b>504.1</b>	1,2-Dibromoethane (EDB), 1,2-Dibromo-3-chloropropane (DBCP), and 1,2,3-Trichloropropane (123TCP) by GC/MS	TRB-1	TR-110233
		TRB-624	TR-603035
		TRB-624	TR-601432
		TRB-1	TR-111033
<b>505</b>	Organohalide Pesticides & Aroclors by GC/ECD	TRB-50	TR-500533
		TRB-50	TR-500232
		TRB-5	TR-120232
<b>507</b>	Nitrogen & Phosphorous containing Pesticides in Water by GC/NPD	30m x 0.25mm x 0.25 µm	TR-520232
<b>508</b>	Chlorinated Pesticides in Water by GC/MS	TRB-1701	TR-130232
		TRB-5	TR-120232
		TRB-5ms	TR-520232
		TRB-1701	TR-130232
<b>513</b>	2,3,7,8-Tetrachlorodibenzo-p-dioxin by GC/MS	TRB-5ms	TR-520162
		TRB-1	TR-110233
<b>515.2</b>	Determination of chlorinated acids in water using liquid-solid extraction & GC/ECD	TRB-5	TR-120233
		TRB-1701	TR-130233
		TRB-5ms	TR-520233
		TRB-624	TR-601432
<b>524.2</b>	Measurement of purgable organic compounds in water by Purge & Trap capillary column GC/MS	TRB-624	TR-603035
		TRB-624	TR-603075
		TRB-624	TR-601863
<b>525</b>	Organic compounds in drinking water by liquid-solid extraction and capillary column GC/MS	TRB-5	TR-120233
		TRB-5ms	TR-520232

## EPA Solid Waste Test Methods

EPA Method	Application	Recommended Teknokroma Capillary Column	Part Number
<b>8010</b>	Halogenated volatile organics	TRB-624	TR-603075
		TRB-624	TR-601432
<b>8015</b>	Non- Halogenated volatile organics	TRB-624	TR-603035
		TRB-624	TR-601432
		TRB-624	TR-603035
		TRB-624	TR-601432
<b>8020/8021</b>	Aromatic volatile organic	TRB-624	TR-603035
		TRB-624	TR-601432
<b>8030/8031</b>	Acrolein, acrylonitrile, acetonitrile	TRB-624	TR-603035
		TRB-624	TR-601432
<b>8040/8041</b>	Phenols	TRB-5	TR-121535
		TRB-5ms	TR-520232
<b>8060/8061</b>	Phthalate esters	TRB-1	TR-111515
		TRB-1ms	TR-510432
<b>8080</b>	Organochlorine pesticides and PCBs	TRB-5	TR-121535
		TRB-5ms	TR-520532
		TRB-5	TR-121535
		TRB-1701	TR-131035
<b>8081/8082</b>	Organochlorine pesticides and PCBs as Arochlor	TRB-5	TR-121535
		TRB-5ms	TR-520532
<b>8090/8091</b>	Nitroaromatics and cyclic ketones	TRB-5	TR-121535
		TRB-5ms	TR-520532
<b>8100</b>	Polynuclear aromatic hydrocarbons	TRB-5	TR-120233
		TRB-5ms	TR-520233
<b>8120/8121</b>	Chlorinated hydrocarbons	TRB-1	TR-111033
		TRB-1ms	TR-511033
<b>8140</b>	Organophosphorus pesticides	TRB-1	TR-111535
		TRB-1701	TR-131035
		TRB-1	TR-110232
		TRB-5	TR-121515
<b>8141</b>	Organophosphorus pesticides	TRB-5ms	TR-520212
		TRB-5	TR-121025
<b>8150/8151</b>	Chlorinated herbicides	TRB-1701	TR-131035
		TRB-5ms	TR-520232
		TRB-624	TR-603035
		TRB-624	TR-603075
<b>8240</b>	GC/MS for volatile organics	TRB-624	TR-6030K5
		TRB-624	TR-601032
		TRB-624	TR-603035
		TRB-624	TR-601032
<b>8250</b>	GC/MS for semi-volatile organics	TRB-5ms	TR-520532
		TRB-5ms	TR-520532

## EPA Solid Waste Test Methods

EPA Method	Application	Recommended Teknokroma Capillary Column	Part Number
<b>8260</b>	GC/MS method for volatile organics capillary techniques	TRB-624	TR-603035
		TRB-624	TR-603075
		TRB-624	TR-6030K5
		TRB-624	TR-601032
<b>8270</b>	GC/MS method for semi-volatile organics capillary techniques	TRB-5	TR-121032
<b>8280</b>	Analysis of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans	TRB-5ms	TR-521032
		TRB-5	TR-120232
		TRB-5ms	TR-520162

## EPA Waste Water Test Methods

EPA Method	Application	Recommended Teknokroma Capillary Column	Part Number
<b>601</b>	Purgeable halocarbons	TRB-624	TR-603035
		TRB-624	TR-603075
		TRB-624	TR-6030K5
		TRB-624	TR-601032
<b>602</b>	Purgeable aromatics	TRB-624	TR-603035
		TRB-624	TR-6030K5
		TRB-624	TR-601032
		TRB-624	TR-603035
<b>603</b>	Acrolein and acrylonitrile	TRB-624	TR-601032
<b>604/605</b>	Phenols and benzidines	TRB-5ms	TR-521435
		TRB-5ms	TR-520232
		TRB-5	TR-121515
		TRB-5ms	TR-520232
<b>606</b>	Phthalate esters	TRB-5	TR-121515
		TRB-5	TR-520232
		TRB-5ms	TR-520232
		TRB-5	TR-121535
<b>607</b>	Nitrosamines	TRB-5ms	TR-520532
<b>608</b>	Organochlorine pesticides and PCBs	TRB-5	TR-121055
		TRB-5ms	TR-520752
<b>609</b>	Nitroaromatics and isophorone	TRB-5	TR-121535
		TRB-5ms	TR-520532

## EPA Waste Water Test Methods

EPA Method	Application	Recommended Teknokroma Capillary Column	Part Number
<b>610</b>	Polycyclic-Aromatic Hydrocarbons	TRB-5	TR-120233
		TRB-5ms	TR-520133
<b>611</b>	Haloethers	TRB-5	TR-121515
		TRB-5ms	TR-520532
<b>612</b>	Chlorinated hydrocarbons	TRB-5	TR-121033
		TRB-5ms	TR-521032
<b>613</b>	2,3,7,8-tetrachlorodibenzo-p-dioxin	TRB-5ms	TR-520162
		TRB-1701	TR-131035
<b>615</b>	Chlorinated herbicides	TRB-1701	TR-130232
		TRB-50	TR-501035
<b>619</b>	Triazine herbicides	TRB-50	TR-500532
		TRB-624	TR-603035
<b>624</b>	Purgeables	TRB-624	TR-603075
		TRB-624	TR-6030K5
		TRB-624	TR-601432
		TRB-5ms	TR-520233
<b>625</b>	Base/neutral and acids	TRB-1ms	TR-510232
		TRB-5	TR-120233
<b>660</b>	Pesticides and PCBs in water and soil/sediment	TRB-5ms	TR-520233
		TRB-624	TR-603035
<b>1624</b>	Volatile organic compounds by isotope dilution GC/MS	TRB-624	TR-601432
		TRB-5	TR-120232
<b>1625</b>	Semivolatile organic compounds by isotope dilution	TRB-5ms	TR-520232
		TRB-5	TR-120233
<b>1653</b>	Chlorinated phenols in waste water by in-situ MS acylation and GC low bleed/MS	TRB-5ms	TR-520233
		TRB-5ms	TR-520233



Method	Teknokroma P/N	Teknokroma Phase Recommendation	Sample
D1983	TR-882162	<b>TR-CN100</b> 60 m x 0.25 mm x 0.2 µm	FAME analysis
D2245	TR-882162	<b>TR-CN100</b> 60 m x 0.25 mm x 0.2 µm	Oils and oil acids in solvent-reducible paints
D2267	TR-960462	<b>TR-TCEP</b> 60 m x 0.25 mm x 0.40 µm	Aromatics in light naphthas and aviation gasolines
D2306	TR-140262	<b>TRB-WAX</b> 60 m x 0.25 mm x 0.25 µm	C8 aromatic hydrocarbons
D2360	TR-140263	<b>TRB-WAX</b> 60 m x 0.32 mm x 0.25 µm	Trace impurities in monocyclic aromatic hydrocarbons and total aromatic determination
D2426	TR-111535	<b>TRB-1</b> 30 m x 0.53 mm x 1.5 µm	Butadiene dimer and styrene in butadiene concentrates
D2456	TR-141035	<b>TRB-WAX</b> 30 m x 0.53 mm x 1.0 µm	Polyhydric alcohols in alkyd resins
D2505	TR-115035	<b>TRB-1</b> 30 m x 0.53 mm x 5 µm	Ethylene, other hydrocarbons, and carbon dioxide in dioxide in high-purity ethylene
D2597		30% SE-30 on Chromosorb PAW 80/100 - Molecular Sieve 13X 45/60	Analysis of demethanized hydrocarbon liquid mixtures containing nitrogen and carbon dioxide
D2580	TR-820423 TR-151035	<b>Meta.X5</b> 25 m x 0.32 mm x 0.4 µm <b>TRB-FFAP</b> 30 m x 0.53 mm x 1.0 µm	Phenols in water
D2600	TR-960462 TR-141223	<b>TR-TCEP</b> 60 m x 0.25 mm x 0.4 µm <b>TRB-WAX</b> 25 m x 0.32 mm x 1.2 µm	Aromatic traces in light saturated hydrocarbons
D2743	TR-882162	<b>TR-CN100</b> 60 m x 0.25 mm x 0.2 µm	Oil and oil acids
D2800	TR-882162	<b>TR-CN100</b> 60 m x 0.25 mm x 0.2 µm	FAME analysis
D2804	TR-141035 TR-571015	<b>TRB-WAX</b> 30 m x 0.53 mm x 1.0 µm <b>TRB-F50</b> 15 m x 0.53 mm x 1.0 µm	Purity of methyl ethyl ketone
D2887	TR-112645	<b>TRB-1</b> 10 m x 0.53 mm x 2.65 µm	Boiling range distribution of petroleum
Extended	TR-1108A5	<b>TRB-1</b> 5 m x 0.53 mm x 0.88 µm	
D2908	TR-601833 TR-603035 TR-140533 TR-141035	<b>TRB-624</b> 30 m x 0.32 mm x 1.8 µm <b>TRB-624</b> 30 m x 0.53 mm x 3.0 µm <b>TRB-WAX</b> 30 m x 0.32 mm x 0.5 µm <b>TRB-WAX</b> 30 m x 0.53 mm x 1.0 µm	Volatile organics in water
D2998	TR-111033	<b>TRB-1</b> 30 m x 0.32 mm x 1.0 µm	Polyhydric alcohols in alkyd resins
D2999	TR-111535	<b>TRB-1</b> 30 m x 0.53 mm x 1.5 µm	Monopentaerythritol in commercial pentaerythritol
D3009	TR-140533 TR-141035	<b>TRB-WAX</b> 30 m x 0.32 mm x 0.5 µm <b>TRB-WAX</b> 30 m x 0.53 mm x 1.0 µm	Composition of turpentine
D3054	TR-110553	<b>TRB-1</b> 50 m x 0.32 mm x 0.5 µm	Impurities in cyclohexane
D3086	TR-120752	<b>TRB-5</b> 50 m x 0.25 mm x 0.12 µm	Organochlorine pesticides in water
D3168	TR-111033 TR-111535	<b>TRB-1</b> 30 m x 0.32 mm x 1.0 µm <b>TRB-1</b> 30 m x 0.53 mm x 1.5 µm	Polymers in emulsion paints
D3257		25% bis-(2-cyanoethyl)formamide on Chromosorb PAW	Aromatics in mineral spirits
D3271	TR-141035	<b>TRB-WAX</b> 30 m x 0.53 mm x 1.0 µm	Solvent analysis in paints
D3304	TR-120752	<b>TRB-5</b> 50 m x 0.25 mm x 0.12 µm	PCBs in environmental materials
D3328	TR-113033 TR-113035	<b>TRB-1</b> 30 m x 0.32 mm x 3.0 µm <b>TRB-1</b> 30 m x 0.53 mm x 3.0 µm	Comparison of waterborne petroleum oils
D3329	TR-141065	<b>TRB-WAX</b> 60 m x 0.53 mm x 1.0 µm	Purity of methyl isobutyl ketonespirits
D3432	TR-111033 TR-111535	<b>TRB-1</b> 30 m x 0.32 mm x 1.0 µm <b>TRB-1</b> 30 m x 0.53 mm x 1.5 µm	Toluene diisocyanates in urethane prepolymers
D3447	TR-115055	<b>TRB-1</b> 50 m x 0.53 mm x 5.0 µm	Purity of trichlorotrifluoroethane (CFC-113)
D3452	TR-111535	<b>TRB-1</b> 30 m x 0.53 mm x 1.5 µm	Identification of rubber
D3457	TR-882162	<b>TR-CN100</b> 60 m x 0.25 mm x 0.2 µm	FAME analysis
D3465	TR-115223 TR-111535	<b>TRB-1</b> 25 m x 0.32 mm x 0.52 µm <b>TRB-1</b> 30 m x 0.53 mm x 1.5 µm	Purity of monomeric plasticizers
D3524	TR-110845	<b>TRB-1</b> 10 m x 0.53 mm x 0.88 µm 10% OV-101 on Chromosorb WAW 80/100	Diesel fuel diluent used in diesel engine oil
D3525		10% Dexel 300 on Chromosorb WAW 80/100	Gasoline diluent in used gasoline engine oils
D3534	TR-120252	<b>TRB-5</b> 50 m x 0.25 mm x 0.25 µm	PCBs in water
D3606	TR-510112 TR-960462	<b>TRB-1ms</b> 15 m x 0.25 mm x 0.1 µm <b>TR-TCEP</b> 60 m x 0.25 mm x 0.4 µm	Benzene and toluene in gasoline
D3687	TR-140533 TR-141035	<b>TRB-WAX</b> 30 m x 0.32 mm x 0.5 µm <b>TRB-WAX</b> 30 m x 0.53 mm x 1.0 µm	Volatile organic compounds
D3710	TR-1150J5	<b>TRB-1</b> 7.5 m x 0.53 mm x 5.0 µm	Boiling range distribution of gasoline and gasoline fractions
D3725	TR-151035	<b>TRB-FFAP</b> 30 m x 0.53 mm x 1.0 µm	Fatty acids in drying oils
D3760	TR-140263 TR-110563	<b>TRB-WAX</b> 60m x 0.32 mm x 0.25 µm <b>TRB-1 60</b> m x 0.32 mm x 0.5 µm	Analysis of isopropylbenzene (cumene)

Method	Teknokroma P/N	Teknokroma Phase Recommendation	Sample
D3797	TR-140563	<b>TRB-WAX</b> 60 m x 0.32 mm x 0.5 µm	Analysis of o-Xylene
D3798	TR-140563	<b>TRB-WAX</b> 60m x 0.32 mm x 0.5 µm	Analysis of p-Xylene
	TR-140263	<b>TRB-WAX</b> 60 m x 0.32 mm x 0.25 µm	
D3876	TR-111033	<b>TRB-1</b> 30 m x 0.32 mm x 1.0 µm	Methoxyl and hydroxypropyl substitution in cellulose ether products
	TR-111535	<b>TRB-1</b> 30 m x 0.53 mm x 1.5 µm	
D3962	TR-151035	<b>TRB-FFAP</b> 30 m x 0.53 mm x 1.0 µm	Impurities in styrene
D4059	TR-120252	<b>TRB-5</b> 50 m x 0.25 mm x 0.25 µm	PCBs in insulating liquids
D4275	TR-113033	<b>TRB-1</b> 30 m x 0.32 mm x 3.0 µm	Butylated hydroxy toluene in ethylene and ethylenevinylacetate polymers
	TR-113035	<b>TRB-1</b> 30 m x 0.53 mm x 3.0 µm	
D4367		10% SE-30 on Chromosorb WAW 80/100 25% TCEP on Chromosorb PAW 80/100	Benzene in hydrocarbon solvents
D4415	TR-150233	<b>TRB-FFAP</b> 30 m x 0.32 mm x 0.25 µm	Determination of dimer and acrylic acid
D4420	TR-510112	<b>TRB-1ms</b> 15 m x 0.25 mm x 0.1 µm	Aromatics in gasoline
	TR-960462	<b>TR-TCEP</b> 60 m x 0.25 mm x 0.4 µm	
D4492	TR-140263	<b>TRB-WAX</b> 60 m x 0.32 mm x 0.25 µm	Analysis of benzene
D4534	TR-960462	<b>TR-TCEP</b> 60 m x 0.25 mm x 0.4 µm	Benzene content of cyclic products
D4735	TR-151035	<b>TRB-FFAP</b> 30 m x 0.53 mm x 1.0 µm	Trace thiophene in refined benzene
D4768	TR-151035	<b>TRB-FFAP</b> 30 m x 0.53 mm x 1.0 µm	Phenol and cresol inhibitors in insulating oils
D4815	TR-113035 + TCEP precolumn	<b>TRB-1</b> 30 m x 0.53 mm x 5.0 µm + 3 <b>TCEP precolumn</b> (56cm)	MTBE, ETBE, TAME, DIPE, tert-amyl alcohol, C1-C4 alcohols in gasoline
D4864	TR-121515	<b>TRB-5</b> 15 m x 0.53 mm x 1.5 µm	Traces of methanol in propylene
D5008	TR-115045	<b>TRB-1</b> 10 m x 0.53 mm x 5.0 µm	Ethyl methyl pentanol content and purity of 2-ethylhexanol
	TR-140233	<b>TRB-WAX</b> 30 m x 0.32 mm x 0.25 µm	
D5060	TR-140563	<b>TRB-WAX</b> 60m x 0.32 mm x 0.5 µm	Impurities in high-purity ethylbenzene
D5134	TR-110559	<b>TRB-50.2PONA</b> 50 m x 0.20 mm x 0.5 µm	Impurities in high-purity ethylbenzene
D5135	TR-140563	<b>TRB-WAX</b> 60m x 0.32 mm x 0.5 µm	Styrene analysis
D5307		10% UCW-982 on Chromosorb PAW 80/100 3% OV-1 on Chromosorb WHP 80/100 10% SE-30 on Chromosorb PAW 80/100	Boiling range distribution of crude oil-simulated distillation of crude oil through 538°C
D5310	TR-120232	<b>TRB-5</b> 30 m x 0.25 mm x 0.25 µm	Tar acid composition
	TR-252129	<b>TRB-225</b> 25 m x 0.20 mm x 0.20 µm	
D5399	TR-113045	<b>TRB-1</b> 10 m x 0.53 mm x 3.0 µm	Boiling point distribution of hydrocarbon solvents
D5441	TR-110592	<b>TRB-1</b> 100m x 0.25 mm x 0.5 µm	Analysis of MTBE
	TR-110559	<b>TRB-50.2PONA</b> 50 m x 0.20 mm x 0.5 µm	
D5442	TR-110232	<b>TRB-1</b> 30 m x 0.25 mm x 0.25 µm	Analysis of petroleum waxes
	TR-120232	<b>TRB-5</b> 15 m x 0.25 mm x 0.25 µm	
D5480	TR-115065	<b>TRB-1</b> 60 m x 0.53 mm x 5.0 µm	Engine oil volatility by GC
D5501	TR-110592	<b>TRB-1</b> 100m x 0.25 mm x 0.5 µm	Ethanol content of denatured fuel ethanol
D5504	TR-974033	<b>TRB-SULFUR</b> 30 m x 0.32 mm x 4.0 µm	Sulfur compounds in natural gas and gaseous fuels by GC and SCD
D5580	TR-115035 + TCEP precolumn	<b>TRB-1</b> 30 m x 0.53 mm x 5.0 µm + <b>TCEP precolumn</b> (56cm)	Aromatics in gasoline
D5599	TR-111062	<b>TRB-1</b> 60m x 0.25 mm x 1.0 µm	Oxygenates in gasoline by GC and oxygen selective flame ionization detector
D5623	TR-114033	<b>TRB-1</b> 30m x 0.32 mm x 4.0 µm	Sulfur compounds in light petroleum liquids by GC and sulfur selective detection
D5713	TR-110559	<b>TRB-50.2PONA</b> 50 m x 0.20 mm x 0.5 µm	Analysis of high-purity benzene for cyclohexane feedstock by capillary GC
D5769	TR-111062	<b>TRB-1</b> 60m x 0.25 mm x 1.0 µm	Determination of benzene, toluene and total aromatics in finished gasoline by GC/MS
	TR-115063	<b>TRB-1</b> 60 m x 0.32 mm x 5.0 um	
D5917	TR-140263	<b>TRB-WAX</b> 60m x 0.32 mm x 0.25 µm	Trace impurities in monocyclic aromatic hydrocarbons by GC and external calibration
D6144	TR-111062	<b>TRB-1</b> 60m x 0.25 mm x 1.0 µm	alpha-Methylstyrene by capillary GC
D6159	TR-115035	<b>TRB-1</b> 30 m x 0.53 mm x 5.0 µm	Hydrocarbon impurities in ethylene
E0202	TR-812122	<b>Meta.WAX</b> 25 m x 0.25 mm x 0.2 µm	Analysis of glycols
E1100	TR-810535	<b>Meta.WAX</b> 30 m x 0.53 mm x 0.50 µm	Analysis of denatured ethanol



# NIOSH Regulatory Methods

Method	Method Name	Teknokroma Phase Recommendation	Teknokroma P/N
1000	Allyl chloride	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1001	Methyl chloride	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1002	Chloroprene	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1003	Halogenated hydrocarbons	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1004	sym-Dichloroethyl ether	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1005	Methylene chloride	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1006	Trichlorofluoromethane	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1007	Vinyl chloride	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1008	Ethylene dibromide	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1009	Vinyl bromide	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1010	Epichlorohydrin	SupraWAX-280 15 m x 0.32 mm ID x 0.5 µm	TR-830513
1011	Ethyl bromide	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1012	Dibromodifluoromethane	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1013	1,2-Dichloropropane	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1014	Methyl iodide	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1015	Vinylidene chloride	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1016	1,1,1,2-Tetrachloro-2,2-difluoroethane and 1,1,2,2-Tetrachloro-1,2-difluoroethane	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1017	Bromotrifluoromethane	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1018	Dichlorodifluoromethane and 1,2-Dichlorotetrafluoroethane	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1019	1,1,2,2-Tetrachloroethane	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1020	1,1,2-Trichloro-1,2,2-trifluoroethane	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1022	Trichloroethylene	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
1300	Ketones 1	SupraWAX-280 30 m x 0.32 mm ID x 0.5 µm	TR-830533
1301	Ketones 2	SupraWAX-280 30 m x 0.32 mm ID x 0.5 µm	TR-830533
1400	Alcohols 1	SupraWAX-280 30 m x 0.32 mm ID x 0.5 µm	TR-830533
1401	Alcohols 2	SupraWAX-280 30 m x 0.32 mm ID x 0.5 µm	TR-830533
1402	Alcohols 3	SupraWAX-280 30 m x 0.32 mm ID x 0.5 µm	TR-830533
1403	Alcohols 4	SupraWAX-280 15 m x 0.32 mm ID x 0.5 µm	TR-830513
1450	Esters 1	SupraWAX-280 30 m x 0.32 mm ID x 0.5 µm	TR-830533
1500	Hydrocarbons, BP 36-126°C	TRB-1 30 m x 0.25 mm ID x 0.25 µm	TR-110232
1501	Hydrocarbons, aromatic	Meta.X5 30 m x 0.25 mm ID x 0.25 µm	TR-820232
1550	Naphthas	TRB-1 60 m x 0.25 mm ID x 0.25 µm	TR-110262
1551	Turpentine	TRB-1 60 m x 0.25 mm ID x 0.25 µm	TR-110262
1602	Dioxane	SupraWAX-280 15 m x 0.32 mm ID x 0.5 µm	TR-830513
1603	Acetic acid	TRB-FFAP 15 m x 0.25 mm ID x 0.25 µm	TR-150212
1604	Acrylonitrile	SupraWAX-280 15 m x 0.32 mm ID x 0.5 µm	TR-830513
1606	Acetonitrile	SupraWAX-280 15 m x 0.32 mm ID x 0.5 µm	TR-830513
1608	Glycidol	SupraWAX-280 15 m x 0.32 mm ID x 0.5 µm	TR-830513
1609	Tetrahydrofuran	TRB-1 15 m x 0.25 mm ID x 0.25 µm	TR-110212
1610	Ethyl ether	SupraWAX-280 15 m x 0.32 mm ID x 0.5 µm	TR-830513
1611	Methylal	SupraWAX-280 15 m x 0.32 mm ID x 0.5 µm	TR-830513
1612	Propylene oxide	SupraWAX-280 15 m x 0.32 mm ID x 0.5 µm	TR-830513
1613	Pyridine	SupraWAX-280 15 m x 0.32 mm ID x 0.5 µm	TR-830513
1614	Ethylene oxide	SupraWAX-280 15 m x 0.32 mm ID x 0.5 µm	TR-830513
1615	Methyl-tert-butyl ether	SupraWAX-280 15 m x 0.32 mm ID x 0.5 µm	TR-830513
2000	Methanol	SupraWAX-280 15 m x 0.32 mm ID x 0.5 µm	TR-830513
2001	Cresol, all isomers	SupraWAX-280 30 m x 0.32 mm ID x 0.5 µm	TR-830232
2002	Amines, aromatic	Meta.X5 30 m x 0.25 mm ID x 1.0 µm	TR-821032
2003	1,1,2,2-Tetrabromoethane	TRB-624 30 m x 0.25 mm ID x 1.4 µm	TR-601432
2004	Dimethylacetamide and dimethylformamide	SupraWAX-280 15 m x 0.32 mm ID x 0.5 µm	TR-830513
2005	Nitrobenzenes	SupraWAX-280 15 m x 0.32 mm ID x 0.5 µm	TR-830513
2007	Aminoethanol compounds	TRB-1 15 m x 0.25 mm ID x 1.0 µm	TR-111012
2500	2-Butanone	SupraWAX-280 15 m x 0.32 mm ID x 0.5 µm	TR-830513
2501	Acrolein	SupraWAX-280 15 m x 0.32 mm ID x 0.5 µm	TR-830513
2503	Acrolein	Meta.X5 15 m x 0.25 mm ID x 0.25 µm	TR-820212
2504	Tetraethyl pyrophosphate	TRB-1 15 m x 0.25 mm ID x 0.25 µm	TR-110212



Method	Method Name	Teknokroma Phase Recommendation	Teknokroma P/N
2505	Furfuryl alcohol	<b>SupraWAX-280</b> 15 m x 0.32 mm ID x 0.5 µm	TR-830513
2506	Acetone cyanohydrin	<b>TRB-1</b> 15 m x 0.25 mm ID x 1.0 µm	TR-111012
2507	Nitroglycerine and ethylene glycol dinitrate	<b>SupraWAX-280</b> 15 m x 0.32 mm ID x 0.5 µm	TR-830513
2508	Isophorone	<b>TRB-1</b> 15 m x 0.25 mm ID x 0.25 µm	TR-110212
2510	1-Octanethiol	<b>Meta.X5</b> 15 m x 0.25 mm ID x 0.25 µm	TR-820212
2513	Ethylene chlorohydrin	<b>SupraWAX-280</b> 15 m x 0.32 mm ID x 0.5 µm	TR-830513
2515	Diazomethane	<b>TRB-1</b> 15 m x 0.32 mm ID x 0.25 µm	TR-110213
2516	Dichlorofluoromethane	<b>TRB-624</b> 30 m x 0.25 mm ID x 1.4 µm	TR-601432
2517	Pentachloroethane	<b>Meta.X5</b> 30 m x 0.25 mm ID x 0.5 µm	TR-820532
2518	Hexachloro-1,3-cyclopentadiene	<b>TRB-624</b> 30 m x 0.25 mm ID x 1.4 µm	TR-601432
2519	Ethyl chloride	<b>TRB-624</b> 30 m x 0.25 mm ID x 1.8 µm	TR-601833
2520	Methyl bromide	<b>TRB-624</b> 30 m x 0.25 mm ID x 1.8 µm	TR-601833
2521	Methylcyclohexanone	<b>SupraWAX-280</b> 30 m x 0.32 mm ID x 0.5 µm	TR-830533
2522	Nitrosamines	<b>Meta.X5</b> 30 m x 0.25 mm ID x 0.5 µm	TR-820532
2523	1,3-Cyclopentadiene	<b>TRB-1</b> 15 m x 0.32 mm ID x 1.0 µm	TR-111013
2524	Dimethylsulfate	<b>SupraWAX-280</b> 15 m x 0.32 mm ID x 0.5 µm	TR-830513
2525	1-Butanethiol	<b>TRB-1</b> 15 m x 0.32 mm ID x 1.0 µm	TR-111013
2526	Nitroethane	<b>SupraWAX-280</b> 15 m x 0.32 mm ID x 0.5 µm	TR-830513
2527	Nitromethane	<b>Meta.X5</b> 30 m x 0.25 mm ID x 0.25 µm	TR-820232
2528	2-Nitropropane	<b>Meta.X5</b> 30 m x 0.25 mm ID x 0.25 µm	TR-820232
2529	Furfural	<b>SupraWAX-280</b> 30 m x 0.32 mm ID x 0.5 µm	TR-830533
2530	Biphenyl	<b>Meta.X5</b> 15 m x 0.25 mm ID x 0.25 µm	TR-820212
2531	Gluteraldehyde	<b>SupraWAX-280</b> 30 m x 0.32 mm ID x 0.5 µm	TR-830533
2533	Tetraethyl lead (as Pb)	<b>TRB-1</b> 15 m x 0.25 mm ID x 0.25 µm	TR-110212
2534	Tetramethyl lead (as Pb)	<b>TRB-1</b> 15 m x 0.25 mm ID x 0.25 µm	TR-110212
2536	Valeraldehyde	<b>SupraWAX-280</b> 15 m x 0.32 mm ID x 0.5 µm	TR-830513
2537	Methylmethacrylate	<b>SupraWAX-280</b> 15 m x 0.32 mm ID x 0.5 µm	TR-830513
2538	Acetaldehyde	<b>TRB-1301</b> 15 m x 0.32 mm ID x 1.0 µm	TR-601013
2539	Aldehydes, Screening	<b>TRB-1</b> 30 m x 0.32 mm ID x 0.25 µm	TR-110232
2541	Formaldehyde	<b>TRB-1701</b> 30 m x 0.25 mm ID x 0.25 µm	TR-130232
3502	Phenol	<b>Meta.X5</b> 15 m x 0.25 mm ID x 0.25 µm	TR-820212
3700	Benzene	<b>SupraWAX-280</b> 15 m x 0.32 mm ID x 0.5 µm	TR-830513
3702	Ethylene oxide	<b>SupraWAX-280</b> 30 m x 0.32 mm ID x 0.5 µm	TR-830533
4000	Toluene	<b>TRB-5</b> 30 m x 0.25 mm ID x 0.25 µm	TR-120232
5012	EPN, malathion, and parathion	<b>Meta.X5</b> 15 m x 0.25 mm ID x 0.25 µm	TR-820212
5014	Chlorinated terphenyl (60% chlorine)	<b>Meta.X5</b> 15 m x 0.25 mm ID x 0.25 µm	TR-820212
5017	Dibutyl phosphate	<b>Meta.X5</b> 15 m x 0.25 mm ID x 0.25 µm	TR-820212
5019	Azelaic acid	<b>TRB-1</b> 15 m x 0.32 mm ID x 0.25 µm	TR-110213
5020	Dibutyl phthalate and Di (2-ethylhexyl) phthalate	<b>Meta.X5</b> 15 m x 0.25 mm ID x 0.25 µm	TR-820212
5021	o-Terphenyl	<b>TRB-1</b> 30 m x 0.25 mm ID x 0.25 µm	TR-110232
5025	Chlorinated diphenyl ether	<b>Meta.X5</b> 15 m x 0.25 mm ID x 0.25 µm	TR-820212
5029	4,4-Dimethylenedianiline	<b>TRB-5</b> 15 m x 0.25 mm ID x 0.25 µm	TR-120212
5500	Ethylene glycol	<b>SupraWAX-280</b> 15 m x 0.32 mm ID x 0.5 µm	TR-830513
5502	Aldrin and lindane	<b>Meta.X5</b> 15 m x 0.25 mm ID x 0.25 µm	TR-820212
5503	Polychlorobiphenyls	<b>Meta.X5</b> 30 m x 0.25 mm ID x 0.25 µm	TR-820232
5506	Polynuclear aromatic hydrocarbons	<b>Meta.X5</b> 30 m x 0.25 mm ID x 0.25 µm	TR-820232
5509	Benzidine and 3,3-dichlorobenzidine	<b>TRB-5</b> 15 m x 0.53 mm ID x 1.5 µm	TR-121515
5510	Chlordane	<b>Meta.X5</b> 15 m x 0.25 mm ID x 0.25 µm	TR-820212
5514	Demeton	<b>TRB-5</b> 15 m x 0.25 mm ID x 0.25 µm	TR-120212
5515	Polynuclear aromatic hydrocarbons (in the presence of isocyanates)	<b>Meta.X5</b> 30 m x 0.25 mm ID x 0.25 µm	TR-820232
5516	2,4- and 2,6-Toluenediamine	<b>TRB-5</b> 30 m x 0.25 mm ID x 0.25 µm	TR-120232
5517	Polychlorobenzenes	<b>TRB-1</b> 15 m x 0.25 mm ID x 0.25 µm	TR-110212
5518	Naphthylamines	<b>Meta.X5</b> 30 m x 0.25 mm ID x 0.25 µm	TR-820232
5519	Endrin	<b>Meta.X5</b> 30 m x 0.25 mm ID x 0.25 µm	TR-820232





## Packed Columns

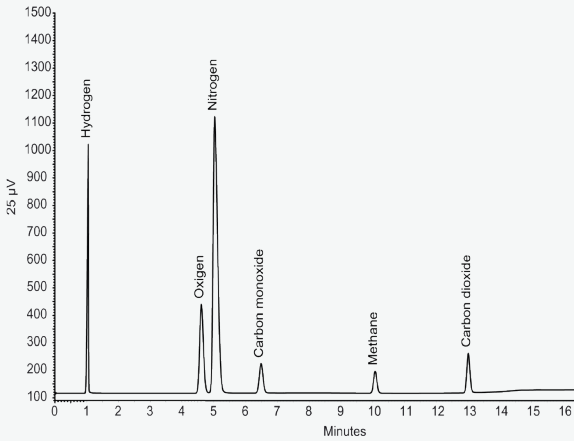


DESCRIPTION	SOLID SUPPORT	USP CODE
Siliceous earth	Silcoport® Chromosorb® WHP	<b>S1A</b>
Siliceous earth, treated as S1A and both acid-and base-washed	Silcoport® WBW	<b>S1AB</b>
Crushed firebrick, calcined or burned with a clay binder above 900°C, acid-washed, may be silanized	Chromosorb® PAW or PAW-DMCS	<b>S1C</b>
Untreated siliceous earth	Chromosorb® W NAW	<b>S1NS</b>
Styrene-divinylbenzene copolymer with nominal surface area of less than 50m <sup>2</sup> /g and ave. pore diameter of 0.3 - 0.4 mm	Chromosorb® 101	<b>S2</b>
Styrene-divinylbenzene copolymer with nominal surface area of 500 to 600m <sup>2</sup> /g and ave. pore diameter of 0.0075 mm	Hayesep® Q, Porapak® Q	<b>S3</b>
Styrene-divinylbenzene copolymer with aromatic -O and -N groups having a nominal surface area of 400 to 600m <sup>2</sup> /g and ave. pore diameter of 0.0076 mm	Hayesep® R, Porapak® R	<b>S4</b>
High molecular weight tetrafluoroethylene polymer, 40-60 mesh	Chromosorb® T	<b>S5</b>
Styrene-divinylbenzene copolymer with nominal surface area of 250-350m <sup>2</sup> /g and ave. pore diameter of 0.0091 mm	Chromosorb® 102, Porapak® P, Hayesep® P	<b>S6</b>
Graphitized carbon having a nominal surface area of 12m <sup>2</sup> /g	CarboBlack® C, Carbopack® C	<b>S7</b>
Copolymer of 4-vinyl-pyridine and styrene divinylbenzene	Hayesep® S, Porapak® S	<b>S8</b>
Porous polymer based on 2,6-diphenyl-p-phenylene oxide	Tenax® TA	<b>S9</b>
Highly cross-linked copolymer of acrylonitrile and divinylbenzene	Hayesep® C	<b>S10</b>
Graphitized carbon having a nominal surface area of 100m <sup>2</sup> /g, modified with small amounts of petrolatum and polyethylene glycol compound	CarboBlack® B 80/120 3% Rt 1500 Carbopack® B 80/120 3% SP-1500	<b>S11</b>
Graphitized carbon having a nominal surface area of 100m <sup>2</sup> /g	CarboBlack® B, Carbopack® B	<b>S12</b>



## PERMANENT GASES ANALYSIS

Column: Permanent Gases 4,6 m x 1/8" x 2,1 mm TR-GC1462010  
 Carrier Gas: He, 30 ml/min  
 Injector: 150 °C  
 Detector: TCD, 200 °C  
 Oven: 35 °C (5min) to 225 °C (10 min) @ 20 °C/min  
 Sample: 50 µl permanent gases in helium



These columns have been used for the last 50 years in all kinds of analyses for gas chromatography.

Nowadays packed column use is understandable due to the wide range of solid support packings available and to their high on-column sample capacity. These aspects make packed columns quite versatile for a wide range of applications.

Teknokroma has been manufacturing packed columns since its inception and has always provided a wide range of different packing material and the latest advances.

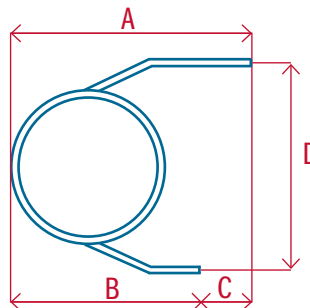
Ask for our micro-packed columns (0,53 mm, 0,75mm and 1,00mm ID) to reduce gas consumption and to increase efficiency.

## WE CAN SUPPLY ANY KIND OF COLUMNS... JUST ASK FOR THEM!

Tubing	External Diameter (OD)	Internal Diameter (ID)
Stainless Steel	1/4" and 1/8"	4mm, 3mm and 2mm
Sulfinert	1/4" and 1/8"	5.2mm and 2mm
	1/16"	0.75mm and 1mm
	0.79 mm	0.53 mm
Nickel, Teflon and Copper	1/8"	2 mm

Columns can be delivered pre-conditioned or conditioned and proved at an extra cost (please inquire).

## To Order a Packed Column Specify the Following



### Physical Dimensions

A: \_\_\_\_\_  
 B: \_\_\_\_\_  
 C: \_\_\_\_\_  
 D: \_\_\_\_\_

Chromatograph manufacturer: \_\_\_\_\_

Model: \_\_\_\_\_  
 Tubing material: \_\_\_\_\_  
 Length: \_\_\_\_\_ O.D. \_\_\_\_\_ I.D. \_\_\_\_\_

### Packing Description

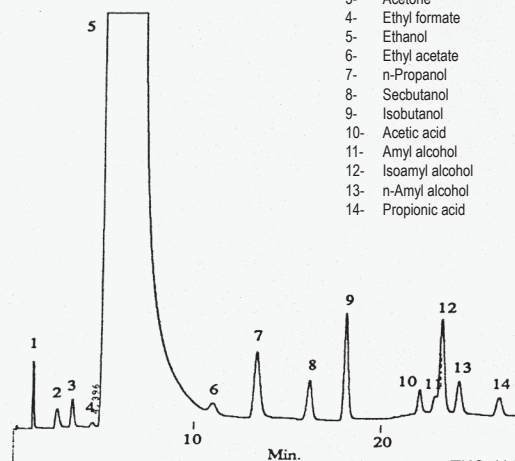
Percentage of coating: \_\_\_\_\_ Phase: \_\_\_\_\_  
 Support: \_\_\_\_\_  
 Treatment (WAW,,WHP,,): \_\_\_\_\_ Mesh size: \_\_\_\_\_

Comments: \_\_\_\_\_

## PACKED COLUMNS

Column: 5% Carbowax 20M CarboBlack B/AW, 80/120 mesh  
 Dimensions: 2m x 1/8" OD X 2mm ID, (Silcosteel)  
 Injection: 1 µl standard, 175°C  
 Carrier Gas: He, 15mL/min  
 Oven temperature: 60°C(6min) @ 10°C/min to 150°C(7min)  
 Detector: FID, 175°C

- | Peak Name |                 |
|-----------|-----------------|
| 1-        | Acetaldehyde    |
| 2-        | Methanol        |
| 3-        | Acetone         |
| 4-        | Ethyl formate   |
| 5-        | Ethanol         |
| 6-        | Ethyl acetate   |
| 7-        | n-Propanol      |
| 8-        | Secbutanol      |
| 9-        | Isobutanol      |
| 10-       | Acetic acid     |
| 11-       | Amyl alcohol    |
| 12-       | Isoamyl alcohol |
| 13-       | n-Amyl alcohol  |
| 14-       | Propionic acid  |



TKG 1146



# Packed Columns

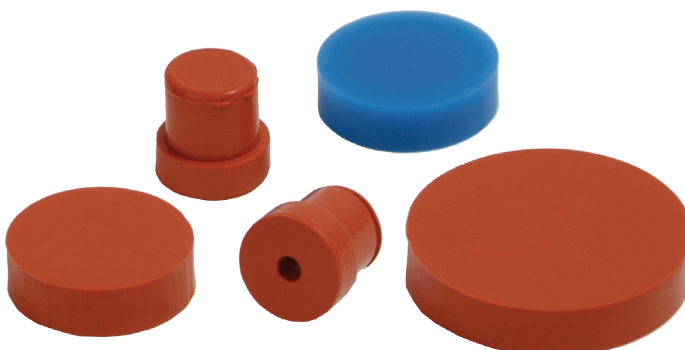
DESCRIPTION	T LIMITS (°C)	USP CODE
Alltech AT™-1000	50/250	G35
Apiezon® L	50/300	-
Apiezon® M	50/300	-
Bentone 34	0/180	-
N,N-bis-(2-Cyanoethyl)formamide (BCEF)	20/125	-
N,N-bis-(p-Methoxybenzylidene)-a,a'-bi-p-toluidine (BMBT)	150	-
Bis-(2-ethoxyethyl) Adipate (BEEA)	150	-
Bis-(2-methoxyethyl) Adipate (BMEA)	150	-
Carbowax® 400	20/100	G20
Carbowax® 540	40/175	G39
Carbowax® 600	20/125	-
Carbowax® 1000	40/150	G14
Carbowax® 1540	50/175	G39
Carbowax® 3350	60/200	G15
Carbowax® 6000	60/200	-
Carbowax® 20M	60/225	G16
Carbowax® 20M-TPA	60/250	G25
DC-200, 350cstk (Methyl)	20/250	-
DC-200, 500cstk (Methyl)	20/250	-
DC-550, (25%-Phehyl)	20/225	G28
Dexsil® 300GC	50/400	G33
Di-n-butyl Maleate	20/50	-
Di-n-decyl phthalate	10/175	-
Di(2-ethylhexyl)sebacate	0/125	G11
Diethyleneglycol Adipate	20/210	-
Diethyleneglycol Succinate	20/200	G4
Diglycerol	20/100	-
2,4-Dimethylsulfonate	0/50	-
Dinonyl Phthalate	20/150	-
Diisodecyl Phthalate	20/150	G24
Ethylene glycol Adipate	100/210	G40
Ethylene glycol Succinate	100/210	-
Fluorad FC-431	40/200	-
FFAP	50/250	G35
Halocarbon oil 14-25	150	-
Igepal® CO-630	30/200	-
Igepal® CO-880 (Nonoxynol)	100/200	G31
Igepal® CO-990	100/200	-
Kel-F® Oil No.10	100	-
Neopentylglycol Succinate	50/230	G21
OV™-1 (Methyl gum)	100/350	G2
OV™-17 (50% phenyl)	20/350	G3
OV™-17-Vinyl (50% phenyl)	300+	-

DESCRIPTION	T LIMITS (°C)	USP CODE
OV™-25 (75% phenyl)	300	G17
OV™-101 (Methyl fluid)	20/350	G1
OV™-210 (50% Trifluoropropyl)	20/275+	G6
OV™-225 (25% phenyl, 25% cyanopropyl methyl)	20/250+	G19
OV™-275 (Dicyanoallyl)	250+	-
OV™-1701	0/250	-
b,b-Oxydiropionitrile	0/75	-
Phenyldiethanolamine Succinate	0/230	G12
Polyethylene glycol adipate	0/225	G23
Polyethyleneimine	0/175	-
Polyphenyl ether (5 rings) OS-124	0/200	-
Polyphenyl ether (6 rings) OS-138	0/225	-
Polypropylene glycol	0/150	-
Polypropyleneimine	0/200	-
QF-1 (50% Trifluoropropyl)	20/250	-
SE-30 (Methyl gum)	75/300	-
SE-30 (GC grade)	75/300	G2
SE-52 (5% Phenyl)	50/300	G27
SE-54 (5% Phenyl, 1% Vinyl)	50/300	G36
Sebaconitrile	150	-
Silar® 5CP (50% Cyanopropyl Phenyl Silicone)	50/250	G7
Silar® 9CP (90% Cyanopropyl Phenyl Silicone)	50/250	G8
Silar® 10C (100% Cyanopropyl Silicone)	50/250	G5
Sorbitol	100/150	G13
SP-1200	25/200	-
SP-2100 (Methyl silicone)	0/350	G1
SP-2300 (Polycyanopropylphenylsiloxane)	20/275	G7
SP-2330 (Poly(80%-biscyanopropyl-20%-cyanopropylphenyl)siloxane)	25/275	G8
SP-2340 (Polybiscyanopropylsiloxane)	25/275	G5
Squalene	20/150	-
SUPEROX® 4 (4.000.000 MW)	300	-
SUPEROX® 20M (20.000 MW)	60/250	-
Tetracyanoethylated Pentaerythritol (TCEPE)	30/150	-
Tetrahydroxyethylene Diamine (THEED)	125	-
1,2,3-Tris-(2-cyanoethoxy)propane (TCEP)	20/180	-
Triton® X-100	0/200	-
Triton® X-305 (Octylphenoxy Polyethoxy-ethanol)	20/250	-
UC W-98 (UC-W982)	80/300+	G9
UCON LB-1800-X (Polyalkylene Glycol)	200	G18
Versamid® 900	275	-

For other stationary phases please inquire



## diskobolus septa by Teknokroma™



Septum is the most general source of contaminants in the injection port. The baseline noise or the appearance of ghost peaks in the chromatogram can be a consequence of the septum bleed or of the samples of former injections that have been adsorbed on the septum surface.

Teknokroma presents the new range of **diskobolus™** septa that have been specially designed and prepared to work at high temperatures, with low bleed, and a better baseline.

### General observations to consider in the Septum election:

- Injector temperature
- Column temperature (isothermal or programmed)
- Detector sensitivity

Septa quickly deteriorate when the injector temperature increases, and consequently the bleeding may also increase.

These peaks coming from the degradation of the silicone of the septum, can be reduced with the gas flow of the septum purge, with the Split injection or using the lowest possible temperature in the injector.

The existence of rare peaks - called "ghost peaks", generally takes place during the temperature programme where volatile

materials of the septum accumulate at the column head during the period of cooling.

When the column warms up again, in the following temperature programme, the accumulated volatile materials elute, ghost peaks and a baseline deviation appears, or a combination of both factors.

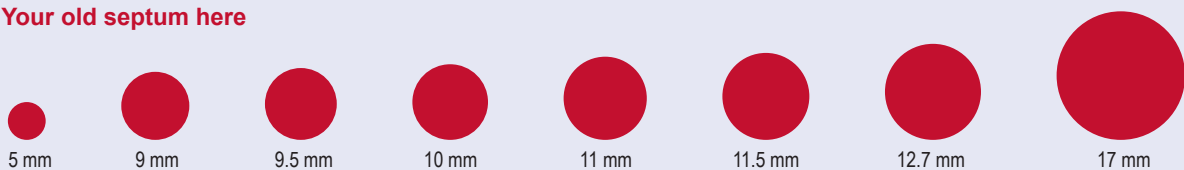
### Influence factors in the septum bleeding

- Type of septum - some septa bleed more than others
- Working temperature of the septum - bleed increases with temperature
- Time after septum installation - bleed decreases gradually with the use of the septum
- Column cooling time - with longer cooling time the accumulation of contaminants in the column head increases
- Septum localization - bleed increases when the septum compression through the nut is high
- Column length and stationary phase amount - short columns and small phases thickness keep less bleeding

In the analysis of compounds, septum bleed interferes with the results according to the detector sensitivity. In situations where less sensitivity may be required, septum bleed has less importance.

### Measure Guide

Your old septum here





# The Teknokroma Diskobolus™ Septa

## Performance Recommendations

Do not touch the septum with the fingers, in order to avoid a contamination from the filth of the user fingers.

Put the lid on the septa container once it has been opened, to avoid cross contamination.

Change the septum periodically - at least once a week -, this will avoid the leaks through the septum with the consequent losses of time and possibility to damage the column in an irreversible way.

It is preferable to change the septum at the end of the day, maintaining a high oven temperature to avoid the accumulation of bleed during the night. Alternatively, make a temperature programming for the following day to eliminate contaminant traces of septum volatiles.

Once the septum has been changed, verify the flow at the end of the column or the pressure at the entry, to make sure that the septum has been correctly sealed.

Do not tighten the septum with the nut more than it is necessary.

Use a guide for the needle to prolong the syringe and septum life. The guide helps to inject always at the same place, and avoids random perforations that may cause leaks.

Use needles with narrow outer diameters to avoid the loss of small pieces of septum; this will increase the septum useful life and will avoid the appearance of tails with active compounds.

In case of working with a high sensitivity detector, it is necessary to put the septum in the injection port all the night to obtain the least possible bleed.

## Septum Size Chart

Instrument	Septum size (mm)	Instrument	Septum size (mm)
<b>Agilent (HP)</b>		<b>Pye/Unicam</b>	
5880A, 5890, 6890, 6850, 7890, PTV	11	All Models	7
5700, 5880, 5890, 6890, 6900	9.5/10	<b>Shimadzu</b>	
On-Column Injection	5	All Models (14, 15A, 16, 17A)	Plug
<b>CE Instruments (TMQ)</b>		<b>Varian</b>	
TRACE GC	17	<i>Injector type:</i>	
<b>Finnigan (TQM)</b>		Varian Packed Column	9.5/10
GC 9001, 9600	9.5	<i>Split/Splitless:</i>	
GCC, 9100	9.5	Varian 1078/1079	11.5
GCC w/TRACE	17	Varian 1177	9
QCQ	9.5	Varian 1075/1077	11.5
TRACE 2000	9.5	Varian 1040/41/60/61	9.5
<b>Fisons/Carlo Erba (TQM)</b>		Varian 1093/94 SPI	11.5
8000 Series	17	<b>Thermo</b>	
<b>PerkinElmer</b>		PTV injector	12.7
Sigma Series	11		
900, 990	11		
8000 Series	11		
Auto SYS	11		
Auto SYS XL, Clarus 500	11		

## Diskobolus™ as (auto-sampler)



- Ideal for autosamplers
- Extremely low bleed
- Long-life injection (more than 200 injections)
- High stability at more than 350 °C
- Supplied in glass containers for high purity.

**diskobolus™ as septum (auto-sampler)** has been manufactured by means of a new technology in the silicone field, and with an extraordinary conditioning process achieving an excellent performance in many applications of gas chromatography.

Ideal to work with autosamplers, it has a long useful life and an extremely low bleed.

**“the septum with the best quality /price ratio”**

Cat.No	Description	Pk
TR-D030500	diskobolus as 9,5 mm D. (3/8")	50
TR-D030600	diskobolus as 11 mm D. (7/16")	50

## Economy Diskobolus™ Blue Septa (Blue)



The Economy **diskobolus™ Blue** septa are designed for non-demanding, routine applications. They are easy to penetrate. These septa can be used up to 250°C and are suitable for 90% of all GC analysis. Made from silicone. The package is for 100 pieces.

Cat.No	Description	Pk
TR-D033072	diskobolus Blue 9.5 mm D. (3/8")	100
TR-D033074	diskobolus Blue 11 mm D. (7/16")	100
TR-D033076	diskobolus Blue 12.7 mm. D. (1/2")	100

# The Teknokroma Diskobolus™ Septa



## Diskobolus™ BTO Premium Septa



- Extended Temperature Range , Low Bleed
- Maximum Temperature 400 °C
- Virtually eliminates injection-port sticking
- Pre-conditioned; packaged in glass to prevent contamination
- Each batch GC-FID tested
- Ideal for use with low bleed “Mass Spec” capillary columns

This septa has an excellent performance. When you need septa to use with high temperature and low bleed these are the septa you should use.

The **diskobolus™** BTO Septa have been optimized to reduce injection port adhesion. Is an ideal septum for trace analysis, high injection port temperature.

The **diskobolus™** BTO Septa are pre-conditioned and packaged in glass to prevent contamination.

Cat.No	Description	Pk
TR-D033006	<b>diskobolus</b> BTO 9.5 mm. D. (3/8") Low Bleed	50
TR-D033010	<b>diskobolus</b> BTO 11 mm. D. (7/16") CAD* L. Bleed	50
TR-D033012	<b>diskobolus</b> BTO 11 mm. D. (7/16") CAD* L. Bleed100	
TR-D033014	<b>diskobolus</b> BTO 11.5 mm. D. CAD* Low Bleed	50
TR-D033018	<b>diskobolus</b> BTO 17 mm. D. CAD* Low Bleed	50
TR-D033020	<b>diskobolus</b> BTO “Plug”, for Shimadzu Low Bleed	50

\* CAD “Center Alignment Depression”





# Teide™ Ferrules for Gas Chromatography



## Ferrules for Gas Chromatography

Ferrules for gas chromatography are used to seal the connections between the column and the injection and detection systems.

The ideal GC column ferrules provide a perfect seal avoiding leaks that would allow the entrance of air and contaminants into the equipment, damage the baseline and increase the background signal.

Ferrules must not stick to the column and must tolerate temperature changes during programming.

## Ferrule selection

### General considerations in the ferrule selection:

- Injector temperature
- Type and sensitivity of the detector
- Type of material that provides a perfect seal to avoid leaks
- Column OD and type

### How to avoid problems with ferrules

- Change the ferrules on installing a new column
- Avoid all type of fingers' grease and other contaminants
- Do not overtighten the ferrules. As a general rule, sealing at ¼ turn past fingertight are enough.
- Observe if the reusable ferrules are damaged before using them again.

### When is it necessary to change the ferrules

- When some changes are observed in retention times
- In case of baseline drift caused by the entrance of oxygen and possible reaction with the stationary phase
- When sample loss is observed
- Increase of the detector background signal

## Types of Ferrules

### Graphite

Graphite is the best material to work at high temperature and at the same time is the softest ferrule. Therefore it fits the capillary column and seals effectively at only ¼ turn past fingertight. As this is a very soft material, they are easily destroyed or deformed. Ideal for FID and NPD detectors.

Do not use with MS or other oxygen sensitive detectors. Upper temperature limit 450°C.

### Vespel/Graphite

Vespel /Graphite ferrules are recommended for applications with GC/MS interface or other oxygen sensitive detectors.

The ferrule composition is 60% polyimide and 40% graphite. It is a ferrule for general use in Gas Chromatography.

It is mechanically robust and forms a perfect seal. It is a reusable ferrule. It needs a frequent retightening. Limit temperature 400°C 85% Polyimide (vespel) 15% graphite for Agilent ferrules.

### Vespel

The composition of the Vespel ferrule is 100% polyimide. It is mechanically robust. It can be removed and reused several times. It is an ideal material for glass and metal columns. It needs a frequent retightening. Limit temperature 350°C.

**“If you don't find ferrules you need please let us know”**



# Teide™ Ferrules for Gas Chromatography



## Graphite Ferrules (100%)



### Features:

- Ideal to work with FID and NPD interface applications
- General use to work with capillary columns
- It is the best material to work at high temperatures

### Advantages:

- They seal perfectly in fused silica and glass columns
- They resist highest temperature, 450°C
- Very easy to remove

### Limitations:

- They are easily deformed and can only be reused if they are not tighten in excess
- Not recommended to work with GC/MS detectors

## Graphite ferrules, (short ferrules) for Agilent 4890, 5890, 6890 except for GC/MS



Cat.No	Description	For Capillary Column	Pk
TR-T031001	teide 1/16" to 0.4 mm	0.18 mm I.D.	10
TR-T031000	teide 1/16" to 0.5 mm	0.25-0.32 mm I.D.	10
TR-T031010	teide 1/16" to 0.8 mm	0.53 mm I.D.	10

## Graphite standard ferrules



Cat.No	Description	For Capillary Column	Pk
TR-T031020	teide 1/16" to 0.4 mm	0.25 mm I.D.	10
TR-T031030	teide 1/16" to 0.5 mm	0.32 mm I.D.	10
TR-T031040	teide 1/16" to 0.8 mm	0.53 mm I.D.	10
TR-T031042	teide 1/16" to 1.0 mm	0.65 mm I.D.	10

## Graphite standard ferrules (two holes)

Cat.No	Description	For Capillary Column	Pk
TR-T031102	teide 1/16" 2 holes, 0.5/0.5	0.32 mm I.D.	10

## Graphite reducing ferrules



Cat.No	Description	For Capillary Column	Pk
TR-T031104	teide 1/8" to 0.4 mm	0.25 mm I.D.	10
TR-T031106	teide 1/8" to 0.5 mm	0.32 mm I.D.	10
TR-T031108	teide 1/8" to 0.8 mm	0.53 mm I.D.	10
TR-T031110	teide 1/8" to 1/16"	1/16" O.D.	10
TR-T031112	teide 1/4" to 0.5 mm	0.32 mm I.D.	10
TR-T031116	teide 1/4" to 0.8 mm	0.53 mm I.D.	10
TR-T031118	teide 1/4" to 4 mm	4 mm O.D.	10
TR-T031120	teide 1/4" to 6 mm	6 mm O.D.	10
TR-T031122	teide 1/4" to 1/16"	1/16" O.D.	10
TR-T031124	teide 1/4" to 1/8"	1/8" O.D.	10

## Special graphite ferrules for Shimadzu



Cat.No	Description	For Capillary Column	Pk
TR-T031128	teide 5 mm for Shimadzu	5 mm O.D.	10





# Teide™ Ferrules for Gas Chromatography

## Vespel/Graphite Ferrules

### Features:

- Ferrules recommended for GC/MS detectors
- More appropriate ferrules for general use in capillary columns
- Perfect seal

### Advantages:

- Mechanically robust and long life time ferrules
- Reusable ferrules

### Limitations:

- Must be retightened
- Temperature limit 400°C

Vespel/Graphite ferrules, (short ferrules)  
for Agilent 4890, 5890, 6890



Cat.No	Description	For Capillary Column	Pk
TR-T031070	<b>teide</b> 1/16" to 0.4 mm	0.25 mm I.D.	10
TR-T031080	<b>teide</b> 1/16" to 0.5 mm	0.32 mm I.D.	10
TR-T031090	<b>teide</b> 1/16" to 0.8 mm	0.53 mm I.D.	10

Special Vespel/Graphite ferrules (85/15)  
for Agilent 4890, 5890, 6890

Cat.No	Description	For Capillary Column	Pk
TR-T031071	<b>teide</b> 1/16" to 0.4 mm	0.25 mm I.D.	10
TR-T031081	<b>teide</b> 1/16" to 0.5 mm	0.32 mm I.D.	10
TR-T031091	<b>teide</b> 1/16" to 0.8 mm	0.53 mm I.D.	10

Vespel/Graphite  
standard ferrules



Cat.No	Description	For Capillary Column	Pk
TR-T032001	<b>teide</b> 1/16" to 0.3 mm	0.10-0.20 mm I.D.	10
TR-T032000	<b>teide</b> 1/16" to 0.4 mm	0.25 mm I.D.	10
TR-T032010	<b>teide</b> 1/16" to 0.5 mm	0.32 mm I.D.	10
TR-T032020	<b>teide</b> 1/16" to 0.8 mm	0.53 mm I.D.	10

Vespel/Graphite standard ferrules (two holes)

Cat.No	Description	For Capillary Column	Pk
TR-T031150	<b>teide</b> 1/16" 2 holes, 0.4/0.4	0.25 mm I.D.	10
TR-T031152	<b>teide</b> 1/16" 2 holes, 0.5/0.5	0.32 mm I.D.	10

## Vespel Ferrules

### Features:

- The composition is 100% polyamide
- Ideal for applications with isotherm temperature
- They can be reused several times
- Upper temperature limit 350°C

### Advantages:

- Mechanically robust
- Reusable for several column changes

### Limitations:

- Must be frequently retightened
- Do not resist high temperatures
- Leaks in case of temperature programming

Vespel ferrules, (short ferrules) for Agilent 4890, 5890, 6890




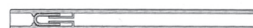






Cat.No	Description	For Capillary Column	Pk
TR-T031210	<b>teide</b> short 1/16" to 0.4 mm	0.25 mm I.D.	10
TR-T031212	<b>teide</b> short 1/16" to 0.5 mm	0.32 mm I.D.	10
TR-T031214	<b>teide</b> short 1/16" to 0.8 mm	0.53 mm I.D.	10

Vespel standard ferrules




Cat.No	Description	For Capillary Column	Pk
TR-T031216	<b>teide</b> 1/16" to 0.3 mm	0.10-0.18 mm I.D.	10
TR-T031218	<b>teide</b> 1/16" to 0.4 mm	0.25 mm I.D.	10
TR-T031220	<b>teide</b> 1/16" to 0.5 mm	0.32 mm I.D.	10
TR-T031222	<b>teide</b> 1/16" to 0.8 mm	0.53 mm I.D.	10
TR-T031224	<b>teide</b> 1/16" to 1.0 mm	0.65 mm I.D.	10
TR-T031226	<b>teide</b> 1/16" 2- holes 0.4/0.4 mm	0.25 mm I.D.	10
TR-T031228	<b>teide</b> 1/16" 2- holes 0.5/0.5 mm	0.32 mm I.D.	10



## Liners for Agilent Capillary GCs







	Cat.No	Description	Similar Item No.	OD (mm)	Lenght (mm)	Pk
	TR-L04010-5	2 mm Splitless	5181-8818	6.5	79	5
	TR-L04010-25	2 mm Splitless		6.5	79	25
	TR-L04014-5	4 mm Split/Splitless	210-3003	6.3	79	5
	TR-L04014-25	4 mm Split/Splitless		6.3	79	25
	TR-L04018-5	4 mm Split/Splitless, with Deactivated Glass Wool	19251-60540	6.3	79	5
	TR-L04018-25	4 mm Split/Splitless, with Deactivated Glass Wool		6.3	79	25
	TR-L04020-5	Split Liner 4 mm id with Cup	18740-80190	6.3	79	5
	TR-L04020-25	Split Liner 4 mm id with Cup		6.3	79	25
	TR-L04022-5	Split Cup Liner, 4 mm id with Deactivated Glass Wool	18740-80190	6.3	79	5
	TR-L04022-25	Split Cup Liner, 4 mm id with Deactivated Glass Wool		6.3	79	25
	TR-L04024-5	Split Cup Liner, 4 mm with OV-1/Chromosorb W-P 80/100	18740-60840	6.3	79	5
	TR-L04024-25	Split Cup Liner, 4 mm id with OV-1/Chromosorb W-P 80/100		6.3	79	25
	TR-L04026-5	Single Taper Liner, 2 mm id	5181-3316/2	6.5	79	5
	TR-L04026-25	Single Taper Liner, 2 mm id		6.5	79	25
	TR-L04028-5	Single Taper Liner, 4 mm id	5181-3316	6.5	79	5
	TR-L04028-25	Single Taper Liner, 4 mm id		6.5	79	25
	TR-L04030-5	Single Taper Liner, 4 mm id with Deactivated Glass Wool	5062-3587	6.5	79	5
	TR-L04030-25	Single Taper Liner, 4 mm id with Deactivated Glass Wool		6.5	79	25
	TR-L04032-5	Double Taper Liner, 4 mm id	5181-3315	6.5	79	5
	TR-L04032-25	Double Taper Liner, 4 mm id		6.5	79	25

## Liners for Perkin Elmer Capillary GCs





	TR-L04070-5	Split Liner for Autosystem, 4mm id	N610-1052	4	92	5
	TR-L04070-25	Split Liner for Autosystem, 4 mm id		4	92	25
	TR-L04072-5	Split Liner for Autosystem with Deactivated Glass Wool	N610-1052/mod	4	92	5
	TR-L04072-25	Split Liner for Autosystem with Deactivated Glass Wool, 4mm id		4	92	25
	TR-L04074-5	Split Liner for Autosystem, 2 mm id	N-612-1372	2	92	5
	TR-L04074-25	Split Liner for Autosystem, 2 mm id		2	92	25



## Liners for Varian Capillary GCs for Injector 1177

Cat.No	Description	Similar Item No.	OD (mm)	Lenght (mm)	Pk
	TR-L05030-5 2 mm Splitless	392611924	6.5	79	5
	TR-L05030-25 2 mm Splitless		6.5	79	25
	TR-L05034-5 4 mm Split/Splitless		6.3	79	5
	TR-L05034-25 4 mm Split/Splitless		6.3	79	25
	TR-L05038-5 4 mm Split/Splitless, with Deactivated Glass Wool	392611934	6.3	79	5
	TR-L05038-25 4 mm Split/Splitless, with Deactivated Glass Wool		6.3	79	25
	TR-L05046-5 Single Taper Liner, 2 mm id	392611926	6.5	79	5
	TR-L05046-25 Single Taper Liner, 2 mm id		6.5	79	25
	TR-L05048-5 Single Taper Liner, 4 mm id	392611927	6.5	79	5
	TR-L05048-25 Single Taper Liner, 4 mm id		6.5	79	25
	TR-L05050-5 Single Taper Liner, 4 mm id with Deactivated Glass Wool	392611936	6.5	79	5
	TR-L05050-25 Single Taper Liner, 4 mm id with Deactivated Glass Wool		6.5	79	25

## Liners for Varian Capillary GCs for Injector 1075/1077

Cat.No	Description	Similar Item No.	OD (mm)	Lenght (mm)	Pk
	TR-L05054-5 4 mm Open Split Liner	16-000830-00		72	5
	TR-L05054-25 4 mm Open Split Liner			72	25
	TR-L05056-5 4 mm Open Split Liner with Glass Wool	01-900109-01		72	5
	TR-L05056-25 4 mm Open Split Liner with Glass Wool			72	25
	TTR-L05058-5 Frit Split Liner	01-900109-3		72	5
	TR-L05058-25 Frit Split Liner	16-000830-01		72	25
	TR-L05060-5 Splitless, Borosilicate Glass	03-949437-90		74	5
	TR-L05060-25 Splitless, Borosilicate Glass	03-949437-00		74	25

## 525 GC Flowmeter For GC (Gas Chromatography)

### Flow Measurement

Accurate and repeatable gas flow measurements are a crucial part of obtaining good results from your Gas Chromatograph. The new 525 GC Flowmeter makes gas flow measurement easier and more accurate, helping to eliminate user errors.

A large OLED display makes reading flows clear and easy, whilst the built in rechargeable battery means the user no longer has to worry about changing dead batteries.

The 525 GC Flowmeter has a 25 point calibration traceable to UKAS standards, to ensure the level of accuracy required in a professional laboratory. Users are able to set the temperature and pressure of their working environment and the 525 GC Flowmeter will automatically compensate for these changes from its calibration conditions.

### Designed for Gas Chromatography

The 525 GC Flowmeter provides a standard, measurement of eight gases commonly used in gas chromatography. In addition to the standard flow measurements mode the 525 GC Flowmeter also features:

#### Linear Velocity

The user is able to select their column diameter in the options menu, the linear velocity can then be calculated and displayed.

#### Split Flow Calculation

Split flows mode allows the user to measure and store a column flow, the user can then measure the split flow and the 525 GC Flowmeter displays both the flow rate and the split ratio.



### Specifications of 525 GC Flowmeter

Range: 0.1 to 500 ml/min (0.1 to 275 ml/min for Carbon Dioxide)  
 Resolution: 0.1 ml/min  
 Accuracy:  $\pm 0.4$  ml/min or 2.5% of reading  
 Gases: Air, Argon, Argon/5% Methane, Carbon Dioxide, Helium, Hydrogen, Nitrogen, Oxygen  
 Size: 68 x 130 x 30 mm  
 Weight: 150 g  
 Calibration: Annually  
 Traceability: Calibration traceable to UKAS standards

Cat.No	Description
TK-525GC	Teknokroma 525 GC Flowmeter



# Teknokroma 2t Headspace Sampler



Manual Headspace Sampler  
The fruit of Experience

## Technical Specifications

Heating temperature Range:	up to 140°C.
Variable injection:	up to 2,5 ml.
Temperature accuracy:	+/- 0,75°C
Holds up to 6 vials of:	2, 4, 6, 9, 10, 12, 20, 22 and 27 ml.
Sampling time control with acoustic alarm:	1 to 99 seconds
Equilibrium time control with acoustic alarm:	1 to 99 minutes
Stabilization time from 25°C to 70°C with 1 ml syringe and 6 empty 20 ml vials:	20 minutes
Safety temperature:	175°C
Power:	110 / 220 +/- 10% VAC.

It is according the Pharmacopeia test:

European Pharmacopeia 7th. (2011).

USP 35-NFO (2012).

The Teknokroma 2t Headspace Sampler for Headspace technique within your reach with a low cost and high precision level

The 2t sampler is the first manual system for Static Headspace that allows the application of this technique in a quantitative, manner.

Until now it was only possible to use the technique of Static Headspace with automatic equipment. This "equipment" has a high cost, low versatility and complex operations. For this reason the Static Headspace technique has not been fully used in most laboratories.

The 2t sampler solves these problems making the technique available to all Gas Chromatography users in a economical and simple way.

It complies with all requeriments of the European CE.

## Applications

- Volatiles in pharmaceuticals
- Flavours analysis in food and cosmetic products
- Alcohol and other toxic compounds in blood
- Screening of volatiles in all type of environmental samples (soils, waters, plastics, polymers, etc.)

# Teknokroma 2t Headpace Sampler



Put the syringe into the black holder.



After the equilibrium time is achieved, move the syringe holder into vial number 1, and aspirate the sample by moving the plunger up until the prefixed volume is reached.



Insert the closed vials with the sample into the heating block.



Inject the sample into the GC.  
Repeat this sequence for the additional samples.



- Insert the syringe holder into the heating block.
- Set the temperature and the equilibrium time with the keyboard.
- Press the start.



# Teknokroma 2t Headspace Sampler

## Performance qualification

To check the Headspace SHS system 0112 proper performance, the following reproductibility test is recommended. In this test, we check not only the equipment performance but we also evaluate:

- The vials are correctly sealed.
- The sampling procedure followed by the analyst is correct
- The Gas Chromatograph works properly
- The data-acquisition system works properly

## Sample preparation

Add 2.5 µl of benzene and 2.5 µl of toluene to 100 ml of water (25ppm), stir up until it is completely dissolved.

Adjust head space sample conditions and inject.

Integrate the benzene and toluene peaks of the 6 chromatograms obtained.

The Relative Standard Deviation of the area quotients must be lower than 5%.

Benzene area	Toulene area	Area Ratio
3418.461	5441.008	0.628
3466.125	5449.905	0.625
3359.176	5381.354	0.624
3316.646	5374.388	0.624
3782.404	6035.683	0.627
3794.026	6063.646	0.626
Mean Value		0.626
Standard deviation (SD)		0.00163
Relative standard deviation (RSD)		0.26%

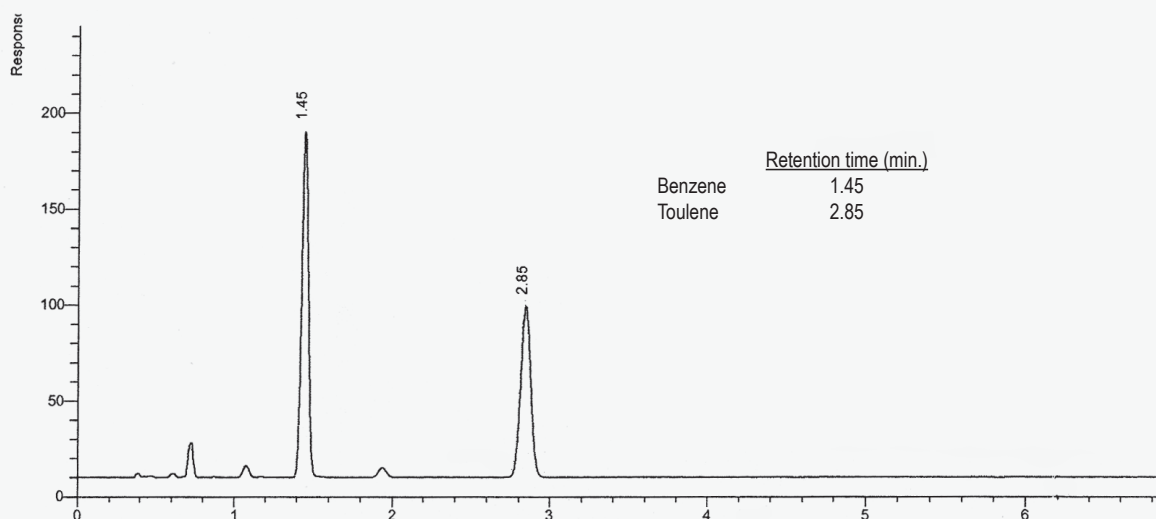
Cat.No	Description
<b>TR-132300</b>	2t Sampler for Static Headspace mod. SHS 0112 (syringe not included)
<b>TR-132113</b>	APE Syringe nod. 1001 HS 1 ml.
<b>TR-132112</b>	APE Syringe nod. 1002 HS 2.5 ml.

### Chromatographic Parameters

Column: TRB-1, P/N TR-113015 15m x 0,53mm x 3µm  
 Injection: 0,7 ml, headspace, split 1:2, 150°C  
 5 ml in 10 ml vials (25 ppm benzene/toulene in water)  
 Carrier gas: He, 4psi (27.6 kPa)  
 Oven: 60°C (10 min)  
 Detector: FID, 250°C

### Headspace conditions

10ml vials, P/N CC-10-CV  
 Cap with blue silicone/PTFE seal P/N CC-20-ST3  
 Heating block temperature: 75°C  
 Equilibrium time: 30 minutes  
 Sampling time: 30 seconds  
 Syringe used: 1ml (1001 LTN, pst 5, P/N HA-81343)  
 Sampled volume: 0,7ml





## Headspace Vials



Cat.No	Description	Pk
TR-400085	10 ml Clear Glass, Beveled Edge, Flat bottom, Crimp HS Vial	100
TR-400086	10 ml Clear Glass, Beveled Edge, Rounded-Flat bottom, Crimp HS Vial	100
TR-400037	20 ml Clear Glass, Beveled Edge, Flat bottom, Crimp HS Vial	100
TR-400087	20 ml Clear Glass, Beveled Edge, Rounded-Flat bottom, Crimp HS Vial	100
TR-400088	20 ml Amber Glass, Beveled Edge, Rounded-Flat bottom Crimp HS Vial short neck (PE)	100

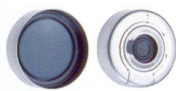


Cat.No	Description	Pk
TR-400030	20 mm Open Top Aluminium Crimp Cap (10 mm Hole) PTFE/Natural Silicone Septa	100
TR-400038	20 mm Open Top Magnetic Crimp Cap (8 mm Hole) Red & Silver PTFE/Silicone Septa	100
TR-400059	20 mm Open Top Magnetic Crimp Cap (8 mm Hole) Blue & Silver PTFE/Silicone Septa	100

## 20 mm Crimp Seals with Prefitted Septa for Headspace Vials



CC-C4020-34A



CC-C4020-36AP



CC-C4020-32AP



CC-C4020-37AP



CC-C4020-31



CC-C4020-42-A

Cat.No	Seal Type	Septa	Pk
CC-C4020-34A	Regular	Ivory PTFE/Red Rubber, (-40 to +100°C)	100
CC-C4020-34AP	Pressure Release	Ivory PTFE/Red Rubber, (-40 to +100°C)	100
CC-C4020-39A	Regular	Clear PTFE/Gray Butyl (-40 to +120°C)	100
CC-C4020-43A	Magnetic Steel	Clear PTFE/Gray Butyl (-40 to +120°C)	100
CC-C4020-43AP	Pressure Release	Clear PTFE/Gray Butyl (-40 to +120°C)	100
CC-C4020-36A	Regular	Gray PTFE/Black Molded Butyl (-40 to +125°C)	100
CC-C4020-36AP	Pressure Release	Gray PTFE/Black Molded Butyl (-40 to +125°C)	100
CC-C4020-32A	Regular	Tan PTFE/White Silicone (-60 to +200°C)	100
CC-C4020-32AP	Pressure Release	Tan PTFE/White Silicone (-60 to +200°C)	100
CC-C4020-42A	Magnetic Steel	Clear PTFE/Translucent Blue Silicone (-60 to +200°C)	100
CC-C4020-42AP	Pressure Release	Clear PTFE/Translucent Blue Silicone (-60 to +200°C)	100
CC-C4020-37AP	Pressure Release	Aluminium Foil/White High Temp. Silicone (-60 to +220°C)	100
CC-C4020-31	Molded Polypropylene Storage Cap	SepCap Integral Molded Polypropylene	250
CC-C4020-42A	Magnetic Steel	Clear PTFE/Translucent Blue Silicone (-60 to +200°C)	100

## Crimpers, Dicrimpers, and Decapping Pliers for 20 mm Top Vials

Cat.No	Description	Use	Pk
CC-C4020-100	Manual Crimper	Attaches 20 mm aluminium crimp seals	1
CC-C4020-101	Decapping Pliers	Removes 20 mm aluminium crimp seals	1
CC-C4020-102	Manual Decrimper	Removes 20 mm aluminium seals without vial damage	1

CC-C4020-102



CC-C4020-100

CC-C4020-101



# Super-Clean Gas Filters



## A revolution in gas purifying of GC and GC/MS gases

Unique «POINT-OF-USE» and «SEMI IN-LINE» glass/metal, diffusionproof Super-Clean Gas Filters, purify the delicate carrier and burner gases for your GC and GC/MS system for Hydrocarbons, Oxygen (colour indicated) and Moisture (colour indicated) to better-as 6.0 gas (99,9999%) quality, independent of the original gas quality.

## Analytical advantages of SGT Super-Clean Gas Filters

- Longer lifetime of analytical columns, avoids bleeding, espec. important for MS and ECD.
- Better sensitivity, decreases baseline noise, eliminates spikes.
- Filter-change during analysis within seconds, system stays online.

### Purifier Cartridge Capacity

Type of Purifier	Outlet Gas Quality	Usable for	Indicator Color Change	Capacity		CO <sub>2</sub>
				H <sub>2</sub> O(gr)	O <sub>2</sub> Hydrocarbons	
<b>Moisture</b>	> 6.0	Inert carrier gas, air hydrogen	Brown to white	7.2		
<b>Oxygen</b>	> 6.0	Inert carrier gas	Green to grey		150 mL	
<b>Hydrocarbon</b>	> 6.0	Inert carrier gas, air hydrogen	No indicator			12 g (as n-butane)
<b>Carbon Dioxide</b>	> 6.0		No indicator			12g
<b>Combi</b> (moisture/hydrocarbon)	> 6.0	Inert carrier gas, air hydrogen	Brown to white	3.5		6 g (as n-butane)
<b>Triple</b> (moisture/oxygen/hydrocarbon)	> 6.0		Brown to white Green to grey	1.8	75 mL	4 g (as n-butane)



## Spec 's on GST Super-Clean Gas Filters

- The specified lifetimes are strongly depending of the quality of the incoming gas.
- Effectivity: <0.1 ppm at a flowrate of 2 liters/minute



One position platform



Quick-Fit System

## Benefits of the "quick-fit" system:

- Filter replacement within seconds.
  - **Eliminates GC downtime.**
- Tool-less filter replacement.
  - **Easy handling**
- Diffusion-proof Baseplate (also during filter replacement).
  - **Eliminates analytical disturbance.**
- Baseplates can be wall-mounted.
  - **Convenient positioning**

## Different Standard Configurations

### GC/MS Carrier Gas Purification System

- Removal of Oxygen, moisture and hydrocarbons for longer column lifetime and cleaner baseline.
- This configuration is excellent for Carrier Gas and ECD, MS applications.

*In this configuration, you need to use: 1-position baseplate + 1 Triple Filter*

**SG-SGT-F0301** Triple Filter (O<sub>2</sub>/Moisture/Hydrocarbons)  
**SG-SGT-B0010-B8** 1-position baseplate - 1/8" Brass

### GC/MS Carrier Gas Helium Specific Purification System

System for Purifying Helium in GC/MS systems

*In this configuration, you need to use: 1-position baseplate + 1 Triple filter gas specific Helium*

**SG-SGT-F0302** Triple Filter; conditioned with Helium (O<sub>2</sub>/Moisture/Hydrocarbons)  
**SG-SGT-B0010-B8** 1-position baseplate - 1/8" Brass

### Carbon Dioxide Filter

*Removes carbon dioxide and sulfur from gas streams. To be used in combination with a Moisture Filter*

*In this configuration, you need to use: 2 units of 1-position baseplate + 1 Carbon dioxide filter*

**1 x SG-SGT-B0010-B8** 1-position baseplate 1/8 " Brass  
**1 x SG-SGT-F0105** Carbon dioxide Filter

### Carrier Gas Purification and FID Gases

The full solution for your GC/FID system  
 Purifying all gases used in a FID operated GC

*In this configuration, you need to use: 3 units of 1-position baseplate + 1 triple filter (O<sub>2</sub>/Moisture/Hydrocarbons) for purifying carrier gas + 2 Combi Filter (Hydrocarbons/Moisture) for purifying gases used in a FID.*

**3 x SG-SGT-B0010-B8** 1-position baseplate 1/8 " Brass  
**1 x SG-SGT-F0301** Triple Filter (O<sub>2</sub>/Moisture/Hydrocarbons)  
**2 x SG-SGT-F0201** Combi Filter (Moisture/Hydrocarbons)

### High Capacity Purifiers for Carrier and FID Gases

Recommended for low quality gases  
 Purifying all gases used in a FID operated GC  
 Use Ultra Capacity Moisture and Oxygen filters for Carrier and 2 Ultra Capacity Hydrocarbon Filter one for Air & one for Hydrogen.

*In this configuration, you need to use: 4 units of 1-position baseplate + 1 Moisture Filter, Standard, Ultra Capacity + 1 Oxygen Filter, Standard, Ultra Capacity + 2 Hydrocarbons Filter, Standard, Ultra Capacity.*

**4 x SG-SGT-B0010-B8** 1-position baseplate 1/8 " Brass  
**1 x SG-SGT-F0101** Moisture Filter, Standard, Ultra Capacity  
**1 x SG-SGT-F0102** Oxygen Filter, Standard, Ultra Capacity  
**2 x SG-SGT-F0103** Hydrocarbons Filter, Standard, Ultra Capacity, pk/1.

### LC-MS Gas Purification System High Flow

Unique 2-Position Super Clean System for purifying the nitrogen gas and zero air utilized in LC/MS instruments.

*In this configuration, you need to use: 1 unit of 2-position baseplate + 1 Set of Hydrocarbons purifiers for nitrogen gas + particle filter*

**1 x SG-SGT-B0021-B4** 2-position baseplate, 1/4" Brass for 2 High Flow Gas Filters  
**1 x SG-SGT-F0720** Hydrocarbons Filter, Standard, Ultra capacity, pk/2  
**1 x SG-SGT-B0060** 0.5 micron Particle Filter 1/4", pk/1





# Click-On Inline Super-Clean™ Purifiers®

## Original Inline Super -Clean™ Purifier



- High-purity output ensures 99.9999% pure gas
- Click-On fittings for easy, leak-tight cartridge changes; brass or stainless steel, 1/4" or 1/8"
- Helium-Specific Triple Purifier is ideal for GC/MS

The SGT Click-On Inline Super-Clean™ purifiers are the latest in in-line gas filtration. Click-On adaptor connectors allow purifiers to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new

filter has been locked in place. There is no need for loosening and tightening fittings every time a purifier is changed, and your system will not become contaminated during the process.

The Triple Click-On Purifier is ideal for purifying carrier gas-it contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

The Fuel Gas Click-On Purifier is ideal for purifying flame ionization detector (FIC) fuel gases, removing both moisture and hydrocarbons.

The Helium-Specific Triple Click-On Purifier is ideal for purifying helium in GC/MS systems. This Click-On purifier under helium contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge, and is packed and purged.

Click-On purifier replacement depends on the quality of the incoming gas. Use the double connector and install an indicating cartridge after a purifier to indicate when the purifier should be replaced.

## Inline Super-Clean™ Specifications

Type	Output Quality	Max Pressure	Max Flow	Used For	Capacity	Estimated Lifetime (years)
Moisture	>6.0 (99.9999%)	160 psi (11 bar)	25 L/min	Inert Carrier, Helium, Air, H2	21 g H2O	>3
Oxygen	>6.0 (99.9999%)	160 psi (11 bar)	25 L/min	Inert Carrier	450 mL	>3
Hydrocarbon	>6.0 (99.9999%)	160 psi (11 bar)	25 L/min	Inert Carrier, Helium, Air, H2	36 g HCs <sup>3</sup>	>3
Fuel Gas <sup>1</sup>	>6.0 (99.9999%)	160 psi (11 bar)	25 L/min	Inert Carrier, Helium, Air, H2	10 g H2O; 18 g HCs <sup>3</sup>	>2
Triple <sup>2</sup>	>6.0 (99.9999%)	160 psi (11 bar)	25 L/min	Inert Carrier	6 g H2O; 12 g HCs <sup>3</sup> 150ml O <sub>2</sub>	>2

<sup>1</sup> Removes hydrocarbons, moisture

<sup>2</sup> Removes hydrocarbons, moisture, oxygen

<sup>3</sup> As n-butane.

Note: Super-Clean™ Gas Filters are recommended for purifying non-corrosive gases with low concentration of contaminants. The maximum concentration of O<sub>2</sub> in the incoming gas stream for oxygen purifiers is 0.5%.

### Click-On Inline Purifier Steel



Cat.No	Description	pK
SG-SGT-CO1005	Click-On Inline Triple Trap (Oxygen/Moisture/Hydrocarbons) Cartridge - Stainless Steel	1 unit
SG-SGT-CO1061	Click-On Inline Indicating Triple He Trap (Oxygen/Moisture/Hydrocarbons) Cartridge-Glass	1 unit
SG-SGT-CO1001	Click-On Inline Moisture Cartridge - Stainless Steel	1 unit
SG-SGT-CO1002	Click-On Inline Oxygen Cartridge - Stainless Steel	1 unit
SG-SGT-CO1003	Click-On Inline Hydrocarbon Cartridge - Stainless Steel	1 unit
SG-SGT-CO1004	Click-On Inline Combi (Oxygen/Moisture) Cartridge - Stainless Steel	1 unit
SG-SGT-CO1007	Click-On Inline Combi (Hydrocarbons/Moisture) Cartridge - Stainless Steel	1 unit

### Click-On Connectors



Cat.No	Description	pK
SGT-CO2001	Click-On Connectors 1/4" Brass	2 units
SGT-CO2002	Click-On Connectors 1/8" Brass	2 units
SGT-CO2010	Click-On Connectors 1/4" SS	2 units
SGT-CO2011	Click-On Connectors 1/8" SS	2 units
SGT-CO2020	Click-On Double Connectors to connect SS Trap with indicating trap	1 unit



## Click-On Inline Purifier Glass



Cat.No	Description	pK
SG-SGT-CO1041	Click-On Inline Combi Trap (Oxygen/Moisture) Cartridge with indicator - Glass	1 unit
SG-SGT-CO1051	Click-On Inline Triple Trap (Oxygen/Moisture/Hydrocarbons) Cartridge with indicator - Glass	1 unit
SG-SGT-CO1011	Click-On Inline Moisture Cartridge with indicator - Glass	1 unit
SG-SGT-CO1021	Click-On Inline Oxygen Cartridge with indicator - Glass	1 unit
SG-SGT-CO1031	Click-On Inline Hydrocarbon Cartridge with indicator - Glass	1 unit

## SGT Super Big Traps with electronic indicator



- Ideal for Central Purifying Solutions
- Largest Big Trap Available
- High-purity output ensures 99.9999% Pure gas
- Click-On fittings for easy, leaktight cartridge changes
- High Pressure Stainless Steel

## Specifications

Material	Stainless Steel
Length	22 inch
Diameter	2,5 inch
Max. Inlet Pressure	1000 psi
Max. Flow (GC/MS)	8 L/min
Max. Flow (LC/MS)	25 L/min
Pressure Drop *	0,30 psi

Click-On Inline Super-Clean™ Big Traps are inline traps designed with Click-On adaptor connectors which allows inline cartridges to be exchanged without introducing oxygen. Spring loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no need for loosening and tightening fittings every time a trap is changed and your system will not become contaminated during the process



## Virtual Indicator Compatible

Compatible with the Virtual Indicator platform, allows you to monitor the status with the CLIK device.

## Capacity Data

Contaminant		Capacity					
Contaminant	Gas Purify	Triple (Oxy/Moist/Hydr)	Moisture	Oxygen	Hydrocarbons	Combi (Hidr/Moist)	Combi (Oxy/Moist)
Oxygen	< 5 ppm	2.0 L	-	4.5 L	-	-	2,25 L
Hydrocarbon	< 5 ppm	120 g	-	-	360 g	180 g	-
Moisture	< 5 ppm	70 g	210 g	-	-	105 g	105 g

## Replacement cartridges for Big Traps

Cat.No	Description	Gas Type
<b>SG-COBT1008</b>		
Triple H2 (Oxy/Moist/Hydr) Big Trap	Hydrogen	
SG-SGT-COBT1006 *1	Triple He (Oxy/Moist/Hydr) Big Trap	Helium
SG-SGT-COBT1005	Triple (Oxy/Moist/Hydr) Big Trap	Nitrogen
SG-SGT-COBT1001	Moisture Big Trap	(He/Ar/Me)
SG-SGT-COBT1002	Oxygen Big Trap	(He/Ar/Me)
SG-SGT-COBT1003 *2	LC/MS Hydrocarbon Big Trap	(He/Ar/Me)
SG-SGT-COBT1007	Combi (Hidr/Moist) Big Trap	(He/Ar/Me)
SG-SGT-COBT1004	Combi (Oxy/Moist) Big Trap	(He/Ar/Me)

\*1 : recommended for GC/MS \*2 : recommended for LC/MS

## Installation Kits (includes re-usable fittings)

Catalog No	Catalog No. Extension	(Re-usable) Fitting
	<b>-S8</b>	1/8" Stainless Steel
Choose any catalog no from the table on the left	<b>-S4</b>	1/4" Stainless Steel
	<b>-B8</b>	1/8" Brass
	<b>-B4</b>	1/4" Brass

For Example: to order a Triple He Big Trap Installation Kit with 1/8" Stainless Steel Click-On Connectors, the part number would be: SGT-COBT1006-S8



The *Fresh Breeze* of Chromatography

Camí de Can Calders, 14  
08173 Sant Cugat del Vallés  
(Barcelona) España  
Tel: 34 936 748 800

[comercial@teknokroma.es](mailto:comercial@teknokroma.es)  
[www.teknokroma.es](http://www.teknokroma.es)

C20002