

Gas Chromatograph Series Columns

GC Column Guidebook



Shimadzu Gas Chromatograph

GC-2010 Plus

High-end Gas Chromatograph

The GC-2010 Plus enables reliable, high-precision trace analysis with high repeatability, utilizing detectors such as FID and FPD that feature best-in-class sensitivity.

In addition, rapid oven cooling and backflush technology shorten analysis time greatly for significant improvements in productivity.

(Cat. No. C184-E019)



GC-2014

Standard Capillary and Packed Gas Chromatograph

Get the high performance of the GC-2010 Plus for your routine work. Based on the successful design of the GC-2010 Plus, the GC-2014 provides excellent results for routine work and offers a good price-performance ratio. Whether you work with packed or capillary columns, the GC-2014 provides excellent performance.

(Cat. No. C184-E014)



GC-2025

Energy-Saving Gas Chromatograph

Shimadzu's new-generation GC-2025 capillary gas chromatograph minimizes environmental impact by reducing power and carrier gas consumption while retaining the performance capabilities required for capillary analysis.

The GC-2025 incorporates a digital flow controller that controls both the carrier and detector gases and a newly designed energy-saving column oven that features small volume and less heating loss, realizing a dramatic improvement in operation costs.

The compact GC-2025 is the gas chromatograph for environmentally friendly, high value performance.

(Cat. No. C184-E026)





GCMS-TQ8040

Triple Quadrupole Gas Chromatograph Mass Spectrometer

The Shimadzu GCMS-TQ8040 is the first triple quadrupole with Smart Productivity for high-efficiency sample throughput, Smart Operation for quick and easy method development, and Smart Performance for low detection limits and Scan/MRM.

These three smart technologies contribute to Smart MRM, and provide the most accurate, cost effective, and easy-to-use triple quadrupole GCMS you have ever imagined.

(Cat. No. C146-E251)



GCMS-QP2020

Gas Chromatograph Mass Spectrometer

The importance of high-performance analytical instruments for monitoring microscopic quantities of compounds related to environmental pollution and human health, and for developing and evaluating new, highly functional materials and chemical products continues to grow. The GCMS-QP2020 has been designed to meet these needs.

Featuring enhanced instrument functionality, analysis software, databases, and a sample introduction system, the GCMS-QP2020 will help maximize the capabilities of your laboratory.

(Cat. No. C146-E295)

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Capillary Columns

Column Selection Guide

Check the structure of the target components

Investigate the structure (functional group), boiling point, nature, stability, and other properties of the target component.



Select the stationary phase

Selecting a stationary phase of chemical properties close to those of the target component helps increase retention force and prevent drops in separation caused by defective peak shape.

Stationary Phase	100% dimethyl polysiloxane	** % diphenyl / ** % dimethyl polysiloxane	** % cyanopropylphenyl / ** % dimethyl polysiloxane	Trifluoropropyl methyl polysiloxane	Polyethylene glycol
Polarity	Non-polar	Low to Medium	Medium	Medium to High	High
Separation Properties	Elution in boiling point order	Aromatic compounds are retained by phenyl group content	Effective for separation of oxygenated compounds, isomers, etc.	Uniquely retains compounds containing halogens	Strong retention of polar compounds
Applications	Gasoline and solvent related	Flavors, environmental related, aromatic compounds	Pesticides, PCBs, oxygenated compounds	Halogenated compounds, polar compounds, solvents	Polar compounds, solvents, Flavors, FAME
Columns	SH-Rxi™-1ms SH-Rxi™-1HT SH-Rtx™-1 SH-MXT™-1	SH-Rxi™-5MS SH-Rxi™-5HT SH-Rxi™-17 SH-Rtx™-5 SH-Rtx™-5MS SH-Rtx™-20 SH-Rtx™-35 SH-Rtx™-35MS SH-Rtx™-65 SH-MXT™-5	SH-Rtx™-1301 SH-Rtx™-624 SH-Rtx™-1701	SH-Rtx™-200 SH-Rtx™-200MS	SH-Rtx™-Wax SH-Stabilwax™



Determine the column size

Determine the column size according to the sample amount to inject while referring to the following table.

Inner Diameter	0.18 mm	Has extremely high resolution but its sample load is small. <ul style="list-style-type: none"> • Samples having a complex mixed system • Suited to split injection
	0.25 mm 0.32 mm	Has high resolution and a moderate sample load <ul style="list-style-type: none"> • Supports samples having a complex mixed system • Suited to split/splitless injection
	0.53 mm	Has satisfactory resolution and a large sample load <ul style="list-style-type: none"> • Suited to purity measurement and analysis of trace components • Used in direct injection, on-column injection, and large-volume injection • Can be easily replaced from packed column
Film Thickness	Thick Film	<ul style="list-style-type: none"> • Good separation of high-concentration components • Suited to purity analysis
	Thin Film	<ul style="list-style-type: none"> • Fast elution of high boiling point compounds • Suited to the analysis of medium to high boiling point compounds
Length		When twice as long (for fixed-temperature analysis) <ul style="list-style-type: none"> • The analysis time will be twice • The degree of separation will be 1.4 times

Capillary Columns

Cross-Reference

Shimadzu	Stationary Phase	USP	Similar Phases						Page
			Agilent	Supelco	SGE	Phenomenex	Quadrex	Alltech	
High-Performance Columns									
SH-Rxi™-1MS	100% dimethyl polysiloxane	G2	HP-1ms UI, HP-1ms, DB-1ms UI, DB-1ms, Ultra-1, VF-1ms	SPB-1, Equity-1	BP-1	ZB-1, ZB-1ms	007-1	AT-1ms	7
SH-Rxi™-1HT	100% dimethyl polysiloxane	–	DB-1HT	–	–	ZB-1HT	–	AT-1ht	9
SH-Rxi™-5MS	5% diphenyl / 95% dimethyl polysiloxane	G27, G36	HP-5ms UI, HP-5ms, DB-5, Ultra-2, CP Sil 8 CB	SPB-5, Equity-5	BP-5	ZB-5, ZB-5ms	007-5	AT-5ms	8
SH-Rxi™-5HT	5% diphenyl / 95% dimethyl polysiloxane	–	DB-5HT, VF-5HT	–	HT-5	ZB-5HT	–	–	9
SH-Rxi™-5Sil MS	1,4-bis(dimethylsiloxy)phenylene dimethyl polysiloxane	–	DB-5ms UI, DB-5ms, VF-5ms	SLB-5ms	BPX-5	ZB-5MS, ZB-Semi-Volatiles	007-5MS	–	10
SH-Rxi™-XLB	/	–	DB-XLB, VF-Xms	–	–	ZB-MR1, ZB-XLB	–	–	11
SH-Rxi™-17	50% diphenyl / 50% dimethyl polysiloxane	G3	HP-17, DB-17, DB-17HT, DB-608	SPB-17	–	ZB-50	–	–	12
SH-Rxi™-35Sil MS	Similar to 35% phenyl methyl polysiloxane	–	DB-35ms, DB-35ms UI, VF-35ms	–	BPX-35	ZB-MR2	–	–	12
SH-Rxi™-17Sil MS	Similar to 50% phenyl methyl polysiloxane	G3	DB-17ms, HP-17, DB-17, VF-17ms, CP-Sil 24 CB	–	BPX-50	ZB-50	–	–	13
SH-Rxi™-PAH	Ideal for EFSA PAH4 analysis	–	–	–	–	–	–	–	13
SH-Rxi™-624Sil MS	Similar to 6% cyanopropylphenyl / 94% dimethyl polysiloxane	G43	HP-624, DB-624, VF-624ms, CP-Select 624 CB	–	BP-624	ZB-624	–	–	14
SH-Rxi™-1301Sil MS	Similar to 6% cyanopropylphenyl / 94% dimethyl polysiloxane	–	VF-1301ms	–	–	–	–	–	15
General Purpose Columns									
SH-Rtx™-1	100% dimethyl polysiloxane	G1, G2, G38	HP-1, DB-1, CP Sil 5 CB	SPB-1	BP-1	ZB-1	007-1	AT-1, EC-1	16
SH-Rtx™-5	5% diphenyl / 95% dimethyl polysiloxane	G27, G36	HP-5, DB-5, CP Sil 8 CB	SPB-5	BP-5	ZB-5	007-5	AT-5, EC-5	17
SH-Rtx™-5MS	5% diphenyl / 95% dimethyl polysiloxane	G27, G36	HP-5, DB-5, CP Sil 8 CB	SPB-5	BP-5	ZB-5	007-5	AT-5, EC-5	18
SH-Rtx™-20	20% diphenyl / 80% dimethyl polysiloxane	G28, G32	–	SPB-20	–	–	007-20	AT-20, EC-20	19
SH-Rtx™-35 / SH-Rtx™-35MS	35% diphenyl / 65% dimethyl polysiloxane	G42	HP-35, DB-35	SPB-35, SPB-608	BPX-35, BPX-608	ZB-35	007-35	AT-35, AT-35ms	20
SH-Rtx™-50	100% methyl phenyl polysiloxane	G3	HP-50+, CP-Sil 24 CB	SPB-50	–	–	007-17	AT-50	21
SH-Rtx™-65	65% diphenyl / 35% dimethyl polysiloxane	G17	–	–	–	–	007-65HT	–	21
SH-Rtx™-1301	6% cyanopropylphenyl / 94% dimethyl polysiloxane	G43	DB-1301, CP-1301	SPB-1301	BP-624	ZB-624	007-1301	AT-1301	22
SH-Rtx™-624	6% cyanopropylphenyl / 94% dimethyl polysiloxane	G43	HP-624, DB-624, DB-624 UI, VF-624ms	SPB-1301	BP-624	ZB-624	007-624	AT-624	22

Shimadzu	Stationary Phase	USP	Similar Phases						Page
			Agilent	Supelco	SGE	Phenomenex	Quadrex	Alltech	
SH-Rtx™-1701	14% cyanopropylphenyl / 86% dimethyl polysiloxane	G46	DB-1701P, DB-1701, CP Sil 19 CB, VF-1701ms, VF-1701 Pesticides	SPB-1701	BP-10	ZB-1701, ZB-1701P	007-1701	AT-1701	23
SH-Rtx™-200 / SH-Rtx™-200MS	Trifluoropropylmethyl polysiloxane	G6	DB-210, DB-200, VF-200ms	–	–	–	–	AT-210	24
SH-Rtx™-225	50% cyanopropylmethyl / 50% phenylmethyl polysiloxane	G7, G19	DB-225, DB-225MS, CP-Sil 43 CB	SPB-225	BP-225	–	007-225	AT-225	26
SH-Rtx™-2330	90% biscyanopropyl / 10% cyanopropylphenyl polysiloxane (Non-bonded)	G8, G48	DB-23, VF-23ms	SP-2330, SP-2331, SP-2380	BPX-70	–	007-23	AT-Silar90	26
SH-Rtx™-Wax	Polyethylene glycol	G14, G15, G16, G20, G39	DB-Wax, CP-Wax 52 CB	–	BP-20	ZB-Wax	007-CW	AT-WAXms, EC-WAX	27
SH-Stabilwax™	Polyethylene glycol	G14, G15, G16, G20, G39	Innowax, CP-Wax 52 CB, VF-WAX MS	Supelcowax-10	–	ZB-Wax Plus	–	AT-WAX	28
Dedicated Columns									
SH-Rtx™-1614	Ideal for analysis of PBDE	–	–	–	–	–	–	–	29
SH-Rtx™-OPP2	Ideal for analysis of organophosphorus pesticides	–	–	–	–	–	–	–	30
SH-Rtx™-CLP / SH-Rtx™-CLP II	Ideal for analysis of organochlorine pesticides	–	DB-CLP1 / DB-CLP2	–	–	–	–	–	31
SH-Rtx™-VMS	Ideal for analysis of volatile organic pollutants	–	–	–	–	–	–	–	32
SH-FAMEWAX™	Ideal for analysis of FAMES	G16	Select FAME	Omegawax	–	–	–	AT-AquaWax, AT-FAME	33
SH-Rtx™-BAC Plus 1 / SH-Rtx™-BAC Plus 2	Ideal for analysis of alcohol compounds in blood	–	DB-ALC1 / DB-ALC2	–	–	ZB-BAC-1 / ZB-BAC-2	–	–	34
SH-Rtx™-5 Amine / SH-Rtx™-35 Amine	Ideal for analysis of amines	–	–	–	–	–	–	–	35
SH-Stabilwax™-DA	Ideal for analysis of free acid	G25, G35	HP-FFAP, DB-FFAP, VF-DA, CP-Wax 58 CB, CP-FFAP CB	Nukol	BP-21	ZB-FFAP	–	AT-AquaWax-DA, AT-1000, EC-1000	36
SH-Stabilwax™-DB	Ideal for analysis of amines	–	CAM, CP-Wax 51 for Amines	Carbowax Amine	–	–	–	AT-CAM	37
PLOT Columns									
SH-Rt™-Silica BOND	Bonded silica	–	GS-GASPRO, CP-SilicaPLOT	–	–	–	–	–	38
SH-Rt™-Alumina BOND/ Na2SO4	Aluminum oxide with Na ₂ SO ₄ deactivation	–	GS-ALUMINA, CP-AI2O3/Na2SO4	Alumina sulfate PLOT	–	–	–	AT-Alumina	39
SH-Rt™-Alumina BOND/ KCl	Aluminum oxide with KCl deactivation	–	GS-Alumina KCl, HP-PLOT AI2O3 KCl, CP-AI2O3/KCl	Alumina chloride PLOT	–	–	PLT-AL2O3	–	39
SH-Rt™-Msieve 5A	Molecular Sieve 5A	–	HP-PLOT Molesieve, CP-Molsieve 5A	Mol Sieve 5A PLOT	–	–	PLT-5A	AT-Mole Sieve	40
SH-Rt™-Q-BOND	100% divinylbenzene porous polymer	–	HP-PLOT Q, CP-PoraPLOT Q, CP-PoraBOND Q	Supel-Q PLOT	–	–	PLT-Q	AT-Q	41
SH-Rt™-U-BOND	Divinylbenzene ethylene glycol / dimethylacrylate porous polymer	–	HP-PLOT U, CP-PoraPLOT U, CP-PoraBOND U	–	–	–	–	–	41
Metal Columns									
SH-MXT™-1	100% dimethyl polysiloxane	G1, G2, G38	DB-PS1	–	–	–	UAC-1	–	42
SH-MXT™-5	5% diphenyl / 95% dimethyl polysiloxane	G27, G36	DB-PS5, VF-5ht UltiMetal	–	–	–	UAC-5	–	42

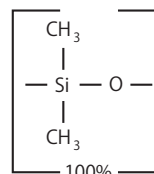
Capillary Columns

High-Performance Columns

SH-Rxi™-1MS

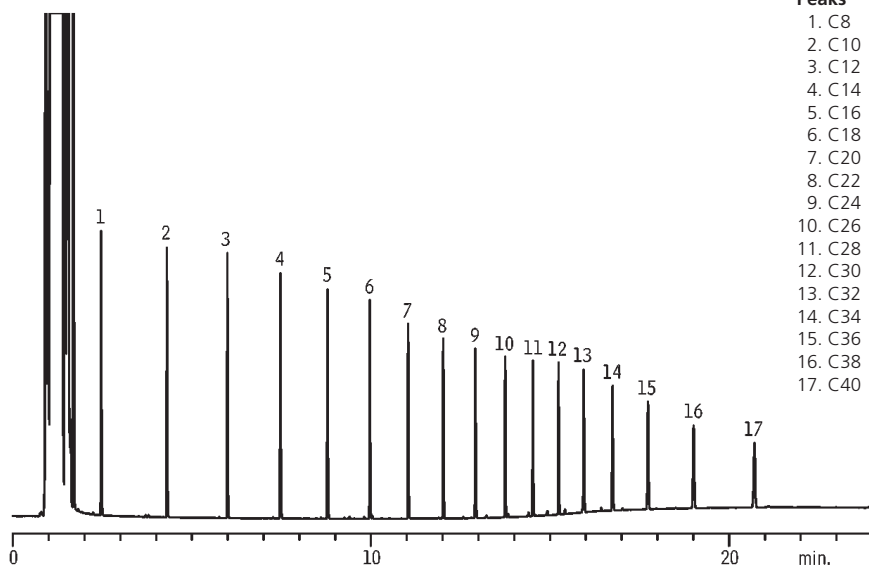
- Non-polar phase: Crossbond™ 100% dimethyl polysiloxane
- Tested and guaranteed for ultra-low bleed; improved signal-to-noise ratio for better sensitivity and mass spectral integrity.
- General-purpose columns for arson accelerants, essential oils, hydrocarbons, pesticides, PCB congeners (e.g., Aroclor mixes), sulfur compounds, amines, solvent impurities, simulated distillation, oxygenates, gasoline range organics (GRO), refinery gases.
- Equivalent to USP G2 phase.
- Similar phases: HP-1ms UI, HP-1ms, DB-1ms UI, DB-1ms, Ultra-1, VF-1ms, SPB-1, Equity-1

SH-Rxi™-1MS Structure



ID	df	Temp. Range	20 m	25 m	50 m
0.15 mm	0.15 µm	-60 to 330/350 °C	227-36001-01	–	–
	2.00 µm	-60 to 330/350 °C	227-36002-01	–	–
0.18 mm	0.18 µm	-60 to 330/350 °C	221-75921-20	–	–
	0.36 µm	-60 to 330/350 °C	227-36003-01	–	–
0.20 mm	0.33 µm	-60 to 330/350 °C	–	227-36004-01	227-36004-02
ID	df	Temp. Range	15 m	30 m	60 m
0.25 mm	0.25 µm	-60 to 330/350 °C	227-36005-01	221-75923-30	227-36005-02
	0.50 µm	-60 to 330/350 °C	227-36006-01	227-36006-02	221-75924-60
	1.00 µm	-60 to 330/350 °C	227-36007-01	227-36007-02	227-36007-03
0.32 mm	0.25 µm	-60 to 330/350 °C	227-36008-01	221-75926-30	227-36008-02
	0.50 µm	-60 to 330/350 °C	227-36009-01	227-36009-02	227-36009-03
	1.00 µm	-60 to 330/350 °C	–	227-36010-01	221-75928-60
	4.00 µm	-60 to 330/350 °C	–	227-36011-01	–
0.53 mm	0.50 µm	-60 to 330/350 °C	227-36012-01	227-36012-02	–
	1.00 µm	-60 to 330/350 °C	227-36013-01	227-36013-02	–
	1.50 µm	-60 to 330/350 °C	227-36014-01	227-36014-02	227-36014-03

Petroleum Hydrocarbons (TPH)



Peaks

1. C8
2. C10
3. C12
4. C14
5. C16
6. C18
7. C20
8. C22
9. C24
10. C26
11. C28
12. C30
13. C32
14. C34
15. C36
16. C38
17. C40

Conditions

Instrument: GC-2010
 Column: SH-Rxi™-1ms, 20 m,
 0.18 mm ID, 0.18 µm
 (P/N: 221-75921-20)
 Sample: Florida TRPH
 Standard, 500 µg/mL
 each component in
 hexane
 Inj. Vol.: 0.5 µL, split (split ratio
 20:1)
 Inj. Temp: 275 °C
 Carrier Gas: Hydrogen, constant
 linear velocity mode,
 55 cm/sec.
 Oven Temp: 40 °C (hold 1 min) to
 330 °C at 20 °C/min
 (hold 10 min)
 Detector: FID, 350 °C

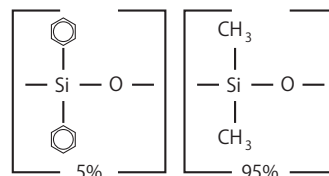
Capillary Columns

High-Performance Columns

SH-Rxi™-5MS

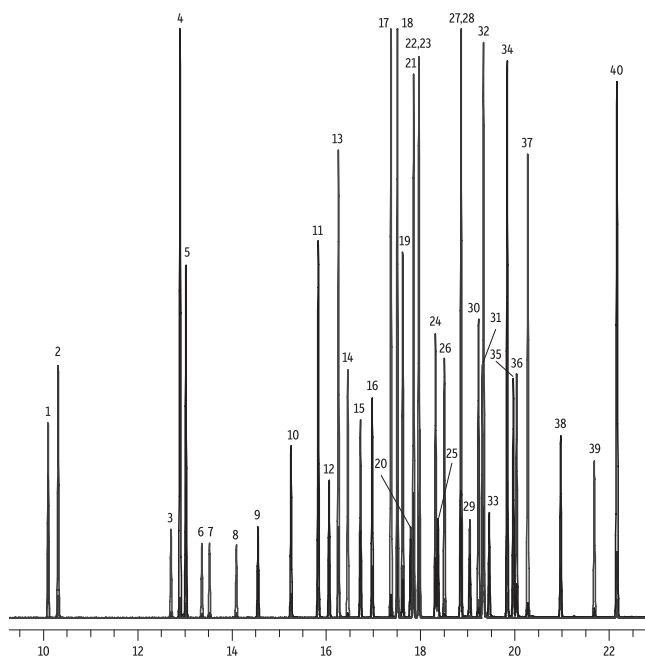
- Low-polarity phase: Crossbond™ 5% diphenyl / 95% dimethyl polysiloxane
- Tested and guaranteed for ultra-low bleed; improved signal-to-noise ratio for better sensitivity and mass spectral integrity.
- General-purpose columns for semi-volatiles, phenols, amines, residual solvents, drugs of abuse, pesticides, PCB congeners (e.g., Aroclor mixes), solvent impurities.
- Equivalent to USP G27 and G36 phases.
- Similar phases: HP-5ms UI, HP-5ms, DB-5, Ultra-2, CP Sil 8 CB, SPB-5, Equity-5

SH-Rxi™-5MS Structure



ID	df	Temp. Range	20 m	25 m	50 m
0.18 mm	0.18 µm	-60 to 330/350 °C	227-36015-01	-	-
	0.30 µm	-60 to 330/350 °C	227-36016-01	-	-
	0.36 µm	-60 to 330/350 °C	227-36017-01	-	-
0.20 mm	0.33 µm	-60 to 330/350 °C	-	227-36018-01	227-36018-02
ID	df	Temp. Range	15 m	30 m	60 m
0.25 mm	0.25 µm	-60 to 330/350 °C	221-75940-15	221-75940-30	227-36019-01
	0.40 µm	-60 to 330/350 °C	-	227-36020-01	-
	0.50 µm	-60 to 330/350 °C	227-36021-01	221-75941-30	221-75942-60
	1.00 µm	-60 to 330/350 °C	227-36022-01	227-36022-02	227-36022-03
0.32 mm	0.25 µm	-60 to 330/350 °C	227-36023-01	221-75943-30	227-36023-02
	0.50 µm	-60 to 330/350 °C	227-36024-01	221-75944-30	227-36024-02
	1.00 µm	-60 to 330/350 °C	227-36025-01	227-36025-02	227-36025-03
0.53 mm	0.25 µm	-60 to 330/350 °C	227-36026-01	227-36026-02	-
	0.50 µm	-60 to 330/350 °C	227-36027-01	227-36027-02	-
	1.00 µm	-60 to 330/350 °C	227-36028-01	227-36028-02	-
	1.50 µm	-60 to 330/350 °C	227-36029-01	227-36029-02	-

GC Multiresidue Pesticide



Peaks

- | | |
|-----------------------------------|------------------------------|
| 1. Chloroneb | 21. <i>cis</i> -Chlordane |
| 2. Pentachlorobenzene | 22. <i>trans</i> -Nonachlor |
| 3. alpha-BHC | 23. Chlorfenson (Ovex) |
| 4. Hexachlorobenzene | 24. 4,4'-DDE |
| 5. Pentachloroanisole | 25. Dieldrin |
| 6. beta-BHC | 26. 2,4'-DDD |
| 7. gamma-BHC (Lindane) | 27. Endrin |
| 8. delta-BHC | 28. Ethylan (Perthane) |
| 9. Endosulfan ether | 29. Endosulfan II |
| 10. Heptachlor | 30. 4,4'-DDD |
| 11. Pentachlorothioanisole | 31. 2,4'-DDT |
| 12. Aldrin | 32. <i>cis</i> -Nonachlor |
| 13. 4,4'-Dichlorobenzophenone | 33. Endrin aldehyde |
| 14. Fenosan | 34. 4,4'-Methoxychlor olefin |
| 15. Isodrin | 35. Endosulfan sulfate |
| 16. Heptachlor epoxide (Isomer B) | 36. 4,4'-DDT |
| 17. Chlorbenside | 37. 2,4'-Methoxychlor |
| 18. <i>trans</i> -Chlordane | 38. Endrin ketone |
| 19. 2,4'-DDE | 39. Tetradifon |
| 20. Endosulfan I | 40. Mirex |

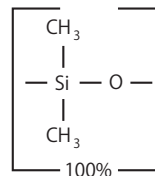
Conditions

Column: SH-Rxi™-5ms, 30 m, 0.25 mm ID, 0.25 µm
(P/N: 221-75940-30)
Inj. Vol.: 1 µL split (split ratio 50:1)
Inj. Temp: 250 °C
Oven Temp: 90 °C (hold 1 min) to 330 °C at
8.5 °C/min (hold 5 min)
Carrier Gas: He, constant flow rate 1.4 mL/min
Detector: MS-QP
Transfer Line Temp: 290 °C
Source Temp: 325 °C
Solvent Delay Time: 5 min
Ionization: EI

SH-Rxi™-1HT

- Non-polar phase: Crossbond™ 100% dimethyl polysiloxane
- 40% longer lifetime from specially designed fused silica tubing.
- Columns processed for high-temperature applications, such as high molecular weight hydrocarbons.
- Similar phases: DB-1HT, AT-1ht

■ SH-Rxi™-1HT Structure

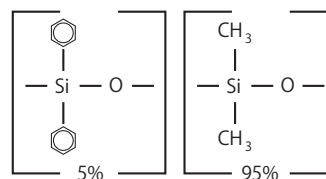


ID	df	Temp. Range	15 m	30 m
0.25 mm	0.10 μm	-60 to 400 °C	227-36087-01	227-36087-02
	0.25 μm	-60 to 400 °C	–	227-36088-01
0.32 mm	0.10 μm	-60 to 400 °C	227-36089-01	227-36089-02
	0.25 μm	-60 to 400 °C	–	227-36090-01

SH-Rxi™-5HT

- Low-polarity phase: Crossbond™ 5% diphenyl / 95% dimethyl polysiloxane
- 40% longer lifetime from specially designed fused silica tubing.
- Columns processed for high-temperature applications, such as mineral oil.
- Similar phases: DB-5HT, VF-5HT

■ SH-Rxi™-5HT Structure



ID	df	Temp. Range	15 m	30 m
0.25 mm	0.10 μm	-60 to 400 °C	221-75933-15	227-36091-01
	0.25 μm	-60 to 400 °C	227-36092-01	221-75934-30
0.32 mm	0.10 μm	-60 to 400 °C	227-36093-01	227-36093-02
	0.25 μm	-60 to 400 °C	–	227-36094-01
0.53 mm	0.15 μm	-60 to 380/400 °C	–	227-36095-01



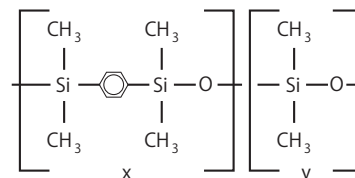
Capillary Columns

High-Performance Columns

SH-Rxi™-5Sil MS

- Low-polarity phase: Crossbond™ silarylene phase 1,4-bis(dimethylsiloxy)phenylene dimethyl polysiloxane
- Engineered to be a low-bleed GCMS column.
- Excellent inertness for active compounds.
- General-purpose columns—ideal for GCMS analysis of semi-volatiles, polycyclic aromatic compounds, chlorinated hydrocarbons, phthalates, phenols, amines, organochlorine pesticides, organophosphorus pesticides, drugs, solvent impurities, and hydrocarbons.
- Similar phases: DB-5ms UI, DB-5ms, VF-5ms, SLB-5ms

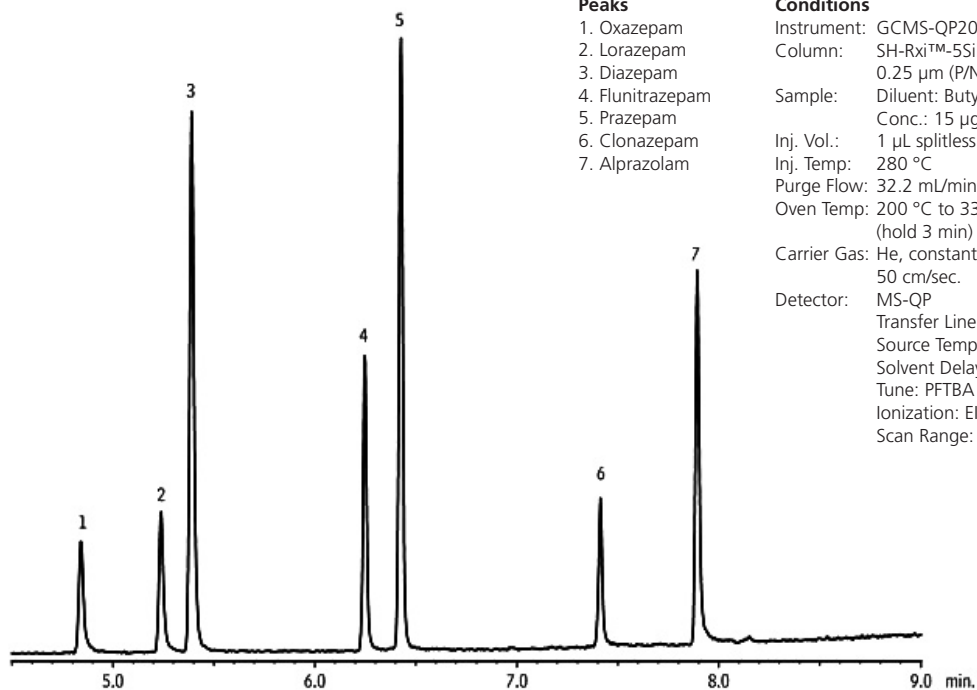
SH-Rxi™-5Sil MS Structure



For SH-Rxi™-5Sil MS columns with Integra-Guard™ column, please refer to page 44.

ID	df	Temp. Range	20 m	40 m	60 m
0.15 mm	0.15 µm	-60 to 320/350 °C	227-36030-01	-	-
	2.00 µm	-60 to 320/350 °C	227-36031-01	-	-
0.18 mm	0.10 µm	-60 to 320/350 °C	-	-	227-36032-01
	0.18 µm	-60 to 320/350 °C	227-36033-01	227-36033-02	-
	0.36 µm	-60 to 320/350 °C	227-36034-01	-	-
ID	df	Temp. Range	15 m	30 m	60 m
0.25 mm	0.10 µm	-60 to 320/350 °C	227-36035-01	227-36035-02	-
	0.25 µm	-60 to 320/350 °C	227-36036-01	221-75954-30	227-36036-02
	0.50 µm	-60 to 320/350 °C	227-36037-01	227-36037-02	-
	1.00 µm	-60 to 320/350 °C	227-36038-01	221-75956-30	227-36038-02
0.32 mm	0.25 µm	-60 to 320/350 °C	227-36039-01	227-36039-02	-
	0.50 µm	-60 to 320/350 °C	-	227-36040-01	-
	1.00 µm	-60 to 320/350 °C	-	227-36041-01	-
0.53 mm	1.50 µm	-60 to 320/350 °C	-	227-36032-02	-

Benzodiazepines



Peaks

1. Oxazepam
2. Lorazepam
3. Diazepam
4. Flunitrazepam
5. Prazepam
6. Clonazepam
7. Alprazolam

Conditions

Instrument: GCMS-QP2010
 Column: SH-Rxi™-5Sil MS, 30 m, 0.25 mm ID, 0.25 µm (P/N: 221-75954-30)
 Sample: Diluent: Butyl chloride
 Conc.: 15 µg/mL
 Inj. Vol.: 1 µL splitless (hold 1 min)
 Inj. Temp: 280 °C
 Purge Flow: 32.2 mL/min (20:1 split)
 Oven Temp: 200 °C to 330 °C at 15 °C/min (hold 3 min)
 Carrier Gas: He, constant linear velocity mode, 50 cm/sec.
 Detector: MS-QP
 Transfer Line Temp: 280 °C
 Source Temp: 200 °C
 Solvent Delay Time: 4 min
 Tune: PFTBA
 Ionization: EI
 Scan Range: 50-350

SH-Rxi™-XLB

- Low-polarity proprietary phase
- General-purpose columns exhibiting extremely low bleed. Ideal for many GCMS applications, including pesticides, PCB congeners (e.g., Aroclor mixes), PAHs.
- Unique selectivity.
- Similar phases: DB-XLB, VF-Xms

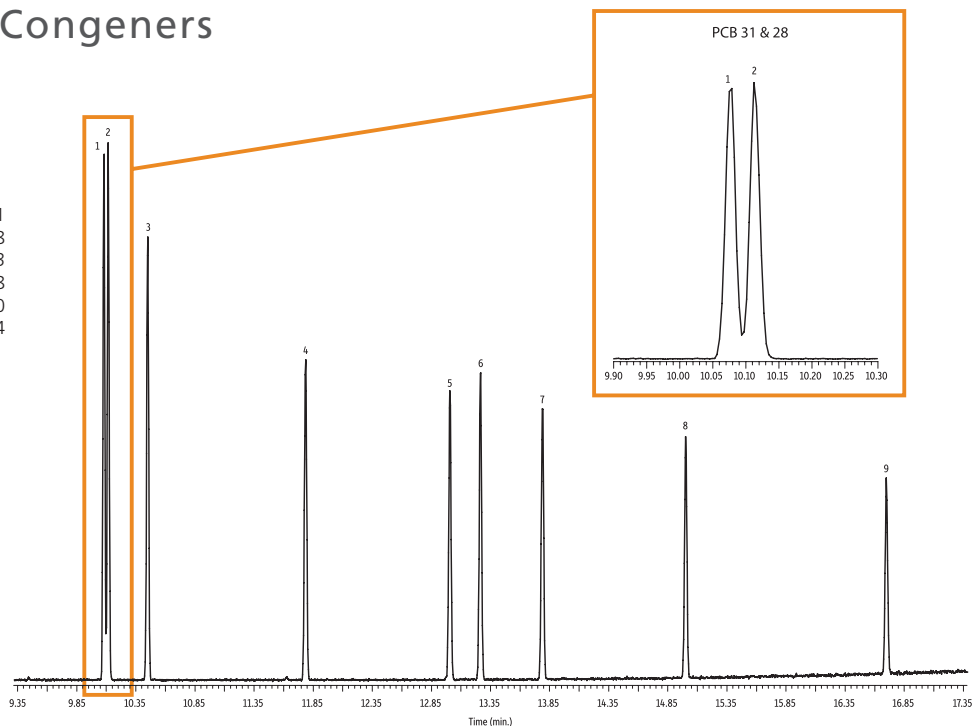
ID	df	Temp. Range	30 m	60 m
0.25 mm	0.10 µm	30 to 340/360 °C	227-36042-01	–
	0.25 µm	30 to 340/360 °C	227-36043-01	227-36043-02
	0.50 µm	30 to 340/360 °C	227-36044-01	–
	1.00 µm	30 to 340/360 °C	227-36045-01	–
0.32 mm	0.25 µm	30 to 340/360 °C	227-36046-01	227-36046-02
	0.50 µm	30 to 340/360 °C	227-36047-01	–
	1.00 µm	30 to 340/360 °C	227-36048-01	–
0.53 mm	0.50 µm	30 to 320/360 °C	227-36049-01	–
	1.50 µm	30 to 320/360 °C	227-36050-01	–

* Maximum temperatures listed are for shorter length columns. Longer columns may have a different maximum temperature.

EU PCB Congeners

Peaks

1. PCB 31
2. PCB 28
3. PCB 52
4. PCB 101
5. PCB 118
6. PCB 153
7. PCB 138
8. PCB 180
9. PCB 194



Conditions

Column: SH-Rxi™-XLB, 30 m, 0.25 mm ID, 0.25 µm
(P/N: 227-36043-01)
Sample: PCB congener standard
Diluent: Dichloromethane
Conc.: 3.5 ppm
Inj. Vol.: 0.5 µL splitless (hold 1.75 min)
Inj. Temp: 300 °C
Purge Flow: 50 mL/min

Oven Temp: 40 °C (hold 2 min) to 240 °C at 30 °C/min
(hold 2 min) to 340 °C at 10 °C/min (hold 5 min)
Carrier Gas: He, constant flow rate 1 mL/min
Detector: MS-QP
Transfer Line Temp: 300 °C
Source Temp: 280 °C
Ionization: EI
Scan Range: 45-550

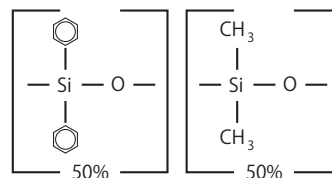
Capillary Columns

High-Performance Columns

SH-Rxi™-17

- Mid-polarity phase: Crossbond™ 50% diphenyl / 50% dimethyl polysiloxane
- General-purpose columns for pesticides, herbicides, rosin acids, phthalate esters, triglycerides, sterols.
- Similar phases: HP-17, DB-17, DB-17HT, DB-608, SPB-17

■ SH-Rxi™-17 Structure

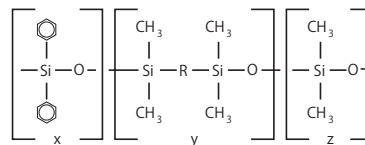


ID	df	Temp. Range	20 m	30 m
0.18 mm	0.18 µm	40 to 280/320 °C	227-36061-01	–
0.25 mm	0.25 µm	40 to 280/320 °C	–	221-75907-30
	0.50 µm	40 to 280/320 °C	–	227-36062-01
	1.00 µm	40 to 280/320 °C	–	227-36063-01
0.32 mm	0.25 µm	40 to 280/320 °C	–	227-36064-01
	0.50 µm	40 to 280/320 °C	–	227-36065-01
	1.00 µm	40 to 280/320 °C	–	227-36066-01
0.53 mm	0.25 µm	40 to 280/320 °C	–	227-36067-01
	0.50 µm	40 to 280/320 °C	–	227-36068-01
	0.83 µm	40 to 280/320 °C	–	227-36069-01
	1.00 µm	40 to 280/320 °C	–	221-76193-30
	1.50 µm	40 to 280/320 °C	–	227-36070-01

SH-Rxi™-35Sil MS

- Mid-polarity: Crossbond™ phase (similar to 35% phenyl methyl polysiloxane)
- Very low-bleed phase for GCMS analysis.
- Special selectivity and excellent inertness for substituted polar compounds, such as drugs, pesticides, herbicides, PCBs, phenols, etc.
- Provides superior separation for cannabinoids.
- Similar phases: DB-35ms, DB-35ms UI, VF-35ms

■ SH-Rxi™-35Sil MS Structure

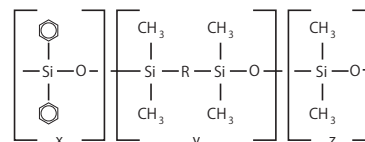


ID	df	Temp. Range	15 m	30 m
0.25 mm	0.25 µm	50 to 340/360 °C	227-36051-01	227-36051-02
	0.50 µm	50 to 340/360 °C	227-36052-01	227-36052-02
	1.00 µm	50 to 320/340 °C	227-36053-01	227-36053-02
0.32 mm	0.25 µm	50 to 340/360 °C	227-36054-01	227-36054-02
	0.50 µm	50 to 340/360 °C	227-36055-01	227-36055-02
	1.00 µm	50 to 320/340 °C	227-36056-01	227-36056-02
0.53 mm	0.50 µm	50 to 340/360 °C	227-36057-01	227-36057-02
	1.00 µm	50 to 320/340 °C	227-36058-01	227-36058-02
	1.50 µm	50 to 310/330 °C	227-36059-01	227-36059-02
	3.00 µm	50 to 280/300 °C	227-36060-01	227-36060-02

SH-Rxi™-17Sil MS

- Mid-polarity Crossbond™ phase (similar to 50% phenyl methyl polysiloxane)
- Low bleed for use with sensitive detectors, such as MS.
- Excellent inertness and selectivity for active environmental compounds, such as PAHs.
- Equivalent to USP G3 phase.
- Similar phases: DB-17ms, HP-17, DB-17, VF-17ms, CP-Sil 24 CB

SH-Rxi™-17Sil MS Structure



ID	df	Temp. Range	30 m	60 m
0.25 mm	0.25 µm	40 to 340/360 °C	221-75916-30	227-36071-01
0.32 mm	0.25 µm	40 to 340/360 °C	227-36072-01	–

* Maximum temperatures listed are for shorter length columns. Longer columns may have a different maximum temperature.

SH-Rxi™-PAH

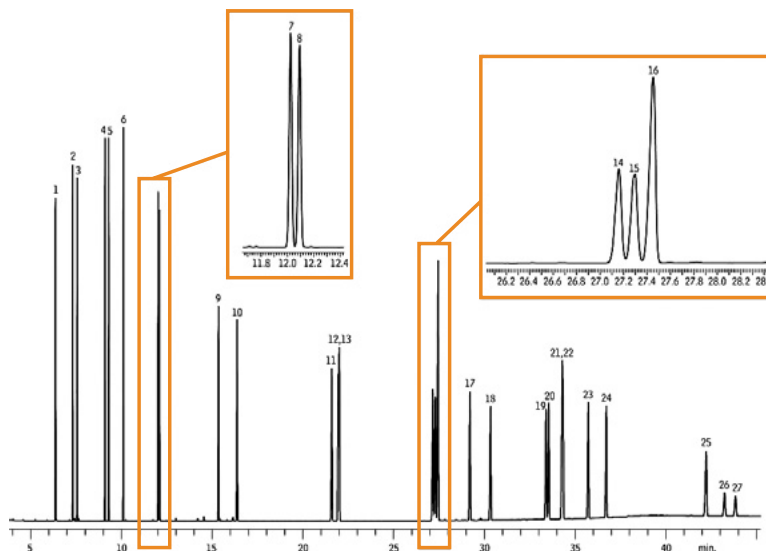
- Mid-polarity proprietary phase
- Ideal for EFSA PAH4 analysis—separates all priority compounds: benz[a]anthracene, chrysene, benzo[b]fluoranthene and benzo[a]pyrene.
- Best resolution of chrysene from interfering PAHs, triphenylene, and cyclopenta[cd]pyrene.
- Complete separation of benzo [b], [k], [j], and [a] fluoranthenes.

ID	df	Temp. Range	30 m	40 m	60 m
0.18 mm	0.07 µm	to 360 °C	–	227-36073-01	–
0.25 mm	0.10 µm	to 360 °C	227-36074-01	–	227-36074-02

Polycyclic Aromatic Hydrocarbons (US EPA Method 8100)

Peaks

- | | |
|----------------------------|------------------------------|
| 1. Naphthalene | 24. 7H-Dibenzo[c,g]carbazole |
| 2. 2-Methylnaphthalene | 25. Dibenzo[a,e]pyrene |
| 3. 1-Methylnaphthalene | 26. Dibenzo(a,i)pyrene |
| 4. Acenaphthylene | 27. Dibenzo(a,h)pyrene |
| 5. Acenaphthene | |
| 6. Fluorene | |
| 7. Phenanthrene | |
| 8. Anthracene | |
| 9. Fluoranthene | |
| 10. Pyrene | |
| 11. Benz[a]anthracene | |
| 12. Chrysene | |
| 13. Triphenylene | |
| 14. Benzo[b]fluoranthene | |
| 15. Benzo[k]fluoranthene | |
| 16. Benzo[j]fluoranthene | |
| 17. Benzo[a]pyrene | |
| 18. 3-Methylcholanthrene | |
| 19. Dibenz(a,h)acridine | |
| 20. Dibenz[a,j]acridine | |
| 21. Indeno[1,2,3-cd]pyrene | |
| 22. Dibenz[a,h]anthracene | |
| 23. Benzo[ghi]perylene | |



Conditions

Column: SH-Rxi™-17Sil MS, 30 m, 0.25 mm ID, 0.25 µm (P/N: 221-75916-30)
 Inj. Vol.: 0.5 µL splitless (hold 1.75 min)
 Inj. Temp: 320 °C
 Purge Flow: 75 mL/min

Oven Temp: 65 °C (hold 0.5 min) to 220 °C at 15 °C/min to 330 °C at 4 °C/min (hold 15 min)
 Carrier Gas: He, constant flow rate 2.0 mL/min
 Detector: FID, 320 °C

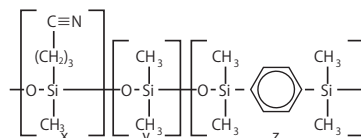
Capillary Columns

High-Performance Columns

SH-Rxi™-624Sil MS

- Mid-polarity Crossbond™ silarylene phase (similar to 6% cyanopropylphenyl / 94% dimethyl polysiloxane)
- Low-bleed, high-thermal stability column—maximum temperatures up to 300–320 °C.
- Inert—excellent peak shape for a wide range of compounds.
- Selective—G43 phase highly selective for volatile organics and residual solvents, great choice for USP<467>.
- Manufactured for column-to-column reproducibility—well-suited for validated methods.
- Similar phases: HP-624, DB-624, VF-624ms, CP-Select 624 CB

SH-Rxi™-624Sil MS Structure

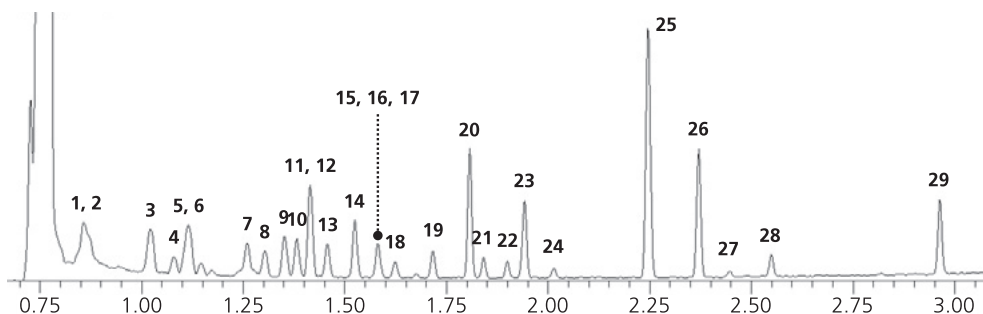


ID	df	Temp. Range	20 m	30 m	60 m	75 m	105 m
0.18 mm	1.00 µm	-20 to 300/320 °C	227-36075-01	–	–	–	–
0.25 mm	1.40 µm	-20 to 300/320 °C	–	221-75962-30	227-36076-01	–	–
0.32 mm	1.80 µm	-20 to 300/320 °C	–	227-36077-01	221-75963-60	–	–
0.53 mm	3.00 µm	-20 to 280/300 °C	–	227-36078-01	227-36078-02	227-36078-03	227-36078-04

Ultra-Fast Analysis of Volatile Organic Compounds in Water

Peaks

- | | | | |
|---|---------------------------|---------------------------------------|----------------------------------|
| 1. Vinyl chloride-d3 (ISTD) | 9. 1,1,1-trichloroethane | 17. 1,4-dioxane | 25. <i>m</i> -, <i>p</i> -xylene |
| 2. Vinyl chloride | 10. Carbon tetrachloride | 18. Bromodichloromethane | 26. <i>o</i> -xylene |
| 3. 1,1-dichloroethylene | 11. 1,2-dichloroethane | 19. <i>Cis</i> -1,3-dichloropropene | 27. Bromoform |
| 4. Dichloromethane | 12. Benzene | 20. Toluene | 28. 4-bromofluorobenzene |
| 5. Methyl- <i>t</i> -butyl ether (MTBE) | 13. Fluorobenzene (ISTD) | 21. <i>Trans</i> -1,3-dichloropropene | 29. 1,4-dichlorobenzene |
| 6. <i>Trans</i> -1,2-dichloroethylene | 14. Trichloroethylene | 22. 1,1,2-trichloroethane | |
| 7. <i>Cis</i> -1,2-dichloroethylene | 15. 1,4-dioxane-d8 (ISTD) | 23. Tetrachloroethylene | |
| 8. Trichloromethane | 16. 1,2-dichloropropane | 24. Dibromochloromethane | |



Conditions

Instrument: GCMS-TQ8030 + HS-20 Loop
 Column: SH-Rxi™-624Sil MS, 20 m, 0.18 mm ID, 1.00 µm (P/N: 227-36075-01)

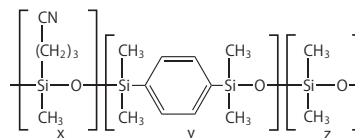
Headspace-Loop: Loop volume: 1 mL
 Sample Equilibration: 70 °C for 30 min
 Vial pressurization: 0.5 min, 50 kPa, equilibration 0.05 min
 Needle Flush: 2 min
 Sample Pathway Temp: 200 °C
 Transfer Line Temp: 200 °C

Inj.: Split (split ratio 30:1)
 Oven Temp: 70 °C, 40 °C/min to 220 °C (hold 0.5 min)
 Carrier Gas: He, constant linear velocity mode, 50 cm/sec
 Detector: MS: SIM
 MS/MS: MRM
 Event (loop) time: 0.15 sec
 Source Temp: 200 °C
 Interface Temp: 230 °C

SH-Rxi™-1301Sil MS

- Mid-polarity Crossbond™ silarylene phase (similar to 6% cyanopropylphenyl / 94% dimethyl polysiloxane)
- Highest thermal stability in the industry ensures dependable, accurate MS results and increased uptime.
- Stabilized cyano phase selectivity improves the performance of existing methods. Ideal for solvents, glycols, and other polar compounds.
- Rigorous QC testing ensures inertness and accurate, reliable data for multiple compound classes.
- Similar phase: VF-1301ms

■ SH-Rxi™-1301Sil MS Structure



ID	df	Temp. Range	15 m	30 m	60 m
0.25 mm	0.25 µm	-60 to 320 °C	-	227-36079-01	227-36079-02
	1.00 µm	-60 to 320 °C	-	227-36080-01	227-36080-02
0.32 mm	0.25 µm	-60 to 320 °C	-	227-36081-01	-
	1.00 µm	-60 to 320 °C	-	227-36082-01	227-36082-02
	1.50 µm	-60 to 320 °C	-	227-36083-01	227-36083-02
0.53 mm	1.00 µm	-60 to 320 °C	227-36084-01	227-36084-02	-
	1.50 µm	-60 to 320 °C	-	227-36085-01	-
	3.00 µm	-60 to 320 °C	-	227-36086-01	227-36086-02



Guard columns for SH-Rxi™ are also available. Please refer to page 43.

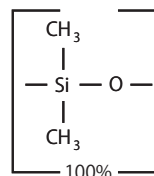
Capillary Columns

General-Purpose Columns

SH-Rtx™-1

- Non-polar phase: Crossbond™ 100% dimethyl polysiloxane
- General-purpose columns for solvent impurities, PCB congeners (e.g., Aroclor mixes), simulated distillation, arson accelerants, gases, natural gas odorants, sulfur compounds, essential oils, hydrocarbons, semi-volatiles, pesticides, oxygenates.
- Equivalent to USP G1, G2, G38 phases.
- Similar phases: HP-1, DB-1, CP Sil 5 CB, SPB-1

■ SH-Rtx™-1 Structure



For SH-Rtx™-1 columns with Integra-Guard™ column, please refer to page 44.

ID	df	Temp. Range	10 m	15 m	25 m	30 m	60 m	105 m
0.25 mm	0.10 µm	-60 to 330/350 °C	–	221-75718-15	–	221-75718-30	227-36096-01	–
	0.25 µm	-60 to 330/350 °C	221-75719-10	–	221-75719-25	221-75719-30	221-75719-60	–
	0.50 µm	-60 to 330/350 °C	–	–	–	227-36097-01	227-36097-02	–
	1.00 µm	-60 to 320/340 °C	–	–	–	227-36098-01	227-36098-02	221-75721-05
0.32 mm	0.10 µm	-60 to 330/350 °C	–	–	–	227-36099-01	227-36099-02	–
	0.25 µm	-60 to 330/350 °C	–	–	–	221-75723-30	221-75723-60	–
	0.50 µm	-60 to 330/350 °C	–	–	–	221-75724-30	227-36100-01	–
	1.00 µm	-60 to 320/340 °C	–	–	–	221-75725-30	221-75725-60	–
	1.50 µm	-60 to 310/330 °C	–	–	–	227-36101-01	227-36101-02	–
	3.00 µm	-60 to 280/300 °C	–	–	–	227-36102-01	227-36102-02	–
	4.00 µm	-60 to 280/300 °C	–	–	–	227-36103-01	–	–
	5.00 µm	-60 to 260/280 °C	–	–	–	221-75728-30	221-75728-60	–
0.53 mm	0.10 µm	-60 to 320/340 °C	–	–	–	227-36104-01	–	–
	0.25 µm	-60 to 320/340 °C	–	–	–	221-75729-30	227-36105-01	–
	0.50 µm	-60 to 310/330 °C	–	221-75730-15	–	221-75730-30	227-36106-01	–
	1.00 µm	-60 to 310/330 °C	–	221-75731-15	–	221-75731-30	221-75731-60	–
	1.50 µm	-60 to 310/330 °C	–	221-75732-15	–	221-75732-30	227-36107-01	–
	3.00 µm	-60 to 270/290 °C	–	–	–	221-75733-30	221-75733-60	–
	5.00 µm	-60 to 270/290 °C	–	–	–	221-75734-30	221-75734-60	–
	7.00 µm	-60 to 240/260 °C	–	–	–	227-36108-01	227-36108-02	–

* Maximum temperatures listed are for shorter length columns. Longer columns may have a different maximum temperature.

SH-Rtx™-1 PONA

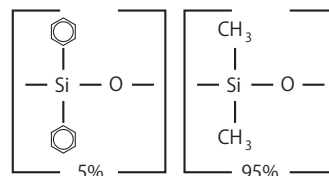
Compatible with ASTM and CGSB for hydrocarbon analysis.

ID	df	Temp. Range	100 m
0.25 mm	0.50 µm	-60 to 300/340 °C	221-76196-00

SH-Rtx™-5

- Low-polarity phase: Crossbond™ 5% diphenyl / 95% dimethyl polysiloxane
- General-purpose columns for drugs, solvent impurities, pesticides, hydrocarbons, PCB congeners (e.g., Aroclor mixes), essential oils, semi-volatiles.
- Equivalent to USP G27 and G36 phases.
- Similar phases: HP-5, DB-5, CP Sil 8 CB, SPB-5

■ SH-Rtx™-5 Structure



For SH-Rtx™-5 columns with Integra-Guard™ column, please refer to page 44.

ID	df	Temp. Range	15 m	25 m	30 m	60 m
0.25 mm	0.10 μm	-60 to 330/350 °C	221-75700-15	–	221-75700-30	227-36109-01
	0.25 μm	-60 to 330/350 °C	–	–	221-75701-30	227-36110-01
	0.50 μm	-60 to 330/350 °C	–	221-76178-25	221-76178-30	227-36111-01
	1.00 μm	-60 to 320/340 °C	–	–	221-75702-30	227-36112-01
0.32 mm	0.10 μm	-60 to 330/350 °C	–	–	227-36113-01	–
	0.25 μm	-60 to 330/350 °C	221-75703-15	–	221-75703-30	221-75703-60
	0.50 μm	-60 to 330/350 °C	–	–	221-75704-30	227-36114-01
	1.00 μm	-60 to 320/340 °C	–	–	221-75705-30	221-75705-60
	1.50 μm	-60 to 310/330 °C	–	–	221-76181-30	227-36115-01
0.53 mm	3.00 μm	-60 to 280/300 °C	–	–	227-36116-01	227-36116-02
	0.10 μm	-60 to 320/340 °C	–	–	227-36117-01	–
	0.25 μm	-60 to 320/340 °C	–	–	221-75708-30	227-36118-01
	0.50 μm	-60 to 320/330 °C	–	–	221-75709-30	227-36119-01
	1.00 μm	-60 to 320/330 °C	221-75710-15	–	221-75710-30	221-75710-60
	1.50 μm	-60 to 310/330 °C	221-75711-15	–	221-75711-30	227-36120-01
	3.00 μm	-60 to 270/290 °C	–	–	221-75712-30	227-36121-01
	5.00 μm	-60 to 270/290 °C	–	–	221-75713-30	221-75713-60

* Maximum temperatures listed are for shorter length columns. Longer columns may have a different maximum temperature.

Metal columns are also available. Please refer to page 42.

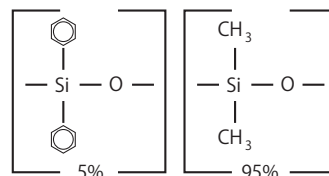
Capillary Columns

General-Purpose Columns

SH-Rtx™-5MS

- Low-polarity phase: Crossbond™ 5% diphenyl / 95% dimethyl polysiloxane
- Column specifically tested for low-bleed performance.
- General-purpose columns for drugs, solvent impurities, pesticides, hydrocarbons, PCB congeners (e.g., Aroclor mixes), essential oils, semi-volatiles.
- Equivalent to USP G27 and G36 phases.
- Similar phases: HP-5, DB-5, CP Sil 8 CB, SPB-5

SH-Rtx™-5MS Structure

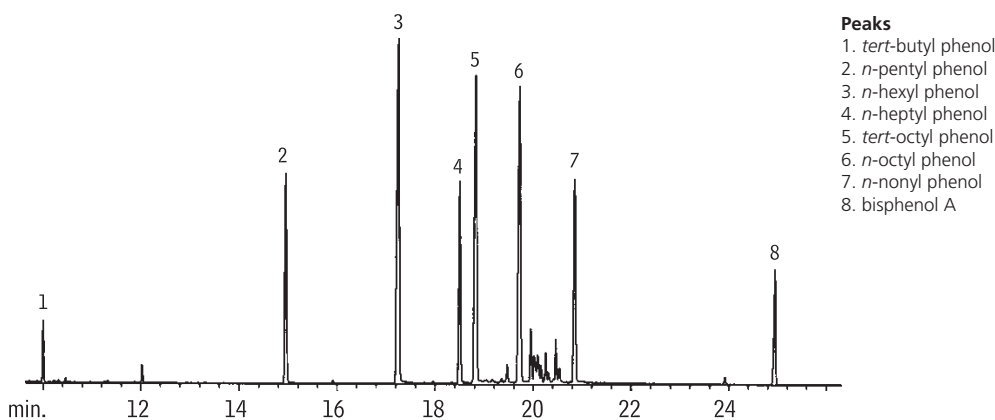


For SH-Rtx™-5MS columns with Integra-Guard™ column, please refer to page 44.

ID	df	Temp. Range	15 m	30 m	60 m
0.25 mm	0.10 µm	-60 to 330/350 °C	221-75854-15	221-75854-30	227-36122-01
	0.25 µm	-60 to 330/350 °C	221-75855-15	221-75855-30	227-36123-01
	0.50 µm	-60 to 330/350 °C	–	227-36124-01	227-36124-02
	1.00 µm	-60 to 325/350 °C	–	221-75857-30	–
0.32 mm	0.10 µm	-60 to 330/350 °C	–	227-36125-01	227-36125-02
	0.25 µm	-60 to 330/350 °C	–	221-75858-30	221-75858-60
	0.50 µm	-60 to 330/350 °C	–	227-36126-01	227-36126-02
	1.00 µm	-60 to 325/350 °C	–	227-36127-01	–
0.53 mm	0.50 µm	-60 to 320/340 °C	–	221-76191-30	–
	1.00 µm	-60 to 320/340 °C	–	227-36128-01	–
	1.50 µm	-60 to 310/330 °C	–	227-36129-01	–

* Maximum temperatures listed are for shorter length columns. Longer columns may have a different maximum temperature.

Endocrine Disruptors: Alkyl Phenols



Peaks

1. *tert*-butyl phenol
2. *n*-pentyl phenol
3. *n*-hexyl phenol
4. *n*-heptyl phenol
5. *tert*-octyl phenol
6. *n*-octyl phenol
7. *n*-nonyl phenol
8. bisphenol A

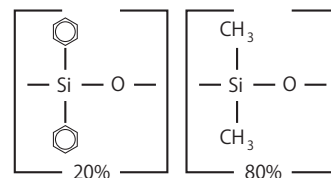
Conditions

Column: SH-Rtx™-5MS, 30 m, 0.25 mm ID, 0.25 µm (P/N: 221-75855-30).
 Conc.: 5–10 ng on-column
 Inj.: Splitless, purge on at 1 min
 Inj. Temp.: 275 °C
 Oven Temp: 35 °C (hold 1 min) to 300 °C at 10 °C/min (hold 15 min)
 Carrier Gas: He
 Det. Temp: 310 °C

SH-Rtx™-20

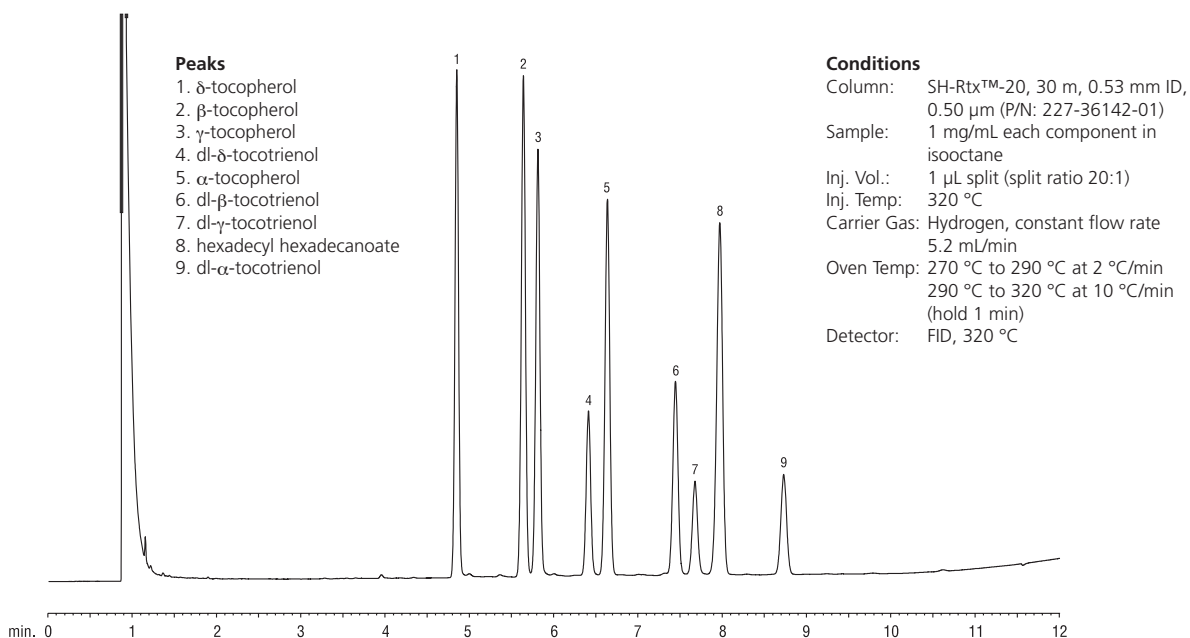
- Mid-polarity phase: Crossbond™ 20% diphenyl / 80% dimethyl polysiloxane
- General-purpose columns for volatile compounds, flavor compounds, alcoholic beverages.
- Equivalent to USP G28 and G32 phases.
- Similar phases: SPB-20, 007-20, AT-20, EC-20

SH-Rtx™-20 Structure



ID	df	Temp. Range	30 m	60 m
0.25 mm	0.10 µm	-20 to 300/320 °C	227-36130-01	227-36130-02
	0.25 µm	-20 to 300/320 °C	227-36131-01	227-36131-02
	0.50 µm	-20 to 290/310 °C	227-36132-01	227-36132-02
	1.00 µm	-20 to 280/300 °C	227-36133-01	227-36133-02
0.32 mm	0.10 µm	-20 to 300/320 °C	227-36134-01	227-36134-02
	0.25 µm	-20 to 300/320 °C	227-36135-01	227-36135-02
	0.50 µm	-20 to 290/310 °C	227-36136-01	227-36136-02
	1.00 µm	-20 to 280/300 °C	227-36137-01	227-36137-02
	1.50 µm	-20 to 270/290 °C	227-36138-01	227-36138-02
	3.00 µm	-20 to 250/270 °C	227-36139-01	227-36139-02
0.53 mm	0.10 µm	-20 to 260/280 °C	227-36140-01	227-36140-02
	0.25 µm	-20 to 260/280 °C	–	227-36141-01
	0.50 µm	-20 to 260/280 °C	227-36142-01	–
	1.00 µm	-20 to 260/280 °C	227-36143-01	227-36143-02
	1.50 µm	-20 to 250/270 °C	227-36144-01	–
	3.00 µm	-20 to 240/260 °C	227-36145-01	227-36145-02

Tocopherols and Tocotrienols



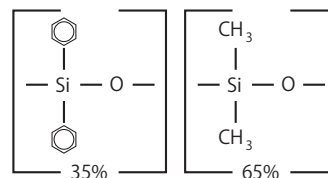
Capillary Columns

General-Purpose Columns

SH-Rtx™-35 / SH-Rtx™-35MS

- Mid-polarity phase: Crossbond™ 35% diphenyl / 65% dimethyl polysiloxane
- General-purpose columns for organochlorine pesticides, PCB congeners (e.g., Aroclor mixes), herbicides, pharmaceuticals, sterols, rosin acids, phthalate esters.
- Equivalent to USP G42 phase.
- Similar phases: HP-35, DB-35, SPB-35, SPB-608

■ SH-Rtx™-35 / SH-Rtx™-35MS Structure



SH-Rtx™-35

ID	df	Temp. Range	30 m	60 m
0.25 mm	0.10 μm	40 to 320 °C	227-36146-01	227-36146-02
	0.25 μm	40 to 320 °C	227-36147-01	227-36147-02
	0.50 μm	40 to 310 °C	227-36148-01	227-36148-02
	1.00 μm	40 to 290 °C	227-36149-01	227-36149-02
0.32 mm	0.10 μm	40 to 320 °C	227-36150-01	227-36150-02
	0.25 μm	40 to 320 °C	227-36151-01	227-36151-02
	0.50 μm	40 to 310 °C	227-36152-01	227-36152-02
	1.00 μm	40 to 290 °C	227-36153-01	227-36153-02
	1.50 μm	40 to 270/290 °C	227-36154-01	–
	3.00 μm	40 to 250/270 °C	227-36155-01	227-36155-02
0.53 mm	0.10 μm	40 to 260/280 °C	–	227-36156-01
	0.25 μm	40 to 260/280 °C	–	227-36157-01
	0.50 μm	40 to 300 °C	227-36158-01	227-36158-02
	1.00 μm	40 to 290 °C	227-36159-01	227-36159-02
	1.50 μm	40 to 280 °C	227-36160-01	227-36160-02
	3.00 μm	40 to 240/260 °C	227-36161-01	227-36161-02

SH-Rtx™-35MS (Low-bleed phase for GCMS analysis)

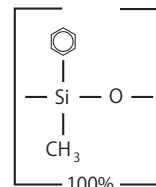
ID	df	Temp. Range	30 m
0.25 mm	0.25 μm	40 to 320 °C	221-75835-30

Download the brochure of GC/GCMS consumables from
http://www.shimadzu.com/an/gc/column_consumable/index.html

SH-Rtx™-50

- Mid-polarity phase: Crossbond™ 100% methyl phenyl polysiloxane
- General-purpose columns for pesticides, herbicides, rosin acids, phthalate esters, sterols.
- Equivalent to USP G3 phase.
- Similar phases: HP-50+, CP-Sil 24 CB, SPB-50

■ SH-Rtx™-50 Structure

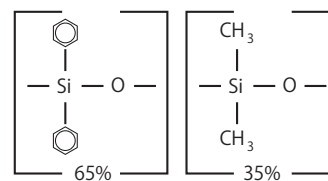


ID	df	Temp. Range	30 m	60 m
0.25 mm	0.25 µm	40 to 300/320 °C	227-36162-01	227-36162-02
	0.50 µm	40 to 290/310 °C	227-36163-01	227-36163-02
	1.00 µm	40 to 280/300 °C	227-36164-01	227-36164-02
0.32 mm	0.25 µm	40 to 300/320 °C	221-76182-30	227-36165-01
	0.50 µm	40 to 290/310 °C	227-36166-01	227-36166-02
	1.00 µm	40 to 280/300 °C	227-36167-01	227-36167-02
0.53 mm	0.50 µm	40 to 270/290 °C	227-36168-01	227-36168-02
	0.83 µm	40 to 270/290 °C	227-36169-01	–
	1.00 µm	40 to 260/280 °C	227-36170-01	227-36170-02
	1.50 µm	40 to 250/270 °C	227-36171-01	227-36171-02

SH-Rtx™-65

- Mid-polarity phase: Crossbond™ 65% diphenyl / 35% dimethyl polysiloxane
- General-purpose columns for phenols, fatty acids, triglycerides.
- Equivalent to USP G17 phase.

■ SH-Rtx™-65 Structure



ID	df	Temp. Range	30 m
0.25 mm	0.25 µm	50 to 300 °C	227-36172-01
	0.50 µm	50 to 280/300 °C	227-36173-01
	1.00 µm	50 to 260/280 °C	227-36174-01
0.32 mm	0.25 µm	50 to 300 °C	227-36175-01
	0.50 µm	50 to 280/300 °C	227-36176-01
	1.00 µm	50 to 260/280 °C	227-36177-01
0.53 mm	1.00 µm	50 to 250/270 °C	227-36178-01

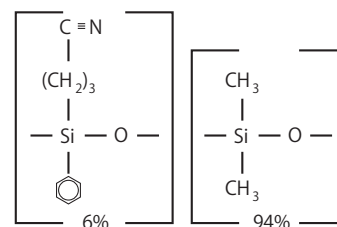
Capillary Columns

General-Purpose Columns

SH-Rtx™-1301

- Mid-polarity phase: Crossbond™ 6% cyanopropylphenyl / 94% dimethyl polysiloxane
- General-purpose columns for residual solvents, alcohols, oxygenates, and volatile organic compounds.
- Equivalent to USP G43 phase.
- Similar phases: DB-1301, CP-1301, SPB-1301

■ SH-Rtx™-1301 Structure



For SH-Rtx™-1301 columns with Integra-Guard™ column, please refer to page 44.

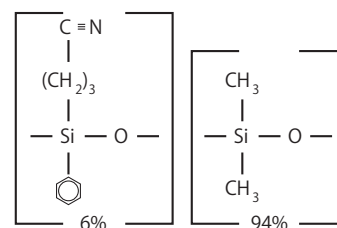
ID	df	Temp. Range	30 m	60 m
0.25 mm	0.25 µm	-20 to 280 °C	221-76194-30	221-76194-60
	0.50 µm	-20 to 270 °C	227-36203-01	–
	1.00 µm	-20 to 260 °C	227-36204-01	227-36204-02
	1.40 µm	-20 to 240 °C	–	227-36205-01
0.32 mm	0.25 µm	-20 to 280 °C	227-36206-01	227-36206-02
	0.50 µm	-20 to 270 °C	227-36207-01	227-36207-02
	1.00 µm	-20 to 260 °C	227-36208-01	227-36208-02
	1.50 µm	-20 to 250 °C	227-36209-01	227-36209-02
	1.80 µm	-20 to 240 °C	227-36210-01	227-36210-02
0.53 mm	0.25 µm	-20 to 280 °C	227-36211-01	–
	0.50 µm	-20 to 270 °C	227-36212-01	227-36212-02
	1.00 µm	-20 to 260 °C	227-36213-01	227-36213-02
	1.50 µm	-20 to 250 °C	227-36214-01	–

* Maximum temperatures listed are for shorter length columns. Longer columns may have a different maximum temperature.

SH-Rtx™-624

- Mid-polarity phase: Crossbond™ 6% cyanopropylphenyl / 94% dimethyl polysiloxane
- Application-specific columns for volatile organic pollutants. Recommended in U.S. EPA methods for volatile organic pollutants.
- Equivalent to USP G43 phase.
- Similar phases: HP-624, DB-624, DB-624 UI, VF-624ms, SPB-1301

■ SH-Rtx™-624 Structure



For SH-Rtx™-624 columns with Integra-Guard™ column, please refer to page 44.

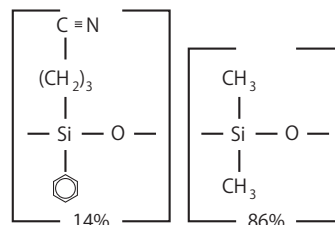
ID	df	Temp. Range	20 m	30 m	60 m	75 m
0.18 mm	1.00 µm	-20 to 240 °C	227-36259-01	–	–	–
0.25 mm	1.40 µm	-20 to 240 °C	–	221-75863-30	227-36215-01	–
0.32 mm	1.80 µm	-20 to 240 °C	–	221-75864-30	221-75864-60	–
0.53 mm	3.00 µm	-20 to 240 °C	–	221-75865-30	221-75865-60	221-75865-75

* Maximum temperatures listed are for shorter length columns. Longer columns may have a different maximum temperature.

SH-Rtx™-1701

- Mid-polarity phase: Crossbond™ 14% cyanopropylphenyl / 86% dimethyl polysiloxane
- General-purpose columns for alcohols, oxygenates, PCB congeners (e.g., Aroclor mixes), pesticides, and fragrance compounds.
- Equivalent to USP G46 phase.
- Similar phases: DB-1701P, DB-1701, CP Sil 19 CB, VF-1701ms, VF-1701 Pesticides, SPB-1701

SH-Rtx™-1701 Structure



For SH-Rtx™-1701 columns with Integra-Guard™ column, please refer to page 44.

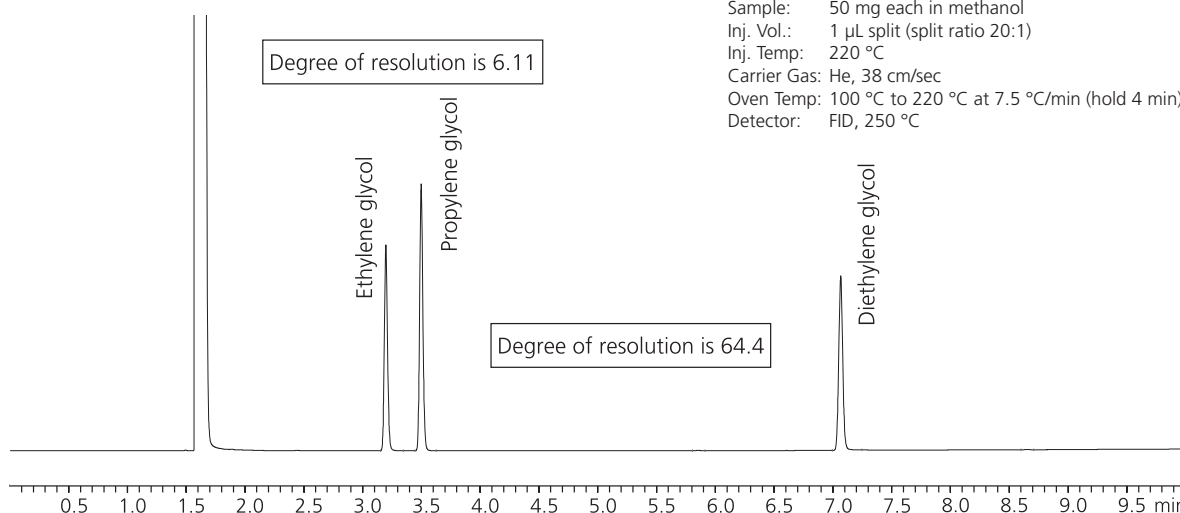
ID	df	Temp. Range	15 m	30 m	60 m
0.25 mm	0.10 µm	-20 to 280 °C	-	227-36216-01	227-36216-02
	0.25 µm	-20 to 280 °C	-	221-75777-30	227-36217-01
	0.50 µm	-20 to 270/280 °C	-	221-75778-30	227-36218-01
	1.00 µm	-20 to 260/280 °C	-	221-75779-30	227-36219-01
0.32 mm	0.10 µm	-20 to 280 °C	-	221-76184-30	227-36220-01
	0.25 µm	-20 to 280 °C	221-75780-15	221-75780-30	221-75780-60
	0.50 µm	-20 to 270/280 °C	-	221-75781-30	227-36221-01
	1.00 µm	-20 to 260/280 °C	-	221-75782-30	221-75782-60
	1.50 µm	-20 to 240/260 °C	-	227-36222-01	227-36222-02
0.53 mm	0.10 µm	-20 to 270/280 °C	-	227-36223-01	227-36223-02
	0.25 µm	-20 to 270/280 °C	-	227-36224-01	-
	0.50 µm	-20 to 260/270 °C	-	227-36225-01	-
	1.00 µm	-20 to 250/270 °C	-	221-75785-30	227-36226-01
	1.50 µm	-20 to 240/260 °C	-	227-36227-01	227-36227-02
	3.00 µm	-20 to 230/250 °C	-	227-36228-01	227-36228-02

* Maximum temperatures listed are for shorter length columns. Longer columns may have a different maximum temperature.

Analysis of Ethylene Glycol and Diethylene Glycol in Propylene Glycol

Conditions

Instrument: GC-2010 Plus AF/AOC-20i
 Column: SH-Rtx™-1701, 30 m, 0.32 mm ID, 1.00 µm (P/N: 221-75782-30)
 Sample: 50 mg each in methanol
 Inj. Vol.: 1 µL split (split ratio 20:1)
 Inj. Temp: 220 °C
 Carrier Gas: He, 38 cm/sec
 Oven Temp: 100 °C to 220 °C at 7.5 °C/min (hold 4 min)
 Detector: FID, 250 °C



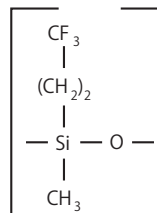
Capillary Columns

General-Purpose Columns

SH-Rtx™-200 / SH-Rtx™-200MS

- Mid-polarity phase: Crossbond™ trifluoropropyl methyl polysiloxane
- General-purpose columns for solvents, Freon® fluorocarbons, alcohols, ketones, silanes, glycols, and drugs of abuse.
- Equivalent to USP G6 phase.
- Similar phases: DB-210, DB-200, VF-200ms

■ SH-Rtx™-200 / SH-Rtx™-200MS Structure



SH-Rtx™-200

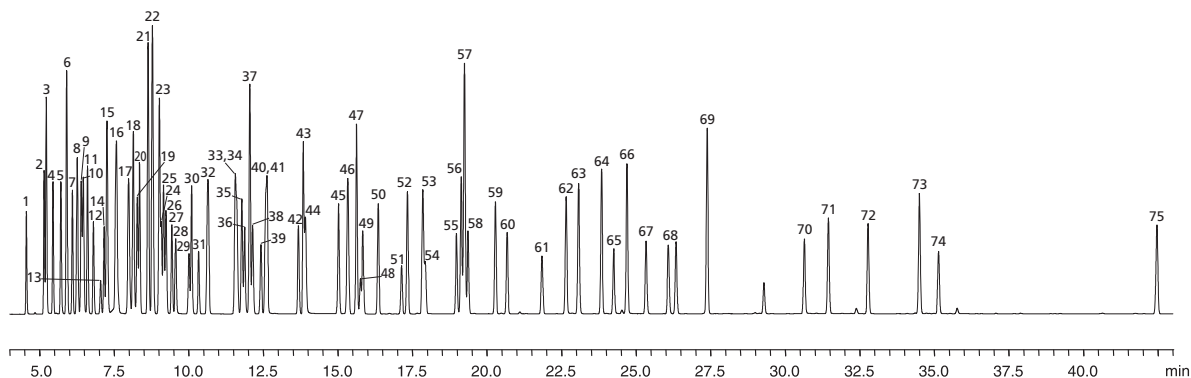
ID	df	Temp. Range	30 m	60 m	105 m
0.25 mm	0.10 µm	-20 to 320/340 °C	227-36179-01	227-36179-02	-
	0.25 µm	-20 to 320/340 °C	227-36180-01	227-36180-02	-
	0.50 µm	-20 to 310/330 °C	227-36181-01	227-36181-02	-
	1.00 µm	-20 to 290/310 °C	221-75800-30	227-36182-01	-
0.32 mm	0.10 µm	-20 to 320/340 °C	227-36183-01	227-36183-02	-
	0.25 µm	-20 to 320/340 °C	227-36184-01	227-36184-02	-
	0.50 µm	-20 to 310/330 °C	227-36185-01	227-36185-02	-
	1.00 µm	-20 to 290/310 °C	227-36186-01	227-36186-02	-
	1.50 µm	-20 to 280/300 °C	227-36187-01	227-36187-02	221-75804-15
0.53 mm	0.10 µm	-20 to 310/330 °C	227-36188-01	227-36188-02	-
	0.25 µm	-20 to 310/330 °C	227-36189-01	227-36189-02	-
	0.50 µm	-20 to 300/320 °C	227-36190-01	227-36190-02	-
	1.00 µm	-20 to 290/310 °C	227-36191-01	227-36191-02	-
	1.50 µm	-20 to 280/300 °C	227-36192-01	227-36192-02	-
	3.00 µm	-20 to 260/380 °C	227-36193-01	227-36193-02	-

* Maximum temperatures listed are for shorter length columns. Longer columns may have a different maximum temperature.

SH-Rtx™-200MS (Low-bleed phase for GCMS analysis)

ID	df	Temp. Range	30 m
0.25 mm	0.10 µm	-20 to 320/340 °C	227-36194-01
	0.25 µm	-20 to 320/340 °C	221-75811-30
	0.50 µm	-20 to 310/330 °C	227-36195-01
	1.00 µm	-20 to 290/310 °C	227-36196-01
0.32 mm	0.10 µm	-20 to 320/340 °C	227-36197-01
	0.25 µm	-20 to 320/340 °C	221-75814-30
	0.50 µm	-20 to 310/330 °C	227-36198-01
	1.00 µm	-20 to 290/310 °C	227-36199-01
0.53 mm	0.50 µm	-20 to 300/320 °C	227-36200-01
	1.00 µm	-20 to 290/310 °C	227-36201-01
	1.50 µm	-20 to 280/300 °C	227-36202-01

Analysis of Organic Solvents



Peaks

- | | | |
|--|---|---|
| 1. Methanol | 27. 1,2-Dimethoxyethane | 52. Methyl Butyl Ketone |
| 2. Ethanol | 28. Ethylene Glycol Monomethyl Ether | 53. Cyclohexanol |
| 3. Acetaldehyde + Ethyl Ether | 29. Ethylenechlorohydrin | 54. 1,1,2,2-Tetrachloroethane |
| 4. 1,1-Dichloroethylene | 30. Methyl Ethyl Ketone | 55. Isoamyl Acetate |
| 5. Isopropanol | 31. Nitromethane | 56. Butyl Acrylate |
| 6. Dichloromethane + Hexane | 32. Propylene Glycol Monomethyl Ether + Isopropyl Acetate | 57. Ethylene Glycol Monobutyl Ether |
| 7. trans-1,2-Dichloroethylene | 33. Ethyl Acrylate | 58. Anisole + Propylene Glycol Monomethyl Ether Acetate |
| 8. tert.-Butanol | 34. Isoamyl Alcohol | 59. n-Amyl Acetate |
| 9. tert.-Butyl Methyl Ether | 35. Methyl Methacrylate | 60. Ethylene Glycol Monoethyl Ether Acetate |
| 10. Isopropyl Ether | 36. Ethylene Glycol Monoethyl Ether | 61. N,N-Dimethylformamide |
| 11. n-Propanol | 37. Toluene | 62. Isooctanol |
| 12. Ethyl Formate | 38. 1,4-Dioxane | 63. Cyclohexanone |
| 13. Chloroform | 39. tetrachloroethylene | 64. o-Dichlorobenzene |
| 14. Methyl Acetate | 40. n-Propyl Acetate | 65. Diethylene Glycol Monoethyl Ether |
| 15. Cyclohexane | 41. n-Amyl Alcohol | 66. Benzyl Alcohol |
| 16. Tetrachloromethane + sec.-Butanol | 42. Epichlorohydrin | 67. N,N-Dimethylacetamide |
| 17. Isooctane | 43. Pyridine | 68. Dimethyl Sulfoxide |
| 18. Isobutanol + 1,1,1-Trichloroethane | 44. Ethylene Glycol Monoisopropyl Ether | 69. Tetralin |
| 19. Acetonitrile | 45. Isobutyl Acetate | 70. Diethylene Glycol Monobutyl Ether |
| 20. Acrylonitrile | 46. Methyl Isobutyl Ketone + Ethylbenzene | 71. 2-Ethylhexyl Acrylate |
| 21. Benzene | 47. Chlorobenzene | 72. N-Methylpyrrolidone |
| 22. Tetrahydrofuran + methylcyclohexane | 48. p-Xylene | 73. Isophorone |
| 23. Methyl Acrylate + 1,2-Dichloroethane | 49. m-Xylene | 74. 1,3-Dimethyl-2-Imidazolidinone |
| 24. Trichloroethylene | 50. n-Butyl Acetate | 75. Sulfolane |
| 25. n-Butanol | 51. o-Xylene | |
| 26. Ethyl Acetate | | |

Conditions

Instrument: GC-2010
 Column: SH-Rtx™-200, 60 m, 0.32 mm ID, 1.00 µm (P/N: 227-36186-02)
 Injection: Split (split ratio: 50:1)
 Inj. Temp: 250 °C
 Carrier Gas: He, constant linear velocity mode, 25 cm/sec
 Oven Temp: 40 °C (0 min) to 310 °C at 4 °C/min
 Detector: FID, 330 °C

For information on connection parts for capillary columns, please refer to page 45.

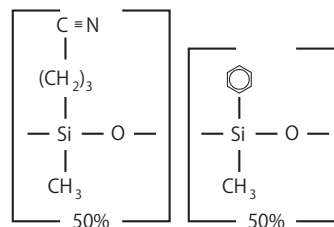
Capillary Columns

General-Purpose Columns

SH-Rtx™-225

- Polar phase: Crossbond™ 50% cyanopropylmethyl / 50% phenylmethyl polysiloxane
- General-purpose columns for FAMES, carbohydrates, sterols, flavor compounds.
- Equivalent to USP G7 and G19 phases.
- Similar phases: DB-225, DB-225MS, CP-Sil 43 CB, SPB-225

■ SH-Rtx™-225 Structure



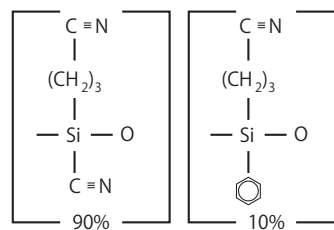
ID	df	Temp. Range	30 m	60 m
0.25 mm	0.25 μm	40 to 220/240 °C	227-36229-01	227-36229-02
	0.50 μm	40 to 220/240 °C	227-36230-01	–
0.32 mm	0.10 μm	40 to 220/240 °C	227-36231-01	–
	0.25 μm	40 to 220/240 °C	227-36232-01	–
	0.50 μm	40 to 220/240 °C	227-36233-01	–
	1.00 μm	40 to 200/220 °C	227-36234-01	227-36234-02
0.53 mm	0.25 μm	40 to 200/220 °C	227-36235-01	–
	0.50 μm	40 to 200/220 °C	227-36236-01	–
	1.00 μm	40 to 200/220 °C	227-36237-01	–

* Maximum temperatures listed are for shorter length columns. Longer columns may have a different maximum temperature.

SH-Rtx™-2330

- Highly polar phase: Crossbond™ 90% biscyanopropyl / 10% cyanopropylphenyl polysiloxane (Non-bonded)
- General-purpose columns for cis/trans FAMES, dioxin isomers.
- Equivalent to USP G8 and G48 phase.
- Similar phases: DB-23, VF-23ms, SP-2330, SP-2331, SP-2380

■ SH-Rtx™-2330 Structure



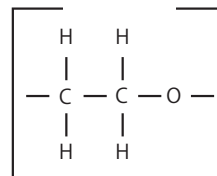
ID	df	Temp. Range	30 m	60 m
0.25 mm	0.10 μm	0 to 260/275 °C	227-36238-01	227-36238-02
	0.20 μm	0 to 260/275 °C	227-36239-01	227-36239-02
0.32 mm	0.10 μm	0 to 260/275 °C	227-36240-01	227-36240-02
	0.20 μm	0 to 260/275 °C	227-36241-01	227-36241-02
0.53 mm	0.10 μm	0 to 260/275 °C	–	227-36242-01
	0.20 μm	0 to 260/275 °C	227-36243-01	227-36243-02

* Maximum temperatures listed are for shorter length columns. Longer columns may have a different maximum temperature.

SH-Rtx™-Wax

- Polar phase: Crossbond™ polyethylene glycol
- Best polyethylene glycol (PEG) phase for alkenols, glycols, and aldehydes.
- Equivalent to USP G14, G15, G16, G20, G39 phases.
- Similar phases: DB-Wax, CP-Wax 52 CB

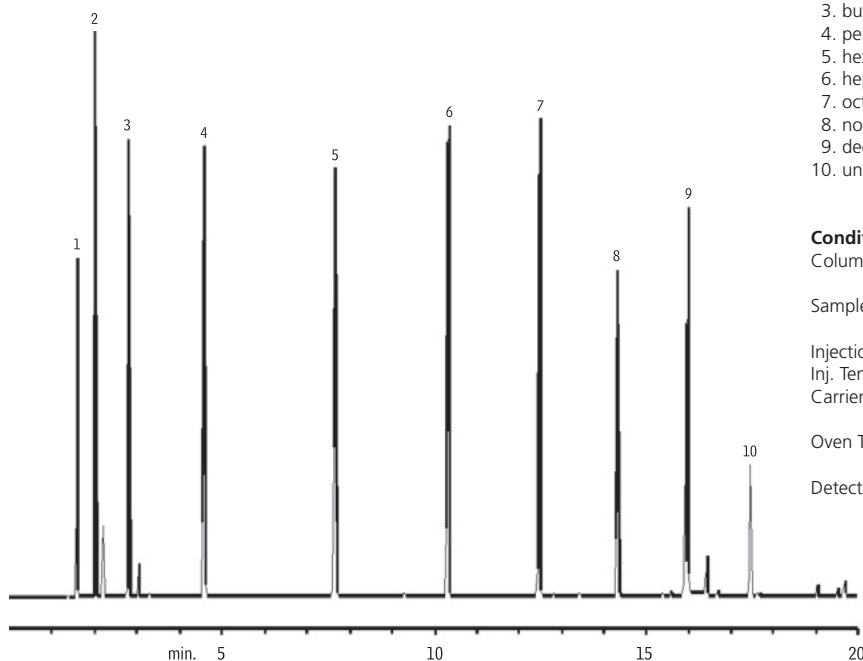
■ SH-Rtx™-Wax Structure



ID	df	Temp. Range	15 m	20 m	30 m	50 m	60 m
0.25 mm	0.10 µm	20 to 250 °C	–	–	221-76186-30	–	–
	0.25 µm	20 to 250 °C	–	–	221-75893-30	221-75893-50	221-75893-60
	0.50 µm	20 to 250 °C	–	–	221-75894-30	–	221-75894-60
0.32 mm	0.25 µm	20 to 250 °C	–	221-75895-20	221-75895-30	–	221-75895-60
	0.50 µm	20 to 250 °C	–	–	221-75896-30	221-75896-50	221-75896-60
	1.00 µm	20 to 240/250 °C	–	–	221-75897-30	–	221-75897-60
0.53 mm	0.25 µm	20 to 250 °C	–	–	227-36244-01	–	–
	0.50 µm	20 to 250 °C	–	–	221-76188-30	–	227-36245-01
	1.00 µm	20 to 240/250 °C	221-75899-15	–	221-75899-30	–	221-75899-60

* Maximum temperatures listed are for shorter length columns. Longer columns may have a different maximum temperature.

Aldehydes



Peaks

1. ethanal
2. propanal
3. butenal
4. pentanal
5. hexanal
6. heptanal
7. octanal
8. nonanal
9. decanal
10. undecanal

Conditions

Column: SH-Rtx™-Wax, 30 m, 0.25 mm ID, 0.50 µm (P/N: 221-75894-30)
 Samples: C2-C11 aldehydes mixture
 On-column conc.: 250 ng
 Injection: Split (split ratio: 100:1)
 Inj. Temp: 200 °C
 Carrier Gas: Hydrogen, linear velocity 35 cm/sec. set at 40 °C
 Oven Temp: 40 °C (hold 5 min) to 200 °C at 10 °C/min
 Detector: FID, 200 °C

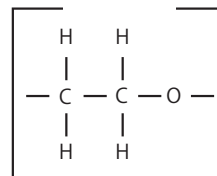
Capillary Columns

General-Purpose Columns

SH-Stabilwax™

- Polar phase: Crossbond™ polyethylene glycol
- Low-bleed PEG column ensures long column lifetimes.
- Rugged enough to withstand repeated water injections.
- Equivalent to USP G14, G15, G16, G20, and G39 phases.
- Similar phases: Innowax, CP-Wax 52 CB, VF-WAX MS, Supelcowax-10

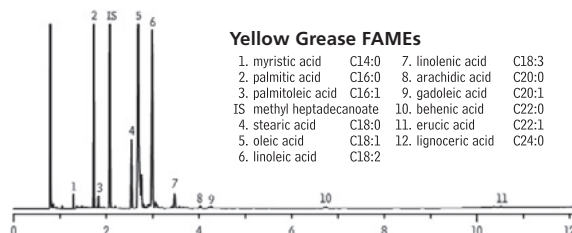
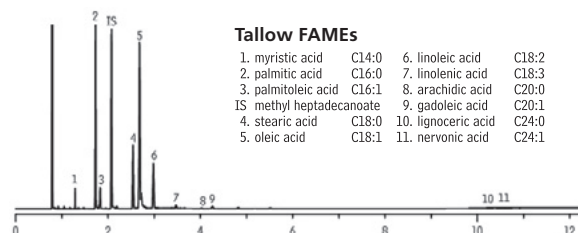
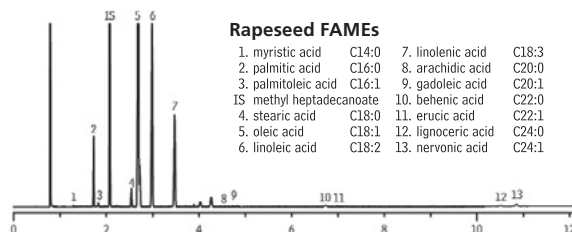
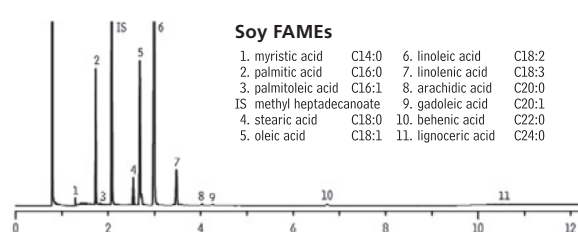
SH-Stabilwax™ Structure



ID	df	Temp. Range	30 m	50 m	60 m
0.25 mm	0.10 µm	40 to 250/260 °C	227-36246-01	–	227-36246-02
	0.25 µm	40 to 250/260 °C	227-36305-02	227-36247-01	227-36247-02
	0.50 µm	40 to 250/260 °C	227-36248-01	–	227-36248-02
0.32 mm	0.10 µm	40 to 250/260 °C	227-36249-01	–	227-36249-02
	0.25 µm	40 to 250/260 °C	221-75972-30	–	227-36250-01
	0.50 µm	40 to 250/260 °C	227-36251-01	–	221-75975-60
	1.00 µm	40 to 240/250 °C	227-36252-01	–	227-36252-02
0.53 mm	0.10 µm	40 to 250/260 °C	227-36253-01	–	–
	0.25 µm	40 to 250/260 °C	227-36254-01	–	227-36254-02
	0.50 µm	40 to 250/260 °C	227-36255-01	–	227-36255-02
	1.00 µm	40 to 240/250 °C	221-75979-30	–	227-36256-01
	1.50 µm	40 to 230/240 °C	227-36257-01	–	227-36257-02
	2.00 µm	40 to 220/230 °C	227-36258-01	–	–

* Maximum temperatures listed are for shorter length columns. Longer columns may have a different maximum temperature.

FAMES in Biodiesel Oils



Conditions

Column: SH-Stabilwax™, 30 m, 0.32 mm ID, 0.25 µm (P/N: 221-75972-30)
 Inj. Vol.: 1 µL split (split ratio 100:1)
 Inj. Temp: 250 °C
 Carrier Gas: Hydrogen, constant flow rate 3mL/min, linear velocity 60 cm/sec.
 Oven Temp: 210 °C (hold 5 min) to 230 °C at 20 °C/min (hold 5 min)
 Det.: FID, 250 °C

Capillary Columns

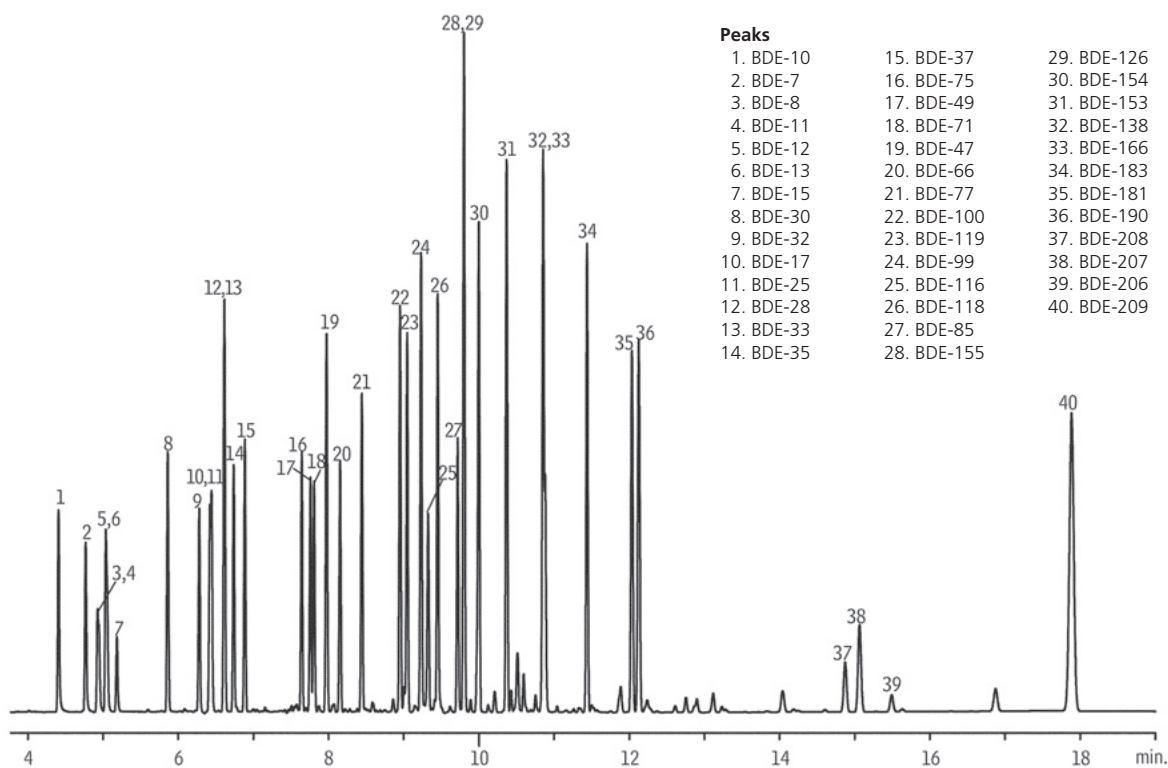
Dedicated Columns

SH-Rtx™-1614

- 5% diphenyl / 95% dimethyl polysiloxane
- Optimized for PBDE analysis by EPA Method 1614.
- Short column option resolves BDE-209 three times faster, with less thermal breakdown.
- Unique deactivation gives higher BDE-209 response than competitor columns, for greater analytical sensitivity.
- Exceeds EPA Method 1614 resolution criteria for BDE-49 and BDE-71.

ID	df	Temp. Range	15 m	30 m
0.25 mm	0.10 µm	-60 to 330/360 °C	227-36265-01	227-36265-02

Brominated Flame Retardants



Conditions

Column: SH-Rtx™-1614, 15 m, 0.25 mm ID, 0.10 µm (P/N: 227-36265-01)
 Sample: 100-300 ppb PBDE PAR Solution
 500 ppb decabromodiphenyl ether
 Inj. Vol.: 1 µL splitless (hold 1 min),
 Inj. Temp: 340 °C
 Carrier Gas: He, constant flow, linear velocity 60 cm/sec., 120 °C
 Oven Temp: 120 °C (hold 1 min) to 275 °C at 15 °C/min to 300 °C at 5 °C/min (hold 5 min)
 Detector: µ-ECD, 345 °C

Capillary Columns

Dedicated Columns

SH-Rtx™-OPP2

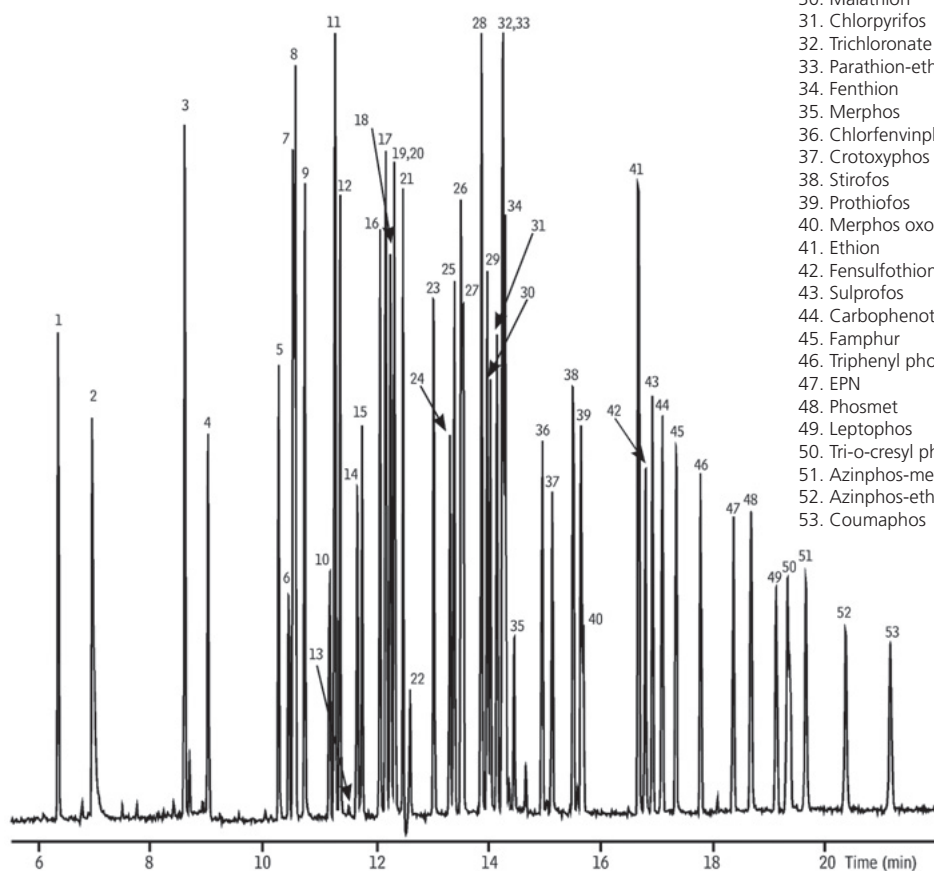
- Dedicated column for organophosphorus pesticides; best column combination for US EPA Method 8141.
- Low bleed - ideal for GC-FPD, GC-NPD, or GCMS analyses.

ID	df	Temp. Range	30 m
0.32 mm	0.32 µm	-20 to 310/330 °C	221-75887-30

Organophosphorus Pesticides (U.S. EPA Method 8141A)

Peaks

- | | | | |
|----------------------------|-------------------|----------------|---|
| 1. Dichlorvos | 8. Thionazin | 15. Demeton-S | 22. Phosphamidon isomer (breakdown product) |
| 2. Hexamethylphosphoramide | 9. Ethoprop | 16. Terbufos | 23. Dichlorofenthion |
| 3. Mevinphos | 10. Naled | 17. Dimethoate | 24. Phosphamidon |
| 4. Trichlorfon | 11. Sulfotepp | 18. Diazinon | 25. Chlorpyrifos methyl |
| 5. TEPP | 12. Phorate | 19. Dioxathion | 26. Methyl parathion |
| 6. Demeton-O | 13. Dicrotophos | 20. Fonophos | 27. Ronnel |
| 7. Tributyl phosphate (SS) | 14. Monocrotophos | 21. Disulfoton | 28. Aspon |



Conditions

Columns: SH-Rtx™-OPP2, 30 m, 0.32 mm ID, 0.32 µm (P/N: 221-75887-30)
 Inj. Vol.: 1 µL splitless (hold 1 min)
 Inj. Temp: 200 °C
 Oven Temp: 80 °C (hold 0.5 min) to 280 °C at 12 °C/min (hold 10 min)

Carrier Gas: He
 Dead Time: 1.03 min at 80 °C
 Detector: FPD, 250 °C
 Notes: Constant pressure

SH-Rtx™-CLP / SH-Rtx™-CLP II

- Dedicated columns for organochlorine pesticides and herbicides.
- Low bleed - ideal for high-sensitivity GC-ECD or GCMS analyses.
- Baseline separations in less than 10 minutes.
- Analyze EPA Method 8081B, 8082A, 8151A, 504.1, 515, 508.1, and 552.2 compounds without time-consuming column changes.
- Similar phases: DB-CLP1 / DB-CLP2

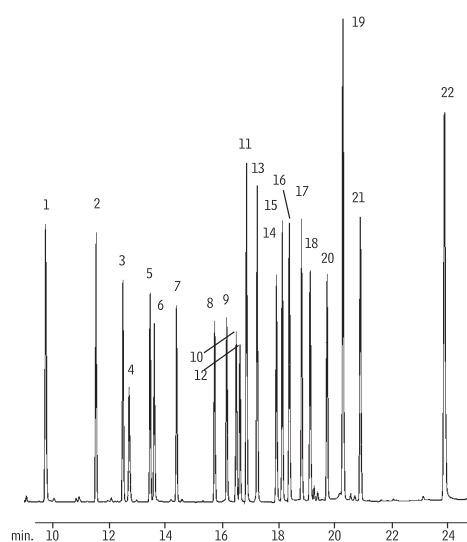
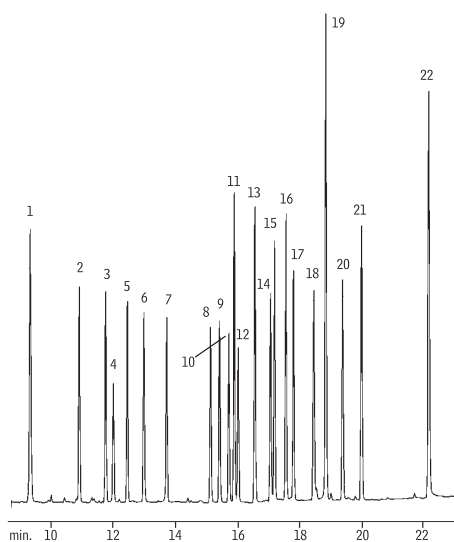
SH-Rtx™-CLP

ID	df	Temp. Range	30 m
0.32 mm	0.32 µm	-20 to 320/340 °C	227-36266-01
	0.50 µm	-20 to 320/340 °C	221-75879-30

SH-Rtx™-CLP II

ID	df	Temp. Range	30 m
0.32 mm	0.25 µm	-20 to 320/340 °C	227-36267-01

Organochlorine Pesticides (US EPA Method 8081)



Peaks

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

Conditions

Column: SH-Rtx™-CLP, 30 m, 0.32 mm ID, 0.50 µm
(P/N: 221-75879-30)
Oven Temp: 120 °C (hold 1 min) to 300 °C (hold 10 min)
at 9 °C/min
Inj.: Direct
Inj. Temp: 200 °C
Detector: ECD, 300 °C with anode purge
Dead time: 1.9 min
Head pressure: 8.7 psi (constant)
Flow rate: 1.3 mL/min at 120 °C, He

SH-Rtx™-CLP2, 30 m, 0.32 mm ID, 0.25 µm
(P/N: 227-36267-01)

Capillary Columns

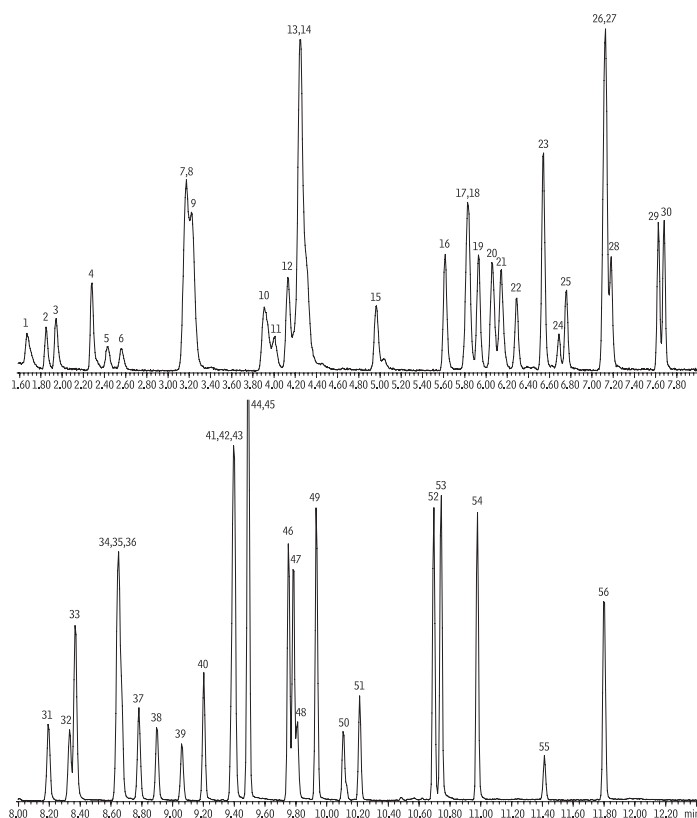
Dedicated Columns

SH-Rtx™-VMS

- Dedicated columns for analyzing volatile organic pollutants by GCMS including methods TO-15, TMS, and EPA 8260.
- Complete separation of U.S. EPA Method 8260 compounds in less than 10 minutes.

ID	df	Temp. Range	20 m	30 m	60 m
0.18 mm	1.00 µm	-40 to 240/260 °C	227-36412-01	–	–
0.25 mm	1.40 µm	-40 to 240/260 °C	–	227-36268-01	227-36268-02
0.32 mm	1.80 µm	-40 to 240/260 °C	–	227-36269-01	227-36269-02

Volatile Organics (US EPA CLP 04.1)



Peaks

- dichlorodifluoromethane
- chloromethane
- vinyl chloride
- bromomethane
- chloroethane
- trichlorofluoromethane
- 1,1-dichloroethene
- carbon disulfide
- 1,1,2-trichloro-1,2,2-trifluoroethane
- methylene chloride
- acetone
- trans*-1,2-dichloroethene
- methyl acetate
- methyl *tert*-butyl ether
- 1,1-dichloroethane
- cis*-1,2-dichloroethane
- cyclohexane
- bromochloromethane (IS)
- chloroform
- carbon tetrachloride
- 1,1,1-trichloroethane
- 2-butanone
- benzene
- 1,2-dichloroethane-d4 (SS)
- 1,2-dichloroethane
- methylcyclohexane
- trichloroethene
- 1,4-difluorobenzene (IS)
- 1,2-dichloropropane
- bromodichloromethane
- cis*-1,3-dichloropropene
- toluene d8 (SS)
- toluene
- tetrachloroethane
- 4-methyl-2-pentanone
- trans*-1,3-dichloropropane
- 1,1,2-trichloroethane
- dibromochloromethane
- 1,2-dibromoethane
- 2-hexanone
- chlorobenzene d5 (IS)
- chlorobenzene
- ethylbenzene
- m*-xylene
- p*-xylene
- o*-xylene
- styrene
- bromoform
- isopropylbenzene
- 4-bromofluorobenzene (SS)
- 1,1,2,2-tetrachloroethane
- 1,3-dichlorobenzene
- 1,4-dichlorobenzene
- 1,2-dichlorobenzene
- 1,2-dibromo-3-chloropropane
- 1,2,4-trichlorobenzene

Conditions

Column: SH-Rtx™-VMS, 30 m, 0.25 mmID, 1.40 µm
(P/N: 227-36268-01)

Purge and Trap: Trap: #10 (Tenax₂/silica gel/carbon molecular sieve)

Sample Temp: ambient

Purge: 11 min at 40 mL/min

Desorb preheat: 185 °C

Desorb: 0.5 min at 190 °C

Desorb flow rate: 35.0 mL/min

Bake: 8 min at 210 °C

Interface: split injector

Transfer Line Temp: 150 °C

Inj.: Split (split ratio: 35:1)

Inj. Temp: 200 °C

Carrier Gas: He, linear velocity 34 cm/sec., 40 °C, constant flow

Oven Temp: 40 °C (hold 4 min) to 90 °C at 16 °C/min to 220 °C at 32 °C/min (hold 5 min)

Detector: MS

Transfer Line Temp: 150 °C

Scan Range: 35-300 amu.

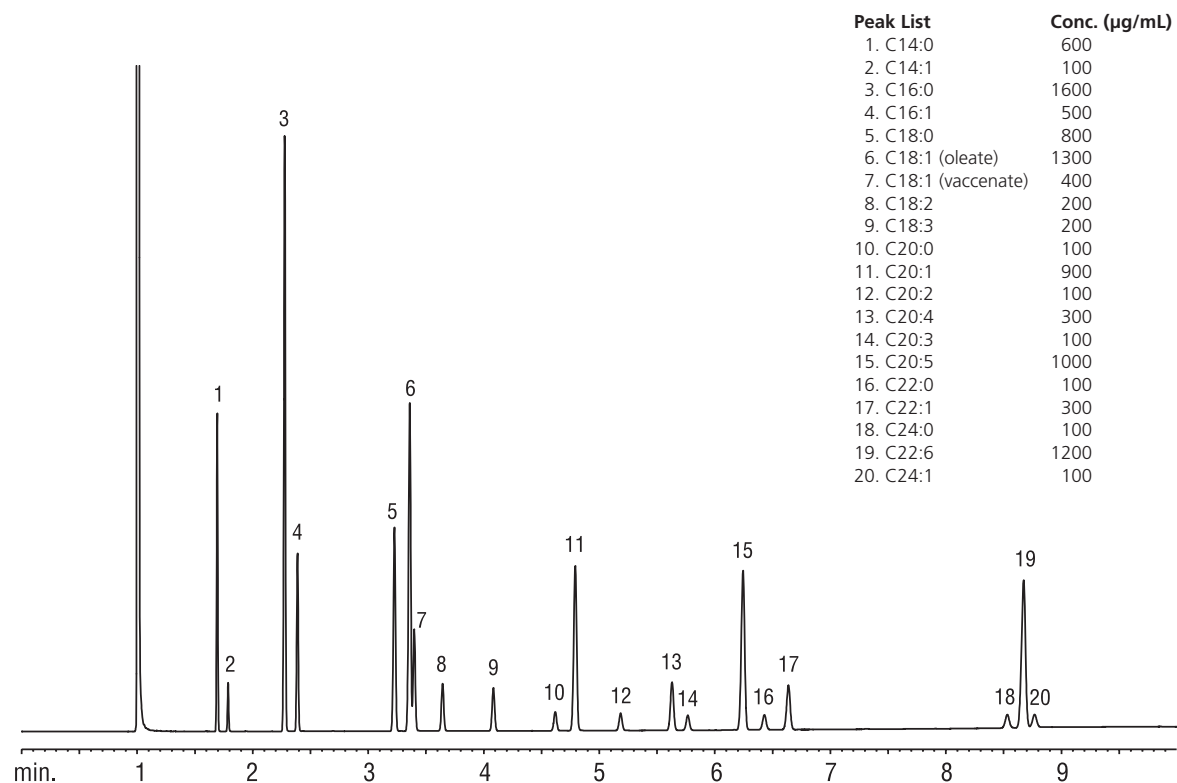
Ionization: EI

SH-FAMEWAX™

- Dedicated column for FAMES, specially tested with a FAME mixture.
- Equivalent to USP G16 phase.
- Similar phases: Select FAME, Omegawax

ID	df	Temp. Range	30 m
0.32 mm	0.25 µm	20 to 240/250 °C	227-36270-01

FAMES (Marine Oil Standard)



Conditions

Column: SH-FAMEWAX™, 30 m, 0.32 mm ID, 0.25 µm (P/N: 227-36270-01)
 Inj. Vol.: 1 µL split (split ratio: 100:1)
 Conc.: 10,000 µg/mL in isoctane (total FAMEOs)
 Inj. Temp: 250 °C
 Carrier Gas: Hydrogen, constant flow rate 3 mL/min
 Oven Temp: 195 - 240 °C at 5 °C/min (hold 1 min)
 Detector Temp: 275 °C

Capillary Columns

Dedicated Columns

SH-Rtx™-BAC Plus 1 / SH-Rtx™-BAC Plus 2

- Optimized column selectivities guarantee resolution of ethanol, internal standards, and frequently encountered interferences.
- Robust and reproducible column chemistry ensures longer column lifetime and consistent results.

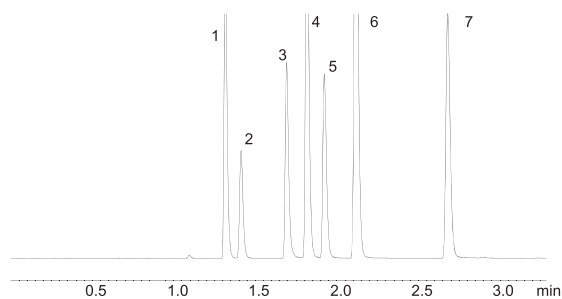
SH-Rtx™-BAC Plus 1

ID	df	Temp. Range	30 m
0.32 mm	1.80 µm	-20 to 240/260 °C	227-36260-01
0.53 mm	3.00 µm	-20 to 240/260 °C	227-36261-01

SH-Rtx™-BAC Plus 2

ID	df	Temp. Range	30 m
0.32 mm	0.60 µm	-20 to 240/260 °C	227-36263-01
0.53 mm	1.00 µm	-20 to 240/260 °C	227-36264-01

Analysis of Alcohol Compounds in Blood



SH-Rtx™-BAC Plus 2

Peaks

- 1 Acetaldehyde
- 2 Methanol
- 3 Ethanol
- 4 Acetone
- 5 Isopropanol
- 6 t-Butanol
- 7 1-Propanol

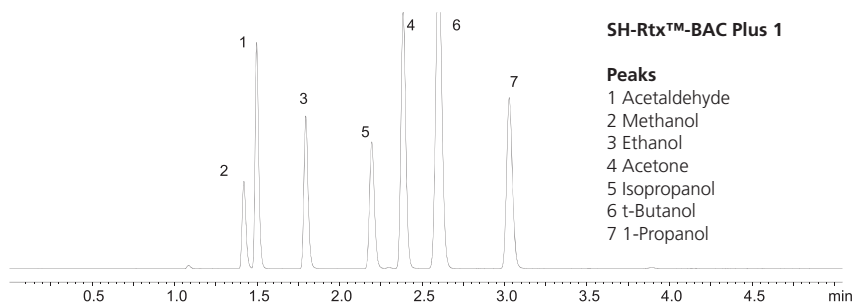
Conditions

Instrument: GC-2010 Plus AF + HS-20
 Headspace: Oven Temp.: 85 °C
 Vial Warming Time: 15 min
 Vial Pressurization Time: 1 min
 Injection Time: 0.5 min
 Sample Line Temp: 150 °C
 Vial Volume: 20 mL
 Vial Agitation: Off
 Vial Pressurization: 100 kPa
 Load Time: 0.5 min
 Needle Flash Time: 0.5 min
 Transfer Line Temp: 150 °C

Column: SH-Rtx™-BAC Plus 2, 30 m, 0.32 mm ID, 0.60 µm (P/N: 227-36263-01)
 SH-Rtx™-BAC Plus 1, 30 m, 0.32 mm ID, 1.80 µm (P/N: 227-36260-01)

Column Temp: 40 °C

Inj.: Split (split ratio: 20:1)
 Carrier Gas: He, 100 kPa
 Detector: FID, 250 °C
 Makeup Gas: He, 30 mL/min
 Hydrogen: 40 mL/min
 Air: 400 mL/min



SH-Rtx™-BAC Plus 1

Peaks

- 1 Acetaldehyde
- 2 Methanol
- 3 Ethanol
- 4 Acetone
- 5 Isopropanol
- 6 t-Butanol
- 7 1-Propanol

SH-Rtx™-5 Amine / SH-Rtx™-35 Amine

- Dedicated columns for amines and other basic compounds, including alkylamines, diamines, triamines, ethanolamines, and nitrogen-containing heterocyclics.

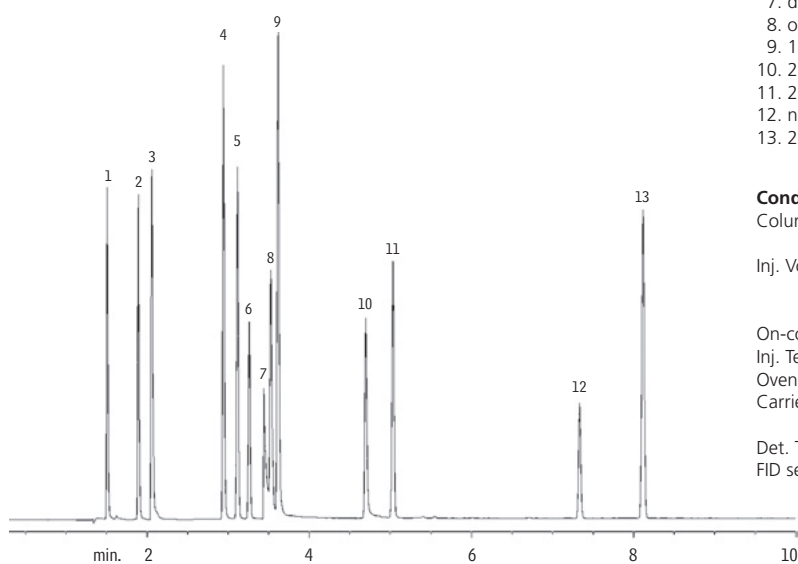
SH-Rtx™-5 Amine (Low-polarity phase: Crossbond™ 5% diphenyl / 95% dimethyl polysiloxane)

ID	df	Temp. Range	30 m
0.25 mm	0.25 µm	-60 to 300/315 °C	227-36282-01
	0.50 µm	-60 to 300/315 °C	227-36283-01
	1.00 µm	-60 to 300/315 °C	227-36284-01
0.32 mm	1.00 µm	-60 to 300/315 °C	227-36332-02
	1.50 µm	-60 to 290/305 °C	227-36285-01
0.53 mm	1.00 µm	-60 to 290/305 °C	227-36286-01
	3.00 µm	-60 to 280/295 °C	227-36287-01

SH-Rtx™-35 Amine (Mid-polarity phase: Crossbond™ 35% diphenyl / 65% dimethyl polysiloxane)

ID	df	Temp. Range	30 m
0.25 mm	0.50 µm	0 to 220 °C	227-36288-01
	1.00 µm	0 to 220 °C	227-36289-01
0.32 mm	1.00 µm	0 to 220 °C	227-36290-01
	1.50 µm	0 to 220 °C	227-36291-01
0.53 mm	1.00 µm	0 to 220 °C	227-36292-01
	3.00 µm	0 to 220 °C	227-36293-01

Amines & Phenols



Peaks

1. diethylamine
2. pyridine
3. morpholine
4. phenol
5. aniline
6. 2-chlorophenol
7. diethylenetriamine
8. octylamine
9. 1-methyl-2-pyrrolidinone
10. 2-nitrophenol
11. 2,6-dimethylaniline
12. nicotine
13. 2-nitroaniline

Conditions

Column: SH-Rtx™-5 Amine, 30 m, 0.32 mm ID, 1.00 µm (P/N: 227-36290-01)
 Inj. Vol.: 1 µL split injection of miscellaneous amines and phenols in water (split ratio: 25:1)
 On-column conc.: 22 ng
 Inj. Temp: 305 °C
 Oven Temp: 120 °C to 220 °C at 10 °C/min
 Carrier Gas: Hydrogen, linear velocity 38cm/sec. set at 120 °C
 Det. Temp: 305 °C
 FID sensitivity: 6.4 × 10⁻¹¹ AFS

Capillary Columns

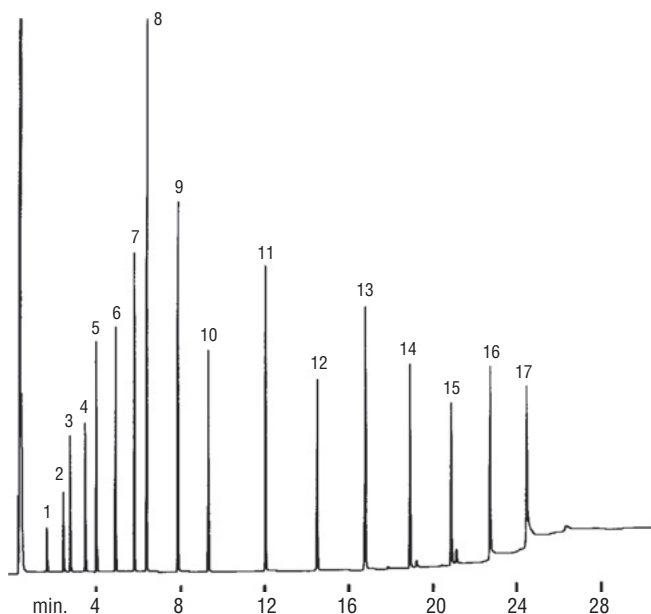
Dedicated Columns

SH-Stabilwax™-DA

- Polar phase: Crossbond™ acid-deactivated Carbowax™ polyethylene glycol
- Dedicated columns for free (underivatized) acids, some inorganic acids.
- Resistant to oxidative damage.
- Equivalent to USP G25 and G35 phases.
- Similar phases: HP-FFAP, DB-FFAP, VF-DA, CP-Wax 58 CB, CP-FFAP CB, Nukol

ID	df	Temp. Range	30 m	60 m
0.25 mm	0.10 µm	40 to 250/260 °C	227-36271-01	-
	0.25 µm	40 to 250/260 °C	221-75981-30	227-36272-01
	0.50 µm	40 to 250/260 °C	227-36273-01	227-36273-02
0.32 mm	0.10 µm	40 to 250/260 °C	227-36274-01	-
	0.25 µm	40 to 250/260 °C	227-36321-02	227-36275-01
	0.50 µm	40 to 250/260 °C	227-36322-02	227-36276-01
	1.00 µm	40 to 240/250 °C	227-36277-01	227-36277-02
0.53 mm	0.25 µm	40 to 250/260 °C	227-36278-01	227-36278-02
	0.50 µm	40 to 250/260 °C	227-36279-01	227-36279-02
	1.00 µm	40 to 240/250 °C	227-36280-01	227-36280-02
	1.50 µm	40 to 230/240 °C	227-36281-01	227-36281-02

Organic Acids (Free Fatty Acids)



Peaks

1. acetic acid
2. propionic acid
3. isobutyric acid
4. *n*-butyric acid
5. isovaleric acid
6. *n*-valeric acid
7. isocaproic acid
8. caproic acid
9. heptanoic acid
10. caprylic acid
11. capric acid
12. lauric acid
13. myristic acid
14. palmitic acid
15. stearic acid
16. arachidic acid
17. behenic acid

Conditions

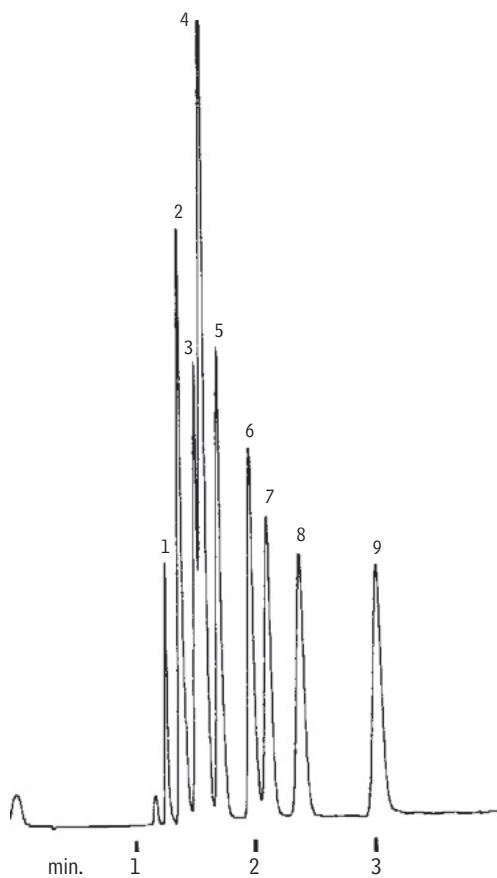
Column: SH- Stabilwax™-DA, 30 m, 0.53 mm ID, 0.25 µm (P/N: 227-36278-01)
 Sample: free acid standard
 Conc.: 25 ng/µL.
 Inj. Vol.: 0.3 µL direct
 Inj. Temp: 280 °C
 Oven Temp: 100 °C (hold 2 min) to 280 °C at 8 °C/min, (hold 10 min)
 Carrier Gas: Hydrogen, flow rate 10 cc/min, linear velocity 80 cm/sec.
 Detector: FID, 280 °C

SH-Stabilwax™-DB

- Polar phase: Crossbond™ base-deactivated Carbowax™ polyethylene glycol
- Dedicated columns for underivatized amines and other basic compounds, including alkylamines, diamines, triamines, nitrogen-containing heterocyclics. No need for column priming.
- Similar phases: CAM, CP-Wax 51 for Amines, Carbowax Amine

ID	df	Temp. Range	30 m	60 m
0.25 mm	0.25 µm	40 to 210/220 °C	227-36294-01	-
	0.50 µm	40 to 210/220 °C	227-36295-01	-
0.32 mm	0.25 µm	40 to 210/220 °C	227-36296-01	227-36296-02
	0.50 µm	40 to 210/220 °C	227-36297-01	-
	1.00 µm	40 to 210/220 °C	227-36298-01	-
0.53 mm	0.50 µm	40 to 210/220 °C	227-36299-01	-
	1.00 µm	40 to 210/220 °C	227-36300-01	227-36300-02

Amines (low MW)



Peaks

1. trimethylamine
2. dimethylamine
3. ethylamine
4. methylamine
5. isopropylamine
6. *n*-propylamine
7. *tert*-butylamine
8. diethylamine
9. *sec*-butylamine

Conditions

Column: SH-Stabilwax™-DB, 30 m, 0.53 mm ID, 1.00 µm
(P/N: 227-36300-01)

Inj. Vol.: 1 µL direct injection of amines in water

Inj. Temp: 250 °C

Carrier Gas: Hydrogen, flow rate 5 cc/min, linear velocity
40 cm/sec.

Oven temp.: 45 °C

Detector: FID, 250 °C

Capillary Columns

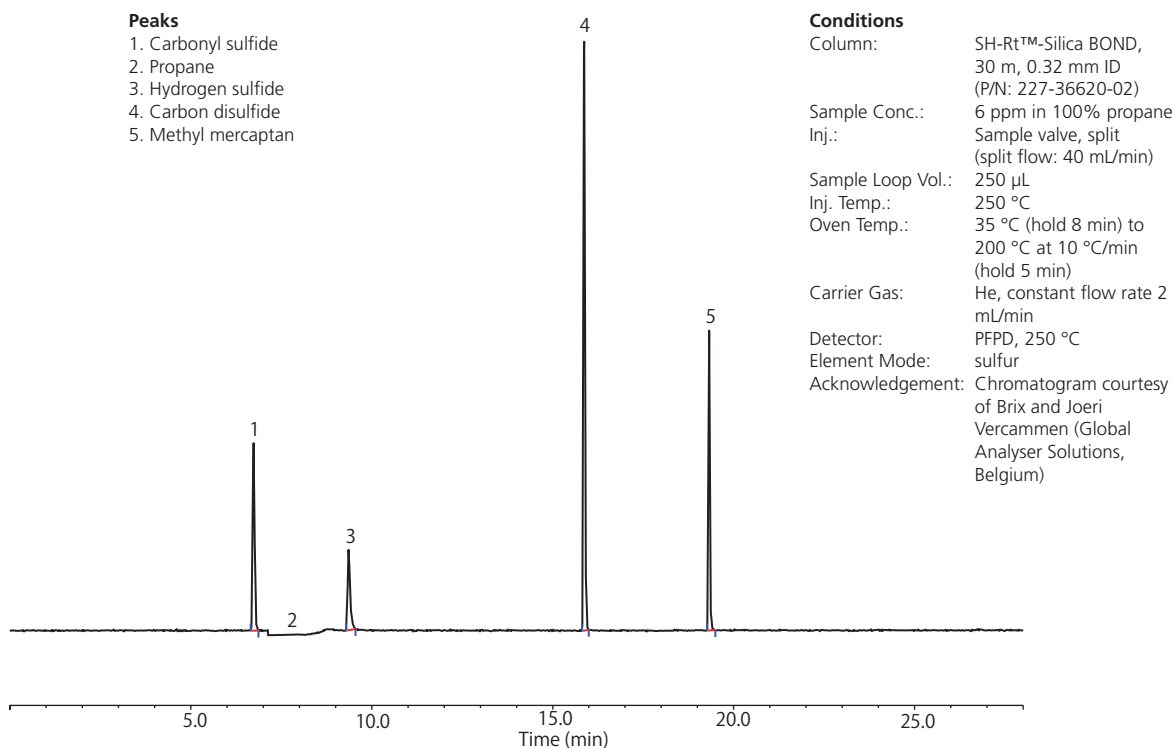
PLOT Columns

SH-Rt™-Silica BOND

- Bonded silica stationary phase minimizes impact of water, resulting in reproducible retention times for water-containing samples.
- Versatile column ideal for analysis of light hydrocarbons, sulfur gases, halocarbons, and carbon dioxide.
- Individually QC tested with sensitive C4 probes to ensure consistent selectivity.
- Proprietary manufacturing process practically eliminates particle release, reducing downtime due to obstructed FID jets.
- Similar phases: GS-GASPRO, CP-SilicaPLOT

ID	Temp. Range	30 m
0.32 mm	-80 to 260 °C	227-36620-02

Sulfur Compounds in Propane



Trap columns for adhering dislodged particles from PLOT columns are also available. Please refer to page 43.

SH-Rt™-Alumina BOND

- The reactivity of the aluminum oxide stationary phase is minimized to improve column response for polar unsaturates, such as dienes, and the column's sensitivity (or response) ensures linear and quantitative chromatographic analysis for these compounds.
- Highly selective for C1–C5 hydrocarbons
- Separate all saturated and unsaturated hydrocarbon isomers above ambient temperatures.

SH-Rt™-Alumina BOND/Na₂SO₄

- Na₂SO₄ deactivation
- Acetylene and propadiene elute after butanes.
- Best separation for butene isomers (impurities in butene streams).
- Methyl acetylene elutes after 1,3-butadiene.
- Cyclopropane (impurity in propylene) elutes well before propylene.
- Similar phases: GS-ALUMINA, CP-Al₂O₃/Na₂SO₄, Alumina sulfate PLOT

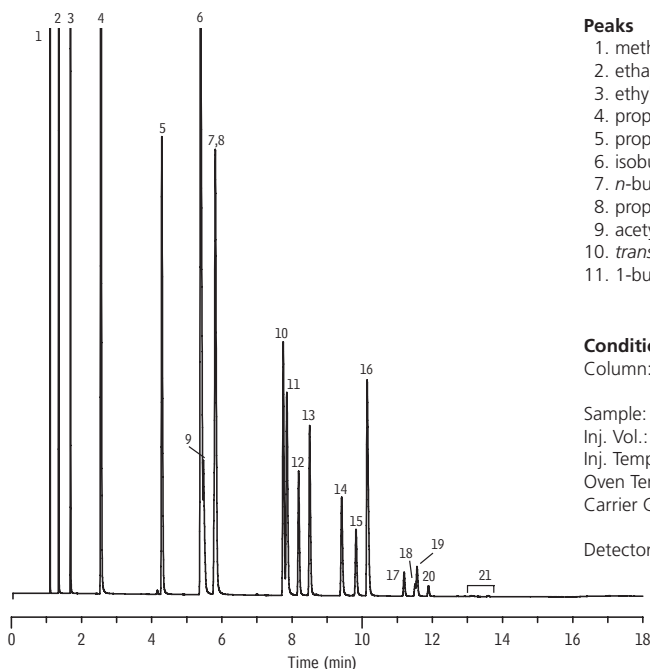
ID	df	Temp. Range	50 m
0.53 mm	10 µm	to 200 °C	227-36301-01

SH-Rt™-Alumina BOND/KCl

- KCl deactivation
- Lowest polarity alumina column in Shimadzu PLOT columns.
- Low moisture sensitivity reduces the need for frequent regeneration.
- Acetylene elutes before n-butane.
- Methyl acetylene (impurity in 1,3-butadiene) elutes before 1,3-butadiene.
- Similar phases: GS-Alumina KCl, HP-PLOT Al₂O₃ KCl, CP-Al₂O₃/KCl, Alumina chloride PLOT

ID	df	Temp. Range	50 m
0.53 mm	10 µm	to 200 °C	221-76139-50

Refinery Gas



Peaks

- | | |
|----------------------------|-----------------------------|
| 1. methane | 12. isobutylene |
| 2. ethane | 13. <i>cis</i> -2-butene |
| 3. ethylene | 14. isopentane |
| 4. propane | 15. <i>n</i> -pentane |
| 5. propylene | 16. 1,3-butadiene |
| 6. isobutane | 17. <i>trans</i> -2-pentene |
| 7. <i>n</i> -butane | 18. 2-methyl-2-butene |
| 8. propadiene | 19. 1-pentene |
| 9. acetylene | 20. <i>cis</i> -2-pentene |
| 10. <i>trans</i> -2-butene | 21. hexanes |
| 11. 1-butene | |

Conditions

- Column: SH-Rt™-Alumina BOND/KCl, 50 m, 0.53 mm ID, 10 µm (P/N: 221-76139-50)
- Sample: Refinery gas
- Inj. Vol.: 10 µL split (split vent flow 80mL/min)
- Inj. Temp: 200 °C
- Oven Temp: 45 °C (hold 1 min) to 200 °C at 10 °C/min (hold 3.5 min)
- Carrier Gas: Hydrogen, constant pressure, 8.0 psi, linear velocity 74 cm/sec. at 45 °C
- Detector: FID, 200 °C

Capillary Columns

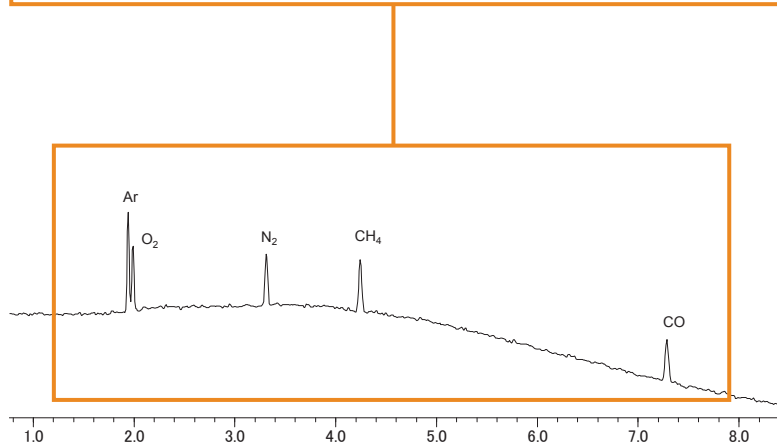
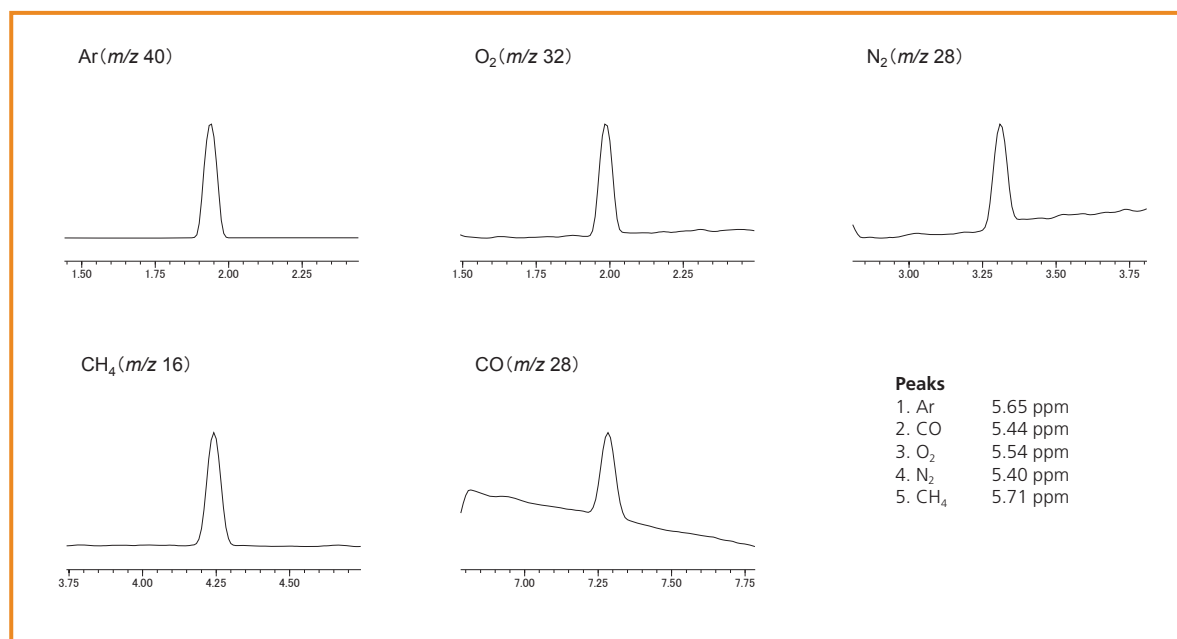
PLOT Columns

SH-Rt™-Msieve 5A

- Stationary phase: Molecular sieve 5A
- Easily separate permanent gases at temperatures above ambient.
- Improve accuracy with sharp, symmetrical peaks for argon, oxygen, and carbon monoxide.
- Similar phases: HP-PLOT Molesieve, CP-Molsieve 5A, Mol Sieve 5A PLOT

ID	df	Temp. Range	30 m
0.32 mm	30 µm	to 300 °C	227-36611-02
0.53 mm	50 µm	to 300 °C	221-75763-30

Analysis of Inorganic Gas



Conditions

Instrument: GCMS-QP2010 Ultra
Column: SH-RT™-Msieve 5A, 30 m, 0.32 mm ID, 30 µm (P/N: 227-36611-02)
Sample injection: Gas sampler (1 mL loop volume) (P/N: 223-57653-91)
Inj. Mode: Split (split ratio: 50:1)
Inj. Temp: 200 °C
Control Mode: Pressure (100 kPa)
Carrier Gas: Helium
Oven Temp: 35 °C (hold 2 min) to 150 °C at 10 °C/min (hold 5 min)
Detector: MS
 Interface Temp: 200 °C
 Ion Source Temp: 200 °C
 Measurement Mode: Scan (m/z 10 to 100)
 Event Time: 0.5 sec
 Ionization Method: EI
 Emission Current: 150 µA

SH-Rt™-Q-BOND

- Non-polar PLOT column incorporating 100% divinylbenzene.
- Excellent for analysis of C1 to C3 hydrocarbons as well as isomers and alkanes up to C12.
- High retention for CO2 simplifies gas analysis; CO2 and methane separated from O2/N2/CO. (Note: O2/N2/CO not separated at ambient temperature.)
- Use for analysis of oxygenated compounds and solvents.
- Similar phases: HP-PLOT Q, CP-PoraPLOT Q, CP-PoraBOND Q, Supel-Q PLOT

ID	df	Temp. Range	30 m
0.32 mm	10 µm	to 280/300 °C	221-75764-30
0.53 mm	20 µm	to 280/300 °C	221-75765-30

SH-Rt™-U-BOND

- Polar PLOT column, incorporating divinylbenzene ethylene glycol / dimethylacrylate.
- Highest polarity porous polymer column in Shimadzu PLOT columns.
- Highly inert for the analysis of polar and nonpolar compounds.
- Ideal for trace H2S, COS, and mercaptans in hydrocarbon streams.
- Similar phases: HP-PLOT U, CP-PoraPLOT U, CP-PoraBOND U

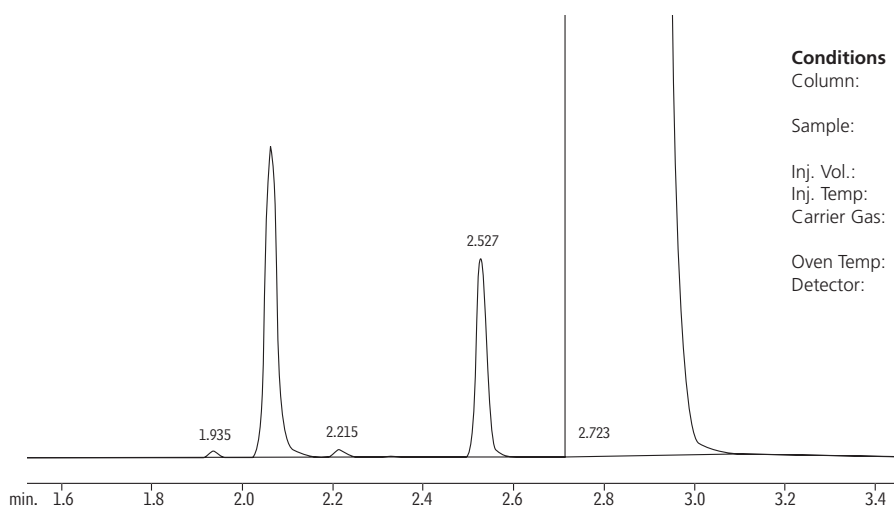
ID	df	Temp. Range	30 m
0.53 mm	20 µm	to 190 °C	227-36302-01

Water and Ethanol in Acetone

Peaks	Ret. Time
Methane	1.935
Water	2.063
Methanol	2.215
Ethanol	2.527
Acetone	2.723

Conditions

Column: SH-Rt™-Q-BOND, 30 m, 0.53 mm ID, 20 µm (P/N: 221-75765-30)
 Sample: 0.5% water and ethanol in acetone
 Inj. Vol.: 3 µL split (split ratio 11:1)
 Inj. Temp: 250 °C
 Carrier Gas: He, constant flow, linear velocity 28.7 cm/sec. @ 200 °C
 Oven Temp: 200 °C, isothermal
 Detector: TCD, 260 °C



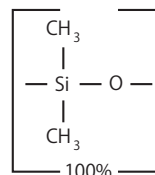
Capillary Columns

Metal Columns

SH-MXT™-1

- Non-polar phase: Crossbond™ 100% dimethyl polysiloxane
- General-purpose columns for solvent impurities, PCB congeners (e.g., Aroclor mixes), gases, natural gas odorants, sulfur compounds, essential oils, hydrocarbons, semivolatiles, pesticides, and oxygenates.
- Equivalent to USP G1, G2, G38 phases.
- 4.5" standard coil diameter.
- Similar phases: DB-PS1, UAC-1

■ SH-MXT™-1 Structure

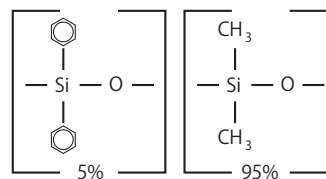


ID	df	Temp. Range	15 m
0.28 mm	0.10 μm	-60 to 430 °C	221-75734-15

SH-MXT™-5

- Low-polarity phase: Crossbond™ 5% diphenyl / 95% dimethyl polysiloxane
- General-purpose columns for drugs, solvent impurities, pesticides, hydrocarbons, PCB congeners (e.g., Aroclor mixes), essential oils, and semivolatiles.
- Equivalent to USP G27 and G36 phases.
- 4.5" standard coil diameter.
- Similar phases: DB-PS5, VF-5ht UltiMetal

■ SH-MXT™-5 Structure



ID	df	Temp. Range	30 m
0.25 mm	0.25 μm	-60 to 430 °C	221-75743-30

Download more application data of GC/GCMS from
<http://www.shimadzu.com/an/gc-datasheet.html>
<http://www.shimadzu.com/an/gcms-datasheet.html>

Capillary Columns

Guard Columns

SH-Rxi™ Guard / Retention Gap Columns

- Extend column lifetime.
- Excellent inertness—obtain lower detection limits for active compounds.
- Sharper chromatographic peaks by utilizing retention gap technology.
- Maximum temperature: 360 °C.

ID	5 m	10 m
0.25 mm	227-36303-01	227-36304-01
0.32 mm	227-36305-01	227-36306-01
0.53 mm	227-36307-01	227-36308-01

SH-Particle Trap (for PLOT columns)

- Includes two Press-Tight® connectors and a 2.5 m column.
- Protects detector and valves; connects between column and detector or valve.
- Eliminates detector spikes and scratches in valve rotors.



* For information about Press-Tight® connectors, please refer to page 46.

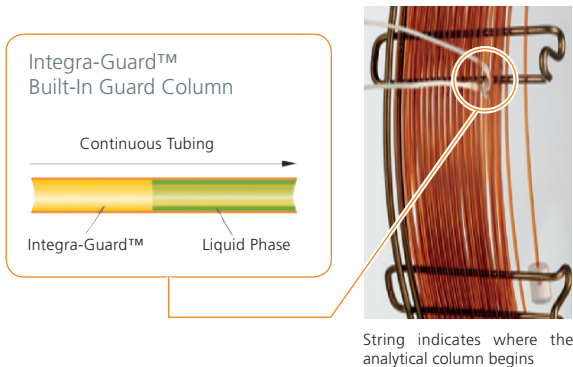
Description	P/N
SH-Particle Trap for 0.32 mmID PLOT Columns	227-36800-01
SH-Particle Trap for 0.53 mmID PLOT Columns	227-36800-02

Capillary Columns

Guard Columns

Integra-Guard™ Columns

- No leaks for a more robust method.
- No column connections for easier, faster maintenance.
- No peak distortions due to connector dead volume and thermal capacity.



Column	ID	df	Length	With 5 m Integra-Guard™	With 10 m Integra-Guard™
SH-Rxi™-5Sil MS	0.25 mm	0.25 µm	30 m	221-76161-30	221-76162-30
SH-Rtx™-1	0.25 mm	0.25 µm	30 m	221-75719-31	-
	0.53 mm	1.00 µm	30 m	221-75731-31	-
	0.53 mm	5.00 µm	30 m	221-75734-31	-
SH-Rtx™-5	0.25 mm	0.25 µm	30 m	221-76153-05	221-76153-30
	0.25 mm	1.00 µm	30 m	221-76179-30	-
	0.32 mm	0.25 µm	30 m	221-76177-30	-
	0.32 mm	0.25 µm	60 m	221-76177-60	-
	0.32 mm	1.00 µm	30 m	221-76180-30	-
	0.53 mm	5.00 µm	30 m	221-76154-35	-
SH-Rtx™-5MS	0.25 mm	0.10 µm	30 m	221-76189-30	-
	0.25 mm	0.25 µm	15 m	221-75861-15	-
	0.25 mm	0.25 µm	30 m	221-75861-05	221-75861-10
SH-Rtx™-1301	0.32 mm	0.25 µm	30 m	221-76190-30	-
SH-Rtx™-624	0.53 mm	3.00 µm	30 m	221-76164-35	-
	0.25 mm	1.40 µm	30 m	221-76183-30	-
	0.32 mm	1.80 µm	30 m	221-76157-35	-
SH-Rtx™-1701	0.53 mm	3.00 µm	30 m	221-76158-30	-
	0.25 mm	0.25 µm	30 m	221-76185-30	-

Capillary Columns

Accessories and Supplies

Connection Parts for Capillary Columns

Nuts and Ferrules



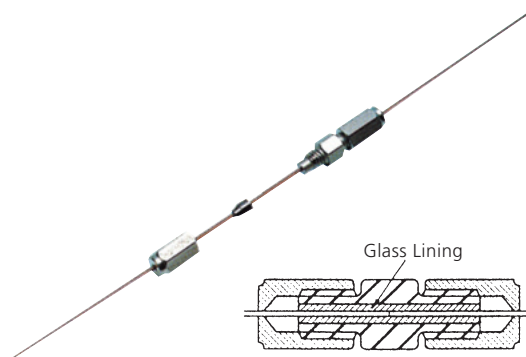
Diag. #	Description	Specification	P/N
1	Nut with slit (5 pcs)	Detector side of GC-2010/2010 Plus/2014/2025	221-32705-84
2	Nut without slit (10 pcs)	Injection unit side of GC-2010/2010 Plus/2014/2025	221-16325-81
	Nut without slit (5 pcs)	For GCMS	670-11009
	Graphite Ferrule 0.5 (10 pcs)	For 0.1 - 0.32 mmID columns	221-32126-05
	Graphite Ferrule 0.8 (10 pcs)	For 0.53 mmID columns	221-32126-08
3	Graphite Vespel® Ferrule (10 pcs)	For 0.1 - 0.25 mmID columns	670-15003-03
	Graphite Vespel® Ferrule (10 pcs)	For 0.32 mmID columns	670-15003-04
	Graphite Vespel® Ferrule (10 pcs)	For 0.53 mmID columns	670-15003-07
4	SilTite™ Metal Ferrule (10 pcs)	For 0.1 - 0.25 mmID columns	221-72563-04
	SilTite™ Metal Ferrule (10 pcs)	For 0.32 mmID columns	221-72563-05
	SilTite™ Metal Ferrule (10 pcs)	For 0.53 mmID columns	221-72563-08
	SilTite™ Metal Ferrule (10 pcs)	For 1/32" ID columns	221-75200-04
	SilTite™ Kit (10 pcs ferrules, 2 pcs nuts)	For 0.1 - 0.25 mmID columns	221-75200
	SilTite™ Kit (10 pcs ferrules, 2 pcs nuts)	For 0.32 mmID columns	221-75200-01
	SilTite™ Kit (10 pcs ferrules, 2 pcs nuts)	For 0.53 mmID columns	221-75200-02
	SilTite™ Kit (10 pcs ferrules, 2 pcs nuts)	For 1/32" ID columns	221-75200-03
	SilTite™ Nut (5 pcs)	-	221-75186

Glass-Lined Stainless Steel Joint

This is a compact joint to connect capillary columns. The glass lining minimizes the adsorption of sample components.

To ensure a positive connection, it is necessary to cut the ends of capillary columns properly to match each other.

Description	Applicable Capillary OD (mm)	P/N
Mini-union (with 5 pcs graphite ferrules)	0.4	670-11424-11
	0.5	670-11424-12
	0.8	670-11424-13
Graphite Ferrule (10 pcs)	0.4 - 0.5	670-11424-21
	0.8	670-11424-22



Capillary Columns

Accessories and Supplies

Connection Parts for Capillary Columns

Press-Tight™ Connectors

This connector is used to connect capillary columns easily by inserting the columns into the connector from both ends. When the columns are coated with polyimide resin, the connection will remain tight almost permanently and will be completely free of leakage.

Applicable to 0.35 mm to 0.8 mmOD capillary columns.



Description	P/N
Press-Tight™ Connector (5 pcs)	221-38102-91
Press-Tight™ Connector (5 pcs with 5 g polyimide resin)	221-38102-92

Main use of Press-Tight™ connectors

- Connection of broken capillary columns
The connectors are unobtrusive.
- On-column sample injection
Any capillary columns can be used in on-column injection mode by connecting a short wide-bore capillary columns to the inlet of the column.
- Retention gap method
An about 2 meters long capillary tube with no stationary phase, which is connected to the head of analytical capillary column, prevents peaks from being split.
- Column conditioning
A short capillary tube, which is connected to the outlet of the column, prevents air (oxygen) from diffusing into the column, thus preventing the deterioration of liquid phase which is kept at a high temperature.
- Stable storing of capillary columns
Deterioration by air and contamination can be prevented by connecting the both ends with a capillary tube.

Capillary Column Accessory Set

This set contains tools and supplies which are used to ensure high analytical productivity in capillary gas chromatography.

P/N	221-38652-91
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The set includes:

- Graphite ferrules
- Nuts
- Soap film flow meter
- Capillary tube cutter
- Spanner
- Tweezers
- Magnifying lens
- Ruler (stainless steel, 150mm)
- Accessory Box
- Pin vise
- Drill
- Press-Tight® connectors
- Polyimide resin
- Compact vise
- Adapter Socket (MM-C)
- Magnet grips



Capillary Tube Cutters

To cut a fused silica capillary tube, score the desired part with the above cutters, which have a ceramic blade, and snap at the position. The figure on the right shows an easy-to-use pen type. A spare blade is included.

Diag. #	Description	P/N
1	Capillary Tube Cutter (pen type with 1 pc spare blade)	221-50595-91
	Capillary Tube Ceramic Cutter (3 pcs)	221-75181





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