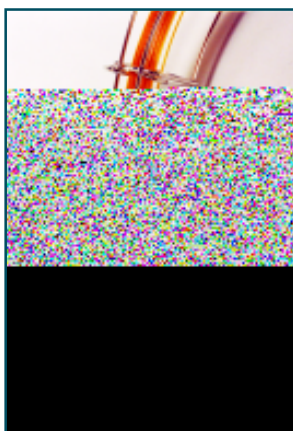




General Index



Corporate Information

Concept	Page
Corporate Information	4-5
Teknokroma Headquarters	4
Teknokroma™ Products	5
Teknokroma Divisions	5
Teknokroma International	265

Gas Chromatography

Teknokroma Capillary Columns Index	6
Teknokroma Capillary Columns	7-61
GC Septa	62-64
GC Ferrules	65-69
Injection Port Liners	70-72
Maintenance - Kits and Tools	73-75
Chart Paper	76-77
Gas & Handling Purification	78-79
Super-Clean Gas Filters	80-81
Helium Leak Gas Check	82
Teknokroma 2t Head Space Sampler	83-85
Headspace Vials & Accesories	86

Vials & Syringes

Vials & Syringes Index	87
Vials	88-108
Syringes	109-128

Filters & Extraction

Filters & Extraction Index	129
Syringe Filters	130-139
Robotic Syringe Filters	139
Membrane Filters	140
Vacuum Manifolds for SPE	141-142
SPE Cartridges	143-144

HPLC Chromatography

HPLC Chromatography Index	145
HPLC Chromatography	146-198
Fittings, Tubings & HPLC Accesories	199-206

Applications Gas ChromatographyGas Chromatography

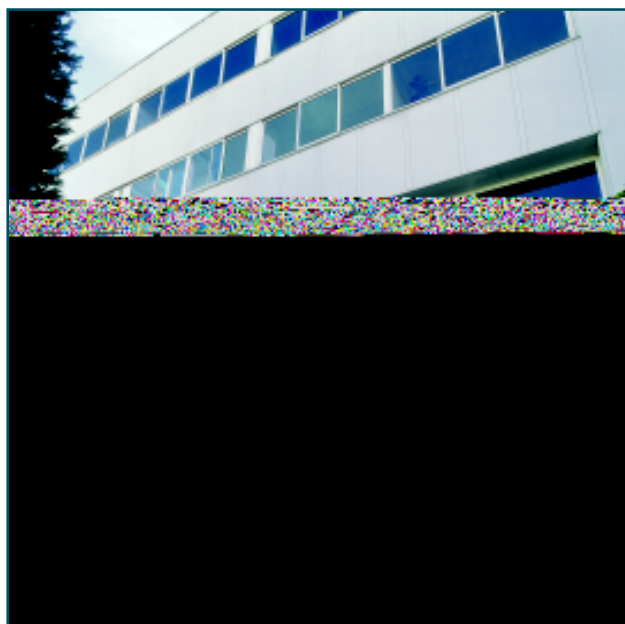
Gas Chromatography Applications Index	207
Chemical, Biological & Industrial	208-220
Environmental	221-238
Foods & Flavours	239-254

Compounds & Analytical Index

Compounds Index	255-259
Analytical Index	260-264



Corporate Information



Teknokroma Headquarters

Jaume Costa i Balcells
Sales & Marketing Director

Camí de Can Calders, 14
08190 Sant Cugat del Vallés (Barcelona) Spain
Tel: +34 936 748 800. Fax: +34 936 752 405

E-mail: export@teknokroma.es
www.teknokroma.com

It is a pleasure to introduce you our 2004-2005 International Catalogue, fruit of our clear objective to be closer to you in a professional and also friendly manner.

Just a few words to explain the basis of our relationship objectives

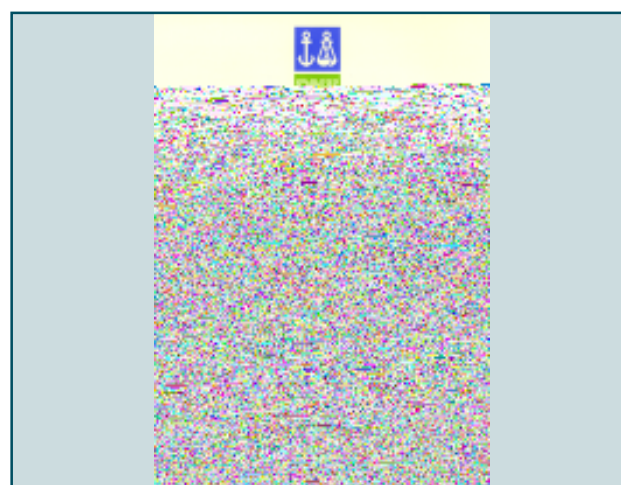
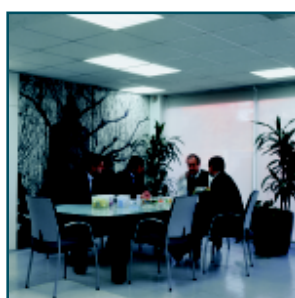
The confidence shown in us by our clients over more than 25 years is explained by our constant policy of surpassing their expectations.

To the quality of our products and services we have always added the value of our understanding of our clients necessities, a personalized technical consultancy and a human relationship which goes beyond the merely commercial.

Our positive attitude to our clients requirements has enabled us to learn from their experiences and to direct this flow of expertise towards an ever greater improvement of our services. It is this attitude to achieve whatever is required that is the backbone of our daily work.

At Teknokroma, each and every one of us who form the team would like to thank you for your confidence in us, expressed over so many years. It is this confidence that strenghtens our convictions, and helps us each day to be closer to you.

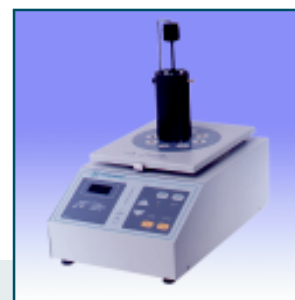
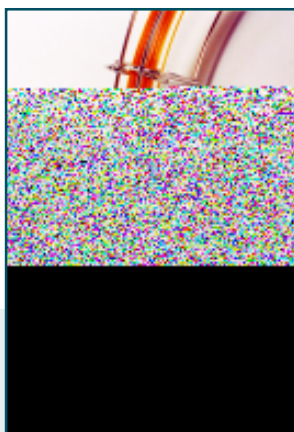
In all, we want to share with you our great challenge. In this complex global era, it is our orientation towards each of our clients that will enable us to build a true personal relationship between us, which can only be to the greatest mutual advantage.



**All brands named in this catalogue belong
to their corresponding owner.**



Corporate Information



Teknokroma™ Products

Our technical analysis products catalogue, with more than 4.000 references, is continuously growing with new own research developments and external collaborations with companies and institutions such as "Consejo Superior de Investigaciones Cientificas (CSIC)", "Institut Quimic de Sarrià (IQS)" and with world-renown chromatographer, Cole Woolley, PhD.

- Packed Columns
- Capillary Columns
- HPLC Columns
- Syringe Filters
- Membrane Filters
- Syringes
- Robot Filters
- Static Head Space Sampler
- SPE
- Vials and Septa for Autosampler
- Consumables GC
- Consumables HPLC

Divisions

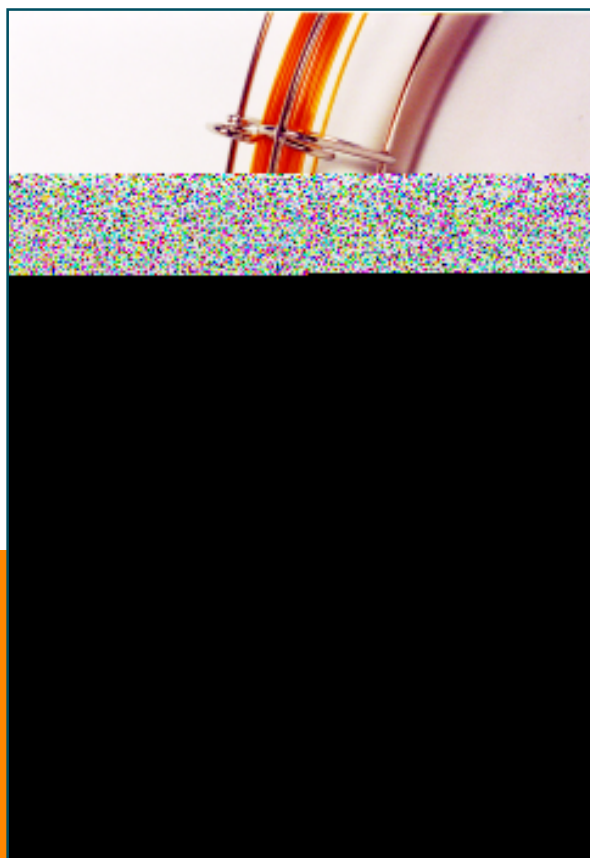
Divisions with specialized vocations

... company development based on excellence vocation

- Chromatography GC and HPLC
- Spectroscopy (UV-VIS, IR, AA)
- Clinical: Instruments and Reagents
- Veterinary: Instruments and Reagents
- Compressors and Gas Generators H₂, N₂ and Air
- Dissolution and Physical testing
- Food & Beverages: Equipment, reagents and food control
- Technical Service



Index Gas Chromatography



Gas Chromatography

<u>Concept</u>	<u>Page</u>
Teknokroma Capillary Columns - General Information	7-10
TRB-1	11
TRB-1ht	12
TRB-1ms	13
TRB-Sulfur	14
TRB-Petrol	14-15
TRB-Petro.150	15-17
TRB-50.2Pona	18
TRB-2887	18
TRB-5	19-20
TRB-5ht/Inox-5ht	21
TRB-Sterol	21
TRB-5ms	22-23
TRB-5Amine	24
TRB-5-625	25
TRB-627	25-26
Meta.X5	26-28
TRB-1301	29
TRB-624	30-31
TRB-643	31-32
TRB-14	33

<u>Concept</u>	<u>Page</u>
TRB-20	34
TRB-35	35
TRB-1701	36
TRB-225	36-37
TRB-50	37
TRB-50ht	38
TRB-F50	38-39
TRB-PAG	39
TRB-WAX	40
TRB-FFAP	41
TRB-WAX.DB	42
TRB-WAXOmega	42-43
Meta.WAX	43-44
TR-CN100	44-45
TR-CRESOL	46
TR-17	46
Meta.VOC	47
TRB-608	47
TRB-TCEP	48
Meta.WAX 400	48
Teknokroma Microbore Columns (0.1 mm ID)	49-50
Custom Capillary Columns	51
Guard Columns (Retention Gap)	52-53
Teknokroma Metal Capillary Columns	53
Columns for Agilent GC 6850	53
USP Capillary Column Equivalents	54
EPA Drinking Water Test Methods	55
EPA Solid Waste Test Methods	56-57
EPA Waste Water Test Methods	57-58
Packed Columns	59-61
GC Septa	62-64
GC Ferrules	65-69
Injection Port Liners	70-72
Maintenance Kits & Tools	73-75
Chart Paper	76-77
Gas Handling & Purification	76-79
Super Clean Gas Filters	80-81
Helium Gas Leak Check	82
Teknokroma 2t Head Space Sampler	83-85
Headspace Vials & Accessories	86

Gas Chromatography Applications

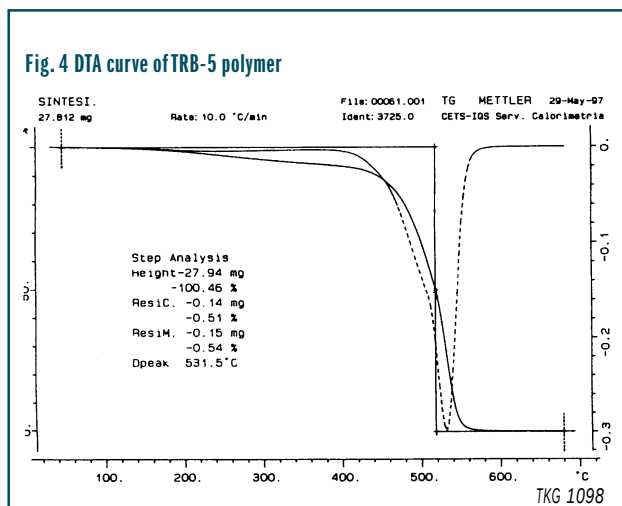
Chemical, Biological & Industrial	208-220
Environmental	221-238
Foods & Flavours	239-253

* See detailed Applications Index on page 207



Teknokroma Capillary 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.



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.).

Stage 4. Quality Control

S E L E C T P R O V E N Q U A L I T Y

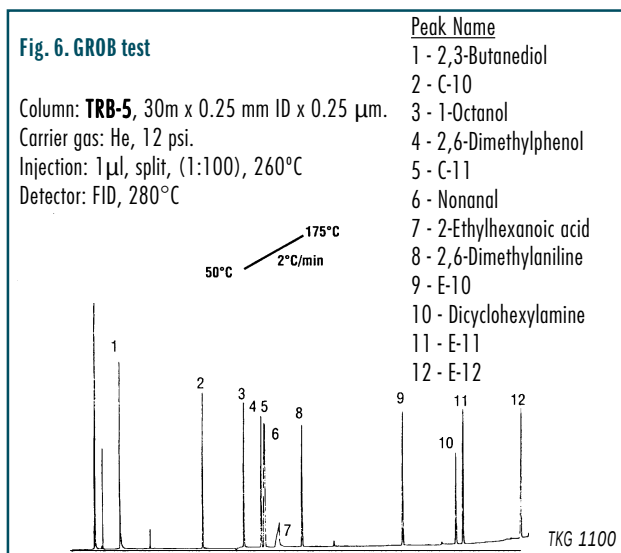
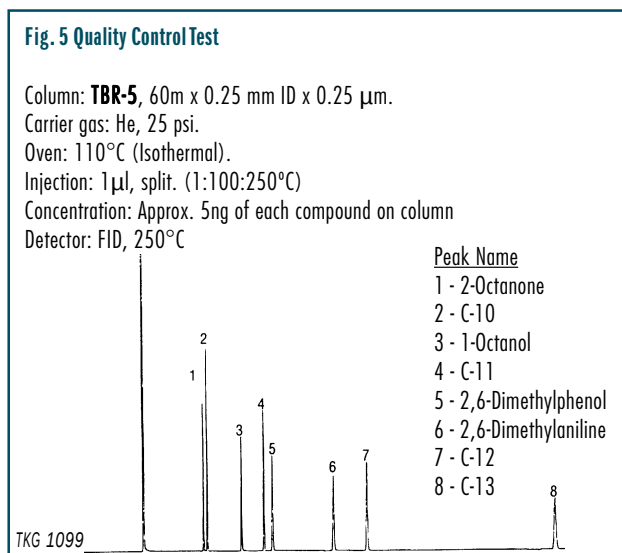
When you buy a Teknokroma capillary column you receive a product designed and manufactured in our laboratory with the aim to help you solve your analytical problems and which meets all of our quality criteria.

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.

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.





Teknokroma Capillary Columns

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.

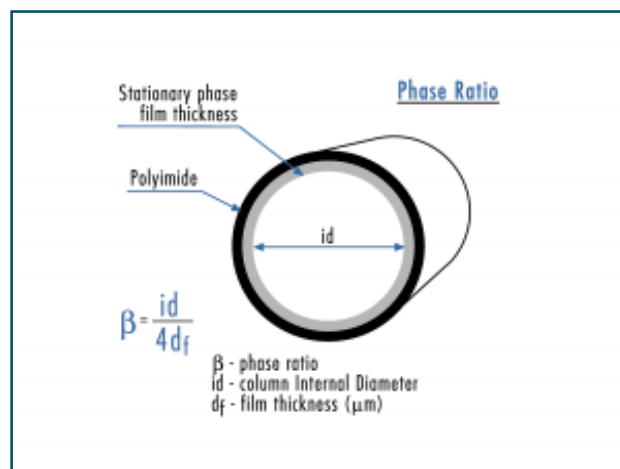
Thick films increase retention of the most volatile components whereas thin films provide faster elution at lower temperatures.

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)

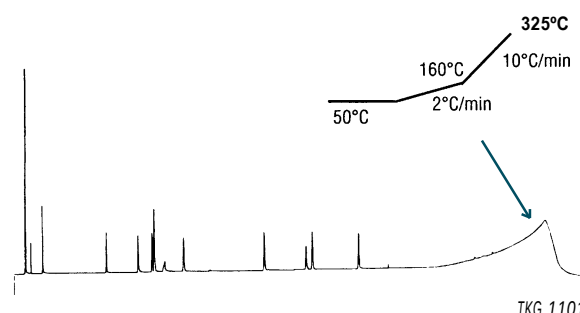
Column: **TRB-5**, 15m x 0.25mm ID x 0.25 μm .

Carrier gas: He, 6 psi.

Injection: 1 μl , split. (1:100), 280°C

Detector: FID, 350°C

Bleed level (FID) <4pA (325°C)





Teknokroma Capillary Columns

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

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)

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

Theoretical Plates (N/m)

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-5AMINE, TRB-5.625, TRB-G27, 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-G43	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 glycol 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-CB			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				

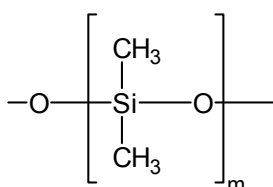


TRB-1

TRB-1

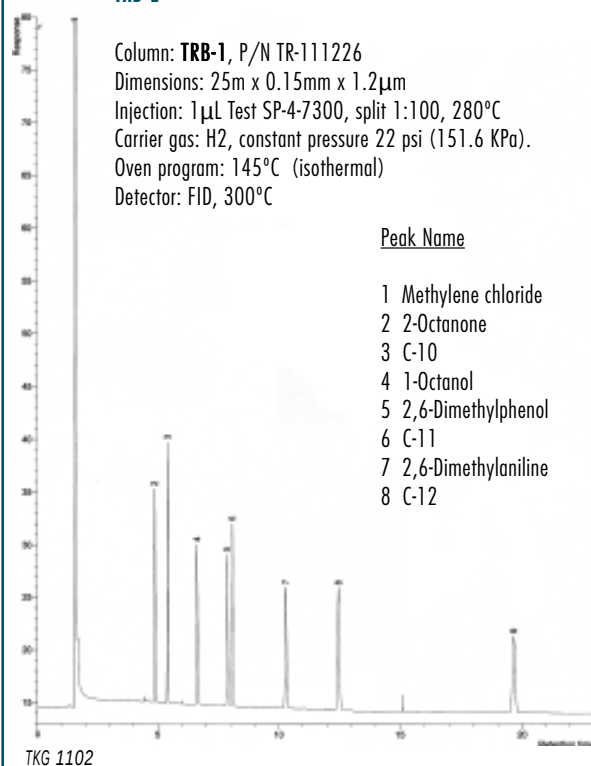
100% Dimethyl polysiloxane, bonded and crosslinked phase

- 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



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-1ht

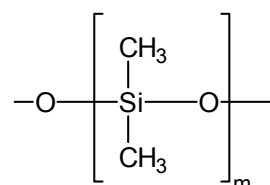
TRB-1

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)

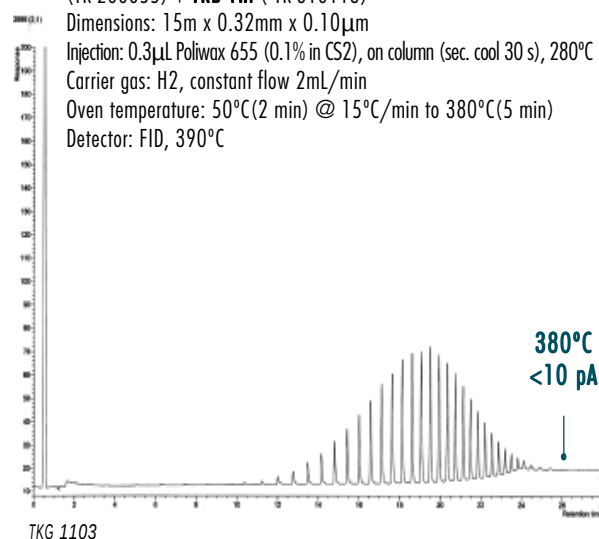
Dimensions: 15m x 0.32mm x 0.10μm

Injection: 0.3μL Poliwax 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



TKG 1103

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 α 395	TR-610112
	30	0,10	-60 α 395	TR-610132
0,32	15	0,10	-60 α 390	TR-610113
	30	0,10	-60 α 390	TR-610133



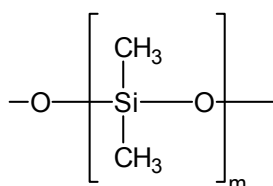
TRB-1ms

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
0,25	60	0,33	-60 to 325/350	TR-513369
	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

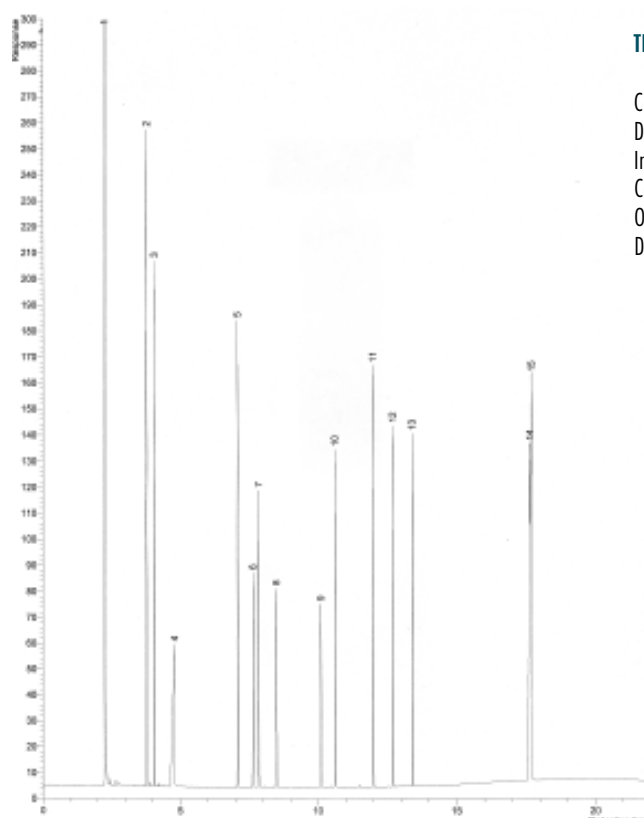
TRB-1ms Equivalent Phase

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 0.25µm

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

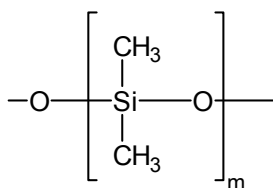


TRB-Sulfur

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

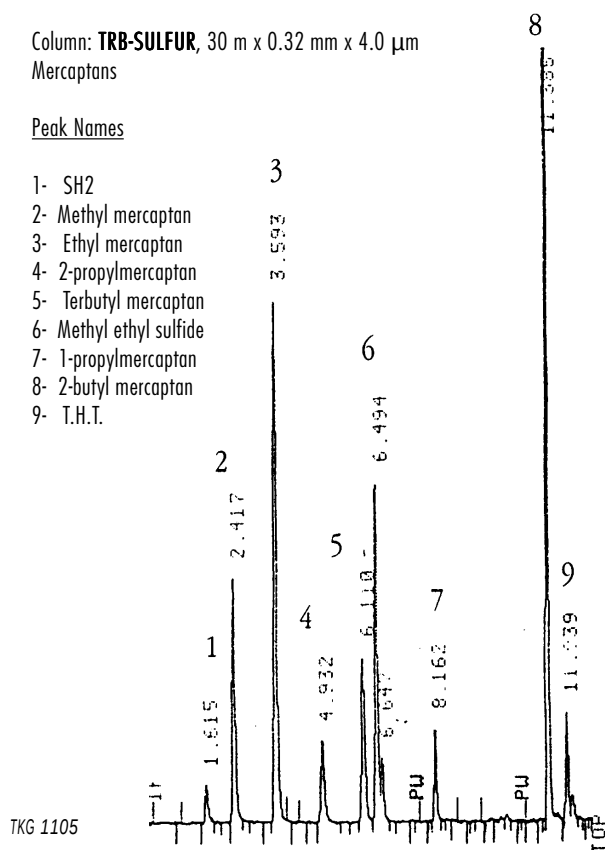
Supelco: SPB-1 SULFUR

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.

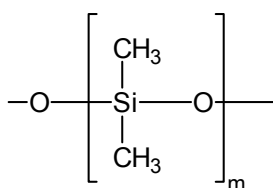


TRB-Petrol

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

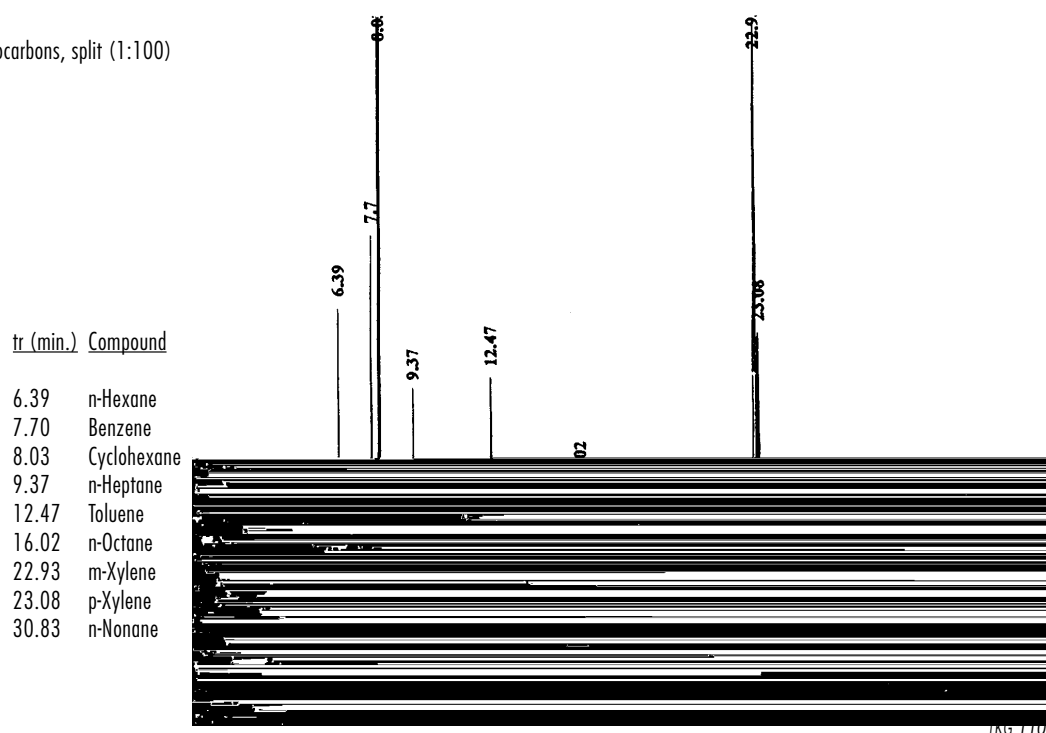
Agilent: DB-Petro
Supelco: Petrocol DH



TRB-Petrol

TRB-PETROL

Column: **TRB-PETROL**, 100m x 0.25mm x 0.50µm TR 110592
 Temperature: 60°C (isothermal)
 Injector: 260°C
 Carrier gas: H₂, 34 psi
 Injection: Test for hydrocarbons, split (1:100)
 Detector: FID, 260°



TRG 1106

TRB-Petro. 150

TRB-Petro.150

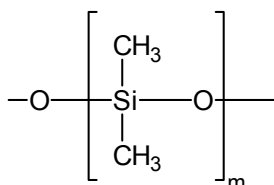
Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,25	150	1,00	-60 to 300/320	TR-111062

TRB-Petro.150

100% Dimethyl polysiloxane, bonded and crosslinked phase.

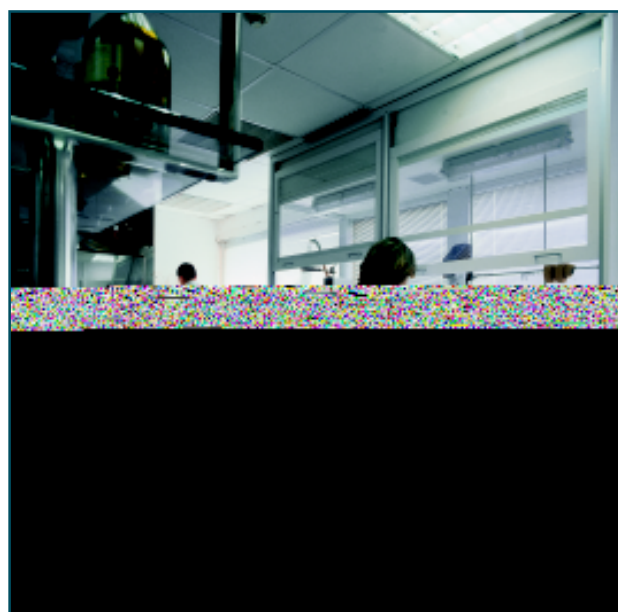
- 100% Dimethylpolysiloxane.
- Maximum resolution for hydrocarbon analysis
- Detailed hydrocarbon analysis.
- Volatiles in essential oil and beverages

Structure of Poly(dimethyl)siloxane



TRB-Petro.150 Equivalent Phase

Supelco: Petrocol DH 150.





TRB-Petro.150

TRB-PETRO.150

Column: **TRB-PETRO.150**, P/N TR-111062

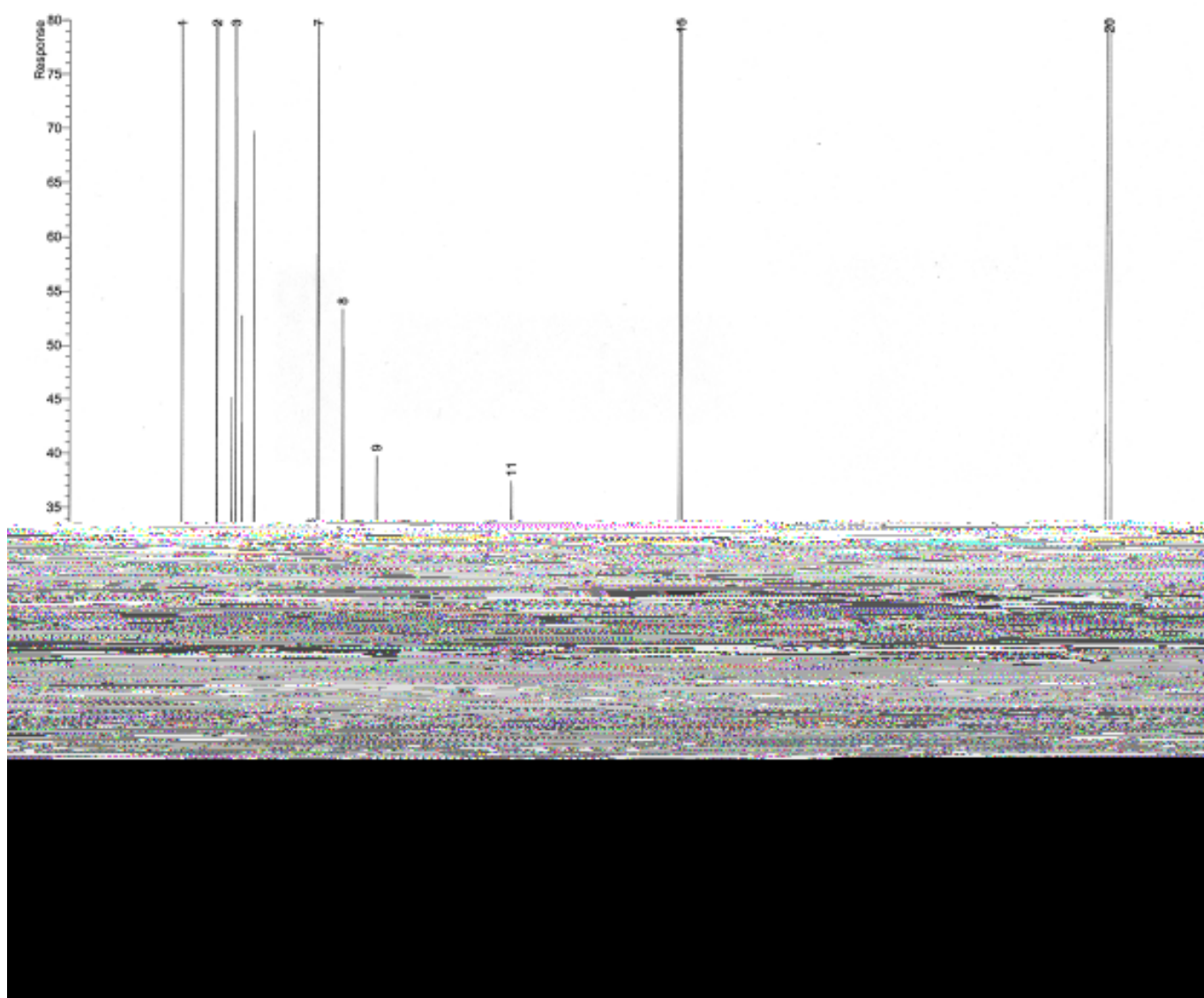
Dimensions: 150m x 0.25mm x 1.0µm

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



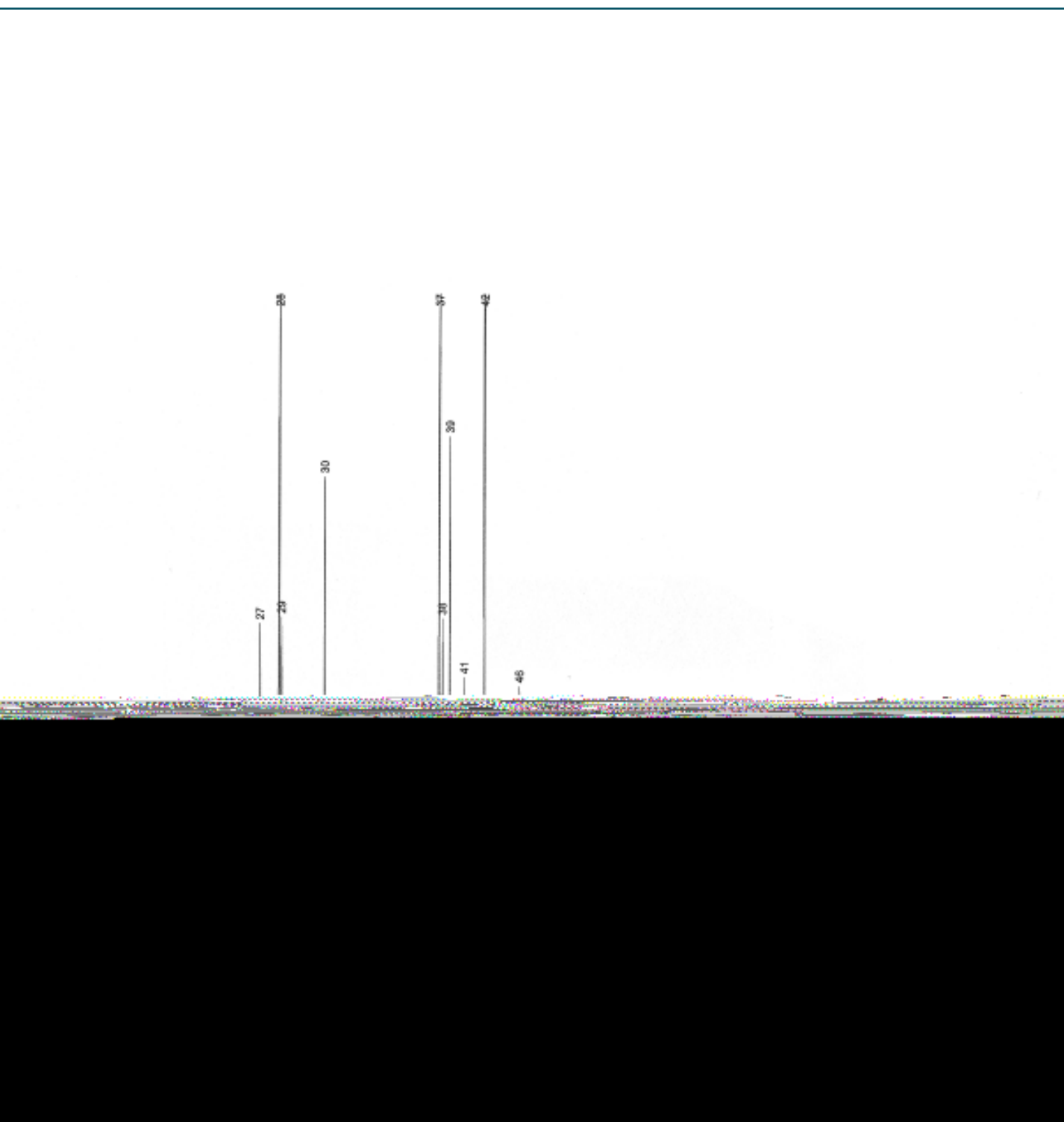
6. 2,3-Dimethylbutane
7. 2-Methylpentane
8. 3-Methylpentane
9. n-Hexane
10. 2,4-Dimethylpentane

16. n-Heptane
17. 2,5-Dimethylhexane
18. 2,4-Dimethylhexane
19. 2,3,4-Trimethylpentane
20. Toluene

26. n-Octane
27. Ethylbenzene
28. m-Xylene
29. p-Xylene
30. o-Xylene



TRB-Petro.150



36. n-propylbenzene
37.1-Methyl-3-ethylbenzene
38. 1-Methyl-4-ethylbenzene
39.1,3,5-Trimethylbenzene
40. 3,3,4- Trimethylheptane

46. 1,2,3- Trimethylbenzene
47.Indane
48. 1,3-Diethylbenzene
49. n-Butylbenzene
50.1,4-Dimethyl-2-ethylbenzene

56.2-Methylnaphthalene
57.1-Methylnaphthalene
58. Dimethylnaphthalenes

TKG 1107

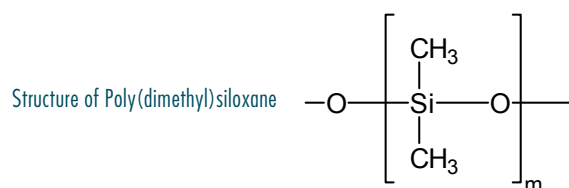


TRB-50.2PONA

TRB-50.2PONA

100% Dimethyl polysiloxane, bonded and crosslinked phase.

- 100% Dimethylpolysiloxane.
- Column designed for the complete analysis of PONA hydrocarbons (P-Paraffins, O-Olefins, N-Naphthenes and A-Aromatics) in petrol-derived products according to the ASTM regulations, method D5134.



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

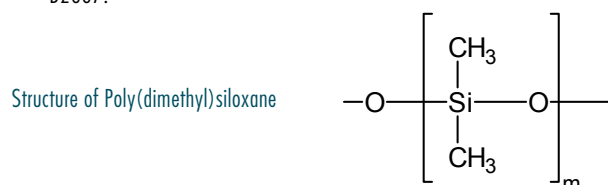
Agilent: HP-PONA
Supelco: Petrocol DH 50.2
Restek: Rtx-1 PONA
Varian: CP-SIL PONA CB
SGE: BP-1 PONA

TRB-2887

TRB-2887

100% Dimethyl polysiloxane, bonded and crosslinked phase.

- 100% Dimethylpolysiloxane
- Designed specifically for simulated distillation according to the ASTM method D2887.

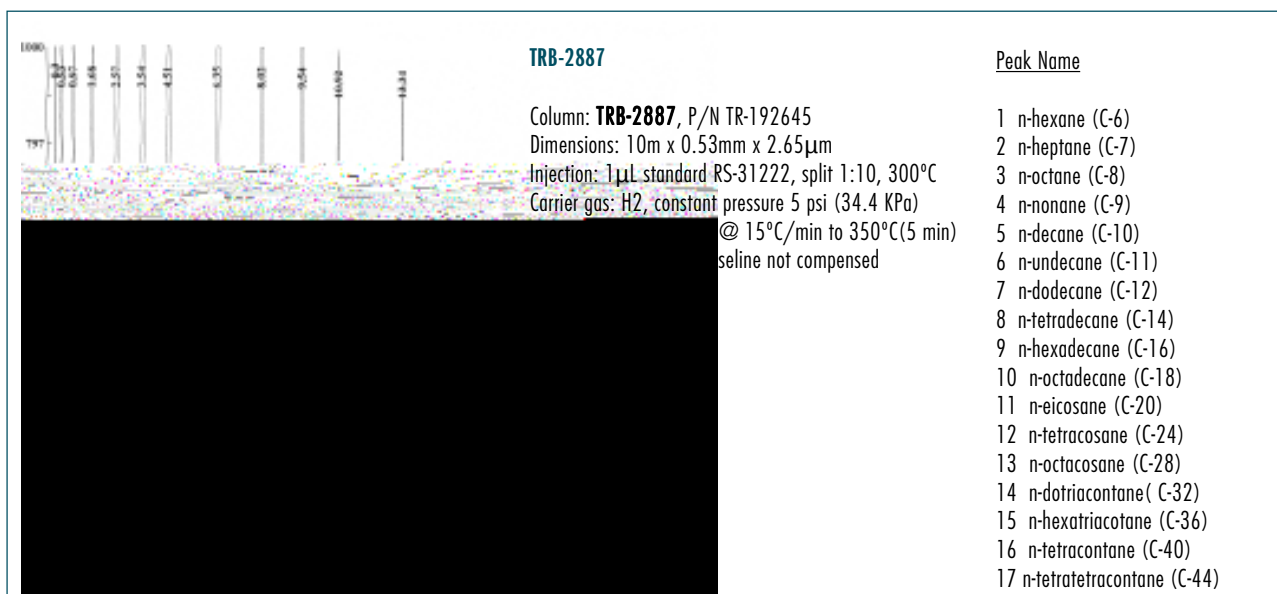


TRB-2887

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



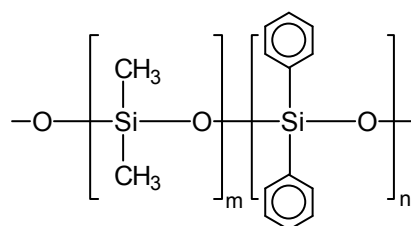


TRB-5

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 dioxins, PCB's, PCT's, polyaromatic compounds, phenols, herbicides, organochlorinated and organophosphorus pesticides, aromatic hydrocarbons, solvents, drugs, oils, etc...



Structure of Poly(dimethyldiphenyl)siloxane

TRB-5

Column: **TRB-5**, P/N TR-120232

Dimensions: 30m x 0.25mm x 0.25µm

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



TRB-5

TRB-5

Internal Diam. (mm)	Length (m)	Film Thickness (μm)	Temp limits (°C)	Part. №. (P/N)	
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-123389	
	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. №. (P/N)
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

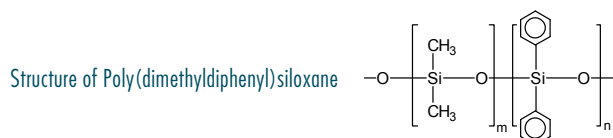


TRB-5ht/Inox-5ht

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, polyoxyethylene alcohols, etc.



TRB-5ht/Inox-5ht

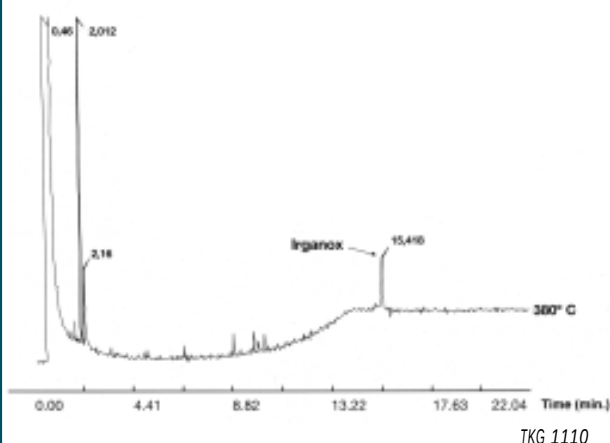
Internal Diam. (mm)	Length (m)	Film Thickness (μm)	Temp limits (°C)	Part. N°. (P/N)
0,25	15	0,10	-60 to 395	TR-620112
	30	0,10	-60 to 395	TR-620132
0,32	15	0,10	-60 to 390	TR-620113
	30	0,10	-60 to 390	TR-620133

TRB-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

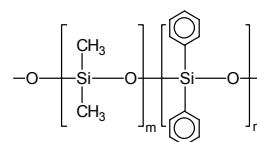


TRB-Sterol

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

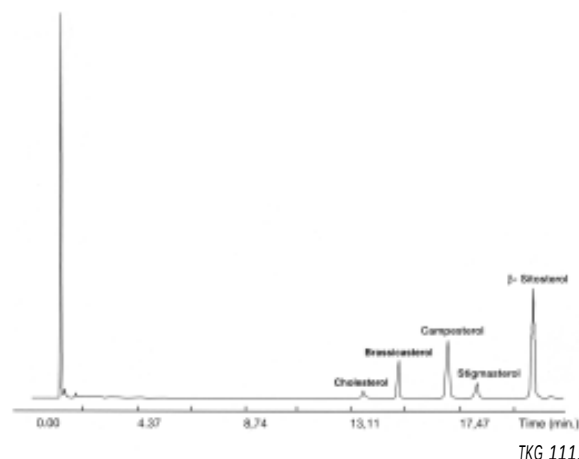
Internal Diam. (mm)	Length (m)	Film Thickness (μm)	Temp limits (°C)	Part. N°. (P/N)
0,22	30	0,22	-60 to 325-350	TR-182238

TRB-Sterol Equivalent Phase

Supelco: SAC-5

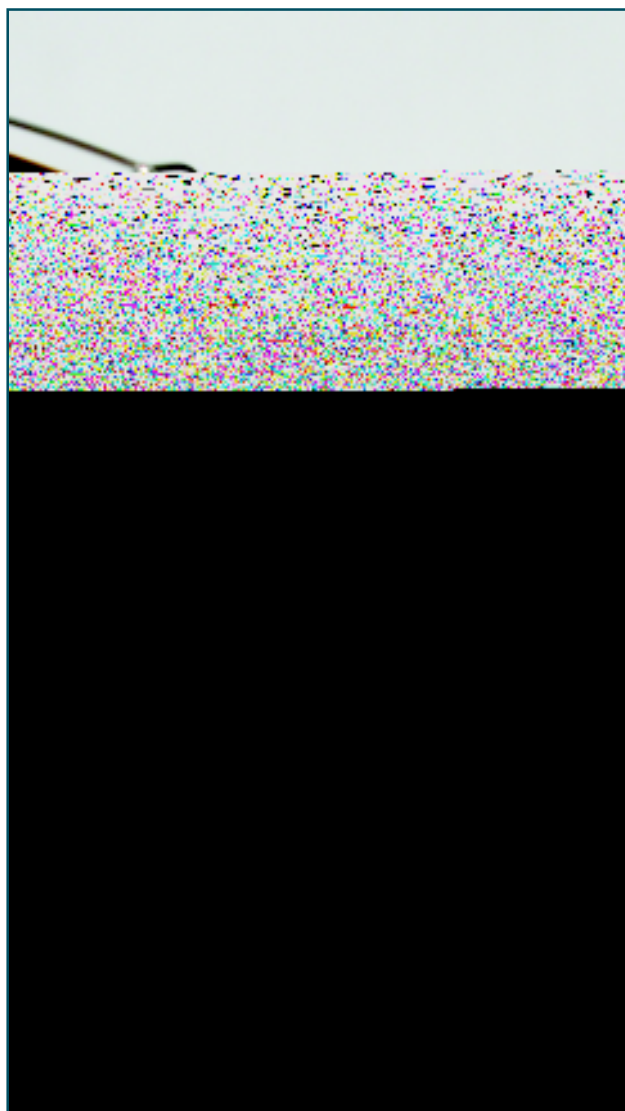
Sterols

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



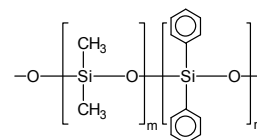
TRB-5MS

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
	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
	60	1,00	-60 to 325-350	TR-521063
	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

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.



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



TRB-5ms

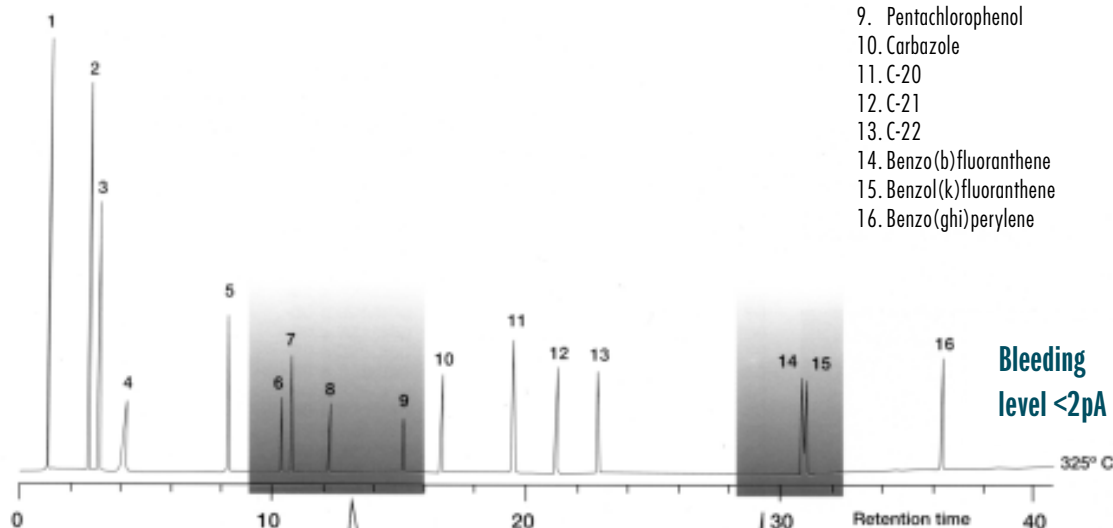
The TRB-5MS column has an excellent resolution and symmetry in all its polarity range, for neutral, acid and basic compounds. All these substances that appear in the analysis of semivolatile traces (for example, EPA official methods) can be analyzed in only one column.

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

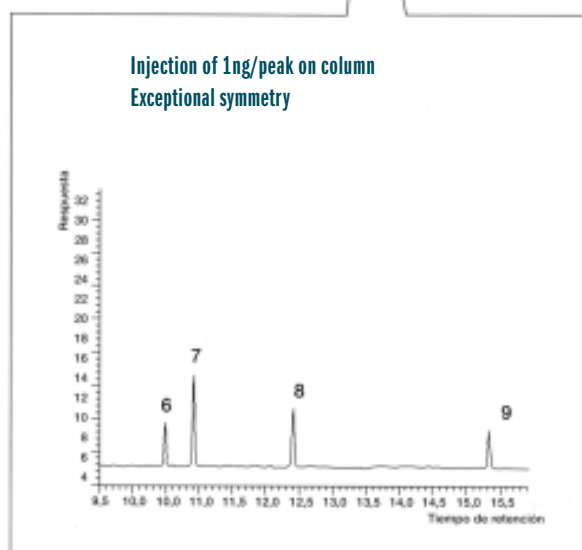
Peak Name

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

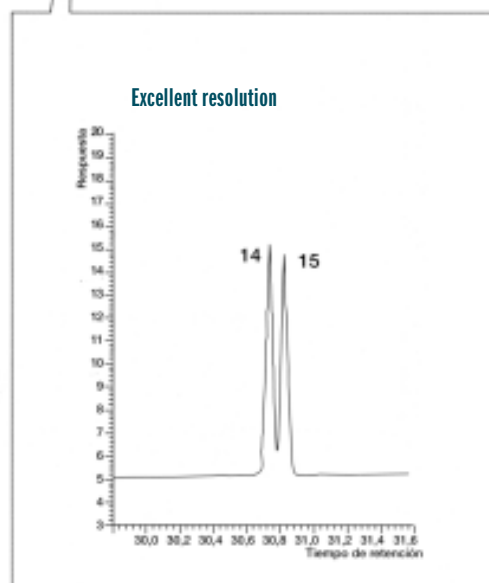


Bleeding level <2pA

Injection of 1ng/peak on column
 Exceptional symmetry



Excellent resolution



TKG 1112

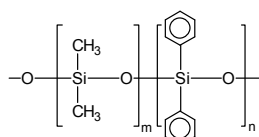


TRB-5Amine

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.



Structure of Poly(dimethyldiphenyl)siloxane

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

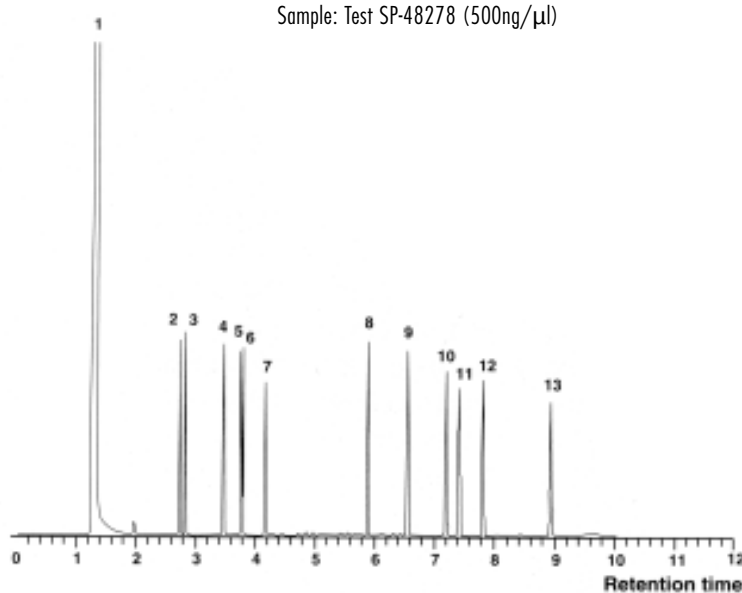
Injection: 1 μL (split 1:50), 280°C

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

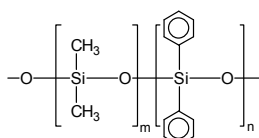


TRB-5. 625

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 semivolatile compounds, designed for methods 625, 1625, 8270 and CLP protocols.
- Inertness and minimum absorption for acidic, basic and neutral compounds.



Structure of 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-2633B9
	25	0,33	-60 to 325/350	TR-263329
	50	0,33	-60 to 325/350	TR-263359
0,25	15	0,10	-60 to 325/350	TR-260112
	15	0,25	-60 to 325/350	TR-260212
	15	0,50	-60 to 325/350	TR-260512
	15	1,00	-60 to 325/350	TR-261012
	30	0,10	-60 to 325/350	TR-260132
	30	0,25	-60 to 325/350	TR-260232
	30	0,50	-60 to 325/350	TR-260532
	30	1,00	-60 to 325/350	TR-261032
	60	0,10	-60 to 325/350	TR-260162
0,32	60	0,25	-60 to 325/350	TR-260262
	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
0,53	60	0,10	-60 to 325/350	TR-260163
	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

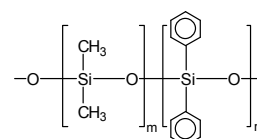
TRB-G27



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>.



Structure of 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

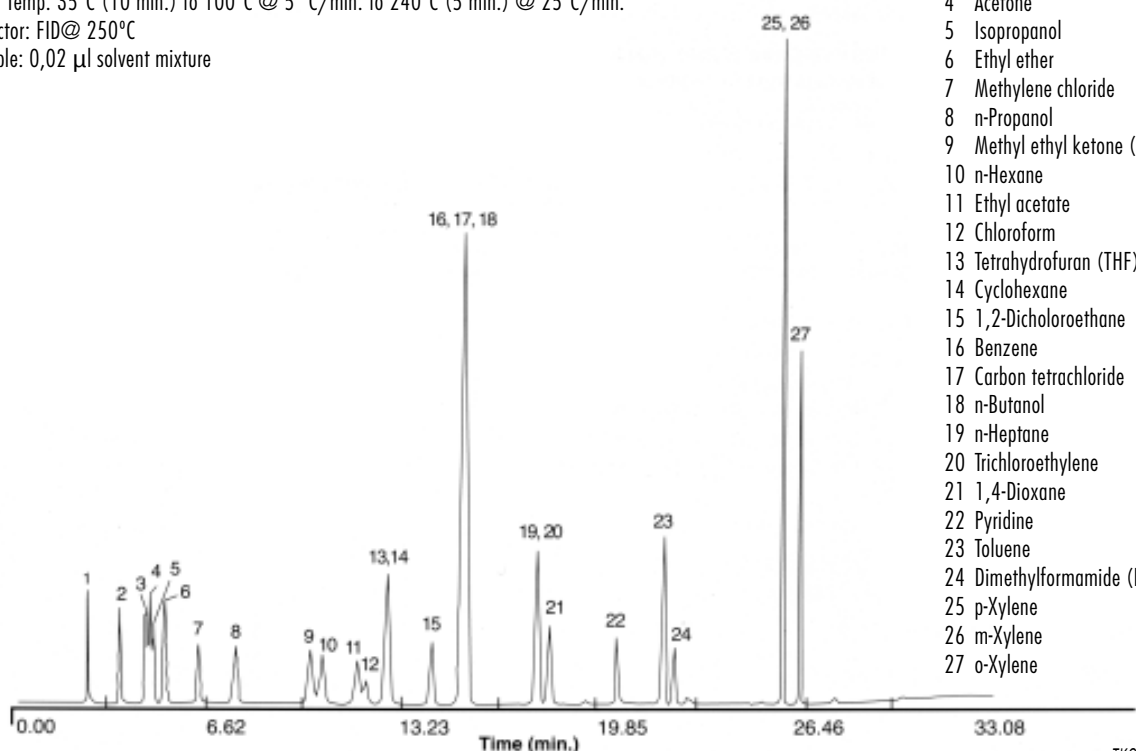
Restek: Rtx-G27
Supelco: G27



TRB-G27

Residual solvents in Pharmaceutical Products

Column: **TRB-G27**, 30 m x 0,53 mm x 5,0 µm, P/N TR-175035
 Injection: 220°C, (split 1:80), 5 m phenylmethyl deactivated retention gap
 Carrier Gas: He, 4,5 psi (31kPa), 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

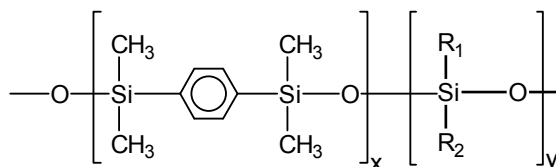
TKG 1114

Meta.X5

Meta.X5

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

- Choice column for the analysis of semivolatile 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-silphenylene

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

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-8233B9
	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	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
0,53	60	0,10	-60 to 325/350	TR-820163
	60	0,25	-60 to 325/350	TR-820263
	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

Compare Column Bleed Levels

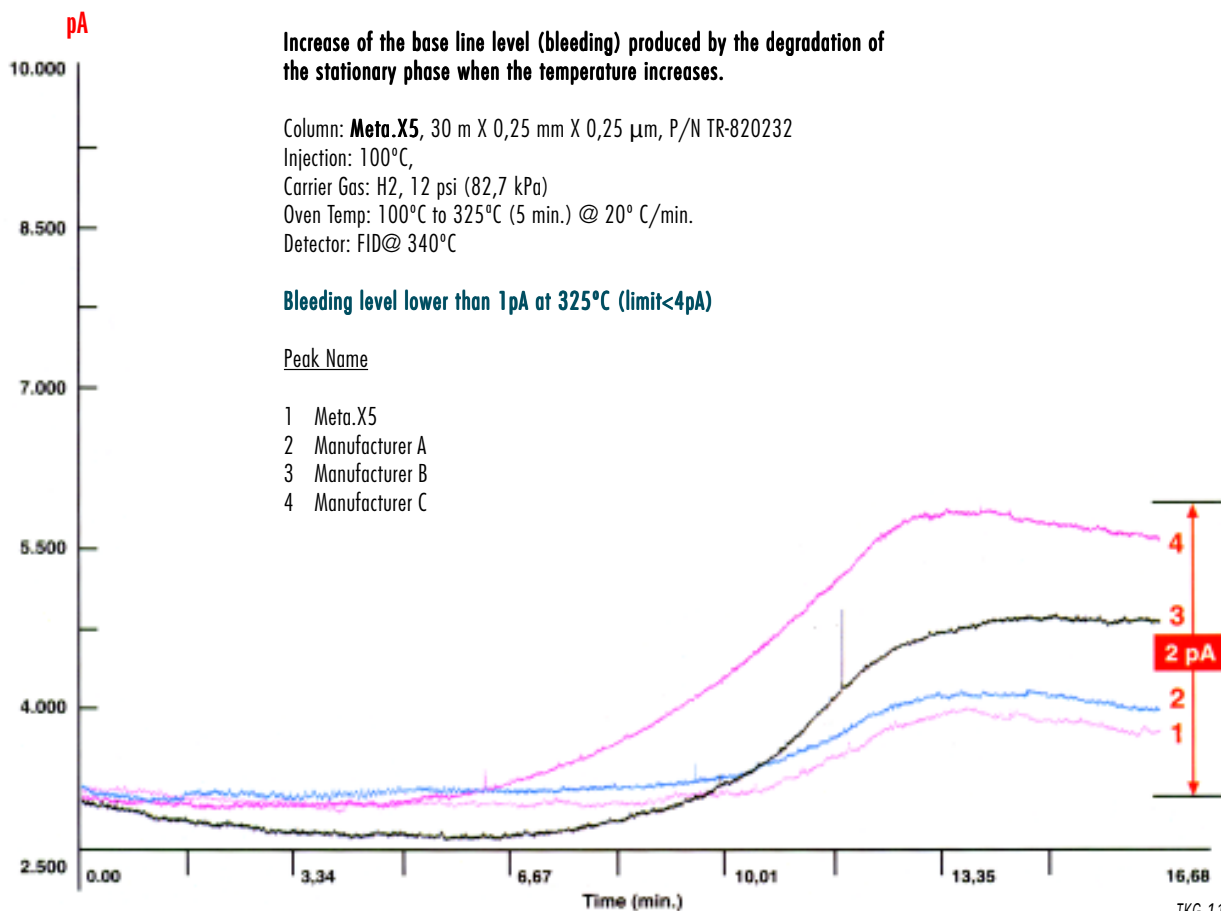
Increase of the base line level (bleeding) produced by the degradation of the stationary phase when the temperature increases.

Column: **Meta.X5**, 30 m X 0,25 mm X 0,25 μm, P/N TR-820232
 Injection: 100°C,
 Carrier Gas: H₂, 12 psi (82,7 kPa)
 Oven Temp: 100°C to 325°C (5 min.) @ 20° C/min.
 Detector: FID@ 340°C

Bleeding level lower than 1pA at 325°C (limit<4pA)

Peak Name

- 1 Meta.X5
- 2 Manufacturer A
- 3 Manufacturer B
- 4 Manufacturer C



TKG 1115



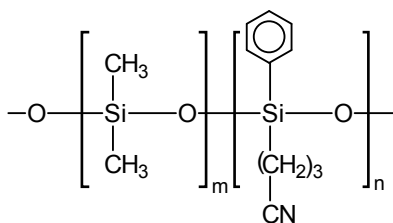


TRB-1301

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(dimethylcyanopropylphenyl)siloxane

TRB-1301

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

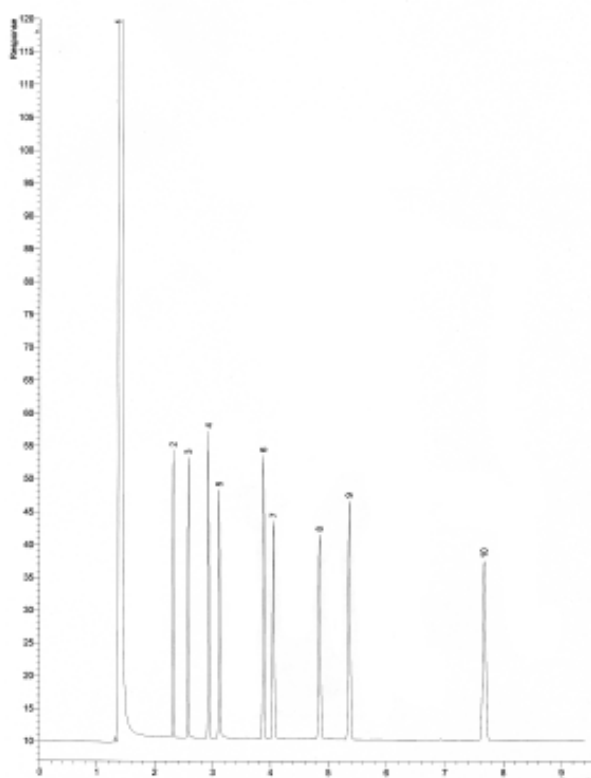
Agilent: HP-1301, HP-624, DB-1301, DB-624

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 1.0μm

Injection: 0.5μL 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

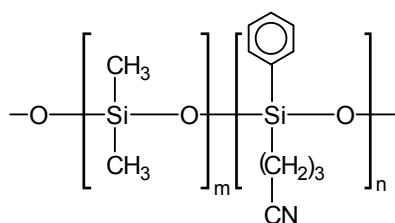


TRB-624

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.



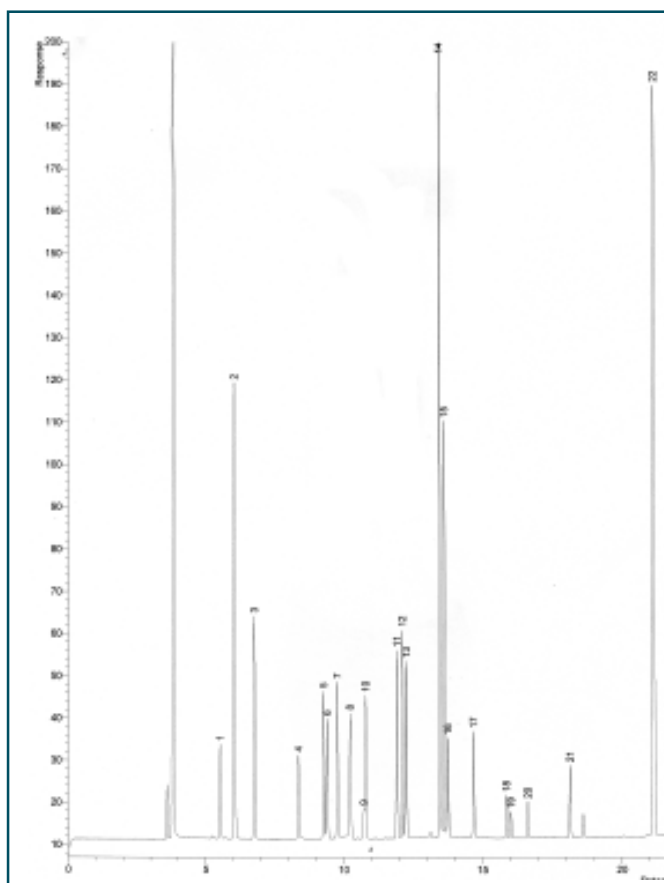
Structure of Poly(dimethylcyanopropylphenyl)siloxane

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-643
 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 1.4μm
 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

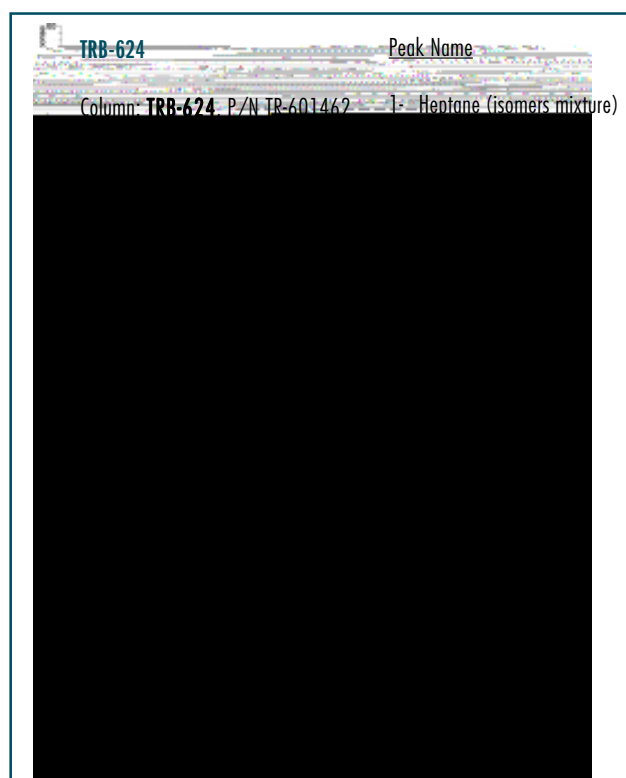
Peak Name

- | | |
|-----------------------|-----------------------|
| 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



TRB-624



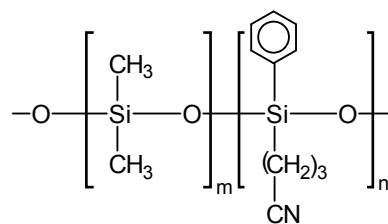
TKG 1120

TRB-G43

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(dimethylcyanopropylphenyl)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 80°C (2t static head space sampler) 28 Class 1 Mix and Class 2 Mix A, Mix B residual solvents at the regulatory limit concentration.

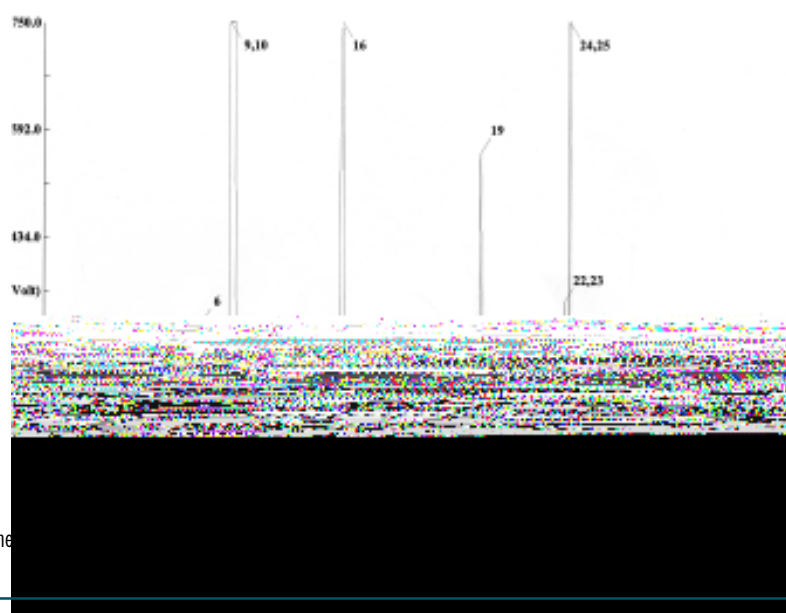
Carrier gas: He, constant pressure 4.8 psi (33.1 KPa), 35 cm/s (40°C)

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

Detector: FID, 250°C

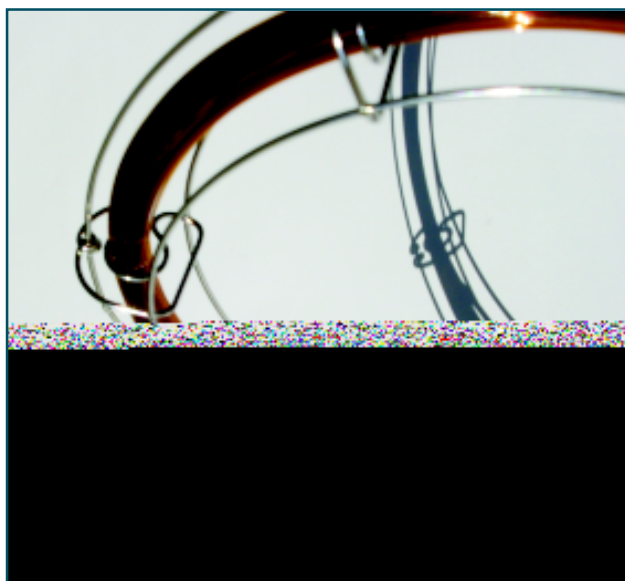
Peak Name

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





TRB-G43



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

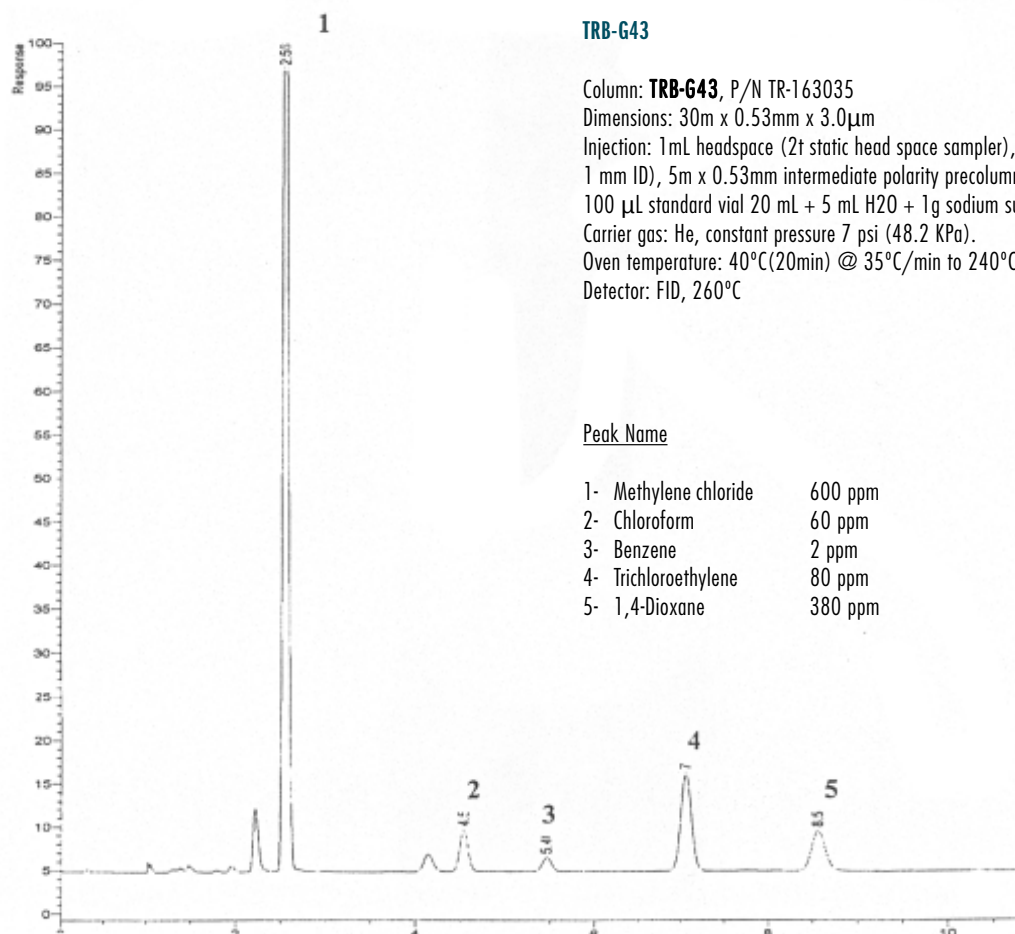
Supelco: SPB-1301, OVI-G43

Restek: Rtx-1301, Rtx-624

SGE: BPX-624

Alltech: AT-624

USP Nomenclature: G43



TRB-G43

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

Dimensions: 30m x 0.53mm x 3.0μm

Injection: 1mL headspace (2t static head space sampler), split 1:2 (liner 1 mm ID), 5m x 0.53mm intermediate polarity precolumn (TR-200055), 100 μL standard vial 20 mL + 5 mL H₂O + 1g sodium sulfate, 140°C

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

Oven temperature: 40°C(20min) @ 35°C/min to 240°C(20min)

Detector: FID, 260°C

Peak Name

1- Methylene chloride	600 ppm
2- Chloroform	60 ppm
3- Benzene	2 ppm
4- Trichloroethylene	80 ppm
5- 1,4-Dioxane	380 ppm

TKG 1122

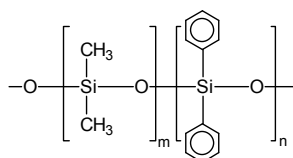


TRB-14

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.



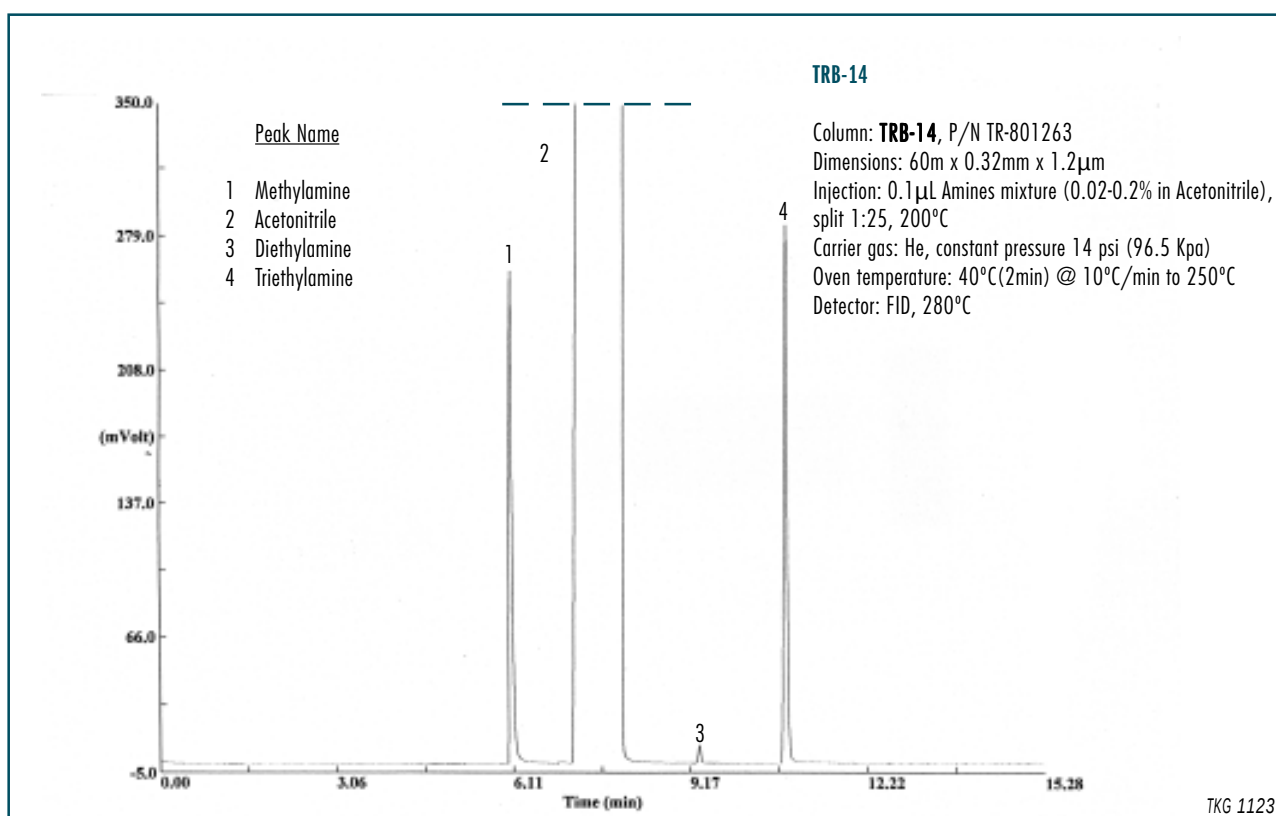
Structure of Poly(dimethyldiphenyl)siloxane

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



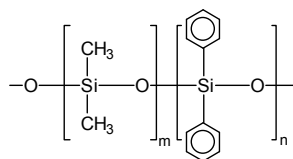


TRB-20

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

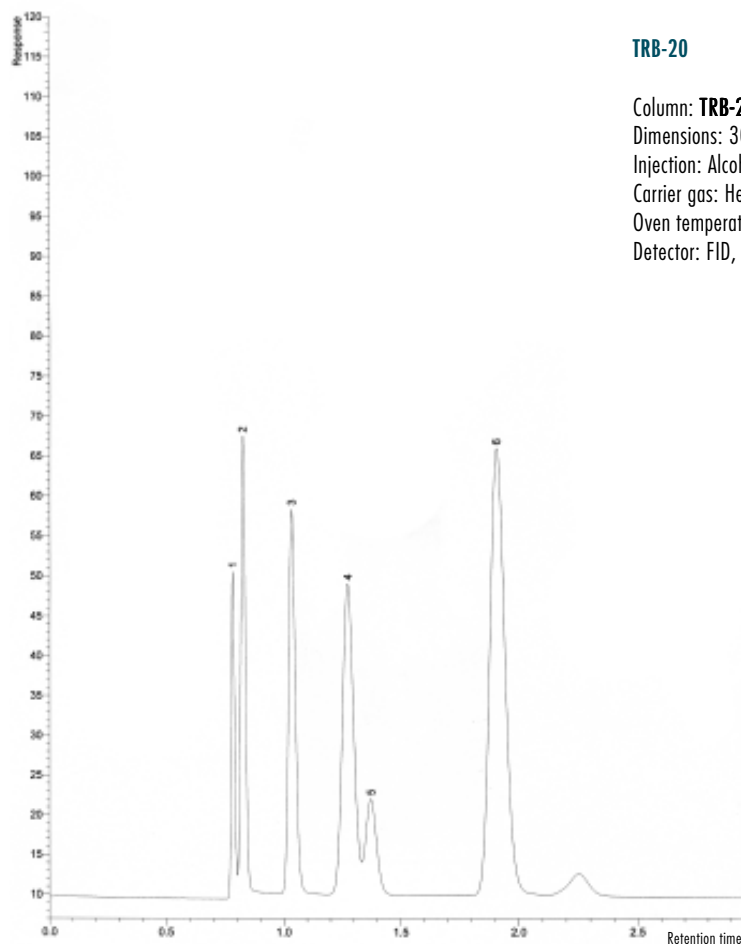
Supelco: SPB-20, VOCOL

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

TKG 1124

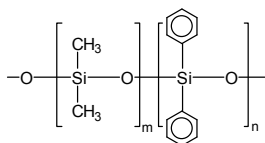


TRB-35

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

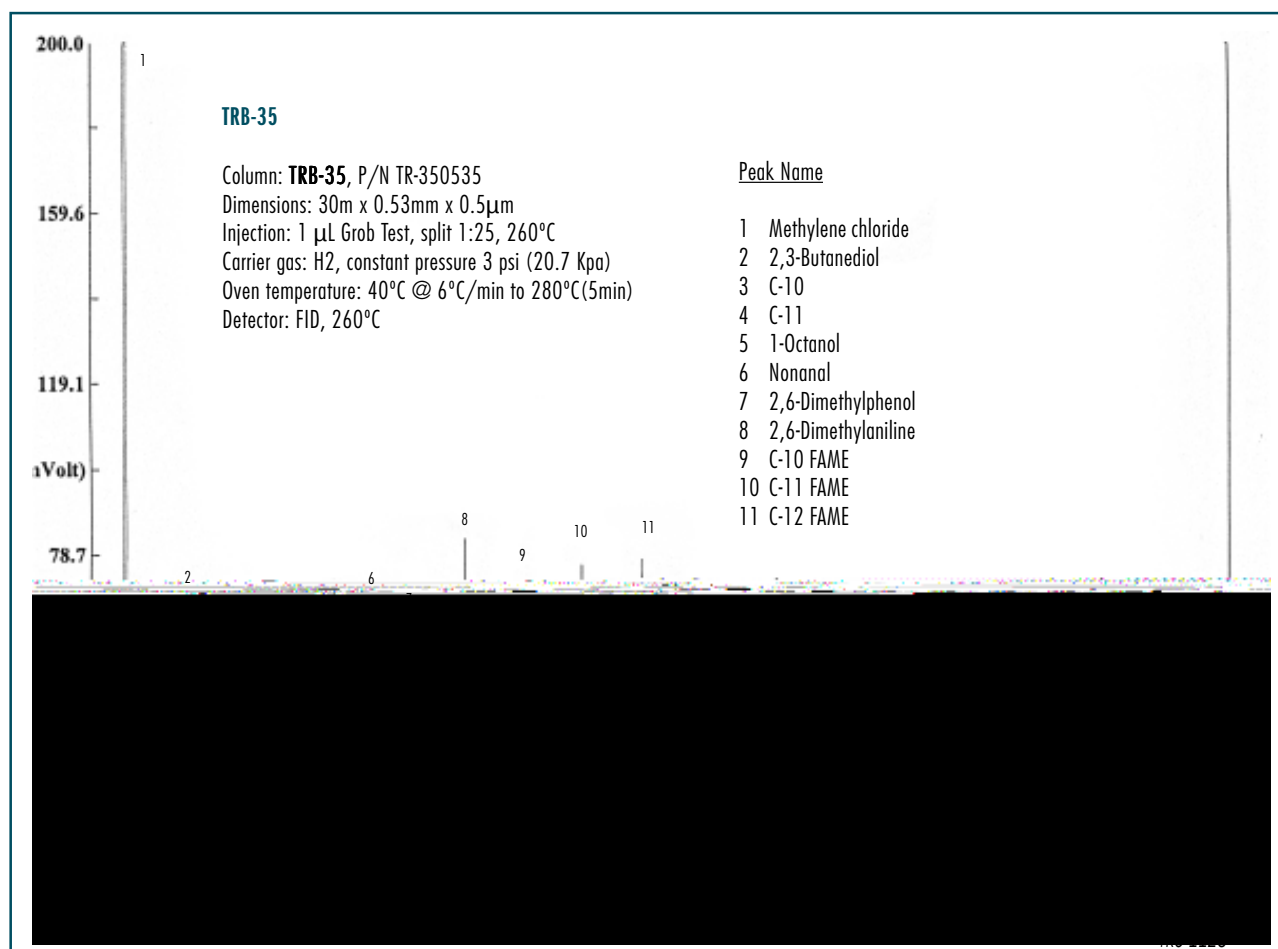
SGE: BPX-35

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
	60	0,50	-20 to 260/280	TR-350515
0,53	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

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

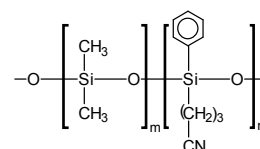
SGE: BP-10

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(dimethylcyanopropylphenyl)siloxane

TRB-1701

Column: **TRB-1701**, P/N TR-131565

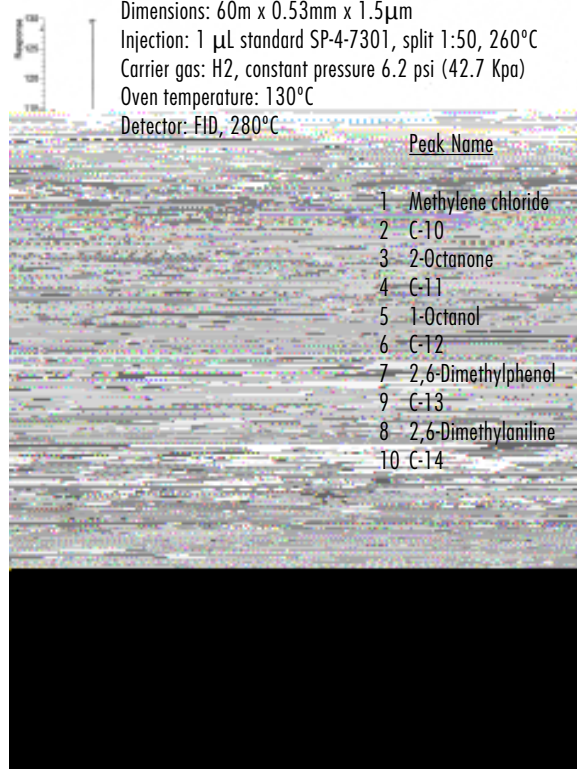
Dimensions: 60m x 0.53mm x 1.5μm

Injection: 1 μL standard SP-4-7301, split 1:50, 260°C

Carrier gas: H2, constant pressure 6.2 psi (42.7 Kpa)

Oven temperature: 130°C

Detector: FID, 280°C



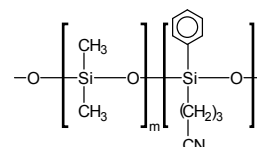
TKG 1126

TRB-225

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(dimethylcyanopropylphenyl)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



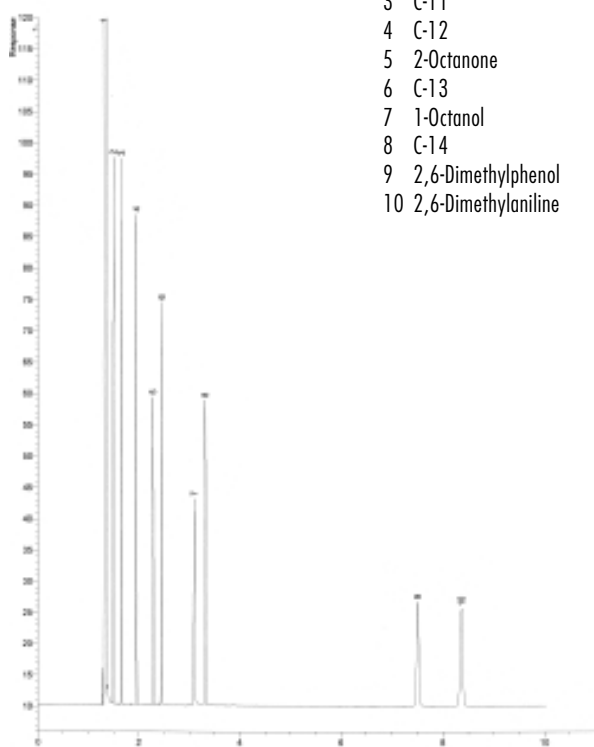
TRB-225

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



TKG 1127

TRB-225

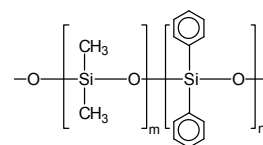
Internal Diam. (mm)	Length (m)	Film Thickness (μm)	Temp limits (°C)	Part. N°. (P/N)
0,20	15	0,20	40 to 220/240	TR-252119
	30	0,20	40 to 220/240	TR-252139
0,25	15	0,15	40 to 220/240	TR-251312
	15	0,25	40 to 220/240	TR-250212
	30	0,15	40 to 220/240	TR-251332
	30	0,25	40 to 220/240	TR-250232
0,32	15	0,15	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

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
	60	0,50	0 to 290/310	TR-500562
0,32	15	0,15	0 to 300/320	TR-501313
	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
	60	0,50	0 to 290/310	TR-500563
0,53	15	0,50	0 to 270/290	TR-500515
	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-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

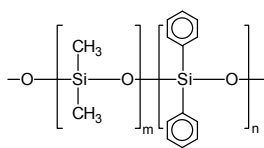
TRB-50ht

Column: **TRB-50ht**, P/N TR-531312

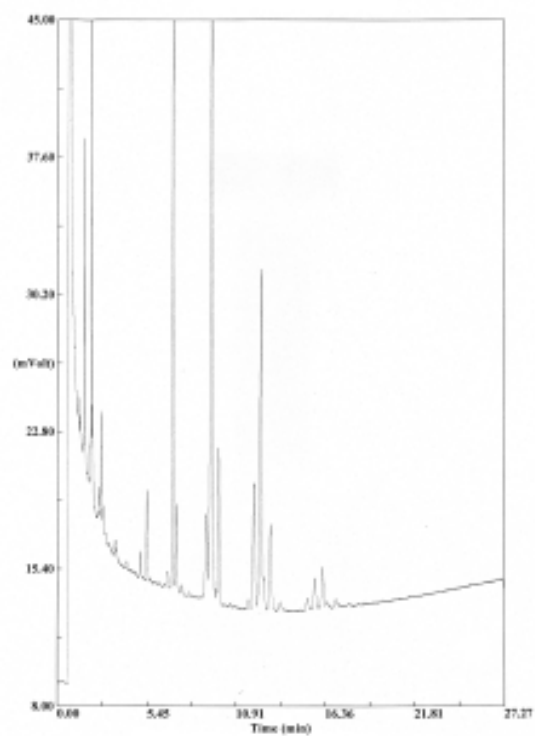
Dimensions: 15m x 0.25mm x 0.15mm

Injection: 0.2mL Triglycerides Palm Oil in Isooctane(50 mg/mL), split 1:12

Carrier gas: H₂, constant pressure, 9psi (56 KPa)



Structure of Poly(dimethyldiphenyl)siloxane





TRB-F50

TRB-F50

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

Dimensions: 30m x 0.32mm x 0.5μm

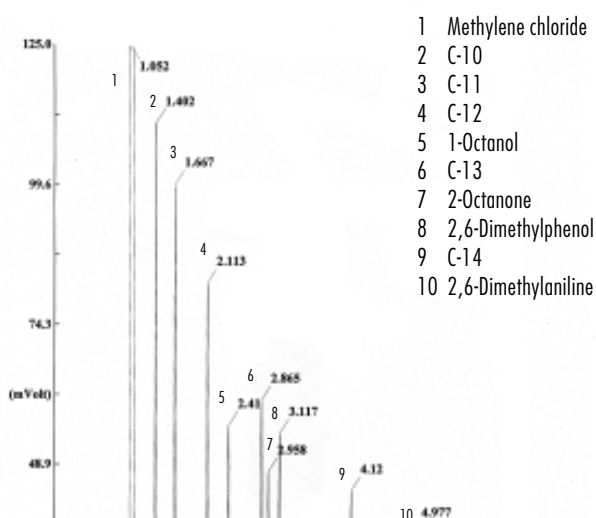
Injection: 1μL standard SP-4-7301 (500 ng/mL comp), split 1:50, 260°C

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

Oven temperature: 100°C

Detector: FID, 280°C

Peak Name



TRB-F50 Equivalent Phase

Agilent: DB-210, DB-200

Restek: Rtx-200

Alltech: AT-210

Quadrex: 007-210

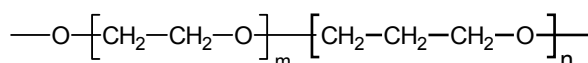
TRB-PAG

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. N°. (P/N)
0,25	15	0,25	30 to 220/230	TR-550212
	30	0,25	30 to 220/230	TR-550232
	60	0,25	30 to 220/230	TR-550262
0,32	15	0,25	30 to 220/230	TR-550213
	30	0,25	30 to 220/230	TR-550233
	60	0,25	30 to 220/230	TR-550263
0,53	15	0,50	30 to 220/230	TR-550515
	30	0,50	30 to 220/230	TR-550535
	60	0,50	30 to 220/230	TR-550565



Structure of Poly(ethylenepropylene)glycol

TRB-PAG Equivalent Phase

Supelco: PAG

TRB-PAG

Peak Name

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

Dimensions: 30m x 0.25mm x 0.25μm

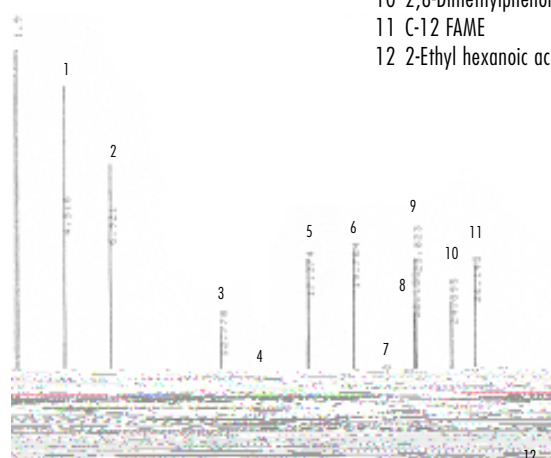
Injection: 1 μL Test Grob, split 1:25, 260°C

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

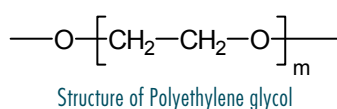
- 1 C-10
- 2 C-11
- 3 Nonanal
- 4 2,3-Butanediol
- 5 1-Octanol
- 6 C-10 FAME
- 7 Dicyclohexylamine
- 8 2,6-Dimethylaniline
- 9 C-11 FAME
- 10 2,6-Dimethylphenol
- 11 C-12 FAME
- 12 2-Ethyl hexanoic acid







TRB-FFAP



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. №. (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
	15	0,50	40 to 240/250	TR-150513
	30	0,25	40 to 240/250	TR-150233
	30	0,50	40 to 240/250	TR-150533
	60	0,25	40 to 240/250	TR-150263
	60	0,50	40 to 240/250	TR-150563
0,53	15	0,50	40 to 240/250	TR-150515
	15	1,00	40 to 230/240	TR-151015
	30	0,50	40 to 240/250	TR-150535
	30	1,00	40 to 230/240	TR-151035
	60	0,50	40 to 240/250	TR-150565
	60	1,00	40 to 230/240	TR-151065

TRB-FFAP Equivalent Phase

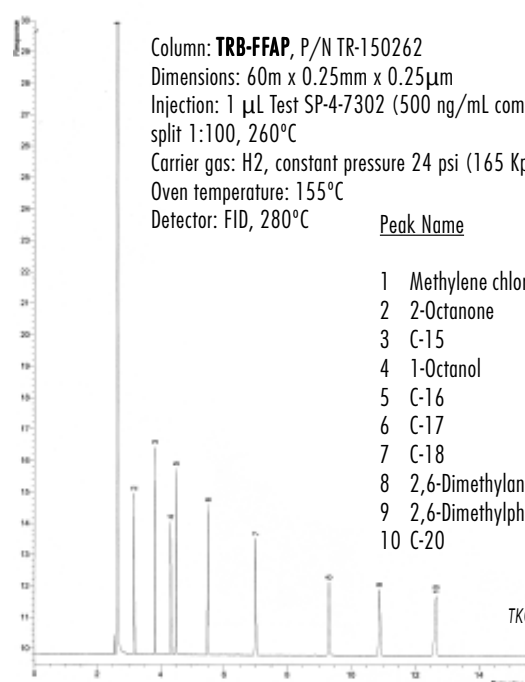
Agilent: HP-FFAP, DB-FFAP
Supelco: NUKOL, SP-1000
Restek: STABILWAX-DA
Varian: CP-WAX 58 CB
SGE: BP-21
Alltech: AT-1000, FFAP
Quadrex: 007-FFAP

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

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 1132

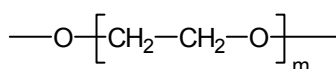


TRB-WAX.DB

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.

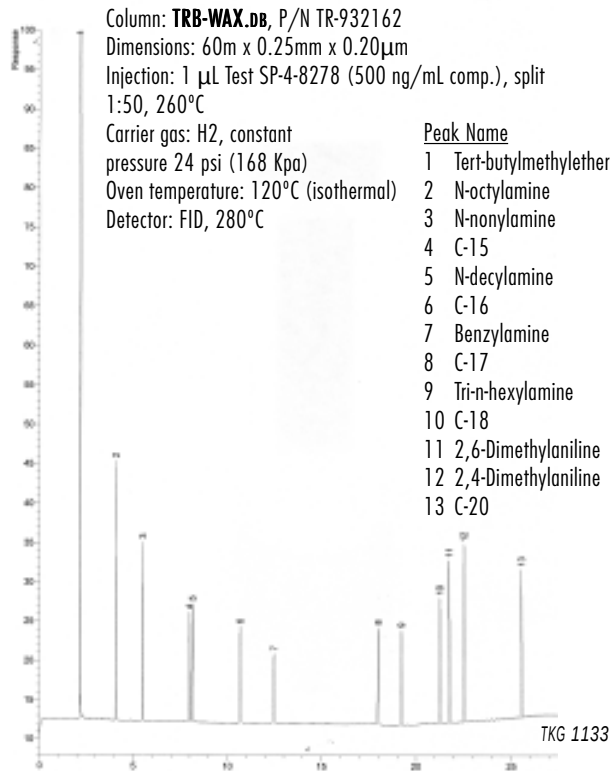


Structure of Polyethylene glycol

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
	60	1,00	60 to 210/220	TR-931015
0,53	15	1,00	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



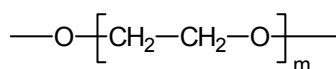
TRB-WAX.DB Equivalent Phase

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.



Structure of Polyethylene glycol

TRB-WAXOmega

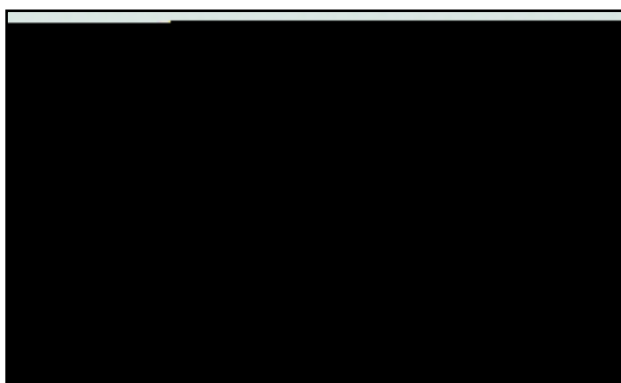
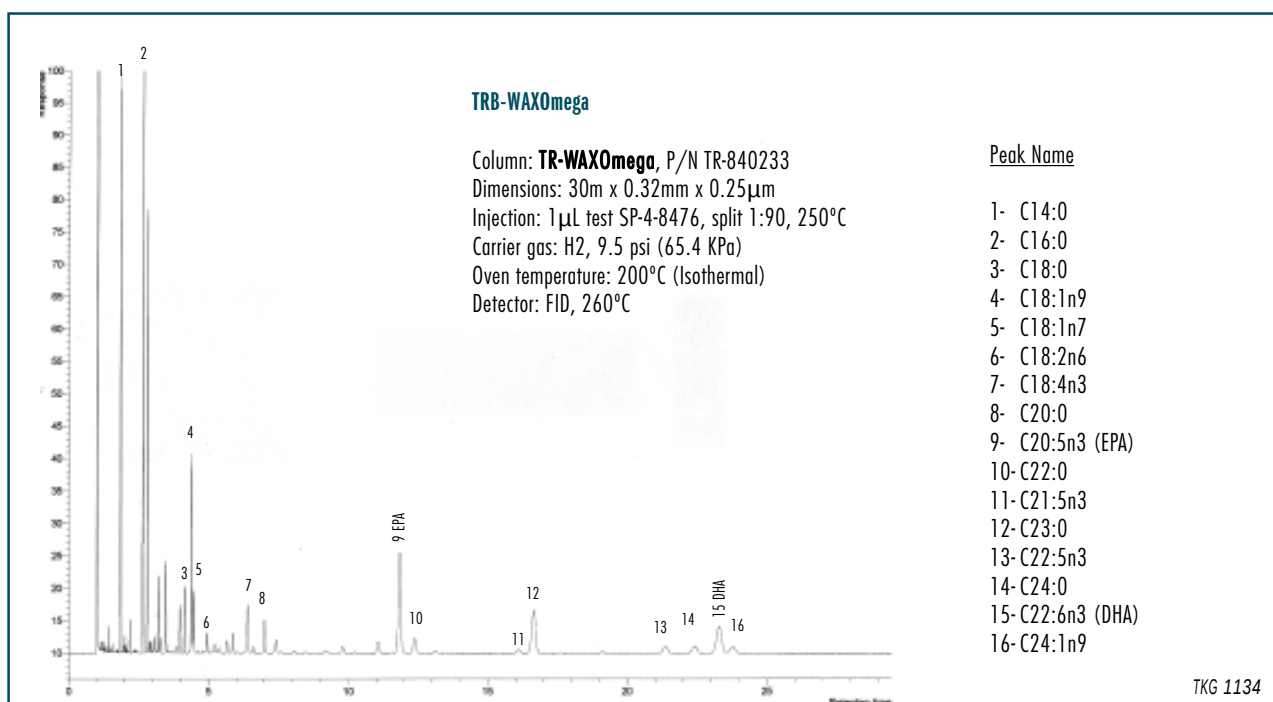
Internal Diam. (mm)	Length (m)	Film Thickness (μm)	Temp limits (°C)	Part. N°. (P/N)
0,25	30	0,25	40 to 260/270	TR-840232
0,32	30	0,25	40 to 260/270	TR-840233
0,53	30	0,50	40 to 260/270	TR-840535

TRB-WAXOmega Equivalent Phase

Supelco: Omegawax
 Restek: Famewax



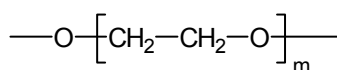
TRB-WAXOmega



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.



Structure of Polyethylene glycol

Meta.WAX

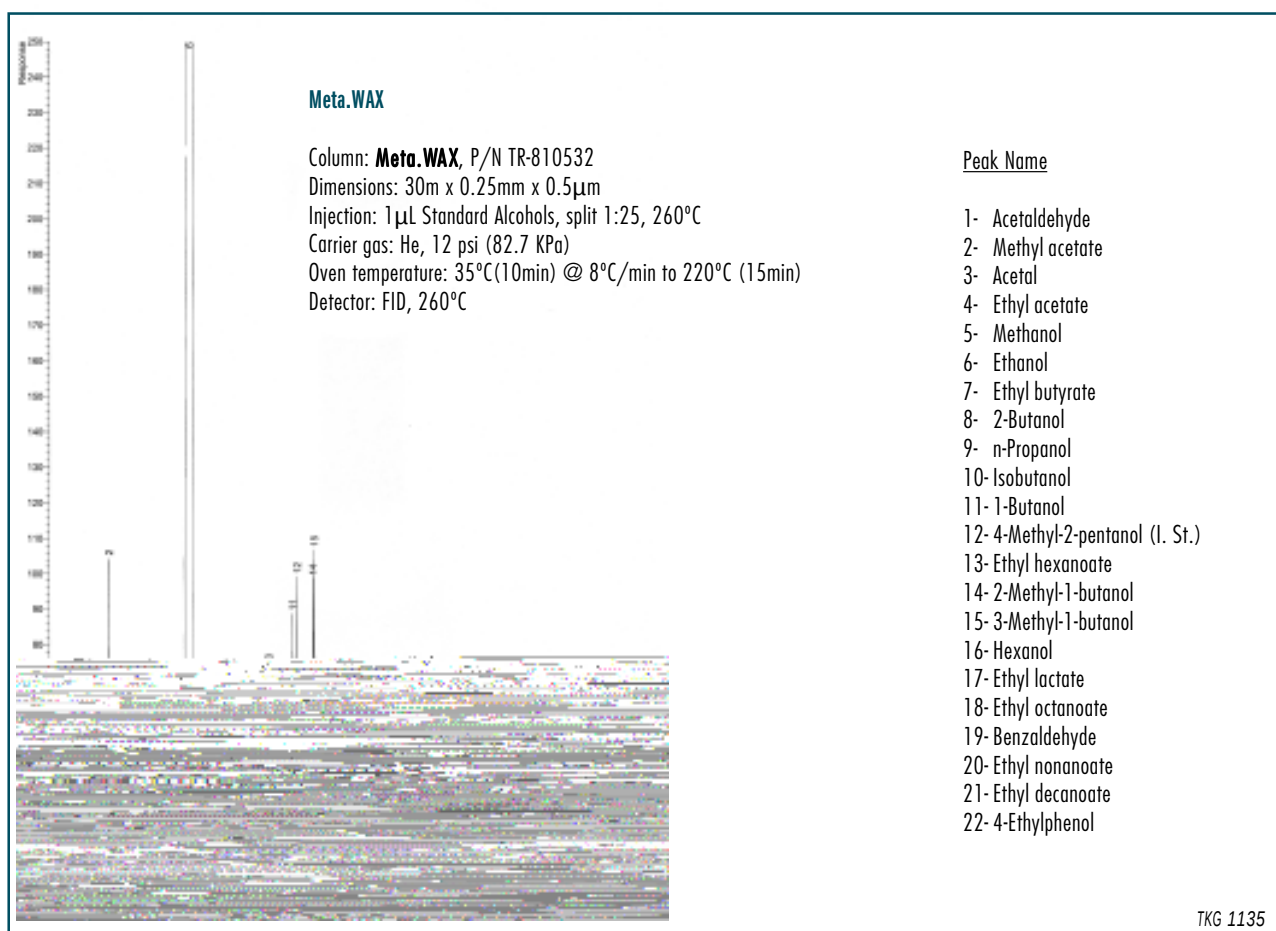
Internal Diam. (mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	Part. N°. (P/N)
0,25	15	0,10	20 to 240/250	TR-810112
	15	0,25	20 to 240/250	TR-810212
	15	0,50	20 to 240/250	TR-810512
	30	0,10	20 to 240/250	TR-810132
	30	0,25	20 to 240/250	TR-810232
	30	0,50	20 to 240/250	TR-810532
	60	0,20	20 to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



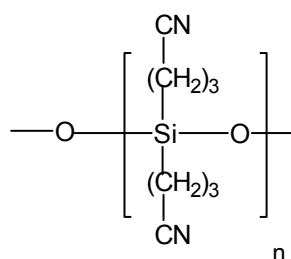
Meta. WAX



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.



Structure of Poly(biscyanopropyl)siloxane

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

TR-CN100 Equivalent Phase

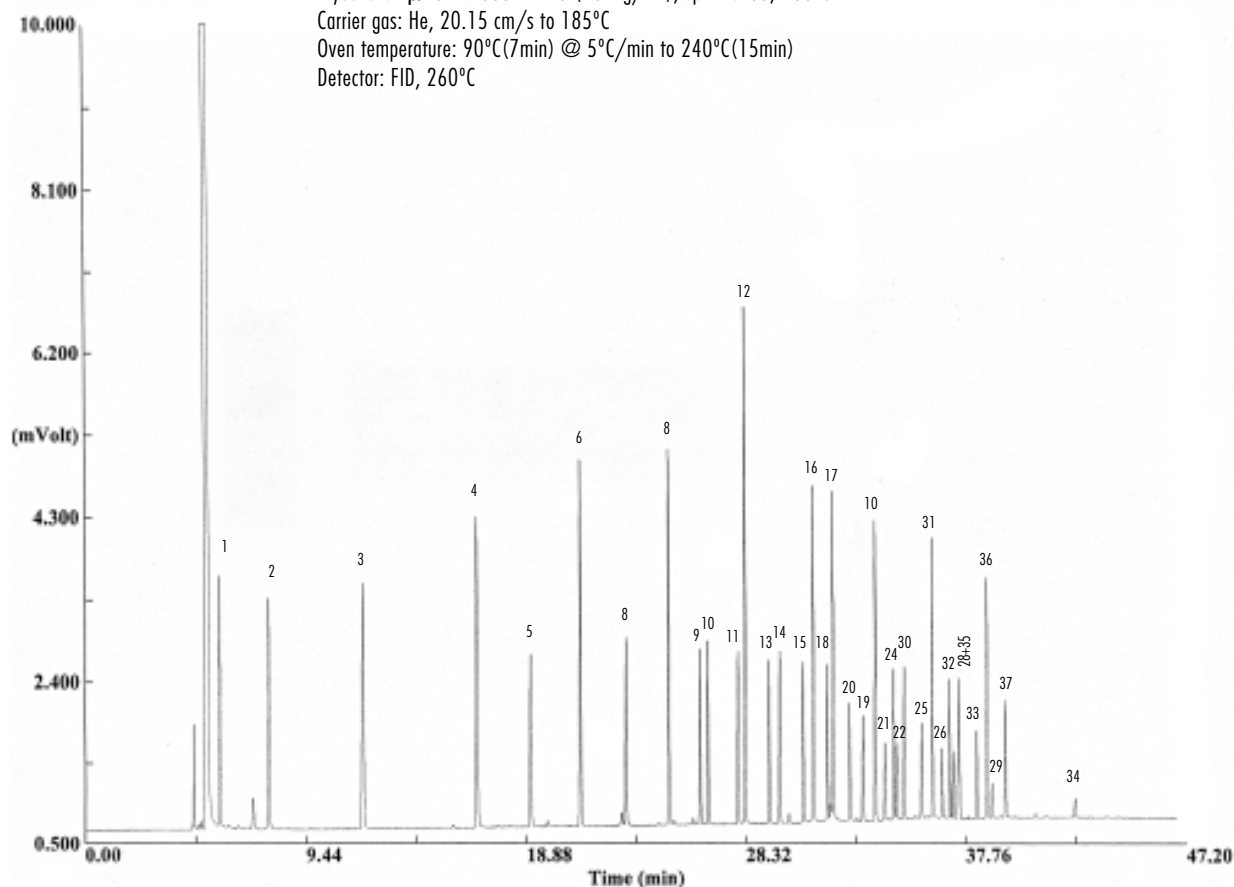
Supelco: SP-2340, SP-2380
Restek: Rt-2340, Rt-2330
Varian: CP-SIL 88



TR-CN100

TR-CN100

Column: **TR-CN100**, P/N TR-882162
 Dimensions: 60m x 0.25mm x 0.20µm
 Injection: 1µL 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- γ-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- <i>Cis</i> -11-eicosenoic acid methyl ester (C20:1) |
| 7- Tridecanoic acid methyl ester (C13:0) | 25- <i>Cis</i> -11,14-eicosadienoic acid methyl ester (C20:2) |
| 8- Myristic acid methyl ester (C14:0) | 26- <i>Cis</i> -8,11,14-eicosatrienoic acid methyl ester (C20:3n6) |
| 9- Myristoleic acid methyl ester (C14:1) | 27- <i>Cis</i> -11,14,17-eicosatrienoic acid methyl ester (C20:3n3) |
| 10- Pentadecanoic acid methyl ester (C15:0) | 28- Arachidonic acid methyl ester (C20:4n6) |
| 11- <i>Cis</i> -10-pentadecenoic acid methyl ester (C15:1) | 29- <i>Cis</i> -5,8,11,14,17-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- <i>Cis</i> -10-heptadecenoic acid methyl ester (C17:1) | 33- <i>Cis</i> -13,16-docosadienoic acid methyl ester (C22:2) |
| 16- Stearic acid methyl ester (C18:0) | 34- <i>Cis</i> -4,7,10,13,16,19-docosahexaenoic acid methyl ester (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

TR-17

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-xylene/2,5-xylene 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

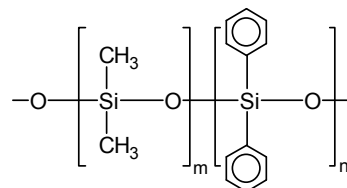
TR-CRESOL Equivalent Phase

Varian: CP-CRESOL

TR-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

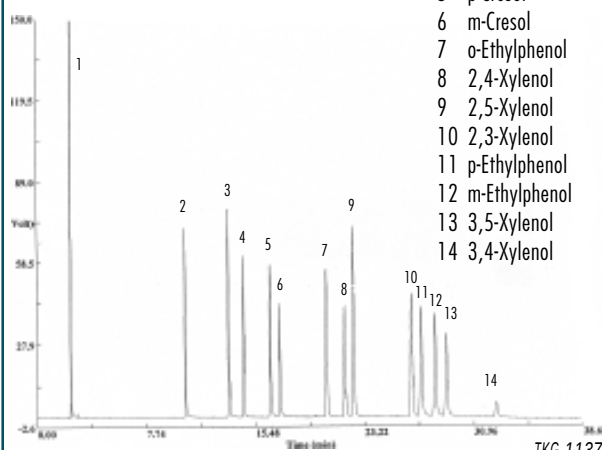
Agilent: HP-17

TR-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



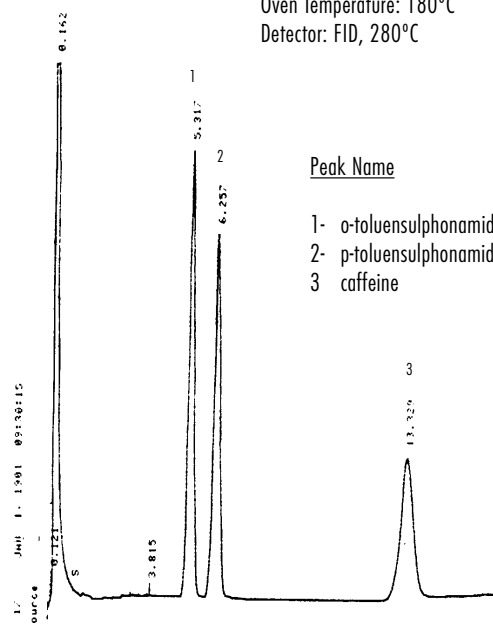
TKG 1137

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



TKG 1138



Meta.VOC

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

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

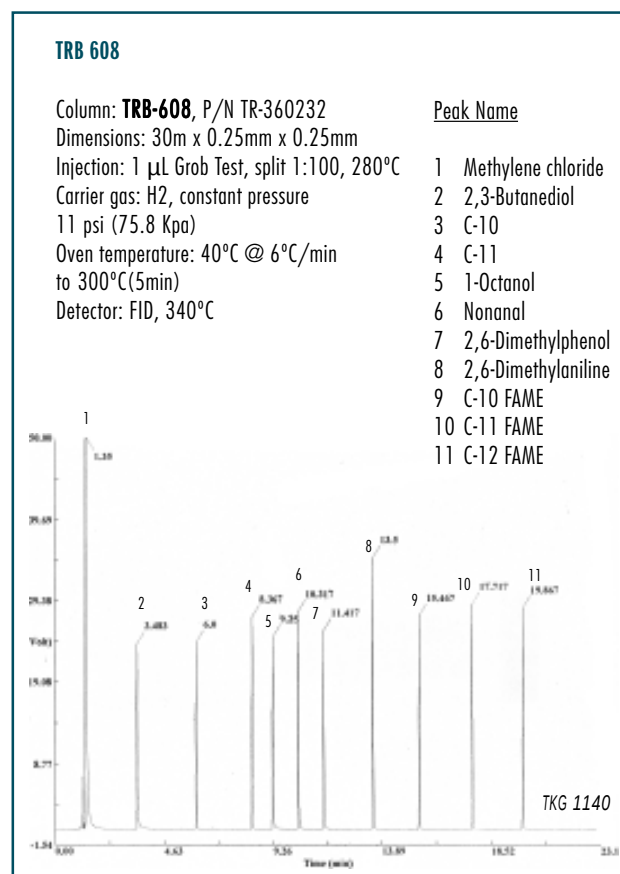
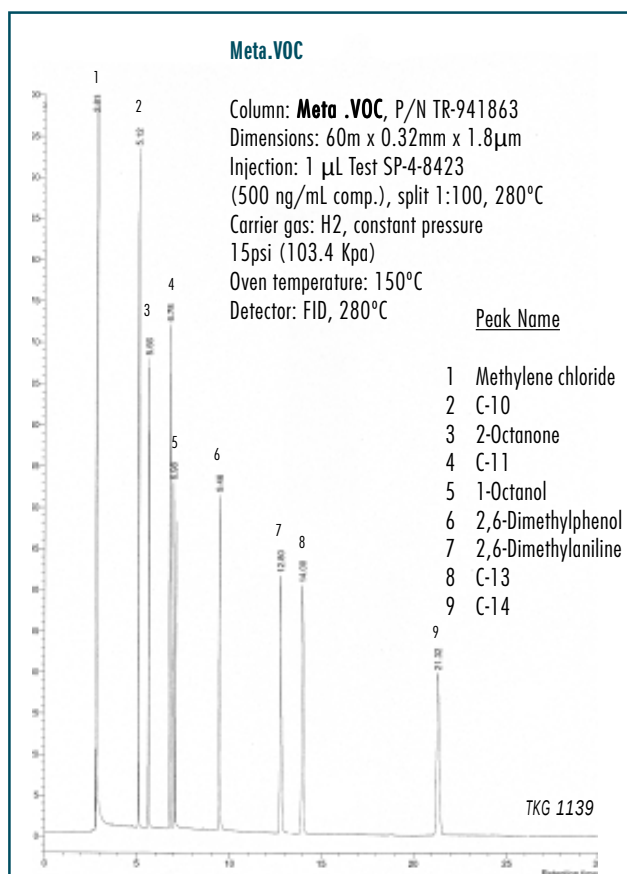
Internal Diam.(mm)	Length (m)	Film Thickness (μm)	Temp limits (°C)	Part. N°. (P/N)
0,25	30	0,25	-20 to 300/310	TR-360232
0,53	15	0,50	-20 to 290/300	TR-360515
	30	0,50	-20 to 290/300	TR-360535

TRB-608 Equivalent Phase

Agilent: HP-608

Supelco: SPB-608

SGE: BP-608





TR-TCEP

Meta.WAX 400

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

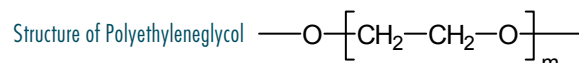
TR-TCEP Equivalent Phase

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

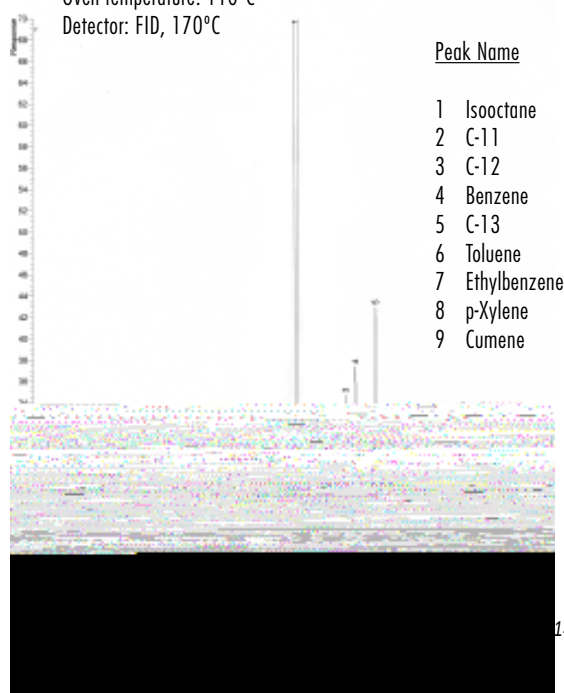
Internal Diam.(mm)	Length (m)	Film Thickness (μm)	Temp limits (°C)	Part. N°. (P/N)
0,32	50	0,20	0 to 60/80	TR-402153

Meta.WAX 400 Equivalent Phase

Varian: CP Carbowax 400

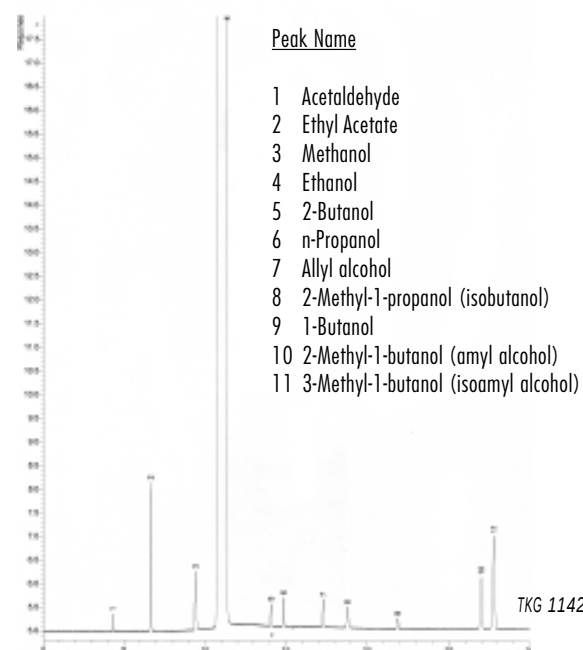
TR-TCEP

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

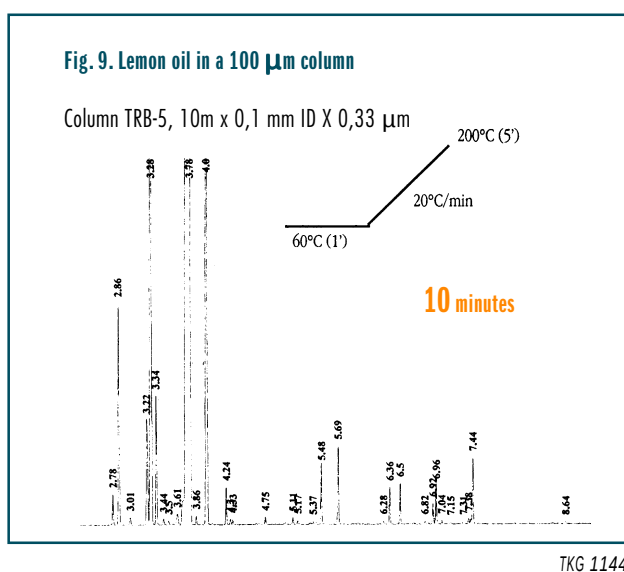
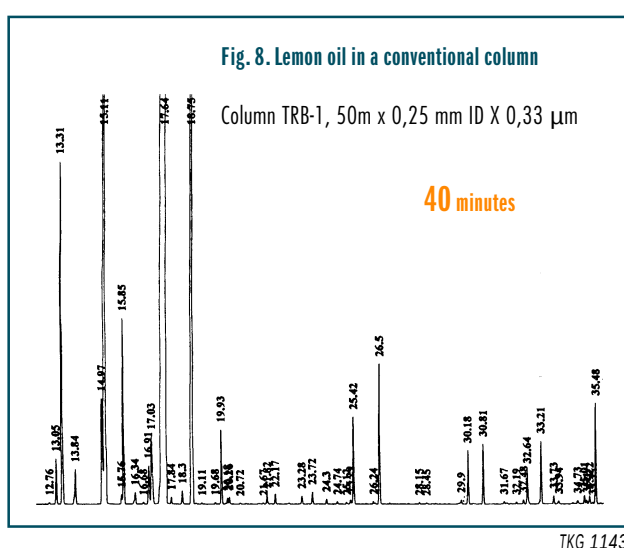




Teknokroma Microbore Columns (0,1mm ID)

- **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).



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 optimed 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 Split-splitless. It is not recommended to work with direct or on-column injection.

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

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

4. DETECTOR

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

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

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

Teknokroma Microbore columns of 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
	20	0.4	TR-110481
TRB-5	10	0.1	TR-120141
	10	0.4	TR-120441
	20	0.1	TR-120181
	20	0.4	TR-120481
TRB-WAX	10	0.1	TR-140141
	10	0.2	TR-142141
	20	0.1	TR-140181
	20	0.2	TR-142181



Teknokroma Microbore Columns

TRB-WAX

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

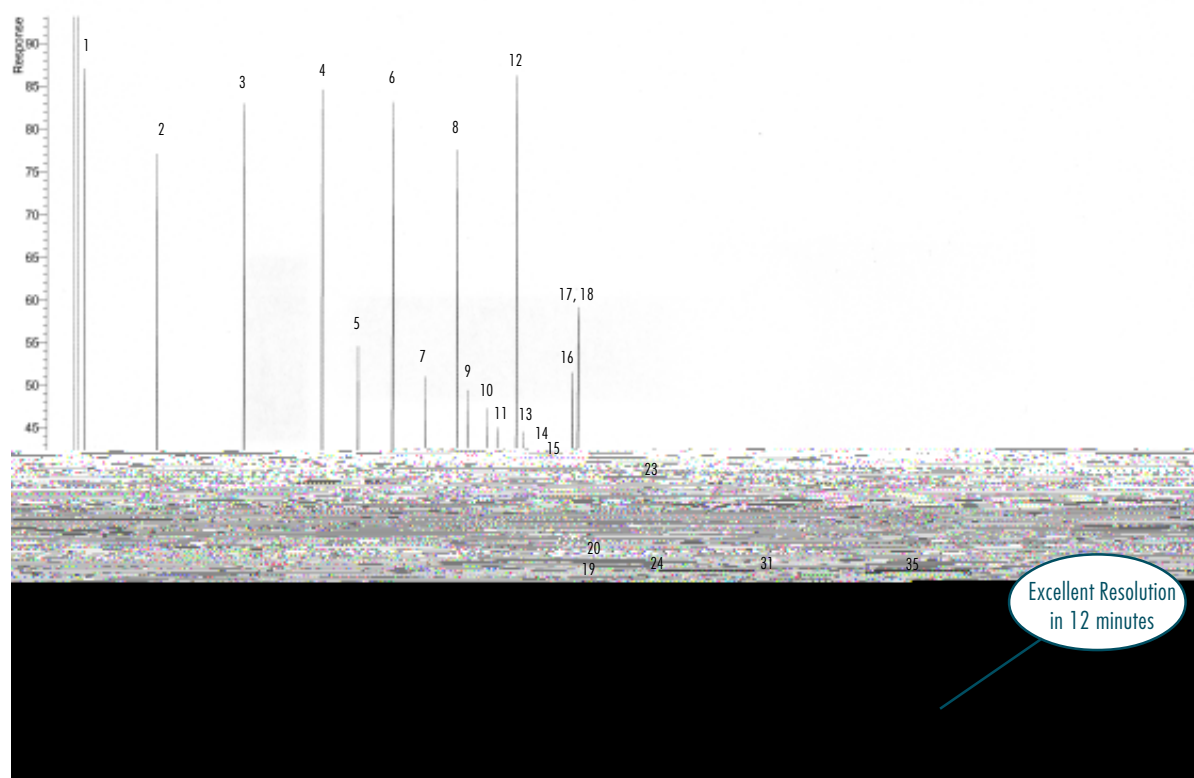
Dimensions: 10m x 0.10mm x 0.10µm

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

TKG 1145



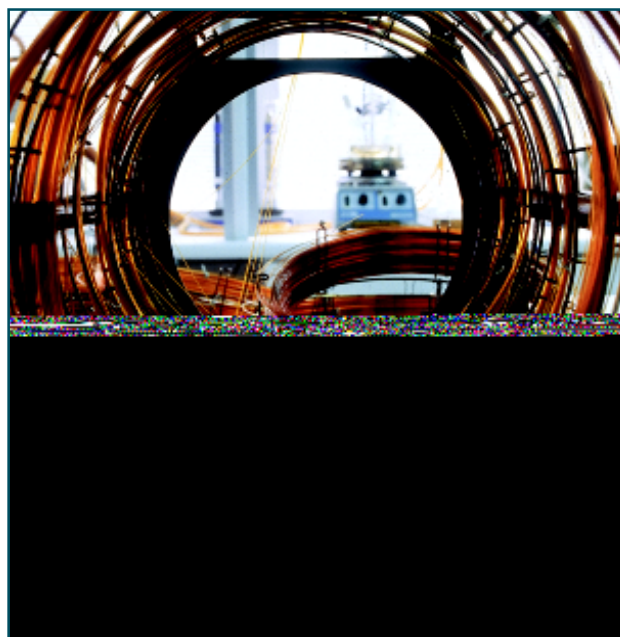
Custom Capillary Columns

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

- TR-101 - 100% polydimethylsiloxane phase ("silicone fluid").
- TR-SE-30 - 100% polydimethylsiloxane phase.
- TR-SE-52 - 5% phenyl -95% dimethylpolysiloxane phase.
- TR-SE-54 - 5% phenyl-1% vinyl-94% dimethylpolysiloxane phase.
- TR-20M - polyethylene glycol 100% (Carbowax 20M) phase.

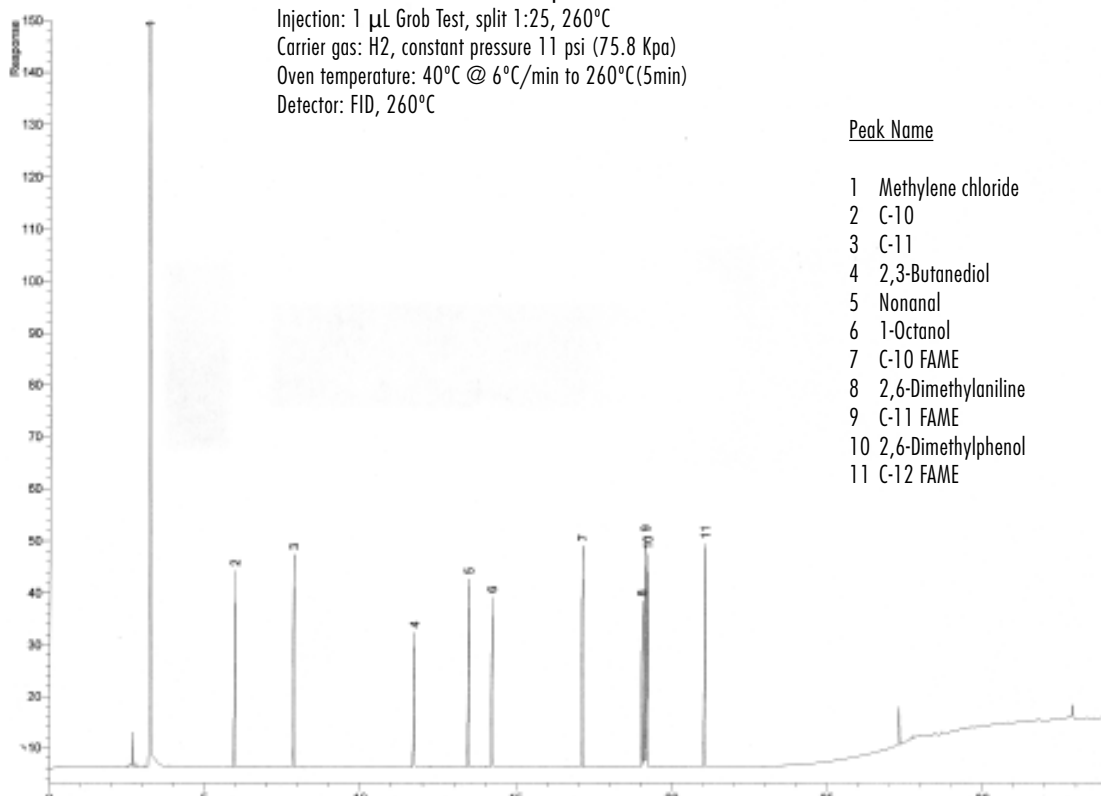
We can also supply you with columns for inverse gas chromatography, used for the characterisation of polymers. Teknokroma can coat your polymer in our fused silica column.

**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



TKG 1147



Guard Columns (Retention Gap)

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
With stainless steel tube, 10m x 0.53 mm x 2.65µm

P/N TR-192645
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
With 5 inch cage, TRB-5, 30m x 0.25 mm x 0.25µm

P/N TR-120232
P/N TR-1202325



USP Capillary Column Equivalents

USP CODE	GENERAL DESCRIPTION	TEKNOKROMA RECOMMENDED CAPILLARY EQUIVALENT
G1	Dimethylpolysiloxane oil	TRB-1, TRB-1ms
G2	Dimethylpolysiloxane gum	TRB-1, TRB-1ms
G3	50%phenyl-50%methylpolysiloxane	TRB-50
G5	3-cyanopropylsiloxane	TR-CN100
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 Drinking Water Test Methods

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
	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
	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
	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
	2,3,7,8-Tetrachlorodibenzo-p-dioxin by GC/MS	TRB-5ms	60m x 0.25mm x 0.10 µm	TR-520162
5	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 i40)-40(u)-5q(o)-30)-57(n)-30)-58(s.50 0 Td(m)TfTO.855 30)-58(s.50 0 Td(m)TfTO.855 2 1 Tf)-40)-4			



EPA Solid Waste Test Methods

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

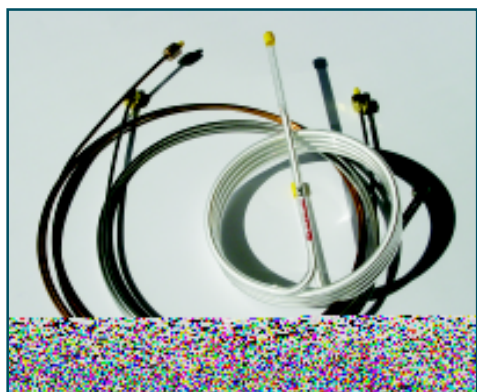


EPA Waste Water Test Methods

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



Packed Columns - 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 tetrafluorethylene 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



Packed Columns



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

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

"Today Packed columns are still demonstrating their utility in the solution of many analytical problems where it is not necessary to use the high resolution of capillary columns".

"Teknokroma has packed columns since its beginnings and have always provided a wide range and latest advantages in this area of gas chromatography. Within these new advances we showcase the latest advance in micro-packed columns (0,75mm and 1,00mm ID) and new bonded phase packings".

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

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

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

To order a packed column it is necessary to supply the following parameters:

Chromatograph Model	Configuration	Tubing	Dimensions	Phase (%)	Support (mesh)
Aglient 5890	ON-Column	Glass	1.8m x 1/4" OD X 2mm ID	3% SE-30	Chromosorb W-HP 80/100 mesh

DESCRIPTION	T LIMITS (°C)	USP CODE
Alltech AT™-1000	50/250	635
Apiezon® L	50/300	-
Apiezon® M	50/300	-
Bentone 34	0/180	-
N,N-bis-(2-Cyanoethyl)formamide (BCEF)	20/125	-
N,N-bis-(p-Methoxybenzylidene)-a,a'-bi-p-toluidine (BMBT)	150	-
Bis-(2-ethoxyethyl) Adipate (BEEA)	150	-
Bis-(2-methoxyethyl) Adipate (BMEA)	150	-
Carbowax® 400	20/100	620
Carbowax® 540	40/175	639
Carbowax® 600	20/125	-
Carbowax® 1000	40/150	614
Carbowax® 1450	50/175	-
Carbowax® 3350	60/200	615
Carbowax® 6000	60/200	-
Carbowax® 20M	60/225	616
Carbowax® 20M-TPA	60/250	625
DC-200, 350cstk (Methyl)	20/250	-
DC-200, 500cstk (Methyl)	20/250	-
DC-550, (25%-Phenyl)	20/225	628
Dexsil® 300GC	50/400	633
Di-n-butyl Maleate	20/50	-
Di-n-decyl phthalate	10/175	-
Di(2-ethylhexyl)sebacate	0/125	611
Diethyleneglycol Adipate	20/210	-
Diethyleneglycol Succinate	20/200	64
Diglycerol	20/100	-
2,4-Dimethylsulfonate	0/50	-
Dinonyl Phthalate	20/150	-
Diisodecyl Phthalate	20/150	624
Ethyleneglycol Adipate	100/210	-
Ethyleneglycol Succinate	100/210	-
Fluorad FC-431	40/200	-
FFAP	50/250	635
Halocarbon oil 14-25	150	-
Igepal® CO-630	30/200	-
Igepal® CO-880 (Nonoxynol)	100/200	631
Igepal® CO-990	100/200	-
Kel-F® Oil No.10	100	-
Neopentylglycol Succinate	50/230	621
OV™-1 (Methyl gum)	100/350	62



Packed Columns

DESCRIPTION	T LIMITS (°C)	USP CODE
OV™-17 (50% phenyl)	20/350	63
OV™-17-Vinyl (50% phenyl)	300+	-
OV™-25 (75% phenyl)	300	617
OV™-101 (Methyl fluid)	20/350	61
OV™-210 (50% Trifluoropropyl)	20/275+	66
OV™-225 (25% phenyl, 25% cyanopropyl methyl)	20/250+	619
OV™-275 (Dicyanoallyl)	250+	-
OV™-1701	0/250	-
β,β-Oxydipropionitrile	0/75	-
Phenyldiethanolamine Succinate	0/230	612
Polyethylene glycol adipate	0/225	623
Polyethyleneimine	0/175	-
Polyphenyl ether (5 rings) OS-124	0/200	-
Polyphenyl ether (6 rings) OS-138	0/225	-
Polypropylene glycol	0/150	-
Polypropyleneimine	0/200	-
QF-1 (50% Trifluoropropyl)	20/250	-
SE-30 (Methyl gum)	75/300	-
SE-30 (GC grade)	75/300	62
SE-52 (5% Phenyl)	50/300	627
SE-54 (5% Phenyl, 1% Vinyl)	50/300	636
Sebaconitrile	150	-
Silar® 5CP (50% Cyanopropyl Phenyl Silicone)	50/250	67
Silar® 9CP (90% Cyanopropyl Phenyl Silicone)	50/250	68
Silar® 10C (100% Cyanopropyl Silicone)	50/250	65
Sorbitol	100/150	613
SP-1200	25/200	-
SP-2100 (Methyl silicone)	0/350	61
SP-2300 (Polycyanopropylphenylsiloxane)	20/275	67
SP-2330 (Poly(80%-biscyanopropyl-20%-cyanopropylphenyl)siloxane)	25/275	68
SP-2340 (Polybiscyanopropylsiloxane)	25/275	65
Squalene	20/150	-
SUPEROX® 4 (4.000.000 MW)	300	-
SUPEROX® 20M (20.000 MW)	60/250	-
Tetracyanoethylated Pentaerythritol (TCEPE)	30/150	-
Tetrahydroxyethylene Diamine (THEED)	125	-
1,2,3-Tris-(2-cyanoethoxy)propane (TCEP)	20/180	-
Triton® X-100	0/200	-
Triton® X-305 (Octylphenoxy Polyethoxyethanol)	20/250	-
UC W-98 (UC-W982)	80/300+	69
UCON LB-1800-X (Polyalkylene Glycol)	200	618
Versamid® 900	275	-

For other stationary phases please inquire



PACKED COLUMNS

Column: 5% Carbowax 20M CarboBlack B/AW, 80/120 mesh

Dimensions: 2m x 1/8" OD X 2mm ID, (Silcosteel)

Injection: 1 µl standard, 175°C

Carrier Gas: He, 15mL/min

Oven temperature: 60°C(6min) @ 10°C/min to 150°C(7min)

Detector: FID, 175°C

Peak Name

- 1- Acetaldehyde
- 2- Methanol
- 3- Acetone
- 4- Ethyl formate
- 5- Ethanol
- 6- Ethyl acetate
- 7- n-Propanol
- 8- Secbutanol
- 9- Isobutanol

