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Grace® GC Capillary Column Families


5382

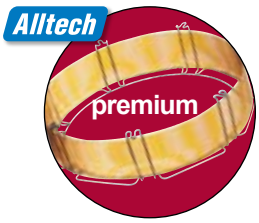
- Alltech® Heliflex®—High-Performance, Widest Selection of Phases
- Alltech® Econo-Cap™—Best Value, Popular Phases

Grace offers two lines of capillary columns to suit every application and budget; Alltech® Heliflex® and Alltech® Econo-Cap™. Heliflex® Columns are Grace's premium line of individually tested capillary columns. Econo-Cap™ Columns are batch tested to dramatically reduce the price without sacrificing quality. Both the Heliflex® and Econo-Cap™ lines are manufactured under identical conditions using the same high-quality polyimide coated fused silica and immobilized stationary phases. In addition each are mounted on a rugged cage.

Regardless of the capillary line you choose, every Grace manufactured capillary column has a guarantee of column performance.

Alltech® Heliflex® Capillary Columns

- High-performance individually tested columns
- Choice of 5" or 7" rugged cage
- Most complete selection of phases
- Custom columns available to suit your specific application

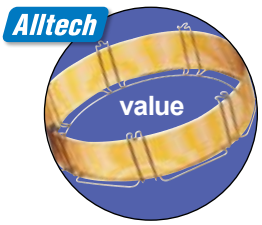


Heliflex® Capillary Columns are manufactured from the highest quality polyimide coated synthetic fused silica. They are mounted on a rugged wear-resistant cage. Each Heliflex® Column is individually tested to guarantee column performance and comes with a test chromatogram, instruction manual, capillary end caps, and a free ceramic column cutter.

Note: Column nuts and ferrules are not included. If the column you need is not available in our standard offering, request a custom Heliflex® Column made to your individual specifications.

Alltech® Econo-Cap™ Capillary Columns

- Best value in capillary columns anywhere
- Batch tested to dramatically reduce price
- Ideal for aggressive applications
- Available in the most popular phases



We've taken our most popular capillary columns and perfected the manufacturing procedure to the point that reproducibility is assured. This allows us to test these columns in batches instead of individually, while still offering a guarantee. Batch testing significantly reduces cost in production without sacrificing quality.

Each Econo-Cap™ Capillary Column comes with a copy of the batch test results, an instruction manual, and capillary end caps. If you are not completely satisfied with the quality of your Econo-Cap™ Capillary Column it will be replaced at no charge.

Note: Column nuts and ferrules are not included.

Available Alltech® Heliflex® Phases	
Phase	**Page**
AT™-1ms	216
AT™-1ht	216
AT™-1	217
AT™-5ms	218
AT™-5	218
AT™-20	219
AT™-35ms	220
AT™-35	220
AT™-50	221
AT™-624	226
AT™-1301	221
AT™-1701	222
AT™-210	222
AT™-225	226
AT™-WAXms	223
AT™-WAX	223
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AT™-AquaWax-DA	224
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Available Alltech® Econo-Cap™ Phases	
Phase	**Page**
EC™-1	217
EC™-5	219
EC™-20	219
EC™-WAX	224
EC™-1000	225

tech tip

Temperature limits

Our GC capillary columns are temperature rated. In some cases, we list two maximum operating temperatures, the lower one is for isothermal condition and the higher one for temperature-programmed condition.

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Capillary Column Phase Cross Reference

Use the chart below to cross reference manufacturers' stationary phases as well as USP method designations to Alltech equivalent columns. Slight variations in selectivity may result between different manufacturers' columns.

Alltech® Standard Phase Cross Reference

Standard Phase Cross Reference			
Composition	Alltech Brand	USP Designation	Similiar Phases
100% Dimethylpolysiloxane	AT™-1ms	G1, G2, G38	DB-1ms, HP-1ms, Rtx®-1ms, CP-Sil 5CB low-bleed/ms
100% Dimethylpolysiloxane	AT™-1ht, AT™-1, EC™-1	G1, G2, G38	007-1, CP-Sil 5CB, DB-1, DB-1ht, HP-1, HP-101, OV™-1, RSL-150, RSL-160, Rtx®-1, SE-30™, SPB™-1, SPB™-Sulfur, ULTRA-1, SP-2100, BP-1, DC-200, PE-1, ZB-1
5% Phenyl equivalent Polysilphenylene-Siloxane	AT™-5ms		DB-5ms, Rtx®-5 Sil ms, BPX™-5, 007-5ms, HP-5ms
(5% Phenyl)-95% methylpolysiloxane	AT™-5, EC™-5	G27, G36	007-2, CP-Sil 8CB, DB-5, DB-5.625, DB-5ht, HP-5, HP-5ms, OV™-5, PTE-5, PTE-5QTM, PAS-5, RSL-200, Rtx®-5, Rtx®-5ms, SAC-5, SE™-54, SPB™-5, ULTRA-2, XTI-5, SE™-52, BP-5, PE-2, ZB-5
(20% Phenyl)-80% methylpolysiloxane	AT™-20, EC™-20	G28, G32	007-7, Rtx®-20, SPB™-20, VOCOL™, PE-7
(35 Phenyl)-65% Methylpolysiloxane	AT™-35ms AT™-35	G42	DB-35ms, Rtx®-35, SPB™-35, SUP-HERB™, MDN-35, BPX™-35 007-11, DB-35, DB-35ms, HP-35, RSL-300, Rtx®-35, SPB™-35, SPB™-608, OV™-11, PE-35, SUP-HERB™
(50 Phenyl)-50% methylpolysiloxane	AT™-50	G3	DB-17ms, H5-50+, Rtx®-50, SP-2250, SPB™-50, SPB™-17, BPX™-50 DB-17ht, Rtx®-65TG, BPX™-50, CP-TAB-CB, 007-17, DB-17, DB-17ht, HP-17, HP-50+, Rtx®-50 SP-50, SP-2250, SPB™-50, CP-Sil 24CB, PE-17, ZB-50
(6% Cyanopropylphenyl)-94% methylpolysiloxane	AT™-624 AT™-1301	G43	007-1301, DB-624, DB-1301, HP-1301, HP-624, Rtx®-1301, Rtx®-624, SPB™-1301, SPB™-624, 007-624, ZB-624
(14% Cyanopropylphenyl)-86% methylpolysiloxane	AT™-1701		007-1701, CP-Sil 19CB, DB-1701, HP-1701, OV™-1701, PAS-1701, Rtx®-1701, SPB™-1701, BP-10, ZB-1701
Trifluoropropylmethyl polysiloxane	AT™-210	G6	DB-210, RSL-400, Rtx®-200, OV™-202, OV™-210, OV™-215, QF-1, SP-2401
(50% Cyanopropylphenyl)-50% methylpolysiloxane	AT™-225	G7	007-225, CP-Sil 43CB, DB-225, HP-225, OV™-225, RSL-500, Rtx®-225, BP-225, PE-225
Poly(80% biscyanopropyl)-20% cyanoproylphenyl siloxane	AT™-SILAR-90	G8	DB-23, CP-Sil 84, Rtx®-2330, SP-2330
Poly(biscyanopropyl siloxane)	AT™-SILAR-100	G5	CP-Sil 88, Rtx®-2330, SP-2340
Polyethyleneglycol	AT™-WAXms AT™-WAX AT™-AquaWax EC™-WAX	G14, G15 G16, G20, G39	DB-WAX, Rtx®-WAX, Supelcowax™-10 007-CW, Carbowax® 20M, CP-Wax 52CB, DB-WAXetr, DB-WAX, Rtx®-WAX, HP-20M, HP-Wax, Innowax™, Omegawax™, Stabilwax®, Supelcowax®-10, Superox® II, BP-20, ZB-WAX
Polyethyleneglycol Acid Modified	AT™-1000, EC™-1000, AT™-AquaWax-DA	G25, G35	007-FFAP, CP-Wax 58CB, DB™-FFAP, HP™-FFAP, Nukol™, OV™-351, SP-1000, Stabilwax®-DA, Superox®-FA, BP-21
Polyethyleneglycol Base Modified	AT™-CAM		Stabilwax®-DB, CAM, Carbowax® Amine, CP Wax 51
PONA Analysis	AT™-Petro		007-1-100-0.5F, CP-Sil PONA CB, DB-Petro100, Petrocol™ DH, PONA, Ttx-1PONA, HP-PONA
ASTM Method 2887	AT™-2887		007-1-10V-1.0F, DB-2887, Petrocol™ 2887, Petrocol™ EX2887, Rtx®-2887, Sim-Dist-CB
ASTM Method 3710	AT™-3710		Petrocol™ 3710

Alltech® Specialty Columns Cross Reference

Specialty Phases Cross Reference		
EPA Method 608	AT™-Pesticide	007-608, DB-608, HP-608, SPB™-608
EPA Method 502.2	AT™-502.2	007-624, 007-502, DB-502.2, DB-VRX, HP-624, HP-VOC, MST-502.2, MXT-624, MXT-Volatiles, OV™-624, Rtx®-502.2, Rtx®-624, Rtx™-Volatiles, VOCOL™
Sulfur Analysis	AT™-Sulfur	SPB™-1 Sulfur
FAME Analysis	AT™-FAME	FAMEWAX™, OmegaWAX™

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Alltech® Custom Capillary Columns

- A wide selection of stationary phases
- Lengths from 1 to 105 meters
- Wide selection of i.d. tubing
- Every column individually tested

Custom Capillary Column Instructions

1. **Stationary Phase:** Choose a Phase in "Table 1: Custom Phase."
2. **Length & Internal Diameter:** Choose any length (1–105 meters) and internal diameter (0.10mm–0.53mm) in "Table 2: Custom Dimensions."
3. **Film Thickness:** Choose a film thickness; 0.01µm tolerance.
4. See Coiling and Guard Information for additional options.
5. Call Customer Service and they will confirm your order and provide exact prices.

Table 1: Custom Phases

Phases Available for Custom Capillary Columns

• Aquawax	• DC-550	• Igepal CO-880
• Aquawax-DA	• Dexsil® 300	• OV™-1
• AT™-1	• Dexsil® 400	• OV™-11
• AT™-5	• Dexsil® 410	• OV™-17
• AT™-20	• Di (2ethylhexyl phthalate	• OV™-1701
• AT™-35	• Diisodecyl phthalate	• OV™-61
• AT™-1000	• FFAP	• OV™-101
• AT™-1301	• Hi-EFF™-1AP	• OV™-105
• AT™-1701	• Hi-EFF™-1BP	• OV™-210
• AT™-WAX	• Hi-EFF™-2AP	• OV™-351
• AT™-Amine	• Hi-EFF™-2BP	• Polyvinylpyrrolidone
• Apiezon® phases	• Hi-EFF™-3AP	• Reoplex 400
• Apolane™-87	• Hi-EFF™-3BP	• SE-30
• Butanediol succinate (Craig's polyester)	• Hi-EFF™-4BP	• Squalane
• Carbowax® phases	• Hi-EFF™-8BP	• Superox®-FA
		• XE-60

technical assistance

Contact Tech Support: Phone: 1.800.255.8324 (North America)
Email: contact.alltech@grace.com
Online: www.discoverysciences.com

Table 2: Custom Dimensions

Alltech® Heliflex® Custom Capillary Columns

Length	i.d.	Description	Part No.
1–5m	0.10mm	Specify Phase and Film	**971001**
	0.18mm	Specify Phase and Film	**971005**
	0.25mm	Specify Phase and Film	**972010**
	0.32mm	Specify Phase and Film	**973010**
	0.45mm	Specify Phase and Film	**974010**
	0.53mm	Specify Phase and Film	**975010**
6–15m	0.10mm	Specify Phase and Film	**971011**
	0.18mm	Specify Phase and Film	**971014**
	0.25mm	Specify Phase and Film	**972015**
	0.32mm	Specify Phase and Film	**973015**
	0.45mm	Specify Phase and Film	**974015**
	0.53mm	Specify Phase and Film	**975015**
16–30m	0.10mm	Specify Phase and Film	**971028**
	0.18mm	Specify Phase and Film	**971029**
	0.25mm	Specify Phase and Film	**972030**
	0.32mm	Specify Phase and Film	**973030**
	0.45mm	Specify Phase and Film	**974030**
	0.53mm	Specify Phase and Film	**975030**
31–60m	0.18mm	Specify Phase and Film	**971050**
	0.25mm	Specify Phase and Film	**972060**
	0.32mm	Specify Phase and Film	**973060**
	0.45mm	Specify Phase and Film	**974060**
	0.53mm	Specify Phase and Film	**975060**
61–105m	0.25mm	Specify Phase and Film	**972105**
	0.32mm	Specify Phase and Film	**973105**
	0.45mm	Specify Phase and Film	**974105**
	0.53mm	Specify Phase and Film	**975105**
Custom Capillary			
	All other Dimensions not specified		**970123**

Custom Capillary Coiling

Custom Coiling

Description	Part No.
Custom Capillary on 4" Cage	**970124**
Custom Capillary on 5" Cage	**970125**

Custom Capillary Column with Integral Guard

Custom Capillary Column with Integral Guard

Description	Part No.
Custom 0.25mm i.d. with Integral 5m Guard	**C-5400**
Custom 0.32mm i.d. with Integral 5m Guard	**C-5500**
Custom 0.53mm i.d. with Integral 5m Guard	**C-5600**

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Heliflex® AT™-1ms

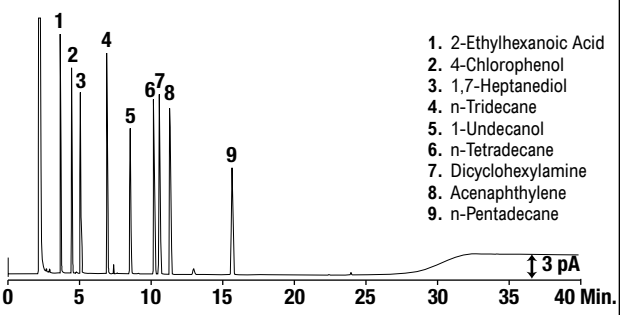
- Guaranteed low-bleed characteristics
- Specifically designed for mass spec analysis
- Highly inert
- Similar to DB-1ms, HP-1ms, Rtx®-1ms, CP-Sil 5CB low-bleed/MS, MDN-1

AT™-1ms is a line of high-performance low bleed non-polar columns designed specifically for use with mass spectrometers. They are ideal for pharmaceutical, environmental, petrochemical, and food and fragrance analysis, or any GC/MS analysis requiring a 100% dimethylpolysiloxane-type polarity capillary column.

Heliflex® AT™-1ms Specifications	
Phase:	100% Dimethylpolysiloxane
Polarity:	Non-polar
Max. Temp.:	340/360°C
USP Designation:	G1, G2, G38
Ideal For:	Mass Spec Analysis for Environmental, PAH, CLP Pesticides, Steroids, and Drugs

Figure 1 – AT™-1ms Low Bleed

CHROM 2578



1. 2-Ethylhexanoic Acid
2. 4-Chlorophenol
3. 1,7-Heptanediol
4. n-Tridecane
5. 1-Undecanol
6. n-Tetradecane
7. Dicyclohexylamine
8. Acenaphthylene
9. n-Pentadecane

Column:	Heliflex® AT™-1ms, 30m x 0.25mm x 0.25µm (Part No. **15897**)
Temp:	135°C (20min hold) to 320°C (10min hold) at 20°C/min
Carrier Gas:	Helium at 0.65mL/min (23.1cm/sec)
Detector:	FID

Heliflex® AT™-1ms Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
15m	0.25mm	0.25µm	-60–360°C	**15880**
	0.32mm	0.25µm	-60–360°C	**15882**
30m	0.25mm	0.10µm	-60–360°C	**15884**
	0.25mm	0.25µm	-60–360°C	**15897**
	0.25mm	0.25µm	-60–360°C	**15735***
	0.32mm	0.10µm	-60–360°C	**15922**
	0.32mm	0.25µm	-60–360°C	**15938**
	0.32mm	0.25µm	-60–360°C	**15739***
60m	0.25mm	0.25µm	-60–360°C	**15941**
	0.32mm	0.25µm	-60–360°C	**15944**

*Equipped with uncoated 5m integral guard column. Total column length is 35 meters.

Heliflex® AT™-1ht

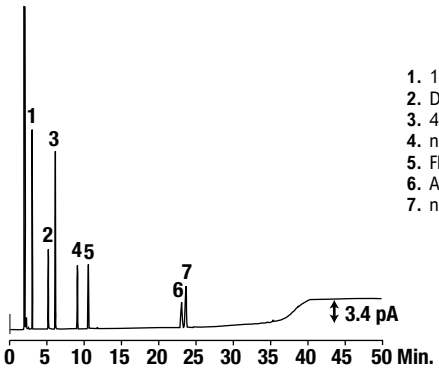
Shorten Your Analysis Time with High-Temperature/Low-Bleed Columns

- Faster analysis time for high boiling compounds
- Better peak detection at lower concentrations
- Individually bleed tested at 380ºC
- Similar to 007-1, CP-Sil 5CB, DB-1, DB-1ht, HP-1, HP-101, OV™-1, RSL-150, RSL-160, Rtx®-1, SE-30™, SPB™-1, SPB™-Sulfur, ULTRA-1, SP-2100, BP-1, DC-200, PE-1, ZB-1

Heliflex® AT™-1ht Specifications	
Phase:	100% Dimethylpolysiloxane
Polarity:	Non-polar
Max. Temp.:	380/400°C
USP Designation:	G1, G2, G38
Ideal For:	High Boiling Compounds Waxes, Crude Oils, and Trigylcerides

QC Test Chromatogram – Bleed Profile

CHROM 2634



1. 1-Undecanol
2. Dicyclohexylamine
3. 4-Chlorophenol
4. n-Pentadecane
5. Fluorene
6. Anthracene
7. n-Heptadecane

Column:	Heliflex® AT™-1ht, 30m x 0.25mm x 0.10µm (Part No. **16368**)
Column Temp:	125ºC (25min hold) to 380ºC at 20ºC/min
Carrier Gas:	Helium at 26.3cm/sec
Detector:	FID at 390ºC

Heliflex® AT™-1ht GC Capillary Columns

Length	i.d.	Film	Temp. Limits* min.–max.	Part No.
15m	0.25mm	0.1µm	-60–380/400°C	**16367**
30m	0.25mm	0.1µm	-60–380/400°C	**16368**
60m	0.25mm	0.1µm	-60–380/400°C	**16369**

*Isothermal/Temp. program.

more info

For more Capillary GC Applications, See the GC Applications Section pages 462–493.

more applications

To view our complete searchable chromatogram database visit www.discoverysciences.com/chromdb/



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Heliflex® AT™-1



- Excellent general purpose columns
- Similar to DB-1, Rtx®-1, SPB™-1, SPB™-Sulfur, SP-2100, HP-1, HP-101, ULTRA-1, BP-1, CP-Sil 5CB, 007-1, OV-1, SE™-30, DC-200, RSL-150, RSL-160, PE-1, ZB-1

Heliflex® AT™-1 Specifications	
Phase:	100% Dimethylpolysiloxane
Polarity:	Non-polar General Purpose Column
USP Designation:	G1, G2, G38
Ideal For:	General Purpose

Heliflex® AT™-1 Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
10m	0.25mm	0.20µm	-60–350°C	**932510**
	0.25mm	0.25µm	-60–350°C	**13752**
	0.25mm	0.10µm	-60–350°C	**16866**
	0.32mm	0.10µm	-60–350°C	**16868**
	0.32mm	0.25µm	-60–350°C	**13755**
	0.32mm	0.30µm	-60–350°C	**933210**
	0.53mm	0.25µm	-60–350°C	**16840**
	0.53mm	1.20µm	-60–350°C	**935110**
	0.53mm	2.65µm	-60–300°C	**16849**
	0.53mm	5.00µm	-60–300°C	**16842**
15m	0.25mm	0.10µm	-60–350°C	**13649**
	0.25mm	0.20µm	-60–350°C	**932515**
	0.25mm	0.25µm	-60–350°C	**13753**
	0.25mm	1.00µm	-60–350°C	**13653**
	0.32mm	0.10µm	-60–350°C	**13673**
	0.32mm	0.25µm	-60–350°C	**13757**
	0.32mm	0.30µm	-60–350°C	**933215**
	0.32mm	1.00µm	-60–350°C	**13698**
	0.32mm	3.00µm	-60–350°C	**13701**
	0.32mm	5.00µm	-60–300°C	**16836**
	0.53mm	0.15µm	-60–350°C	**13945**
	0.53mm	0.25µm	-60–350°C	**14194**
	0.53mm	0.50µm	-60–350°C	**14030**
	0.53mm	1.00µm	-60–350°C	**13505**
	0.53mm	1.20µm	-60–350°C	**935115**
	0.53mm	1.50µm	-60–330°C	**13905**
	0.53mm	2.65µm	-60–300°C	**16875**
	0.53mm	3.00µm	-60–300°C	**13893**
	0.53mm	5.00µm	-60–300°C	**16851**
25m	0.25mm	0.20µm	-60–350°C	**932525**
	0.32mm	0.30µm	-60–350°C	**933225**
	0.53mm	1.20µm	-60–350°C	**935125**
30m	0.25mm	0.10µm	-60–350°C	**13663**
	0.25mm	0.20µm	-60–350°C	**932530**
	0.25mm	0.25µm	-60–350°C	**13638**
	0.25mm	1.00µm	-60–350°C	**13639**
	0.32mm	0.10µm	-60–350°C	**13699**
	0.32mm	0.25µm	-60–350°C	**13640**
	0.32mm	0.30µm	-60–350°C	**933230**
	0.32mm	1.00µm	-60–350°C	**13641**
	0.32mm	3.00µm	-60–300°C	**13702**
	0.32mm	5.00µm	-60–300°C	**16838**
	0.53mm	0.50µm	-60–350°C	**14038**
	0.53mm	1.00µm	-60–350°C	**13515**
	0.53mm	1.20µm	-60–350°C	**935130**
	0.53mm	1.50µm	-60–330°C	**13908**
30m	0.53mm	2.65µm	-60–300°C	**16876**
	0.53mm	3.00µm	-60–300°C	**13897**
	0.53mm	5.00µm	-60–300°C	**16843**

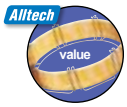
Heliflex® AT™-1 Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
50m	0.25mm	0.20µm	-60–350°C	**932550**
	0.32mm	0.30µm	-60–350°C	**933250**
	0.53mm	1.20µm	-60–350°C	**13938**
60m	0.25mm	0.10µm	-60–350°C	**13672**
	0.25mm	0.25µm	-60–350°C	**13666**
	0.25mm	1.00µm	-60–350°C	**13667**
	0.32mm	0.10µm	-60–350°C	**13700**
	0.32mm	0.25µm	-60–350°C	**13668**
	0.32mm	1.00µm	-60–350°C	**13669**
	0.32mm	3.00µm	-60–300°C	**13703**
	0.32mm	5.00µm	-60–300°C	**13704**
	0.53mm	0.50µm	-60–350°C	**13898**
	0.53mm	1.00µm	-60–350°C	**13533**
	0.53mm	1.20µm	-60–350°C	**13809**
	0.53mm	1.50µm	-60–330°C	**13930**
	0.53mm	3.00µm	-60–300°C	**13902**
	0.53mm	5.00µm	-60–300°C	**13810**
100m	0.25mm	0.25µm	-60–350°C	**13972**
	0.32mm	0.25µm	-60–350°C	**13979**
	0.53mm	1.20µm	-60–350°C	**13982**

Heliflex® AT™-1 Capillary Columns on 5" Cage

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
15m	0.25mm	0.25µm	-60–350°C	**137535**
	0.32mm	0.25µm	-60–350°C	**137575**
	0.32mm	1.00µm	-60–350°C	**136985**
	0.53mm	1.00µm	-60–350°C	**135055**
	0.53mm	1.50µm	-60–350°C	**139055**
30m	0.25mm	0.25µm	-60–350°C	**136385**
	0.32mm	0.25µm	-60–350°C	**136405**
	0.32mm	1.00µm	-60–350°C	**136415**
	0.53mm	1.00µm	-60–350°C	**135155**
	0.53mm	1.50µm	-60–350°C	**139085**

Econo-Cap™ EC™-1



- Batch tested to dramatically reduce price

Econo-Cap™ EC™-1 Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
10m	0.53mm	2.65µm	-60–350°C	**19678**
15m	0.45mm	1.00µm	-60–350°C	**19642**
	0.53mm	1.20µm	-60–350°C	**19650**
30m	0.25mm	0.25µm	-60–350°C	**19652**
	0.32mm	0.25µm	-60–350°C	**19651**
	0.32mm	1.00µm	-60–350°C	**19660**
	0.45mm	1.00µm	-60–350°C	**19644**
	0.53mm	1.00µm	-60–350°C	**19664**
	0.53mm	1.20µm	-60–350°C	**19656**

best value

Econo-Cap™ EC™-1 Capillary Columns, Six Pack

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
30m	0.25mm	0.25µm	-60–350°C	**196526**
30m	0.32mm	0.25µm	-60–350°C	**196516**
30m	0.53mm	1.20µm	-60–350°C	**196566**

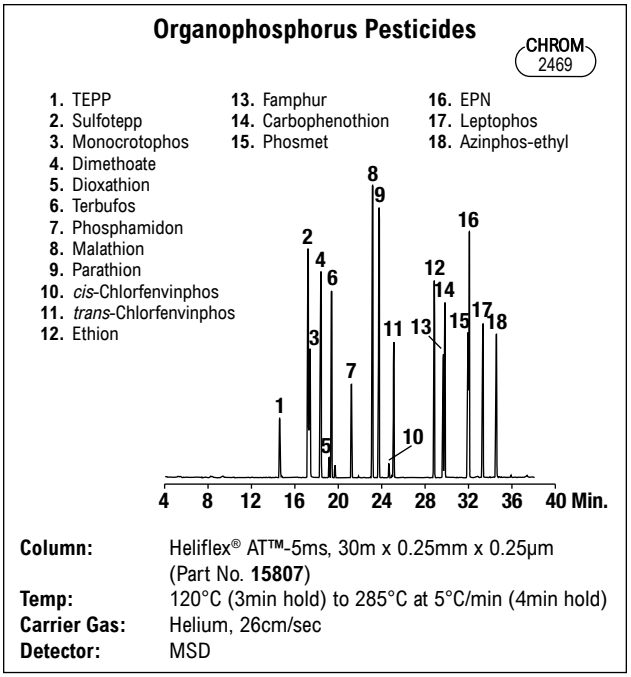
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Heliflex® AT™-5ms

- Similar to DB-5ms, Rtx®-5 Sil ms, HP-5TA, BPX™-5, 007-5ms

The AT™-5ms capillaries are ideal for environmental, pharmaceutical, and petrochemical analysis, or any GC/MS analysis requiring a 5% phenyl-type polarity capillary column.

Heliflex® AT™-5ms Specifications	
Phase:	(5% Phenyl)-95% Methoxpolysiloxane
Polarity:	Non-polar
USP Designation:	G27, G36
Ideal For:	Mass Spec Analysis—General Application



Column: Heliflex® AT™-5ms, 30m x 0.25mm x 0.25µm (Part No. **15807**)
Temp: 120°C (3min hold) to 285°C at 5°C/min (4min hold)
Carrier Gas: Helium, 26cm/sec
Detector: MSD

Heliflex® AT™-5ms Capillary Columns

Length	i.d.	Film	Temp. Limits* min.–max.	Part No.
15m	0.25mm	0.25µm	-60–325/350°C	**15801**
30m	0.25mm	0.10µm	-60–325/350°C	**15806**
	0.25mm	0.25µm	-60–325/350°C	**15807**
	0.25mm	0.25µm	-60–325/350°C	**15881***
	0.25mm	0.50µm	-60–325/350°C	**15808**
	0.25mm	0.50µm	-60–325/350°C	**15889***
	0.25mm	1.00µm	-60–325/350°C	**15809**
	0.32mm	0.10µm	-60–325/350°C	**15893**
	0.32mm	0.25µm	-60–325/350°C	**15894**
	0.32mm	0.25µm	-60–325/350°C	**15883***
	0.32mm	1.00µm	-60–325/350°C	**15895**
60m	0.25mm	0.10µm	-60–325/350°C	**15879**
	0.25mm	0.25µm	-60–325/350°C	**15891**
	0.25mm	1.00µm	-60–325/350°C	**15892**
	0.32mm	0.25µm	-60–325/350°C	**15896**

*Isothermal/Temp. program.

Heliflex® AT™-5

- Excellent general purpose columns
- Similar to DB-5, Rtx®-5, SPB™-5, HP-5, ULTRA-2, BP-5, CP-Sil 8CB, 007-2, OV™-5, SE™-52, SE™-54, RSL-200, ZB-5

Heliflex® AT™-5 Specifications	
Phase:	(5% Phenyl)-95% Methylpolysiloxane
Polarity:	Non-polar
Max. Temp.:	380/400°C
USP Designation:	G27, G36
Ideal For:	General Applications

Heliflex® AT™-5 Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
10m	0.25mm	0.20µm	-60–350°C	**952510**
	0.32mm	0.30µm	-60–350°C	**953210**
	0.53mm	0.25µm	-60–350°C	**16145**
	0.53mm	1.20µm	-60–350°C	**955110**
	0.53mm	2.65µm	-60–300°C	**16853**
	0.53mm	5.00µm	-60–300°C	**16855**
15m	0.25mm	0.10µm	-60–300°C	**13705**
	0.25mm	0.20µm	-60–300°C	**952515**
	0.25mm	0.25µm	-60–350°C	**13758**
	0.25mm	1.00µm	-60–350°C	**13706**
	0.32mm	0.10µm	-60–350°C	**13709**
	0.32mm	0.25µm	-60–350°C	**13887**
	0.32mm	0.30µm	-60–350°C	**953215**
	0.32mm	1.00µm	-60–350°C	**13710**
	0.53mm	0.25µm	-60–350°C	**14196**
	0.53mm	0.50µm	-60–300°C	**14039**
	0.53mm	1.00µm	-60–350°C	**13569**
	0.53mm	1.20µm	-60–350°C	**955115**
	0.53mm	1.50µm	-60–330°C	**13906**
	0.53mm	3.00µm	-60–300°C	**13894**
	0.53mm	5.00µm	-60–300°C	**13896**
25m	0.25mm	0.20µm	-60–350°C	**952525**
	0.32mm	0.30µm	-60–350°C	**953225**
	0.53mm	1.20µm	-60–350°C	**955125**
30m	0.25mm	0.10µm	-60–350°C	**13707**
	0.25mm	0.25µm	-60–350°C	**13656**
	0.25mm	0.50µm	-60–330°C	**13309**
	0.25mm	1.00µm	-60–350°C	**13657**
	0.32mm	0.10µm	-60–300°C	**13711**
	0.32mm	0.25µm	-60–350°C	**13658**
	0.32mm	0.30µm	-60–350°C	**953230**
	0.32mm	1.00µm	-60–350°C	**13659**
	0.53mm	0.50µm	-60–300°C	**14045**
	0.53mm	1.00µm	-60–350°C	**13798**
	0.53mm	1.20µm	-60–350°C	**955130**
	0.53mm	1.50µm	-60–330°C	**13909**
	0.53mm	2.65µm	-60–300°C	**16857**
	0.53mm	5.00µm	-60–300°C	**16859**
50m	0.25mm	0.20µm	-60–350°C	**952550**
	0.32mm	0.30µm	-60–300°C	**953250**
	0.53mm	1.20µm	-60–350°C	**13942**

more applications

To view our complete searchable chromatogram database visit www.discoverysciences.com/chromdb/



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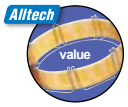
Heliflex® AT™-5 Capillary Columns (continued)

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
60m	0.25mm	0.10µm	-60–350°C	**13708**
	0.25mm	0.20µm	-60–350°C	**952560**
	0.25mm	0.25µm	-60–350°C	**13676**
	0.25mm	1.00µm	-60–350°C	**13677**
	0.32mm	0.10µm	-60–350°C	**13712**
	0.32mm	0.25µm	-60–350°C	**13678**
	0.32mm	0.30µm	-60–350°C	**953260**
	0.32mm	1.00µm	-60–350°C	**13679**
	0.53mm	0.50µm	-60–350°C	**13899**
	0.53mm	1.00µm	-60–350°C	**14076**
	0.53mm	1.20µm	-60–350°C	**13820**
	0.53mm	1.50µm	-60–330°C	**13931**
	0.53mm	3.00µm	-60–350°C	**13903**
	0.53mm	5.00µm	-60–300°C	**13829**
100m	0.25mm	0.25µm	-60–350°C	**13973**
	0.32mm	0.25µm	-60–350°C	**14011**
	0.53mm	1.20µm	-60–350°C	**14019**

Heliflex® AT™-5 Capillary Columns on 5" Cage

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
15m	0.25mm	0.25µm	-60–350°C	**137585**
	0.32mm	0.25µm	-60–350°C	**138875**
	0.32mm	1.00µm	-60–350°C	**137105**
	0.53mm	1.00µm	-60–350°C	**135695**
	0.53mm	1.50µm	-60–350°C	**139065**
30m	0.25mm	0.25µm	-60–350°C	**136565**
	0.32mm	0.25µm	-60–350°C	**136585**
	0.32mm	1.00µm	-60–350°C	**136595**
	0.53mm	1.00µm	-60–350°C	**137985**
	0.53mm	1.50µm	-60–350°C	**139095**

Econo-Cap™ EC™-5



- Batch tested to dramatically reduce price

Econo-Cap™ EC™-5 Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
15m	0.45mm	1.00µm	-60–350°C	**19661**
	0.53mm	1.20µm	-60–350°C	**19645**
30m	0.25mm	0.25µm	-60–350°C	**19647**
	0.32mm	0.25µm	-60–350°C	**19646**
	0.32mm	1.00µm	-60–350°C	**19665**
	0.53mm	1.00µm	-60–350°C	**19671**
	0.53mm	1.20µm	-60–350°C	**19657**

best value

Econo-Cap™ EC™-5 Capillary Columns, Six Pack

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
15m	0.25mm	0.25µm	-60–350°C	**19649**
30m	0.25mm	0.25µm	-60–350°C	**196476**
	0.32mm	0.25µm	-60–350°C	**196466**
	0.53mm	1.20µm	-60–350°C	**196576**

Heliflex® AT™-20



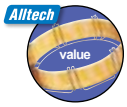
- Unique polarity between non-polar and mid-range
- Similar to 007-7, Rtx®-20, SPB™-20, VOCOL™, PE-7

Heliflex® AT™-20 Specifications	
Phase:	(20% Phenyl)-80% Methylpolysiloxane
Polarity:	Intermediate Polarity
USP Designation:	G28, G32
Ideal For:	Volatile Compounds and Solvents

Heliflex® AT™-20 Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
10m	0.53mm	1.20µm	-20–320°C	**13936**
15m	0.25mm	0.25µm	-20–320°C	**13838**
	0.32mm	0.25µm	-20–320°C	**13849**
	0.53mm	1.20µm	-20–320°C	**13919**
	0.53mm	1.00µm	-20–300°C	**13880**
25m	0.53mm	1.20µm	-20–320°C	**13934**
30m	0.25mm	0.25µm	-20–320°C	**13857**
	0.32mm	0.25µm	-20–320°C	**13859**
	0.53mm	1.00µm	-20–300°C	**13882**
	0.53mm	1.20µm	-20–300°C	**13932**
50m	0.53mm	1.20µm	-20–320°C	**13944**
60m	0.25mm	0.25µm	-20–320°C	**13868**
	0.32mm	0.25µm	-20–320°C	**13869**
	0.53mm	1.00µm	-20–300°C	**13884**
	0.53mm	3.00µm	-20–280°C	**13324**

Econo-Cap™ EC™-20



- Batch tested to dramatically reduce price

Econo-Cap™ EC™-20 Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
15m	0.45mm	1.00µm	-20–300°C	**19670**
	0.53mm	1.20µm	-20–300°C	**19673**



6515

related products

Parker Balston® FID gas station

The Parker Balston® FID gas station combines Parker's zero air and hydrogen generation technologies into a single unit, eliminating the inconveniences and cost of hydrogen and gas cylinders. See page 208.

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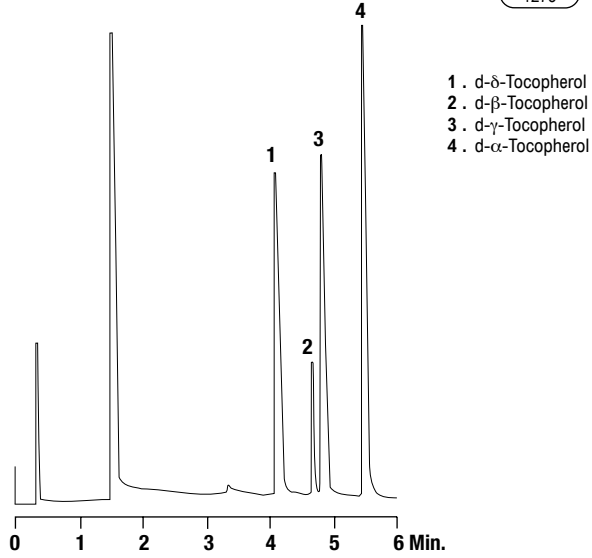
Heliflex® AT™-35ms

- Guaranteed low-bleed
- Specifically designed for mass spec analysis
- Similar to DB-35ms, Rtx®-35, SPB™-35, SUP-HERB™, MDN-35, BPX™-35

Heliflex® AT™-35ms Specifications	
Phase:	(35% Phenyl)-65% Methylpolysiloxane
Polarity:	Intermediate Polarity
USP Designation:	G42
Ideal For:	Pesticides, Herbicides, Drugs, Aromatics

Heliflex® AT™-35ms Capillary Column

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
15m	0.25mm	0.25µm	-40–340°C	**12588**
30m	0.25mm	0.25µm	-40–340°C	**12589**
60m	0.25mm	0.25µm	-40–340°C	**12590**



Column: Heliflex® AT™-35, 25m x 0.25mm x 0.20µm (Part No. **962525**)
Temp: 310°C
Carrier: Hydrogen at 40cm/sec
Detector: FID

Heliflex® AT™-35

- Ideal column for conformational analysis
- Similar to DB-35, DB-35ms, Rtx®-35, BPX™-35, SPB™-35, SPB™-608, HP-35, 007-11, OV™-11, RSL-300, PE-35, SUP-HERB™, ZB-35

Heliflex® AT™-35 Specifications	
Phase:	(35% Phenyl)-65% Methylpolysiloxane
Polarity:	Intermediate Polarity
USP Designation:	G42
Ideal For:	Pesticides, Herbicides, Drugs, Aromatics

Heliflex® AT™-35 Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
10m	0.25mm	0.25µm	-20–320°C	**19613**
	0.32mm	0.10µm	-20–350°C	**16872**
	0.32mm	0.25µm	-20–300°C	**13759**
	0.53mm	0.10µm	-20–350°C	**16861**
	0.53mm	0.20µm	-20–280°C	**16865**
	0.53mm	1.20µm	-20–300°C	**965110**
	0.53mm	2.65µm	-20–280°C	**16877**
15m	0.25mm	0.25µm	-20–320°C	**13943**
	0.25mm	0.50µm	-20–320°C	**13713**
	0.32mm	0.15µm	-20–280°C	**13714**
	0.32mm	0.25µm	-20–320°C	**13760**
	0.32mm	0.50µm	-20–320°C	**13091**
	0.53mm	1.00µm	-20–300°C	**14129**
	0.53mm	1.20µm	-20–300°C	**965115**
25m	0.25mm	0.20µm	-20–320°C	**962525**
	0.32mm	0.30µm	-20–320°C	**963225**
	0.53mm	1.20µm	-20–300°C	**965125**
30m	0.25mm	0.15µm	-20–320°C	**13432**
	0.25mm	0.20µm	-20–300°C	**962530**
	0.25mm	0.25µm	-20–320°C	**13642**
	0.25mm	0.50µm	-20–320°C	**13643**
	0.25mm	1.00µm	-20–300°C	**13796**
	0.32mm	0.15µm	-20–320°C	**13716**
	0.32mm	0.25µm	-20–320°C	**13644**
	0.32mm	0.50µm	-20–320°C	**13645**
	0.53mm	0.50µm	-20–320°C	**13797**
	0.53mm	1.00µm	-20–300°C	**14001**
	0.53mm	1.20µm	-20–300°C	**965130**
	0.53mm	2.65µm	-20–280°C	**16878**
50m	0.25mm	0.20µm	-20–320°C	**962550**
	0.32mm	0.30µm	-20–320°C	**963250**
60m	0.25mm	0.20µm	-20–320°C	**962560**
	0.25mm	0.25µm	-20–320°C	**13682**
	0.25mm	0.50µm	-20–320°C	**13683**
	0.32mm	0.25µm	-20–320°C	**13684**
	0.32mm	0.50µm	-20–320°C	**13685**
	0.53mm	1.00µm	-20–320°C	**14070**

more info

For more Capillary GC Applications, See the GC Applications Section pages 462–493.

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Heliflex® AT™-50

- General purpose column
- Similar to DB-17, DB-17ht, Rtx®-50, BPX™-50, SPB™-50, SP-2250, HP-50+, HP-17, 007-17, OV™-17, CP-Sil 24CB, PE-17, ZB-50

Heliflex® AT™-50 Specifications	
Phase:	(50% Phenyl)-Methylpolysiloxane
Polarity:	Intermediate Polarity
USP Code:	G3
Ideal For:	Pesticides, Herbicides, Phthalate Esters, Free Phenols, and Basic Drugs

Heliflex® AT™-50 Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
15m	0.25mm	0.25µm	40–325°C	**13837**
	0.32mm	0.25µm	40–325°C	**13856**
	0.53mm	1.00µm	40–280°C	**13876**
30m	0.25mm	0.25µm	40–325°C	**13839**
	0.32mm	0.25µm	40–325°C	**13858**
	0.53mm	0.50µm	40–300°C	**13991**
	0.53mm	1.00µm	40–280°C	**13878**

Heliflex® AT™-1301

- Unique polarity makes it ideal for a range of applications
- Similar to BP624, DB-1301, Rtx®-1301, Rtx®-624, HP-1301, HP-624, DB-624, 007-624, 007-1301, SPB™-1301, SPB™-624, ZB-624

Heliflex® AT™-1301 Specifications	
Phase:	(6% Cyanopropylpenyl)-Methylpolysiloxane
Polarity:	Intermediate Polarity
USP Code:	G43
Ideal For:	Volatile Organics, Pharmaceuticals, and EPA Method 612

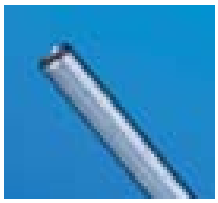
Heliflex® AT™-1301 Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
30m	0.25mm	0.25µm	-20–280°C	**13959**
	0.25mm	1.00µm	-20–260°C	**13962**
	0.32mm	0.25µm	-20–280°C	**14123**
	0.53mm	1.00µm	-20–260°C	**13970**
	0.53mm	3.00µm	-20–260°C	**15562**

related product

Stainless steel tubing

We offer a full selection of lengths, IDs, and coating types to meet all of your GC tubing needs. See pages 386, 388–389.



5096

related product

GC fittings

For a full selection of stainless steel GC fittings, reducing unions, and other connectors, see pages 282–285.



5130

related product

Vials

We have one of the largest selections of vials for all types of chromatography, including headspace vials, autosampler vials, and much more. See pages 348–378.



4715

more info

For Capillary GC Applications, see the GC Applications Section, pages 462–493.

technical assistance

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Email: contact.alltech@grace.com
Online: www.discoverysciences.com

more applications

To view our complete searchable chromatogram database visit www.discoverysciences.com/chromdb/



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Heliflex® AT™-210

- Similar to DB- 210, Rtx®-200, OV™- 202, OV™-210, OV™-215, QF-1, SP-2401, RSL-400

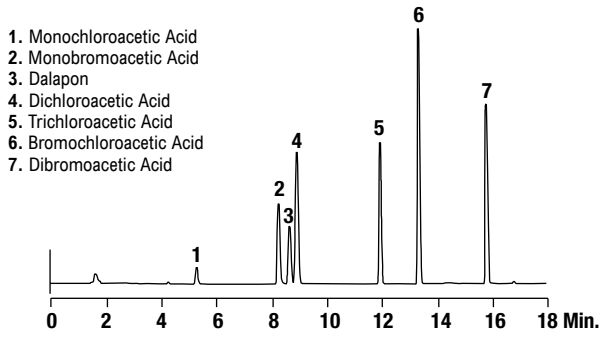
Heliflex® AT™-210 Specifications	
Phase:	Trifluoropropyl Methylpolysiloxane
Polarity:	Polar
USP Code:	G6
Ideal For:	Ketones, Aldehydes, Silanes, Glycols, Nitro Aromatics, Herbicides, and Method 8140 and 609

Heliflex® AT™-210 Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
10m	0.53mm	1.20µm	45–240°C	**985110**
15m	0.32mm	0.15µm	45–260°C	**13724**
	0.32mm	0.25µm	45–260°C	**13888**
	0.53mm	1.00µm	45–240°C	**13127**
	0.53mm	1.20µm	45–240°C	**985115**
25m	0.53mm	1.20µm	45–240°C	**985125**
30m	0.32mm	0.15µm	45–260°C	**13726**
	0.32mm	0.25µm	45–260°C	**13840**
	0.32mm	0.50µm	45–260°C	**13727**
	0.53mm	1.00µm	45–240°C	**13136**
	0.53mm	1.20µm	45–240°C	**985130**
60m	0.32mm	0.30µm	45–260°C	**983260**

EPA Method 552.1: Haloacetic Acids

CHROM 2105



Column:	Heliflex® AT™-1701, 30m x 0.32mm x 0.25µm (Part No. **13690**)
Temp:	50°C (10min hold) to 120°C at 10°C/min
Carrier Gas:	Helium at 35cm/sec
Detector:	ECD

Heliflex® AT™-1701

- Similar to DB-1701, OV™-1701, SPB™-1701, Rtx®-1701, 007-1701, PAS-1701, CP-Sil 19CB, HP-1701, BP-10, ZB-1701

Heliflex® AT™-1701 Specifications	
Phase:	(14% Cyanopropylphenyl)-86% Methylpolysiloxane
Polarity:	Intermediate Polarity
USP Code:	n/a
Ideal For:	Pesticides, PCB's, Drugs, Herbicides, and TMS Sugars

Heliflex® AT™-1701 Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
10m	0.25mm	0.20µm	-20–280°C	**942510**
	0.53mm	1.20µm	-20–280°C	**945110**
15m	0.25mm	0.25µm	-20–280°C	**13881**
	0.25mm	1.00µm	-20–280°C	**13718**
	0.32mm	0.25µm	-20–280°C	**13762**
	0.32mm	1.00µm	-20–280°C	**13720**
	0.53mm	0.50µm	-20–280°C	**14046**
	0.53mm	1.00µm	-20–280°C	**14074**
	0.25mm	0.20µm	-20–280°C	**942515**
	0.32mm	0.15µm	-20–280°C	**13719**
	0.53mm	1.20µm	-20–280°C	**945115**
25m	0.25mm	0.20µm	-20–280°C	**942525**
	0.32mm	0.30µm	-20–280°C	**943225**
	0.53mm	1.20µm	-20–280°C	**945125**
30m	0.25mm	0.15µm	-20–280°C	**13417**
	0.25mm	0.25µm	-20–280°C	**13686**
	0.25mm	1.00µm	-20–280°C	**13687**
	0.32mm	0.25µm	-20–280°C	**13690**
	0.32mm	0.25µm	-20–280°C	**13106***
	0.32mm	1.00µm	-20–280°C	**13691**
	0.53mm	0.50µm	-20–280°C	**14105**
	0.53mm	1.00µm	-20–280°C	**13795**
	0.53mm	1.20µm	-20–280°C	**13830**
50m	0.25mm	0.20µm	-20–280°C	**942550**
	0.32mm	0.30µm	-20–280°C	**943250**
60m	0.25mm	0.15µm	-20–280°C	**13404**
	0.25mm	0.25µm	-20–280°C	**13688**
	0.25mm	1.00µm	-20–280°C	**13689**
	0.32mm	0.15µm	-20–280°C	**13434**
	0.32mm	0.25µm	-20–280°C	**13692**
	0.32mm	1.00µm	-20–280°C	**13693**
	0.53mm	0.50µm	-20–280°C	**14107**
	0.53mm	1.00µm	-20–280°C	**14131**

*10-meter integral guard column.

Heliflex® AT™-1701 Capillary Columns on 5" Cage

Length	i.d.	Film	Temp. Range min.–max.	Part No.
15m	0.25mm	0.25µm	-20–280°C	**138815**
	0.32mm	0.25µm	-20–280°C	**137625**
	0.32mm	1.00µm	-20–280°C	**137205**
	0.53mm	1.00µm	-20–280°C	**140745**
	0.53mm	1.20µm	-20–280°C	**9451155**
30m	0.25mm	0.25µm	-20–280°C	**136865**
	0.32mm	0.25µm	-20–280°C	**136905**
	0.32mm	1.00µm	-20–280°C	**136915**
	0.53mm	1.00µm	-20–280°C	**137955**
	0.53mm	1.20µm	-20–280°C	**138305**

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Heliflex® AT™-WAXms

- Designed to provide low MS bleed
- Similar to DB-WAX, Rtx®-WAX, Supelcowax™-10

Heliflex® AT™-WAXms Specifications	
Phase:	100% Polyethylene Glycol
Polarity:	Polar
USB Code:	G14, G15, G16, G39
Ideal For:	Mass Spec Analysis

Heliflex® AT™-WAXms Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
15m	0.25mm	0.25µm	40–260°C	**12603**
	0.32mm	0.25µm	40–260°C	**12606**
	0.53mm	1.00µm	40–260°C	**12610**
30m	0.25mm	0.25µm	40–260°C	**12604**
	0.32mm	0.25µm	40–260°C	**12607**
	0.53mm	1.00µm	40–260°C	**12611**
60m	0.25mm	0.25µm	40–260°C	**12605**
	0.32mm	0.25µm	40–260°C	**12608**

Heliflex® AT™-WAX

- Similar to DB-WAX, DB-WAXetr, Rtx®-WAX, Stabilwax®, Carbowax® 20M, Supelcowax™-10, Innowax™, HP-20M, HP-Wax, BP-20, CP-Wax 52-CB, 007-CW, Superox® II, OmegaWAX™, ZB-WAX

Heliflex® AT™-WAX Specifications	
Phase:	100% Polyethylene Glycol
Polarity:	Polar
USB Code:	G14, G15, G16, G39
Ideal For:	FAMEs, Polar Solvents, BTEX, Flavor and Fragrances, Glycols, Alcohols, and Aromatics

Heliflex® AT™-WAX Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
10m	0.25mm	0.25µm	40–280°C	**19615**
	0.25mm	0.20µm	40–280°C	**9925102**
	0.32mm	0.25µm	40–280°C	**13778**
	0.53mm	1.20µm	40–260°C	**9951102**
15m	0.25mm	0.15µm	40–280°C	**13433**
	0.25mm	0.20µm	40–280°C	**9925152**
	0.25mm	0.25µm	40–280°C	**13777**
	0.25mm	0.50µm	40–260°C	**137302**
	0.25mm	1.00µm	40–260°C	**137312**
	0.32mm	0.25µm	40–280°C	**13779**
	0.32mm	0.30µm	40–280°C	**9932152**
	0.32mm	0.50µm	40–260°C	**137352**
	0.32mm	1.00µm	40–260°C	**137362**

Heliflex® AT™-WAX Capillary Columns (continued)

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
15m	0.32mm	2.50µm	40–260°C	**137372**
	0.53mm	0.50µm	40–260°C	**14109**
	0.53mm	1.00µm	40–260°C	**13904**
	0.53mm	1.20µm	40–260°C	**9951152**
	0.53mm	150µm	40–250°C	**13215**
	0.53mm	2.50µm	40–250°C	**16881**
	0.53mm	5.00µm	40–250°C	**16883**
25m	0.25mm	0.20µm	40–280°C	**9925252**
	0.32mm	0.30µm	40–280°C	**9932252**
	0.53mm	1.20µm	40–260°C	**9951252**
30m	0.25mm	0.15µm	40–280°C	**13418**
	0.25mm	0.20µm	40–280°C	**9925302**
	0.25mm	0.25µm	40–280°C	**136462**
	0.25mm	0.50µm	40–260°C	**136472**
	0.32mm	0.25µm	40–280°C	**136482**
	0.32mm	0.30µm	40–280°C	**9932302**
	0.32mm	0.50µm	40–260°C	**136522**
	0.32mm	1.00µm	40–260°C	**137382**
	0.53mm	0.50µm	40–260°C	**14111**
	0.53mm	1.00µm	40–260°C	**13907**
	0.53mm	1.20µm	40–260°C	**9951302**
	0.53mm	1.50µm	40–260°C	**13109**
	0.53mm	2.00µm	40–250°C	**16162**
	0.53mm	2.50µm	40–250°C	**16885**
	0.53mm	5.00µm	40–250°C	**16887**
50m	0.25mm	0.20µm	40–280°C	**9925502**
	0.32mm	0.30µm	40–280°C	**9932502**
	0.53mm	1.20µm	40–260°C	**13946**
60m	0.25mm	0.20µm	40–280°C	**9925602**
	0.25mm	0.25µm	40–280°C	**136942**
	0.25mm	0.50µm	40–260°C	**13916**
	0.32mm	0.25µm	40–280°C	**136962**
	0.32mm	0.30µm	40–280°C	**9932602**
	0.32mm	0.50µm	40–260°C	**136972**
	0.53mm	0.50µm	40–260°C	**13901**
	0.53mm	1.00µm	40–260°C	**13929**
	0.53mm	1.20µm	40–260°C	**13850**
	0.53mm	1.50µm	40–260°C	**13243**

Heliflex® AT™-WAX Capillary Columns on 5" Cage

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
15m	0.25mm	0.25µm	40–280°C	**137755**
	0.32mm	0.25µm	40–280°C	**137785**
	0.32mm	1.00µm	40–260°C	**1373625**
	0.53mm	1.00µm	40–260°C	**139045**
	0.53mm	1.20µm	40–260°C	**99511525**
30m	0.25mm	0.25µm	40–280°C	**1364625**
	0.32mm	0.25µm	40–280°C	**1364825**
	0.32mm	1.00µm	40–260°C	**1373825**
	0.53mm	1.00µm	40–260°C	**139075**
	0.53mm	1.20µm	40–260°C	**99513025**

more applications

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Econo-Cap™ EC™-WAX

- Batch tested to dramatically reduce price
- For phase specifications, see Heliflex® AT™ version

Econo-Cap™ EC™-WAX Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
15m	0.45mm	1.00µm	40–260°C	**19667**
	0.53mm	1.00µm	40–260°C	**19674**
	0.53mm	1.20µm	40–260°C	**19653**
30m	0.25mm	0.25µm	40–280°C	**19655**
	0.32mm	0.25µm	40–280°C	**19654**
	0.45mm	1.00µm	40–260°C	**19663**
	0.53mm	1.00µm	40–260°C	**19676**
	0.53mm	1.20µm	40–260°C	**19659**

best value

Econo-Cap™ EC™-WAX Six-Pack Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
30m	0.25mm	0.25µm	40–260°C	**196556**
	0.32mm	0.25µm	40–260°C	**196546**
	0.53mm	1.20µm	40–260°C	**196596**

more info

For more information on the Econo-Cap™ Capillary Line, refer to page 213.

Heliflex® AT™-AquaWax

- Designed and tested for aqueous injections
- Similar to DB-Wax, DB-Waxer, Rtx®-WAX, Stabilwax®, HP-Wax, HP-20M, HP-Innowax, ZB-Wax, and Supelcowax™-10

Heliflex® AT™-AquaWax Specifications	
Phase:	100% Polyethylene Glycol
Polarity:	Polar
USP Code:	N/A
Ideal For:	Food and Beverage Analysis

Heliflex® AT™-AquaWax Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
30m	0.25mm	0.25µm	40–260°C	**12437**
	0.32mm	0.25µm	40–260°C	**12439**
60m	0.25mm	0.25µm	40–260°C	**12447**
	0.32mm	0.25µm	40–260°C	**12449**

more applications

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Heliflex® AT™-AquaWax-DA

- Designed and tested for aqueous injections
- Eliminates the need for derivatization of acidic organic compounds
- Similar to DB-FFAP, Stabilwax®, HP-FFAP-DA, ZB-FFAP, SPB™-1000, and Nukol™

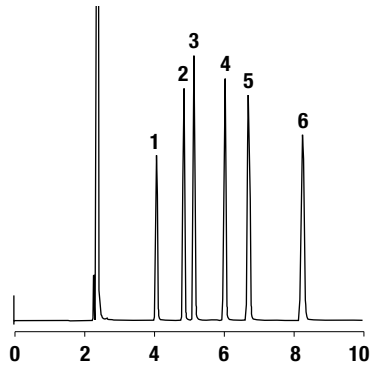
Heliflex® AT™-AquaWax-DA Specifications	
Phase:	100% Polyethylene Glycol—Nitroterephthal Acid Modified
Polarity:	Polar
USP Code:	N/A
Ideal For:	Analysis of Acidic Organic Compounds and Free Fatty Acids

Heliflex® AT™-AquaWax-DA Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
30m	0.25mm	0.25µm	40–250°C	**14537**
	0.32mm	0.25µm	40–250°C	**14539**
	0.53mm	1.00µm	40–250°C	**14543**
60m	0.25mm	0.25µm	40–250°C	**14547**
	0.32mm	0.25µm	40–250°C	**14549**

Free Fatty Acids

CHROM 2528



1. Propionic Acid
2. Butyric Acid
3. Valeric Acid
4. Caproic Acid
5. Heptanoic Acid
6. Caprylic Acid

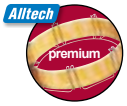
Column: Heliflex® AT™-AquaWax-DA, 30m x 0.25mm x 0.25µm (Part No. **14537**)
Temp: 180°C
Carrier Gas: Helium at 22cm/sec
Detector: FID

more info

For Capillary GC Applications, see the GC Applications Section, pages 462–493.

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Heliflex® AT™-1000



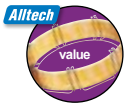
- Similar to DB™-FFAP, Stabilwax®-DA, SPB™-1000, Nukol™, HP-FFAP, BP-21, CP-Wax-58-CB, 007-FFAP, OV™-351, FFAP, Superox®-FA, ZB-FFAP

Heliflex® AT™-1000 Specifications	
Phase:	100% Polyethylene Glycol—Acid Modified
Polarity:	High Polarity
USP Code:	G25, G35
Ideal For:	Free Fatty Acids

Heliflex® AT™-1000 Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
10m	0.25mm	0.20µm	40–250°C	**972510**
	0.32mm	0.30µm	40–250°C	**973210**
	0.53mm	1.20µm	40–250°C	**975110**
15m	0.25mm	0.20µm	40–250°C	**972515**
	0.25mm	0.25µm	40–250°C	**13782**
	0.32mm	0.25µm	40–250°C	**13886**
	0.32mm	0.30µm	40–250°C	**973215**
	0.53mm	1.00µm	40–250°C	**13873**
	0.53mm	1.20µm	40–250°C	**975115**
25m	0.25mm	0.20µm	40–250°C	**972525**
	0.32mm	0.30µm	40–250°C	**973225**
	0.53mm	1.20µm	40–250°C	**975125**
30m	0.25mm	0.20µm	40–250°C	**972530**
	0.25mm	0.25µm	40–250°C	**13783**
	0.32mm	0.25µm	40–250°C	**13785**
	0.32mm	0.30µm	40–250°C	**973230**
	0.53mm	1.00µm	40–250°C	**13877**
	0.53mm	1.20µm	40–250°C	**975130**
	0.53mm	2.00µm	40–250°C	**13017**
50m	0.25mm	0.20µm	40–250°C	**972550**
	0.32mm	0.30µm	40–250°C	**973250**
60m	0.25mm	0.20µm	40–250°C	**972560**
	0.25mm	0.25µm	40–250°C	**13784**
	0.32mm	0.25µm	40–250°C	**13786**
	0.32mm	0.30µm	40–250°C	**973260**
	0.32mm	1.00µm	40–250°C	**13276**
	0.53mm	1.00µm	40–250°C	**13879**

Econo-Cap™ EC™-1000



- Batch tested to dramatically reduce price
- For phase specifications, see Heliflex® AT™ version

Econo-Cap™ EC™-1000 Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
15m	0.45mm	1.00µm	40–250°C	**19648**
	0.53mm	1.20µm	40–250°C	**19684**
30m	0.25mm	0.25µm	40–250°C	**19686**
	0.32mm	0.25µm	40–250°C	**19685**
	0.53mm	1.00µm	40–250°C	**19692**
	0.53mm	1.20µm	40–250°C	**19688**

best value

Econo-Cap™ EC™-1000 Six-Pack Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
30m	0.25mm	0.25µm	40–250°C	**196866**
	0.32mm	0.25µm	40–250°C	**196856**
	0.53mm	1.20µm	40–250°C	**196886**

Heliflex® AT™-CAM



- Eliminates need for derivitazation
- Similar to Stabilwax®-DB, Carbowax® Amine, CAM, CP-Wax 51

Heliflex® AT™-CAM Specifications	
Phase:	100% Polyethylene Glycol—Base Modified
Polarity:	High Polarity
USP Code:	G25, G35
Ideal For:	Basic Compounds, Amines

Heliflex® AT™-CAM Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
30m	0.32mm	0.25µm	40–250°C	**13024**
	0.53mm	0.50µm	40–250°C	**13026**
	0.53mm	1.00µm	40–250°C	**13028**

Heliflex® AT™-FAME

- Similar to FAMEWAX™ and OmegaWAX™

Heliflex® AT™-FAME Specifications	
Phase:	Stable Bonded Polyethylene Glycol
Polarity:	High Polarity
USP Code:	G25, G35
Ideal For:	Fatty Acid Methyl Esters

Heliflex® AT™-FAME Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
30m	0.25mm	0.25µm	40–280°C	**12436**
	0.32mm	0.25µm	40–280°C	**12438**

more applications

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Heliflex® AT™-624

- Specially tested for EPA Method 624
- Similar to DB™-1301, Rtx®-1301, Rtx®-624, HP-1301, HP-624, DB™-624, 007™-624, 007™-1301, SPB™-1301, SPB™-624, ZB-624

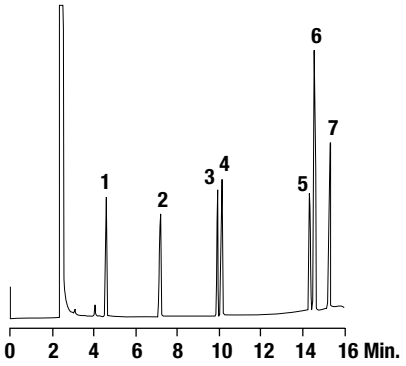
Heliflex® AT™-624 Specifications	
Phase:	6% Cyanopropylphenyl-94% Methylpolysiloxane
Polarity:	Intermediate Polarity
USP Code:	G43
Ideal For:	EPA Methods 524, 601, 602, 624, 8240 and 8260, and Solvent Analysis

Heliflex® AT™-624 Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
30m	0.25mm	1.40µm	-20–260°C	**13754**
	0.32mm	1.80µm	-20–260°C	**13756**
	0.32mm	3.00µm	-20–260°C	**13780**
	0.53mm	3.00µm	-20–260°C	**16889**
60m	0.25mm	1.40µm	-20–260°C	**13503**
	0.32mm	1.80µm	-20–260°C	**13799**
	0.53mm	3.00µm	-20–260°C	**13800**
75m	0.53mm	3.00µm	-20–260°C	**13937**

EPA Method 602—Purgeable Aromatics

CHROM 1233



1. Benzene
2. Toluene
3. Chlorobenzene
4. Ethylbenzene
5. 1,3-Dichlorobenzene
6. 1,4-Dichlorobenzene
7. 1,2-Dichlorobenzene

Column: Heliflex® AT™-624, 30m x 0.32mm x 1.80µm (Part No. **13756**)
Temp: 90°C (7min hold) to 180°C at 10°C/min
Carrier Gas: Helium at 1.1mL/min
Detector: FID

Heliflex® AT™-225

- Similar to DB™-225, HP-225, Rtx®-225, OV™-225, RSL-500, 007-225, CP-Sil 43CB, BP-225, PE-225

Heliflex® AT™-225 Specifications	
Phase:	(50% Cyanopropylphenyl)-50% Methylpolysiloxane
Polarity:	Mid to High Polarity
USP Code:	G19
Ideal For:	Carbohydrates and Solvents

Heliflex® AT™-225 Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
15m	0.25mm	0.20µm	40–240°C	**912515**
	0.25mm	0.25µm	40–240°C	**13883**
	0.32mm	0.25µm	40–240°C	**13774**
25m	0.25mm	0.20µm	40–240°C	**912525**
	0.53mm	1.20µm	40–220°C	**915125**
30m	0.25mm	0.25µm	40–240°C	**13773**
	0.32mm	0.25µm	40–240°C	**13775**
	0.32mm	0.30µm	40–240°C	**913230**
	0.53mm	1.20µm	40–220°C	**915130**


6515

related products

Parker Balston® FID gas station

The Parker Balston® FID gas station combines Parker's zero air and hydrogen generation technologies into a single unit, eliminating the inconveniences and cost of hydrogen and gas cylinders. See page 208.

technical assistance

Contact Tech Support: Phone: 1.800.255.8324 (North America)
Email: contact.alltech@grace.com
Online: www.discoverysciences.com

more applications

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Heliflex® AT™-Silar-90

- Designed and tested for FAME
- Similar to DB™-23, CP-Sil 84, Rtx®-2330, SP-2330

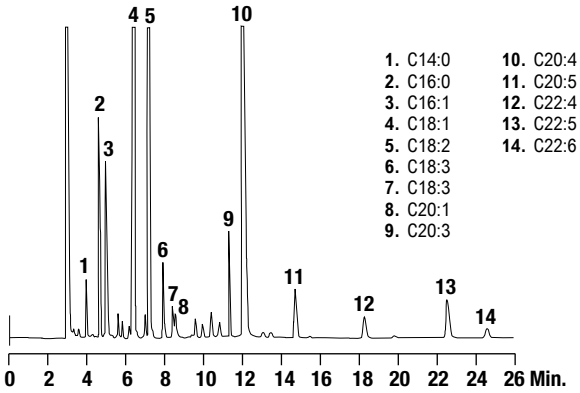
Heliflex® AT™-Silar-90 Specifications	
Phase:	Poly (90% bis Cyanopropyl)-10% Cyanopropyphenyl Siloxane
Polarity:	High Polarity
USP Code:	G8
Ideal For:	Analysis of FAMEs

Heliflex® AT™-Silar-90 Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
15m	0.25mm	0.20µm	0–250°C	**12627**
	0.32mm	0.20µm	0–250°C	**12629**
30m	0.25mm	0.20µm	0–250°C	**12628**
	0.32mm	0.20µm	0–250°C	**12630**

Fatty Acid Methyl Esters

CHROM 2678



Column: Heliflex® AT™-Silar-90, 30m x 0.25mm x 0.20µm (Part No. **24019**)
Temp: 200°C
Carrier Gas: Helium at 20cm/sec
Detector: FID

Heliflex® AT™-Silar-100

- Ideal for high and low temperature separation of samples containing geometric isomers of FAMEs
- Similar to CO-Sil 88, Rtx®-2330, SP-2340

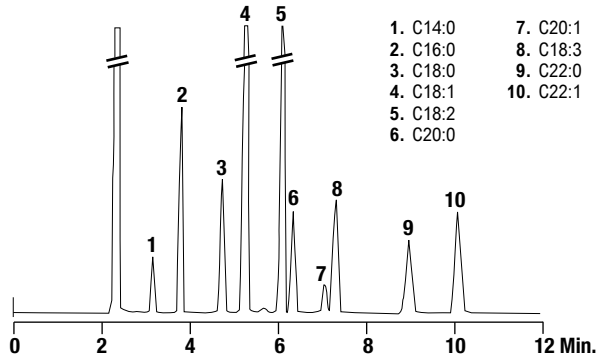
Heliflex® AT™-Silar-100 Specifications	
Phase:	Poly bis Cyanopropyl
Polarity:	High Polarity Available
USP Code:	G8
Ideal For:	*cis/trans* Isomers of FAMEs, Dioxins, and Furans

Heliflex® AT™-Silar-100 Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
15m	0.25mm	0.20µm	0–250°C	**12631**
	0.32mm	0.20µm	0–250°C	**12633**
30m	0.25mm	0.20µm	0–250°C	**12632**
	0.32mm	0.20µm	0–250°C	**12634**

Fatty Acid Methyl Esters in Rapeseed Oil

CHROM 2679



Column: Heliflex® AT™-Silar-100, 30m x 0.25mm x 0.20µm (Part No. **24022**)
Temp: 190°C
Carrier Gas: Helium at 20cm/sec
Detector: FID

tech tip

Tips for Heliflex® AT™-Silar-90 and Silar-100
Silar-90 and Silar-100 are more susceptible to damage by oxygen, moisture, and HCL than other silicone phases. Avoid solvents such as water and methanol when using on-column injection techniques. Columns should not be rinsed.

more info

For Capillary GC Applications, see the GC Applications Section, pages 462–493.

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Heliflex® AT™-Amino Acid

- Separates all 20 essential amino acids

Heliflex® AT™-Amino Acid Specifications	
Phase:	Proprietary
Polarity:	Intermediate
USP Code:	n/a
Ideal For:	Amino Acids

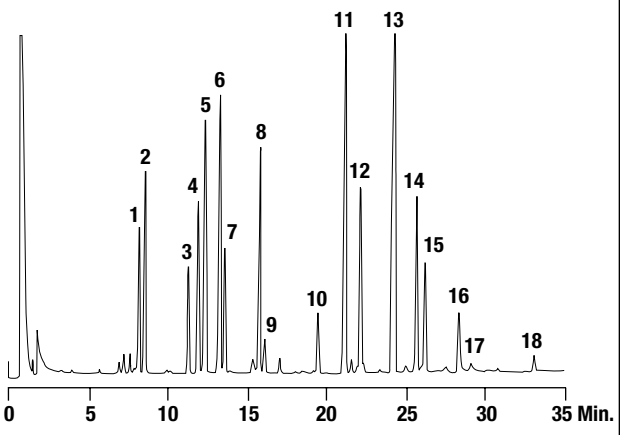
Heliflex® AT™-Amino Acid Capillary Column

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
25m	0.53mm	1.20µm	-20–350°C	**16864**

N(O,S)-Heptafluorobutyl-isobutyl Esters of Amino Acids from Soy Protein Hydrolysate

CHROM 1288

1. Alanine
2. Glycine
3. Valine
4. Threonine
5. Serine
6. Leucine
7. Isoleucine
8. Proline
9. Cystine
10. Methionine
11. Aspartic Acid
12. Phenylalanine
13. Glutamic Acid
14. Lysine
15. Tyrosine
16. Arginine
17. Histidine
18. Tryptophan



Column: Heliflex® AT™-Amino Acid, 25m x 0.53mm x 1.20µm (Part No. **16864**)
Temp: 80°C (2min hold) to 230°C at 4°C/min
Carrier Gas: Helium at 10mL/min
Detector: FID

more info

For Capillary GC Applications, see the GC Applications Section, pages 462–493.

more applications

To view our complete searchable chromatogram database visit www.discoverysciences.com/chromdb/



Heliflex® Drug Analysis Capillaries

- No derivatization of sample necessary
- Specially tested for drugs

Drug One is a non-polar column that will elute drugs in the same order as an OV™-1 or OV™-101 packed column. Drug Two is a moderately polar column that will give a retention order similar to OV™-17. Drug Three is a special phase formulated for the analysis of anticonvulsants.

Drug Specifications	
Phase:	Proprietary
Polarity:	Drug 1—Non-Polar, Drug 2—Intermediate Polarity, Drug 3—Polar
Temp. Limit:	330°C Isothermal/350°C Programmed
USP Code:	n/a
Ideal For:	Drug Analysis

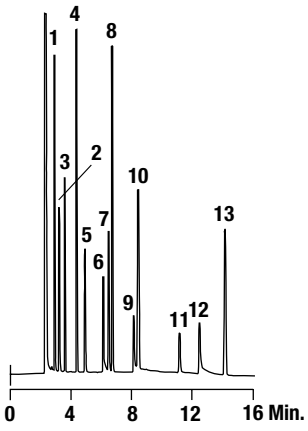
Heliflex® Drug Capillary Columns

Length	Coating	i.d.	Film	Temp. Limits*	Part No.
10m	Drug One	0.53mm	1.20µm	330/350°C	**16844**
	Drug Two	0.53mm	1.20µm	330/350°C	**16845**
	Drug Three	0.53mm	1.20µm	330/350°C	**16847**
30m	Drug One	0.25mm	0.25µm	330/350°C	**13745**
	Drug Two	0.25mm	0.25µm	330/350°C	**13746**
	Drug One	0.32mm	0.25µm	330/350°C	**13748**
	Drug Two	0.32mm	0.25µm	330/350°C	**13750**

*Isothermal/Temp. program.

Drug Mixture

CHROM 0042



1. Methylenedioxy-methamphetamine (MDMA)
2. Benzocaine
3. Meperidine
4. Phencyclidine (PCP)
5. Caffeine
6. Procaine
7. Mepivacaine
8. Methadone
9. Atropine
10. Cocaine
11. Oxazepam
12. Codeine
13. Diazepam

Column: Heliflex® Drug Two, 30m x 0.25mm x 0.25µm (Part No. **13746**)
Temp: 230°C to 250°C at 5°C/min
Carrier Gas: Helium at 0.64mL/min
Detector: FID

tech tip

Temperature limits

Our GC capillary columns are temperature rated. In some cases, we list two maximum operating temperatures, the lower one is for isothermal condition and the higher one for temperature-programmed condition.

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Heliflex® USP 467 Capillary Kits

- Tested for organic volatile impurities
- Kits for Method I and V for Method 467
- Guard columns plus connector

USP Method 467 deals with the determination of organic volatile impurities in pharmaceuticals, which results from solvents commonly used in the manufacturing process.

Method I Kit Contains:

AT™-5, (USP G27) 30m x 0.53mm x 5.00µm; 5 x Universal FSOT Connectors; and 5 x 5m Deactivated Guard Columns (0.53mm i.d.).

Method I Kit Specifications	
Phase:	(5% Phenyl)-95% Methylpolysiloxane
Polarity:	Non-Polar
Temp. Limit:	-60–350°C
USP Code:	G27
Ideal For:	Drug Analysis

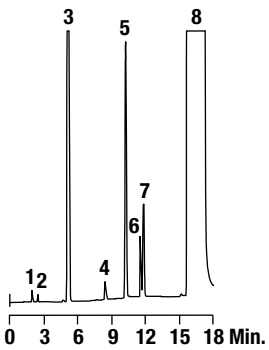
Method V Kit Contains:

AT™-624, (USP G43) 30m x 0.53mm x 3.00µm; 5 x Universal FSOT Connectors; and 5 x 5m Deactivated Guard Columns (0.53mm i.d.).

Method V Kit Specifications	
Phase:	(6% Cyanopropylphenyl)-94% Methylpolysiloxane
Polarity:	Intermediate
Temp. Limit:	20–260°C
USP Code:	G43
Ideal For:	Drug Analysis

USP 467 - Trace Volatiles

CHROM 1797

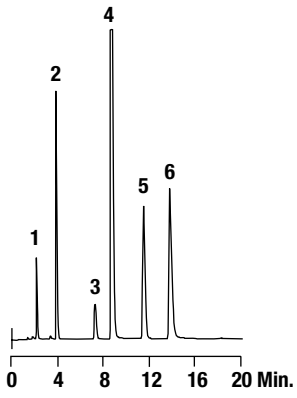


1. Ethylene Oxide
2. Impurity
3. Methylene Chloride
4. Chloroform
5. Benzene
6. Trichloroethylene
7. 1,4-Dioxane
8. Dimethyl Sulfoxide

Column:	Heliflex® AT™-5, 30m x 0.53mm x 5.00µm (Part No. **16859**)
Temp:	35°C (5 min hold) to 175°C at 8°C/min
Carrier Gas:	Helium at 35cm/sec
Detector:	FID at 260°C

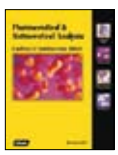
USP 467 - Method V

CHROM 1866



1. Ethylene Oxide
2. Methylene Chloride
3. Chloroform
4. Benzene
5. Trichloroethylene
6. 1,4-Dioxane

Column:	Heliflex® AT™-624, 30m x 0.53mm x 3.00µm (Part No. **16889**)
Temp:	40°C
Carrier Gas:	Helium at 35cm/sec
Detector:	FID



more info

For more information on Pharmaceutical analysis, request brochure #470.

USP 467 Capillary Kits

Description	Part No.
Capillary Kits	
USP 467/Method I Capillary Kit	**13963**
USP 467/Method V Capillary Kit	**13971**
Replacement Components	
AT™-5, 30m x 0.53mm x 5.0µm	**16859**
AT™-624, 30m x 0.53mm x 3.0µm	**16889**
Universal FSOT Connectors, 5/pk	**20400**
Deactivated Guard Columns, 5m x 0.53mm, 5/pk	**13990**

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Heliflex® AT™-Pesticide

- Unique selectivity for pesticide confirmation
- Pretested with pesticide mix

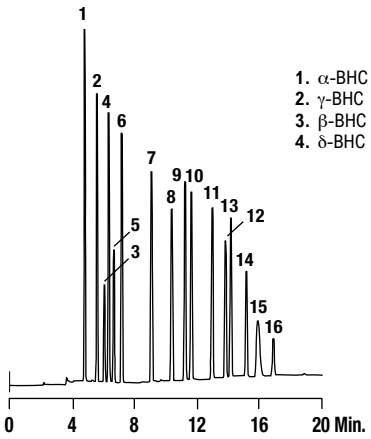
Heliflex® AT™-Pesticide Specifications	
Phase:	Proprietary
Polarity:	Intermediate
USP Code:	n/a
Ideal For:	Chlorinated Pesticides, PCBs

Heliflex® AT™-Pesticide Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
20m	0.53mm	0.60µm	40–240°C	**16846**
30m	0.25mm	0.25µm	40–240°C	**13662**
	0.32mm	0.25µm	40–240°C	**13744**
	0.53mm	0.60µm	40–240°C	**13969**

Chlorinated Pesticides

CHROM 1569



1. α-BHC
2. γ-BHC
3. β-BHC
4. δ-BHC
5. Heptachlor
6. Aldrin
7. Heptachlor Epoxide
8. Endosulfan I
9. *p,p'*-DDE
10. Dieldrin
11. Endrin
12. *p,p'*-DDD
13. Endosulfan II
14. *p,p'*-DDT
15. Endrin Aldehyde
16. Endosulfan Sulfate

Column: Heliflex® AT™-Pesticide, 30m x 0.25mm x 0.25µm (Part No. **13662**)
Temp: 190°C to 240°C at 3°C/min
Carrier Gas: Helium at 0.65mL/min
Detector: ECD

Heliflex® AT™-502.2

- Separates early eluting gases at above ambient temperature
- Useful for volatile organics analysis, including EPA Methods 502.2, 524.2, 8260

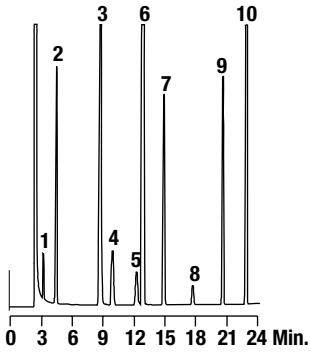
Heliflex® AT™-502.2 Specifications	
Phase:	Proprietary
Polarity:	Intermediate
USP Code:	n/a
Ideal For:	Volatile Organics and EPA Methods 502.2, 524.2, and 8260

Heliflex® AT™-502.2 Capillary Columns

Length	i.d.	Film	Temp. Limit max.	Part No.
30m	0.25mm	1.40µm	270°C	**13787**
	0.32mm	1.80µm	270°C	**13789**
	0.53mm	3.00µm	270°C	**13792**
60m	0.25mm	1.40µm	270°C	**13788**
	0.32mm	1.80µm	270°C	**13790**
	0.53mm	3.00µm	270°C	**13793**
105m	0.32mm	1.80µm	270°C	**13791**
	0.53mm	3.00µm	270°C	**13794**

TCLP Volatiles Mix

CHROM 2064



1. Vinyl Chloride
2. 1,1-Dichloroethene
3. 2-Butanone
4. Chloroform
5. Carbon Tetrachloride
6. Benzene + 1,2-Dichloroethene
7. Trichloroethene
8. Tetrachloroethene
9. Chlorobenzene
10. 1,4-Dichlorobenzene

Column: Heliflex® AT™-502.2, 30m x 0.53mm x 3.00µm (Part No. **13792**)
Temp: 40°C (10min hold) to 120°C at 4°C/min
Carrier Gas: Helium at 22cm/sec
Detector: FID

more info

For Capillary GC Applications, see the GC Applications Section, pages 462–493.



related products

Need sample prep for your pesticide analysis?
Florisil®-PR is pretested specifically chlorinated pesticides, see page 309.

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Heliflex® AT™-2887

- For simulated distillation of petroleum products

Heliflex® AT™-2887 Specifications	
Phase:	100% Methylpolysiloxane
Polarity:	Non-Polar
USP Code:	n/a
Ideal For:	Petroleum Distillation

Heliflex® AT™-2887 Capillary Column

Length	i.d.	Film	Temp. Limit max.	Part No.
10m	0.53mm	1.20µm	350°C	**13947**
Test Mix for AT™-2887				**41719**

Heliflex® AT™-Sulfur

- Designed for the analysis of volatile sulfur-containing compounds in petroleum distillates

Heliflex® AT™-Sulfur Specifications	
Phase:	100% Methylpolysiloxane
Polarity:	Non-Polar
USP Code:	n/a
Ideal For:	Volatile Sulfur Compounds

Heliflex® AT™-Sulfur Capillary Columns

Length	i.d.	Film	Temp. Limit min.–max.	Part No.
30m	0.32mm	4.00µm	-20–350°C	**14029**

Heliflex® AT™-3710

- For boiling range of gasoline samples

Heliflex® AT™-3710 Specifications	
Phase:	100% Methylpolysiloxane
Polarity:	Non-Polar
USP Code:	n/a
Ideal For:	Boiling Point of Gasoline

Heliflex® AT™-3710 Capillary Column

Length	i.d.	Film	Temp. Limit max.	Part No.
15m	0.53mm	5.00µm	300°C	**13949**
Test Mix for AT™-3710				**41718**

Heliflex® AT™-Amine

- Separates underivatized amines with no tailing

Heliflex® AT™-Amine Specifications	
Phase:	Proprietary—Non-bonded
Polarity:	Intermediate
USP Code:	n/a
Ideal For:	Amino Acids

Heliflex® AT™-Amine Capillary Columns

Length	i.d.	Film	Temp. Limit max.	Part No.
30m	0.25mm	0.25µm	200°C	**13314**
	0.32mm	0.25µm	200°C	**13316**
	0.53mm	0.25µm	200°C	**13318**
60m	0.25mm	0.25µm	200°C	**13315**
	0.32mm	0.25µm	200°C	**13317**
	0.53mm	0.25µm	200°C	**13319**

Heliflex® AT™-Petro

- For high resolution of complex hydrocarbon mixtures

Heliflex® AT™-Petro Specifications	
Phase:	100% Methylpolysiloxane
Polarity:	Non-Polar
USP Code:	n/a
Ideal For:	hydrocarbon Mixtures

Heliflex® AT™-Petro Capillary Column

Length	i.d.	Film	Temp. Limit max.	Part No.
100m	0.25mm	0.50µm	350°C	**13948**



more info

For more information about Petrochemical analysis, request brochure #478.

more info

For Capillary GC Applications, see the GC Applications Section, pages 462–493.

more applications

To view our complete searchable chromatogram database visit www.discoverysciences.com/chromdb/



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Alltech Column Guide to EPA Methods

Alltech Guide to Capillary Columns for Environmental Analysis

Method Description and Recommended Columns	Comments	Part No.
501.3—Trihalomethanes in Drinking Water		
Heliflex® AT™-624, 30m x 0.53mm x 3.00µm		**16889**
502.1—Volatile Halogenated Organics by Purge and Trap GC/ELCD		
Heliflex® AT™-624, 30m x 0.53mm x 3.00µm	Subambient	**16889**
Heliflex® AT™-624, 60m x 0.53mm x 3.00µm	Ambient	**13800**
502.2—Volatile Organics in Water by Purge and Trap GC/PID/ELCD		
Heliflex® AT™-502.2, 105m x 0.53mm x 3.00µm		**13794**
Heliflex® AT™-624, 60m x 0.53mm x 3.00µm		**13800**
DB™-624, 75m x 0.53mm x 3.00µm		**125-1374**
504—DBE and DBCP by Microextraction GC/ECD		
DX-3, 30m x 0.32mm x 0.25µm		**123-6332**
Econo-Cap™ EC™-1, 30m x 0.32mm x 1.00µm	(Inexpensive, Batch QC'ed Column)	**19660**
505—Organohalide Pesticides and PCBs by Microextraction and GC/ECD		
Heliflex® AT™-1, 30m x 0.32mm x 1.00µm	Primary Column	**13641**
DX-3, 30m x 0.32mm x 0.25µm	Alternate Column	**123-6332**
506—Phthalate and Adipate Esters in Water (GC/PID)		
Heliflex® AT™-1, 30m x 0.32mm x 0.25µm		**13640**
Heliflex® AT™-5, 30m x 0.32mm x 0.25µm		**13658**
507—Nitrogen and Phosphorus Containing Pesticides by GC/NPD		
Heliflex® AT™-5, 30m x 0.25mm x 0.25µm	Primary Column	**13656**
Econo-Cap™ EC™-5, 30m x 0.25mm x 0.25µm	(Inexpensive, Batch QC'ed Column)	**19647**
Heliflex® AT™-1701, 30m x 0.25mm x 0.25µm	Confirmation Column	**13686**
508—Chlorinated Pesticides by GC/ECD		
Heliflex® AT™-5, 30m x 0.25mm x 0.25µm	Primary Column	**13656**
Econo-Cap™ EC™-5, 30m x 0.25mm x 0.25µm	(Inexpensive, Batch QC'ed Column)	**19647**
Heliflex® AT™-1701, 30m x 0.25mm x 0.25µm	Alternate Column	**13686**
Heliflex® AT™-Pesticide, 30m x 0.32mm x 0.25µm		**13744**
Heliflex® AT™-Pesticide, 30m x 0.25mm x 0.25µm		**13662**
513—2, 3, 7, 8 Tetrachlorodibenzo-p-Dioxin		
DB-Dioxin, 60m x 0.25mm x 0.15µm		**122-2461**
DB-Dioxin, 60m x 0.32mm x 0.15µm		**123-2461**
515.1—Chlorinated Acids by GC/ECD		
Heliflex® AT™-5, 30m x 0.25mm x 0.25µm	Primary Column	**13656**
Econo-Cap™ EC™-5 Econo-Cap, 30m x 0.25mm x 0.25µm	(Inexpensive, batch QC'ed column)	**19647**
Heliflex® AT™-1701, 30m x 0.25mm x 0.25µm	Confirmation Column	**13686**
524.2—Purgeables by Purge and Trap GC/MS		
Heliflex® AT™-624, 30m x 0.53mm x 3.00µm	Subambient (10°C)	**16889**
Heliflex® AT™-624, 60m x 0.53mm x 3.00µm	Ambient	**13800**
Heliflex® AT™-5, 30m x 0.32mm x 1.00µm	Subambient, Cryofocusing	**13659**
Heliflex® AT™-5, 30m x 0.25mm x 1.00µm	Subambient, Cryofocusing	**13657**
525—Organic Compounds in Water by Liquid-Solid Extraction and Capillary GC/MS		
Heliflex® AT™-5ms, 30m x 0.32mm x 0.25µm		**15894**
Heliflex® AT™-5ms, 30m x 0.25mm x 0.25µm		**15807**
548—Endothall in Drinking Water		
Heliflex® AT™-1, 30m x 0.25mm x 0.25µm		**13638**
Heliflex® AT™-5, 30m x 0.25mm x 0.25µm		**13656**
551—Chlorination Disinfection By-products and Chlorinated Solvents in Drinking Water		
Heliflex® AT™-1, 30m x 0.32mm x 1.00µm		**13641**
Heliflex® AT™-210, 30m x 0.32mm x 0.50µm		**13727**
Econo-Cap™ EC™-1, 30m x 0.32mm x 1.00µm	(Inexpensive, Batch QC'ed Column)	**19660**
552.1—Haloacetic Acids in Drinking Water		
Heliflex® AT™-1701, 30m x 0.32mm x 0.25µm		**13690**
Heliflex® AT™-210, 30m x 0.32mm x 0.50µm		**13727**
556.1—Carbonyl Compounds in Drinking Water		
Heliflex® AT™-5, 10m x 0.10mm x 0.10µm	Fast GC	**14438**
Heliflex® AT™-1701, 10m x 0.10mm x 0.10µm	Fast GC	**14439**

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Alltech Column Guide to EPA Methods (continued)

Alltech Guide to Capillary Columns for Environmental Analysis (continued)

Method Description and Recommended Columns	Comments	Part No.
601—Purgeable Halocarbons by Purge and Trap ELCD		
Heliflex® AT™-624, 30m x 0.53mm x 3.00µm	Subambient	**16889**
Heliflex® AT™-624, 60m x 0.53mm x 3.00µm	Ambient	**13800**
602—Purgeable Aromatics by Purge and Trap GC/PID		
Heliflex® AT™-624, 30m x 0.53mm x 3.00µm		**16889**
Heliflex® AT™-WAX, 30m x 0.53mm x 2.50µm	Plus xylenes	**16885**
Econo-Cap™ EC™-WAX, 30m x 0.53mm x 1.20µm	(Inexpensive, Batch QC'ed Column)	**19659**
603—Acrolein and Acrylonitrile by GC/FID		
Heliflex® AT™-624, 30m x 0.53mm x 3.00µm		**16889**
604—Phenols by GC/FID and GC/ECD		
Heliflex® AT™-5, 30m x 0.53mm x 1.20µm		**955130**
Econo-Cap™ EC™-5, 30m x 0.53mm x 1.20µm	(Inexpensive, Batch QC'ed Column)	**19657**
Heliflex® AT™-5, 30m x 0.32mm x 0.25µm		**13658**
Econo-Cap™ EC™-5, 30m x 0.32mm x 0.25µm	(Inexpensive, Batch QC'ed Column)	**19646**
Heliflex® AT™-5, 30m x 0.25mm x 0.25µm		**13656**
Econo-Cap™ EC™-5, 30m x 0.25mm x 0.25µm	(Inexpensive, Batch QC'ed Column)	**19647**
606—Phthalate Esters by GC/ECD		
Heliflex® AT™-5, 15m x 0.53mm x 1.20µm		**955115**
Econo-Cap™ EC™-5, 15m x 0.53mm x 1.20µm	(Inexpensive, Batch QC'ed Column)	**19645**
607—Nitrosamines		
Heliflex® AT™-5, 15m x 0.53mm x 1.20µm		**955115**
Econo-Cap™ EC™-5, 15m x 0.53mm x 1.20µm	(Inexpensive, Batch QC'ed Column)	**19645**
608—Organochlorine Pesticides and PCBs by GC/ECD		
Heliflex® AT™-Pesticide, 20m x 0.53mm x 0.60µm		**16846**
Heliflex® AT™-Pesticide, 30m x 0.32mm x 0.25µm		**13744**
Heliflex® AT™-Pesticide, 30m x 0.25mm x 0.25µm		**13662**
609—Nitroaromatics and Isophorone by GC/FID and GC/ECD		
Heliflex® AT™-5, 15m x 0.53mm x 1.20µm	(Capillary GC)	**955115**
610—Polynuclear Aromatic Hydrocarbons by GC/FID		
Heliflex® AT™-5, 30m x 0.53mm x 1.20µm		**955130**
Econo-Cap™ EC™-5, 30m x 0.53mm x 1.20µm	(Inexpensive, Batch QC'ed Column)	**19657**
Heliflex® AT™-5, 30m x 0.32mm x 0.25µm		**13658**
610—Polynuclear Aromatic Hydrocarbons by HPLC and GC/FID		
Heliflex® AT™-5, 30m x 0.32mm x 0.25µm		**13658**
Econo-Cap™ EC™-5, 30m x 0.32mm x 0.25µm	(Inexpensive, Batch QC'ed Column)	**19646**
Heliflex® AT™-5, 30m x 0.25mm x 0.25µm		**13656**
Econo-Cap™ EC™-5, 30m x 0.25mm x 0.25µm	(Inexpensive, Batch QC'ed Column)	**19647**
611—Haloethers by GC/HSD		
Heliflex® AT™-5, 15m x 0.53mm x 1.20µm		**955115**
Econo-Cap™ EC™-5, 15m x 0.53mm x 1.20µm	(Inexpensive, Batch QC'ed Column)	**19645**
612—Chlorinated Hydrocarbons by GC/ECD		
Heliflex® AT™-5, 15m x 0.53mm x 1.20µm		**955115**
Econo-Cap™ EC™-5, 15m x 0.53mm x 1.20µm	(Inexpensive, Batch QC'ed Column)	**19645**
615—Chlorinated Herbicides by GC/ECD/ELCD		
Heliflex® AT™-1, 30m x 0.32mm x 0.25µm		**13640**
Econo-Cap™ EC™-1, 30m x 0.32mm x 0.25µm	(Inexpensive, Batch QC'ed Column)	**19651**
619—Triazine Herbicides		
Heliflex® AT™-50, 30m x 0.53mm x 1.00µm		**13878**
624—Purgeables by Purge and Trap GC/MS		
Heliflex® AT™-624, 30m x 0.53mm x 3.00µm	Subambient (10°C)	**16889**
Heliflex® AT™-624, 60m x 0.53mm x 3.00µm	Ambient	**13800**
Heliflex® AT™-5, 30m x 0.32mm x 1.00µm	Subambient, Cryofocusing	**13659**
Heliflex® AT™-5, 30m x 0.25mm x 1.00µm	Subambient, Cryofocusing	**13657**
625—Base/Neutral and Acids by GC/MS	See Method 8270	**—**
680—Pesticides and PCBs in Water and Soil/Sediment by GC/MS		
Heliflex® AT™-5ms, 30m x 0.32mm x 0.25µm		**15894**
8011- EDB and DBCP by Microextraction Using GC		
Heliflex® AT™-1, 30m x 0.32mm x 0.25µm		**13640**

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Alltech Column Guide to EPA Methods (continued)

Alltech Guide to Capillary Columns for Environmental Analysis (continued)

Method Description and Recommended Columns	Comments	Part No.
8015—Nonhalogenated Volatile Organics		
Heliflex® AT™-WAX, 30m x 0.53mm x 1.00µm		**13907**
Heliflex® AT™-5, 30m x 0.53mm x 1.50µm		**13909**
8021—Halogenated Volatiles Using GC/PID/ELCD		
Heliflex® AT™-20, 60m x 0.53mm x 1.20µm		**13933**
8032—Acrylamide by GC/ECD		
Heliflex® AT™-1000, 15m x 0.53mm x 1.20µm		**975115**
8033—Acetonitrile by GC/NPD		
Heliflex® AT™-WAX, 15m x 0.53mm x 1.00µm		**13904**
8041—Phenols by GC/FID/(ECD)		
Heliflex® AT™-5, 30m x 0.53mm x 1.50µm		**13909**
Heliflex® AT™-1701, 30m x 0.53mm x 1.00µm		**13795**
8070—Nitrosamines		
Heliflex® AT™-5, 15m x 0.53mm x 1.20µm		**955115**
Econo-Cap™ EC™-5, 15m x 0.53mm x 1.20µm	(Inexpensive, Batch QC'ed Column)	**19645**
8081—Organochlorine Pesticides by GC/ECD		
Heliflex® AT™-5, 30m x 0.25mm x 1.00µm		**13657**
Heliflex® AT™-35, 30m x 0.25mm x 1.00µm		**13796**
Heliflex® AT™-35, 30m x 0.53mm x 0.50µm		**13797**
Heliflex® AT™-1701, 30m x 0.53mm x 1.00µm		**13795**
Heliflex® AT™-5, 30m x 0.53mm x 1.50µm		**13909**
Heliflex® AT™-Pesticide, 30m x 0.53mm x 0.60µm		**13969**
8082—Polychlorinated Biphenyls (PCBs) by GC/ECD or GC/ELCD		
Heliflex® AT™-5, 30m x 0.25mm x 1.00µm		**13657**
Heliflex® AT™-35, 30m x 0.25mm x 1.00µm		**13796**
Heliflex® AT™-35, 30m x 0.53mm x 0.50µm		**13797**
Heliflex® AT™-1701, 30m x 0.53mm x 1.00µm		**13795**
Heliflex® AT™-5, 30m x 0.53mm x 1.50µm		**13909**
Heliflex® AT™-Pesticide, 30m x 0.53mm x 0.60µm		**13969**
8091—Nitroaromatics and Cyclic Ketones by GC/ECD or GC/NPD		
Heliflex® AT™-5, 30m x 0.53mm x 1.50µm		**13909**
Heliflex® AT™-1701, 30m x 0.53mm x 1.00µm		**13795**
8100—Polynuclear Aromatic Hydrocarbons by GC/FID		
Heliflex® AT™-5, 30m x 0.53mm x 1.20µm		**955130**
Econo-Cap™ EC™-5, 30m x 0.53mm x 1.20µm	(Inexpensive, Batch QC'ed Column)	**19657**
Heliflex® AT™-5, 30m x 0.32mm x 0.25µm		**13658**
Econo-Cap™ EC™-5, 30m x 0.32mm x 0.25µm	(Inexpensive, Batch QC'ed Column)	**19646**
Heliflex® AT™-5, 30m x 0.25mm x 0.25µm		**13656**
Econo-Cap™ EC™-5, 30m x 0.25mm x 0.25µm	(Inexpensive, Batch QC'ed Column)	**19647**
8111—Haloethers by GC/ECD		
Heliflex® AT™-5, 30m x 0.53mm x 1.50µm		**13909**
Heliflex® AT™-1701, 30m x 0.53mm x 1.20µm		**13830**
8141—Organophosphorus Pesticides by GC/NPD/FPD/ELCD		
Heliflex® AT™-210, 15m x 0.53mm x 1.20µm	Column 1	**985115**
Heliflex® AT™-5, 15m x 0.53mm x 1.20µm	Column 2	**955115**
Econo-Cap™ EC™-5, 15m x 0.53mm x 1.20µm	(Inexpensive, Batch QC'ed Column)	**19645**
8151—Chlorinated Herbicides by GC/ECD Using Methylation and Pentafluorobenzylation Derivatization		
Heliflex® AT™-5, 30m x 0.25mm x 0.25µm		**13656**
Heliflex® AT™-5, 30m x 0.32mm x 1.00µm		**13659**
Heliflex® AT™-35, 30m x 0.25mm x 0.25µm		**13642**
Heliflex® AT™-1701, 30m x 0.25mm x 0.25µm		**13686**
Heliflex® AT™-1701, 30m x 0.53mm x 1.00µm		**13795**
Heliflex® AT™-Pesticide, 30m x 0.53mm x 0.60µm		**13969**
8260—Volatile Organics by GC/MS: Capillary Column Technique		
Heliflex® AT™-624, 30m x 0.53mm x 3.00µm	Subambient (10°C)	**16889**
Heliflex® AT™-624, 60m x 0.53mm x 3.00µm	Ambient	**13800**
Heliflex® AT™-5, 30m x 0.32mm x 1.00µm	Subambient, Cryofocusing	**13659**
Heliflex® AT™-5, 30m x 0.25mm x 1.00µm	Subambient, Cryofocusing	**13657**
Heliflex® AT™-502.2, 60m x 0.53mm x 3.00µm	Ambient	**13793**
Heliflex® AT™-502.2, 105m x 0.53mm x 3.00µm	Ambient	**13794**

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Astec Chiraldex® GC Capillary Columns

- Resolve aromatic and nonaromatic enantiomers
- Pure cyclodextrin derivative coating
- No racemization of chiral stationary phase at elevated temperatures

Chiraldex® capillaries are based on derivatized cyclodextrins, which are chiral in nature formed by the α-1,4 linkage of glucose units into toroidal shaped structures. The enzyme cyclodextrin glucosyl transferance (CGT) cleaves partially digested starch and links the glucose units into predominantly three forms, referred to as alpha, beta, and gamma; 6, 7, and 8 glucose units, respectively. These cyclodextrins are thermally stable, highly crystalline and virtually insoluble in most organic solvents. Using the three forms of cyclodextrin, Astec has manufactured derivatives that exhibit properties allowing them to be used as GC phases. They are:

- Permethylated Hydroxypropyl (PH)
- Dialkylated (DA)
- Trifluoroacetylated (TA)
- Propionylated (PN)
- Butyrylated (BP)
- Permethylated (PM)
- Dimethylated (DM)
- Dipropionyl (DP)

The prefix A, B, G describes the cyclodextrins alpha, beta, and gamma, respectively. The suffix describes the nature of the derivatization i.e., G-TA refers to Gamma Trifluororacetylated phase.

The most striking characteristic of these phases is that they separate nonaromatic enantiomers including saturated alcohols, amines, carboxylic acids, epoxides, diols, polyols, cyclic, bicyclic, heterocyclic compounds, lactones, amino alcohols, amino acids, halohydrocarbons, α-halocarboxylic esters, pyrans, and furans. Little functionality is required for chiral recognition (**Table 1**). Also, there can be reversals of elution order from one series to the next as well as from one cavity size (beta) to another (gamma). The acylating reagent also can contribute to stereo-selectivity.

technical assistance

Contact Tech Support: Phone: 1.800.255.8324 (North America)
Email: contact.alltech@grace.com
Online: www.discoverysciences.com

Table 1—General Classes of Compounds Separated on Chiraldex™ Capillary Columns

Chiraldex® A-PH:	Smaller linear and saturated amines, alcohols, carboxylic acids, and epoxides
Chiraldex® B-PH:	Most structural types of compounds including linear and cyclic amines and alcohols, carboxylic acids, lactones, amino alcohols, sugars, bicyclics, epoxides, haloalkanes, and more
Chiraldex® G-PH:	Cyclic and bicyclic diols and other larger compounds including steroids and carbohydrates
Chiraldex® A-DA:	Smaller cyclic amines, alcohols, and epoxides (Inquire regarding availability)
Chiraldex® B-DA:	Nitrogen heterocyclics, heterocyclics, some bicyclics, and epoxides, lactones, aromatic amines, sugars, amino acid derivatives
Chiraldex® G-DA:	Aromatic amines containing 2 or more rings, large cyclic diols, some heterocyclics, multi-ring compounds or compounds with bulky substituents
Chiraldex® A-TA:	Smaller alcohols, amino alcohols, amino alkanes, and diols
Chiraldex® B-TA:	Broad range alkyl alcohols, halo acid esters, amino alkanes, halocycloalkanes, certain lactones, diols, alkyl halides, furan and pyran derivatives
Chiraldex® G-TA:	>350 pairs chiral alcohols, diols, polyols, hydrocarbons, lactones, amine alcohols, halocarboxylic acid esters, homologous series, furan and pyran derivatives, epoxides, glycidyl analogs, and haloepihydrins
Chiraldex® G-PN:	Epoxides, higher alcohols >C4, lactones
Chiraldex® G-BP:	Amino acids, certain primary amines and furans
Chiraldex® G-DM:	Selectivity similar to PM and PH, but with shorter retention times, and greater resolution. Especially applicable to aliphatic, olefenic, and aromatic enantiomers
Chiraldex® B-PM:	Acids, alcohols, barbitals, diols, epoxides, esters, hydrocarbons, ketones, lactones, and terpenes
Chiraldex® B-DM:	Selectivity similar to PM and PH, but with shorter retention times, and greater resolution. Especially applicable to aliphatic, olefenic, and aromatic enantiomers
Chiraldex® B-DP:	Aromatic and aliphatic amines and some aliphatic and aromatic esters
Chiraldex® G-DP:	Aromatic and aliphatic amines and some aliphatic and aromatic esters

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Astec Chiraldex® GC Capillary Columns

Chiraldex® Capillary Columns

Phase	Length	i.d.	Film	Temp. Limits*	Part No.
B-PM	30m	0.25mm	0.125µm	230/250°C	**4711**
	50m	0.25mm	0.125µm	230/250°C	**4713**
A-TA	10m	0.25mm	0.125µm	180/180°C	**4123**
	20m	0.25mm	0.125µm	180/180°C	**4125**
	30m	0.25mm	0.125µm	180/180°C	**4127**
	40m	0.25mm	0.125µm	180/180°C	**4405**
	50m	0.25mm	0.125µm	180/180°C	**4635**
B-TA	10m	0.25mm	0.125µm	180/180°C	**4129**
	20m	0.25mm	0.125µm	180/180°C	**4131**
	30m	0.25mm	0.125µm	180/180°C	**4133**
	40m	0.25mm	0.125µm	180/180°C	**4407**
	50m	0.25mm	0.125µm	180/180°C	**4637**
G-TA	10m	0.25mm	0.125µm	180/180°C	**4135**
	20m	0.25mm	0.125µm	180/180°C	**4137**
	30m	0.25mm	0.125µm	180/180°C	**4139**
	40m	0.25mm	0.125µm	180/180°C	**4409**
	50m	0.25mm	0.125µm	180/180°C	**4639**
A-PH	10m	0.25mm	0.125µm	200/220°C	**4073**
	20m	0.25mm	0.125µm	200/220°C	**4088**
	30m	0.25mm	0.125µm	200/220°C	**4089**
	40m	0.25mm	0.125µm	200/220°C	**4393**
	50m	0.25mm	0.125µm	200/220°C	**4197**
B-PH	10m	0.25mm	0.125µm	200/220°C	**4090**
	20m	0.25mm	0.125µm	200/220°C	**4092**
	30m	0.25mm	0.125µm	200/220°C	**4094**
	40m	0.25mm	0.125µm	200/220°C	**4395**
	50m	0.25mm	0.125µm	200/220°C	**4199**
G-PH	10m	0.25mm	0.125µm	200/220°C	**4096**
	20m	0.25mm	0.125µm	200/220°C	**4098**
	30m	0.25mm	0.125µm	200/220°C	**4101**
	40m	0.25mm	0.125µm	200/220°C	**4397**
	50m	0.25mm	0.125µm	200/220°C	**4202**

*Isothermal/Temp. program.

Chiraldex® GC Kits

Chiraldex® 3 column kits include 1 each of any three columns of the same i.d. and length at an economical price. We recommend as a starter kit for the broadest range of applications a Chiraldex®-30 Kit including 1 each of B-DA, BDM, G-TA. Please note that Chiraldex® B-PM is not included in the Chiraldex® kits.

Chiraldex® GC Kits

Phase	Length	i.d.	Part No.
Chiraldex®-10 Kit	10m	0.25mm	**4207**
Chiraldex®-20 Kit	20m	0.25mm	**4209**
Chiraldex®-30 Kit	30m	0.25mm	**4211**
Chiraldex®-40 Kit	40m	0.25mm	**4608**
Chiraldex®-50 Kit	50m	0.25mm	**4634**

tech tip

Temperature Limits

Our GC capillary columns are temperature rated. In some cases, we list two maximum operating temperatures, the lower one is for isothermal condition and the higher one for temperature-programmed condition.

Chiraldex® Capillary Columns

Phase	Length	i.d.	Film	Temp. Limits*	Part No.
A-DA	10m	0.25mm	0.125µm	200/220°C	**4104**
	20m	0.25mm	0.125µm	200/220°C	**4107**
	30m	0.25mm	0.125µm	200/220°C	**4109**
	40m	0.25mm	0.125µm	200/220°C	**4399**
	50m	0.25mm	0.125µm	200/220°C	**4614**
B-DA	10m	0.25mm	0.125µm	200/220°C	**4111**
	20m	0.25mm	0.125µm	200/220°C	**4113**
	30m	0.25mm	0.125µm	200/220°C	**4115**
	40m	0.25mm	0.125µm	200/220°C	**4401**
	50m	0.25mm	0.125µm	200/220°C	**4626**
G-DA	10m	0.25mm	0.125µm	200/220°C	**4117**
	20m	0.25mm	0.125µm	200/220°C	**4119**
	30m	0.25mm	0.125µm	200/220°C	**4121**
	40m	0.25mm	0.125µm	200/220°C	**4403**
	50m	0.25mm	0.125µm	200/220°C	**4627**
G-PN	10m	0.25mm	0.125µm	200/220°C	**4660**
	20m	0.25mm	0.125µm	200/220°C	**4664**
	30m	0.25mm	0.125µm	200/220°C	**4668**
	40m	0.25mm	0.125µm	200/220°C	**4672**
	50m	0.25mm	0.125µm	200/220°C	**4676**
G-BP	10m	0.25mm	0.125µm	200/220°C	**4662**
	20m	0.25mm	0.125µm	200/220°C	**4680**
	30m	0.25mm	0.125µm	200/220°C	**4670**
	40m	0.25mm	0.125µm	200/220°C	**4674**
	50m	0.25mm	0.125µm	200/220°C	**4678**
G-DM	10m	0.25mm	0.125µm	230/250°C	**5550**
	20m	0.25mm	0.125µm	230/250°C	**5551**
	30m	0.25mm	0.125µm	230/250°C	**5552**
	40m	0.25mm	0.125µm	230/250°C	**5599**
	50m	0.25mm	0.125µm	230/250°C	**5688**
B-DM	10m	0.25mm	0.125µm	230/250°C	**4718**
	20m	0.25mm	0.125µm	230/250°C	**4719**
	30m	0.25mm	0.125µm	230/250°C	**4727**
	40m	0.25mm	0.125µm	230/250°C	**4728**
	50m	0.25mm	0.125µm	230/250°C	**4729**
B-DP	10m	0.25mm	0.125µm	200/220°C	**41159**
	20m	0.25mm	0.125µm	200/220°C	**41160**
	30m	0.25mm	0.125µm	200/220°C	**41193**
	40m	0.25mm	0.125µm	200/220°C	**41165**
	50m	0.25mm	0.125µm	200/220°C	**41166**
G-DP	10m	0.25mm	0.125µm	200/220°C	**41173**
	20m	0.25mm	0.125µm	200/220°C	**41174**
	30m	0.25mm	0.125µm	200/220°C	**41175**
	40m	0.25mm	0.125µm	200/220°C	**41176**
	50m	0.25mm	0.125µm	200/220°C	**41177**

*Isothermal/Temp. program.

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SGE® BPX Capillary Columns

- Extended temperature range
- Low bleed ideal for GC/MS applications

SGE® uses silphenylene-siloxane chemistry to manufacture BPX stationary phases, resulting in extremely low bleed, thermally stable capillary columns.

BPX Specifications	
Phase	**Phase Composition**
BPX1-SimD	100% Methylpolysiloxane
BPX5	5% Phenyl, 95% Methylpolysiloxane
BPX35	35% Phenyl, 65% Methylpolysiloxane
BPX50	50% Phenyl, 50% Methylpolysiloxane
BPX70	70% Cyanopropyl
BPX90	90% Cyanopropyl Polysilphenylene-siloxane
BPX 608	35% Phenyl Polysilphenylene-siloxane
BPX Volatiles	Cyanopropylphenyl Polysiloxane

BPX1-SimD Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
5m	0.53mm	0.1µm	30–430°C	**54800***
10m	0.53mm	0.9µm	30–400°C	**54801****
	0.53mm	2.65µm	30–370°C	**54802****

*Aluminum Clad. **Polyimide Clad.

BPX5 Capillary Columns

Length	i.d.	Film	Temp. Limits* min.–max.	Part No.
15m	0.25mm	0.25µm	-40–360/370°C	**54103**
	0.25mm	1.00µm	-40–360/370°C	**54121**
	0.32mm	0.25µm	-40–360/370°C	**54144**
	0.32mm	1.00µm	-40–360/370°C	**54152**
	0.53mm	1.00µm	-40–360/370°C	**54147**
	0.53mm	3.00µm	-40–350/360°C	**54159**
30m	0.25mm	0.25µm	-40–360/370°C	**54101**
	0.25mm	0.50µm	-40–360/370°C	**541025**
	0.25mm	1.00µm	-40–360/370°C	**54122**
	0.32mm	0.25µm	-40–360/370°C	**54145**
	0.32mm	0.50µm	-40–360/370°C	**541205**
	0.32mm	1.00µm	-40–360/370°C	**54153**
	0.53mm	0.50µm	-40–360/370°C	**541345**
	0.53mm	1.00µm	-40–360/370°C	**54148**
	0.53mm	1.50µm	-40–360/370°C	**541348**
	0.53mm	3.00µm	-40–350/360°C	**54160**
60m	0.25mm	0.25µm	-40–360/370°C	**54102**
	0.25mm	1.00µm	-40–360/370°C	**54123**
	0.32mm	0.25µm	-40–360/370°C	**54146**
	0.32mm	1.00µm	-40–360/370°C	**54154**
	0.53mm	1.00µm	-40–360/370°C	**54158**

*Isothermal/Temp. program.

BPX35 Capillary Columns

Length	i.d.	Film	Temp. Limits* min.–max.	Part No.
15m	0.25mm	0.25µm	0–360/370°C	**54700**
	0.25mm	1.00µm	0–360/370°C	**54703**
	0.32mm	0.25µm	0–360/370°C	**54723**
	0.32mm	1.00µm	0–360/370°C	**54716**
	0.53mm	0.50µm	0–360/370°C	**54734**
	0.53mm	1.00µm	0–360/370°C	**54736**

*Isothermal/Temp. program.

BPX35 Capillary Columns (continued)

Length	i.d.	Film	Temp. Limits* min.–max.	Part No.
30m	0.25mm	0.25µm	0–360/370°C	**54701**
	0.25mm	0.50µm	0–360/370°C	**547025**
	0.25mm	1.00µm	0–360/370°C	**54704**
	0.32mm	0.25µm	0–360/370°C	**54724**
	0.32mm	0.50µm	0–360/370°C	**547158**
	0.32mm	1.00µm	0–360/370°C	**54717**
	0.53mm	0.50µm	0–360/370°C	**54735**
	0.53mm	1.00µm	0–360/370°C	**54737**
60m	0.25mm	0.25µm	0–360/370°C	**54702**
	0.25mm	1.00µm	0–360/370°C	**54705**
	0.32mm	0.25µm	0–360/370°C	**54725**

*Isothermal/Temp. program.

BPX50 Capillary Columns

Length	i.d.	Film	Temp. Limits* min.–max.	Part No.
15m	0.25mm	0.25µm	40–360/370°C	**54750**
	0.32mm	0.25µm	40–360/370°C	**54760**
	0.53mm	0.50µm	40–360/370°C	**54769**
30m	0.25mm	0.25µm	40–360/370°C	**54751**
	0.32mm	0.25µm	40–360/370°C	**54761**
	0.53mm	0.50µm	40–360/370°C	**54771**

*Isothermal/Temp. program.

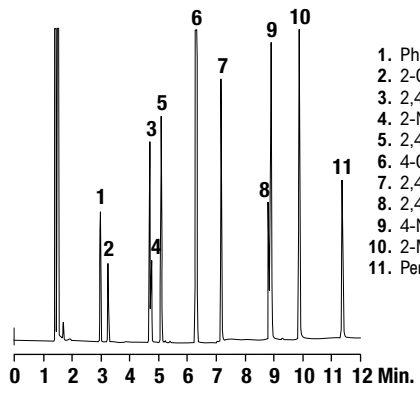
BPX70 Capillary Columns

Length	i.d.	Film	Temp. Limits* min.–max.	Part No.
15m	0.25mm	0.25µm	50–260/290°C	**54621**
	0.53mm	0.50µm	50–260/290°C	**54619**
30m	0.25mm	0.25µm	50–260/290°C	**54622**
	0.32mm	0.25µm	50–260/290°C	**54616**
	0.53mm	0.50µm	50–260/290°C	**54620**
60m	0.25mm	0.25µm	50–260/290°C	**54623**
	0.32mm	0.25µm	50–260/290°C	**54617**
120m	0.25mm	0.25µm	50–260/290°C	**54624**

*Isothermal/Temp. program.

EPA Method 625—Phenols

CHROM 1871



1. Phenol
2. 2-Chlorophenol
3. 2,4-Dinitrophenol
4. 2-Nitrophenol
5. 2,4-Dichlorophenol
6. 4-Chloro-3-methylphenol
7. 2,4,6-Trichlorophenol
8. 2,4-Dinitrophenol
9. 4-Nitrophenol
10. 2-Methyl-4,6-dinitrophenol
11. Pentachlorphenol

Column: SGE® BPX-5, 25m x 0.32mm x 0.50µm (Part No. **52318**)
Temp: 125°C to 250°C (5min hold) at 15°C/min
Carrier Gas: Hydrogen at 1.4mL/min
Detector: FID

more info

This is a partial listing of SGE® Capillary Columns available from Grace. To view Grace's complete chromatogram library, visit www.discoverysciences.com/chromdb/.

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SGE® BPX Capillary Columns

(continued)

BPX90 Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
15m	0.25mm	0.25µm	75–280°C	**54570**
	0.32mm	0.50µm	75–280°C	**54573**
30m	0.25mm	0.25µm	75–280°C	**54580**
	0.32mm	0.50µm	75–280°C	**54583**
60m	0.25mm	0.25µm	75–280°C	**54590**
	0.32mm	0.50µm	75–280°C	**54593**

BPX 608 Capillary Columns

Length	i.d.	Film	Temp. Limits* min.–max.	Part No.
25m	0.32mm	0.4µm	0–360/370°C	**54823**

*Isothermal/Temp. program.

BPX Volatiles Capillary Columns

Length	i.d.	Film	Temp. Limits* min.–max.	Part No.
20m	0.18mm	1µm	0–290/300°C	**54978**
30m	0.25mm	1.4µm	0–290/300°C	**54980**
	0.32mm	1.8µm	0–290/300°C	**54982**
	0.53mm	3µm	0–290/300°C	**54984**
40m	0.18mm	1µm	0–290/300°C	**54979**
60m	0.25mm	1.4µm	0–290/300°C	**54981**
	0.32mm	1.8µm	0–290/300°C	**54983**
	0.53mm	3µm	0–290/300°C	**54985**

*Isothermal/Temp. program.

SGE® HT5— 5% Phenyl (equiv.) Polycarborane-siloxane

- A unique high-temperature phase

HT5 Polyimide Clad Capillary Columns

Length	i.d.	Film	Temp. Limits* min.–max.	Part No.
15m	0.25mm	0.1µm	10–380/400°C	**054633**
	0.32mm	0.5µm	10–380/400°C	**054667**
	0.53mm	0.5µm	10–380/400°C	**054671**
30m	0.25mm	0.1µm	10–380/400°C	**054634**
	0.32mm	0.5µm	10–380/400°C	**054668**
	0.53mm	0.5µm	10–380/400°C	**054672**

*Isothermal/Temp. program.

HT5 Aluminum Clad Capillary Columns

Length	i.d.	Film	Temp. Limits* min.–max.	Part No.
12m	0.32mm	0.10µm	10–460/480°C	**054651**
	0.53mm	0.15µm	10–460/480°C	**054662**
50m	0.32mm	0.10µm	10–460/480°C	**054653**

*Isothermal/Temp. program.

SGE® SolGeL Capillary Columns

- Unique technology encapsulates phase in synthetic glass
- Greater inertness and thermal stability than “coated” phases

SolGeL-WAX™ Capillary Columns

- Highest temperature polyethylene glycol column
- Maximum temperature 300°C
- Ideal for: essential oils, food additives, industrial solvents, unreacted latex monomers, mixtures of aromatic hydrocarbons (e.g., BTEX), FAMEs, and mixtures of alcohols, esters, aldehydes, and ketones

SolGeL-WAX™ is a bonded polyethylene glycol stationary phase. It is unique technology because the phase is encapsulated in synthetic glass (SolGeL material) and the whole matrix is itself bonded to the surface of the fused silica. This process leads to a very inert high-temperature column.

SolGeL-WAX™ Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
30m	0.25mm	0.25µm	0–300°C	**54706**
	0.32mm	0.50µm	0–300°C	**54707**
60m	0.25mm	0.25µm	0–300°C	**54708**
	0.32mm	0.50µm	0–300°C	**54709**

SolGeL-1ms™ Capillary Columns

- MS-grade capillary columns
- Maximum temperature 380°C
- Ideal for: essential oils, pharmaceuticals, food additives, industrial solvents, and hydrocarbons

SolGeL-1ms™ is a low bleed bonded polydimethylsiloxane (100% methyl) stationary phase encapsulated in synthetic glass (SolGeL material) and the whole matrix is itself bonded to the surface of the fused silica capillary. The anchoring of the matrix to the glass surface using this unique technology leads to a very inert, high-temperature column.

SolGeL-1ms™ Capillary Columns

Length	i.d.	Film	Temp. Limits min.–max.	Part No.
30m	0.25mm	0.25µm	0–380°C	**54715**
	0.32mm	0.25µm	0–380°C	**54718**
60m	0.25mm	0.25µm	0–380°C	**54713**
	0.32mm	0.25µm	0–380°C	**54714**

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Alltech® Custom Packed Metal and PTFE Columns

Before ordering a custom-packed GC column, consult the list of popular packed columns on pages 244–245 to see if the column you need is there. Each column comes complete with brass nuts and brass ferrules. For assistance or a quote, please contact Technical Support.

Coiling Schematics

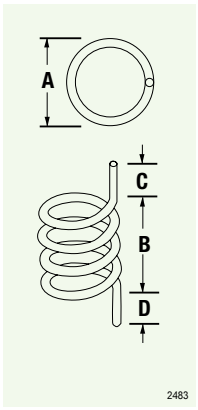


Figure 1

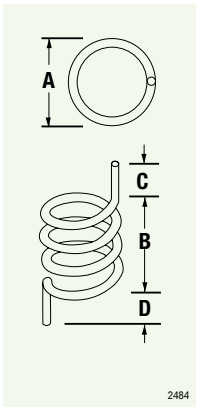


Figure 2

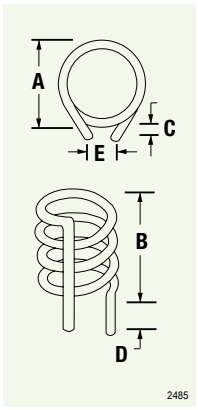


Figure 3

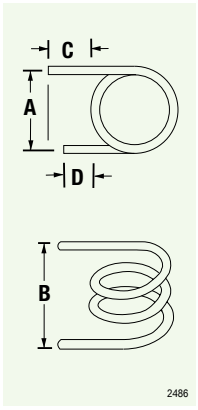


Figure 4

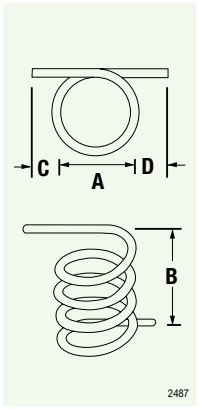


Figure 5

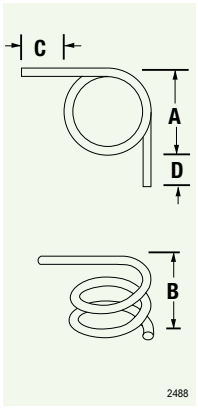


Figure 6

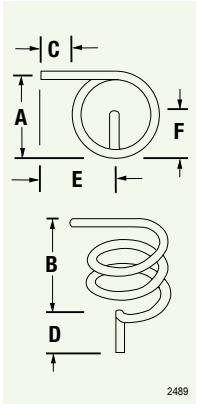


Figure 7

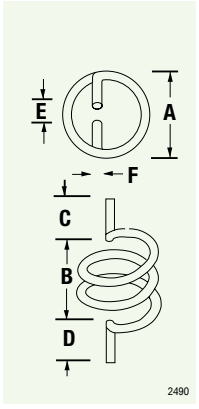


Figure 8

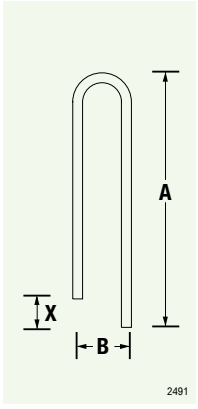


Figure 9

more info

Certain expensive stationary phases and packings may require a surcharge. Be sure to state coiling instructions.

Custom Metal and PTFE Columns — Ordering Instructions

Specify Coiling

1) **Instrument Make and Model:** _____
2) **Configuration Number: (see coiling schematics)** _____
3) **Dimensions:** **A=** _____ in/mm (circle one)
   B= _____ in/mm (circle one)
   C= _____ in/mm (circle one)
   D= _____ in/mm (circle one)
   E= _____ in/mm (circle one)
   F= _____ in/mm (circle one)
   X= _____ in/mm (circle one)
4) **Column Length:** _____ ft/m (circle one)
5) **Column i.d.:** _____ in/mm (circle one)
6) **Column o.d.:** _____ in/mm (circle one)
7) **Tubing Material: (circle one)**
   Stainless Steel AT-Steel Nickel PTFE
   TFE-Coated SS Aluminum Copper
8) **Solid Support:** _____ **Mesh Size:** _____

Specify Packing

Choose either a Pretested Packing (p368–369) or create your own custom (refer to p370–371) by specifying information below:

9) **Stationary Phase A:** _____ **% Loading:** _____
   Stationary Phase B*: _____ **% Loading:** _____
   Stationary Phase C*: _____ **% Loading:** _____
10) **Mirror Image:**
   _____ Please check if a mirror image is required.
11) **Injection Port Design: (circle one)**
   on-column not on-column
12) **Stainless Steel Fittings:**
   _____ Please check if stainless steel fittings are required (PN: C-14010N)
13) **Preconditioning:**
   _____ Please check if column preconditioning is required (PN: C-14005)
14) **Other Special Instructions: (please be specific)**
   _____
   _____
   _____

*Additional charge applies to dual- and triple-coated packings (Part No. **C-14020**).

Custom Packed Columns

Description	Part No.
Custom Packed Columns (Specify all information from Table 1)	**C-5000**
Empty Columns	
Empty Column with Fittings and Ferrules	**C-5100**
Additional Charges (per Column)	
Preconditioned Column	**C-14005**
Stainless Steel Fittings	**C-14010N**
Dual- and Triple-Coated Packings	**C-14020**

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Alltech® GC Packed Columns

Custom Deactiglas® Glass

- Silane treated for inertness
- Precision bore glass for reproducibility
- Brass fittings and vespel/graphite ferrules included
- Available packed or empty



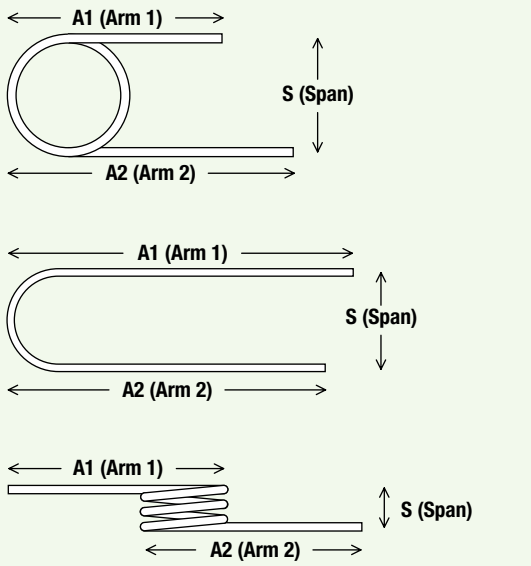
Alltech® Deactiglas® GC Columns are fabricated from precision-bore (2mm ±0.05mm or 4mm ±0.1mm i.d.) glass. All columns are 1/4" o.d. unless otherwise specified. Columns longer than 2 meters may have joints. Several additional services such as stainless steel fittings and preconditioning of the packing are available. Certain expensive stationary phases and packings may require a surcharge.

Due to space limitations we are not able to list all of the different manufacturers columns in our catalog. However, they are still available and can be specified at time of order placement. If you do not see your instrument on the following pages, please call Customer Service.

Special Services for Glass Columns

Description	Part No.
Stainless Steel Fittings (Per Column)	**C-14010N**
Preconditioned Packing (Per Column)	**C-14005**

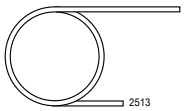
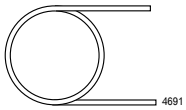
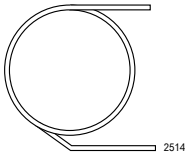
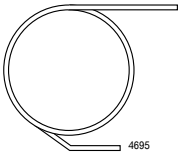
Key to Configurations for Glass Columns



Deactiglas® Column Ordering Instructions:

1. Choose column configuration part no. below.
2. Choose either a pretested packing (p247–248) or create a custom packing (refer to p249–250) by specifying information below:
   Stationary Phase A _____ % Loading _____
   Stationary Phase B _____ % Loading _____
   Stationary Phase C _____ % Loading _____

Deactiglas® Glass GC Columns

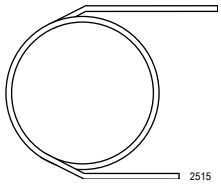
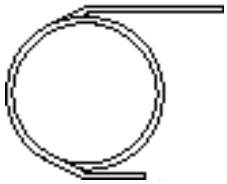
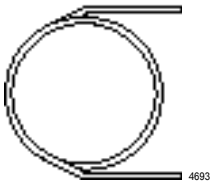
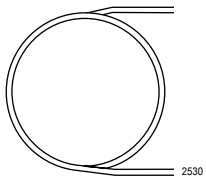
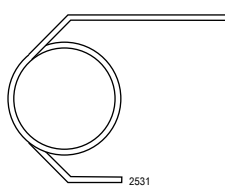
Chromatograph	Configuration	Length	i.d.	Packed Part No.	Empty Part No.
Agilent 5830, 5840, 5985					
	On-Column Injection A1 = 10.72" (272mm) A2 = 7.18" (182mm) S = 6" (152mm)	3ft	2mm	**131122**	**131121**
		6ft	2mm	**C6067**	**6067**
		6ft	4mm	**C6076**	**6076**
	Not On-Column Injection A1 = 8.95" (227mm) A2 = 9.25" (235mm) S = 6" (152mm)	3ft	2mm	**C6564**	**6564**
		6ft	2mm	**C6568**	**6568**
		6ft	4mm	**C6572**	**6572**
	On-Column Injection A1 = 10.72" (272mm) A2 = 7.18" (182mm) S = 9" (229mm)	6ft	2mm	**C6055**	**6055**
		6ft	4mm	**C6061**	**6061**
	Not On-Column Injection A1 = 8.95" (227mm) A2 = 9.25" (235mm) S = 9" (229mm)	6ft	2mm	**C6578**	**6578**
		6ft	4mm	**C6580**	**6580**

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Alltech® GC Packed Columns

Custom Deactiglas® Glass

Deactiglas® Glass GC Columns (continued)

Chromatograph	Configuration	Length	i.d.	Packed Part No.	Empty Part No.
*Agilent 5880, 5890, 5987, 6890**					
	Configuration A On-Column Injection A1 = 11.02" (280mm) A2 = 9.05" (230mm) S = 9" (229mm) FID	3ft	2mm	**130962**	**130961**
		3ft	4mm	**130972**	**130971**
		4ft	2mm	**C6082**	**6082**
		4ft	4mm	**C6085**	**6085**
		6ft	2mm	**C6087**	**6087**
		6ft	4mm	**C6089**	**6089**
		2m	2mm	**C6336**	**6336**
		2m	4mm	**C6343**	**—**
		8ft	2mm	**C6347**	**6347**
		1.8m	3mm	**C6346**	**6346**
		10ft	2mm	**C6091**	**6091**
		10ft	4mm	**131552**	**131551**
	Configuration B On-Column Injection A1 = 11.02" (280mm) A2 = 7.09" (180mm) S = 9" (229mm) TCD	6ft	2mm	**C6368**	**6368**
		6ft	4mm	**C6391**	**6391**
		2m	2mm	**C6393**	**6393**
		2m	4mm	**C6396**	**6396**
		8ft	2mm	**C6413**	**6413**
		1.8m	3mm	**C6346**	**6346**
		10ft	2mm	**C6431**	**6431**
		10ft	4mm	**C6435**	**6435**
	Configuration C Not On-Column Injection A1 and A2 = 9.05" (230mm) S = 9" (229mm) All Detectors Use with Liner or Disposable Insert	3ft	2mm	**C6427**	**6427**
		3ft	4mm	**C6433**	**6433**
		4ft	2mm	**C6436**	**6436**
		4ft	4mm	**C6440**	**6440**
		6ft	2mm	**C6442**	**6442**
		6ft	4mm	**C6445**	**6445**
		2m	2mm	**C6447**	**6447**
		2m	4mm	**C6449**	**6449**
		8ft	2mm	**C6452**	**6452**
		2.4m	2mm	**C6454**	**6454**
		10ft	2mm	**C6456**	**6456**
		10ft	4mm	**C6460**	**6460**
PerkinElmer® 115, 300, 900, 910, 990, F30, 2000, 2100, 3920, Sigma Series					
	Not On-Column Injection A1 = 9" (229mm) A2 = 9" (229mm) S = 8.75" (222mm)	2ft	2mm	**132442**	**132441**
		3ft	2mm	**131432**	**131431**
		3ft	4mm	**131442**	**131441**
		1m	2mm	**C6437**	**6437**
		4ft	2mm	**C6148**	**6148**
		4ft	4mm	**C6150**	**6150**
		6ft	2mm	**C6152**	**6152**
		6ft	4mm	**C6154**	**6154**
		2m	2mm	**C6439**	**6439**
		2m	4mm	**C6441**	**6441**
		8ft	2mm	**C6443**	**6443**
		2.4m	2mm	**C6446**	**6446**
		10ft	2mm	**C6105**	**6105**
		12ft	2mm	**C6448**	**6448**
	On-Column Injection A1 = 12.62" (321mm) A2 = 7.09" (180mm) S = 8.75" (222mm)	3ft	2mm	**C6451**	**6451**
		1m	2mm	**C6453**	**6453**
		6ft	2mm	**C6149**	**6149**
		6ft	4mm	**C6151**	**6151**
		2m	2mm	**C6455**	**6455**
		2m	4mm	**C6458**	**6458**
		2.4m	2mm	**C6462**	**6462**
		10ft	2mm	**C6106**	**6106**

more info

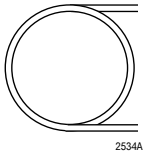
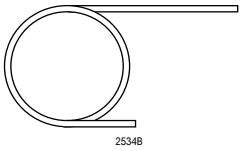
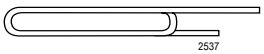
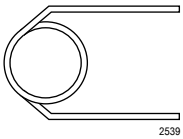
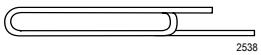
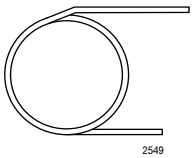
For explanation of A1, A2, and S, refer to key on page 240.

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Alltech® GC Packed Columns

Custom Deactiglas® Glass

Deactiglas® Glass GC Columns (continued)

Chromatograph	Configuration	Length	i.d.	Packed Part No.	Empty Part No.
PerkinElmer® 8300, 8400, 8700 Series, 9000 Series, Autosystem					
 2534A	Not On-Column Injection A1 = 6.75" (171mm) A2 = 6.75" (171mm) S = 6.5" (165mm)	3ft	2mm	**C6464**	**6464**
		1m	2mm	**C6466**	**6466**
		6ft	2mm	**C6479**	**6479**
		6ft	4mm	**C6482**	**6482**
		2m	2mm	**C6468**	**6468**
		2m	4mm	**C6584**	**6584**
		2.4m	2mm	**C6471**	**6471**
 2534B	On-Column Injection A1 = 12" (305mm) A2 = 6.75" (171mm) S = 6.5" (165mm)	3ft	2mm	**C6474**	**6474**
		1m	2mm	**C6477**	**6477**
		4ft	2mm	**C6243**	**6243**
		4ft	4mm	**C6245**	**6245**
		6ft	2mm	**C6247**	**6247**
		6ft	4mm	**C6249**	**6249**
		2m	2mm	**C6484**	**6484**
Shimadzu® 4BF, 4BM, 4CM, 4MG, 6A, 6AM, 7AG (No Fittings Included)					
 2537	A1 = 13.2" (335mm) A2 = 11.1" (282mm) S = 1.57" (40mm) 5mm o.d. Tubing	1.7m	3mm	**C6509**	**6509**
		2m	2mm*	**C6349**	**6349**
		2m	3mm	**C6485**	**6485**
		2m	4mm*	**C6359**	**6359**
		2.5m	3mm	**C6515**	**6515**
Shimadzu® 8A, RIA, GC-8A8IF (No Fittings Included)					
 2539	A1 = 9" (229mm) A2 = 9" (229mm) S = 6" (152mm) 5mm o.d. Tubing	1m	3mm	**C6489**	**6489**
		1.5m	2.6mm	**C6598**	**6598**
		1.5m	3mm	**C6658**	**6658**
		2m	2mm*	**C6281**	**62811**
		2m	2.6mm	**C6673**	**6673**
		2m	3mm	**C6493**	**6493**
		2m	4mm*	**C6334**	**6334**
Shimadzu® 7A, 9A, 12A, 14A, 14B, 15A, 16A (No Fittings Included)					
 2538	A1 = 10.69" (272mm) A2 = 12.81" (327mm) S = 1.57" (40mm) 5mm o.d. Tubing	1m	2.6mm	**C6487**	**6487**
		1m	3mm	**C6497**	**6497**
		1.7m	2.6mm	**C6491**	**6491**
		1.7m	3mm	**C6495**	**6495**
		2m	2mm*	**C6337**	**6337**
		2m	2.6mm	**C6498**	**6498**
		2m	3mm	**C6499**	**6499**
		2m	4mm*	**C6367**	**6367**
		2.4m	2.6mm	**C6501**	**6501**
		2.4m	3mm	**C6505**	**6505**
Varian® 3300, 3400					
 2549	Injector B to Detector B A1 = 9.5" (241mm) A2 = 8.1" (206mm) S = 6.82" (173mm) FID	3ft	2mm	**C6558**	**6558**
		4ft	2mm	**C6261**	**6261**
		4ft	4mm	**C6263**	**6263**
		6ft	2mm	**C6265**	**6265**
		6ft	4mm	**C6283**	**6283**
		2m	2mm	**C6340**	**6340**
		2m	4mm	**C6342**	**6342**

*1/4" o.d. Column tapered to 5mm o.d. x 2.6mm i.d. ends.

more info

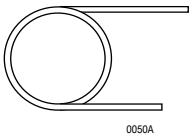
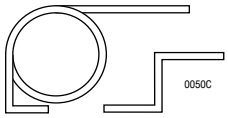
For explanation of A1, A2, and S, refer to page 240.

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Alltech® GC Packed Columns

Custom Deactiglas® Glass

Deactiglas® Glass GC Columns (continued)

Chromatograph	Configuration	Length	i.d.	Packed Part No.	Empty Part No.
Varian® 3300, 3400,3600, 3700, 4400, 4600, 6000 Vista Series					
 0050A	Injector A to Detector A A1 = 9.5" (241mm) A2 = 8.1" (206mm) S = 5.5" (140mm) FID	3ft	2mm	**131662**	**131661**
		3ft	4mm	**131672**	**131671**
		1m	2mm	**C6306**	**6306**
		1m	4mm	**C6308**	**6308**
		4ft	2mm	**C6189**	**6189**
		4ft	4mm	**C6190**	**6190**
		6ft	2mm	**C6191**	**6191**
		6ft	4mm	**C6192**	**6192**
		2m	2mm	**C6310**	**6310**
		2m	4mm	**C6312**	**6312**
		2.4m	2mm	**C6560**	**6560**
		10ft	2mm	**C6197**	**6197**
		10ft	4mm	**131692**	**131691**
		4m	2mm	**C6314**	**6314**
		4m	4mm	**C6316**	**6316**
Varian® Universal Columns 3300, 3400, 3600, 3700, 4400, 4600, 6000 Vista Series					
 0050C	A1 = 9.5" (241mm) A2 = 2.25" (57mm) S = N/A FID, TCD, ECD	3ft	2mm	**C6562**	**6562**
		6ft	2mm	**C6206**	**6206**
		6ft	4mm	**C6208**	**6208**
		2m	2mm	**C6356**	**6356**
		2m	4mm	**C6358**	**6358**
		4m	2mm	**C6360**	**6360**
		4m	4mm	**C6366**	**6366**

more info
For explanation of A1, A2, and S, refer to page 240.

Adapter Kit

Description	Part No.
Universal Adapter Kit	**6210**

more info
Universal Glass Column Adapters are available for the Varian® 3000 and Varian® 3700/Vista Series. Please contact Customer Service for part numbers and prices.

Hi-EFF™ Pre-Columns

- Extend column life
- Reduce sample clean-up
- Perform reaction chromatography
- Perform subtraction chromatography

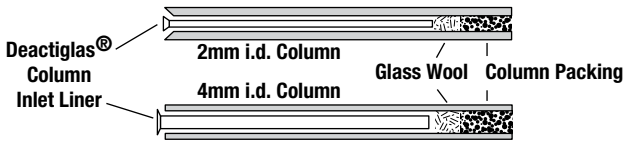
To order a Hi-EFF™ Pre-Column, state catalog number and, if packed, describe the packing (% load, phase, support, and mesh). Glass and glass-lined stainless steel and columns are deactivated at no charge.

Hi-EFF™ Pre-Columns

Description	Length	Qty.	Packed Part No.	Empty Part No.
1/8" SS	6"	6	**5900**	**5910**
1/4" Glass with Guide	6"	6	**5902**	**5912**
1/8" Glass-Lined SS	6"	3	**5904**	**5914**
1/8" Bottom-Drilled SS Union	—	ea	**—**	**5920**
1/4" Bottom-Drilled SS Union	—	ea	**—**	**5921**

Deactiglas® Column Inlet Liners

- Prolong the life of your glass columns
- Silane-treated for inertness
- Available for 2mm or 4mm i.d. columns
- Inserts directly into the end of your column



Deactiglas® Column Inlet Liners

Description	Qty.	Part No.
For 2mm i.d. Columns	10	**6301**
For 2mm i.d. Columns	50	**6302**
For 4mm i.d. Columns	10	**6303**
For 4mm i.d. Columns	50	**6304**
Glass Wool Inserter/Remover	2	**6292**

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Alltech® Popular GC Packed Columns

These columns are 6' x 1/8" o.d. 304 premium grade, precleaned stainless steel (unless otherwise indicated). Each column is made with preconditioned, pretested packing and comes complete with fittings, packing quality control chromatogram, column tags, and conditioning instructions.

Popular Packed Column Ordering Instructions:

1. Choose the part no. for your column from pages 244–245.
2. Specify make and model of GC.*
3. If your column is not listed, see page 239 for custom columns.

*If no coiling instructions are provided, we will supply in a nominal 6" coil.

Popular GC Packed Columns

Packing Description	Dimensions*	Part No.
Alumina F-1, 60/80	5' x 1/8" SS Tubing	**5664PC**
1% AT™-1000 on Carbograph™ 1, 60/80		**14404**
1% AT™-1000 on Carbograph™ 1, 60/80	24' x 1/8" SS Tubing	**14468**
10% AT™-1000 on Chromosorb® W-AW, 80/100		**12001PC**
0.10% AT™-1000 on Graphpac™-GC, 80/100		**8542PC**
10% Carbowax® 1500 on Chromosorb® T, 40/60		**14479**
6.6% Carbowax® 20M on Carbograph™ 1 AW, 80/100	10' x 1/8" SS Tubing	**14473**
5.0% Carbowax® 20M on Chromosorb® W-HP, 80/100		**14482**
10% Carbowax® 20M on Chromosorb® W-AW, 80/100		**12005PC**
10% Carbowax® 20M on Chromosorb® W-HP, 80/100		**12106PC**
6.6% Carbowax® 20M on Graphpac™-GB, 80/120	10' x 1/8" SS Tubing	**14472**
0.20% Carbowax® 1500 on Graphpac™-GC, 80/100		**8546PC**
Carbosphere™, 60/80		**5680PC**
Carbosphere™, 80/100	10' x 1/8" SS Tubing	**56821PC**
Carbosphere™, 80/100		**5682PC**
Chemipack C18, 80/100		**2768PC**
Chromosorb® 101, 80/100		**2406PC**
Chromosorb® 102, 80/100		**2409PC**
Chromosorb® 107, 80/100		**2424PC**
Chromosorb® 107, 80/100	6' x 1/8" TFE Tubing	**9783**
Chromosorb® 750, 80/100	4' x 1/8" SS Tubing	**14480**
30% DC-200 (500cstks) on Chromosorb® P-AW, 60/80		**14481**
30% DC-200 (500cstks) on Chromosorb® P-AW, 60/80	30' x 1/8" SS Tubing	**12713PC**
10% FFAP on Chromosorb® W-AW, 80/100		**8434PC**
Gas Chrom™ 220, 80/100		**2484PC**
Gas Chrom™ 254, 80/100		**2486PC**
Gas Chrom™ MP-1, 100/120	30' x 1/8" SS Tubing	**4945PC**
HayeSep® A, 80/100		**14484**
HayeSep® A, 120/140	40' x 1/8" SS Tubing	**28211**
HayeSep® B, 80/100		**14485**
HayeSep® D, 80/100		**14487**
HayeSep® D, 100/120	3' x 1/8" SS Tubing	**14486**
HayeSep® D, 100/120	20' x 1/8" Ni Tubing	**27082PC**
HayeSep® D, 100/120	30' x 1/8" SS Tubing	**27083PC**
HayeSep® D, 100/120	10' x 1/8" SS Tubing	**28301PC**
HayeSep® DB, 100/120	30' x 1/8" SS Tubing	**2836PC**
HayeSep® Dip, 100/120	9' x 1/8" SS Tubing	**2833PC**
HayeSep® N, 80/100		**14488**
HayeSep® Q, 60/80		**14490**
HayeSep® Q, 80/100	8' x 1/8" SS Tubing	**28010PC**
HayeSep® Q, 80/100		**2801PC**
HayeSep® Q, 100/120		**14489**
HayeSep® P, 60/80	8' x 1/8" SS Tubing	**2803PC**
HayeSep® P, 80/100		**2804PC**
HayeSep® R, 80/100		**2807PC**
HayeSep® S, 100/120		**2811PC**
HayeSep® T, 60/80	3' x 1/8" SS Tubing	**14491**
HayeSep® T, 80/100		**2813PC**
HayeSep® T, 100/120	5' x 1/8" SS Tubing	**2814PC**

*6' x 1/8" stainless steel unless otherwise specified.

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Alltech® Popular GC Packed Columns (continued)

Popular GC Packed Columns (continued)**

Packing Description	Dimensions*	Part No.
5% Krytox® 143 AC on Graphpac™-GB 60/80	10' x 1/8" SS Tubing	**85222**
Molecular Sieve 5A (Washed), 60/80		**14494**
Molecular Sieve 5A (Washed), 80/100		**5605PC**
Molecular Sieve 5A (Washed), 80/100	10' x 1/8" SS Tubing	**14495**
Molecular Sieve 13X (Washed), 60/80	5' x 1/8" SS Tubing	**57730PC**
Molecular Sieve 13X (Washed), 80/100	3' x 1/8" SS Tubing	**14492**
Molecular Sieve 13X (Washed), 80/100		**5773PC**
Molecular Sieve 13X (Washed), 80/100	10' x 1/8" SS Tubing	**14493**
3% OV™-1 on Chromosorb® W-HP, 80/100		**12716PC**
10% OV™-101 on Chromosorb® P-AW, 80/100	4' x 1/8" SS Tubing	**14477**
10% OV™-101 on Chromosorb® P-AW, 80/100		**14478**
20% OV™-101 on Chromosorb® P-AW, 80/100		**14469**
3% OV™-101 on Chromosorb® W-HP, 80/100		**12019PC**
3% OV™-101 on Chromosorb® W-HP, 100/120		**12700PC**
20% OV™-101 on Chromosorb® W-HP, 80/100		**14470**
10% OV™-101 on Chromosorb® W-HP, 80/100		**12703PC**
3% OV™-17 on Chromosorb® W-HP, 100/120		**12017PC**
3% OV™-17 on Chromosorb® W-HP, 80/100		**12719PC**
0.19% Picric Acid on Graphpac™-GC, 80/100	7' x 1/8" SS Tubing	**85501PC**
Porapak® N, 80/100	3' x 1/8" SS Tubing	**14497**
Porapak® N, 80/100		**2716PC**
Porapak® N, 80/100	12' x 1/8" SS Tubing	**14498**
Porapak® N, 100/120	3' x 1/8" SS Tubing	**14496**
Porapak® P, 80/100		**14499**
Porapak® PS, 80/100	10' x 1/8" SS Tubing	**14506**
Porapak® PS, 100/120	3' x 1/8" SS Tubing	**14500**
Porapak® Q, 50/80	4' x 1/8" SS Tubing	**14508**
Porapak® Q, 50/80		**2700PC**
Porapak® Q, 80/100	3' x 1/8" SS Tubing	**14519**
Porapak® Q, 80/100	12' x 1/8" SS Tubing	**27012PC**
Porapak® Q, 80/100		**2701PC**
Porapak® Q, 100/120		**2702PC**
Porapak® QS, 80/100		**2719PC**
Porapak® R, 80/100		**2707PC**
Porapak® S, 50/80	7' x 1/8" SS Tubing	**2709PC**
Porapak® S, 80/100		**2710PC**
Porapak® T, 80/100		**2713PC**
5% SE-30 on Chromosorb® W-HP, 80/100		**12025PC**
10% SE-30 on Chromosorb® W-HP, 80/100		**12423PC**
Silica Gel Grade 12, 60/80	8' x 1/8" SS Tubing	**14523**
Silica Gel Grade 12, 60/80	18' x 1/8" SS Tubing	**5651PC**
Silica Gel Grade 12, 80/100	8' x 1/8" SS Tubing	**14530**
10% Silar™ 10C on Chromosorb® W-HP, 100/120		**12430PC**
20% Squalane on Chromosorb® P-AW, 80/100	3' x 1/8" SS Tubing	**14471**
15% Squalane on Chromosorb® P-AW-DMCS, 80/100	8' x 1/8" SS Tubing	**5327PC**
Sulfur Gas Column	36' x 1/8" TFE Tubing	**9779**
18" of Super Q, 80/100	30" x 1/8" TFE Tubing	**9781**
Tenax® TA, 60/80	4' x 1/8" SS Tubing	**14538**
Tenax® TA, 60/80		**4900PC**
Tenax® TA, 80/100		**4901PC**
Tenax® GR, 60/80		**4937PC**
Unibeads™ 1S, 60/80		**2752PC**
Unibeads™ 2S, 60/80		**2760PC**
Unibeads™ 3S, 60/80		**14541**
Unibeads™ 3S, 80/100		**14542**
VZN-1, 60/80	23' x 1/8" SS Tubing	**84623PC**
10% Silicone UCW-98 on Chromosorb® W-HP, 80/100		**8493PC**
1% TCEP on Carbograph™ 1, 80/120	4' x 1/8" SS Tubing	**14474**

*6' x 1/8" stainless steel unless otherwise specified. **To order, use the part number shown and specify the instrument for which it should be coiled.

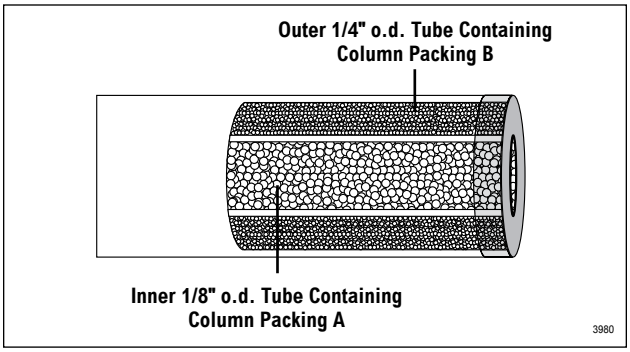
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Alltech® CTR Concentric Packed Columns

For Gas Analysis

- CTR I is ideal for separating O_2, N_2, CH_4, CO, CO_2 at ambient conditions
- CTR III is ideal for argon analysis in the presence of O_2
- Useful where two separate chromatographic runs are required to analyze one sample
- Individually tested

A CTR column is essentially a column within a column. This permits you to use two different packings for the analysis of your sample. The diagram shows the construction of the CTR column.



Cut-away view of CTR column.

CTR I—Oxygen, Nitrogen, Methane, Carbon Monoxide, and Carbon Dioxide

Until the CTR, no single column operating at room temperature has been designed to permit, in one analysis, all these components in air. The analysis is usually accomplished by separate runs or with expensive valves. The CTR I accomplishes this separation in less than nine minutes.

Calibration Gas for CTR I Column—This special mixture is useful for calibrating Part No. **8700** CTR I columns. It contains approximately 15% CO_2 + 7% CO + 7% O_2 + 4.5% CH_4 with the balance N_2. It is supplied in a 4L push button can with a needle applicator.

CTR III Argon Analysis Column

The CTR III is special designed for the separation of argon in the presence of oxygen. The outer column contains a special adsorbent that removes oxygen allowing the elution of argon and nitrogen. The inner column allows the combined elution of a peak containing oxygen and argon and later nitrogen. This separation is accomplished at ambient temperatures in ten minutes.

more info
For GC Applications, see the GC Applications Section, pages 462–493.

CTR I Column

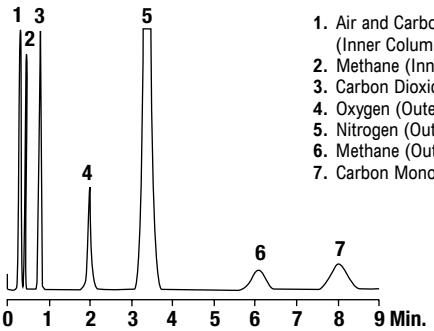
Description	Temp. Limit max.	Part No.
CTR I Column	275°C	**8700**
Calibration Gas for CTR I	—	**9799**

CTR III Column

Description	Temp. Limit max.	Part No.
CTR III Argon Analysis Column	275°C	**8725**
Additional Fittings		
Tube End Connector, 1/4" to 1/8" Tube	—	**14169**

CTR I—Air, CO, CH_4, CO_2, O_2, N_2

CHROM 1059

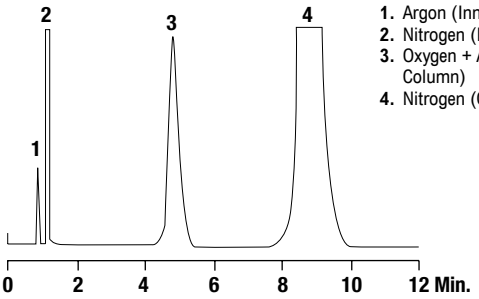


1. Air and Carbon Monoxide (Inner Column)
2. Methane (Inner Column)
3. Carbon Dioxide (Inner Column)
4. Oxygen (Outer Column)
5. Nitrogen (Outer Column)
6. Methane (Outer Column)
7. Carbon Monoxide (Outer Column)

Column: CTR I (Part No. **8700**)
Outer Column: 6ft x 1/4" Packed with Activated Molecular Sieve
Inner Column: 6ft x 1/8" Packed with Porous Polymer Mixture
Temp: Ambient
Carrier Gas: Helium at 65mL/min
Detector: TCD

CTR III—Argon in Air

CHROM 1060



1. Argon (Inner Column)
2. Nitrogen (Inner Column)
3. Oxygen + Argon (Outer Column)
4. Nitrogen (Outer Column)

Column: CTR III, 6ft x 1/4" SS (Part No. **8725**)
Outer Column: 6ft x 1/4" Packed with Activated Molecular Sieve
Inner Column: 6ft x 1/8" Packed with Molecular Sieve and Oxy Adsorbent
Temp: Ambient
Carrier Gas: Helium at 70mL/min
Detector: TCD

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Pretested GC Packings

Pretested packings are guaranteed and supplied with a test chromatogram. Preconditioning service is available for 20g or 25g of packing. The packing is heated at 25°C below the upper temperature limit for 3 hours with a flow of oxygen-free nitrogen.

Preconditioning Services

Description	Part No.
Packing Preconditioning Service (per 20–25 grams). Specify Pretested GC Packing Part Number.	**C-14000**

Pretested GC Packings

Packing Description	Temp. Limits	Qty.	Part No.
Alumina F-1, 60/80	300°C	100g	**5664**
1% AT™-1000 on Carbograph™ 1, 60/80	250°C	15g	**1733**
10% AT™-1000 on Chromosorb® W-AW, 80/100	250°C	20G	**12001**
0.10% AT™-1000 on Graphpac™-GC, 80/100	225°C	15g	**8542**
10% Carbowax® 1500 on Chromosorb® T, 40/60	175°C	20g	**16146**
6.6% Carbowax® 20M on Carbograph™ 1-AW, 80/120	60–225°C	15g	**1731**
5.0% Carbowax® 20M on Chromosorb® W-HP, 80/100	60–225°C	20g	**16147**
5.0% Carbowax® 20M on Chromosorb® T, 40/60	60–225°C	25g	**8416**
10.0% Carbowax® 20M on Chromosorb® W-AW, 80/100	60–225°C	20g	**12005**
10.0% Carbowax® 20M on Chromosorb® W-HP, 80/100	60–225°C	20g	**12106**
4% Carbowax® 20M + 0.8% KOH on Graphpac™-GB, 60/80	220°C	15g	**8519**
6.6% Carbowax® 20m on Graphpac™-GB, 80/120	175°C	15g	**16148**
0.2% Carbowax® 1500 on Graphpac™-GC, 80/100	175°C	15g	**8546**
Carbosphere®, 60/80	400°C	5g	**5680**
Carbosphere®, 80/100	400°C	5g	**5682**
Chemipack C18, 80/100	320°C	15mL	**2768**
Chromosorb® 101, 80/100	275/325°C	25g	**16149**
Chromosorb® 102, 80/100	250/300°C	25g	**16150**
Chromosorb® 107, 80/100	250/275°C	25g	**16151**
Chromosorb® 750, 80/100	250/275°C	25g	**16152**
30% DC-200 (500 cstk) on Chromosorb® P-AW, 60/80	20–200°C	25g	**12713**
10% FFAP on Chromosorb® W-AW, 80/100	50–250°C	25g	**8434**
28% AT-223 + 4% KOH on Gas Chrom™ R, 80/100	200°C	25g	**49259**
Gas Chrom™ 220, 80/100	250°C	25g	**2484**
Gas Chrom™ 254, 80/100	275°C	25g	**2486**
Gas Chrom™ MP-1, 100/120	50–250°C	25g	**16153**
HayeSep® A, 80/100	165°C	15g	**16154**
HayeSep® A, 120/140	165°C	15g	**16155**
HayeSep® B, 80/100	190°C	15g	**16156**
HayeSep® D, 80/100	290°C	15g	**16157**

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Pretested GC Packings (continued)

Pretested GC Packings (continued)

Packing Description	Temp. Limits	Qty.	Part No.
HayeSep® D, 100/120	290°C	15g	**16166**
HayeSep® DB, 100/120	290°C	15g	**16169**
HayeSep® Dip, 100/120	290°C	15g	**16170**
HayeSep® N, 80/100	165°C	15g	**16172**
HayeSep® Q, 60/80	275°C	15g	**16196**
HayeSep® Q, 80/100	275°C	15g	**16197**
HayeSep® Q, 100/120	275°C	15g	**16198**
HayeSep® P, 60/80	250°C	15g	**16199**
HayeSep® P, 80/100	250°C	15g	**16210**
HayeSep® R, 80/100	250°C	15g	**16211**
HayeSep® S, 100/120	250°C	15g	**16212**
HayeSep® T, 60/80	165°C	15g	**16213**
HayeSep® T, 80/100	165°C	15g	**16214**
HayeSep® T, 100/120	165°C	15g	**16215**
5% Krytox® 143AC on Graphpac™ GB, 60/80	175°C	15g	**8522**
Molecular Sieve 5A (washed), 60/80	350°C	50g	**5604**
Molecular Sieve 5A (washed), 80/100	350°C	50g	**5605**
Molecular Sieve 13X (washed), 60/80	350°C	50g	**57730**
Molecular Sieve 13X (washed), 80/100	350°C	50g	**57732**
3% OV™-1 on Chromosorb® W-HP, 80/100	100–350°C	20g	**12716**
10% OV™-101 on Chromosorb® P-AW, 80/100	20–350°C	20g	**16216**
20% OV™-101 on Chromosorb® P-AW, 80/100	20–350°C	20g	**16217**
3% OV™-101 on Chromosorb® W-HP, 80/100	20–350°C	20g	**12019**
3% OV™-101 on Chromosorb® W-HP, 100/120	20–350°C	20g	**12700**
20% OV™-101 on Chromosorb® P-AW, 80/100	20–350°C	20g	**16218**
10% OV™-101 on Chromosorb® W-HP, 80/100	20–350°C	20g	**12703**
3% OV™-17 on Chromosorb® W-HP, 100/120	20–350°C	20g	**12017**
3% OV™-17 on Chromosorb® W-HP, 80/100	20–350°C	20g	**12719**
0.19% Picric Acid on Graphpac™-GC, 80/100	120°C	15g	**8550**
Porapak® N, 80/100	190°C	15g	**16219**
Porapak® N, 100/120	190°C	15g	**16220**
Porapak® P, 80/100	250°C	15g	**16221**
Porapak® PS, 80/100	250°C	15g	**16223**
Porapak® PS, 100/120	250°C	15g	**16224**
Porapak® Q. 50/80	250°C	15g	**16225**
Porapak® Q, 80/100	250°C	15g	**16226**
Porapak® Q, 100/120	250°C	15g	**16228**
Porapak® QS, 80/100	250°C	15g	**16229**
Porapak® R, 80/100	250°C	15g	**16230**
Porapak® S, 50/80	250°C	15g	**16231**
Porapak® S, 80/100	250°C	15g	**16232**
Porapak® T, 80/100	190°C	15g	**16233**
Silica Gel Grade 12, 60/80	350°C	100g	**5651**
Silica Gel Grade 12, 80/100	350°C	100g	**5653**
20% Squalane on Chromosorb® P-AW, 80/100	140°C	20g	**16235**
15% Squalane on Chromosorb® P-AW-DCMS, 80/100	140°C	20g	**16236**
Tenax® TA, 60/80	350°C	10g	**04916**
Tenax® TA, 80/100	350°C	10g	**04917**
Tenax® GR, 60/80	350°C	10g	**4937**
Unibeads™ 1S, 60/80	200°C	25g	**2752**
Unibeads™ 2S, 60/80	200°C	25g	**2760**
Unibeads™ 3S, 60/80	200°C	25g	**2764**
Unibeads™ 3S, 80/100	200°C	25g	**2766**
VZN-1, 60/80	50°C	10g	**8462**
1% TCEP on Carbograph™ 1, 80/120	180°C	15g	**16270**

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Custom Coated Packings

Before ordering a custom coated packing, please check the list of stock pretested packings on pages 247–248 (called "Pretested" on these pages). You may find the packing you need in stock and at a savings.

Custom Coated Packing Ordering Instructions:

1. Choose your solid support from Table 1.
2. Specify mesh range.
3. Choose the stationary phase from Table 3 or 4. It is possible to coat up to three stationary phases on one support).
4. Specify % loading for each stationary phase. Note maximum % loading guidelines for each support in Table 2.

Table 1—Base Price for Custom-Coated Packings

Solid Support	20 Grams Part No.	50 Grams Part No.	100 Grams Part No.
Chromosorb® G, W (HP)	**C-3004**	**C-3036**	**C-3068**
Chromosorb® G, W, or P (NAW, AW, DMCS)	**C-3006**	**C-3038**	**C-3070**
Chromosorb® T	**C-3008**	**C-3040**	**C-3072**
Chromosorb® 101-108	**C-2031**	**C-2032**	**—**
Chromosorb® 750	**C-3012**	**C-3044**	**C-3076**
Gas Chrom™ S	**C-3018**	**C-3050**	**C-3082**
Gas Chrom™ R	**C-3020**	**C-3052**	**C-3084**
Gas Chrom™ 220, 254	**C-3022**	**C-3054**	**C-3086**
Graphpac™-GC and -GB (15 grams), Carbograph™	**C-2200**	**—**	**—**
Porapak®	**C-2041**	**C-2042**	**—**
Tenax® or HayeSep® (15 grams)	**C-3028**	**—**	**—**

Table 2—Maximum Stationary Phase Loading for Solid Supports

Max. Load	Supported Material	Max. Load	Supported Material	Max. Load	Supported Material
5%	Chromosorb® G	12%	Chromosorb® 750	2%	Porapak®
15%	Chromosorb® W	15%	Gas Chrom™ S, A, P, Z, and Q	2%	Super Q
25%	Chromosorb® A	30%	Gas Chrom™ R	12%	T-Port-F
30%	Chromosorb® P	2%	Gas Chrom™ 220 and 254	2%	HayeSep®
12%	Chromosorb® T	0.5%	Glass Beads	2%	Tenax®
2%	Chromosorb® 101–108	8%	Graphpac™, Carbograph™	15%	Supelcoport

Stationary Phases

Table 3—GC Stationary Phases

Description	Solvent	Temp. Limits min.–max.	USP Code	Qty.	Part No.
Apiezon® L	Chloroform	50–300°C	—	25g	**5017**
bis-(2-Ethoxyethyl) Adipate (BEEA)	Chloroform	150°C	—	25g	**5046**
Carbowax® 400	Chloroform	20–100°C	G20	100g	**5051**
Carbowax® 20M	Chloroform	60–225°C	G16	10g	**5264**
DC-200, 350 cstk (Methyl)	Chloroform	20–250°C	—	100g	**5251**
Dexsil® 300GC	Chloroform	50–400°C	G33	1g	**5092**
FFAP	Chloroform	50–250°C	G35	20g	**5156**
Hi-EFF™-1BP (Diethyleneglycol Succinate)[1]	Chloroform	20–200°C	G4	25g	**09505**
Igepal® CO-630	Methanol	30–200°C	—	50g	**5175**
OV™-1 (Methyl Gum)	Chloroform	100–350°C	G2	10g	**5293**
OV™-17 (50% Phenyl)	Acetone	20–350°C	G3	20g	**5301**
OV™-101 (Methyl Fluid)	Chloroform	20–350°C	G1	20g	**5309**
OV™-275 (Dicyanoallyl)	Chloroform	250°C+	—	5g	**5314**
QF-1 (50% Trifluoropropyl)	Ethyl Acetate	20–250°C	—	25g	**5269**
SE-30 (Methyl Gum)	Chloroform	75–300°C	—	100g	**5271**
Sebaconitrile	Chloroform	150°C	—	20g	**5244**
Silar™ 10C (100% Cyanopropyl Silicone)[2]	Chloroform	50–250°C	G5	5g	**5250**
Tetrahydroxyethylethylene Diamine (THEED)	Methanol	125°C	—	25g	**5347**

[1]U.S. Patent #3,239,997, [2]U.S. Patent #4,063,911.

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Custom Coated Packings

Additional Stationary Phases for Custom Packings and Columns

Table 4—Stationary Phases		
AT™-1000	bis-(2-Ethoxyethyl) Sebacate (BEES)	OV™-351
Apiezon® H	Glycerin	Poly-A® 103
Apiezon® J	Halocarbon 25-55 Grease	Poly-A® 135
Apiezon® K	Halocarbon Oil 14-25	Poly-I 110
Apiezon® N	Hexadecanol	Poly-S 176
BBBT	Hi-EFF™ 1AP (Diethyleneglycol Adipate)	Polyox 600M
Bentone 34	Hi-EFF™ 2AP (Ethyleneglycol Adipate)	Polyvinylpyrrolidone
BHXBT	Hi-EFF™ 2BP (Ethyleneglycol Succinate)	Reoplex 400
BMBT	Hi-EFF™ 3BP (Neopentylglycol Succinate)	SE™-52
BMEA	Hi-EFF™ 3CP (Neopentylglycol Sebacate)	SF-96
Carbowax® 540	Hi-EFF™ 8AP (Cyclohexanedimethanol Adipate)	Sorbitol
Carbowax® 600	Igepal® CO-880	SPAN 80
Carbowax® 1000	Igepal® CO-990	Squalane
Carbowax® 1450	Kel-F® Oil No. 3	SUPEROX® 4
Carbowax® 20M-TPA	Kel-F® Oil No. 10	SUPEROX® 20M
CS-10	Kel-F® Wax	TCEPE
N,N-bis-(2-Cyanoethyl) formamide (BCEF)	Krytox® 143AD	TCEP
DC-200 (500cstk)	LAC 3-R-728	β,β-Thiodipropionitrile
DC-410	LAC 4-R-886	Triton® X-100
DC-550	LAC 5-R-737	Triton® X-305
DC-702	Lexan (Polycarbonate Resin)	TWEEN 80
Di-n-butyl Maleate	Neopentylglycol Succinate	UC L-45
Didecyl Phthalate	Octyldecyl Adipate	UCON 50-HB-280-X
Di(2-ethylhexyl) Sebacate	OV™-7	UCON 75-H-90,000
Di(2-ethylhexyl) Phthalate	OV™-17 Vinyl	UCON LB-135
Diglycerol	OV™-22	UCON LB-1715
Diisodecyl Phthalate	OV™-105	UCON LB-550X
Dimethyl Sulfolane	OV™-202	UCON LB-1800-X
Dinonyl Phthalate	OV™-210	UC W-98
ECNSS-M	OV™-215	Versamid® 900
EGSS-X	OV™-225	Versilube® F-50
Ethofat 60-25	OV™-330	Versilube® F-50

Additional Charges for Custom Coated Packings

Description	Part No.
Multiple Stationary Phases (per phase)	**C-2000**
Expensive Stationary Phases: Add the cost of the stationary phase used to base price	**—**
Acetone Washing	**C-2700**

technical assistance

Need help selecting the right packing for your analysis?

Contact Tech Support: Phone: 1.800.255.8324 (North America)
Email: contact.alltech@grace.com
Online: www.discoverysciences.com

related products

Looking for GC packing accessories?

See pages 262–263.



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GC Supports

Chromosorb® Diatomite Supports

Chromosorb® A, G, P, and W are available in both untreated and treated forms, as well as in a choice of various mesh ranges.

Chromosorb® Specifications

Chromosorb® Series	Type	Surface Area	Packed Density	Recommended Liquid Phase Load
A	Flux-calcined	2.7m²/g	0.48g/cc	25%
G	Flux-calcined	0.5m²/g	0.58g/cc	5%
P	Calcined	4.0m²/g	0.47g/cc	30%
W	Flux-calcined	1.0m²/g	0.24g/cc	15%
750	Flux-calcined	0.75m²/g	0.40g/cc	12%

Chromosorb® Treatment Specifications

Abbreviation	Treatments
NAW	Untreated (non-acid washed)
AW	Acid washed (HCL is used)
DMCS	Dimethyldichlorosilane (silanized)
HP	High performance QC'ed (acid washed, silanized, flux-calcined)

Chromosorb® Diatomite Supports

Description	Qty.	Part No.
Chromosorb® A-NAW		
20/30	454g	**2431**
45/60	454g	**2432**
60/80	454g	**2433**
Chromosorb® G-NAW		
45/60	225g	**23721**
60/80	225g	**23731**
80/100	225g	**23741**
100/120	225g	**23751**
120/140	225g	**23761**
Chromosorb® G-AW		
45/60	225g	**23821**
60/80	225g	**23831**
80/100	225g	**23841**
100/120	225g	**23851**
Chromosorb® G-AW-DMCS		
45/60	225g	**23921**
60/80	225g	**23931**
80/100	225g	**23941**
100/120	225g	**23951**
120/140	225g	**23961**
Chromosorb® G-HP		
60/80	225g	**2396**
80/100	225g	**2397**
100/120	225g	**2398**
120/140	225g	**2444**

Chromosorb® Diatomite Supports (continued)

Description	Qty.	Part No.
Chromosorb® P-NAW		
30/60	454g	**2304**
45/60	454g	**2305**
60/80	454g	**2306**
80/100	454g	**2307**
100/120	454g	**2308**
Chromosorb® P-AW		
30/60	454g	**2314**
45/60	454g	**2315**
60/80	454g	**2316**
80/100	454g	**2317**
100/120	454g	**2318**
Chromosorb® P-AW-DMCS		
45/60	454g	**2323**
60/80	454g	**2324**
80/100	454g	**2325**
100/120	454g	**2326**
Chromosorb® W-NAW		
30/60	150g	**23331**
45/60	150g	**23341**
60/80	150g	**23351**
80/100	150g	**23361**
100/120	150g	**23371**
120/140	150g	**23381**
Chromosorb® W-AW		
30/60	150g	**23451**
45/60	150g	**23461**
60/80	150g	**23471**
80/100	150g	**23481**
100/120	150g	**23491**
Chromosorb® W-AW-DMCS		
45/60	150g	**23581**
60/80	150g	**23591**
80/100	150g	**23601**
100/120	150g	**23611**
Chromosorb® W-HP		
60/80	150g	**24401**
80/100	150g	**23651**
100/120	150g	**23661**
120/140	150g	**24421**

Chromosorb® 750

- Designed specifically for biomedical and pesticide analyses

Chromosorb® 750 is the most inert and highly efficient support material in the series. This support material is acid-washed, DMCS treated, and carefully screened.

Chromosorb® 750

Description	Qty.	Part No.
60/80	100g	**2399**
80/100	100g	**2400**
100/120	100g	**2401**

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GC Supports and Packings

Chromosorb® T

Chromosorb® T is a support material made from PTFE and is useful for the analysis of polar compounds such as water, hydrazine, sulfur dioxide, etc.

Chromosorb® T melts at 327°C, starts to decompose at 290°C, and fuses together under prolonged use at 250°C. The density is 0.42g/cc. The surface area is 7–8m^2/g and maximum loading capacity is 12%. When packing, chill the material below 19°C.

Chromosorb® T

Description	Qty.	Part No.
30/60	225g	**24371**
40/60	225g	**24381**

T-Port-F

T-Port-F is a screened tetrafluoroethylene support useful for analysis of very polar compounds. It has a density of about 0.5g/cc with a maximum temperature limit of 150°C.

T-Port-F

Description	Qty.	Part No.
30/60	50g	**2447**
60/80	50g	**2448**
80/100	50g	**2449**

Activated Alumina

Activated alumina is useful for the analysis of light hydrocarbons. Unsaturated hydrocarbons are retained longer than saturated ones. Grade F-6 is an indicating alumina which turns from blue to pink upon adsorption of water. The maximum temperature limit is 300°C.

Activated Alumina

Description	Qty.	Part No.
Grade F-1		
40/60	100g	**5662**
60/80	100g	**5664**
80/100	100g	**5666**
100/120	100g	**5668**
Grade F-6		
8/14	100g	**05561**
Stock Packed Column		
5ft x 1/8" SS Packed with Alumina Grade F-1, 60/80	ea	**5664PC**

Gas Chrom™

Gas Chrom™ S is white diatomaceous earth that is screened and is non-acid washed. Use as a filtering agent or trapping material.

Gas Chrom™ R is red diatomaceous earth that is screened and water washed to neutrality.

Gas Chrom™ Porous Polymers 220 and 254 are low in residual monomers and contaminants, condition faster and have lower column bleed.

Gas Chrom™ Specifications

	Gas Chrom™ 254	Gas Chrom™ 220
Pore Size:	3000nm	10nm
Surface Area:	1000m^2/g	450m^2/g
Equivalents:	Porapak® P	Porapak® Q

Gas Chrom™

Description	Qty.	Part No.
Gas Chrom™ S		
80/100	100g	**03010**
Gas Chrom™ R		
40/60	100g	**4956**
60/80	100g	**4966**
80/100	100g	**4976**
Gas Chrom™ Porous Polymer		
220, 80/100	25g	**2484**
254, 80/100	25g	**2486**
Stock Packed Columns		
6ft x 1/8" SS Column with Gas Chrom™ Porous Polymer 220, 80/100	ea	**2484PC**
6ft x 1/8" SS Column with Gas Chrom™ Porous Polymer 254, 80/100	ea	**2486PC**

Glass Beads

Glass beads can be loaded up to 0.5 wt. % before becoming tacky. Two types are available: untreated (regular) or dimethyldichlorosilane (DMCS)-treated.

Glass Beads

Description	Qty.	Part No.
Regular, 60/80 mesh	125g	**5420**
Regular, 80/100 mesh	125g	**5422**
Regular, 100/120 mesh	125g	**5424**
DMCS Treated, 60/80 mesh	125g	**5426**
DMCS Treated, 80/100 mesh	125g	**5428**
DMCS Treated, 100/120 mesh	125g	**5430**

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GC Packings

Silica Gel

Silica Gel is used for the analysis of fixed gases and light hydrocarbons. It is also useful for dehydration of gases and liquids.

Grade 42 Indicating Silica Gel changes from blue to pink as it becomes saturated with water. It conforms to MIL-D-3716 Type IV Grade H. It will absorb water up to about 40% by weight. The maximum temperature limit is 350°C.

Silica Gel

Description	100g Part No.	1kg Part No.
Grade 12		
40/60	**5650**	**05532**
60/80	**5651**	**05533**
80/100	**5653**	**05534**
100/120	**5655**	**05535**
Grade 15		
35/60	**5648**	**05545**
Indicating Silica Gel, Grade 42		
6/16	**05559**	**05560**
Stock Packed Column		
18ft x 1/8" SS Packed with Silica Gel, 60/80, ea		**5651PC**

Unibeads™ S

The Unibeads™ S series consists of spherical porous silica beads. Unibeads™ 2S are comparable to Porasil® A. Unibeads™ 3S are similar to Porasil® B. The smaller the pore size, the greater the retention for hydrocarbons.

Unibeads™ S

Description	Qty.	Part No.
1S, 60/80, 22A	25g	**2752**
1S, 80/100, 22A	25g	**2758**
2S, 60/80, 60A	25g	**2760**
2S, 80/100, 60A	25g	**2762**
3S, 60/80, 100A	25g	**2764**
3S, 80/100, 100A	25g	**2766**
Stock Packed Column		
6ft x 1/8" SS Packed with Unibeads™ 1S, 60/80	ea	**2752PC**
6ft x 1/8" SS Packed with Unibeads™ 2S, 60/80	ea	**2760PC**

Chemipack® C18

Chemipack® C18 is a chemically bonded GC packing. Because it is bonded, it has high thermal stability, zero bleed and stability to water. These properties make it ideal for GC/MS or high sensitivity GC with any detector. The functional group bonded to the silica is octadecyl.

Chemipack®

Description	Qty.	Part No.
Chemipack® C18, 80/100, 320°C	15mL	**2768**
Stock Packed Column		
6ft x 1/8" SS Packed with Chemipack® C18, 80/100, 320°C	ea	**2768PC**

Carbosphere™—Carbon Molecular Sieve

Carbosphere™ exhibits properties similar to molecular sieves. It has a surface area of about 1000m²/g with a pore size of about 13Å. Carbosphere™ separates oxygen, nitrogen, methane, carbon monoxide, and carbon dioxide in the same run. It also separates air, carbon dioxide, and the C1–C2 hydrocarbons. At ambient temperatures, hydrogen will elute before oxygen.

Carbosphere™ resolves trace amounts of methane and acetylene in ethylene and even trace amounts of methane, acetylene, and ethylene in ethane. The carbon molecular sieves also separate oxides of nitrogen and sulfur. Because Carbosphere™ is very nonretentive for water, rapid separations of organics, such as formaldehyde and methanol in water are possible.

It is important to remove every trace of oxygen from the carrier gas used on Carbosphere™ columns. This is essential if you are doing trace analysis or using temperatures above 200°C. An oxygen purifier such as Oxy-Trap™ or Indicating Oxy-Trap™ is ideal for removal of oxygen from carrier gas. Carbosphere™ can be affected by contaminants in the air and in carrier gas. Store under pure nitrogen or argon gas.

Carbosphere™

Description	Qty.	Part No.
60/80	5g	**5680**
80/100	5g	**5682**
Stock Packed Columns		
6ft x 1/8" SS Packed with Carbosphere™, 60/80	ea	**5680PC**
6ft x 1/8" SS Packed with Carbosphere™, 80/100	ea	**5682PC**
10ft x 1/8" SS Packed with Carbosphere™, 80/100	ea	**56821PC**

related products

Need an oxygen trap?

See page 271.



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GC Packings

Molecular Sieves

- For drying applications

Molecular sieves are synthetic alkali metal alumino-silicates with various cations. They are used for the separation of fixed gases and drying of liquid or gas streams. They can be reactivated by heating at 250°C for 12 hours; 300°C for 4 hours; or 350°C for 2 hours.

Molecular Sieves

Description	100g Part No.	1kg Part No.
Molecular Sieve 3A		
1/8" Pellets	**05252**	**05253**
1/16" Pellets	**05254**	**05255**
40/60	**05306**	**05295**
60/80	**05307**	**05298**
80/100	**05308**	**05301**
100/120	**05309**	**05304**
Molecular Sieve 4A		
8/12 Beads	**05256**	**05257**
1/8" Pellets	**05258**	**05259**
1/16" Pellets	**05260**	**05261**
40/60	**5620**	**05345**
60/80	**5622**	**05348**
80/100	**5624**	**05351**
100/120	**5625**	**05355**
Molecular Sieve 5A		
1/8" Pellets	**05264**	**05265**
1/16" Pellets	**5633**	**05267**
40/60	**5626**	**05327**
60/80	**5328**	**05330**
80/100	**5630**	**05333**
100/120	**5632**	**05336**
Molecular Sieve 13X		
8/12 Beads	**05268**	**05269**
1/8" Pellets	**05270**	**05271**
1/16" Pellets	**05272**	**05273**
40/60	**5634**	**05493**
60/80	**5636**	**05496**
80/100	**5638**	**05499**
100/120	**5640**	**05502**

Washed Molecular Sieves

- For chromatography applications

The usual gas chromatographic grades of molecular sieves have a fine dust adhering to each particle which cannot be removed simply by careful sieving. This dust is responsible for poorer separations and higher pressure drops than molecular sieves which are essentially dust-free.

The washed molecular sieves offered here have been carefully cleaned of dust particles by washing with distilled water. The cleaned product is then activated and sealed in glass jars. Molecular sieves are typically reactivated at a temperature of 300°C for four hours.

Washed Molecular Sieves

Description	Qty.	Part No.
Washed Molecular Sieve 5A		
40/60	50g	**5602**
60/80	50g	**5604**
80/100	50g	**5605**
100/120	50g	**5606**
Washed Molecular Sieve 13X		
40/60	50g	**57728**
60/80	50g	**57730**
80/100	50g	**57732**
100/120	50g	**57734**
Stock Packed Columns		
6ft x 1/8" SS Packed with 80/100 Washed 5A	ea	**5605PC**
6ft x 1/8" SS Packed with 80/100 Washed 13X	ea	**5773PC**
5ft x 1/8" SS Packed with 60/80 Washed 13X	ea	**57730PC**

technical assistance

Contact Tech Support: Phone: 1.800.255.8324 (North America)
Email: contact.alltech@grace.com
Online: www.discoverysciences.com

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Graphitized Carbon Blacks

Carbograph™ Packings

- High speed analysis
- Extremely hydrophobic—ideal for aqueous injections

Equivalent to the Carbopack™ packings. Carbograph™ packings can be modified with a stationary phase giving them unique selectivities.

Carbograph™ 1

Equivalent to Carbopack™ B. It has a surface area of 100m²/g. Carbograph™ 1-TD has a coarse mesh of 20/40 which is suitable for thermal desorption work. Maximum temperature 500°C.

Carbograph™ 1SC

Similar to Carbopack™ BHT, specifically for the separation of sulfur compounds. It has a mesh of 40/60, and a maximum temperature of 225°C.

Carbograph™ 2

Equivalent to Carbopack™ C. It has a specific surface of 10m²/g for the separation of volatile organic compounds. Carbograph™ 2-TD has a coarse mesh of 20/40 which is suitable for thermal desorption work. Maximum temperature 500°C.

Graphpac™-GC and -GB Packings

- Graphitized carbon
- Inert, non-specific surface
- Unique separation properties
- Optimized phase loading
- Hydrophobic—ideal for aqueous injections

Graphpac™-GC has an average surface area of 10–13m²/g, while Graphpac™-GB has a larger surface area of 100–110m²/g. Both types interact with samples almost completely by non-specific adsorption. Which results in unique separations not achievable with fused silica open tubular (FSOT) capillary columns. Alcohols, hydrocarbons, and acids are separated in series according to carbon number.

The carbons possess partitioning capabilities as uncoated packings, use stationary phases to modify the selectivity of these carbons.

Carbograph™

Description	Qty.	Part No.
Uncoated		
Carbograph™ 1-TD, 20/40, >500°C	15g	**1740**
Carbograph™ 1, 60/80, >500°C	10g	**1722**
Carbograph™ 1 80/120, >500°C	10g	**1724**
Carbograph™ 2-TD, 20/40, >500°C	15g	**1745**
Carbograph™ 2, 60/80, >500°C	10g	**1726**
Carbograph™ 2, 80/100, >500°C	10g	**1728**
Carbograph™ 1-SC, 40/60, 225°C	10g	**1734**
Coated		
1% AT™-1000 on Carbograph™ 1 60/80, 225°C	15g	**1733**
0.1% AT™-1000 on Carbograph™ 2 80/100, 225°C	15g	**1737**
4% Carbowax® 20M on Carbograph™ 1 DA 80/120, 200°C	15g	**17271**
0.2% Carbowax® 1500 on Carbograph™ 2 60/80, 175°C	15g	**1725**
0.2% Carbowax® 1500 on Carbograph™ 2 80/100, 175°C	15g	**1720**
5% Carbowax® 20M on Carbograph™ 1 AW 80/120, 225°C	15g	**1729**
6.6% Carbowax® 20M on Carbograph™ 1 AW 80/120, 225°C	15g	**1731**
4% Carbowax® 20M + 0.8% KOH on Carbograph™ 1 60/80, 220°C	15g	**1735**
0.19% Picric Acid on Carbograph™ 2 80/100, 120°C	15g	**1736**
0.8% THEED on Carbograph™ 2 80/100, 125°C	15g	**1942**

Graphpac™

Description	Qty.	Part No.
Graphpac™-GC		
0.1% AT™-1000, 225°C, 80/100	15g	**8542**
0.2% Carbowax® 1500, 175°C, 80/100	15g	**8546**
0.19% Picric Acid, 120°C, 80/100	15g	**8550**
0.8% THEED, 125°C, 80/100	15g	**8552**
Uncoated, 60/80	15g	**8536**
Uncoated, 80/100	15g	**8538**
Custom—Specify Phase and % Loading	15g	**C-2200**
Graphpac™-GB		
1% AT™-1000, 225°C, 60/80	15g	**8517**
4% Carbowax® 20M + 0.8% KOH Amines, 220°C, 60/80	15g	**8519**
Uncoated, 60/80	15g	**8513**
Uncoated, Acid Washed, 60/80	15g	**8533**
Custom—Specify Phase, Mesh, and % Loading	15g	**C-2200**
Custom, Acid Washed—Specify Phase, Mesh, and % Loading	15g	**C-2300**
Stock Packed Columns		
6ft x 1/8" SS Packed with 0.1% AT™-1000, 225°C, 80/100	ea	**8542PC**
6ft x 1/8" SS Packed with 0.2% Carbowax® 1500, 175°C, 80/100	ea	**8546PC**
7ft x 1/8" SS Packed with 0.19% Picric Acid, 120°C 80/100	ea	**85501PC**
10ft x 1/8" SS Packed with 5% Krytox® 143°C, 60/80	ea	**85222**

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Porous Polymers

Tenax®-TA (GC) Polymers

- Stable baseline after conditioning
- Short retention times
- Low affinity for water
- Maximum temperature limit is 350°C

Tenax®-TA is a porous polymer that is based on 2,6-Diphenyl-p-phenylene Oxide. It has replaced Tenax®-GC. Tenax®-TA can be used as a packing and as a trapping material. Both the EPA and NIOSH specify the use of Tenax® in their standard methods. Tenax® is particularly useful for the analysis of high boiling compounds such as alcohols, polyethylene glycols, diols, phenols, monoamines and diamines, ethanolamines, aldehydes, ketones, and chlorinated aromatics.

Tenax®-TA (GC) Specifications	
Specific Surface Area:	35m²/g
Pore Volume:	2.4g/cc
Average Pore Size:	200nm
Density:	0.25g/cc

Tenax®-TA (GC)

Description	Qty.	Part No.
20/35	10g	**04914**
20/35	100g	**049141**
20/35	500g	**049142**
20/35	1000g	**049143**
35/60	10g	**04915**
35/60	100g	**049151**
35/60	500g	**049152**
35/60	1000g	**049153**
60/80	10g	**04916**
60/80	100g	**049161**
60/80	500g	**049162**
60/80	1000g	**049163**
80/100	10g	**04917**
80/100	100g	**049171**
80/100	500g	**049172**
80/100	1000g	**049173**
Pretreated Tenax®-TA		
Cleaned by Solvent Extraction	—	**C-4196**
Stocked Packed Columns		
6ft x 1/8" SS Packed with Tenax®-TA Porous Polymer, 60/80	ea	**4900PC**
6ft x 1/8" SS Packed with Tenax®-TA Porous Polymer, 80/100	ea	**4901PC**
Tenax®-TA — Membranes, 47mm	10	**4943**

Tenax®-GR Polymers

- Superior properties as trapping material
- Maximum temperature limit is 350°C

Tenax®-GR contains 23% graphitized carbon as an integral part of the material. This is not an admixture; the graphitized carbon is co-precipitated with the Tenax® polymer. The resulting material gives higher breakthrough volumes for most materials, yet is less water retentive than Tenax®-TA. When using this material for packing GC columns, better peak symmetry is observed. Surface area is 24.1m²/g.

Tenax®-GR

Description	Qty.	Part No.
20/35	10g	**4933**
20/35	100g	**49331**
20/35	500g	**49332**
20/35	1000g	**49333**
35/60	10g	**4935**
35/60	100g	**49351**
35/60	500g	**49352**
35/60	1000g	**49353**
60/80	10g	**4937**
60/80	100g	**49371**
60/80	500g	**49372**
60/80	1000g	**49373**
80/100	10g	**4939**
80/100	100g	**49391**
80/100	500g	**49392**
80/100	1000g	**49393**
Stocked Packed Columns		
6ft x 1/8" SS Packed with Tenax®-GR Porous Polymer, 60/80	ea	**4937PC**

tech tip

Conditioning

We highly recommend that Tenax®, like all other porous polymers, be preconditioned before being packed into GC columns. This removes most of the shrinkage of the polymer and minimizes the need for further conditioning. Tenax® can be expected to shrink further in use.

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GC Packings

HayeSep® Porous Polymer

- Pre-purified porous polymers for GC
- Less bleed and shrinkage than other porous polymers
- Cleaned and conditioned to 200°C (165°C for N & T)

HayeSep® polymers were developed to solve room temperature separation of N_2, O_2, Ar and CO; ppm H_2O in the presence of HCl, Cl_2 etc. The HayeSep® D series better separates the fixed gases to the C_2 hydrocarbons.

HayeSep® Specifications

Series	Polymer Composition	Surface Area	Polarity
Q	DVB*	582m^2/g	Non-Polar
P	DVB*/Styrene	165m^2/g	Slightly Polar
R	DVB*/N-Vinyl-2-pyrrolidinone	344m^2/g	Moderately Polar
S	DVB*/4-Vinyl-pyridine	583m^2/g	Moderately Polar
T	EGDM**	250m^2/g	Very Polar
N	DVB*/EGDM**	405m^2/g	Very Polar
A	DVB*/EGDM** (high purity)	526m^2/g	Moderately Polar
B	DVB*/Polyethyleneimine	608m^2/g	Very Polar
C	DVB*/Acrylonitrile	442m^2/g	Moderately Polar
D	DVB* (high purity)	795m^2/g	Non-Polar

*Divinylbenzene. **Ethyleneglycoldimethacrylate.

Comparison of HayeSep® "D" Formulations†

Table 1—Retention Time (in minutes)

	Air	CH_4	CO_2	C_2H_2	C_2H_4	C_2H_6	H_2O
DIP	0.9	1.7	3.1	5.4	5.8	8.3	9.0
D	0.9	1.7	3.1	5.8	6.1	8.4	8.6
DOX	1.0	1.8	3.2	5.9	6.3	8.5	8.3
DB	0.9	1.6	3.1	6.1	6.6	8.7	8.1

†Retention data based on 10ft x 1/8" stainless steel at 45°C, 30mL/min.

HayeSep®

Description	Mesh	Temp. Limit max.	Qty.	Part No.
HayeSep® A	60/80	165°C	75cc	**2818**
	80/100	165°C	75cc	**2819**
	100/120	165°C	75cc	**2820**
	20/140	165°C	75cc	**2821**
HayeSep® B	60/80	190°C	75cc	**2822**
	80/100	190°C	75cc	**2823**
	100/120	190°C	75cc	**2824**
HayeSep® C	60/80	250°C	75cc	**2825**
	80/100	250°C	75cc	**2826**
	100/120	250°C	75cc	**2827**
HayeSep® D	60/80	290°C	75cc	**2828**
	80/100	290°C	75cc	**2829**
	100/120	290°C	75cc	**2830**

HayeSep® (continued)

Description	Mesh	Temp. Limit max.	Qty.	Part No.
HayeSep® DB	60/80	290°C	75cc	**2834**
	80/100	290°C	75cc	**2835**
	100/120	290°C	75cc	**2836**
HayeSep® DIP	60/80	290°C	75cc	**2831**
	80/100	290°C	75cc	**2832**
	100/120	290°C	75cc	**2833**
HayeSep® N	60/80	165°C	75cc	**2815**
	80/100	165°C	75cc	**2816**
	100/120	165°C	75cc	**2817**
HayeSep® P	60/80	250°C	75cc	**2803**
	80/100	250°C	75cc	**2804**
	100/120	250°C	75cc	**2805**
HayeSep® Q	60/80	275°C	75cc	**2800**
	80/100	275°C	75cc	**2801**
	100/120	275°C	75cc	**2802**
HayeSep® R	60/80	250°C	75cc	**2806**
	80/100	250°C	75cc	**2807**
	100/120	250°C	75cc	**2808**
HayeSep® S	60/80	250°C	75cc	**2809**
	80/100	250°C	75cc	**2810**
	100/120	250°C	75cc	**2811**
HayeSep® T	60/80	165°C	75cc	**2812**
	80/100	165°C	75cc	**2813**
	100/120	165°C	75cc	**2814**
Stock Packed Columns				
40ft x 1/8" SS Packed with HayeSep® A	120/140	165°C	ea	**28211**
10ft x 1/8" SS Packed with HayeSep® D	100/120	290°C	ea	**28301PC**
20ft x 1/8" NI Packed with HayeSep® D	100/120	290°C	ea	**27082PC**
30ft x 1/8" SS Packed with HayeSep® D	100/120	290°C	ea	**27083PC**
30ft x 1/8" SS Packed with HayeSep® DB	100/120	290°C	ea	**2836PC**
9ft x 1/8" SS HayeSep® DIP	100/120	290°C	ea	**2833PC**
8ft x 1/8" SS Packed with HayeSep® P	60/80	250°C	ea	**2803PC**
6ft x 1/8" SS Packed with HayeSep® P	80/100	250°C	75cc	**2804PC**
6ft x 1/8" SS Packed with HayeSep® Q	80/100	275°C	ea	**2801PC**
8ft x 1/8" SS Packed with HayeSep® Q	80/100	275°C	ea	**28010PC**
6ft x 1/8" SS Packed with HayeSep® R	80/100	250°C	ea	**2807PC**
6ft x 1/8" SS Packed with HayeSep® S	100/120	250°C	ea	**2811PC**
6ft x 1/8" SS Packed with HayeSep® T	80/100	165°C	ea	**2813PC**
5ft x 1/8" SS Packed with HayeSep® T	100/120	165°C	ea	**2814PC**

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GC Packings

Century Series Chromosorb®

Century Series Chromosorb® porous polymers have a rigid structure and distinct pore size. They are packed into columns in the normal manner and do not require a liquid coating. We recommend preconditioning all porous polymers before packing columns.

Porapak®

Porapak® GC packings are cross-linked polymers which can be used directly in GC columns without a stationary phase coating. Acetone washing of Porapaks® improves performance.

Chromosorb® Specifications

Series	Polymer Composition	Surface Area	Polarity
101	DVB*/Styrene	>50m²/g	Non-Polar
102	DVB*/Styrene	300–400m²/g	Slightly Polar
103	Cross-linked Polystyrene**	15–25m²/g	Non-Polar
105	Polyaromatic	600–700m²/g	Mod. Polar
106	Cross-linked Polystyrene	700–800m²/g	Non-Polar
107	Cross-linked Acrylic Ester	400–500m²/g	Polar
108	Cross-linked Acrylic	100–200m²/g	Polar

*Divinylbenzene. **The surface is basic.

Porapak® Specifications

Series	Polymer Composition	Surface Area	Polarity
Q	DVB*/Ethylvinylbenzene	500–600m²/g	Slightly Polar
P	DVB*/Styrene	100–200m²/g	Non-Polar
R	DVB*/Vinyl pyrrolidinone	450–600m²/g	Mod. Polar
S	DVB*/Vinyl pyridine	300–450m²/g	Mod. Polar
T	EGDM**	225–350m²/g	Polar
N	DVB*/Vinyl pyrrolidinone	250–350m²/g	Very Polar

*Divinylbenzene. **Ethyleneglycoldimethacrylate.

Chromosorb®

Description	Mesh	Temp. Limit* max.	Qty.	Part No.
Chromosorb® 101	60/80	275/325°C	50g	**2405**
	80/100	275/325°C	50g	**2406**
	100/120	275/325°C	50g	**2407**
Chromosorb® 102	60/80	250/300°C	50g	**2408**
	80/100	250/300°C	50g	**2409**
	100/120	250/300°C	50g	**2410**
Chromosorb® 103	60/80	250/300°C	50g	**2411**
	80/100	250/300°C	50g	**2412**
	100/120	250/300°C	50g	**2413**
Chromosorb® 105	60/80	250/275°C	50g	**2417**
	80/100	250/275°C	50g	**2418**
	100/120	250/275°C	50g	**2419**
Chromosorb® 106,	60/80	250/275°C	50g	**2420**
	80/100	250/275°C	50g	**2421**
	100/120	250/275°C	50g	**2422**
Chromosorb® 107	60/80	250/275°C	50g	**2423**
	80/100	250/275°C	50g	**2424**
	100/120	250/275°C	50g	**2425**
Chromosorb® 108	60/80	250/275°C	50g	**2426**
	80/100	250/275°C	50g	**2427**
	100/120	250/275°C	50g	**2428**
Preconditioning Service†			per bottle	**C-14030**

†Specify bulk packing part no. and preconditioning service part no.
*Isothermal/Temp. program.

Porapak®

Description	Mesh	Temp. Limit max.	Qty.	Part No.
Porapak® Q	50/80	250°C	26g	**2700**
	80/100	250°C	26g	**2701**
	100/120	250°C	26g	**2702**
Porapak® P	50/80	250°C	20g	**2703**
	80/100	250°C	20g	**2704**
	100/120	250°C	20g	**2705**
Porapak® R	50/80	250°C	24g	**2706**
	80/100	250°C	24g	**2707**
	100/120	250°C	24g	**2708**
Porapak® S	50/80	250°C	26g	**2709**
	80/100	250°C	26g	**2710**
	100/120	250°C	26g	**2711**
Porapak® T	50/80	190°C	31g	**2712**
	80/100	190°C	31g	**2713**
	100/120	190°C	31g	**2714**
Porapak® N	50/80	190°C	29g	**2715**
	80/100	190°C	29g	**2716**
	100/120	190°C	29g	**2717**
Porapak® PS	50/80	250°C	20g	**2721**
	80/100	250°C	20g	**2722**
	100/120	250°C	20g	**2723**
Acetone Washing Service†			per bottle	**C-2700**

†Specify bulk packing part no. in addition to acetone washing part no.

tech tip

Temperature limits

Our GC capillary columns are temperature rated. In some cases, we list two maximum operating temperatures, the lower one is for isothermal condition and the higher one for temperature-programmed condition.

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