

Agilent GC Capillary Columns

New! HP-88 Column for cis-/trans-FAMEs Analysis

HP-88

- For cis-/trans-FAMEs Analysis
- Increased thermal stability while still maintaining the same elution order of critical cis/trans-FAMEs separations as previous-generation columns
- Very high column polarity and specific selectivity to separate molecules with extremely subtle vapor pressure differences
- Very high number of theoretical plates (300,000 +)
- Optimized deactivation for coating the stationary phase evenly and efficiently, minimizing production problems

In response to concerns about the health effects of “trans-fats” and links to coronary artery disease, the U.S. Department of Health and Human Services, through the U.S. Federal Drug Administration, has mandated that, by January 1, 2006, all manufacturers of processed food sold in the U.S. must label the “trans-fat” content of their food products.

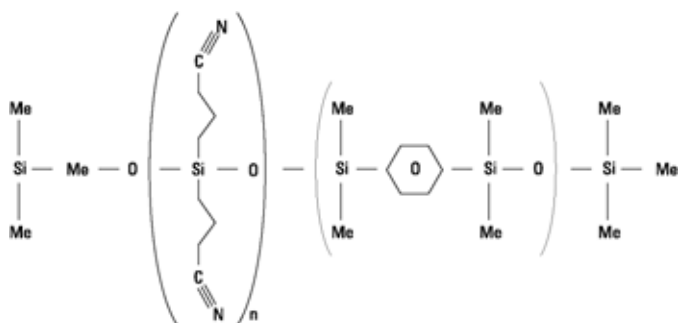
Natural edible oils have only a very small amount of trans-fat; most trans-fat in foods is the result of hydrogenation of unsaturated vegetable oils¹—undertaken to increase the vegetable oil’s desirable qualities for use in processed foods.

Leading manufacturers and food quality and safety testing laboratories are already gearing up for this new reporting requirement.

New HP-88 Column for Analyzing trans-fats Content

Agilent now offers the new HP-88, a column designed especially for the traditional method of determining trans-fat content by GC analysis of cis/trans FAMEs. The HP-88 is a highly efficient, high cyanopropyl-containing polysiloxane GC column. The high cyanopropyl moiety content (about 90%) is similar to the previous generation of columns used for this analysis², but unlike these columns, this is a 90% bis-(cyanopropyl) poly-siloxane with an arylene backbone included. This small amount of phenyl in the backbone of the polymer (Figure 1) increases thermal stability while still maintaining the same elution order of critical cis/trans-FAMEs separations as previous-generation columns (shown in Figure 2).

Figure 1. Structure of the bis (Cyanopropyl) Polysiloxanes Stationary Phase Column



1. Code of the Federal Register, Volume 21, Part 10.
2. AOCS Official Method Ce 1f-96, available online from www.aocs.org

Figure 2. Comparison of HP-88 to Manufacturer A and B Columns

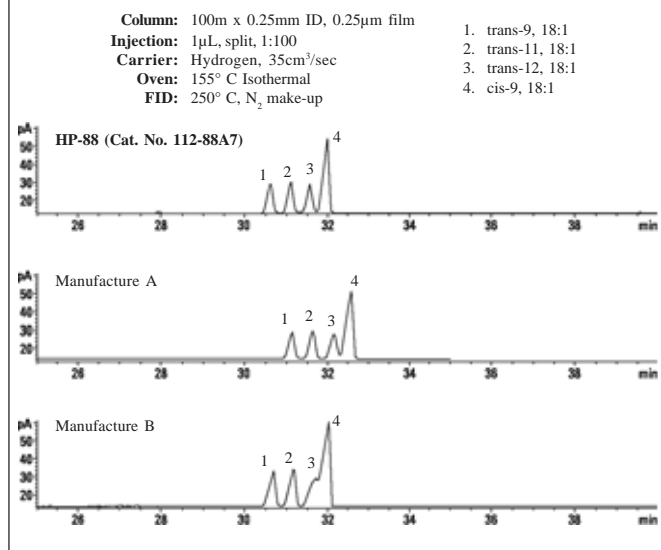
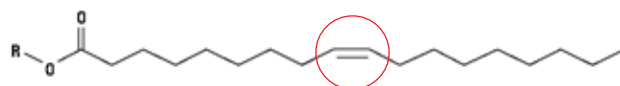


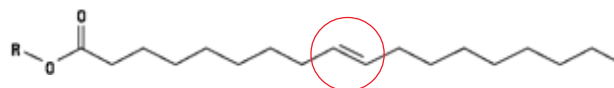
Figure 3. Boiling Point Differences of cis- and trans-FAMEs

cis-9, 18:1, Boiling Point 186



Differences imperceptible by normal means

trans-9, 18:1, Boiling Point 186

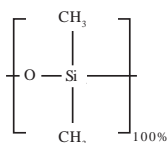


High polarity columns such as this one in the past have proven difficult to manufacture reliably, which makes them not always readily available from historical suppliers. In particular, cis/trans-FAMEs separations require not only very high column polarity and specific selectivity to separate molecules with extremely subtle vapor pressure differences (Figure 3), but also a very high number of theoretical plates (300,000+), which means that the column has to be coated with the stationary phase with high efficiency. With the HP-88 column, optimized deactivation ensures that the polymer coats evenly and efficiently, minimizing production problems that historically have caused long waiting times and unpredictable delivery.

You can now replace your previous-generation column with a readily available HP-88 column and enjoy the benefits of greater thermal stability—with no changes in your separation.

HP-88, Column for cis-/trans-FAMEs Analysis

ID(mm)	Length	Film	Iso/Prog	Cat. No.
0.25	100m	0.25µm	250/260	112-88A7



Structure of Dimethylpolysiloxane

HP-1

- 100% Dimethylpolysiloxane
- Excellent general purpose column
- Superior performance for low molecular weight alcohols

ID(mm)	Length	Film	Iso/Prog	Cat. No.	
0.20	12m	0.33µm	325/350	19091-60312	
	25m	0.11µm	325/350	19091Z-002	
	25m	0.33µm	325/350	19091Z-102	
	25m	0.50µm	325/350	19091Z-202	
	50m	0.11µm	325/350	19091Z-005	
	50m	0.33µm	325/350	19091Z-105	
	50m	0.50µm	325/350	19091Z-205	
0.25	15m	0.10µm	325/350	19091Z-331	
	15m	0.25µm	325/350	19091Z-431	
	15m	1.00µm	325/350	19091Z-231	
	30m	0.10µm	325/350	19091Z-333	
	30m	0.25µm	325/350	19091Z-433	
	30m	1.00µm	325/350	19091Z-233	
	60m	0.25µm	325/350	19091Z-436	
	60m	1.00µm	325/350	19091Z-236	
	100m	0.50µm	325/350	19091Z-530	
	0.32	15m	0.25µm	325/350	19091Z-411
15m		1.00µm	325/350	19091Z-211	
25m		0.17µm	325/350	19091Z-012	
25m		0.52µm	325/350	19091Z-112	
25m		1.05µm	325/350	19091Z-212	
30m		0.10µm	325/350	19091Z-313	
30m		0.25µm	325/350	19091Z-413	
30m		1.00µm	325/350	19091Z-213	
30m		3.00µm	260/280	19091Z-513	
30m		4.00µm	260/280	19091Z-613	
30m		5.00µm	260/280	19091Z-713	
50m		0.17µm	325/350	19091Z-015	
50m		0.52µm	325/350	19091Z-115	
50m		1.05µm	325/350	19091Z-215	
60m		0.25µm	325/350	19091Z-416	
60m		1.00µm	325/350	19091Z-216	
60m		5.00µm	260/280	19091Z-716	
0.53		5m	0.15µm	to 400	19095Z-220
		5m	0.88µm	300/320	19095Z-020
		5m	2.65µm	260/280	19095S-100
	7.5m	5.00µm	260/280	19095Z-627	
	10m	0.88µm	300/320	19095Z-021	
	10m	2.65µm	260/280	19095Z-121	
	15m	0.15µm	to 400	19095Z-221	
	15m	1.50µm	300/320	19095Z-321	
	15m	3.00µm	260/280	19095Z-421	
	15m	5.00µm	260/280	19095Z-621	
	30m	0.88µm	300/320	19095Z-023	
	30m	1.50µm	300/320	19095Z-323	
	30m	2.65µm	260/280	19095Z-123	
	30m	3.00µm	260/280	19095Z-423	
	30m	5.00µm	260/280	19095Z-623	
	60m	5.00µm	260/280	19095Z-626	

HP-1MS

- 100% Dimethylpolysiloxane
- Identical selectivity to HP-1
- Low bleed

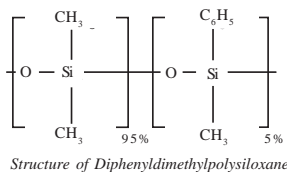
ID(mm)	Length	Film	Iso/Prog	Cat. No.
0.20	25m	0.33µm	325/350	19091S-602
0.25	15m	0.25µm	325/350	19091S-931
	30m	0.10µm	325/350	19091S-833
	30m	0.25µm	325/350	19091S-933
	30m	0.50µm	325/350	19091S-633
	30m	1.00µm	325/350	19091S-733
	60m	0.25µm	325/350	19091S-936
0.32	15m	0.25µm	325/350	19091S-911
	25m	0.52µm	325/350	19091S-612
	30m	0.10µm	325/350	19091S-813
	30m	0.25µm	325/350	19091S-913
	30m	1.00µm	325/350	19091S-713
	60m	0.25µm	325/350	19091S-916

HP-5

- (5% Phenyl) - methylpolysiloxane
- Equivalent to USP Phase G27

ID(mm)	Length	Film	Iso/Prog	Cat. No.	
0.20	12m	0.33µm	325/350	19091J-101	
	25m	0.11µm	325/350	19091J-002	
	25m	0.33µm	325/350	19091J-102	
	25m	0.50µm	325/350	19091J-202	
	50m	0.11µm	325/350	19091J-005	
	50m	0.33µm	325/350	19091J-105	
	50m	0.50µm	325/350	19091J-205	
	0.25	0.6m	1.00µm	325/350	19091J-236
		15m	0.25µm	325/350	19091J-431
		15m	1.00µm	325/350	19091J-231
30m		0.10µm	325/350	19091J-333	
30m		0.25µm	325/350	19091J-433	
30m		1.00µm	325/350	19091J-233	
60m		0.25µm	325/350	19091J-436	
0.32		15m	0.25µm	325/350	19091J-411
		15m	1.00µm	325/350	19091J-211
		25m	0.17µm	325/350	19091J-012
	25m	0.52µm	325/350	19091J-112	
	25m	1.05µm	325/350	19091J-212	
	30m	0.10µm	325/350	19091J-313	
	30m	0.25µm	325/350	19091J-413	
	30m	0.50µm	325/350	19091J-113	
	30m	1.00µm	325/350	19091J-213	
	50m	0.17µm	325/350	19091J-015	
0.53	50m	0.52µm	325/350	19091J-115	
	50m	1.05µm	325/350	19091J-215	
	60m	0.25µm	325/350	19091J-416	
	60m	1.00µm	325/350	19091J-216	
	10m	2.65µm	260/280	19095J-121	
	15m	1.50µm	300/320	19095J-321	
	15m	5.00µm	260/280	19095J-621	
	30m	0.88µm	300/320	19095J-023	
	30m	1.50µm	300/320	19095J-323	
	30m	2.65µm	260/280	19095J-123	
30m	5.0µm	260/280	19095J-623		

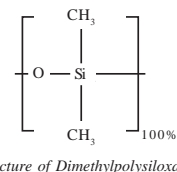
Agilent GC Capillary Columns



HP-5MS

- (5% Phenyl) - methylpolysiloxane
- Equivalent to USP Phase G27

ID(mm)	Length	Film	Iso/Prog	Cat. No.
0.20	12.5m	0.33µm	325/350	19091S-101
	25m	0.33µm	325/350	19091S-102
	50m	0.33µm	325/350	19091S-105
0.25	15m	0.10µm	325/350	19091S-331
	15m	0.25µm	325/350	19091S-431
	15m	1.00µm	325/350	19091S-231
	30m	0.10µm	325/350	19091S-333
	30m	0.25µm	325/350	19091S-433
	30m	0.50µm	325/350	19091S-133
	30m	1.00µm	325/350	19091S-233
	60m	0.10µm	325/350	19091S-336
	60m	0.25µm	325/350	19091S-436
	0.32	15m	0.10µm	325/350
15m		0.25µm	325/350	19091S-411
15m		1.00µm	325/350	19091S-211
25m		0.52µm	325/350	19091S-112
30m		0.10µm	325/350	19091S-313
30m		0.25µm	325/350	19091S-413
30m		0.50µm	325/350	19091S-113
30m		1.00µm	325/350	19091S-213
60m		0.10µm	325/350	19091S-316
60m		0.25µm	325/350	19091S-416



Ultra 1 and Ultra 2

- Ultra 1: 100% Dimethylpolysiloxane
- Ultra 2: (5% Phenyl) - methylpolysiloxane
- Intended for use with Sadtler Retention Index Library

Ultra 1

ID(mm)	Length	Film	Iso/Prog	Cat. No.
0.20	12.5m	0.33µm	325/350	19091A-101
	25m	0.11µm	325/350	19091A-002
	25m	0.33µm	325/350	19091A-102
	50m	0.11µm	325/350	19091A-005
	50m	0.33µm	325/350	19091A-105
0.32	25m	0.17µm	325/350	19091A-012
	25m	0.52µm	325/350	19091A-112
	50m	0.17µm	325/350	19091A-015
	50m	0.52µm	325/350	19091A-115

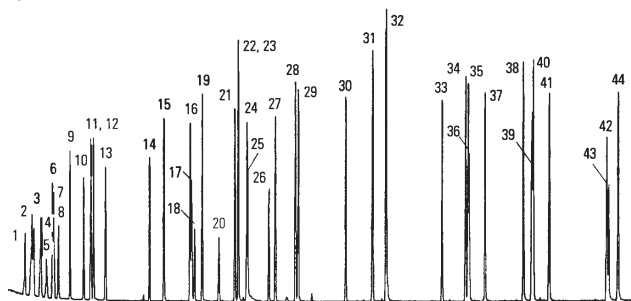
Ultra 2

0.20	12.5m	0.33µm	325/350	19091B-101
	25m	0.11µm	325/350	19091B-002
	25m	0.33µm	325/350	19091B-102
	50m	0.11µm	325/350	19091B-005
	50m	0.33µm	325/350	19091B-105
0.32	25m	0.17µm	325/350	19091B-012
	25m	0.52µm	325/350	19091B-112
	50m	0.17µm	325/350	19091B-015
	50m	0.52µm	325/350	19091B-115

Semivolatile Organics: EPA Method 625

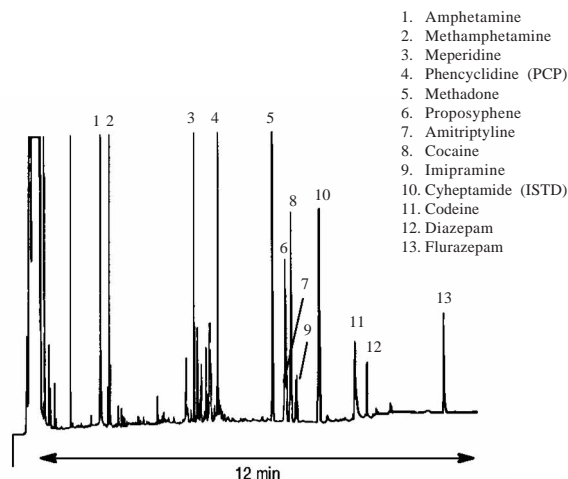
EPA Method 625

- | | | |
|----------------------------------|---------------------------------|----------------------------------|
| 1. Bis (2-chloroethyl) ether | 15. 2-Chloronaphthalene | 30. Di-n-butylphthalate |
| 2. Dichlorobenzene, 1,2- | 16. Acenaphthylene | 31. Fluoranthene |
| 3. Dichlorobenzene, 1,4- | 17. Dimethyl phthalate | 32. Pyrene |
| 4. Dichlorobenzene, 1,2- | 18. Dinitrotoluene, 2,6- | 33. Butylbenzyl phthalate |
| 5. Bis (2-chloroisopropyl) ether | 19. Acenaphthene | 34. Benz (a) anthracene |
| 6. N-nitroso di-n-propylamine | 20. Dinitrotoluene, 2,4- | 35. Chrysene |
| 7. Hexachloroethane | 21. Fluorene | 36. Dichlorobenzidine, 3,3' |
| 8. Nitrobenzene | 22. Diethyl phthalate | 37. Bis (2-ethylhexyl) phthalate |
| 9. Isophorone | 23. 4-Chlorophenyl phenyl ether | 38. Di-n-octyl phthalate |
| 10. Bis (2-chloroethoxy) methane | 24. N-Nitrosodiphenylamine | 39. Benzo (b) fluoranthene |
| 11. Trichlorobenzene, 1,2,4- | 25. Azobenzene | 40. Benzo (k) fluoranthene |
| 12. Naphthalene | 26. 4-Bromophenyl phenyl ether | 41. Benzo (a) fluoranthene |
| 13. Hexachlorobutadiene | 27. Hexachlorobenzene | 42. Indeno (1,2,3-c,d) pyrene |
| 14. Hexachlorocyclopentadiene | 28. Phenanthrene | 43. Dibenz (a,h) anthracene |
| | 29. Anthracene | 44. Benzo (g,h,i) perylene |



Column: HP-5MS, 19091S-433
Carrier: Helium, 33cm/sec (1 mL/min) constant flow,
Oven: 80° C (4 min), to 310° C (5 min) at 7° C/min
Injection: On-column, 1µL, inlet=83° C to 315° C (5 min) at 50° C/min.
Detector: 5971A MSD (280° C)

Urine Drug Screen on Ultra 2



Column: Ultra 2, 50m x 0.32mm ID, 0.52µm, 19091B-115
Carrier: Hydrogen 80cm³/sec
Injector: Splitless
Oven: 45° C for 1.5 min
 45-300° C at 6° C/min
Detector: FID

HP-35

- (35% Phenyl) - methylpolysiloxane
- Equivalent to USP Phase G42

ID(mm)	Length	Film	Iso/Prog	Cat. No.
0.25	15m	0.25µm	300/320	19091G-131
	30m	0.25µm	300/320	19091G-133
	60m	0.25µm	300/320	19091G-136
0.32	30m	0.15µm	300/320	19091G-013
	30m	0.25µm	300/320	19091G-113
	30m	0.50µm	300/320	19091G-213

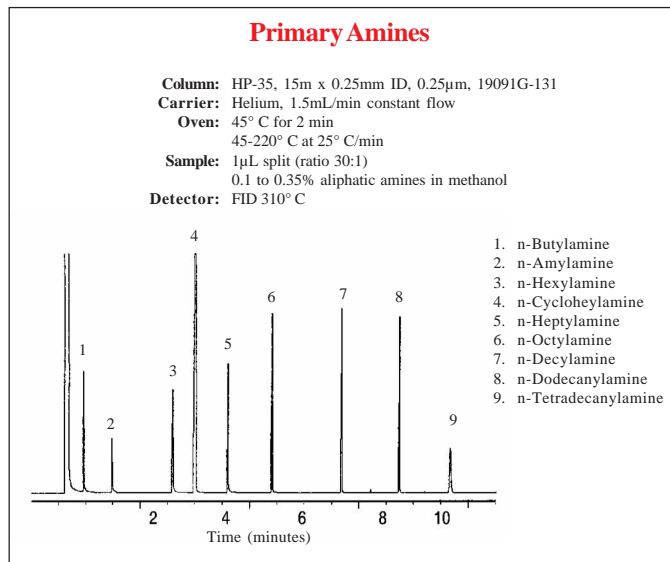


HP-FFAP

- Nitrorephthalic acid modified polyethylene glycol
- Designed for the analysis of volatile fatty acids and phenols
- Close equivalent to USP Phase G35

It is not recommend to use water or methanol to rinse this column.

ID(mm)	Length	Film	Iso/Prog	Cat. No.
0.2	25m	0.33µm	240/250	19091F-102
	50m	0.33µm	240/250	19091F-105
0.25	15m	0.25µm	240/250	19091F-431
	30m	0.25µm	240/250	19091F-433
0.32	15m	0.25µm	240/250	19091F-411
	25m	0.5µm	240/250	19091F-112
	30m	0.25µm	240/250	19091F-413
	50m	0.5µm	240/250	19091F-115
0.53	10m	1µm	230/240	19095F-121
	15m	1µm	230/240	19095F-120
	30m	1µm	230/240	19095F-123



HP-50+

- (50%)-Diphenyl-(50%)-Dimethylpolysiloxane
- Equivalent to USP Phase G3

ID(mm)	Length	Film	Iso/Prog	Cat. No.
0.20	12m	0.16µm	280/300	19091L-001
	12m	0.31µm	280/300	19091L-101
	25m	0.16µm	280/300	19091L-002
	25m	0.31µm	280/300	19091L-102
	50m	0.31µm	280/300	19091L-105
	0.25	15m	0.15µm	280/300
15m		0.25µm	280/300	19091L-431
15m		0.50µm	280/300	19091L-131
30m		0.15µm	280/300	19091L-333
30m		0.25µm	280/300	19091L-433
30m		0.50µm	280/300	19091L-133
60m		0.25µm	280/300	19091L-436
0.32		15m	0.25µm	280/300
	15m	0.50µm	280/300	19091L-111
	30m	0.15µm	280/300	19091L-313
	30m	0.25µm	280/300	19091L-413
	30m	0.50µm	280/300	19091L-113
	60m	0.25µm	280/300	19091L-416
0.53	15m	1.00µm	260/280	19095L-021
	30m	0.50µm	260/280	19095L-523
	30m	1.00µm	260/280	19095L-023

HP-INNOWax

- Close equivalent to USP Phase G16

ID(mm)	Length	Film	Iso/Prog	Cat. No.
0.2	25m	0.11µm	260/270	19091N-102
	25m	0.33µm	260/270	19091N-202
	50m	0.11µm	260/270	19091N-105
	50m	0.33µm	260/270	19091N-205
0.25	15m	0.25µm	260/270	19091N-131
	15m	0.5µm	260/270	19091N-231
	30m	0.15µm	260/270	19091N-033
	30m	0.25µm	260/270	19091N-133
	30m	0.5µm	260/270	19091N-233
	60m	0.15µm	260/270	19091N-036
	60m	0.25µm	260/270	19091N-136
	60m	0.5µm	260/270	19091N-236
0.32	15m	0.25µm	260/270	19091N-111
	15m	0.5µm	260/270	19091N-211
	30m	0.15µm	260/200	19091N-013
	30m	0.25µm	260/270	19091N-113
	30m	0.5µm	260/270	19091N-213
	60m	0.15µm	260/270	19091N-016
0.53	60m	0.25µm	260/270	19091N-116
	60m	0.5µm	260/270	19091N-216
	15m	1µm	240/250	19095N-121
	30m	1µm	240/250	19095N-123
	60m	1µm	240/250	19095N-126

Agilent GC Capillary Columns



HP-Chiral β

- Beta-cyclodextrin in (35% Phenyl) - methylpolysiloxane
- 20 β best choice for initial screening

Chiral-10 β

ID(mm)	Length	Film	Iso/Prog	Cat. No.
0.25	30m	0.25 μ m	240/250	19091G-B133
0.32	30m	0.25 μ m	240/250	19091G-B113

Chiral-20 β

ID(mm)	Length	Film	Iso/Prog	Cat. No.
0.25	30m	0.25 μ m	240/250	19091G-B233
0.32	30m	0.25 μ m	240/250	19091G-B213

HP-VOC

- Selectivity engineered for:
US EPA Methods 502.2, 524.2, and 8260

ID(mm)	Length	Film	Iso/Prog	Cat. No.
0.20	30m	1.12 μ m	-60 to 280	19091R-303
	60m	1.12 μ m	-60 to 280	19091R-306
0.32	60m	1.80 μ m	-60 to 280	19091R-316
	90m	1.00 μ m	-60 to 280	19091R-219
	90m	1.80 μ m	-60 to 280	19091R-319
0.53	90m	3.00 μ m	-60 to 280	19095R-429
	105m	3.00 μ m	-60 to 280	19095R-420

HP-Fast GC Residual Solvent

- Equivalent to USP Phase G43
- Thinner film reduces run time by 2.5 times and increases MDL by 2 times compared to standard film thickness used for this method

ID(mm)	Length	Film	Iso/Prog	Cat. No.
0.53	30m	1.0 μ m	280/300	19095V-420

PAS-5

- Designed for the analysis of organochlorine pesticides
- ECD tested to assure minimal pesticide breakdown and low ECD bleed

ID(mm)	Length	Film	Iso/Prog	Cat. No.
0.32	25m	0.52 μ m	325/350	19091S-010

HP-PLOT AL₂O₃ “KCI”

- Aluminum oxide deactivated with KCl
- Low retention of olefins relative to comparable paraffin
- Excellent for quantitation of dienes, esp. propadiene and butadiene from ethylene and propylene streams

ID(mm)	Length	Film	Max ° C	Cat. No.
0.25	30m	5 μ m	200	19091P-K33
0.32	50m	8 μ m	200	19091P-K15
0.53	30m	15 μ m	200	19095P-K23
	50m	15 μ m	200	19095P-K25

HP-PLOT AL₂O₃ “M”

- Aluminum oxide deactivated with proprietary deactivation
- Good for resolving acetylene from butane and propylene from isobutane

ID(mm)	Length	Film	Max ° C	Cat. No.
0.32	50m	8 μ m	200	19091P-M15
0.53	30m	15 μ m	200	19095P-M23
	50m	15 μ m	200	19095P-M25

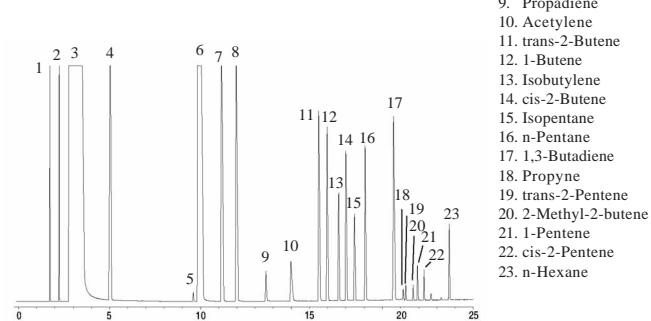
HP-PLOT AL₂O₃ “S”

- Aluminum oxide deactivated with sodium sulfate
- Best for resolving acetylene from butane and propylene from isobutane

ID(mm)	Length	Film	Max ° C	Cat. No.
0.25	15m	5 μ m	200	19091P-S31
	30m	5 μ m	200	19091P-S33
0.32	50m	8 μ m	200	19091P-S15
	15m	15 μ m	200	19095P-S21
0.53	30m	15 μ m	200	19095P-S23
	50m	15 μ m	200	19095P-S25

Ethylene

Column: HP-PLOT/Al₂O₃ “S”, 19095P-S25
 50m x 0.53mm ID, 15 μ m
 GC: 6890
 Sample: Ethylene 98.4%
 Carrier: Helium, 50cm/sec (35° C)
 7mL/min constant flow
 Oven: 35° C for 2 minutes
 35-100° C at 5° C
 Injection: Split 65:1, 250° C, 5 μ L
 Detector: FID 250° C



HP-PLOT MoleSieve

- A PLOT column for the analysis of permanent gases
- O₂, N₂, CO, and CH₄ resolve in less than 5 minutes
- Durable molecular sieve 5Å coating minimizes baseline spiking and damage to multiport valves
- Select a thick film for Ar/O₂ separation without cryogenic cooling
- Select a thin film for routine air monitoring applications

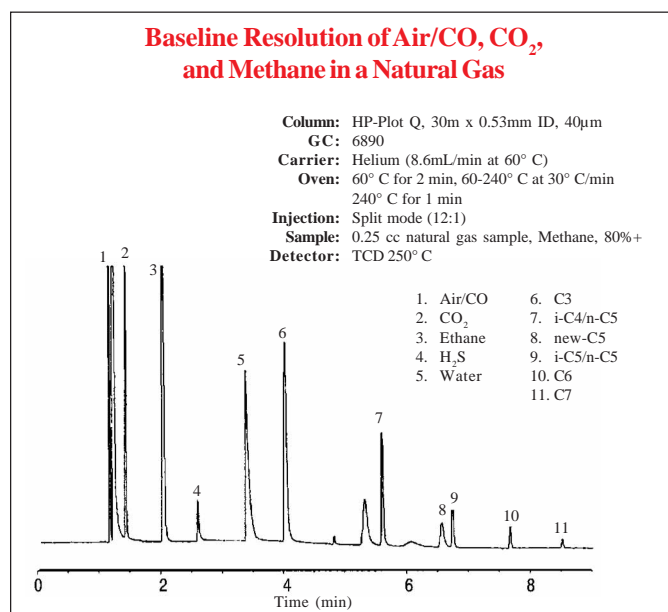
Note: Molecular sieve columns will adsorb water which, over time, results in changes in retention time. We use an advanced, proprietary deactivation process which allows for rapid regeneration. Fully saturated HP-PLOT MoleSieve columns regenerate in 7 hours or less at 200°C.

ID(mm)	Length	Film	Iso/Prog	Cat. No.
0.32	15m	12µm	200	19091P-MS3
	15m	25µm	200	19091P-MS7
	30m	12µm	200	19091P-MS4
	30m	25µm	200	19091P-MS8
0.53	15m	25µm	200	19095P-MS5
	15m	50µm	200	19095P-MS9
	30m	25µm	200	19095P-MS6
	30m	50µm	200	19095P-MS0

HP-Plot Q

- Excellent column for C1-C3 isomers and Alkanes to C12, CO₂, methane, air/CO, oxygenated compounds, sulfur compounds and solvents
- Separates ethane, ethylene, and ethyne (acetylene)
- Minimal conditioning time required – 1 hour

ID(mm)	Length	Film	Iso/Prog	Cat. No.
0.32	15m	20µm	270/290	19091P-QO3
	30m	20µm	270/290	19091P-QO4
0.53	15m	40µm	270/290	19095P-QO3
	30m	40µm	270/290	19095P-QO4



HP-PLOT U

- Bonded divinylbenzene/ethylene glycol dimethacrylate
- Excellent column for C1 to C7 hydrocarbons, CO₂, methane, air/CO, water, oxygenates, amines, solvents, alcohols, ketones, and aldehydes

ID(mm)	Length	Film	Max ° C	Cat. No.
0.32	15m	10µm	190	19091P-UO3
	30m	10µm	190	19091P-UO4
0.53	15m	20µm	190	19095P-UO3
	30m	20µm	190	19095P-UO4

HP-101

- 100% Polydimethylsiloxane
- Not bonded or crosslinked
- Solvent rinsing is NOT recommended

ID(mm)	Length	Film	Iso/Prog	Cat. No.
0.20	12m	0.25µm	0 to 280	19091-60010
	25m	0.2µm	0 to 280	19091Y-102
	50m	0.2µm	0 to 280	19091Y-105
0.32	25m	0.3µm	0 to 280	19091Y-012
	50m	0.3µm	0 to 280	19091Y-015

HP-17

- 50% Phenyl and 50% Methyl siloxane
- Not bonded or crosslinked
- Solvent rinsing is NOT recommended

ID(mm)	Length	Film	Iso/Prog	Cat. No.
0.53	10m	2.0µm	260/280	19095L-121

HP-20M

- Polyethylene glycol, MW 20,000
- Equivalent to USP Phase G16
- Not bonded or crosslinked
- Solvent rinsing is NOT recommended

ID(mm)	Length	Film	Iso/Prog	Cat. No.
0.2	25m	0.1µm	60 to 220	19091W-102
	50m	0.1µm	60 to 220	19091W-105
0.32	25m	0.3µm	60 to 220	19091W-012
	50m	0.3µm	60 to 220	19091W-015
0.53	10m	1.33µm	60 to 220	19095W-121
	30m	1.33µm	60 to 220	19095W-123