

Teknokroma has been at the forefront of chromatographic developments in Spain. From its beginnings at 1979, 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 manufacturers, 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

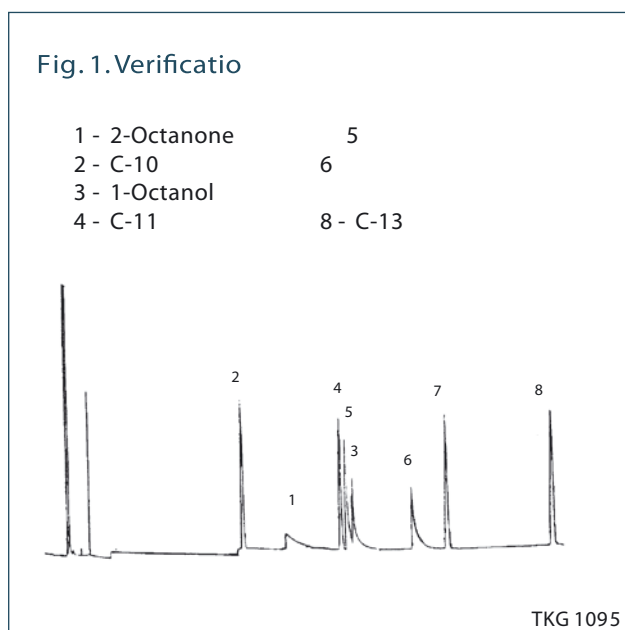
Stage 3: Wetting, bonding and crosslinking

Stage 4: Quality control

Stage 1: Hydrothermal Treatment

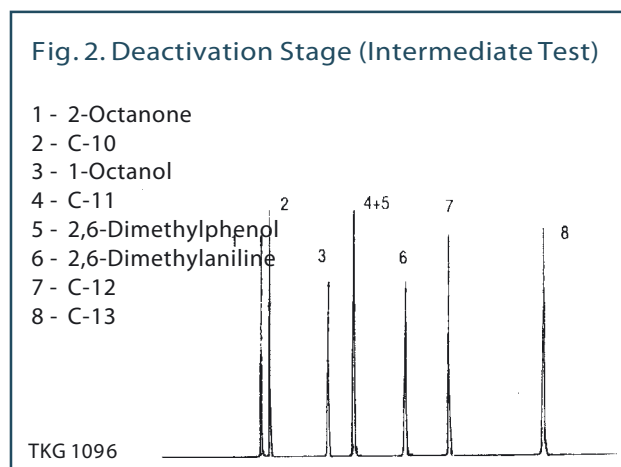
Teknokroma starts its manufacturing process with the selection of the best possible fused silica tubing. This tube presents an extremely reduced tolerance of internal diameters and has a polyimide outer coating capable of withstanding the highest temperatures without loss of its flexible mechanical characteristics. 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 (~2000°C).



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.



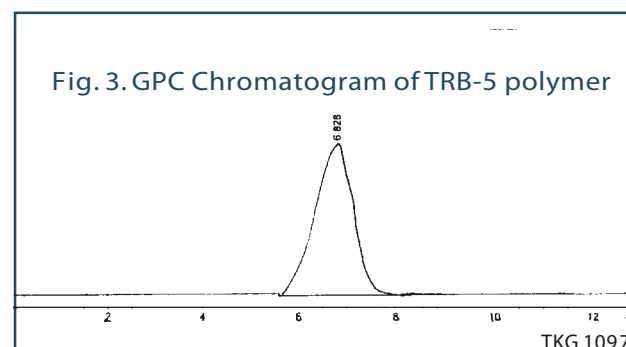
Stage 3: Wetting, bonding and crosslinking

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.

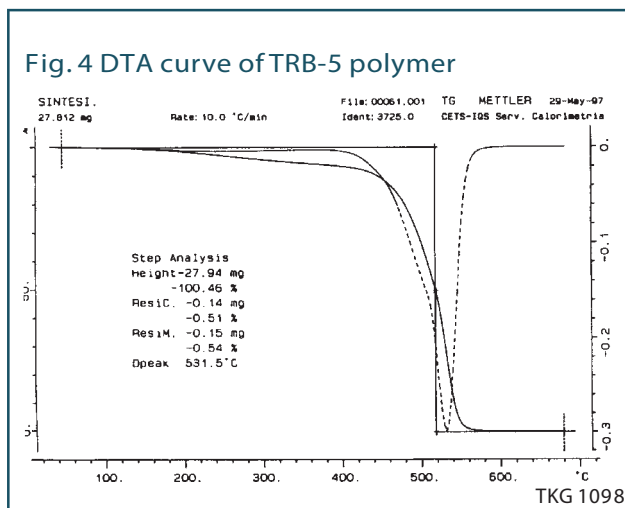
The polymers used are carefully fractionated to eliminate the low molecular weight components and trace catalyst. This results in a higher thermal stability and lower bleeding. Then, these polymers are tested by means of spectroscopic (FTIR, UV, NMR), chromatographic (GPC) techniques and by differential 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.



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.

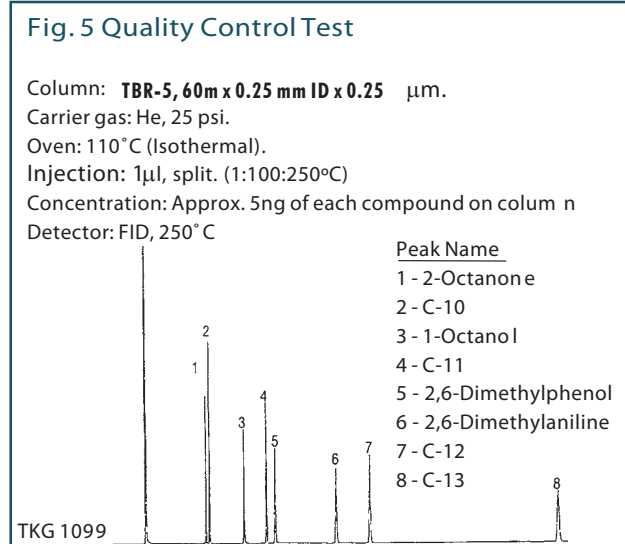


Stage 4. Quality Control SELECT PROVEN QUALITY

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.



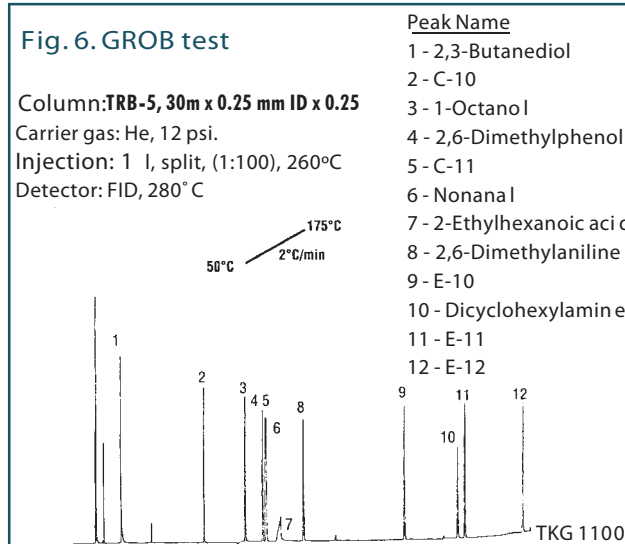
Stationary Phase

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 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.

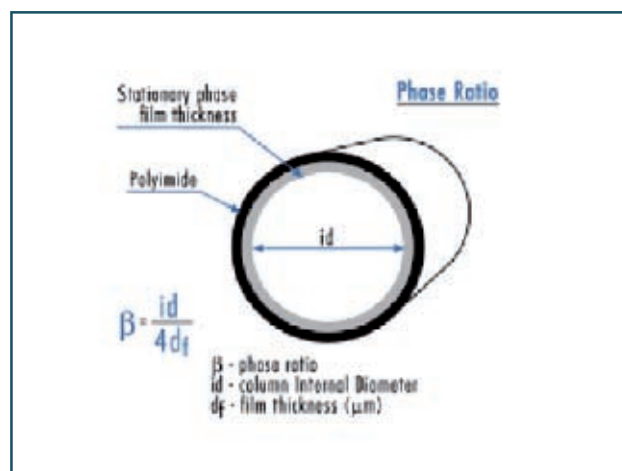
A film thickness of 0.25-0.32 μm is the standard thickness allowing for a compromise between loading capacity and resolution; and for the injection of samples with a wide volatility range.

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 μm) 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 μm 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 β 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 β factor allows for the easy exchange of columns since, for a given analysis with the same stationary phase, similar β 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 β

β 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

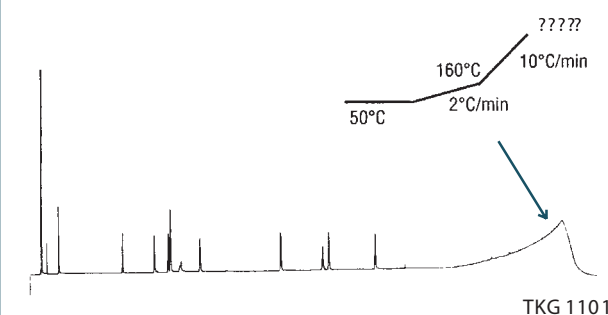
The bleed level of stationary phase from a capillary column is the parameter which will determine the level of sensitivity in a given assay. It is directly related to the amount of stationary phase in the column and thus with the film thickness. It also increases exponentially with temperature (fig.7).

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.

Fig. 7. Bleed level (GROB test)

Column: **TRB-5, 15m x 0.25mm ID x 0.2 μm** .
Carrier gas: He, 6 psi.
Injection: 1 μl , split. (1:100), 280°C
Detector: FID, 350°C

Bleed level (FID) <4pA (325°C)



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.

Maximum Reproducibility

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

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).

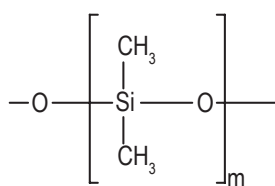
STATIONARY PHASE CROSS REFERENCE (TABLE 1)

TEKNOKROMA	PHASE COMPOSITION	AGILENT	SUPELCO	RESTEK	VARIAN	SGE	ALLTECH	QUADREX	USP NOMENCUTURE
TRB-1,TRB-1ht,TRB-1MS,TRBSULFUR, TRB-PETROL,TRB-PETROL150, TRB-50.2PONA,TRB-2887,SE-30	100% dimethylpolysiloxane	HP-1,HP101,ULTRA-1 DB-1,DB-1ht,DB-2887	SPB-1, EQUITY-1 SPB-1 SULFUR	Rtx-1, Rtx-2887	CP-SIL5CB CP-SIL5CBMS	BP-1	AT-1	007-1	G1,G2,G38
TRB-5,TRB-5ht,TRB-5 MS, TRB-STEROL, TRB-SAMINE, TRB-5.625,TRB-627,SE-54	95%dimethyl-5%diphenyl polysiloxane	HP-5,ULTRA-2,DB-5 DB-5.625,DB-5ht, PAS-5	SPB-5.EQUITY-5 PTE-5.SAC-5, PTE-5QTM	Rtx-5,XTI-5, Rtx-5 MS	CP-SIL8CB	BP-5	AT-5	007-2	G27, G36
Meta.X5	95%dimethyl-5%diphenyl polysilphenylene	HP-5TA.DB-5MS	MDN-5	Rtx-5Sil MS	CP-SIL8CB LowBleed/MS	BPX-5	AT-5ms	007-5 MS	
TRB-1301,TRB-624,TRB-643	6% cyanopropylphenyl-94% dimethylpolysiloxane	HP-1301, HP-624 DB-1301, DB-624	SPB-1301 OVI- G43	Rtx-1301, Rtx-624		BPX-624	AT-624		G43
TRB-14	14%diphenyl-86%dimethyl polysiloxane				CP-SIL13CB				
TRB-20	20%diphenyl-80%dimethyl polysiloxane		SPB-20.VOCOL				AT-20	007-7	G28.G32
TRB-35	35%diphenyl-65%dimethyl polysiloxane	HP-35.DB-35	SPB-35	Rtx-35		BPX-35, BPX-608	AT-35	007-11	G42
TRB-1701	14% cyanopropylphenyl-86% dimethyl polysiloxane	HP-1701.PAS-1701 DB-1701	SPB-1701	Rtx-1701	CP-SIL19CB	BP-10	AT-1701	007-1701	
TRB-225	50% cyanopropylphenyl-50% dimethyl polysiloxane	HP-225.DB-225		Rtx-225	CP-SIL43CB	BP-225	AT-225	007-225	G7.G19
TRB-PAG	50% polyethylene-50% polypropylene glycol		PAG						
TRB-FFAP	treated polyethylene glycol for acidic compounds	HP-FFAP.DB-FFAP	NUKOL.SP-1000	STABILWAX-DB	CP-WAX58CB	BP-21	AT-1000, FFAP	007-FFAP	G25.G35
TRB-50	50% diphenyl-50%dimethyl polysiloxane	HP-50+.DB-17, DB-608	SPB-50. SPB-2250	Rtx-50	CP-SIL24CB		AT-50	007-17	G3
TRB-50ht	50% diphenyl-50%dimethyl polysiloxane	DB17ht		Rtx-65	TAB-C8			007-65HT	G17
TRB-F50	50% trifluoropropyl 50% methyl polysiloxane	DB-210.DB-200		Rtx-200			AT-210	007-210	G6
TRB-WAX	100% polyethylene glycol	HP-20M.INNOWAX DB-WAX, DB-WAXetr	SUPELCOWAX 10 Carbowax 20M	STABILWAX	CP-WAX52CB	BP-20	AT-WAX	007-CW	G14,G15,G16, G20.G39
TRB-WAX-DB	treated polyethylene glycol for basic compounds	CAM,HP-BasicWax	Carbowax-Amine		CP-WAX51CB				
Meta.Wax	100%polyethylene glycol	HP-WAX, DB-WAX			CP-WAX57CB				
TRB-WAX-Omega	100%polyethylene glycol		OMEGAWAX	FAMEWAX					
TR-CN100	100%biscyanopropyl polysiloxane		SP-2340	Rt-2340	CP-SIL88				
TR-CRESOL	proprietary nonbonded phase				CP-CRESOL				
TRB-17	50%diphenyl-50%dimethyl polysiloxane	HP-17							G3
Meta.VOC	proprietary bonded phase	DB-502.2,HP-VOC	VOCOL	Rtx-502.2					
TRB-608	proprietary bonded phase	HP-608	SPB-608			BP-608			
TR-TCEP	1,2,3-tris(cyanoethoxy)propane		TCEP	Rt-TCEP	CP-TCEP				

TRB-1

100% Dimethyl polysiloxane, bonded and crosslinked phase

- 100% Dimethylpolysiloxane.
- 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

Column: **TRB-1, P/N TR-111226**

Dimensions: 25m x 0.15mm x 1. 2 μm.

Injection: 1μL Test SP-4-7300, split 1:100, 280° C

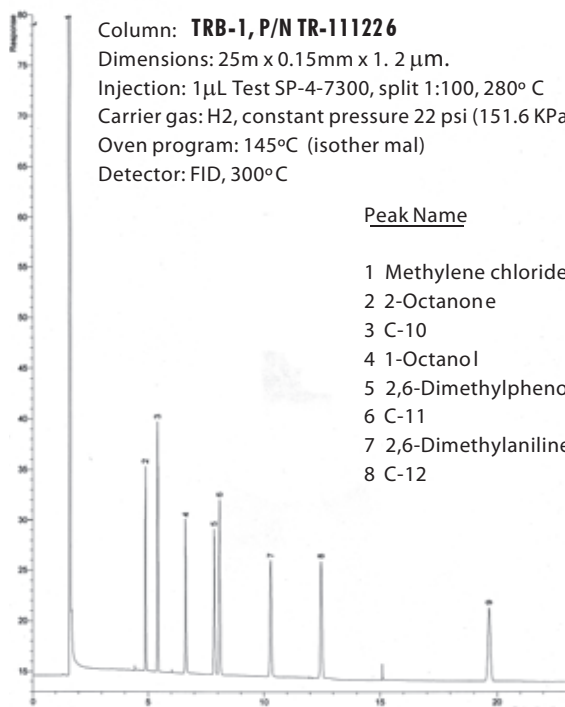
Carrier gas: H2, constant pressure 22 psi (151.6 KPa)

Oven program: 145°C (isother mal)

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



TKG 1102

TRB-1 EQUIVALENT PHASE

Agilent: HP-1, HP101, ULTRA-1, DB-1

Supelco: SPB-1, EQUITY-1

Restek: Rtx-1, Rtx-2887

Varian: CP-SIL 5 CB

SGE: BP-1.

Alltech: AT-1

Macherey-Nagel: OPTIMA-1

TRB-1

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-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
0,20	12	0,33	-60 to 325/350	TR-113889
	15	0,15	-60 to 325/350	TR-111319
	15	0,35	-60 to 325/350	TR-110319
	15	0,50	-60 to 325/350	TR-110519
	25	0,15	-60 to 325/350	TR-111329
	25	0,33	-60 to 325/350	TR-113329
	25	0,35	-60 to 325/350	TR-110329
	25	0,50	-60 to 325/350	TR-110529
	30	0,15	-60 to 325/350	TR-111339
	30	0,35	-60 to 325/350	TR-110339
	30	0,50	-60 to 325/350	TR-110539
	50	0,15	-60 to 325/350	TR-111359
	50	0,33	-60 to 325/350	TR-113359
	50	0,35	-60 to 325/350	TR-110359
	50	0,50	-60 to 325/350	TR-110559
	60	0,15	-60 to 325/350	TR-111369
60	0,50	-60 to 325/350	TR-110569	
0,25	15	0,10	-60 to 325/350	TR-110112
	15	0,25	-60 to 325/350	TR-110212
	15	0,50	-60 to 325/350	TR-110512
	15	1,00	-60 to 325/340	TR-111012
	25	0,10	-60 to 325/350	TR-110122
	25	0,25	-60 to 325/350	TR-110222
	25	0,50	-60 to 325/350	TR-110522
	25	1,00	-60 to 320/340	TR-111022
	30	0,10	-60 to 325/350	TR-110132
	30	0,25	-60 to 325/350	TR-110232
	30	0,50	-60 to 325/350	TR-110532
	30	1,00	-60 to 320/340	TR-111032
	50	0,10	-60 to 325/350	TR-110152
	50	0,25	-60 to 325/350	TR-110252
	50	0,50	-60 to 325/350	TR-110552
	50	1,00	-60 to 320/340	TR-111052
60	0,10	-60 to 325/350	TR-110162	
60	0,25	-60 to 325/350	TR-110262	
60	0,50	-60 to 325/350	TR-110562	
60	1,00	-60 to 325/350	TR-111062	
100	1,00	-60 to 325/350	TR-111092	
105	1,00	-60 to 325/350	TR-1110K2	
0,32	15	0,10	-60 to 325/350	TR-110113
	15	0,25	-60 to 325/350	TR-110213
	15	0,50	-60 to 325/350	TR-110513
	15	1,00	-60 to 325/350	TR-111013
	15	3,00	-60 to 280/300	TR-113013
	25	0,10	-60 to 325/350	TR-110123
	25	0,25	-60 to 325/350	TR-110223
	25	0,50	-60 to 325/350	TR-110523

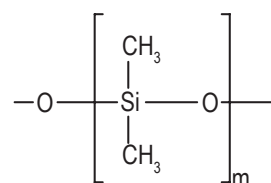
TRB-1

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
	25	1,00	-60 to 325/350	TR-111023
	25	3,00	-60 to 280/300	TR-113023
	30	0,10	-60 to 325/350	TR-110133
	30	0,25	-60 to 325/350	TR-110233
	30	0,50	-60 to 325/350	TR-110533
	30	1,00	-60 to 325/350	TR-111033
	30	3,00	-60 to 280/300	TR-113033
	50	0,10	-60 to 325/350	TR-110153
	50	0,25	-60 to 325/350	TR-110253
	50	0,50	-60 to 325/350	TR-110553
	50	1,00	-60 to 325/350	TR-111053
	50	3,00	-60 to 280/300	TR-113053
	60	0,10	-60 to 325/350	TR-110163
	60	0,25	-60 to 325/350	TR-110263
	60	0,50	-60 to 325/350	TR-110563
	60	1,00	-60 to 325/350	TR-111063
	60	3,00	-60 to 280/300	TR-113063
	60	5,00	-60 to 260/280	TR-115063
0,53	10	2,65	-60 to 300/310	TR-112645
	15	0,10	-60 to 320/340	TR-110115
	15	0,50	-60 to 320/340	TR-110515
	15	1,50	-60 to 310/330	TR-111515
	15	3,00	-60 to 270/290	TR-113015
	15	5,00	-60 to 270/290	TR-115015
	15	7,00	-60 to 260/280	TR-117015
	25	0,10	-60 to 320/340	TR-110125
	25	0,50	-60 to 320/340	TR-110525
	25	1,50	-60 to 310/330	TR-111525
	25	3,00	-60 to 270/290	TR-113025
	25	5,00	-60 to 270/290	TR-115025
	30	0,10	-60 to 320/340	TR-110135
	30	0,50	-60 to 320/340	TR-110535
	30	0,88	-60 to 310/330	TR-110835
	30	1,50	-60 to 310/330	TR-111535
	30	2,65	-60 to 270/290	TR-112635
	30	3,00	-60 to 270/290	TR-113035
	30	5,00	-60 to 270/290	TR-115035
	30	7,00	-60 to 260/280	TR-117035
	50	0,10	-60 to 320/340	TR-110155
	50	0,50	-60 to 320/340	TR-110555
	50	1,50	-60 to 310/330	TR-111555
	50	3,00	-60 to 270/290	TR-113055
	50	5,00	-60 to 270/290	TR-115055
	60	0,10	-60 to 320/340	TR-110165
	60	0,50	-60 to 320/340	TR-110565
	60	1,50	-60 to 310/330	TR-111565
	60	3,00	-60 to 270/290	TR-113065
	60	5,00	-60 to 270/290	TR-115065
	60	7,00	-60 to 240/260	TR-117065
	100	3,00	-60 to 270/290	TR-113095
	105	3,00	-60 to 270/290	TR-1130K5

TRB-1HT

100% Dimethyl polysiloxane, bonded and crosslinked phase.

- 100% Dimethylpolysiloxane
- Non-polar phase
- Produced specially for high temperature analyses (Max.temp. 400°C).
- Fused silica tubing with polyimide coating for high temperatures.
- Uses: analysis of compounds with high boiling point, triglycerides, waxes, etc.



STRUCTURE OF POLY(DIMETHYL)SILOXANE

TRB-1ht

Column: Retention Gap (intermediate polarity) 5m x 0.53mm

(TR-200055) + **TRB-1ht (TR-610113)**

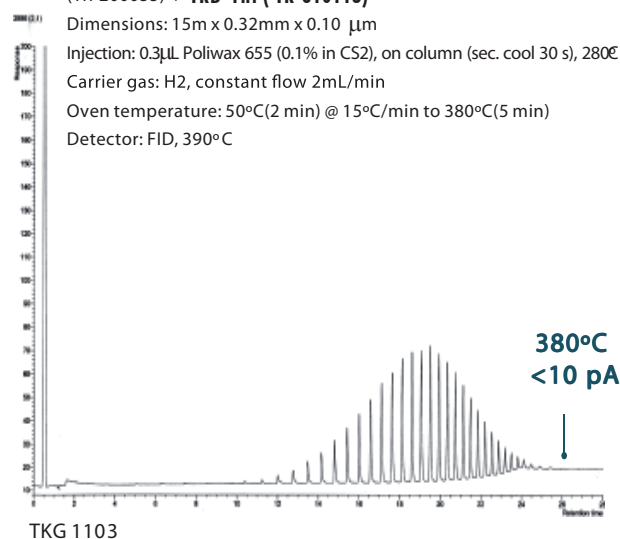
Dimensions: 15m x 0.32mm x 0.10 µm

Injection: 0.3µL Poliwx 655 (0.1% in CS₂), on column (sec. cool 30 s), 280°C

Carrier gas: H₂, constant flow 2mL/min

Oven temperature: 50°C(2 min) @ 15°C/min to 380°C(5 min)

Detector: FID, 390°C



TRB-1HT EQUIVALENT PHASE

Agilent: DB-1ht

Restek: Stx-1HT

Alltech: AT-1 ht

TRB-1ht

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,25	15	0,10	-60 a 395	TR-610112
	30	0,10	-60 a 395	TR-610132
0,32	15	0,10	-60 a 390	TR-610113
	30	0,10	-60 a 390	TR-610133

TRB-1MS

100% Dimethyl polysiloxane, bonded and crosslinked phase.

- 100% Dimethylpolysiloxane.

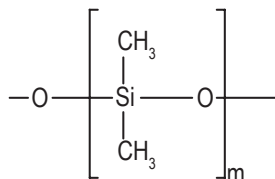
- These columns, with a selectivity identical to the TRB-1, fulfil column bleed specifications that make them compatible with analysis of trace components with GC/MS. Therefore, the standard column of 30 m x 0.25 mm x 0.25 µm has a guaranteed maximum bleed of 4 pA at 325 °C.

- Great chemical inertness towards active constituents and excellent thermal stability.

- Improved signal/noise ratio, which enables greater sensitivity to be obtained with the MS, ECD, NPD, SCD, etc. detectors and provides greater precision in quantitative analysis at trace levels.

- Less column bleed means less detectors contamination and greater speed in conditioning columns.

STRUCTURE OF POLY(DIMETHYL)SILOXANE



TRB-1ms

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,20	12	0,33	-60 to 325/350	TR-513389
	15	0,33	-60 to 325/350	TR-513319
	25	0,33	-60 to 325/350	TR-513329
	30	0,33	-60 to 325/350	TR-513339
	50	0,33	-60 to 325/350	TR-513359
	60	0,33	-60 to 325/350	TR-513369
0,25	15	0,10	-60 to 325/350	TR-510112
	15	0,25	-60 to 325/350	TR-510212
	15	1,00	-60 to 325/350	TR-511012
	30	0,10	-60 to 325/350	TR-510132
	30	0,25	-60 to 325/350	TR-510232
	30	1,00	-60 to 325/350	TR-511032
	60	0,10	-60 to 325/350	TR-510162
	60	0,25	-60 to 325/350	TR-510262
	60	1,00	-60 to 325/350	TR-511062

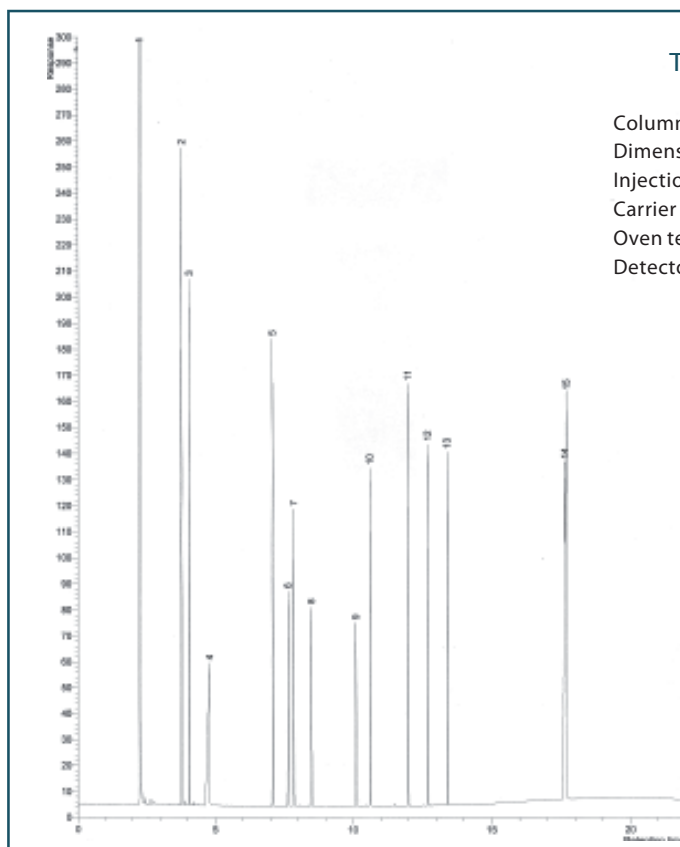
TRB-1MS EQUIVALENT PHASE

Agilent: HP-1MS, DB-1MS

Restek: Rtx-1ms

Varian: CP-SIL 5 CB MS

Alltech: AT-1 MS



TRB-1ms

Column: **TRB-1ms, P/N TR-510262**

Dimensions: 60m x 0.25mm x 0.25 µm.

Injection: 1µL Test MX5 (10 to 20 ng/comp. on column), split 1:100, 280° C

Carrier gas: H2, constant pressure 25 psi (172 KPa) .

Oven temperature: 100°C @ 6°C/min to 325°C(5 min)

Detector: FID, 340°C

Peak Name

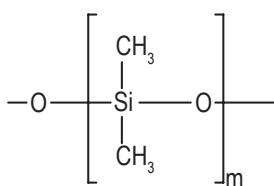
- 1 Methylene chloride
- 2 1,2-Hexanediol
- 3 Nitroso-di-n-propylamine
- 4 Benzoic acid
- 5 C-14
- 6 2,4-Dinitrophenol
- 7 4-Nitrophenol
- 8 4-Nitroaniline
- 9 Pentachlorophenol
- 10 Carbazole
- 11 C-20
- 12 C-21
- 13 C-22
- 14 Benzo(b)fluoranthene
- 15 Benzo(k)fluoranthene

TKG 1104

TRB-SULFUR

100% Dimethyl polysiloxane, bonded and crosslinked phase.

- 100% Dimethylpolysiloxane.
- 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

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-114033

TRB-SULFUR EQUIVALENT PHASE

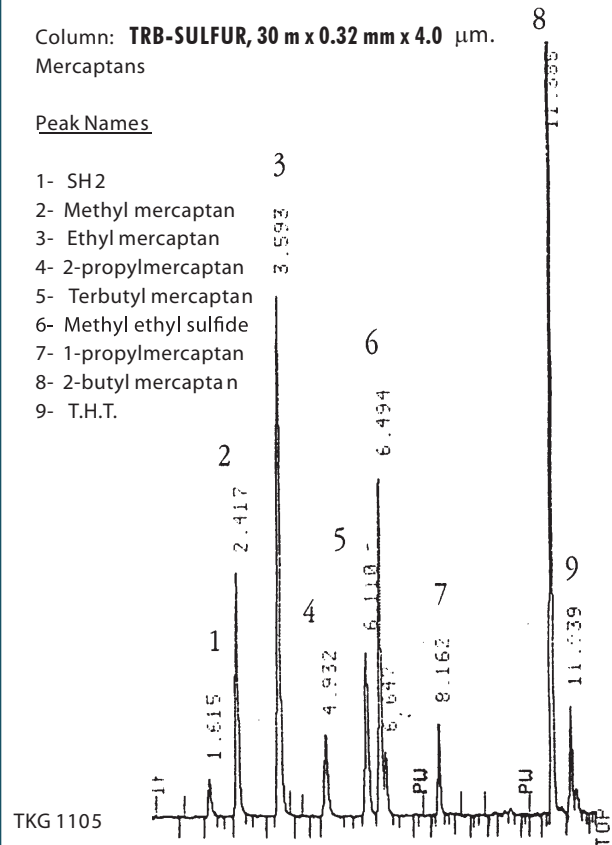
Supelco: SPB-1 SULFUR

TRB- SULFUR

Column: **TRB-SULFUR, 30 m x 0.32 mm x 4.0 μm.**
Mercaptans

Peak Names

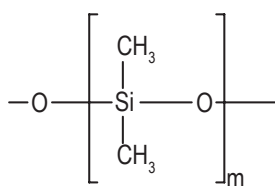
- 1- SH2
- 2- Methyl mercaptan
- 3- Ethyl mercaptan
- 4- 2-propylmercaptan
- 5- Terbutyl mercaptan
- 6- Methyl ethyl sulfide
- 7- 1-propylmercaptan
- 8- 2-butyl mercaptan
- 9- T.H.T.



TRB-PETROL

100% Dimethyl polysiloxane, bonded and crosslinked phase.

- 100% Dimethylpolysiloxane.
- 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

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 EQUIVALENT PHASE

Agilent: DB-Petro
Supelco: Petrocol DH

TRB-PETROL

Column: **TRB-PETROL, 100m x 0.25mm x 0.50 μm TR 110592**

Temperature: 60°C (isothermal)

Injector: 260°C

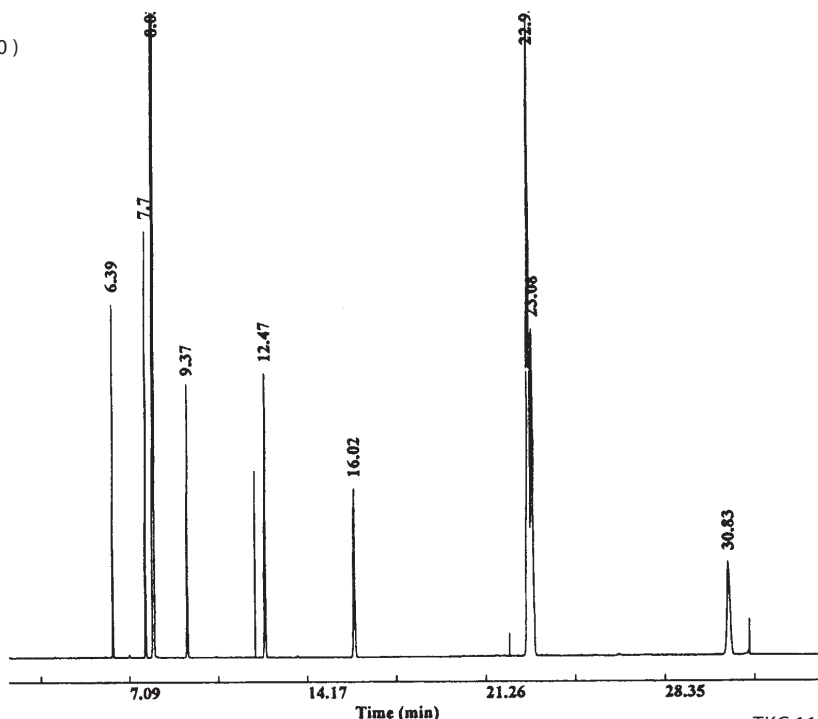
Carrier gas: H2, 34 ps i

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

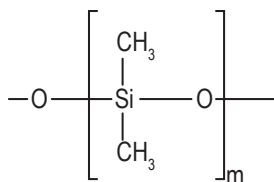


TKG 1106

TRB-PETRO.150

100% Dimethyl polysiloxane, bonded and crosslinked phase.

- 100% Dimethylpolysiloxane.
- Maximum resolution for hydrocarbon analysis
- Detailed hydrocarbon analysis.
- Volatiles in essential oil and beverages



STRUCTURE OF POLY(DIMETHYL)SILOXANE

TRB-PETRO.150 EQUIVALENT PHASE

Supelco: Petrocol DH 150.

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-111062



TRB-PETRO.150

Column: TRB-PETRO.150, P/N TR-1110G2

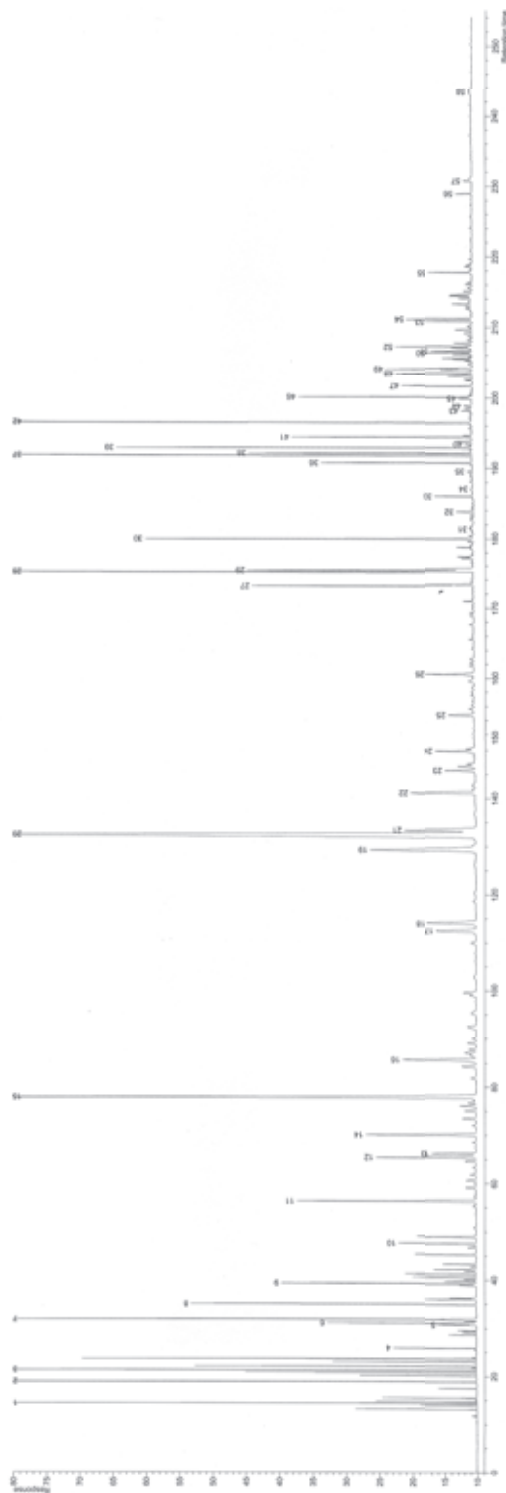
Dimensions: 150m x 0.25mm x 1.0µm

Injection: 0.1µl unleaded gasoline split 100:1 @ 280°C

Carrier gas: He, 75psi (517 kPa) @ 35°C

Oven program: 35°C(hold 135 min.) to 200°C @ 2°C/min. (hold 20 min)

Detector: FID @ 280°C



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

36. n-propylbenzene
37. 1-Methyl-3-ethylbenzene
38. 1-Methyl-4-ethylbenzene
39. 1,3,5-Trimethylbenzene
40. 3,3,4- Trimethylheptane
41. 1-Methyl-2-ethylbenzene
42. 1,2,4- Trimethylbenzene
43. Isobutylbenzene

44. sec-Butylbenzene
45. n-Decane
46. 1,2,3- Trimethylbenzene
47. Indane
48. 1,3-Diethylbenzene
49. n-Butylbenzene
50. 1,4-Dimethyl-2-ethylbenzene
51. 1,3- Dimethyl-4-ethylbenzene

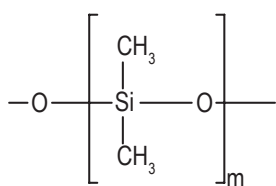
52. 1,2-Dimethyl-4-ethylbenzene
53. 1,2,4,5- Tetramethylbenzene
54. 1,2,3,5- Tetramethylbenzene
55. Naphthalene
56. 2-Methylnaphthalene
57. 1-Methylnaphthalene
58. Dimethylnaphthalenes

TRB-50.2PONA

100% Dimethyl polysiloxane, bonded and crosslinked phase.

- 100% Dimethylpolysiloxane.

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



STRUCTURE OF POLY(DIMETHYL)SILOXANE

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-50.2PONA. EQUIVALENT PHASE

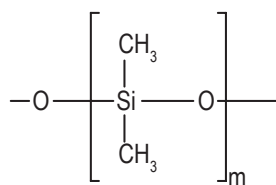
Agilent: HP-PONA
Supelco: Petrocol DH 50.2
Restek: Rtx-1 PONA
Varian: CP-SIL PONA CB
SGE: BP-1 PONA

TRB-2887

100% Dimethyl polysiloxane, bonded and crosslinked phase.

- 100% Dimethylpolysiloxane

- Designed specifically for simulated distillation according to the ASTM method D2887.



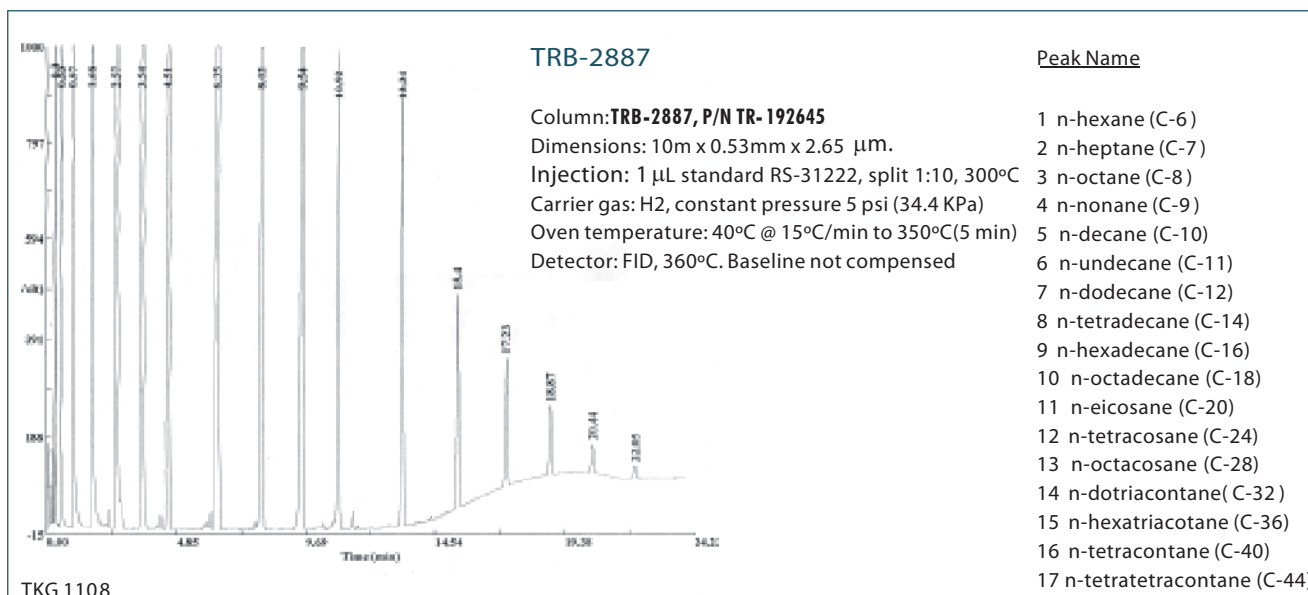
STRUCTURE OF POLY(DIMETHYL)SILOXANE

TRB-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

TRB-2887 EQUIVALENT PHASE

Agilent: DB-2887
Supelco: PETROCOL-2887
Restek: Rtx-2887



TRB-5

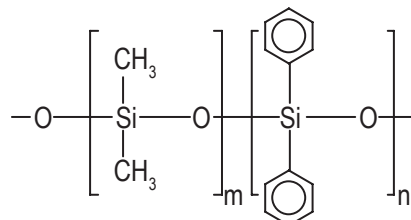
(95%) Dimethyl-(5%) diphenylpolysiloxane, bonded and crosslinked phase.

- It is the most versatile and universal stationary phase in the gas chromatography analysis field.

- The low percentage of phenyl in the polymer structure gives it a characteristic affinity towards the compounds with aromatic rings. This phase, the most popular one, due to its great thermal stability and chemical inertness is the stationary phase of choice for any type of analysis.

- It allows the analysis of acidic and basic compounds.

- It is ideal for the analysis in the environmental field. Analysis of dioxines, PCB's, PCT's, polyaromatic compounds, phenols, herbicides, organochlorinated and organophosphorus pesticides, aromatic hydrocarbons, solvents, drug, oils, etc...



POLY (DIMETHYLDIPHENYL) SILOXANE

TRB-5

Column: **TRB-5, P/N TR-12023 2**

Dimensions: 30m x 0.25mm x 0.25 µm

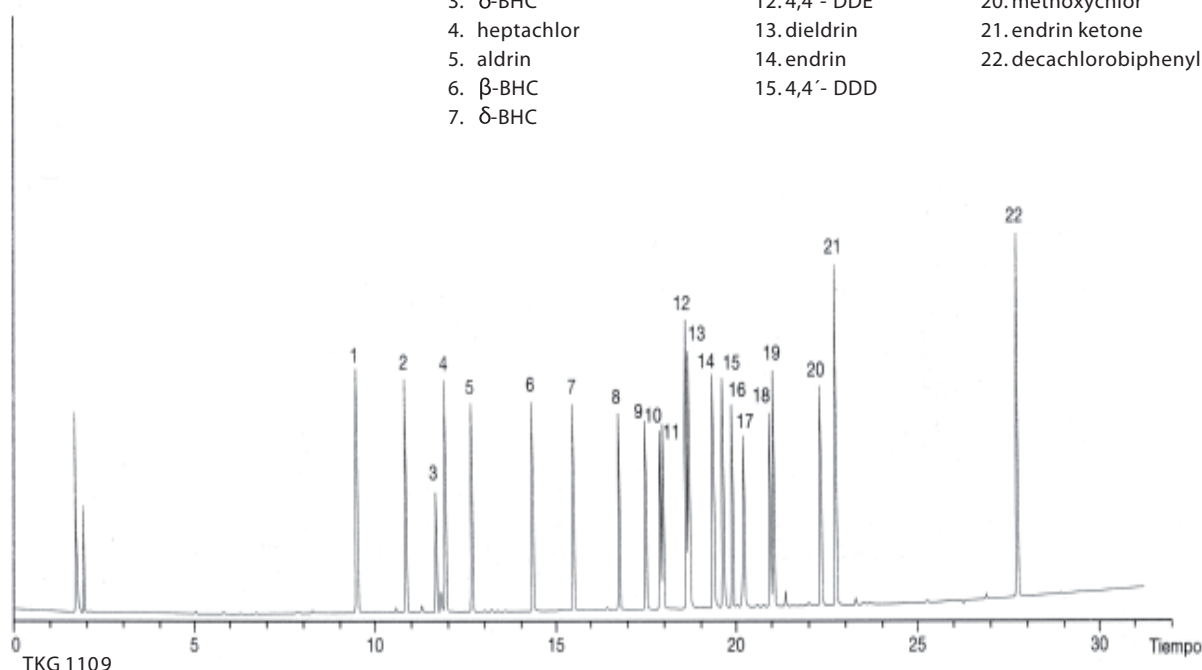
Injection: 1 µL chlorinated pesticides mixture, splitless @230°C (25-270 ppb on column)

Carrier gas: H₂, constant pressure 12 psi (87.7 KPa) 150° C

Oven temperature: 150°C to 225°C@ 2°C/min (10 min.)

Detector: ECD, 310°C

Peak Name	8. heptachlor epoxide	16. endosulfan II
1. 2,4,5,6-tetrachloro-m-xylene	9. endosulfan I	17. 4,4'- DDT
2. γ-BHC	10. γ-chlordane	18. endrin aldehyde
3. δ-BHC	11. α-chlordane	19. endosulfan sulfate
4. heptachlor	12. 4,4'- DDE	20. methoxychlor
5. aldrin	13. dieldrin	21. endrin ketone
6. β-BHC	14. endrin	22. decachlorobiphenyl
7. δ-BHC	15. 4,4'- DDD	



TRB-5

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/M)
0,10	10	0,10	-60 to 325/350	TR-120141
	10	0,40	-60 to 320/350	TR-120441
	20	0,10	-60 to 325/350	TR-120181
	20	0,40	-60 to 320/350	TR-120481
0,20	12	0,33	-60 to 325/350	TR-1233B9
	15	0,15	-60 to 325/350	TR-121319
	15	0,35	-60 to 325/350	TR-120319
	15	0,50	-60 to 325/350	TR-120519
	25	0,15	-60 to 325/350	TR-121329
	25	0,33	-60 to 325/350	TR-123329
	25	0,35	-60 to 325/350	TR-120329
	25	0,50	-60 to 325/350	TR-120529
	30	0,15	-60 to 325/350	TR-121339
	30	0,35	-60 to 325/350	TR-120339
	30	0,50	-60 to 325/350	TR-120539
	50	0,15	-60 to 325/350	TR-121359
	50	0,33	-60 to 325/350	TR-123359
	50	0,35	-60 to 325/350	TR-120359
	50	0,50	-60 to 325/350	TR-120559
	60	0,15	-60 to 325/350	TR-121369
60	0,35	-60 to 325/350	TR-120369	
60	0,50	-60 to 325/350	TR-120569	
0,25	15	0,10	-60 to 325/350	TR-120112
	15	0,25	-60 to 325/350	TR-120212
	15	0,50	-60 to 325/350	TR-120512
	15	1,00	-60 to 320/350	TR-121012
	25	0,10	-60 to 325/350	TR-120122
	25	0,25	-60 to 325/350	TR-120222
	25	0,50	-60 to 325/350	TR-120522
	25	1,00	-60 to 320/350	TR-121022
	30	0,10	-60 to 325/350	TR-120132
	30	0,25	-60 to 325/350	TR-120232
	30	0,50	-60 to 325/350	TR-120532
	30	1,00	-60 to 320/350	TR-121032
	50	0,10	-60 to 325/350	TR-120152
	50	0,25	-60 to 325/350	TR-120252
	50	0,50	-60 to 325/350	TR-120552
	50	1,00	-60 to 320/350	TR-121052
	60	0,10	-60 to 325/350	TR-120162
	60	0,25	-60 to 325/350	TR-120262
60	0,50	-60 to 325/350	TR-120562	
60	1,00	-60 to 325/350	TR-121062	
0,32	15	0,10	-60 to 325/350	TR-120113
	15	0,25	-60 to 325/350	TR-120213
	15	0,50	-60 to 325/350	TR-120513
	15	1,00	-60 to 325/350	TR-121013
	15	3,00	-60 to 280/350	TR-123013
	25	0,10	-60 to 325/350	TR-120123

TRB-5

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/M)
0,32	25	0,25	-60 to 325/350	TR-120223
	25	0,50	-60 to 325/350	TR-120523
25	1,00	-60 to 325/350	TR-121023	
25	3,00	-60 to 280/350	TR-123023	
30	0,10	-60 to 325/350	TR-120133	
30	0,25	-60 to 325/350	TR-120233	
30	0,50	-60 to 325/350	TR-120533	
30	1,00	-60 to 325/350	TR-121033	
30	3,00	-60 to 280/350	TR-123033	
50	0,10	-60 to 325/350	TR-120153	
50	0,25	-60 to 325/350	TR-120253	
50	0,50	-60 to 325/350	TR-120553	
50	1,00	-60 to 325/350	TR-121053	
50	3,00	-60 to 280/350	TR-123053	
60	0,10	-60 to 325/350	TR-120163	
60	0,25	-60 to 325/350	TR-120263	
60	0,50	-60 to 325/350	TR-120563	
60	1,00	-60 to 325/350	TR-121063	
60	3,00	-60 to 280/350	TR-123063	
0,53	10	2,65	-60 to 270/290	TR-122645
	15	0,10	-60 to 320/340	TR-120115
	15	0,50	-60 to 320/340	TR-120515
	15	1,50	-60 to 310/330	TR-121515
	15	3,00	-60 to 270/290	TR-123015
	15	5,00	-60 to 270/290	TR-125015
	25	0,10	-60 to 320/340	TR-120125
	25	0,50	-60 to 320/340	TR-120525
	25	1,50	-60 to 310/330	TR-121525
	25	3,00	-60 to 270/290	TR-123025
	25	5,00	-60 to 270/290	TR-125025
	30	0,10	-60 to 320/340	TR-120135
	30	0,50	-60 to 320/340	TR-120535
	30	0,88	-60 to 310/330	TR-120835
	30	1,50	-60 to 310/330	TR-121535
	30	2,65	-60 to 270/290	TR-122635
30	3,00	-60 to 270/290	TR-123035	
30	5,00	-60 to 270/290	TR-125035	
50	0,10	-60 to 320/340	TR-120155	
50	0,50	-60 to 320/340	TR-120555	
50	1,50	-60 to 310/330	TR-121555	
50	3,00	-60 to 270/290	TR-123055	
50	5,00	-60 to 270/290	TR-125055	
60	0,10	-60 to 320/340	TR-120165	
60	0,50	-60 to 320/340	TR-120565	
60	1,50	-60 to 310/330	TR-121565	
60	3,00	-60 to 270/290	TR-123065	
60	5,00	-60 to 270/290	TR-125065	

TRB-5 EQUIVALENT PHASE

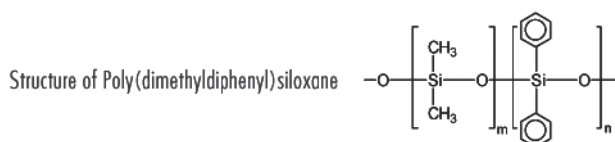
Restek: Rtx-5, Rtx XTI
 Agilent/JW: HP-5, Ultra-2, DB-5, DB-5.625
 Supelco: SPB-5, PTE-5, SAC-5, Equity-5

Chromapack/Varian: CP-SIL8CB
 Alltech: AT-5
 Macherey-Nagel: OPTIMA-5
 Quadrex: 007-2
 SGE: BP-5

TRB-5HT/INOX-5HT

(95%) Dimethyl-(5%) diphenylpolysiloxane, bonded and crosslinked phase.

- Produced specially for analysis at high temperature up to 400°C.
- Fused silica tube covered with polyimide, resistant to high temperatures, or stainless steel tube (specially deactivated).
- Excellent symmetry for compounds with high boiling points.
- Preferably used for the analysis of waxes, triglycerides, sterol esters, polyoxyethylenated alcohols, etc.



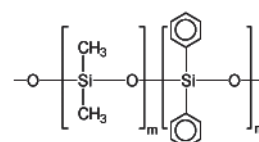
TRB-5ht/Inox-5ht

Internal Diam. (mm)	Length (m)	Film Thickness (μm)	Temp limits (°C)	Part. N°. (P/N)
0,25	15	0,10	-60 to 395	TR-620112
	30	0,10	-60 to 395	TR-620132
0,32	15	0,10	-60 to 390	TR-620113
	30	0,10	-60 to 390	TR-620133

TRB-STEROL

(95%) Dimethyl-(5%) diphenylpolysiloxane, bonded and crosslinked phase.

- Column specifically designed for the analysis of complex mixtures of sterols, from either animal or plant origin.
- Deactivation method of the capillary tube wall, developed by Teknokroma, that guarantees a high chemical inertness a low bleeding level and allows the analysis of sterols without derivatization.
- The column is specifically tested for sterols.



Structure of Poly(dimethyldiphenyl)siloxane

TRB-5-Sterol

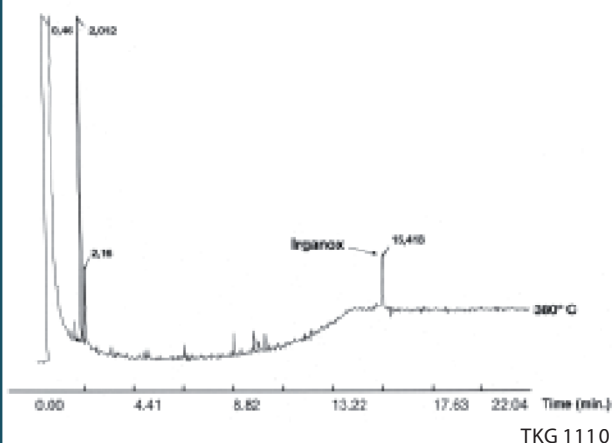
Internal Diam. (mm)	Length (m)	Film Thickness (μm)	Temp limits (°C)	Part. N°. (P/N)
0,22	30	0,22	-60 to 325-350	TR-182238

TRB-5HT/INOX-5HT EQUIVALENT PHASE

Agilent: DB-5ht

IRGANOX 1010

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

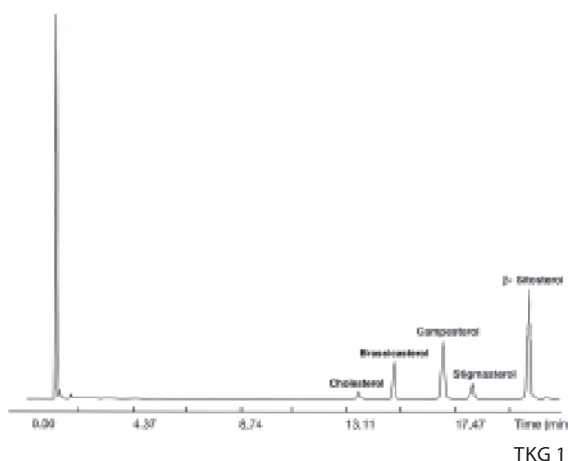


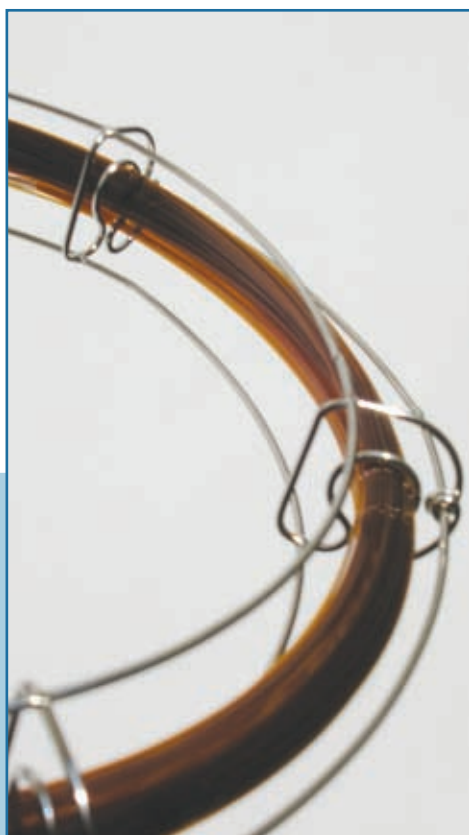
TRB-STEROL EQUIVALENT PHASE

Supelco: SAC-5

Sterols

Column: **TRB-Sterol**, 30m X 0,22 mm X 0,22 μm, P/N TR-182238
 Oven Temp.: 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





TRB-5MS

(95%) Dimethyl-(5%) diphenylpolysiloxane, bonded and crosslinked phase.

- The TRB-5ms Column uses the same stationary phase as TRB-5, but the polymer synthesis process, the capillary deactivation technique and the bonding and crosslinking procedures have been optimized to obtain the minimum possible bleeding level and an exceptional chemical inertness.

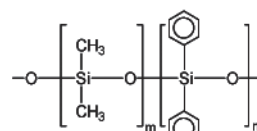
- The bleeding specifications for a column of 30m x 0,25 mm x 0,25 µm (P/N 520232) indicate that it is lower than 4 pA at 325°C.

- Column recommended to work with any selective detector.

- Ideal column to connect with a mass detector. Its ultra-low bleeding joined to its high chemical inertness allows for a better signal/noise ratio (higher sensitivity level), and therefore better detection and quantification of sample components at low concentrations.

TRB-5MS

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N° (P/N)	
0,20	12	0,33	-60 to 325-350	TR-523389	
	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	
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	
	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	



Structure of Poly(dimethyldiphenyl)siloxane

TRB-5MS EQUIVALENT PHASE

Restek: Rtx 5ms
 Agilent/JW: HP-5MS
 Supelco: PTE-5, Equity-5
 Macherey-Nagel: OPTIMA-5
 Varian: CP-Sil8-MS

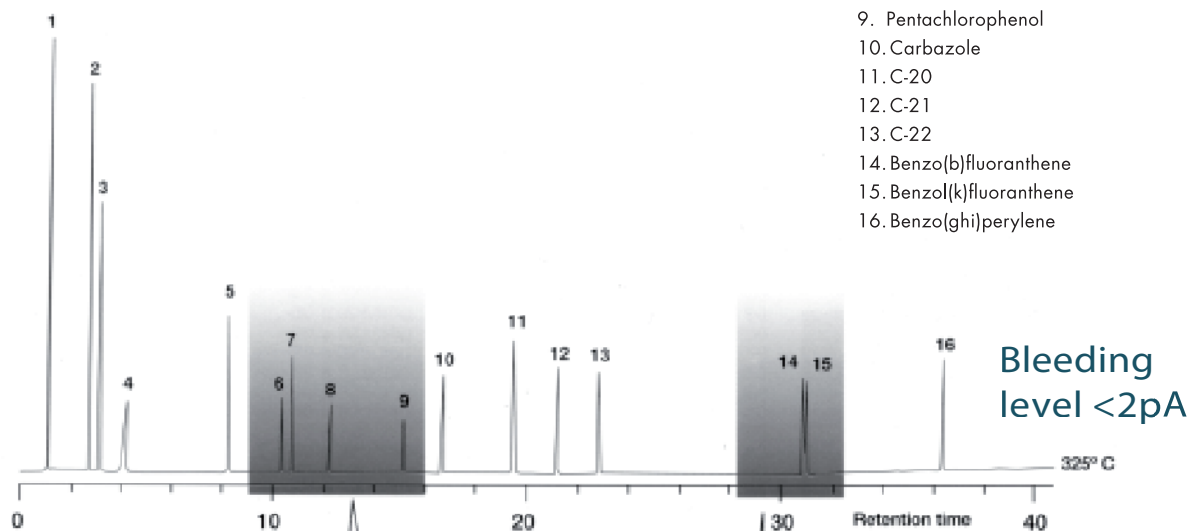
The TRB-5MS column has an excellent resolution and symmetry in all its polarity range, for neutral, acid and basic compounds. All these substances that appear in the analysis of semivolatile traces (for example, EPA official methods) can be analyzed in only one column.

Test MX5

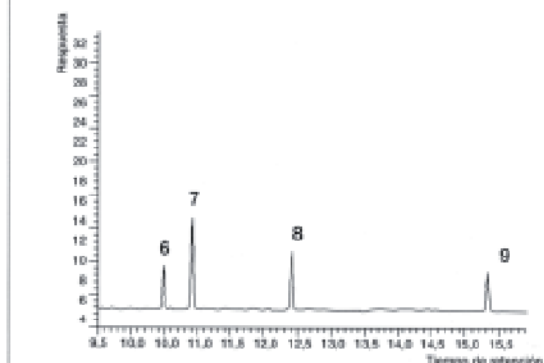
Column: **TRB-5ms**, P/N TR-520232
 Dimensions: 30 m x 0,25 mm x 0,25 μ m
 Injection: 1 μ l, split (1:100), 5 to 10 ng/comp. on column, 280° C
 Carrier gas: H₂, 12 psi (87,7 kPa)
 Oven temp.: 100° C to 325° C (5 min.) @ 6° C/min .
 Detector: FID to 300° C
 Sample: Test MX5

Peak Name

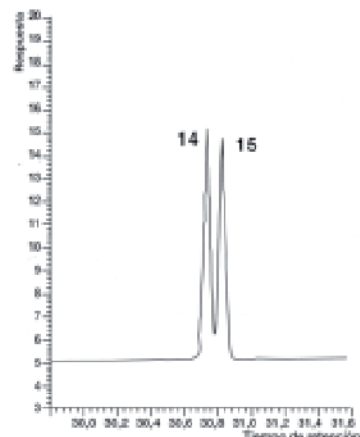
1. Methylene chloride
2. 1,2-Hexanediol
3. Nitroso-di-n-propylamine
4. Benzoic acid
5. C-14
6. 2,4-Dinitrophenol
7. 4-Nitrophenol
8. 4-Nitroaniline
9. Pentachlorophenol
10. Carbazole
11. C-20
12. C-21
13. C-22
14. Benzo(b)fluoranthene
15. Benzo(k)fluoranthene
16. Benzo(ghi)perylene



Injection of 1 ng/peak on column
 Exceptional symmetry



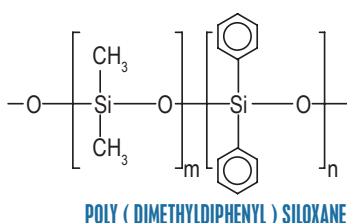
Excellent resolution



TRB-5AMINE

95% Dimethyl-(5%) diphenylpolysiloxane, bonded and crosslinked phase.

- Column specially designed for the analysis of amines.
- Basic deactivation of the column surface with reagents synthesized in our laboratories, that jointly with the crosslinking method have permitted the minimization of the absorption level and tailing of basic compounds, like the alkylamines, alcoholamines, basic pharmaceuticals, aromatic amines, etc.
- Selectivity and thermal stability equivalent to the TRB-5 columns.



TRB-5AMINE EQUIVALENT PHASE

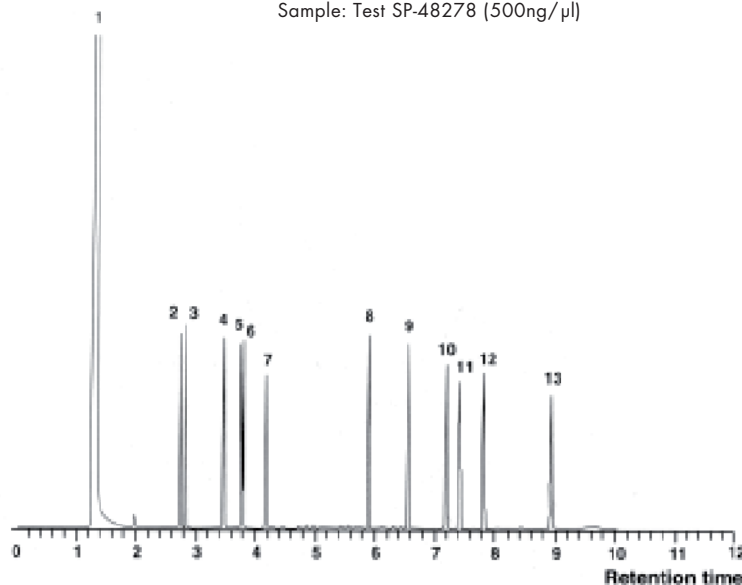
Restek: Rtx-5Amine
Supelco: PTA-5

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	TR-210512	
	15	1,00	-60 to 300/315	TR-211012	
	30	0,50	-60 to 300/315	TR-210532	
	30	1,00	-60 to 300/315	TR-211032	
	60	0,50	-60 to 300/315	TR-210562	
	60	1,00	-60 to 300/315	TR-211062	
0,32	15	0,50	-60 to 300/315	TR-210513	
	15	1,00	-60 to 300/315	TR-211013	
	15	1,50	-60 to 290/305	TR-211513	
	30	0,50	-60 to 300/315	TR-210533	
	30	1,00	-60 to 300/315	TR-211033	
	30	1,50	-60 to 290/305	TR-211533	
	60	0,50	-60 to 300/315	TR-210563	
	60	1,00	-60 to 300/315	TR-211063	
	60	1,50	-60 to 290/305	TR-211563	
	0,53	15	1,00	-60 to 290/305	TR-211015
		15	3,00	-60 to 280/295	TR-213015
		30	1,00	-60 to 290/305	TR-211035
30		3,00	-60 to 280/295	TR-213035	
60		1,00	-60 to 290/305	TR-211065	
60		3,00	-60 to 280/295	TR-213065	

Amines Test

Column **TRB-5Amine**, P/N TR-210532
Dimensions: 30 m x 0.25 mm x 0.50 µm
Injection: 1 µL (split 1:50), 280°C
Carrier gas: H₂, 12 psi (87.7 kPa) .
Oven temperature: 100°C to 280°C (5 min.) @ 20°C/min .
Detector: FID, 300°C
Sample: Test SP-48278 (500ng/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

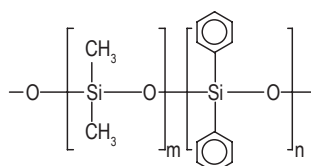
TKG 1113

TRB-5. 625

95% Dimethyl-(5%) diphenylpolysiloxane, bonded and crosslinked phase.

- Specially manufactured column to fulfil the level of inertness required by the EPA methods for the analysis of semivolatiles compounds, designed for methods 625, 1625, 8270 and CLP protocols.

- Inertness and minimum absorption for acidic, basic and neutral compounds.



POLY (DIMETHYLDIPHENYL) SILOXANE

TRB-5. 625 EQUIVALENT PHASE

Restek: Rtx-XTI-5

Supelco: PTE-5

Agilent: DB.5.625



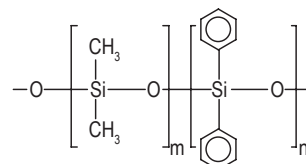
TRB-5.625

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,20	12	0,33	-60 to 325/350	TR-263389
	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-260263

TRB-G27

95% Dimethyl-(5%) diphenylpolysiloxane, bonded and crosslinked phase.

- Column which fulfils the specifications of the American Pharmacopeia (USP), for the test of organic volatile impurities (OVI) in pharmaceutical products. Methods <USP 467>.



POLY (DIMETHYLDIPHENYL) SILOXANE

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

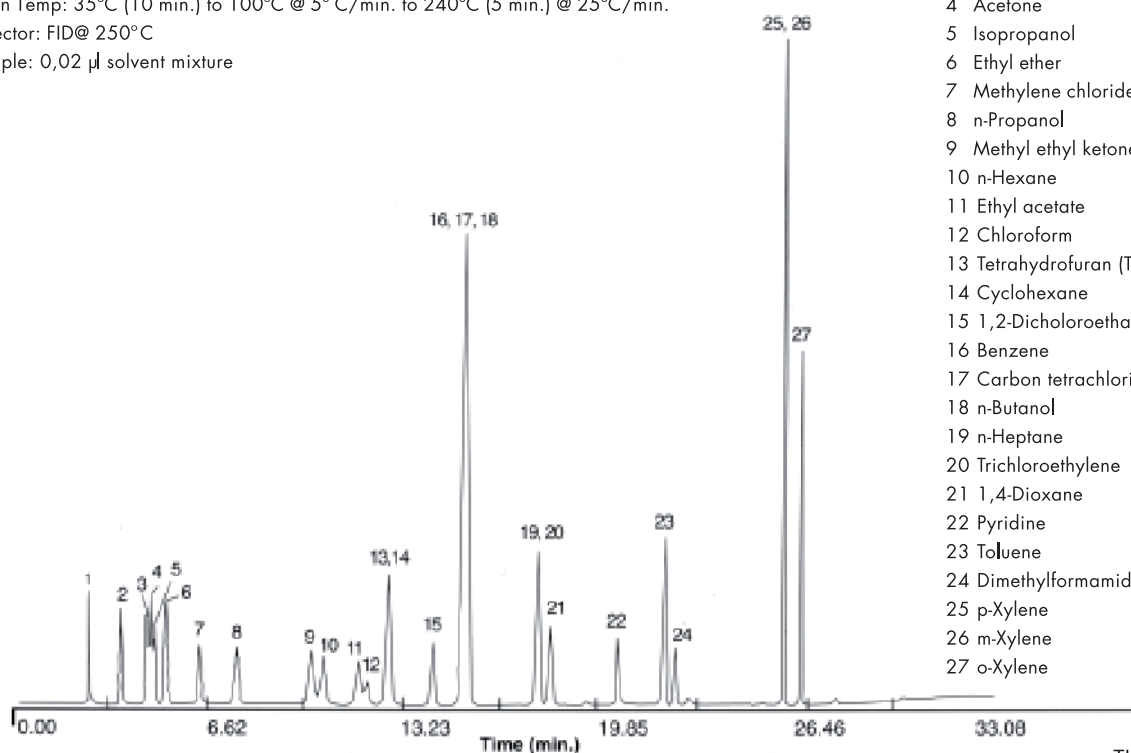
TRB-G27 EQUIVALENT PHASE

Restek: Rtx-G27

Supelco: 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 µl phenylmethyl deactivated retention gas
 Carrier Gas: He, 4,5 psi (31 kPa), 35 cm/s. to 35°C
 Oven Temp: 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

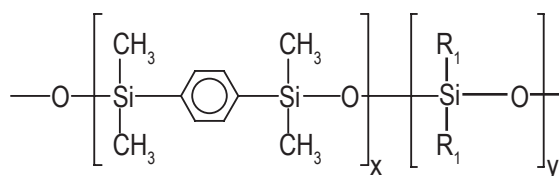
- 1 Methanol
- 2 Ethanol
- 3 Acetonitrile
- 4 Acetone
- 5 Isopropanol
- 6 Ethyl ether
- 7 Methylene chloride
- 8 n-Propanol
- 9 Methyl ethyl ketone (MEK)
- 10 n-Hexane
- 11 Ethyl acetate
- 12 Chloroform
- 13 Tetrahydrofuran (THF)
- 14 Cyclohexane
- 15 1,2-Dichloroethane
- 16 Benzene
- 17 Carbon tetrachloride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

TKG 1114

META.X5

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

- Choice column for the analysis of semivolatiles compounds with GC, EM.
- Polymer synthesis designed and developed by scientists at Teknokroma.
- Selectivity similar to TRB-5.
- New generation of column incorporates arylene groups in the polymer structure, and this improves the thermal stability, reduces the bleeding level and provides optimal resolution for aromatic compounds.
- Manufacturing procedures of this Teknokroma column guarantees maximal inertness and minimal bleeding level.
- Quality control test (MX5) that guarantees total inertness and optimal signal/ noise ratio (S/N) for the more active compounds that normally suffer adsorption problems, like 2,4-dinitrophenol, 4 nitroaniline and pentachlorophenol.



STRUCTURE OF POLYSILOXANE CONTAINING P-SILOXANE

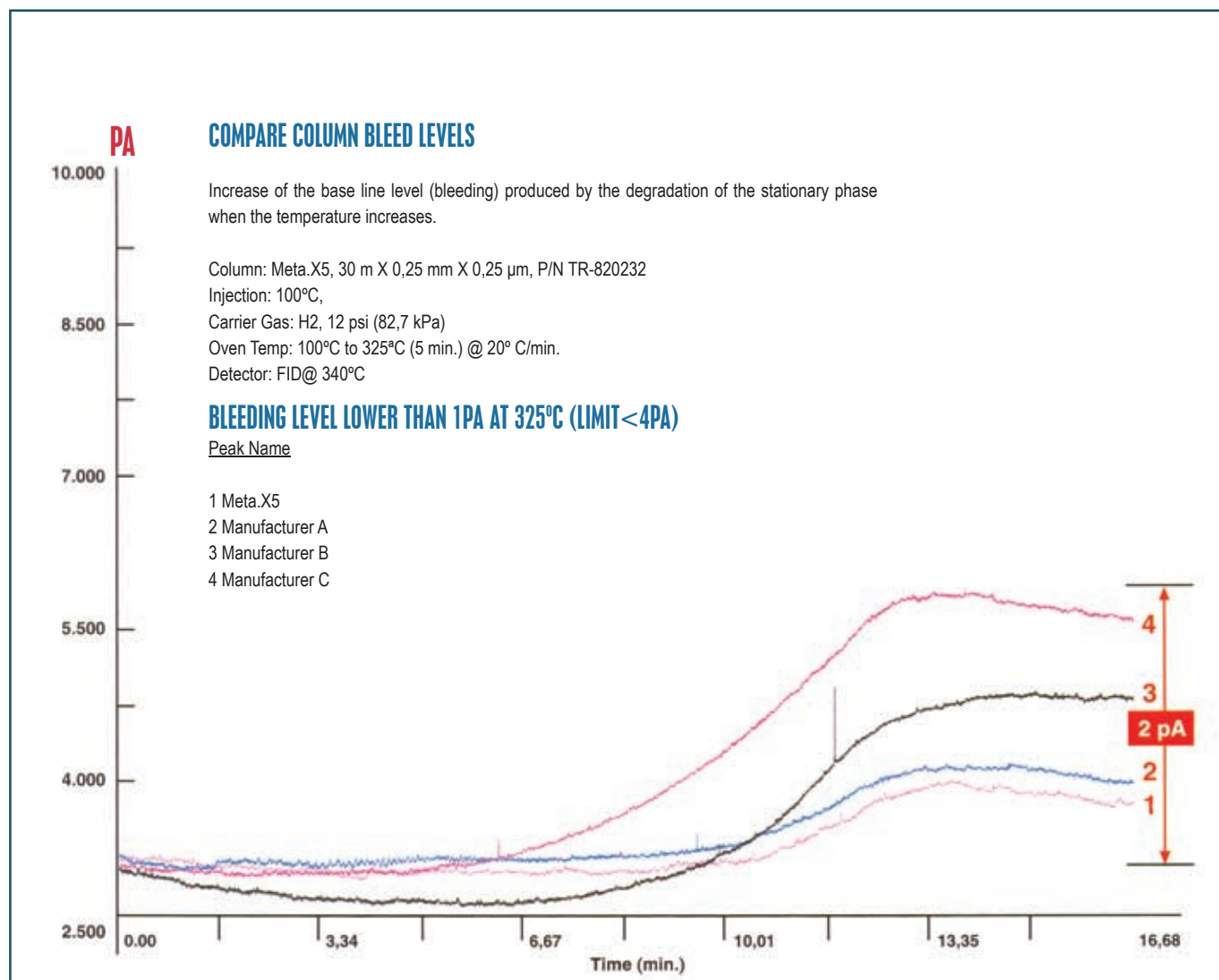
META.X5 EQUIVALENT PHASE

Restek: Rtx-5Sil MS
 Agilent/JW: DB.5 MS, HP-5TA
 Supelco: MDN-5
 Chromopack/Varian: CP-SIL8CB MS
 Alltech: AT-5ms
 Quadrex: 007-5MS
 SGE: BPX-5

Meta.X5

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N° (P/N)
0,20	12	0,33	-60 to 325/350	TR-823389
	25	0,33	-60 to 325/350	TR-823329
	50	0,33	-60 to 325/350	TR-823359
0,25	15	0,10	-60 to 325/350	TR-820112
	15	0,25	-60 to 325/350	TR-820212
	15	0,50	-60 to 325/350	TR-820512
	15	1,00	-60 to 325/350	TR-821012
	30	0,10	-60 to 325/350	TR-820132
	30	0,25	-60 to 325/350	TR-820232
	30	0,50	-60 to 325/350	TR-820532
	30	1,00	-60 to 325/350	TR-821032
	60	0,10	-60 to 325/350	TR-820162
	60	0,25	-60 to 325/350	TR-820262
0,32	15	0,10	-60 to 325/350	TR-820113
	15	0,25	-60 to 325/350	TR-820213

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N° (P/N)	
0,32	15	0,50	-60 to 325/350	TR-820513	
	15	1,00	-60 to 325/350	TR-821013	
	30	0,10	-60 to 325/350	TR-820133	
	30	0,25	-60 to 325/350	TR-820233	
	30	0,50	-60 to 325/350	TR-820533	
	30	1,00	-60 to 325/350	TR-821033	
	60	0,10	-60 to 325/350	TR-820163	
	60	0,25	-60 to 325/350	TR-820263	
	0,53	15	0,50	-60 to 320/340	TR-820515
		15	1,00	-60 to 320/340	TR-821015
15		1,50	-60 to 320/340	TR-821515	
30		0,50	-60 to 320/340	TR-820535	
30		1,00	-60 to 320/340	TR-821035	
30	1,50	-60 to 310/330	TR-821535		



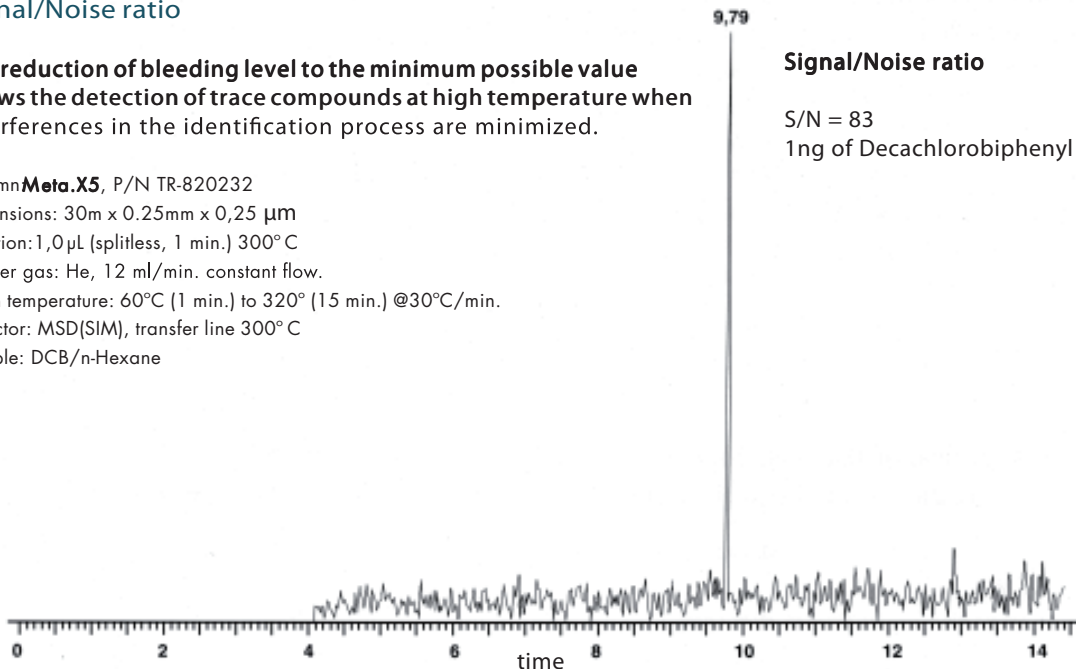
Signal/Noise ratio

The reduction of bleeding level to the minimum possible value allows the detection of trace compounds at high temperature when interferences in the identification process are minimized.

Column: **Meta.X5**, P/N TR-820232
 Dimensions: 30m x 0.25mm x 0,25 µm
 Injection: 1,0 µL (splitless, 1 min.) 300°C
 Carrier gas: He, 12 ml/min. constant flow.
 Oven temperature: 60°C (1 min.) to 320° (15 min.) @30°C/min.
 Detector: MSD(SIM), transfer line 300° C
 Sample: DCB/n-Hexane

Signal/Noise ratio

S/N = 83
 1ng of Decachlorobiphenyl (DCB)



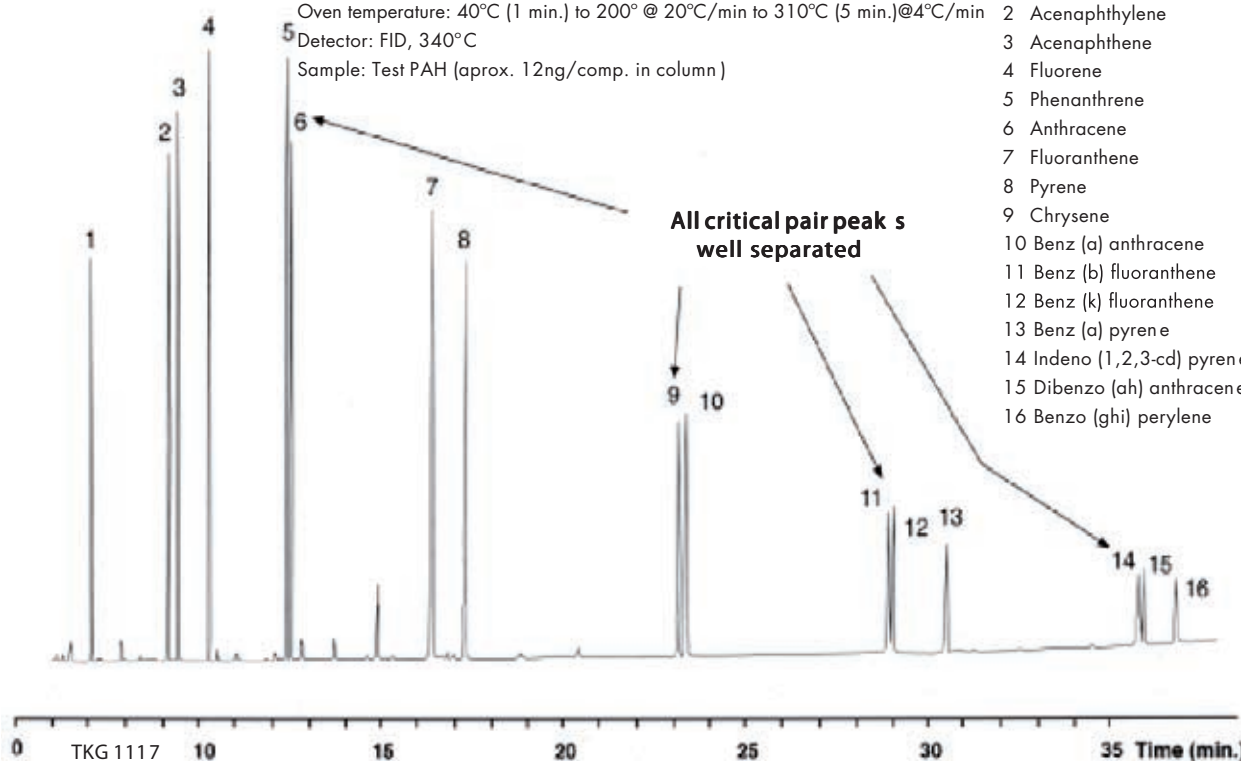
TKG 1116

Separation of aromatic polycyclic hydrocarbons (EPA Method 610)

Column: **Meta.X5**, P/N TR-820232
 Dimensions: 30m x 0.25mm x 0,50 µm
 Injection: 0,3 µL (splitless, 1') 300°C
 Carrier gas: H2, 16 PSI (110,2 kPa). Cte.
 Oven temperature: 40°C (1 min.) to 200° @ 20°C/min to 310°C (5 min.)@4°C/min
 Detector: FID, 340°C
 Sample: Test PAH (aprox. 12ng/comp. in column)

Peak Name

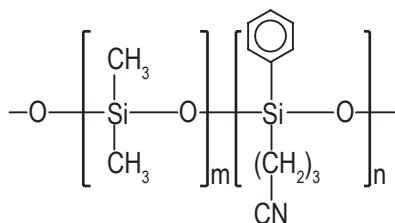
- 1 Naphthalene
- 2 Acenaphthylene
- 3 Acenaphthene
- 4 Fluorene
- 5 Phenanthrene
- 6 Anthracene
- 7 Fluoranthene
- 8 Pyrene
- 9 Chrysene
- 10 Benz (a) anthracene
- 11 Benz (b) fluoranthene
- 12 Benz (k) fluoranthene
- 13 Benz (a) pyrene
- 14 Indeno (1,2,3-cd) pyrene
- 15 Dibenzo (ah) anthracene
- 16 Benzo (ghi) perylene



TRB-1301

94% Dimethyl-(6%) cyanopropylphenyl polysiloxane, bonded and crosslinked phase.

- (6%)Cyanopropyl-phenyl-(94%)dimethylpolysiloxane.
- Ideal column for analyzing mixtures of acidic and basic compounds with a wide range of polarity.
- This column of intermediate polarity is very useful for analyzing pesticides and herbicides.



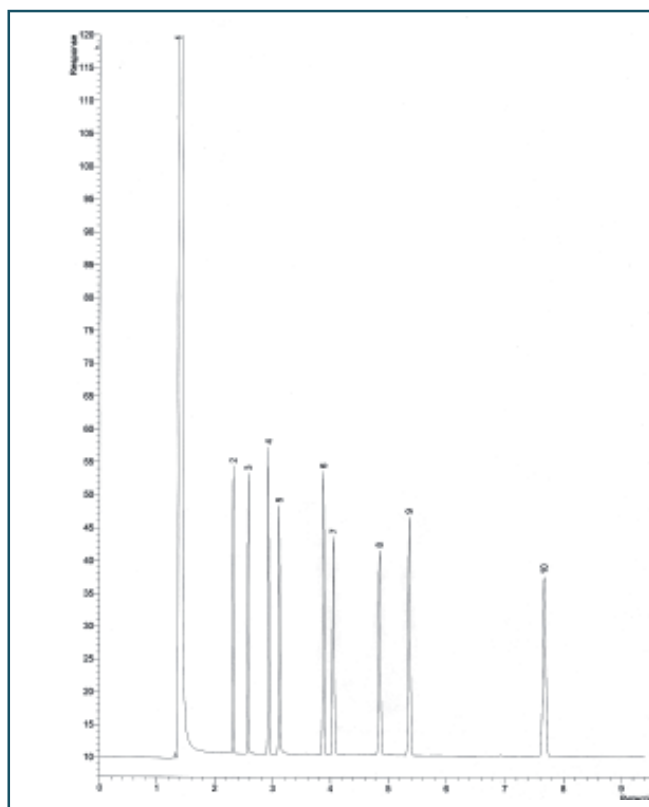
STRUCTURE OF POLY (DIMETHYLCYANOPROPYLPHENYLSILOXANE) SILOXANE

TRB-1301

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N° (P/N)
0,25	15	0,25	-20 to 280/300	TR-600212
	15	1,00	-20 to 260/280	TR-601012
	30	0,25	-20 to 280/300	TR-600232
	30	1,00	-20 to 260/280	TR-601032
	60	0,25	-20 to 280/300	TR-600262
	60	1,00	-20 to 260/280	TR-601062
0,32	15	0,25	-20 to 280/300	TR-600213
	15	1,00	-20 to 260/280	TR-601013
	30	0,25	-20 to 280/300	TR-600233
	30	1,00	-20 to 260/280	TR-601033
	60	0,25	-20 to 280/300	TR-600263
	60	1,00	-20 to 260/280	TR-601063
0,53	15	1,00	-20 to 260/280	TR-601015
	30	1,00	-20 to 260/280	TR-601035
	60	1,00	-20 to 260/280	TR-601065

TRB-1301 EQUIVALENT PHASE

Agilent: HP-1301, HP-624, DB-1301, DB-624
 Supelco: SPB-1301, OVI-G43
 Restek: Rtx-1301, Rtx-624
 SGE: BPX-624
 Alltech: AT-624



TRB-1301

Column: **TRB-1301**, P/N TR-601032
 Dimensions: 30m x 0.25mm x 1.0 µm
 Injection: 0.5 µL standard SP-4-7301 (500 ng/mL), split 1:50, 260°C
 Carrier gas: H2, constant pressure 12 psi (82.7 KPa) .
 Oven temperature: 165°C
 Detector: FID, 280°C

Peak Name

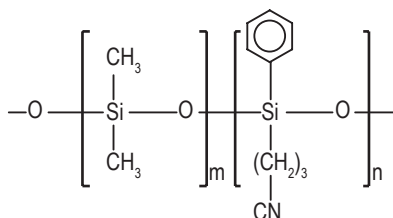
- 1 Methylene chloride
- 2 C-10
- 3 2-Octanone
- 4 C-11
- 5 1-Octanol
- 6 C-12
- 7 2,6-Dimethylphenol
- 8 2,6-Dimethylaniline
- 9 C-13
- 10 C-14

TKG 1118

TRB-624

94% Dimethyl-(6%) cyanopropylphenyl polysiloxane, bonded and crosslinked phase.

- (6%) Cyanopropyl-phenyl - (94%) dimethylpolysiloxane.
- Column developed specially for environmental analysis of volatile compounds ("Volatile Priority Pollutants").
- Column perfectly compatible with EPA methods 501.3, 502.2, 524.2, 601, 602, 8010, 8015, 8020, 8221, 8240 and 8260.
- Excellent inertness against active compounds.



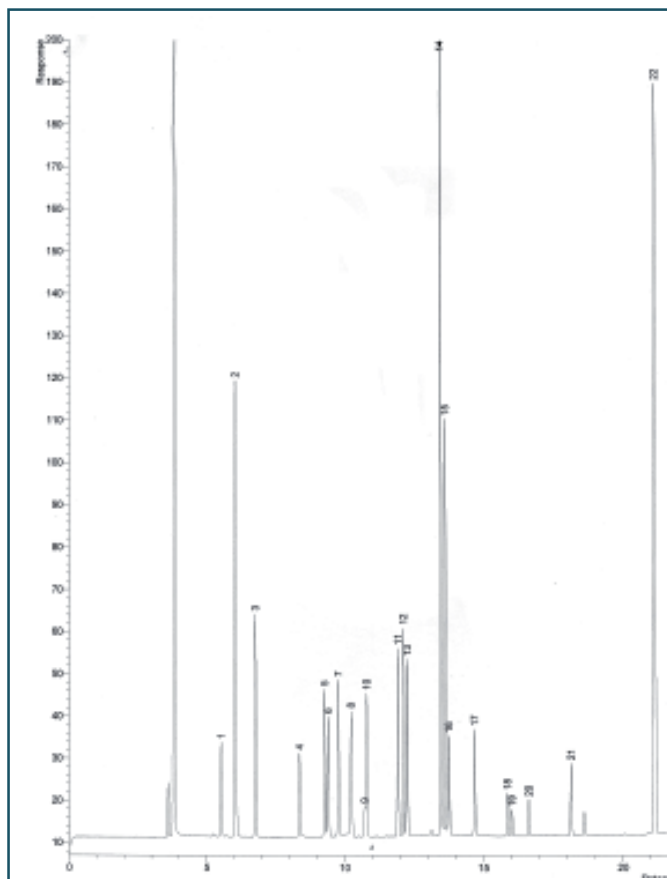
STRUCTURE OF POLY (DIMETHYLCYANOPROPYLPHENYLSILOXANE) SILOXANE

TRB-624

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

TRB-624 EQUIVALENT PHASE

Agilent: HP-1301, HP-624, DB-1301, DB-624
Supelco: SPB-1301, OVI-G43
Restek: Rtx-1301, Rtx-624
SGE: BPX-624
Alltech: AT-624



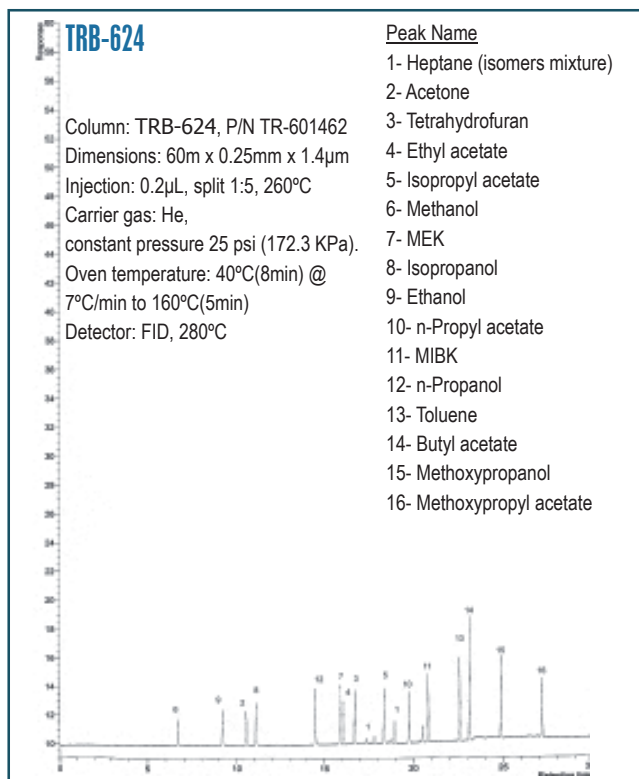
TRB-624

Column **TRB-624**, P/N TR-601462
Dimensions: 60m x 0.25mm x 1.4 µm
Injection: 1 µL solvents mixture, split 1:100 (20-600 ng/comp.), 260° C
Carrier gas: H2, constant pressure 25 psi (172.3 KPa).
Oven temperature: 50°C(5min) @ 6°C/min to 220° C
Detector: FID, 280° C

Peak Name

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

TKG 1119

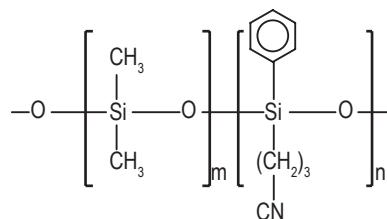


TKG 1120

TRB-G43

94% Dimethyl-(6%) cyanopropylphenyl polysiloxane, bonded and crosslinked phase.

- (6%) Cyanopropyl-phenyl - (94%) dimethylpolysiloxane (USP G43).
- Fulfills the 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.
- Column with chemical inertness and low bleed guaranteed.
- Specially tested for complete separation of the five solvents regulated by USP Method 467.
- For this analysis, 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 (DIMETHYLCYANOPROPYLPHENYLSILOXANE) SILOXANE

TRB-G43

Column: **TRB-G43**, P/N TR-163035

Dimensions: 30m x 0.53mm x 3.0µm

Injection: split 1:2, 250°C, 5m x 0.53mm intermediate polarity column (TR-200055)

Sample: 0.5 mL headspace (21 static head space sampler) 28 Class 1 Mix and Class 2 Mix A, Mix B residual solvents at the regulatory limit concentration.

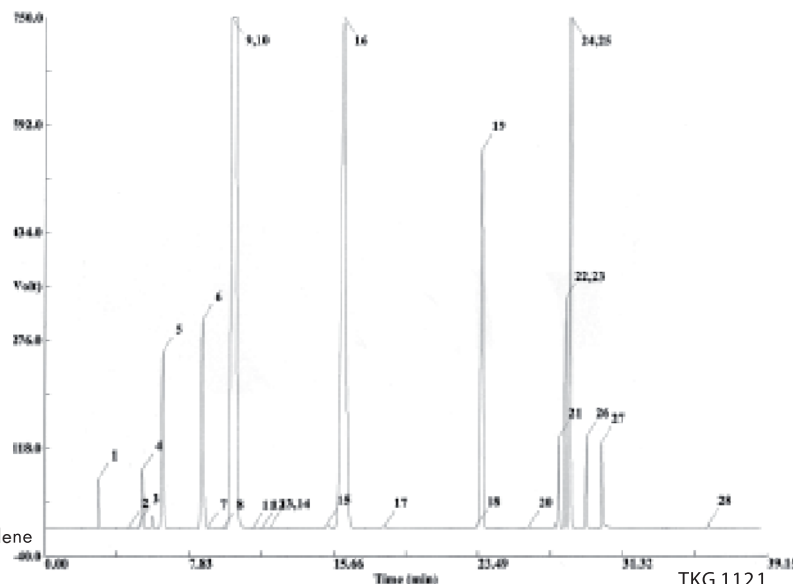
Carrier gas: He, constant pressure 4.8 psi (33.1 KPa), 35 cm/s (40°C)

Oven temperature: 40°C(20min) @ 10°C/min to 240°C(10min)

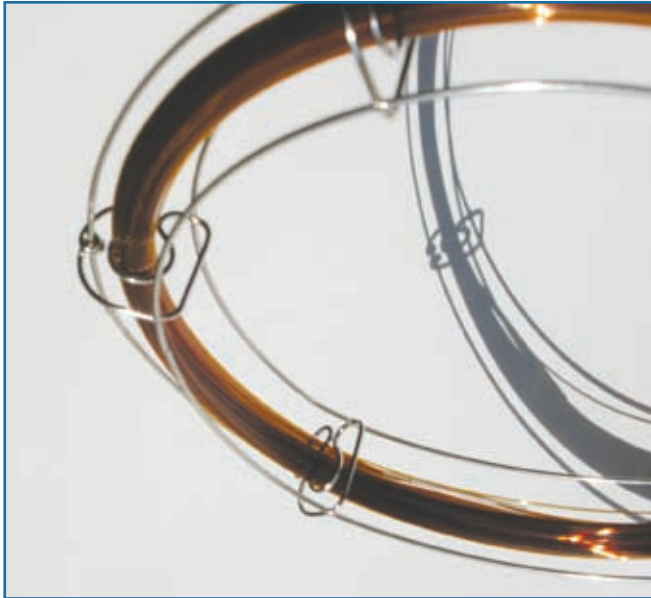
Detector: FID, 250°C

Peak Name

1- Methanol	15- Trichloroethylene
2- 1,2-Dichloroethene	16- Methylcyclohexane
3- Acetonitrile	17- 1,4-Dioxane
4- Methylene chloride	18- Pyridine
5- n-Hexane	19- Toluene
6- Cis-1,2-dichloroethene	20- 2-Hexanone
7- Nitromethane	21- Chlorobenzene
8- Chloroform	22- Dimethylformamide
9- Cyclohexane	23- Ethylbenzene
10- 1,1,1-Trichloroethane	24- m Xylene
11- Carbon tetrachloride	25- p-Xylene
12- Benzene	26- o-Xylene
13- 1,2-Dimethoxyethane	27- N,N-dimethylacetamide
14- 1,2-Dichloroethane	28- 1,2,3,4-Tetrahydronaphthalene



TKG 1121

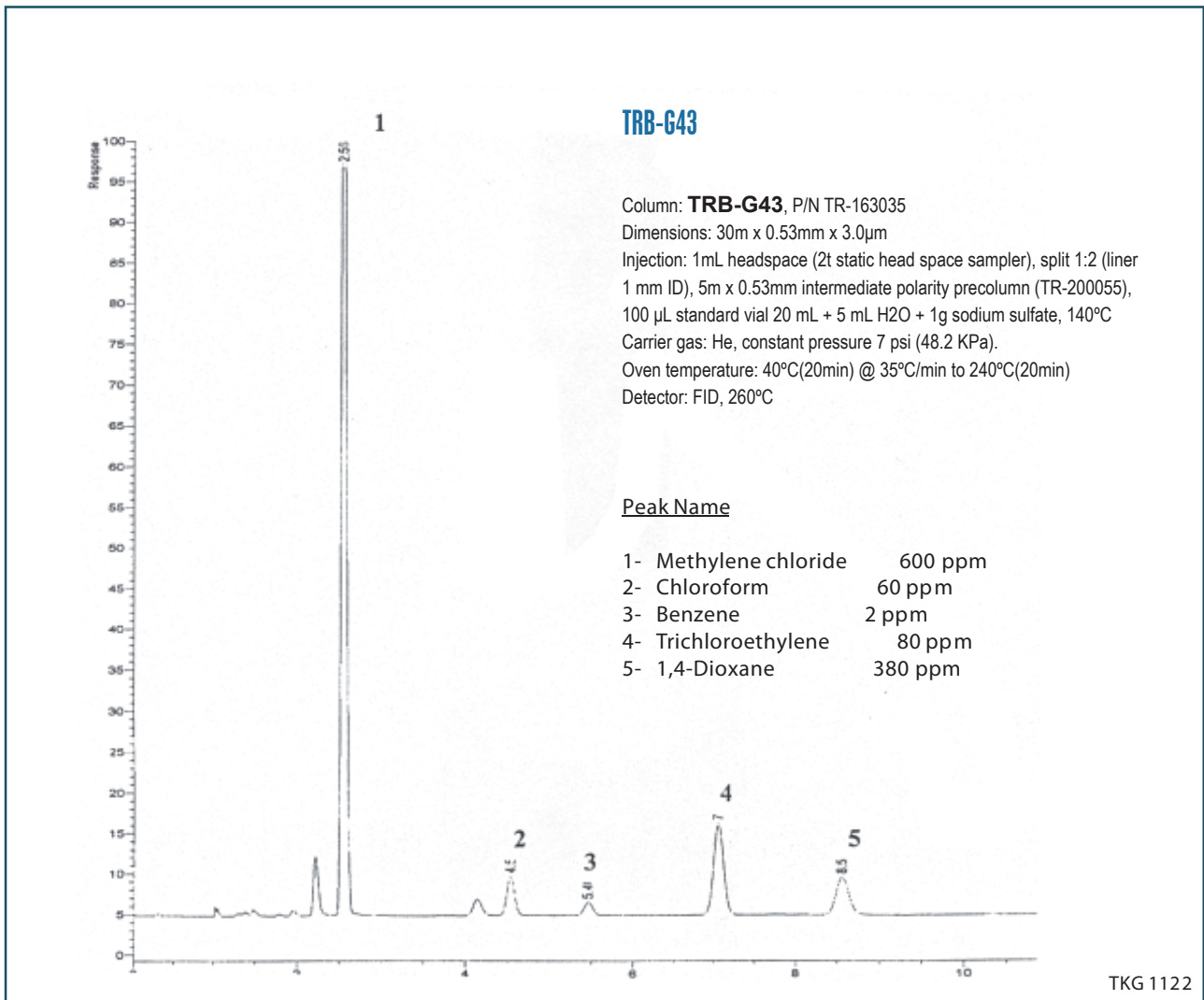


TRB-G43

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

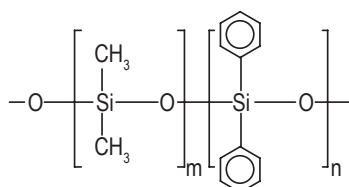
Agilent: HP-1301, HP-624, DB-1301, DB-624
 Supelco: SPB-1301, OVI-G43
 Restek: Rtx-1301, Rtx-624
 SGE: BPX-624
 Alltech: AT-624
 USP Nomenclature: G43



TRB-14

(14%) Diphenyl - (86%) dimethylpolysiloxane, bonded and crosslinked phase.

- (14%) Diphenyl- (86%) dimethylpolysiloxane.
- Column of intermediate polarity without cyanopropyl groups in its structure.
- Chemical inertness and low bleed guaranteed.
- Confirmation column alongside TRB-1 and TRB-5.



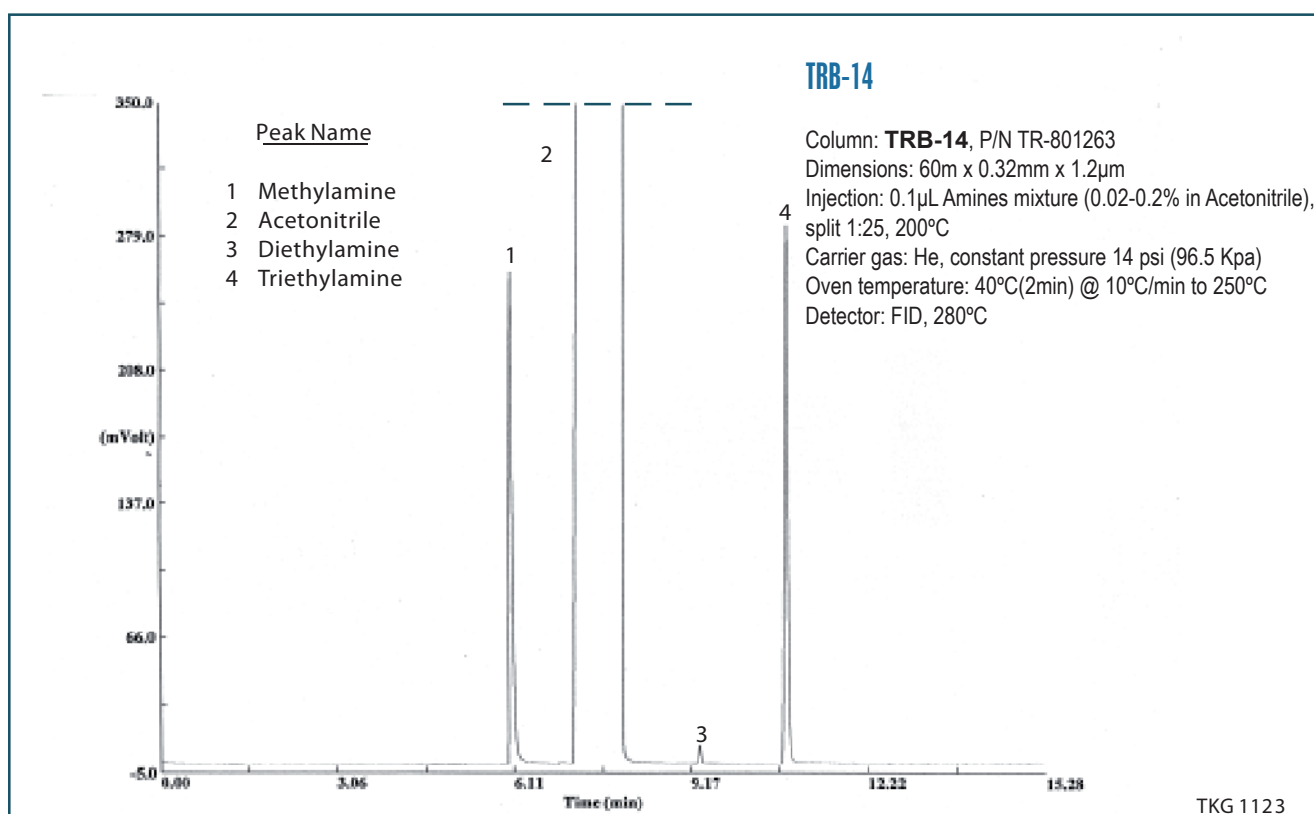
STRUCTURE OF POLY(DIMETHYLDIPHENYL)SILOXANE

TRB-14 EQUIVALENT PHASE

Varian: CP-SIL 13 CB

TRB-14

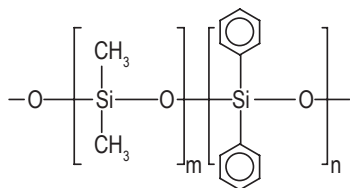
Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N° (P/N)	
0,25	15	0,20	-20 to 300/330	TR-802112	
	15	0,40	-20 to 300/330	TR-800412	
	15	1,20	-20 to 300/330	TR-801212	
	30	0,20	-20 to 300/330	TR-802132	
	30	0,40	-20 to 300/330	TR-800432	
	30	1,20	-20 to 300/330	TR-801232	
	60	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-20

(20%) Diphenyl-(80%) Dimethylpolysiloxane, bonded and crosslinked phase.

- (20%) Diphenyl-(80%) dimethylpolysiloxane.
- Column of intermediate polarity without cyanopropyl groups in its structure
- Excellent confirmation column.



STRUCTURE OF POLY(DIMETHYLDIPHENYL)SILOXANE

TRB-20 EQUIVALENT PHASE

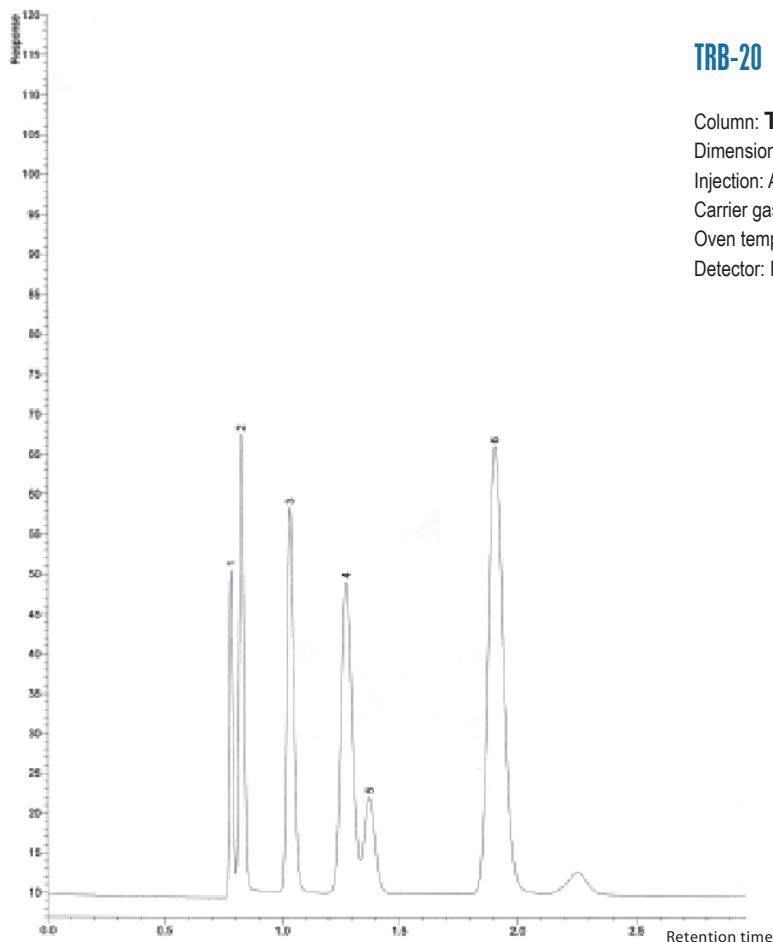
Supelco: SPB-20, VOCOL

Alltech: AT-20

Quadrex: 007-502

TRB-20

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



TRB-20

Column: **TRB-20**, P/N TR-203035

Dimensions: 30m x 0.53mm x 3.0µm

Injection: Alcohols in blood, 0.5 µL Head Space, split 5:1, 200°C

Carrier gas: He, constant pressure 10 psi (69Kpa)

Oven temperature: 40°C (isothermal)

Detector: FID, 200°C

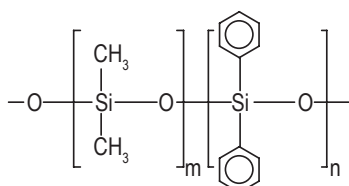
Peak Name

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

TRB-35

(35%) Diphenyl (65%) Dimethylpolysiloxane, bonded and crosslinked phase.

- (35%) Diphenyl-(65%) dimethylpolysiloxane.
- Column of intermediate polarity without cyanopropyl groups in its structure.
- Excellent confirmation column.



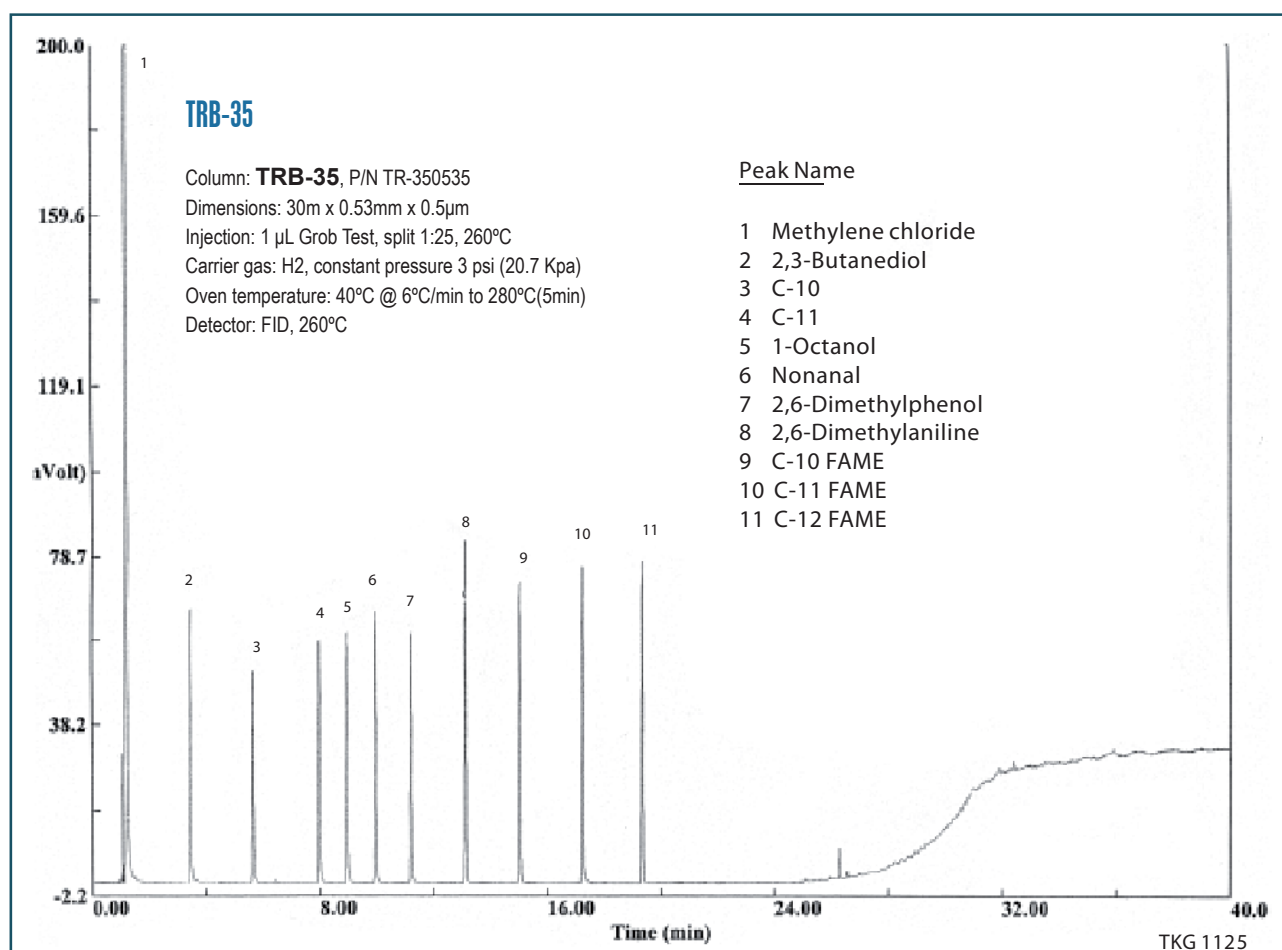
STRUCTURE OF POLY(DIMETHYLDIPHENYL)SILOXANE

TRB-35 EQUIVALENT PHASE

Agilent: HP-35, DB-35
Supelco: SPB-35
Restek: Rtx-35
SGE: BPX-35
Alltech: AT-35
Quadrex: 007-11

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-1701

(14%) Cyanopropylphenyl-(86%) dimethyl polysiloxane, bonded and crosslinked phase.

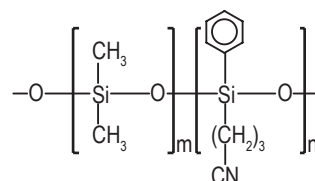
- (14%) Cyanopropyl-phenyl- (86%)dimethylpolysiloxane.
- Intermediate polarity column of wide use.
- Historically used in the analysis of pesticides.

TRB-1701 EQUIVALENT PHASE

Agilent: HP-1701, PAS-1701, DB-1701
Supelco: SPB-1701
Restek: Rtx-1701
Varian: CP-SIL 19 CB
SGE: BP-10
Alltech: AT-1701
Quadrex: 007-1701

TRB-1701

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N° (P/N)
0,20	15	0,20	-20 to 280/280	TR-132119
	30	0,20	-20 to 280/280	TR-132139
	60	0,20	-20 to 280/280	TR-132169
0,25	15	0,25	-20 to 280/280	TR-130212
	15	0,50	-20 to 270/280	TR-130512
	15	1,00	-20 to 260/280	TR-131012
	30	0,10	-20 to 280/280	TR-130132
	30	0,25	-20 to 280/280	TR-130232
	30	0,50	-20 to 270/280	TR-130532
	30	1,00	-20 to 260/280	TR-131032
	60	0,10	-20 to 280/280	TR-130162
	60	0,25	-20 to 280/280	TR-130262
	60	0,50	-20 to 270/280	TR-130562
	60	1,00	-20 to 260/280	TR-131062

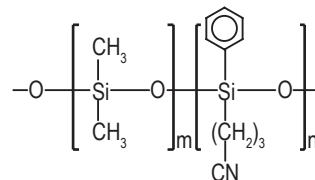


STRUCTURE OF POLY(DIMETHYLDIPHENYL)SILOXANE

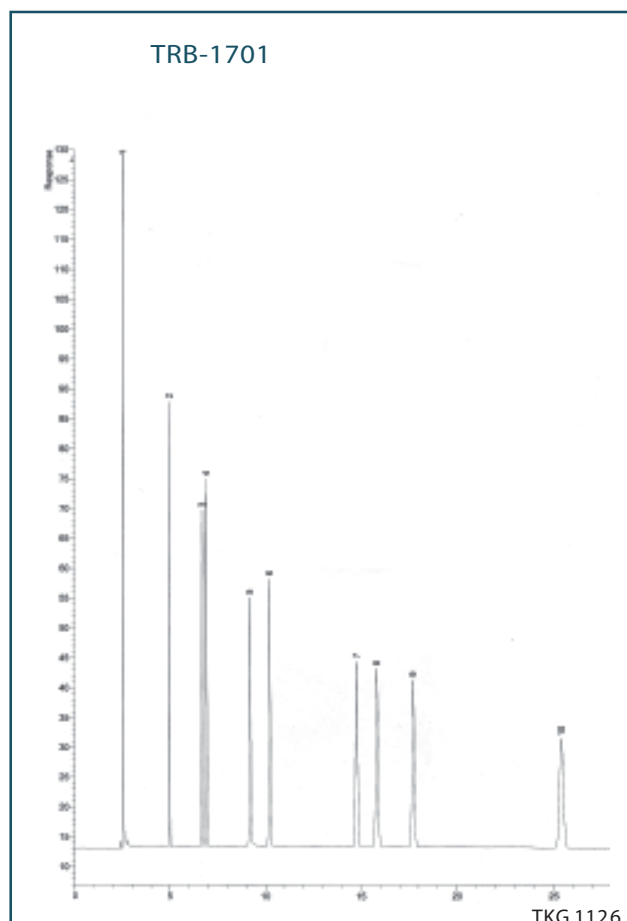
TRB-225

(50%) Cyanopropylphenyl - (50%) dimethyl polysiloxane, bonded and crosslinked phase.

- (50%) Cyanopropylphenyl - (50%) dimethyl polysiloxane.
- Medium/high polarity column.
- Excellent for separating cis-trans isomers of FAMES and sugar derivatives.



STRUCTURE OF POLY(DIMETHYLDIPHENYL)SILOXANE

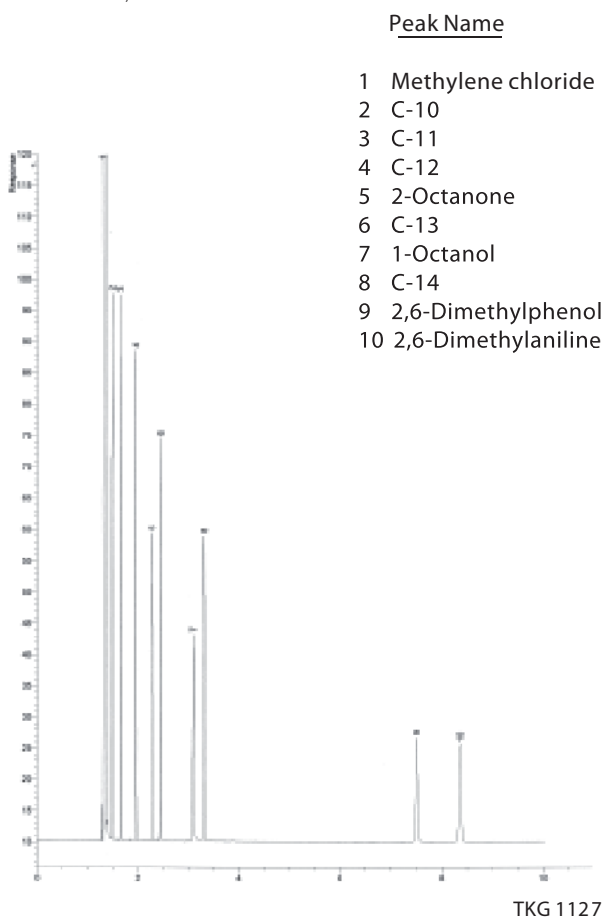


TRB-225 EQUIVALENT PHASE

Agilent: HP-225, DB-225
Restek: Rtx-225
Varian: CP-SIL 43 CB
SGE: BP-225
Alltech: AT-225
Quadrex: 007-225

TRB-225

Column: **TRB-225**, P/N TR-251332
 Dimensions: 30m x 0.25mm x 0.15µm
 Injection: 1 µL standard SP-4-7301, split 1:50, 260°C
 Carrier gas: H2, constant pressure 12 psi (82.7 Kpa)
 Oven temperature: 110°C
 Detector: FID, 280°C



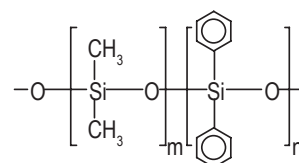
Peak Name

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

TRB-50

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

- (50%) Diphenyl-(50%) dimethyl polysiloxane.
- Medium polarity column.
- Excellent column for confirmation of TRB-5 analyses.



STRUCTURE OF POLY(DIMETHYLDIPHENYL)SILOXANE

TRB-50

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,25	15	0,15	0 to 300/320	TR-501312
	15	0,25	0 to 300/320	TR-500212
	15	0,50	0 to 290/310	TR-500512
	30	0,15	0 to 300/320	TR-501332
	30	0,25	0 to 300/320	TR-500232
	30	0,50	0 to 290/310	TR-500532
	60	0,15	0 to 300/320	TR-501362
	60	0,25	0 to 300/320	TR-500262
	60	0,50	0 to 290/310	TR-500562
	0,32	15	0,15	0 to 300/320
15		0,25	0 to 300/320	TR-500213
15		0,50	0 to 290/310	TR-500513
30		0,15	0 to 300/320	TR-501333
30		0,25	0 to 300/320	TR-500233
30		0,50	0 to 290/310	TR-500533
60		0,15	0 to 300/320	TR-501363
60		0,25	0 to 300/320	TR-500263
60		0,50	0 to 290/310	TR-500563
0,53		15	0,50	0 to 270/290
	15	1,00	0 to 260/280	TR-501015
	30	0,50	0 to 270/290	TR-500535
	30	1,00	0 to 260/280	TR-501035
	60	0,50	0 to 270/290	TR-500565
	60	1,00	0 to 260/280	TR-501065

TRB-225

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
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

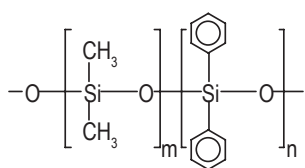
TRB-50 EQUIVALENT PHASE

Agilent: HP-50, +DB-17, DB-608
 Supelco: SPB-50, SPB-2250
 Restek: Rtx-50
 Varian: CP-SIL 24 CB
 Alltech: AT-50
 Quadrex: 007-17

TRB-50HT

(50%) Diphenyl-(50%) dimethylpolysiloxane, bonded and crosslinked phase

- (50%) Diphenyl-(50%) dimethylpolysiloxane.
- Medium polarity column with high thermal stability.
- Best column for triglycerides analysis.



STRUCTURE OF POLY(DIMETHYLDIPHENYL)SILOXANE

TRB-50ht

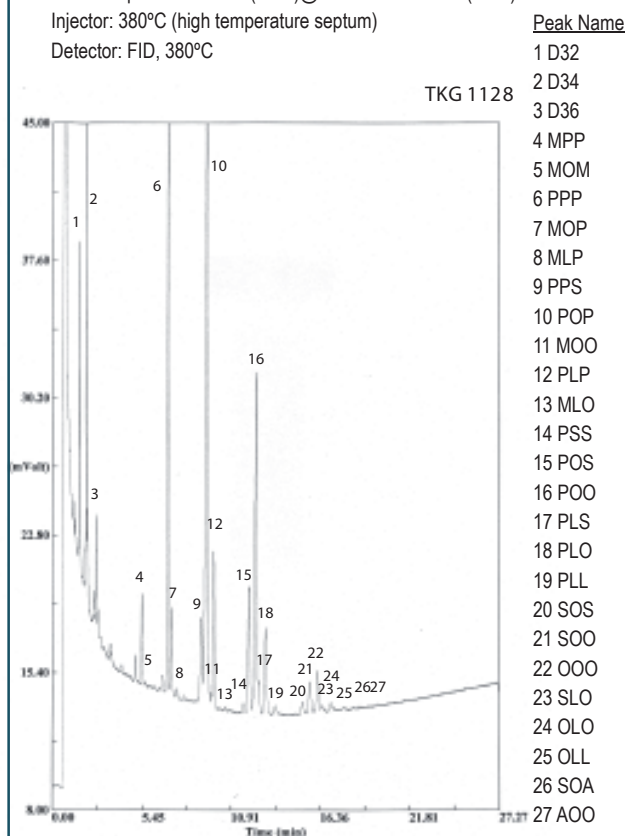
Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,25	15	0,10	50 to 370	TR-530112
	15	0,15	50 to 370	TR-531312
	30	0,10	50 to 370	TR-530132
	30	0,15	50 to 370	TR-531332

TRB-50HT EQUIVALENT PHASE

Agilent: DB17ht
Restek: Rtx-65
Varian: TAB-CB
Quadrex: 007-65HT

TRB-50HT

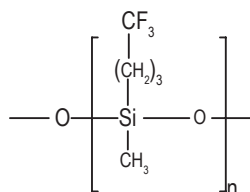
Column: **TRB-50ht**, P/N TR-531312
Dimensions: 15m x 0.25mm x 0.15mm
Injection: 0.2mL Triglycerides Palm Oil in Isooctane(50 mg/mL), split 1:12
Carrier gas: H2, constant pressure, 9psi (56 KPa)
Oven temperature: 340°C(1min)@0.5°C/min to 355°C(5min)
Injector: 380°C (high temperature septum)
Detector: FID, 380°C



TRB-F50

(50%) Trifluoropropyl-(50%) Methylpolysiloxane, bonded and crosslinked phase.

- (50%) Trifluoropropyl-(50%) Methylpolysiloxane.
- High polarity column.
- Column designed for the EPA 609 and 8140 methods.



POLY (METHYL + TRIFLUOROPROPYL) SILOXANE

TRB-F50

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

TRB-F50

Column: **TRB-F50**, P/N TR-570533

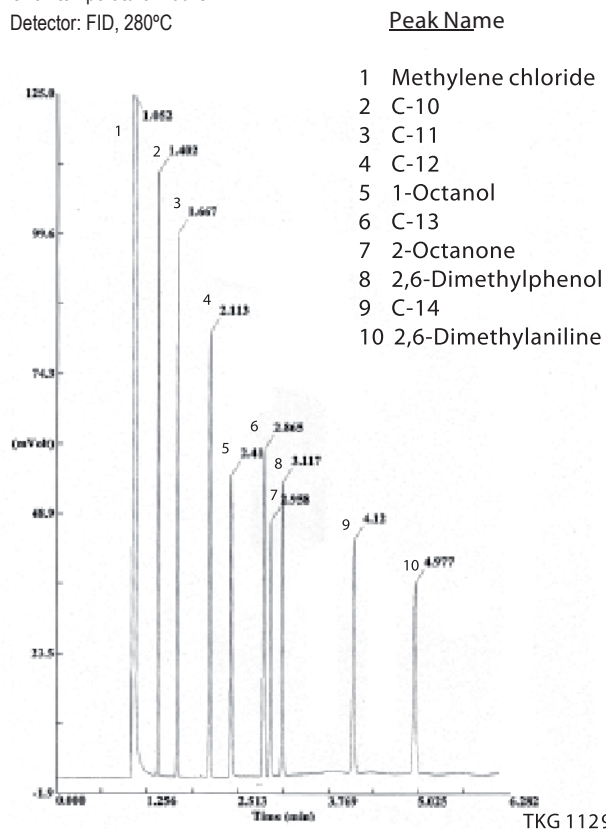
Dimensions: 30m x 0.32mm x 0.5µm

Injection: 1µL standard SP-4-7301 (500 ng/mL comp), split 1:50, 260°C

Carrier gas: H2, constant pressure, 7psi (48.2 KPa)

Oven temperature: 100°C

Detector: FID, 280°C



TRB-F50 EQUIVALENT PHASE

Agilent: DB-210, DB-200

Restek: Rtx-200

Alltech: AT-210

Quadrex: 007-210

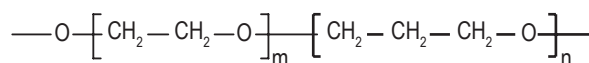
TRB-PAG

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

- (50%) Polyethylene-(50%) polypropylene glycol.
- Phase polarity slightly lower than TRB-WAX due to the inclusion of groups of propylene oxide.
- Polarity similar to UCON phase.

TRB-PAG

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. No. (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



POLYETHYLENE GLYCOL

TRB-PAG EQUIVALENT PHASE

Supelco: PAG

TRB-PAG

Column: TRB-PAG, P/N TR-550232

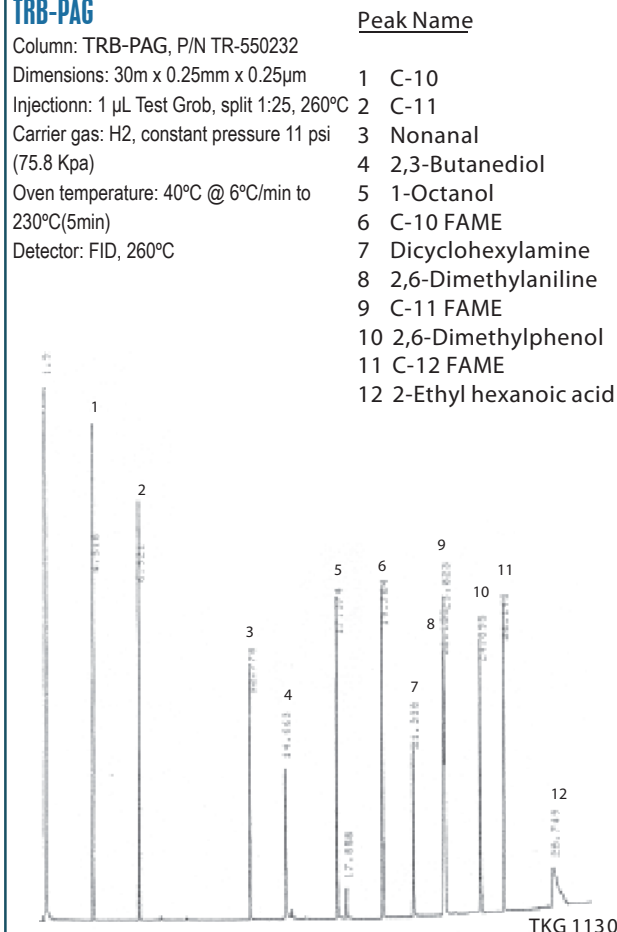
Dimensions: 30m x 0.25mm x 0.25µm

Injection: 1 µL Test Grob, split 1:25, 260°C

Carrier gas: H2, constant pressure 11 psi (75.8 Kpa)

Oven temperature: 40°C @ 6°C/min to 230°C(5min)

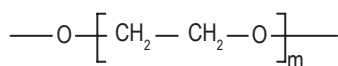
Detector: FID, 260°C



TRB-WAX

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

- 100% Polyethylene glycol (PEG).
- High polarity column.
- Wide range of working temperatures and high thermal stability (270° C)
- Ideal for separating alcohols, aldehydes, ketones and aromatic isomers (BTX)



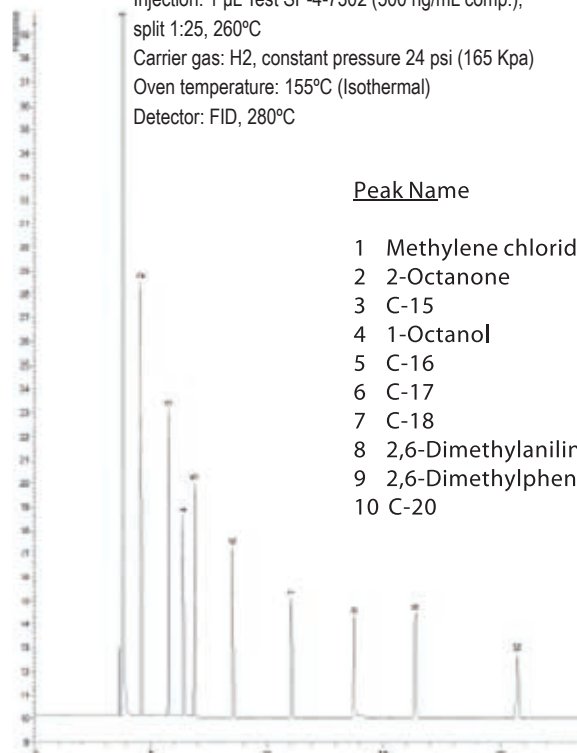
POLYETHYLENE GLYCOL

TRB-AWX EQUIVALENT PHASE

Agilent: HP-20M, INNOWAX, DB-WAX, DBWAXetr
Supelco: SUPELCOWAX-10, Carbowax 20M
Restek: STABILWAX
Varian: CP-WAX 52CB
SGE: BP-20
Alltech: AT-WAX

TRB-WAX

Column: TRB-WAX, P/N TR-140262
Dimensions: 60m x 0.25mm x 0.25µm
Injection: 1 µL Test SP-4-7302 (500 ng/mL comp.), split 1:25, 260°C
Carrier gas: H2, constant pressure 24 psi (165 Kpa)
Oven temperature: 155°C (Isothermal)
Detector: FID, 280°C



Peak Name

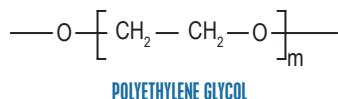
- 1 Methylene chloride
- 2 2-Octanone
- 3 C-15
- 4 1-Octanol
- 5 C-16
- 6 C-17
- 7 C-18
- 8 2,6-Dimethylaniline
- 9 2,6-Dimethylphenol
- 10 C-20

TKG 1131

TRB-WAX

Internal Length Diam.(mm)(m)	Film Thickness(µm)	Temp limits (°C)	Pat. N°. (P/N)	
0,10	10	0,10	40 to 260/270	TR-140141
	10	0,20	40 to 260/270	TR-142141
	20	0,10	40 to 260/270	TR-140181
	20	0,20	40 to 260/270	TR-142181
0,20	15	0,20	40 to 260/270	TR-142119
	15	0,40	40 to 260/270	TR-140419
	30	0,20	40 to 260/270	TR-142139
	30	0,40	40 to 260/270	TR-140439
	60	0,20	40 to 260/270	TR-142169
	60	0,40	40 to 260/270	TR-140469
0,25	15	0,10	40 to 260/270	TR-140112
	15	0,25	40 to 260/270	TR-140212
	15	0,50	40 to 260/270	TR-140512
	30	0,10	40 to 260/270	TR-140132
	30	0,25	40 to 260/270	TR-140232
	30	0,50	40 to 260/270	TR-140532
	30	1,00	40 to 260/270	TR-141032
	60	0,10	40 to 260/270	TR-140162
	60	0,25	40 to 260/270	TR-140262
	60	0,50	40 to 260/270	TR-140562

Internal Length Diam.(mm)(m)	Film Thickness(µm)	Temp limits (°C)	Pat. N°. (P/N)	
0,32	15	0,10	40 to 260/270	TR-140113
	15	0,25	40 to 260/270	TR-140213
	15	0,50	40 to 260/270	TR-140513
	30	0,10	40 to 260/270	TR-140133
	30	0,25	40 to 260/270	TR-140233
	30	0,50	40 to 260/270	TR-140533
	50	1,20	40 to 230/240	TR-141253
	60	0,10	40 to 260/270	TR-140163
	60	0,25	40 to 260/270	TR-140263
	60	0,50	40 to 260/270	TR-140563
0,53	60	1,00	40 to 230/240	TR-141063
	60	1,20	40 to 230/240	TR-141263
	100	1,00	40 to 230/240	TR-141093
	10	1,00	40 to 240/250	TR-141045
	15	1,00	40 to 240/250	TR-141015
	30	1,00	40 to 240/250	TR-141035
	30	1,33	40 to 240/250	TR-141735
	30	2,00	40 to 240/250	TR-142035
	60	1,00	40 to 240/250	TR-141065
	60	2,00	40 to 240/250	TR-142065



TRB-FFAP

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

- 100% Polyethylene glycol (PEG) esterified with nitroterephthalic acid.
- Ideal for analysis of free acids (without derivatization), phenols and glycols.
- High thermal stability (250°C)

TRB-FFAP

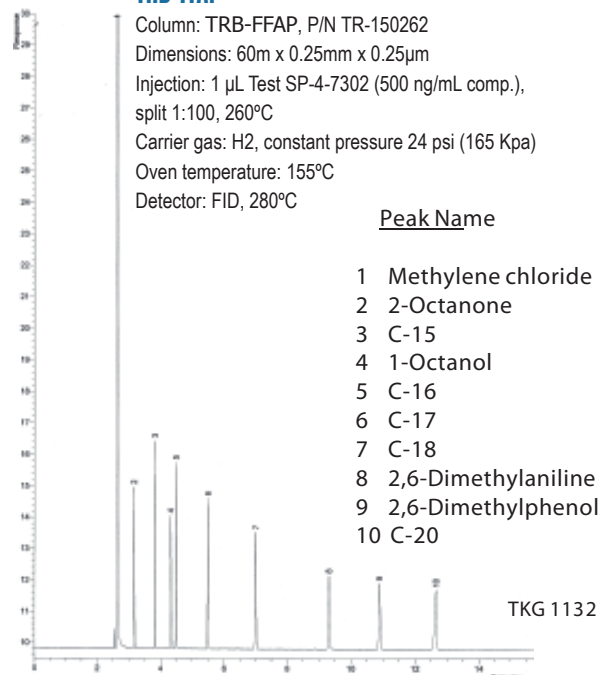
Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N° (P/N)
0,20	15	0,30	40 to 240/250	TR-152119
	30	0,30	40 to 240/250	TR-152139
	60	0,30	40 to 240/250	TR-152169
0,25	15	0,25	40 to 240/250	TR-150212
	30	0,25	40 to 240/250	TR-150232
	60	0,25	40 to 240/250	TR-150262
0,32	15	0,25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

TRB-FFAP EQUIVALENT PHASE

Agilent: HP-FFAP, DB-FFAP
 Supelco: NUKOL, SP-1000
 Restek: STABILWAX-DA
 Varian: CP-WAX 58 CB
 SGE: BP-21
 Alltech: AT-1000, FFAP
 Quadrex: 007-FFAP

TRB-FFAP

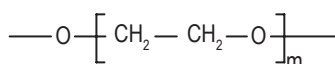
Column: TRB-FFAP, P/N TR-150262
 Dimensions: 60m x 0.25mm x 0.25µm
 Injection: 1 µL Test SP-4-7302 (500 ng/mL comp.), split 1:100, 260°C
 Carrier gas: H₂, constant pressure 24 psi (165 Kpa)
 Oven temperature: 155°C
 Detector: FID, 280°C



TRB-WAX.DB

(100%) Polyethylene glycol, nonbonded phase.

- 100% basic deactivated Polyethylene glycol (PEG).
- Excellent for analysing basic nonderivatized compounds
- Ideal for separating amines and nitrosamines.



POLYETHYLENE GLYCOL

TRB-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	TR-931015
	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

TRB-WAX.DB

Column: **TRB-WAX.DB**, P/N TR-932162

Dimensions: 60m x 0.25mm x 0.20µm

Injection: 1 µL Test SP-4-8278 (500 ng/mL comp.), split 1:50, 260°C

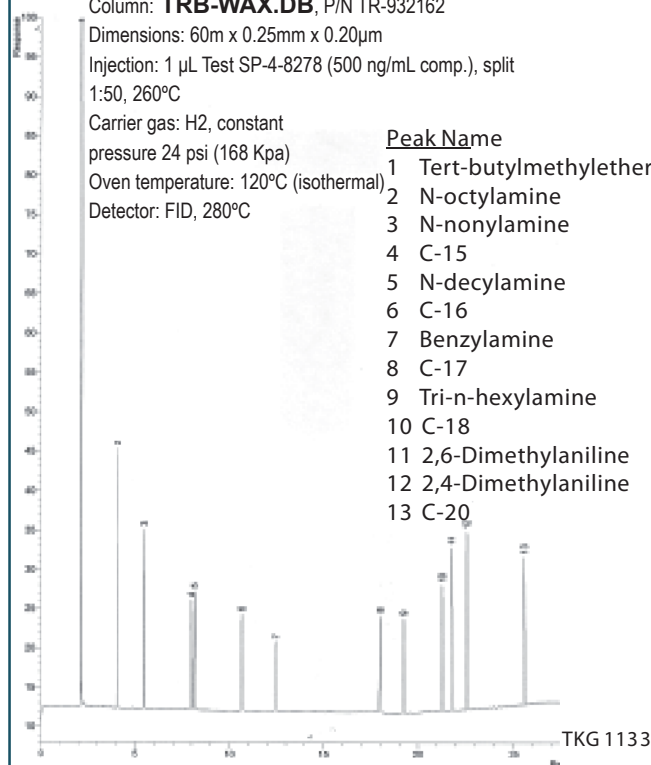
Carrier gas: H2, constant pressure 24 psi (168 Kpa)

Oven temperature: 120°C (isothermal)

Detector: FID, 280°C

Peak Name

- 1 Tert-butylmethylether
- 2 N-octylamine
- 3 N-nonylamine
- 4 C-15
- 5 N-decylamine
- 6 C-16
- 7 Benzylamine
- 8 C-17
- 9 Tri-n-hexylamine
- 10 C-18
- 11 2,6-Dimethylaniline
- 12 2,4-Dimethylaniline
- 13 C-20



TKG 1133

TRB-WAX.DB EQUIVALENT PHASE

Agilent: CAM, HP-BasicWax

Varian: CP-WAX 51

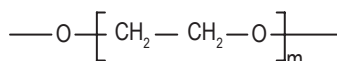
Supelco: Carbowax-Amine

Restek: Stabilwax-DB

TRB-WAXOMEGA

(100%) Polyethylene glycol, bonded and crosslinked phase.

- 100% Polyethylene glycol (PEG).
- High polarity column
- Specially designed for analysis of Omega 3 and Omega 6 fatty acids methyl esters.



POLYETHYLENE GLYCOL

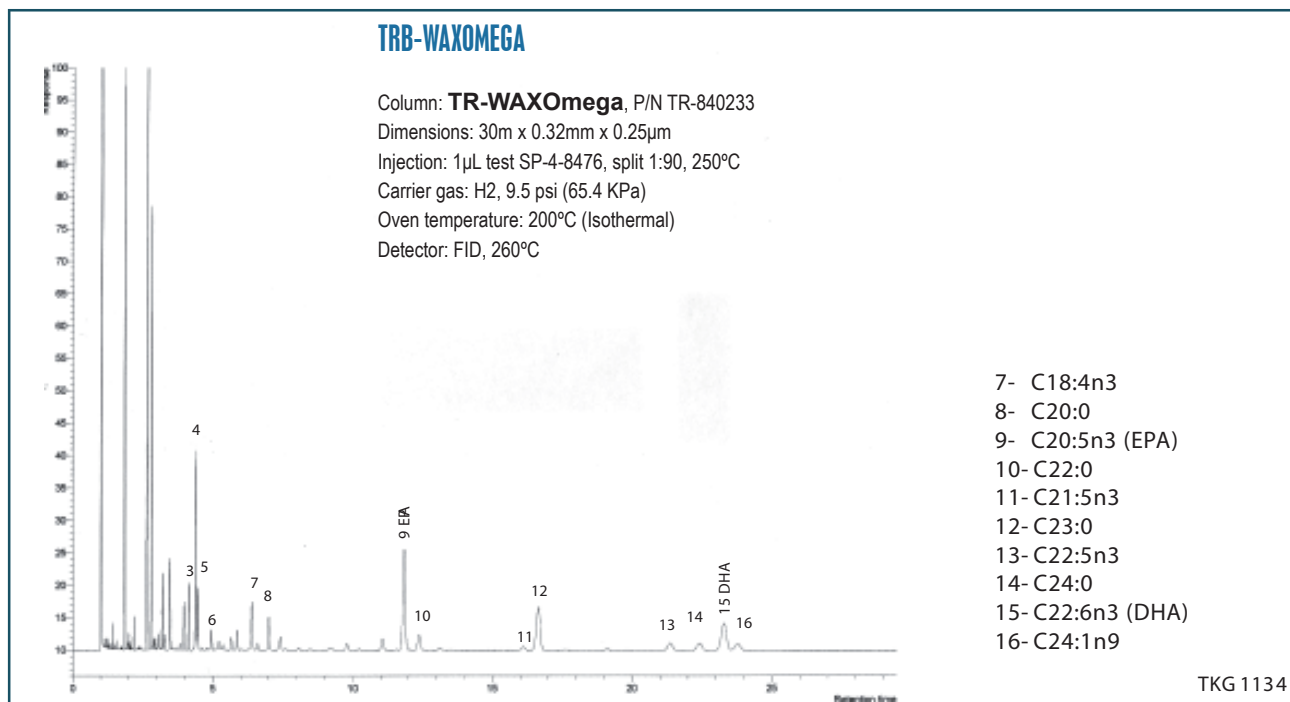
TRB-WAXOMEGA

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 EQUIVALENT PHASE

Supelco: Omegawax

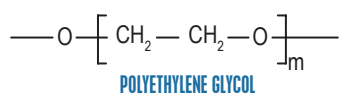
Restek: Famewax



META.WAX

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

- 100% Polyethylene glycol (PEG).
- High polarity column.
- Minimum operating temperature 20° C.
- Designed for analyzing volatiles in alcoholic beverages.
- Excellent symmetry for aldehyde and glycol peaks.

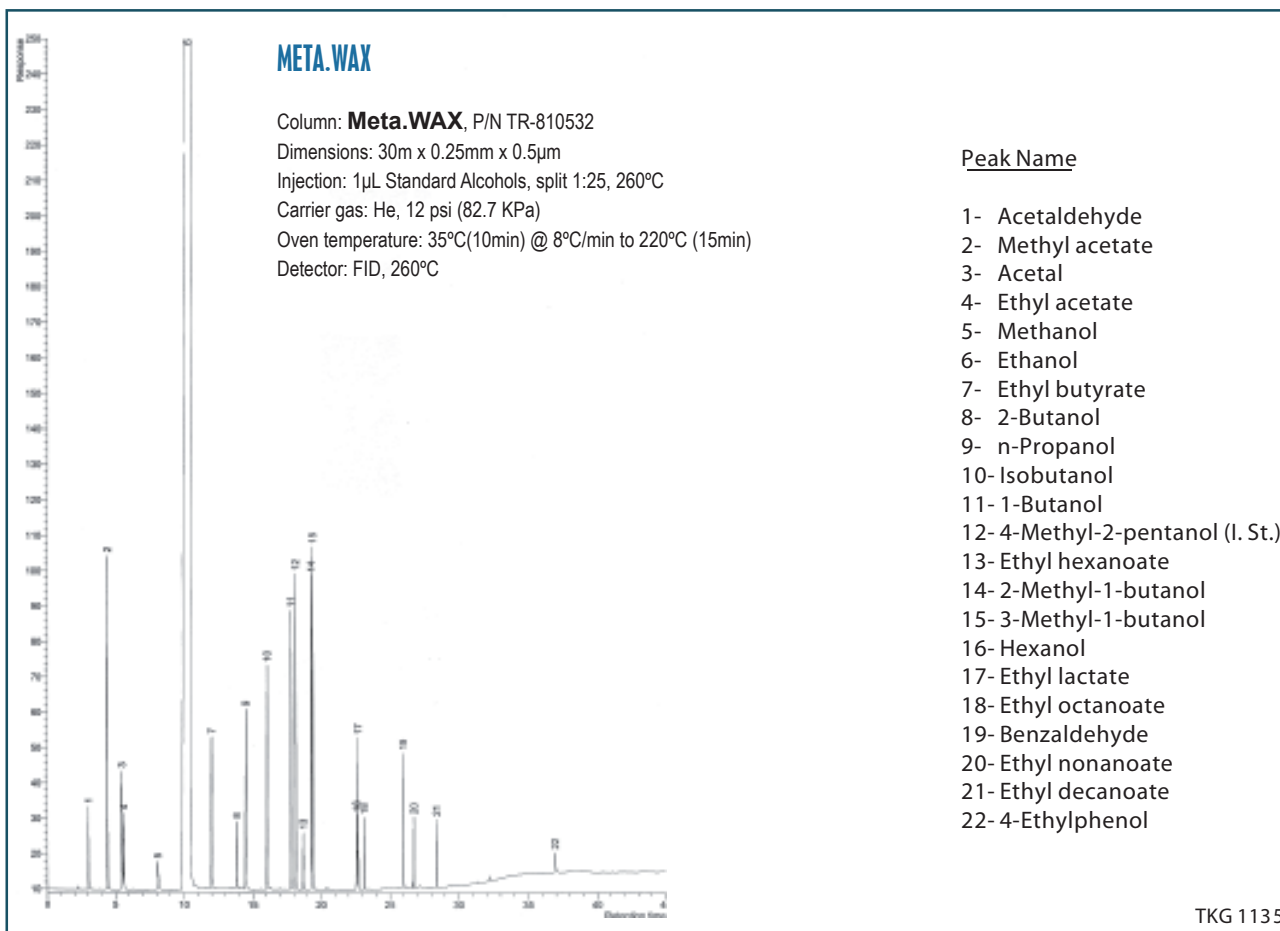


Meta.WAX

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N° (P/N)		
0,25	15	0,10	20 to 240/250	TR-810112		
		0,25	20 to 240/250	TR-810212		
		0,50	20 to 240/250	TR-810512		
	30	30	0,10	20 to 240/250	TR-810132	
			0,25	20 to 240/250	TR-810232	
			0,50	20 to 240/250	TR-810532	
	60	60	0,20	20 to 240/250	TR-812162	
			0,25	20 to 240/250	TR-810262	
			0,50	20 to 240/250	TR-810562	
0,32	15	0,25	20 to 240/250	TR-810213		
		0,50	20 to 240/250	TR-810513		
		1,00	20 to 230/240	TR-811013		
	30	30	0,25	20 to 240/250	TR-810233	
			0,50	20 to 240/250	TR-810533	
			1,00	20 to 230/240	TR-811033	
	60	60	0,25	20 to 240/250	TR-810263	
			0,50	20 to 240/250	TR-810563	
			0,64	20 to 240/250	TR-816463	
60	60	1,00	20 to 230/240	TR-811063		
		0,53	15	1,20	20 to 230/240	TR-811215
			30	1,20	20 to 230/240	TR-811235

META.WAX EQUIVALENT PHASE

Agilent: HP-WAX, DB-WAX
 Varian: CP-WAX 57 CB
 Restek: Rtx-WAX



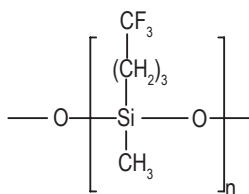
TR-CN100

(100%) Cyanopropyl polysiloxane, nonbonded phase

- 100% Cyanopropyl polysiloxane.
- Column of maximum polarity.
- Designed for separating fatty acids methyl esters (FAMES)
- High selectivity towards cis-trans isomers of FAMES.

TR-CN100

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



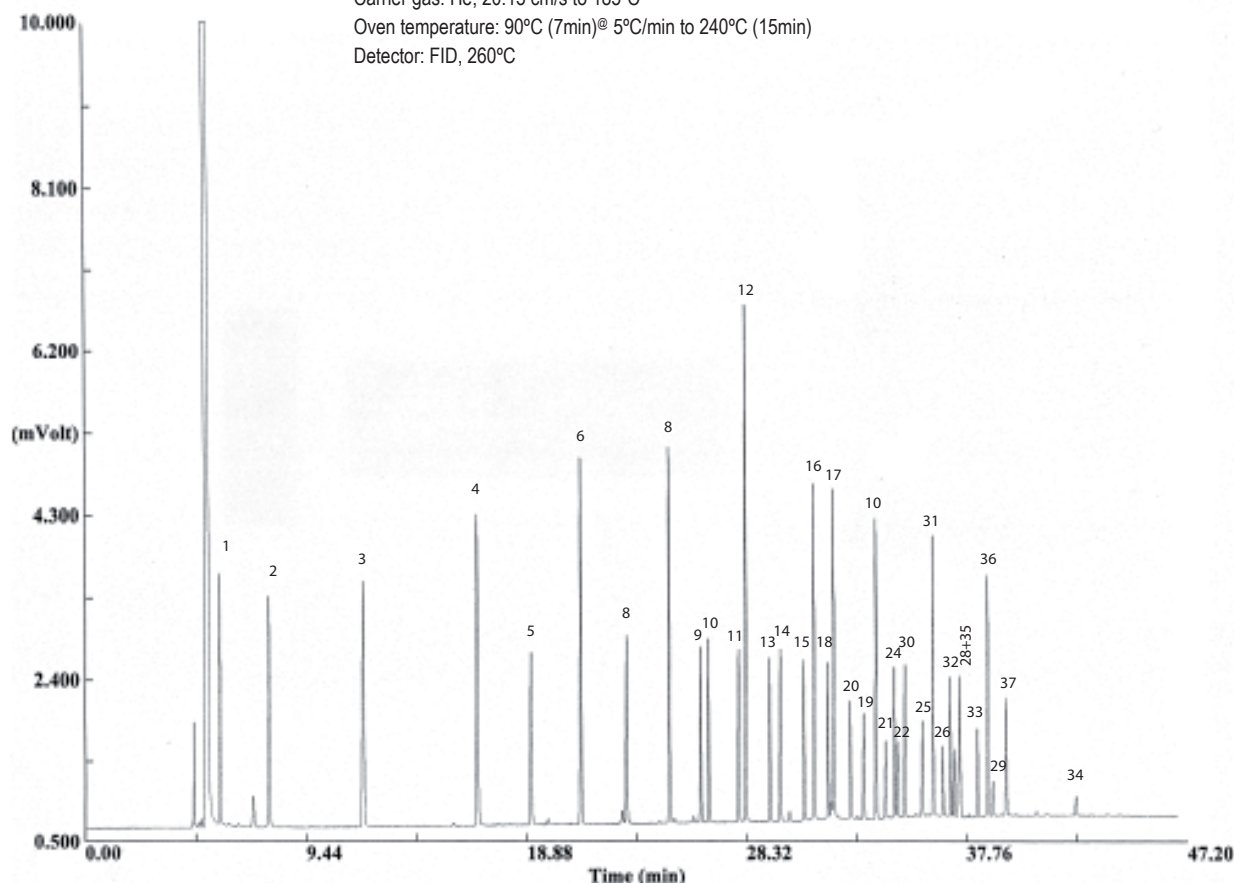
STRUCTURE OF POLY (DIMETHYLDIPHENYL) SILOXANE

TR-CN100 EQUIVALENT PHASE

Supelco: SP-2340, SP-2380
 Restek: Rt-2340, Rt-2330
 Varian: CP-SIL 88

TR-CN100

Column: **TR-CN100**, P/N TR-882162
 Dimensions: 60 m x 0.25 mm x 0.20 µm
 Injection: 1 µL SP-47885 FAMES (10 mg/mL), split 1:100, 260°C
 Carrier gas: He, 20.15 cm/s to 185°C
 Oven temperature: 90°C (7min)@ 5°C/min to 240°C (15min)
 Detector: FID, 260°C



Peak Name

1- Butyric acid methyl ester (C4:0)	19- Linoleic acid methyl ester (C18:2n6c)
2- Caproic acid methyl ester (C6:0)	20- Linolelaidic acid methyl ester (C18:2n6t)
3- Caprylic acid methyl ester (C8:0)	21-?-Linolenic acid methyl ester (C18:3n6)
4- Capric acid methyl ester (C10:0)	22- Linolenic acid methyl ester (C18:3n3)
5- Undecanoic acid methyl ester (C11:0)	23-Arachidic acid methyl ester (C20:0)
6- Lauric acid methyl ester (C12:0)	24-Cis11-eicosenoic acid methyl ester (C20:1)
7- Tridecanoic acid methyl ester (C13:0)	25-Cis11,14-eicosadienoic acid methyl ester (C20:2)
8- Myristic acid methyl ester (C14:0)	26-Cis8,11,14-eicosatrienoic acid methyl ester (C20:3n6)
9- Myristoleic acid methyl ester (C14:1)	27-Cis11,14,17-eicosatrienoic acid methyl ester (C20:3n3)
10- Pentadecanoic acid methyl ester (C15:0)	28- Arachidonic acid methyl ester (C20:4n6)
11-Cis10-pentadecenoic acid methyl ester (C15:1)	29-Cis5,8,11,14,17-eicosapentaenoic acid methyl ester (C20:5n3)
12- Palmitic acid methyl ester (C16:0)	30- Heneicosanoic acid methyl ester (C21:0)
13- Palmitoleic acid methyl ester (C16:1)	31- Behenic acid methyl ester (C22:0)
14- Heptadecanoic acid methyl ester (C17:0)	32- Erucic acid methyl ester (C22:1n9)
15-Cis10-heptadecenoic acid methyl ester (C17:1)	33-Cis13,16-docosadienoic acid methyl ester (C22:2)
16- Stearic acid methyl ester (C18:0)	34-Cis4,7,10,13,16,19-docosahexaenoic acid methyl ester r (C22:6n3)
17- Oleic acid methyl ester (C18:1n9c)	35- Tricosanoic acid methyl ester (C23:0)
18- Elaidic acid methyl ester (C18:1n9t)	36- Lignoceric acid methyl ester (C24:0)
	37- Nervonic acid methyl ester (C24:1)

TKG 1136

TR-CRESOL

Proprietary nonbonded phase.

- Stationary phase of perfectly defined purity.
- Column specially designed for 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

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,25	30	0,20	130	TR-712132
	60	0,20	130	TR-712162

TR-CRESOL EQUIVALENT PHASE

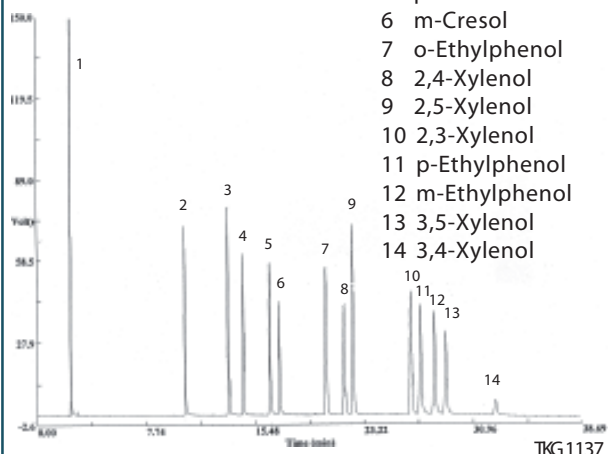
Varian: CP-CRESOL

TR-CRESOL

Column: TR-CRESOL, P/N TR-712162
 Dimensions: 60m x 0.25mm x 0.20µm
 Injection: 1 µL standard Cresols (5000 ng/mL comp.), split 1:25, 150°C
 Carrier gas: H2, constant pressure 24 psi (165 Kpa)
 Oven temperature: 130°C
 Detector: FID, 150°C

Peak Name

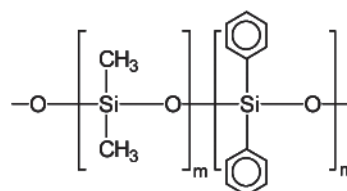
- 1 Methylene chloride
- 2 Phenol
- 3 o-Cresol
- 4 2,6-Xylenol
- 5 p-Cresol
- 6 m-Cresol
- 7 o-Ethylphenol
- 8 2,4-Xylenol
- 9 2,5-Xylenol
- 10 2,3-Xylenol
- 11 p-Ethylphenol
- 12 m-Ethylphenol
- 13 3,5-Xylenol
- 14 3,4-Xylenol



TR-17

Polymethylphenylsiloxane

- Polymethylphenylsiloxane.
- Recommended by pharmacopoeia for determining the impurities of sodium saccharin (o-p-toluenesulphonamides).



Structure of Poly(dimethyldiphenyl)siloxane

TR-17

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,53	10	2,0	0 to 220/240	TR-502045

TR-17 EQUIVALENT PHASE

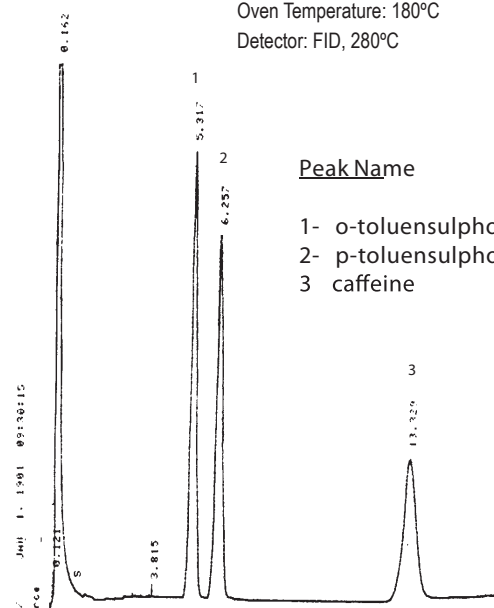
Agilent: HP-17

TR-17

Column: TR-17 P/N TR-502045
 Dimensions: 10m X 0,53 mm X 2.0 µm
 Injector: 260°C
 Carrier gas: He, 6.5 psi
 Injection: 1ml standard, split (1:4)
 Oven Temperature: 180°C
 Detector: FID, 280°C

Peak Name

- 1- o-toluenesulphonamide
- 2- p-toluenesulphonamide
- 3 caffeine



META.VOC

Proprietary bonded and crosslinked phase.

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

Meta.VOC

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
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 240/230	TR-943063
0,53	30	3,00	-20 to 240/230	TR-943035
	60	3,00	-20 to 240/230	TR-943065
	105	3,00	-20 to 240/230	TR-9430K5

META.VOC EQUIVALENT PHASE

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

TRB-608

Proprietary bonded and crosslinked phase.

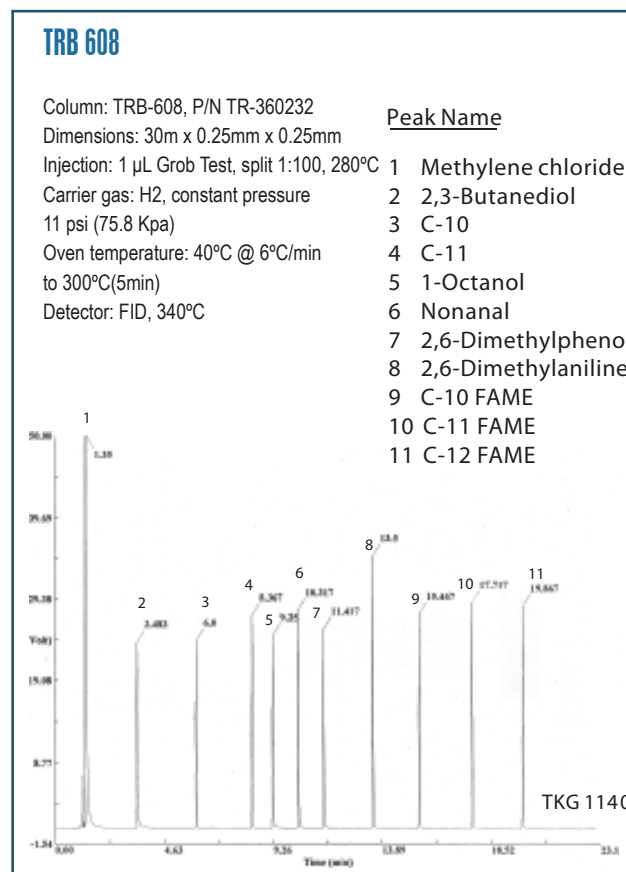
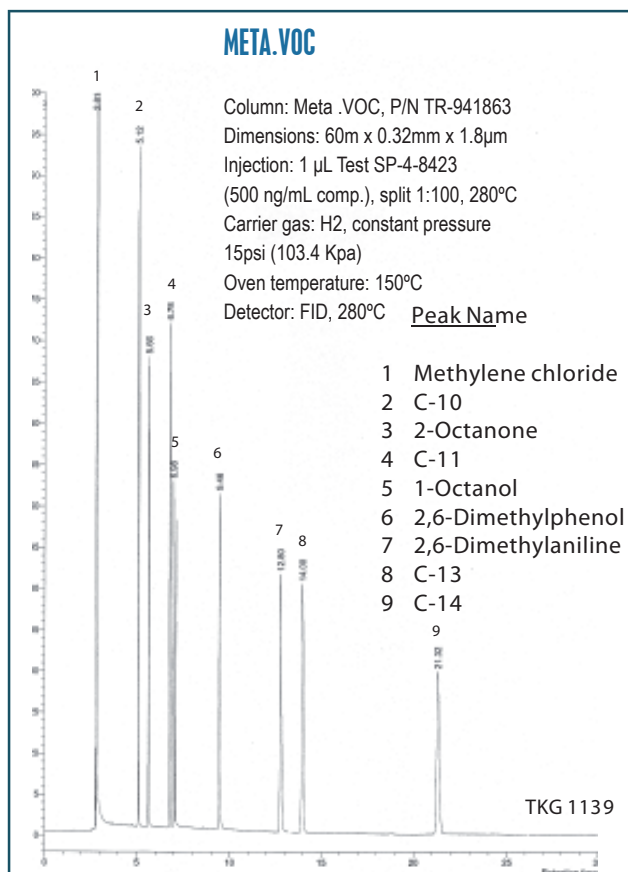
- Specifically designed for analysing chlorinated pesticides and PCBs
- Designed for the EPA 508, 608 and 8080 methods.

TRB-608

Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
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 EQUIVALENT PHASE

Agilent: HP-608
Supelco: SPB-608
SGE: BP-608



TR-TCEP

1, 2, 3-tris (2-cyanoethoxy) propane, nonbonded phase

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

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	TR-960432
	60	0,40	0 to 135	TR-960462

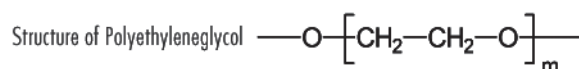
TR-TCEP EQUIVALENT PHASE

Supelco: TCEP
Restek: Rt-TCEP
Varian: CP-TCEP

META.WAX 400

100% Polyethylene glycol (PEG), nonbonded phase.

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



Meta.WAX 400

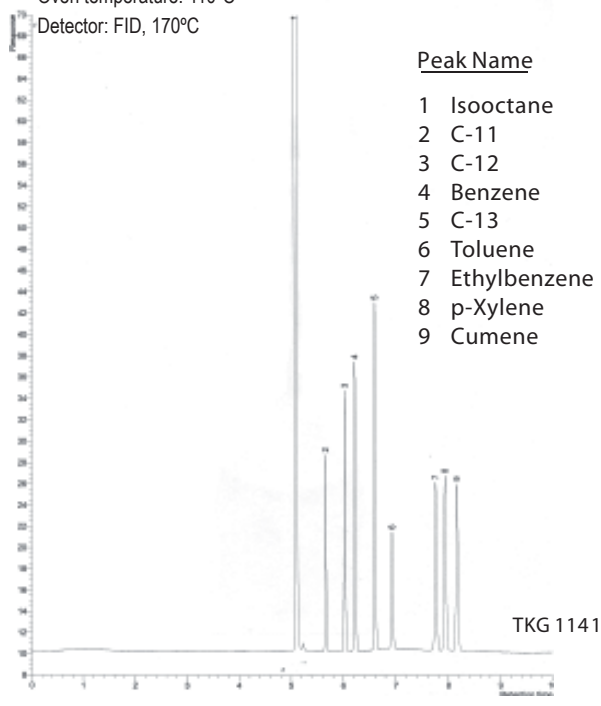
Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N° (P/N)
0,32	50	0,20	0 to 60/80	TR-402153

META.WAX 400 EQUIVALENT PHASE

Varian: CP Carbowax 400

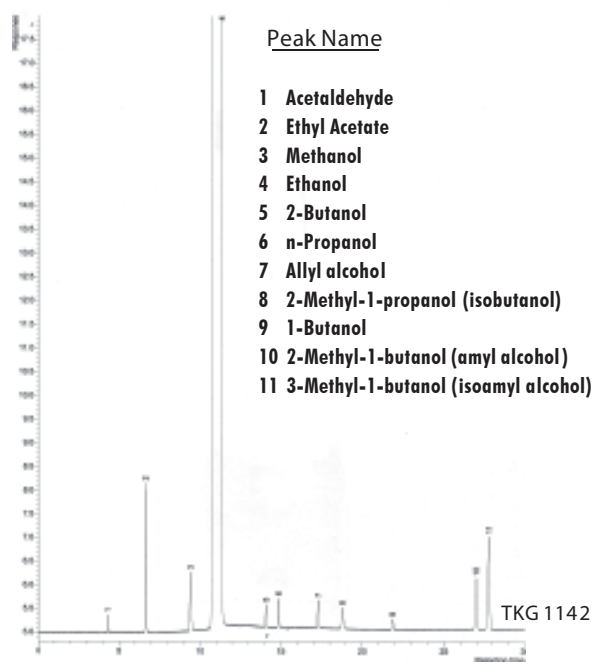
TR-TCEP

Column: TR-TCEP, P/N TR-960462
Dimensions: 60m x 0.25mm x 0.40µm
Injection: 1 µL standard (20 ng/mL comp.), split 1:50, 170°C
Carrier gas: H₂, constant pressure 24 psi (165 Kpa)
Oven temperature: 110°C
Detector: FID, 170°C



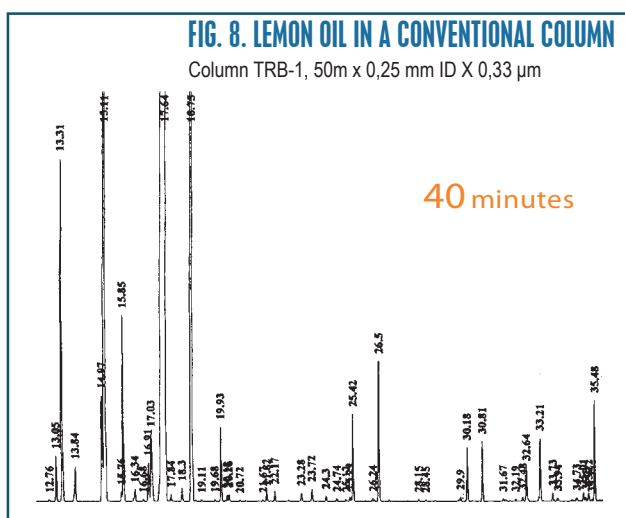
META.WAX 400

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

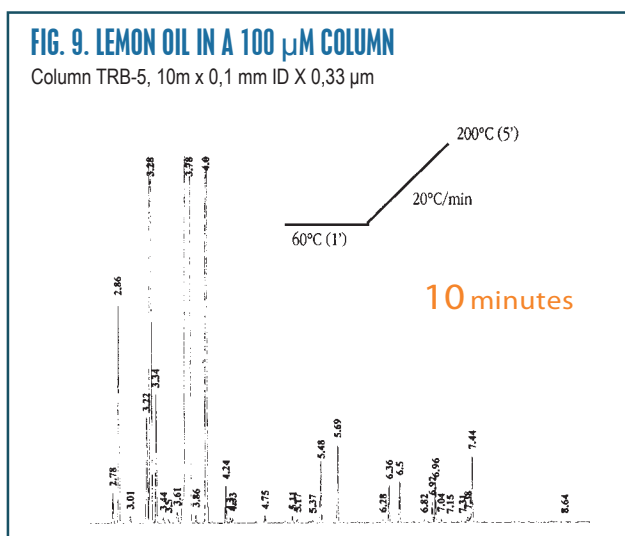


- **MINIMUM BLEED LEVEL** (approximately 10 times less than that of a conventional column of 0.25 mm ID).
- **HIGH ANALYTICAL SPEED** (the analysis are approximately 3 times faster than a conventional column of 0.25 mm ID).

These columns of 100 μm internal diameter also enable them to be connected to a conventional chromatograph fitted with a SPLIT/SPLITLESS injector, and due to its great efficiency ($\sim 7,000\text{-}10,000$ plates/m) and its reduced diameter, the analysis can be undertaken with greater speed compared to standard capillary columns, without loss of peak resolving power. Having such a high level of efficiency enables the analysis of complex mixtures, with a large number of components. The standard length is 10 metres (Fig. 8 and Fig. 9).



TKG 1143



TKG 1144

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 from the injector cavity or with ferrules.

At optimized pressure the carrier gas flow is low ($\text{H}_2 \sim 0.2\text{cc/min}$, $\text{He} \sim 0.1\text{cc/min}$), 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

In these columns with a small diameter the sample that can be injected is much smaller than with a column with a conventional diameter. Its sample capacity is around ten times less than that of a column of 0.25 mm ID.

3. INJECTOR

The columns of 0.1 mm ID are compatible with the injection techniques in Splitsplitless. 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 100 μm

Phase	Length (m)	(df μm)	P/N
TRB-1	10	0.1	TR-110141
	10	0.4	TR-110441
	20	0.1	TR-110181
TRB-5	20	0.4	TR-110481
	10	0.1	TR-120141
	10	0.4	TR-120441
TRB-WAX	20	0.1	TR-120181
	20	0.4	TR-120481
	10	0.1	TR-140141
	10	0.2	TR-142141
	20	0.1	TR-140181
	20	0.2	TR-142181

TRB-WAX

Column: **TRB-WAX**, P/N TR-140141

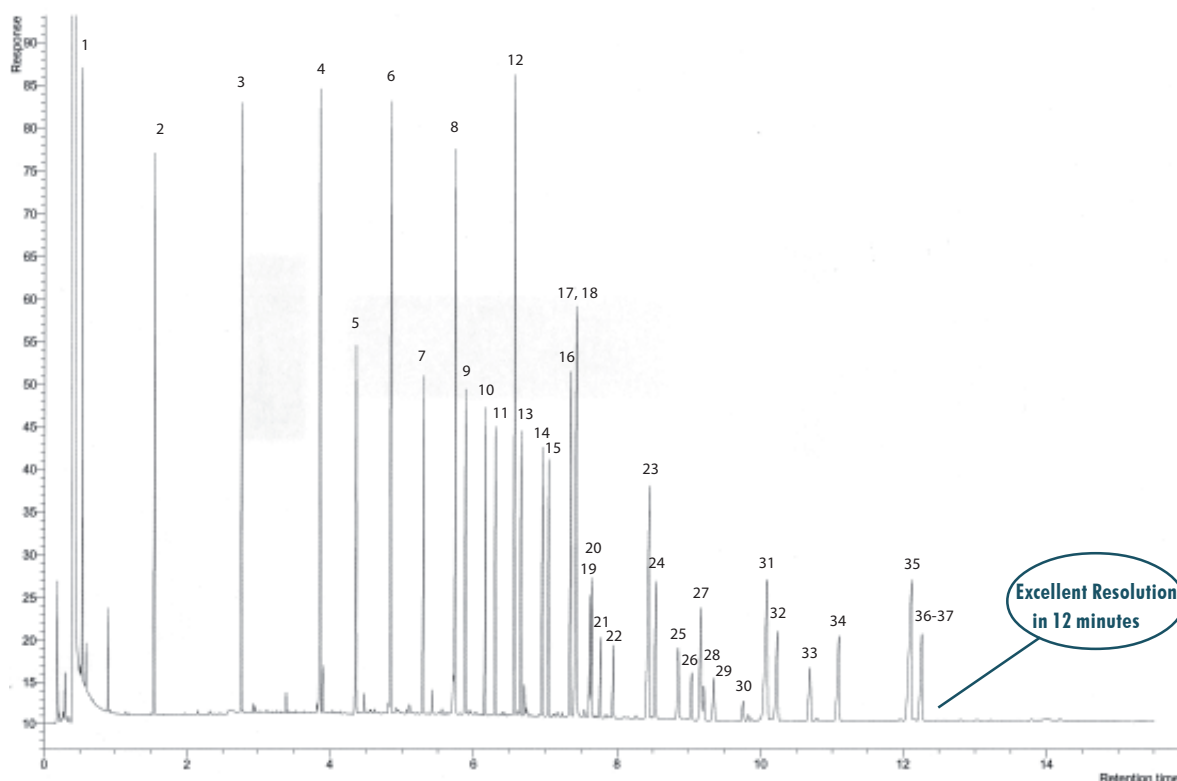
Dimensions: 10m x 0.10mm x 0.10µm

Injection: 1µL standard FAMES, (200ng/comp), split 1:50, 280°C

Carrier gas: H2, constant pressure 50 psi (344.5 Kpa)

Oven temperature: 40°C(1min) @ 25°C/min to 195°C @ 3°C/min to 205°C @ 8°C/min to 230°C(1min)

Detector: FID, 280°C



Peak Name

- | | |
|---|--|
| 1 Butyric acid methyl ester (C4:0) | 19 Linoleic acid methyl ester (C18:2n6c) |
| 2 Caproic acid methyl ester (C6:0) | 20 Linolelaidic acid methyl ester (C18:2n6t) |
| 3 Caprylic acid methyl ester (C8:0) | 21 g-Linolenic acid methyl ester (C18:3n6) |
| 4 Capric acid methyl ester (C10:0) | 22 Linolenic acid methyl ester (C18:3n3) |
| 5 Undecanoic acid methyl ester (C11:0) | 23 Arachidic acid methyl ester (C20:0) |
| 6 Lauric acid methyl ester (C12:0) | 24 Cis-11-eicosenoic acid methyl ester (C20:1) |
| 7 Tridecanoic acid methyl ester (C13:0) | 25 Cis-11,14-eicosadienoic acid methyl ester (C20:2) |
| 8 Myristic acid methyl ester (C14:0) | 26 Cis-8,11,14-eicosatrienoic acid methyl ester (C20:3n6) |
| 9 Myristoleic acid methyl ester (C14:1) | 27 Heneicosanoic acid methyl ester (C21:0) |
| 10 Pentadecanoic acid methyl ester (C15:0) | 28 Cis-11,14,17-eicosatrienoic acid methyl ester (C20:3n3) |
| 11 Cis-10-pentadecenoic acid methyl ester (C15:1) | 29 Arachidonic acid methyl ester (C20:4n6) |
| 12 Palmitic acid methyl ester (C16:0) | 30 Cis-5,8,11,14,17-eicosapentaenoic acid methyl ester (C20:5n3) |
| 13 Palmitoleic acid methyl ester (C16:1) | 31 Behenic acid methyl ester (C22:0) |
| 14 Heptadecanoic acid methyl ester (C17:0) | 32 Erucic acid methyl ester (C22:1n9) |
| 15 Cis-10-heptadecenoic acid methyl ester (C17:1) | 33 Cis-13,16-docosadienoic acid methyl ester (C22:2) |
| 16 Stearic acid methyl ester (C18:0) | 34 Tricosanoic acid methyl ester (C23:0) |
| 17 Oleic acid methyl ester (C18:1n9c) | 35 Lignoceric acid methyl ester (C24:0) |
| 18 Elaidic acid methyl ester (C18:1n9t) | 36 Cis-4,7,10,13,16,19-docosahexaenoic acid methyl ester (C22:6n3) |
| | 37 Nervonic acid methyl ester (C24:1) |

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.

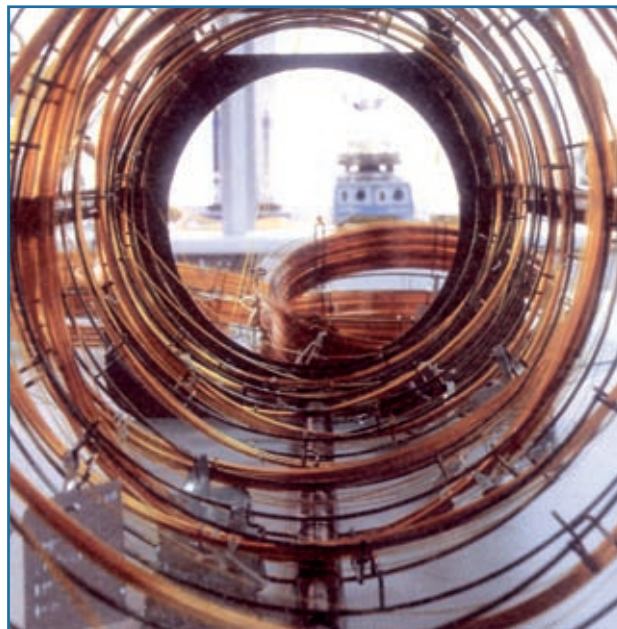
TR-SE-52 - 5% phenyl -95% dimethylpolysiloxane phase.

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

TR-20M - polyethylene glycol 100% (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



TRB-240

Column: **TRB-240** (OV-240-OH), P/N TR-240262

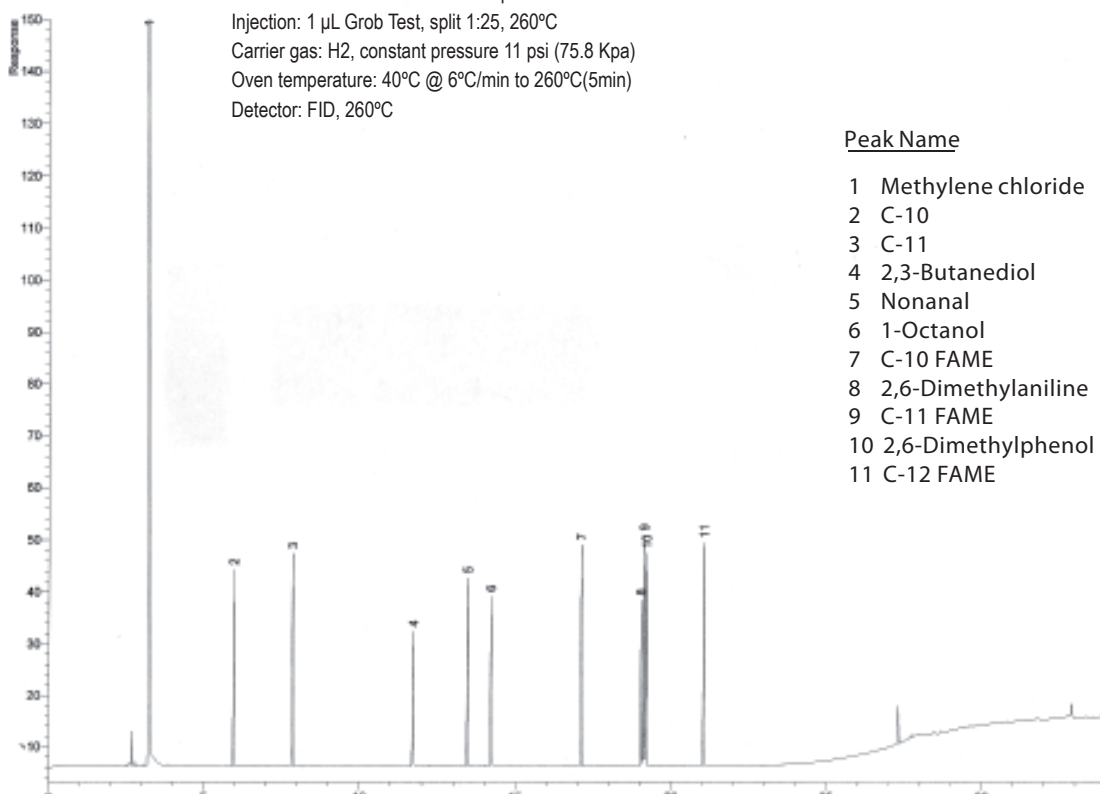
Dimensions: 60m x 0.25mm x 0.25µm

Injection: 1 µL Grob Test, split 1:25, 260°C

Carrier gas: H₂, constant pressure 11 psi (75.8 Kpa)

Oven temperature: 40°C @ 6°C/min to 260°C(5min)

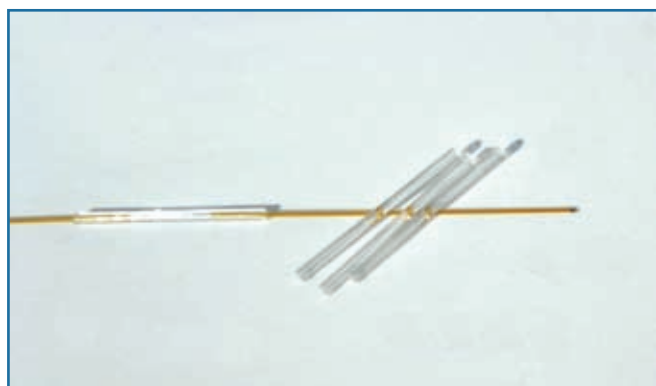
Detector: FID, 260°C



Peak Name

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

TKG 1147



UNIVERSAL PRESS FIT CONNECTORS

Description

TR-33001	Universal Press Fit 12pk
TR-33002	Universal Press Fit Angled Y/unit



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)
0,25	3x1	TR-100012
	1X5	TR-100052
	1X10	TR-100042
	1X20	TR-100082
0,32	3x1	TR-100013
	1X5	TR-100053
	1X10	TR-100043
	1X20	TR-100083
0,53	3x1	TR-100015
	1X5	TR-100055
	1X10	TR-100045
	1X20	TR-100085

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)
0,25	3x1	TR-200012
	1X5	TR-200052
	1X10	TR-200042
	1X20	TR-200082
0,32	3x1	TR-200013
	1X5	TR-200053
	1X10	TR-200043
	1X20	TR-200083
0,53	3x1	TR-200015
	1X5	TR-200055
	1X10	TR-200045
	1X20	TR-200085

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)
0,25	3x1	TR-300012
	1X5	TR-300052
	1X10	TR-300042
	1X20	TR-300082
0,32	3x1	TR-300013
	1X5	TR-300053
	1X10	TR-300043
	1X20	TR-300083
0,53	3x1	TR-300015
	1X5	TR-300055
	1X10	TR-300045
	1X20	TR-300085

AQUASAFE

Proprietary deactivation suitable for water direct aqueous injections.

Internal Diam. (mm)	Length (m)	Part. N° (P/N)
0,25	3x1	TR-310012
	1X5	TR-310052
	1X10	TR-310042
	1X20	TR-310082

AQUASAFE (Cont.)

Internal Diam. (mm)	Length (m)	Part. N° (P/N)
0,32	3x1	TR-310013
	1X5	TR-310053
	1X10	TR-310043
	1X20	TR-310083
0,53	3x1	TR-310015
	1X5	TR-310055
	1X10	TR-310045
	1X20	TR-310085

BASE-DEACTIVATED

Proprietary deactivation suitable for analysis of amines and other basic compounds

Internal Diam. (mm)	Length (m)	Part. N° (P/N)
0,25	3x1	TR-320012
	1X5	TR-320052
	1X10	TR-320042
	1X20	TR-320082
0,32	3x1	TR-320013
	1X5	TR-320053
	1X10	TR-320043
	1X20	TR-320083
0,53	3x1	TR-320015
	1X5	TR-320055
	1X10	TR-320045
	1X20	TR-320085

TEKNOKROMA METAL CAPILLARY COLUMNS

STAINLESS STEEL TEKNOKROMA COLUMNS (TR-INOX)

- Chemical inertness comparable to that of fused silica
- Bonded and crosslinked
- Ideal for chromatographs in industrial control processes
- Practically unbreakable
- Enables the use of high analysis temperatures

Teknokroma can supply you with Teknokroma stainless steel columns with a 0.53 mm internal diameter and with an external diameter similar to that of fused silica semi-capillary columns, enabling you to use the same 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 prefix INOX at the end of the corresponding reference to the column in the catalog.

For example: TRB-2887 of 10m x 0.53 mm x 2.65µm **P/N TR-192645**

With stainless steel tube, 10m x 0.53 mm x 2.65µm **P/N TR-192645INOX**

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 example: 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**

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
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 = 380-420)	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 METHOD	APPLICATION	RECOMMENDED	TEKNOKROMA CAPILLARY COLUMN	PART NUMBER
501.3	Trihalomethanes by GC/MS and SIM	TRB-624	30m x 0.53mm x 3.0 µm	TR-603035
		TRB-624	75m x 0.53mm x 3.0 µm	TR-603075
		TRB-624	105m x 0.53mm x 3.0 µm	TR-6030K5
		TRB-624	30m x 0.25mm x 1.0 µm	TR-601032
502.2	Volatile halogenated Organics in Water by Purge & Trap GC/PID/ELCD	TRB-624	30m x 0.53mm x 3.0 µm	TR-603035
503.1	Volatile Aromatics & Unsaturated Organics by Purge & Trap GC	TRB-624	30m x 0.53mm x 3.0 µm	TR-603035
		TRB-624	30m x 0.25mm x 1.4 µm	TR-601432
504.1	1,2-Dibromoethane (EDB), 1,2-Dibromo-3-chloropropane (DBCP), and 1,2,3-Trichloropropane (123TCP) by GC/MS	TRB-1	30m x 0.32mm x 0.25 µm	TR-110233
		TRB-624	30m x 0.53mm x 3.0 µm	TR-603035
		TRB-624	30m x 0.25mm x 1.4 µm	TR-601432
505	Organohalide Pesticides & Aroclors by GC/ECD	TRB-1	30m x 0.32mm x 1.0 µm	TR-111033
		TRB-50	30m x 0.32mm x 0.5 µm	TR-500533
		TRB-50	30m x 0.25mm x 0.25 µm	TR-500232
507	Nitrogen & Phosphorous containing Pesticides in Water by GC/NPD	TRB-5	30m x 0.25mm x 0.25 µm	TR-120232
		TRB-5ms	30m x 0.25mm x 0.25 µm	TR-520232
		TRB-1701	30m x 0.25mm x 0.25 µm	TR-130233
508	Chlorinated Pesticides in Water by GC/MS	TRB-5	30m x 0.25mm x 0.25 µm	TR-120232
		TRB-5ms	30m x 0.25mm x 0.25 µm	TR-520232
		TRB-1701	30m x 0.25mm x 0.25 µm	TR-130233
513	2,3,7,8-Tetrachlorodibenzo-p-dioxin by GC/MS	TRB-5ms	60m x 0.25mm x 0.10 µm	TR-520162
515.2	Determination of chlorinated acids in water using liquid-solid extraction and GC/ECD	TRB-1	30m x 0.32mm x 0.25 µm	TR-110233
		TRB-5	30m x 0.32mm x 0.25 µm	TR-120233
		TRB-1701	30m x 0.32mm x 0.25 µm	TR-130233
		TRB-5ms	30m x 0.32mm x 0.25 µm	TR-520233
524.2	Measurement of purgeable organic compounds in water by Purge & Trap capillary column GC/MS	TRB-624	30m x 0.25mm x 1.4 µm	TR-601432
		TRB-624	30m x 0.53mm x 3.0 µm	TR-603035
		TRB-624	75m x 0.53mm x 3.0 µm	TR-603075
		TRB-624	60m x 0.32mm x 1.8 µm	TR-601863
525	Capillary column GC/MS Organic compounds in drinking water by liquid-solid extraction	TRB-5	30m x 0.32mm x 0.25 µm	TR-120233
		TRB-5ms	30m x 0.25mm x 0.25 µm	TR-520232

EPA METHOD	APPLICATION	RECOMMENDED	TEKNOKROMA CAPILLARY COLUMN	PART NUMBER
8010	Halogenated volatile organics	TRB-624	75m x 0.53mm x 3.0µm	TR-603075
		TRB-624	30m x 0.25mm x 1.4µm	TR-601432
8015	Non- Halogenated volatile organics	TRB-624	30m x 0.53mm x 3.0µm	TR-603035
		TRB-624	30m x 0.25mm x 1.4µm	TR-601432
8020/8021	Aromatic volatile organic	TRB-624	30m x 0.53mm x 3.0µm	TR-603035
		TRB-624	30m x 0.25mm x 1.4µm	TR-601432
8030/8031	Acrolein, acrylonitrile, acetonitrile	TRB-624	30m x 0.53mm x 3.0µm	TR-603035
		TRB-624	30m x 0.25mm x 1.4µm	TR-601432
8040/8041	Phenols	TRB-5	30m x 0.53mm x 1.5µm	TR-121535
		TRB-5ms	30m x 0.25mm x 0.25µm	TR-520232
8060/8061	Phthalate esters	TRB-1	15m x 0.53mm x 1.5µm	TR-111515
		TRB-1ms	30m x 0.25mm x 0.4µm	TR-510432
8080	Organochlorine pesticides and PCBs	TRB-5	30m x 0.53mm x 1.5µm	TR-121535
		TRB-5ms	30m x 0.25mm x 0.5µm	TR-520532
8081/8082	Organochlorine pesticides and PCBs as Arochlor	TRB-5	30m x 0.53mm x 1.5µm	TR-121535
		TRB-1701	30m x 0.53mm x 1.0µm	TR-131035
8090/8091	Nitroaromatics and cyclic ketones	TRB-5	30m x 0.53mm x 1.5µm	TR-121535
		TRB-5ms	30m x 0.25mm x 0.5µm	TR-520532
8100	Polynuclear aromatic hydrocarbons	TRB-5	30m x 0.32mm x 0.25µm	TR-120233
		TRB-5ms	30m x 0.32mm x 0.25µm	TR-520233
8120/8121	Chlorinated hydrocarbons	TRB-1	30m x 0.32mm x 1.0µm	TR-111033
		TRB-1ms	30m x 0.32mm x 1.0µm	TR-511033
8140	Organophosphorus pesticides	TRB-1	30m x 0.32mm x 1.5µm	TR-111535
		TRB-1701	30m x 0.53mm x 1.0 µm	TR-131035
		TRB-1	30m x 0.25mm x 0.25µm	TR-110232
8141	Organophosphorus pesticides	TRB-5	15m x 0.53mm x 1.5µm	TR-121515
		TRB-5ms	15m x 0.25mm x 0,25µm	TR-520212
8150/8151	Chlorinated herbicides	TRB-5	25m x 0.53mm x 1.0µm	TR-121025
		TRB-1701	30m x 0.53mm x 1.0µm	TR-131035
		TRB-5ms	15m x 0.25mm x 0,25µm	TR-520232

EPA SOLID WASTE TEST METHODS

EPA METHOD	APPLICATION	RECOMMENDED	TEKNOKROMA CAPILLARY COLUMN	PART NUMBER
8240	GC/MS for volatile organics	TRB-624	30m x 0.53mm x 3.0µm	TR-603035
		TRB-624	75m x 0.53mm x 3.0µm	TR-603075
		TRB-624	105m x 0.53mm x 3.0µm	TR-6030K5
		TRB-624	30m x 0.25mm x 1.0µm	TR-601032
8250	GC/MS for semi-volatile organics	TRB-5ms	30m x 0.25mm x 0,50µm	TR-520532
8260	GC/MS method for volatile organics capillary techniques	TRB-624	30m x 0.53mm x 3,0µm	TR-603035
		TRB-624	75m x 0.53mm x 3,0µm	TR-603075
		TRB-624	105m x 0.53mm x 3,0µm	TR-6030K5
		TRB-624	30m x 0.25mm x 1,0µm	TR-601032
8270	GC/MS method for semi-volatile organics capillary techniques	TRB-5	30m x 0.25mm x 1,0µm	TR-121032
		TRB-5ms	30m x 0.25mm x 1,0µm	TR-521032
8280	Analysis of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans	TRB-5	30m x 0.25mm x 0,25µm	TR-120232
		TRB-5ms	60m x 0.25mm x 0,25µm	TR-520162

EPA WASTE WATER TEST METHODS

EPA METHOD	APPLICATION	RECOMMENDED	TEKNOKROMA CAPILLARY COLUMN	PART NUMBER
601	Purgeable halocarbons	TRB-624	30m x 0.53mm x 3.0µm	TR-603035
		TRB-624	75m x 0.53mm x 3.0µm	TR-603075
		TRB-624	105m x 0.53mm x 3.0µm	TR-6030K5
		TRB-624	30m x 0.25mm x 1.0µm	TR-601032
602	Purgeable aromatics	TRB-624	30m x 0.53mm x 3.0µm	TR-603035
		TRB-624	105m x 0.53mm x 3.0µm	TR-6030K5
		TRB-624	30m x 0.25mm x 1.0 µm	TR-601032
603	Acrolein and acrylonitrile	TRB-624	30m x 0.53mm x 3.0 µm	TR-603035
		TRB-624	30m x 0.25mm x 1.0 µm	TR-601032
604/605	Phenols and benzidines	TRB-5ms	30m x 0.53mm x 1.4 µm	TR-521435
		TRB-5ms	30m x 0.25mm x 0.25µm	TR-520232
606	Phthalate esters	TRB-5	15m x 0.53mm x 1.5 µm	TR-121515
		TRB-5ms	30m x 0.25mm x 0.25 µm	TR-520232

EPA METHOD	APPLICATION	RECOMMENDED	TEKNOKROMA CAPILLARY COLUMN	PART NUMBER
606	Phthalate esters	TRB-5	15m x 0.53mm x 1.5 µm	TR-121515
		TRB-5ms	30m x 0.25mm x 0.25 µm	TR-520232
607	Nitrosamines	TRB-5	30m x 0.53mm x 1.5 µm	TR-121535
		TRB-5ms	30m x 0.25mm x 0.50 µm	TR-520532
608	Organochlorine pesticides and PCBs	TRB-5	50m x 0.53mm x 1.0 µm	TR-121055
		TRB-5ms	50m x 0.25mm x 0.12 µm	TR-520752
609	Nitroaromatics and isophorone	TRB-5	30m x 0.53mm x 1.5 µm	TR-121535
		TRB-5ms	30m x 0.25mm x 0.5 µm	TR-520532
610	Polycyclic Aromatic Hydrocarbons	TRB-5	30m x 0.32mm x 0.25 µm	TR-120233
		TRB-5ms	30m x 0.32mm x 0.10 µm	TR-520133
611	Haloethers	TRB-5	15m x 0.53mm x 1.5 µm	TR-121515
		TRB-5ms	30m x 0.25mm x 0.50 µm	TR-520532
612	Chlorinated hydrocarbons	TRB-5	30m x 0.32mm x 1.0 µm	TR-121033
		TRB-5ms	30m x 0.25mm x 1.0 µm	TR-521032
613	2,3,7,8-tetrachlorodibenzo-p-dioxin	TRB-5ms	60m x 0.25mm x 0.10 µm	TR-520162
615	Chlorinated herbicides	TRB-1701	30m x 0.53mm x 1.0 µm	TR-131035
		TRB-1701	30m x 0.25mm x 0.25 µm	TR-130232
619	Triazine herbicides	TRB-50	30m x 0.53mm x 1.0 µm	TR-501035
		TRB-50	30m x 0.25mm x 0.50 µm	TR-500532
624	Purgeables	TRB-624	30m x 0.53mm x 3.0 µm	TR-603035
		TRB-624	75m x 0.53mm x 3.0 µm	TR-603075
		TRB-624	105m x 0.53mm x 3.0 µm	TR-6030K5
		TRB-624	30m x 0.25mm x 1.4 µm	TR-601432
625	Base/neutrals and acids	TRB-5ms	30m x 0.32mm x 0.25 µm	TR-520233
		TRB-1ms	30m x 0.25mm x 0.25 µm	TR-510232
680	Pesticides and PCBs in water and soil/sediment	TRB-5	30m x 0.32mm x 0.25 µm	TR-120233
		TRB-5ms	30m x 0.32mm x 0.25 µm	TR-520233
1624	Volatile organic compounds by isotope dilution GC/MS	TRB-624	30m x 0.53mm x 3.0 µm	TR-603035
		TRB-624	30m x 0.25mm x 1.4 µm	TR-601432
1625	Semivolatile organic compounds by isotope dilution	TRB-5	30m x 0.25mm x 0.25 µm	TR-120232
		TRB-5ms	30m x 0.25mm x 0.25 µm	TR-520232
1653	Chlorinated phenols in waste water by in-situ MS acylation and GC low bleed/MS	TRB-5	30m x 0.32mm x 0.25 µm	TR-120233
		TRB-5ms	30m x 0.32mm x 0.25 µm	TR-520233



- SOLID SUPPORTS FOR USP METHODS

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